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1. Purpose

This analysis is prepared by the Mined Geologic Disposal System (MGDS) Waste Package Development (WPD) department with the objective of providing a comprehensive, conservative estimate of the consequences of the criticality which could possibly occur as the result of commercial spent nuclear fuel emplaced in the underground repository at Yucca Mountain. The consequences of criticality are measured principally in terms of the resulting changes in radionuclide inventory as a function of the power level and duration of the criticality. The purpose of this analysis is to extend the prior estimates of increased radionuclide inventory (Refs. 5.52 and 5.54), for both internal and external criticality. This analysis, and similar estimates and refinements to be completed before the end of fiscal year 1997, will be provided as input to Total System Performance Assessment - Viability Assessment (TSPA-VA) to demonstrate compliance with the repository performance objectives.

2. Quality Assurance

The Quality Assurance (QA) program applies to this analysis. The work reported in this document is part of the preliminary probabilistic evaluation of the waste package (WP). This activity can affect the proper functioning of the MGDS waste package; the waste package has been identified as an MGDS Q-List item important to safety and waste isolation (Ref. 5.1, pp. 5, 16). The waste package is on the Q-List by direct inclusion by the Department of Energy (DOE) as are the natural barriers of the Topopah Spring Welded (TSw) Hydrogeologic Unit, the Calico Hills Nonwelded (CHn) Hydrogeologic Unit, and the Saturated Zone (SZ) barrier; a QAP-2-3 evaluation has yet to be conducted. The work performed for this analysis is covered by a WPD QAP-2-0 work control Activity Evaluation entitled *Perform Probabilistic Waste Package Design Analyses* (Ref. 5.2). This QAP-2-0 evaluation determined that such activities are subject to *Quality Assurance Requirements and Description* (QARD) (Ref. 5.3) requirements. Applicable procedural controls are listed in the evaluation.

All design inputs which are identified in this document are for preliminary design and shall be treated as unqualified data; these design inputs will require subsequent qualification (or superseding inputs) as the waste package design proceeds. This document will not directly support any construction, fabrication or procurement activity and therefore is not required to be procedurally controlled as TBV (to be verified). In addition, the inputs associated with this analysis are not required to be procedurally controlled as TBV. However, use of any data from this analysis for input into documents supporting procurement, fabrication, or construction is required to be controlled as TBV in accordance with the appropriate procedures.

3. Method

The following methods are used for evaluating the consequences of WP internal criticality:

- The waste package temperature is determined as that at which the evaporation from the water surface (assumed to be just covering the top most assemblies; see Assumption 4.3.16) will just balance the infiltration which is assumed to be the maximum credible, 10

mm/yr (Ref. 5.18, Sect. 7).

- The drift wall temperature is determined by repository scale and drift scale hydrothermal calculations summarized in TSPA-95 (Ref. 5.18).
- The power level of the internal criticality is that necessary to support the rate of heat dissipation to the environment: (1) by radiation to the drift wall and conduction through the rock invert which is driven by the temperature gradient between the waste package and the drift wall; (2) by heating the infiltrating water from the general repository temperature to the waste package temperature; and (3) by evaporation of the water (heat of vaporization) from the surface of the pond within the waste package.
- The duration of the internal criticality is limited by the duration of the peak inflow (to the waste package) of water moderator necessary to maintain the power level.
- The sustainability of this criticality with respect to the balance between fissile species, which are generally consumed by the criticality, and neutron absorbers, which are generally produced by the criticality is verified by using SAS2H (Ref. 5.39) to calculate the species amounts at several times during the criticality, and using these amounts as input to MCNP (Ref. 5.40) to calculate the k_{eff} at each of the times.
- The radionuclide inventory found by using SAS2H is decayed after criticality shutdown for several times up to 999,999 years, using ORIGEN-S (Ref. 5.39).

The following methods are used for evaluating the consequences of criticality external to the WP:

- The average temperature of the critical mass is estimated as the boiling temperature of water at 50 atm. The reason for this estimate is that the most probable place where a reducing zone may occur is in organic material at the base of the tuff (Ref. 5.52), which is typically 500 meters below the water table (Ref. 5.25, Figure 1-6), giving rise to a hydrostatic pressure of 50 atm.
- The maximum power is determined as that required to maintain the average temperature of the critical spherical configuration against heat conduction out from the sphere.
- The maximum <u>sustainable</u> power is determined by assuming that all fissile material transported to the critical mass by the fissile material bearing water from one or more degraded waste packages in the repository is burned (Assumption 4.3.8).
- The duration of the external criticality is determined by the duration of flow of fissile material bearing water from the repository.
- The sustainability of the criticality and the increase in radionuclide inventory are determined by the same methods as were used for the internal criticality, using the computer codes, MCNP (Ref. 5.40), SAS2H, and ORIGEN-S (both Ref. 5.39).

Further detail on the specific analytical methods employed for each step is available in Section 7 of this analysis.

4. Design Inputs

The design inputs identified in this document are for preliminary design and shall be treated as unqualified data; these design input will require subsequent qualification (or superseding inputs) as the waste package design proceeds. This document will not directly support any construction, fabrication, or procurement activity and therefore is not required to be procedurally controlled as TBV.

4.1 Design Parameters

4.1.1 Spent Fuel Assembly Parameters

The fuel assembly upon which this calculation is based is the B&W 15 x 15 fuel assembly. The mechanical parameters for this assembly type are shown in Table 4.1-1. Note that inches are converted to centimeters exactly (2.54 cm/in.); this is not an indication of tolerance (accuracy), but is done for consistency between calculations using English or metric units. The theoretical density of UO_2 is 10.96 g/cm^3 (Ref. 5.39, Table M8.2.1). Non-fuel material compositions of Alloy 825, water, Zircaloy-4, A 516 carbon steel, and 316B6A stainless steel-boron alloy are taken from a QAP-3-9 analysis on material compositions (Ref. 5.5) and used in Attachment VII.

Table 4.1-1. Mechanical Parameters of B&W 15x15 Fuel Assembly

Parameter	Value	Units	Metric	Units	Radius (cm)	Ref.
Fuel Rods	208	/assbly	208	/assbly		5.41
Fuel Rods on a Lattice Side	15	/side	15	/side		5.41
Guide Tubes	16	/assbly	16	/assbly		5.41
Instrumentation Tubes	1	/assbly	1	/assbly		5.41
Total Guide + Instrument Tubes	17	/assbly	17	/assbly		-
Clad/Tube Material	ZIRC-4		ZIRC-4			5.41
Fuel Pellet OD	0.3686	inches	0.936244	cm	0.468122	5.41
Fuel Stack Height	141.8	inches	360.172	cm		5.41
Mass of U	1023	lb	464	kg		5.7
Mass of UO_2	1160.64	lb	526.46	kg		5.41
Percent of Theoretical Density	95	%	95	%		5.41
Fuel Clad OD	0.430	inches	1.0922	cm	0.5461	5.41
Clad Thickness	0.0265	inches	0.06731	cm		5.41
Fuel Clad ID*	0.377	inches	0.95758	cm	0.47879	-
Fuel Rod Pitch	0.568	inches	1.44272	cm		5.41
Guide Tube OD	0.530	inches	1.3462	cm	0.6731	5.41
Guide Tube Thickness	0.016	inches	0.04064	cm		5.41
Guide Tube ID*	0.498	inches	1.26492	cm	0.63246	-
Instrumentation Tube OD	0.493	inches	1.25222	cm	0.62611	5.41
Fuel Assembly Envelope	8.536	inches	21.68144	cm		5.41

* The inner diameters (IDs) above are calculated by subtracting 2 X thickness from the outer diameter (OD).

4.1.2 Intact Waste Package Geometry Parameters

The intact waste package geometry parameters used in this analysis are taken from Reference 5.54. The dimensions are listed in Table 4.1-2 below. Figure 4.1-1 depicts the 21 Pressurized Water Reactor (PWR) Advanced Uncanistered Fuel (AUCF) WP, its internals, and the material specifications (Ref. 5.34).

Table 4.1-2. Intact WP Dimensions

Component	Dimension (cm)
Outer barrier length (skirt edge to skirt edge)	533.5
Outer barrier skirt length (both ends)	22.5
Outer barrier inner radii	73.1
Outer barrier outer radii	83.1
Inner barrier length (overall)	466.5
Inner barrier inner radii	71.095
Inner barrier outer radii	73.095
Fuel cell tube opening	22.9
Fuel cell tube thickness	0.5
Fuel cell tube height	457.5
Criticality control panel/plate thickness	0.7
Criticality control panel/plate width	113.4
Criticality control long panel/plate (16 total) length	122.1
Criticality control short panel/plate (16 total) length	73.0
Criticality control panel/plate cutout length (4 per long panel/2 per short panel)	56.7
Criticality control panel/plate cutout width	0.7
Side and corner guide thickness	1.0

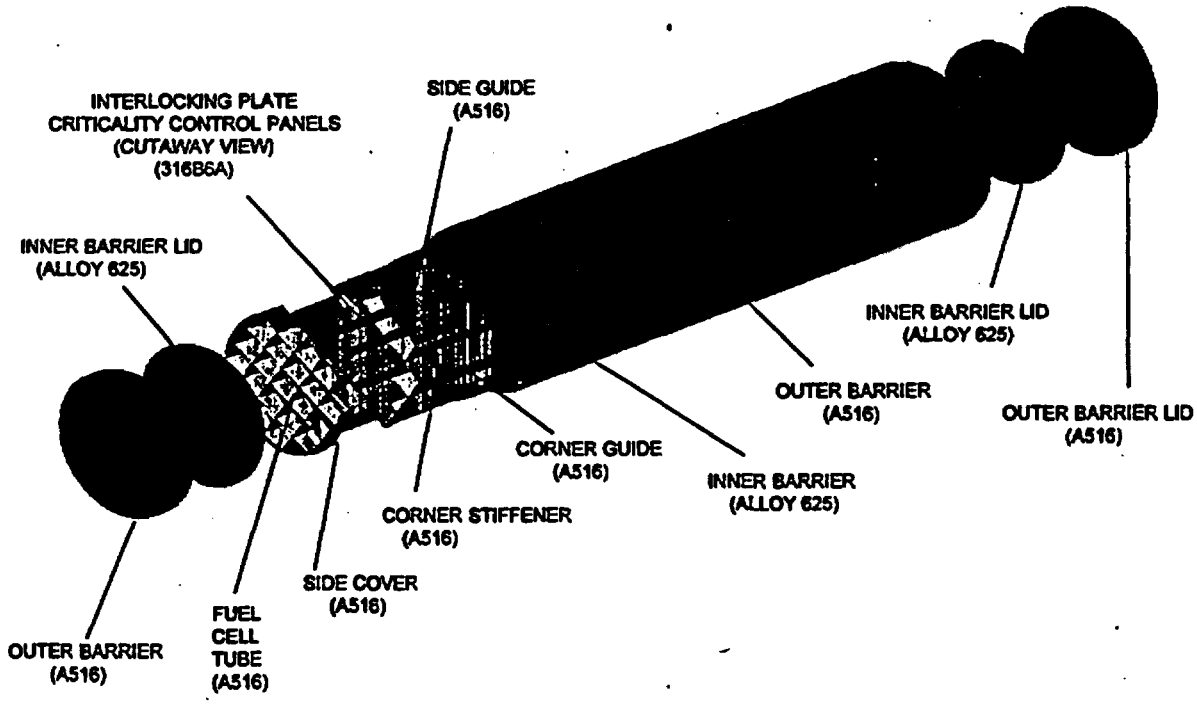

Figure 4.1-1. Advanced Uncanistered Fuel Waste Package with Internals Shown

4.1.3 Isotope Atomic Weights

The atomic weights of isotopes are listed in Table 4.1-3 below (Ref. 5.43 unless otherwise noted) and are used in the number density calculations discussed in Sections 7.2.1 and 7.4.4.

Table 4.1-3. Atomic Weights in g/mole (Ref. 5.43)

Isotope	MCNP ID	Atomic Weight
O-16	8016.50C	15.994915
nat. Mo	42000.50C	95.94
Mo-95	42095.50C	94.905839
Tc-99	43099.50C	98.90627501*
Ru-101	44101.50C	100.905576
Rh-103	45103.50C	102.905511
Ag-109	47109.50C	108.904756
nat. Cd	48000.50C	112.4
Xe-131	54131.50C	130.905069**
Xe-135	54135.50C	134.9063***
Cs-133	55133.50C	132.905355
Cs-135	55135.50C	134.90577
Nd-143	60143.50C	142.909779
Nd-145	60145.50C	144.912538
Sm-147	62147.50C	146.914867
Sm-149	62149.50C	148.91718
Sm-150	62150.50C	149.917276
Sm-151	62151.50C	150.919919
Sm-152	62152.50C	151.919756
Eu-151	63151.55C	150.919838
Eu-153	63153.55C	152.921242
Eu-154	63154.50C	153.923053
Gd-155	64155.50C	154.922664
Gd-157	64157.50C	156.924025
U-233	92233.50C	233.039522
U-234	92234.50C	234.040904
U-235	92235.50C	235.043915
U-236	92236.50C	236.045637
U-238	92238.50C	238.05077
Np-237	93237.55C	237.048056
Pu-238	94238.50C	238.049511
Pu-239	94239.55C	239.052146
Pu-240	94240.50C	240.053882
Pu-241	94241.50C	241.056737
Pu-242	94242.50C	242.058725
Pu-243	94243.35C	243.061972
Am-241	95241.50C	241.056714
Am-242m	95242.50C	242.059502
Am-243	95243.50C	243.061367
Cm-243	96243.35C	243.06137
Cm-245	96245.35C	245.065371

* From Reference 5.5
** From Reference 5.33
***Linearly interpolated from Atomic Weights of Xe-134 and Xe-136 in Reference 5.33.

Avogadro's Number [N_A] = 0.602252 (g-mol)$^{-1}\times10^{24}$ (Ref. 5.43, p. 933).

4.1.4 Far-Field Tuff Composition and Characteristics

The composition and characteristics of the far field tuff are shown in Table 4.1-1 (Ref. 5.48, p. 16 unless noted otherwise).

Table 4.1-4. Calico Hills/Prow Pass Nonwelded-Zeolitic Tuff

Parameter	Value
Mean Density 198 samples	1.746 g/cm^3 *
Mean Porosity 127 samples (Max = 0.470**)	0.306*
Estimated Average Thermal Conductivity	1.38 W/m·K***
SiO_2 Wt%	69.1
TiO_2 Wt%	0.11
Al_2O_3 Wt%	13.4
Fe_2O_3 Wt%	1.13
MnO Wt%	0.05
MgO Wt%	0.94
CaO Wt%	3.22
Na_2O Wt%	1.23
K_2O Wt%	2.64
P_2O_5 Wt%	0.01
LOI (volatile) Wt%	8.90
Total Wt%	100.7

* Average values obtained form the data in Reference 5.47, p. 7-11.

** Previous evaluation of the porosity data for this tuff indicated that the 47% porosity data point was a statistical outlier (Ref. 5.47, p. 7-10) which was probably anomalous, so that the maximum of the sample should have been the maximum of the remaining 126 elements, 40% porosity.

*** Estimate is from Reference 5.31, p. 6 and is based on the average of two values from the Calico Hills tuff unit.

In addition to the above major-element concentrations, 25 trace-element concentrations were identified by parts per million (ppm) by weight (Ref. 5.48, Appendix C). Some of these trace elements have high absorption cross sections, for example, Eu, Hf, Sm, etc. Previous evaluation (Ref. 5.55, p. 5) indicated that none of these elements is contained in sufficient concentrations in the tuff, with an adequate confidence in the nominal value, to be included.

4.1.5 Properties of Saturated Liquid Water

Table 4.1-5. Properties of Saturated Water (Ref. 5.20, p. 656)

Temperature (°F)	Pressure (psia)	Specific Volume (ft^3/lb)
500	680.0	0.02043
510	743.5	0.02067

4.2 Criteria

This design analysis provides preliminary input for criticality analyses which evaluate whether waste package designs meet the repository criticality control design criteria from requirement documents. The *Mined Geological Disposal System Requirements Document* (Ref. 5.11) and the *Engineered Barrier Design Requirements Document* (EBDRD, Ref. 5.12) have criteria which pertain to criticality analyses. Reference 5.12 is the lower level document and contains all of the criteria listed in Reference 5.11. These requirements also apply to accumulations of fissile material in the far-field because far-field consequences can have an impact on the WP design. The WP is the source for material in the far-field and mitigation of significant consequences in the far-field may require some modification of the WP (Engeneered Barrier) design. The criteria cited in Reference 5.12 that have bearing on this analysis include the following:

4.2.1 From the EBDRD (Ref. 5.12);
"3.2.2.6 CRITICALITY PROTECTION

A. The Engineered Barrier Segment shall be designed to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. Each system shall be designed for criticality safety under normal and accident conditions. The calculated effective multiplication factor must be sufficiently below unity to show at least a five percent margin, after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the methods of calculation.
[MGDS-RD 3.2.2.6.A][10CFR60.131(b)(7)]

B. To mitigate the potential for nuclear criticality, the Engineering Barrier Segment shall be designed and constructed to comply with the nuclear criticality requirements specified by DOE order 6430.1A, 1300-4.
[MGDS-RD 3.2.2.6.B] [DOE Order 6430.1A, 1300-4]"

4.2.2 From the EBDRD (Ref. 5.12);
"3.7.1.3 INTERNAL STRUCTURE REQUIREMENTS

A. The internal structure shall provide separation of the waste forms such that

nuclear criticality shall not be possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. The calculated effective multiplication factor (k_{eff}) must be sufficiently below unity to show at least a five percent margin after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the methods of calculation (TBD).
[MGDS-RD 3.2.2.6.A] [10CFR60.131(b)(7)]"

The present DOE Office of Civilian Radioactive Waste Management (OCWRM) and Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O) position is that the requirement cited in the above criteria based on 10CFR60.131(b)7, being primarily of a deterministic nature, is not appropriate for postclosure disposal criticality. Instead, the probability or risk based approach has been recommended to the U.S. Nuclear Regulatory Commission (NRC) in the following two letters:

4.2.3 From Ronald A. Milner, Director, Office of Program Management and Integration, OCRWM, to the NRC, Docketing and Service Branch, dated June 16, 1995, which included the specific recommendation to apply the above requirements only to preclosure, and create the following new requirement for postclosure criticality:

"Postclosure criticality safety. The engineered barrier system shall be designed such that the probability and consequences of nuclear criticality provide reasonable assurance that the performance objective of §60.112 is met." (Ref. 5.4)

4.2.4 From Stephan J. Brocoum, Assistant Manager for Suitability and Licensing, OCRWM, to Michael J. Bell, Chief, Engineering and Geosciences Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, NRC, which referred to the above referenced letter, and specifically commented as follows:

"The DOE, therefore, requests that consideration be given to the DOE's proposed revision to 10CFR60.131(b)7 that would allow disposal criticality to be evaluated with risk-based methods." (Ref. 5.6)

The analyses in this document are intended to provide values of, and justification for, consequence parameters (specifically increased radionuclide inventory) plus probability information which will be used as part of TSPA-License Application (LA) to demonstrate compliance with the performance objective of §60.112 (or, as appropriate, other applicable performance objectives in effect or proposed by the NRC at the time the TSPA-LA analysis is performed). The "TBD" items identified in the above criteria will not be carried to the conclusions of this analysis based on the rationale that the conclusions are for preliminary design, and will not be used as input in design documents supporting construction, fabrication, or procurement.

4.3 Assumptions

All assumptions identified in this section will require verification (or superseding assumptions) as the waste package design proceeds and should be treated as unconfirmed items for preliminary design. For this preliminary design, that will not be used to support procurement, fabrication, or construction, the assumptions are clearly identified and traceable to a source, but are not procedurally controlled as TBV.

4.3.1 Principal Isotope (PI) burnup credit is assumed to be an acceptable method to account for reduced reactivity of SNF in criticality evaluations. The basis for this assumption is CDA Key 009 (Ref. 5.44). This assumption is used throughout Section 7.

4.3.2 The reference PWR fuel physical assembly selected for conceptual development is the B&W 15 x 15 fuel type, which has been established as one of the more reactive PWR fuel designs under intact fuel assembly and fixed basket geometry conditions (Ref. 5.16, p. II.A.3-35). This assumption is used throughout Section 7.

4.3.3 The design basis spent nuclear fuel (SNF) characteristics within the physical assembly are 3.0% U-235 enrichment, 20 GWd/MTU burnup, as established by the M&O (Ref. 5.10, Section 5). This SNF composition is assumed to be more stressing with respect to criticality than 96-97% of the SNF inventory. This SNF composition is representative only. It does not necessarily match any composition for a B&W assembly type specified in the previous assumption. This assumption is used throughout Section 7.

4.3.4 For SNF, the list of "Principal Isotopes" previously established (Ref. 5.46, p. 4-4) for long-term criticality control was used. The 29 principal isotopes are shown in Table 4.3-1. This assumption is used in Sections 7.3.2 and 7.4.

Table 4.3-1. Principal Long-Term Burnup Credit Isotopes

-	Mo-95	Tc-99	Ru-101	Rh-103
Ag-109	Nd-143	Nd-145	Sm-147	Sm-149
Sm-150	Sm-151	Sm-152	Eu-151	Eu-153
Gd-155	U-233	U-234	U-235	U-236
U-238	Np-237	Pu-238	Pu-239	Pu-240
Pu-241	Pu-242	Am-241	Am-242m	Am-243

4.3.5 It is assumed that the cooling of the external criticality in the saturated zone will be primarily by conduction. The basis for this assumption is that the maximum cooling possible from the next largest physical mechanism, advective flow through the criticality zone, is much smaller than the rock conduction, as is seen from the following calculation:

The maximum advective heat transfer is approximated by the mean advective flow

(Darcy velocity) in the saturated zone (2 meters/yr, Ref. 5.18, p. 7-21) multiplied by the cross-section area of the critical zone (1.4 m radius, which is 6.16 m^2 cross-section), multiplied by the heat capacity of water (aproximated by 4200 Joules/kg·K, Ref 5.14, which is also 4.2×10^6 Joules/m^3·K), multiplied by maximum temperature change between the critical mass and the far-field heat sink, and divided by the number of seconds in a year (31.5×10^6). The maximum change in temperature between the critical sphere and the far field is given in Attachment I, and in Section 7.3.2, as $P/(4\pi kR)$, where k is the thermal conductivity (1.38 W/m·K, Ref. 5.31, p. 6), P is the power generated by the critical sphere, and R is the radius, 1.4 m, given above. The resulting conservative estimate of advective heat transfer is 0.07P, which means that it can be no more than 7% of the conductive heat transfer. This assumption is used in Section 7.3.2.

4.3.6 It is assumed that the maximum power from the worst case external criticality will occur in the saturated zone, at the base of the tuff and will be at a pressure of 50 atmospheres. The basis for this assumption is that the reducing material from original organic deposits could not have been emplaced while the tuff was being deposited, and can, therefore, be found only at the base of the tuff, which is approximately 500 meters below the water table (Ref. 5.25, Figure 1-6), at which the hydrostatic pressure is approximately 50 atmospheres. A rapid onset of criticality could, of course, result in a temporary overpressure, but that possibility is not considered according to the steady state assumption (Assumption 4.3.7, below). This assumption is used in Section 7.3.3.

4.3.7 It is assumed that the criticality is in a steady state so that the time independent heat conduction equation can be used to establish the relation between criticality power and temperature. The basis for this assumption is that over the thousands of years (conservative estimate of reactor duration) the short period fluctuations will average out. This assumption is used in Section 7.3.2 and in Attachment I.

4.3.8 First, it is assumed that the sustainable criticality power for the external criticality is limited by the fuel replenishment rate from the infiltration of fissile material bearing water from the repository. (This is lower than the maximum power identified in Assumption 4.3.6, above and described in Section 7.3.3.) Secondly, it is further assumed that the incoming fissile material can only provide that portion of the fissile material which is above 1.37%, as is explained in Section 7.3.4 of this analysis and Section 7.7 of Reference 5.52, where the argument was initially presented. The basis for the first part of this assumption is that the criticality will begin when k_{eff} just reaches 1, so that any amount of fissile material consumed must be replaced by fresh fissile material in order to sustain the criticality. The basis for the second part of this assumption is given in Section 7.3.4 of this analysis and Section 7.7 of Reference 5.52. This assumption is used in Section 7.3.4.

4.3.9 The SAS2H module in SCALE4.3 (Ref. 5.39) is assumed to be applicable to analysis of accumulations of fissile material in tuff. The basis of this assumption is that the 44 group cross section library used in these calculations likely provides enough detail to cover the more thermal spectrum (compared to PWRs) of the external accumulations adequately.

This assumption will require future verification. This assumption was used in a previous analysis (Ref. 5.53) to generate the data used in Section 7.2.2, and is also used in Section 6.1.

4.3.10 The SAS2H and ORIGEN-S modules in SCALE4.3 are assumed to provide reasonable predictions of isotopic compositions for a low power criticality event over several thousand years. The basis of this assumption is the demonstration in Section 7.4.2 that no nonconservative trends exist by comparing the results of 100 year and 1000 year time steps. This assumptions will require future verification. This assumption is used in Sections 6.1, 7.2.1, 7.2.2, 7.4.3, and 7.4.4.

4.3.11 For external criticality, water infiltration has provided the mechanism for waste package and SNF degradation, as well as the mechanism for actinide transport to the far field environment. This assumption is used throughout Sections 7.3 and 7.4.

4.3.12 The material compositions for tuff in the far field is assumed to be represented by the major constituents of Calico Hills/Prow Pass nonwelded-zeolitic tuff taken from References 5.47 and 5.48. Portions of these formations fall within the saturated zone. This assumption is used throughout Sections 7.3 and 7.4.

4.3.13 The accumulation of UO_2 in saturated tuff is assumed to be represented by a spherical homogeneous mixture of UO_2/tuff/water. Fracture distributions and densities in the tuff, size and density of potential uranium deposits, and presence and composition of reducing zones within the tuff are unknown. This assumption is used throughout Sections 7.3 and 7.4.

4.3.14 The power level of the internal criticality is that necessary to support the rate of heat dissipation to the environment: (1) from the lower half of the waste package, by conduction through the rock invert which is driven by the temperature gradient between the waste package and the drift wall; (2) from the upper half of the waste package, which is assumed to be uncovered, by radiation from the package surface to the drift wall; (3) by evaporation of the water from the surface of the pond within the waste package. This assumption was used in Reference 5.54, which is the basis for information provided in Sections 7.1 and 7.2.

4.3.15 In determining the temperature gradient for Assumption 4.3.14, the drift wall temperature is determined by repository scale and drift scale hydrothermal calculations summarized in TSPA-95 (Ref. 5.18). This assumption is used throughout Sections 7.1 and 7.2.

4.3.16 In determining the temperature gradient for Assumption 4.3.14, the waste package temperature is assumed to be just large enough that the evaporation from the water surface (assumed to just cover the top most assemblies) will just balance the water inflow to the package which is assumed to be at the maximum high infiltration rate 10 mm/yr (Ref. 5.18, TSPA-95). The basis for this assumption is that the internal criticality is moderator limited, so that it is necessary to maintain the water level in order to maintain

the criticality. It turns out that even for this maximum possible infiltration rate, this waste package temperature is significantly less than the boiling temperature. This assumption is stated in Section 3.0, and is used throughout Sections 7.1, 7.2, and 7.3.4.

4.3.17 The duration of the internal criticality is limited by the peak inflow of water necessary to maintain the power level estimated according to Assumption 4.3.14. The basis for this assumption is the same as the basis for Assumption 4.3.16 to which it is closely related. This assumption is used throughout Sections 7.1 and 7.2.

4.3.18 The fresh fuel bias and uncertainty for MCNP is approximately 0.015 (Ref. 5.45, p. 6-221). The preliminary SNF bias and uncertainty is approximately 0.06 (Ref. 5.45, p. 6-221). These uncertainties were used in a prior unverified analysis. This assumption is used throughout Section 7.

4.3.19 The deterministic based requirements in the EBDRD (Ref. 5.12) are assumed not to apply to postclosure disposal criticality. The basis is the ongoing interaction between DOE and NRC to change the requirements to allow a probabilistic approach to postclosure disposal criticality as indicated in Section 4.2. This assumption is used throughout Section 7.

4.3.20 It is assumed that the mobilization (removal from the waste package) of the fissile material is much slower than the dissolution of the SNF. The consequence of this assumption is that the removal of the fissile material from the waste package is limited by the water flux through the waste package, or incident on the waste package. The basis of this assumption is the analysis given in Reference 5.52, Section 7.2. This assumption is used in Section 7.3.4.

4.4 Codes and Standards

American National Standard on "Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors", ANSI/ANS-8.17, 1984.

5. References -

5.1 *Q-List*, YMP/90-55Q, REV 3, Yucca Mountain Site Characterization Project

5.2 Activity Evaluation, *Perform Probabilistic Waste Package Design Analyses*, Document Identifier Number (DI#) BB0000000-01717-2200-00030 REV 02, CRWMS M&O

5.3 *Quality Assurance Requirements and Description*, DOE/RW-0333P, REV 5, Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM)

5.4 Letter, R.A. Milner to Secretary, U.S. NRC Docketing and Service Branch, Transmitting DOE comments regarding NRC-proposed revisions to 10 CFR Part 60 Regulations for Design Basis Events, June 16, 1995

5.5 *Material Compositions and Number Densities for Neutronics Calculations*, DI# BBA000000-01717-0200-00002 REV 00, CRWMS M&O

5.6 Letter, S.J. Brocoum to M.J. Bell, Providing DOE acknowledgment of receipt of NRC comments on the Annotated Outline for the Disposal Criticality Analysis Topical Report, April 12, 1996

5.7 *Characteristics of Potential Repository Wastes*, DOE/RW-0184-R1, Volume 1, p. 2A-8, July 1992, DOE OCRWM

5.8 *Initial Waste Package Probabilistic Criticality Analysis: Uncanistered Fuel*, DI# B00000000-01717-2200-00079 REV 01, CRWMS M&O

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5.10 *Mined Geologic Disposal System Advanced Conceptual Design Report, Volume III of IV, Engineered Barrier Segment/Waste Package*, DI#: B00000000-01717-5705-00027 REV 00, CRWMS M&O.

5.11 *Mined Geologic Disposal System Requirements Document*, DOE/RW-0404P REV 02/ICN 01, DOE OCRWM

5.12 *Engineered Barrier Design Requirements Document*, YMP/CM-0024, REV 0, ICN 1, Yucca Mountain Site Characterization Project

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5.14 Holman, J.P., *Heat Transfer*, 7th Edition, McGraw-Hill Publishing Company, 1990

5.15 *User Manual for the CDB_R*, DI#: A00000000-01717-2002-20002 REV 01, CRWMS M&O

5.16 *Multi-Purpose Canister (MPC) Implementation Program Conceptual Design Phase Report, Volume II.A - MPC Conceptual Design Report*, DI# A20000000-00811-5705-00002 REV 00, CRWMS M&O

5.17 *CRC Handbook of Chemistry and Physics*, 66th Edition, CRC Press, 1985

5.18 *Total System Performance Assessment - 1995: An Evaluation of the Potential Yucca Mountain Repository*, DI# B00000000-01717-2200-00136 REV 01, CRWMS M&O

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5.25 *Performance Assessment of the Direct Disposal in Unsaturated Tuff of Spent Nuclear Fuel and High-Level Waste Owned by U.S. Department of Energy*, Sandia National Laboratory, SAND94-2563/2, March 1995

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5.31 *Emplacement Scale Thermal Evaluations of Large and Small WP Designs*, DI# BB0000000-01717-0200-00009 REV 00, CRWMS M&O

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5.33 *Nuclides and Isotopes*, Fourteenth Edition, General Electric Company, 1989

5.34 *Material of 21 PWR AUCF Waste Container*, Interoffice Correspondence LV.WP.HW.03/96.059, Helen Wang, March 13, 1996, CRWMS M&O

5.35 Reserved

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5.37 Reserved

5.38 Reserved

5.39 *SCALE 4.3, RSIC Computer Code Collection*, CCC-545, Oak Ridge National Laboratory, October 1995

5.40 *MCNP 4A - Monte Carlo N-Particle Transport Code System*, CSCI# 30006 v4A, RSIC Computer Code Collection, CCC-200, Oak Ridge National Laboratory, February 1994

5.41 *Preliminary Waste Form Characteristics Report Version 1.0*, UCRL-ID-108314 Rev 1, Lawrence Livermore National Laboratory, December 1994

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5.44 *Controlled Design Assumptions (CDA) Document*, DI# B00000000-01717-4600-00032 REV 03, CRWMS M&O (TBV-221-DD)

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5.46 *Disposal Criticality Analysis Technical Report*, DI# B00000000-01717-5705-00020 REV 00, CRWMS M&O

5.47 *Total-System Performance Assessment for Yucca Mountain - SNL Second Iteration (TSPA-1993), Volume 1*, SAND93-2675, April, 1994

5.48 *Chemistry of Diagenetically Altered Tuffs at a Potential Nuclear Waste Repository, Yucca Mountain, Nye County, Nevada*, LA-10802-MS, Los Alamos National Laboratory, October, 1986

5.49 *SCALE4.3 and MCNP4A Installation*, Interoffice Correspondence LV.WP.JWD.06/96.135, J. Wesley Davis, June 11, 1996, CRWMS M&O

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5.54 *Second Waste Package Probabilistic Criticality Analysis: Generation and Evaluation of Internal Criticality Configurations*, DI# BBA000000-01717-2200-00005 REV 00, CRWMS M&O

5.55 *Preliminary Criticality Analysis of Degraded SNF Accumulations External to a Waste Package*, DI# BBA000000-01717-0200-00016 REV 00, CRWMS M&O

5.56 *Validation of the Scale System for PWR Spent Fuel Isotopic Composition Analyses*, Oak Ridge National Laboratory, ORNL/TM-12667, March 1995

6. Use of Computer Software -

6.1 Scientific and Engineering Software

SCALE 4.3 (Ref. 5.39), which includes the SAS2H and ORIGEN-S modules used in this report, has not been qualified according to QA procedures. The SAS2H and ORIGEN-S results for external criticalities of this analysis, therefore, shall be treated as unqualified data. SCALE 4.3 was run on HP Series 735 Workstations. SCALE 4.3 is an appropriate tool to be utilized to determine the composition and characteristics of PWR spent fuel and has been demonstrated to run correctly on the HP 735 workstations (Ref. 5.49). This code has been validated for this application by ORNL (Ref. 5.56). The application of SAS2H to accumulations of fissile material in tuff and to long term low power depletion due to a criticality event does not fall within the ORNL range of validation and must be validated in the future. The 44 group cross section library used in these calculations likely provides enough detail to cover the more thermal spectrum of the external accumulations adequately (Assumption 4.3.9). In addition, the ability to cover the long term low power depletion calculations is checked in this report (Section 7.4.2) by comparing the results from two different time step sizes (100 and 1000 years; Assumption 4.3.10).

MCNP4A (Ref. 5.40; CSCI# 30006 v4A) was run on HP 735 Workstations. MCNP4A is qualified according to QA procedures and was obtained from the SCM in accordance with appropriate procedures. MCNP4A is utilized to determine the criticality potential SNF and of fissile material accumulations in the far field environment external to the repository and is an appropriate tool for these purposes, and was used within the range of validation.

The results from MCNP cases are reported as $k_{eff} \pm 2\sigma$. k_{eff} is the final estimated combined collision/absorption/track-length k_{eff} reported in MCNP. 2σ is twice the standard deviation of the calculated value and $k_{eff} \pm 2\sigma$ approximately represents the 95% confidence interval of the result.

There are biases and uncertainties associated with a criticality calculation. How these biases and uncertainties are treated in criticality calculations is covered in the American National Standard on "Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors" (see Section 4.4). The fresh fuel bias and uncertainty for MCNP is approximately 0.015 (Ref. 5.16, p. II.A.3-35). The fresh fuel bias and uncertainty is appropriate for application to the external accumulations of fissile material investigated in this analysis.

The CDB LWR Radiological PC Database (CDB-R, Ref. 5.13), CSCI: A00000000-02268-1200-20002 v1.1, was used to obtain the radiological characteristics of the thermal/shielding DBF. The CDB has been qualified by the Office of Civilian Radioactive Waste Management for use in work subject to the requirements of the QARD (Ref. 5.3). The CDB was installed on an IBM-compatible PC in accordance with the User Manual for the CDB-R (p. 1, Ref. 5.15) and was obtained in accordance with the QAP-SI series procedures. Use of the SNF radionuclide inventories from the CDB is appropriate for this design analysis and is within the range of validation performed for the CDB.

6.2 Computational Support Software

LOTUS 1-2-3, Release 4.01 for Windows was used to calculate the isotopic number densities for the spent nuclear fuel and tuff/water/UO_2 mixtures investigated. Details of the equations and used of the spreadsheet are provided in Section 7.

7. Design Analysis -

This design analysis is presented in five sections. Sections 7.1 and 7.2 deal with internal criticality. The first gives the basic parameters of the criticality, and the second gives the results of the neutronics evaluation; increase in radionuclide inventory and change in k_{eff}. Sections 7.3 and 7.4 deal with external criticality in the same way as the internal criticality sections. Section 7.5 summarizes the previous estimates of probability associated with the critical configurations and lists the data items expected to be obtained within the next year to improve these estimates.

7.1 Internal Criticality, Basic Parameters

7.1.1 Waste Package Nominal Criticality Configuration

The purpose of this section is to summarize the 21 PWR AUCF WP internal degraded configuration for which the consequences of criticality have been modeled, and provide a brief summary of the progression of WP degradation from the initial configuration to the configuration for which criticality may be of concern. Further detail on the information presented here can be found in the *Second Waste Package Probabilistic Criticality Analysis: Generation and Evaluation of Internal Criticality Configurations* (Ref. 5.54) and the *Emplaced Waste Package Structural Capability Through Time Report* (Ref. 5.50).

7.1.1.1 Basket Collapse

This section discusses the four primary basket components responsible for maintaining the initial configuration of the WP, and the anticipated changes in the WP configuration which will occur as a result of their degradation following WP breach. These are the side and corner guides, the neutron absorber plates, fuel cell tubes, and the fuel assemblies themselves. Prior to WP breach, the interior of the WP is filled with an inert gas, and no degradation of the internal components would be expected. The inert environment is lost on first pit penetration of both WP barriers, which TSPA-95 (Ref. 5.18, Sect. 5) predicted would occur for a majority of WPs (typically 80% or more) within 2000 to 10,000 years after emplacement under most of the 83 MTU/acre scenarios. However, those scenarios which considered that the remaining carbon steel could provide cathodic protection for the inner barrier showed much longer times to first pit penetration (in the 10,000 to 100,000 year time frame)

The AUCF WP side and corner guides are fabricated from 10 mm thick carbon steel plates. Reference 5.50 indicates that the side guide will fail by bending at a thickness of 2.9 mm if there is no backfill loading the basket. Reference 5.50 estimated that this failure would occur within 60 to 340 years following WP breach for the 83 MTU/acre case without backfill using the TSPA-95 carbon steel corrosion model. Failure of the side guides will cause the bottom row of fuel assemblies to shift downward to touch the inside of the inner barrier. As the criticality control plate assemblies also rest on the top of the side guides, the entire basket structure should also shift downward. Since the corner guides are under less loading, their failure should occur shortly after failure of the side guides. Failure of the corner guides will result in the assemblies on the end of the second row from the bottom to shift downward to touch the inside of the inner barrier.

The assemblies above them should remain in place until sufficient degradation of the neutron absorber plates which support them has occurred.

The fuel cell tubes are also fabricated from carbon steel and have a wall thickness of 5 mm. The tubes will fully degrade before the failure of the side guides or the criticality control plates. In analyzing the criticality control plates, it was determined that the plates could maintain the basket and SNF assembly configuration without structural support from the tubes. Failure of the tubes will, therefore, not cause collapse of the basket, so no specific analysis was performed for the tubes. However, the remaining corrosion products occupy a greater volume than the original tubes and are fairly insoluble. Thus their presence may have some impact on WP internal criticality.

The AUCF WP neutron absorber plates are fabricated from 7 mm thick borated Type 316L stainless steel plates. Reference 5.50 found that the horizontal absorber plates will bend once 2.5 mm of thinning has occured, and the vertical plates will buckle after 5.36 mm of material is removed. Reference 5.50 made a preliminary estimate that it will take 2000 to 8500 years following breach of the WP for general corrosion of both sides of the neutron absorber plates to remove the 2.5 mm of material that would be required for bending to occur. It was estimated to take 4300 to 18,000 years to remove the 5.36 mm of material that would be required for buckling of the vertical plates. Bending will occur first at the ends of horizontal long criticality plates, causing the assemblies in the two side columns to drop down. Final collapse of the basket will occur due to bending of the horizontal plates supporting the assemblies (which would be expected to occur at a time later than the bending of the ends because the plates are supported on two sides) or buckling of the vertical plates. Final collapse will leave the center three columns of fuel assemblies resting on the bottom of the inner barrier.

Finally, Reference 5.50 also evaluated possible mechanisms for denting or crushing the fuel assemblies such that they no longer provide an optimum geometry for criticality. It was concluded that denting of the fuel rods would not occur because there is sufficient void space for expansion of the corroding basket materials, thus preventing them from causing any load on the fuel assemblies. Preliminary structural analyses were also performed which determined that the bottom-most fuel assemblies would be capable of supporting the entire degraded basket structure, and all fuel assemblies above them, without being crushed. Based on this information, the assumption of intact fuel assemblies for criticality analyses is appropriate and conservative until significant corrosion of the fuel rods and spacer grids has occured. Efforts to estimate the amount of corrosion required for such failures are currently under way.

Figure 7.1.1-1 shows the initial and degraded waste package internal configurations. As will be discussed in the following sections the final stage, where complete degradation of the basket components has occured, will be the primary configuration of concern for postclosure internal AUCF WP criticality.

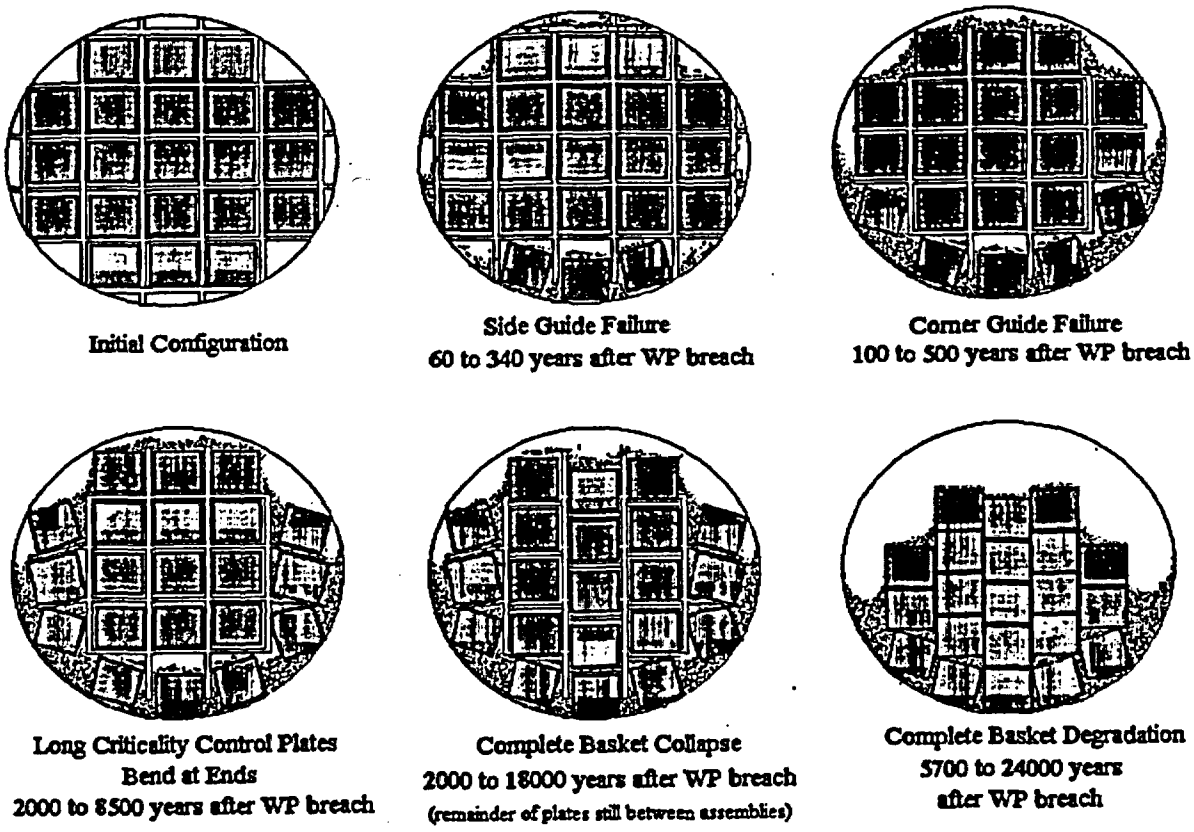

Figure 7.1.1-1. Initial and Degraded Waste Package Internal Configurations

7.1.1.2 Neutron Absorber Loss

As discussed above in Section 7.1.1.1, the degradation and collapse of the basket will leave behind a significant amount of iron, nickel, and chromium oxide corrosion products. In addition, the boron in borated stainless steel is in the form of a boride of iron (or one of the other metal components of stainless steel). Since such borides are generally found to be very stable (as described in Reference 5.25), the borides can be assumed to oxidize much more slowly than the iron, and some fraction will be trapped in the solid iron/chromium/nickel oxide matrix of the corroding stainless steel. Oxide corrosion products from the carbon steel components will also contribute to this trapping process.

Reference 5.54 performed an evaluation of the times required to remove specific amounts of the oxide corrosion products and the trapped boron from a WP which is assumed to be penetrated only on top and filled with water. A scenario which could lead to this configuration is based on the assumption that there will be very little probability of penetration of the lower portion of the waste package barriers before penetration of the upper portion, because such an "outside-in" process would require pit growth to a depth of 12 centimeters against gravity. The scenario begins with penetration of the upper portion of the barrier in 3000 to 5000 years; during much of the time before 3000 years the barrier temperature is above 90°C, and the aqueous corrosion rate of corrosion resistant inner barrier is modeled as being relatively high (Ref. 5.18), which is the reason why the penetration time is so short. After penetration of the upper portion of the barrier, penetration of the lower portion can begin from the inside out. By this time, however, the temperature is likely to have dropped below 50°C, where the TSPA-95 inner barrier corrosion models predict very small corrosion rates (Ref. 5.18). Because of the present uncertainty in the corrosion model, the probability for achieving a water-filled configuration as a result of this scenario has not yet been estimated. It is expected to be small.

Under such a flooded "bath tub" scenario (which is a required precondition for any internal WP criticality), removal of the oxides is accomplished by dissolution and removal via flushing through the upper portion of the WP. Reference 5.54 assumed that by the time oxides are dissolved, the trapped boride will have oxidized and will also dissolve, in which case it will be quickly flushed out of the package. The alternative is that the boron would still be solid boride, in which case it could remain in place (clinging to the remaining solid iron oxide, or fuel rods) or it could fall to the bottom of the package. The preliminary analysis in Reference 5.54 found that a flooded WP did not exceed a k_{eff} of 0.91 (used as the delimiter for criticality in that reference) until only 90% of the iron, nickel, and chromium oxides (uniformly occupying approximately 26% of the interior void space), and 5% of the initial boron remained. By this time, all internal plates, guides, and tubes had completely degraded. Thus, the first four degraded configurations identified in Figure 7.1.1-1 are of no concern from a postclosure criticality standpoint. Flushing times required to remove this material ranged from 12,000 years to greater than 100,000 years, depending on a number of assumptions such as the fraction of trapped boron, the inflow rate, the solubility of the oxides, the efficiency of the flushing process, and the drip rate of water onto the package.

7.1.2 Determination of Power, Temperature, and Duration

The internal criticality scenarios evaluated thus far simulate a flooded waste package that is gradually approaching a critical condition (k_{eff}=1) as a result of positive reactivity insertions caused by a slow loss of boron and iron from the package interior. Once a waste package reaches a k_{eff} of 1, continued small positive reactivity insertions will cause the power output of the waste package to begin to slowly rise (i.e., a long reactor period). If the power exceeds a certain limit, the rate at which water is consequentially removed from the waste package will exceed the rate of input, and the resulting water level drop will provide a negative reactivity insertion driving the waste package back towards a subcritical condition. Conversely, if insufficient power is produced, the water level will be maintained and the exchange process discussed previously will continue to remove dissolved boron, thus providing a continued source of positive reactivity insertions until the point of equilibrium is achieved. The maximum steady state power can then be estimated by determining the power required to maintain the bulk waste package water temperature at the point where water is removed at the same rate that it drips into the waste package. The waste package must produce sufficient power to raise the temperature of the incoming water to this equilibrium value, as well as account for the heat of vaporization and heat losses to the environment by radiation and/or conduction. Preliminary calculations, which are provided in detail in Reference 5.54, have shown that at a water temperature of 57.4°C, the evaporation rate will match the maximum TSPA-95 rate at which water drips into a WP located beneath a flowing fracture (191 liters/yr, Ref. 5.18, Sect. 7). The thermal power required to raise the water temperature to 57.4°C, while at the same time compensating for heat losses to the environment is 2.18 kW.

7.2 Internal Criticality, Neutronic Evaluation

The neutronic evaluation procedure for the far-field criticality involves three tasks as indicated below:

1) SAS2H burn calculations for intact fuel assemblies were run in a separate analysis (Ref. 5.53) and the results are displayed and utilized in this analysis,
2) Spreadsheet calculations of compositions from various duration criticality events using information from step 1, and
3) MCNP calculations of k_{eff} based on compositions from a 15,000 year decay case and the various duration criticality events.

7.2.1 Radionuclide Increase Resulting From an Internal Criticality

To evaluate the effects of a criticality on the radionuclide inventory of a waste package, the computer code ORIGEN-S was run using the PWR criticality design basis fuel, and the steady state power of 2.18 kW discussed above. The criticality was assumed in References 5.53 and 5.54 to occur after the fuel had aged/decayed for 15,000 years and was maintained at the above mentioned power for three durations: 1000, 5000 and 10,000 years. The maximum duration of 10,000 years is based on the assumption that it is the upper bound for the conditions supporting criticality (high infiltration, integrity of the lower part of the barrier, sufficient fissile material and

void space remaining). The output of these runs was the radionuclide inventory, in curies, at the times corresponding to the end of each criticality, and at fuel ages (time since reactor discharge) of 45,000 and 65,000 years (Ref. 5.53, Atts. VII-XI). In addition a fourth, decay-only case was run to determine the radionuclide inventories at the above times for fuel which did not experience a criticality event (Ref. 5.53, Att. VI). The percentage increase in the inventories of 36 of the isotopes examined in TSPA-95 is provided in Reference 5.54. The overall effect of the criticality on the radionuclide inventory can be summarized by the percentage increase in the total curies, over that of the decay-only case, for the 36 TSPA-95 isotopes. Table 7.2.1-1 shows this comparison. The explicitly stated times are measured from emplacement. Figure 7.2.1-1 graphically shows that even the 10,000 year duration criticality does not increase the inventory of the 36 isotopes above that at the time the criticality began. In addition, the criticality appears to have no significant long-term effect on the inventory of these isotopes. Within 25,000 years the total inventory of these 36 isotopes in fuel assemblies which experienced a criticality can barely be distinguished (<10%) from the inventory in fuel assemblies which did not experience a criticality. Furthermore, Table 7.2.1-2 indicates that the increase in the total inventory of the 36 TSPA-95 isotopes in a fuel assembly which experiences a criticality at 15,000 years does not exceed that of the worst decay only fuel, which is represented by the PWR thermal/shielding DBF.

Table 7.2.1-3 shows that the total increase in the inventory of the 36 TSPA-95 isotopes per unit burnup for the PWR criticality DBF is comparible to the in-reactor burn with ≈400 years of decay. Note that Table 7.2.1-3 gives the increment in Curies due to the specified burn, while Table 7.2.1-2 gives the toal Curies after the specified burn. These results are consistent based on the fact that the short lived isotopes present from the in-reactor burn have decayed by 400 years. It is just these short lived isotopes which are not present after the long post-closure criticality burns. It should be noted that the comparison of the 10,000 year burn increment in totoal Curies with the meaningful 400 year initial decay shows only a 2% increase. All calculations are performed in Attachment VIII. Tables 7.2.1-4 through 7.2.1-6 provide detailed inventories of the 36 isotopes, and the percentage change from the decay-only case, for the 1000, 5000, and 10,000 year criticalities.

Table 7.2.1-1. Percentage Increase in Total Curies of the 36 TSPA-95 Isotopes

Duration of Criticality (years)	Percent Increase at End of Criticality	Percent Increase at 45,000 years	Percent Increase at 65,000 years
1000	8.5% (16k years)	0.73%	0.73%
5000	15% (20k years)	4.2%	3.7%
10,000	24% (25k years)	9.9%	8.5%

Table 7.2.1-2. Total Curies of 36 TSPA-95 Isotopes Per Assembly

Fuel Age (years since)	16,000	20,000	25,000	45,000	65,000
PWR Thermal/Shielding DBF, Decay Only*	-	1.7e+02	-	-	-
PWR Criticality DBF, Decay Only	1.4e+02	1.2e+02	9.8e+01	5.3e+01	3.2e+01
PWR Criticality DBF, 1000 yr Criticality	1.5e+02	-	-	5.4e+01	3.3e+01
PWR Criticality DBF, 5000 yr Criticality	-	1.4e+02	-	5.5e+01	3.3e+01
PWR Criticality DBF, 10,000 yr Criticality	-	-	1.2e+02	5.8e+01	3.5e+01

* - Information for this fuel obtained from the CDB-R (Ref. 5.13).

Table 7.2.1-3. Total Curies of 36 TSPA-95 Isotopes Per Unit Burnup (Ci/GWd) Per Assembly

	Incremental Burnup (GWd)	Fuel Age (years since discharge)							
		30	400	15,000	16,000	20,000	25,000	45,000	65,000
PWR Criticality DBF, Decay Only	9.3e+00	1.3e+03	1.2e+02	1.6e+01	1.5e+01	1.3e+01	1.1e+01	5.7e+00	3.5e+00
PWR Criticality DBF, 1000 yr Criticality	3.8e-02	-	-	-	3.0e+02	-	-	2.6e+01	2.6e+01
PWR Criticality DBF, 5000 yr Criticality	1.9e-01	-	-	-	-	1.1e+02	-	1.1e+01	5.3e+00
PWR Criticality DBF, 10,000 yr Criticality	3.8e-01	-	-	-	-	-	5.8e+01	1.3e+01	7.9e+00

Inventory of 36 TSPA 95 Nuclides as a Function of Time for a PWR SNF Assembly After A 10,000 Year Criticality Starting at 15,000 Years

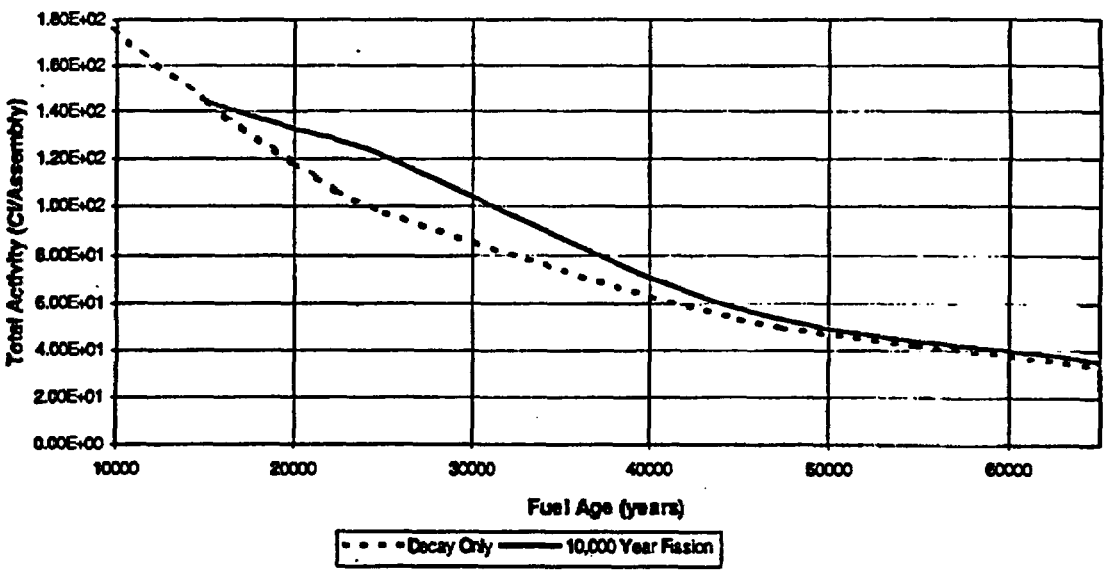

Figure 7.2.1-1

Table 7.2.1-4. Effects of 1000 Year Criticality on the Radionuclide Inventory of a PWR Fuel Assembly (Ref. 5.54)

	16,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	45,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	65,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total
ac227	6.9e-003	4.3e-003	1.6e+001	4.9e-004	1.0e-002	1.0e-002	3.0e+000	5.6e-004	1.3e-002	1.3e-002	2.3e+000	9.3e-004
am241	2.6e+000	2.2e-003	1.2e+005	1.9e+000	2.0e-004	2.0e-004	-1.5e+000	-5.6e-006	3.9e-005	3.9e-005	-1.5e+000	-1.9e-006
am242m	2.0e-003	0.0e+000	N/A	1.4e-003	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
am243	4.8e-001	4.5e-001	7.2e+000	2.3e-002	3.1e-002	2.9e-002	7.2e+000	3.9e-003	4.8e-003	4.5e-003	7.2e+000	9.9e-004
c 14	4.9e-006	4.8e-006	2.5e+000	8.7e-008	1.5e-007	1.4e-007	2.8e+000	7.5e-009	1.3e-008	1.3e-008	2.3e+000	9.3e-010
cm244	1.7e-002	0.0e+000	N/A	1.2e-002	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
cm245	2.1e-003	2.1e-003	-1.4e+000	-2.2e-005	2.0e-004	2.0e-004	-1.5e+000	-5.6e-006	3.9e-005	3.9e-005	-1.5e+000	-1.9e-006
cm246	9.6e-005	8.8e-005	9.2e+000	5.8e-006	1.4e-006	1.3e-006	9.5e+000	2.3e-007	7.3e-008	6.7e-008	9.2e+000	1.9e-008
cs135	2.0e-001	2.0e-001	9.9e-001	1.4e-003	2.0e-001	2.0e-001	1.0e+000	3.8e-003	2.0e-001	2.0e-001	1.0e+000	6.2e-003
i129	8.8e-003	8.8e-003	4.5e-001	2.9e-005	8.8e-003	8.8e-003	4.5e-001	7.5e-005	8.8e-003	8.8e-003	3.4e-001	9.3e-005
nb 93m	3.5e-001	3.5e-001	5.8e-001	1.4e-003	3.4e-001	3.4e-001	2.9e-001	1.9e-003	3.4e-001	3.4e-001	2.9e-001	3.1e-003
nb 94	1.9e-005	1.4e-005	4.0e+001	4.0e-006	7.1e-006	5.0e-006	4.1e+001	3.9e-006	3.6e-006	2.5e-006	4.1e+001	3.2e-006
np237	3.8e-001	3.8e-001	2.6e-001	7.2e-004	3.8e-001	3.8e-001	2.6e-001	1.9e-003	3.8e-001	3.8e-001	2.7e-001	3.1e-003
pa231	4.9e-003	4.3e-003	1.6e+001	4.9e-004	1.0e-002	1.0e-002	3.0e+000	5.6e-004	1.3e-002	1.3e-002	1.6e+000	6.2e-004
pb210	8.0e-002	8.0e-002	0.0e+000	0.0e+000	2.1e-001	2.1e-001	4.7e-001	1.9e-003	2.8e-001	2.8e-001	7.1e-001	6.2e-003
pd107	2.6e-002	2.6e-002	3.8e-001	7.2e-005	2.6e-002	2.6e-002	3.8e-001	1.9e-004	2.6e-002	2.6e-002	7.7e-001	6.2e-004
pu238	2.9e+000	0.0e+000	N/A	2.1e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
pu239	1.0e+002	1.0e+002	9.7e-001	7.2e-001	4.5e+001	4.5e+001	6.7e-001	5.6e-001	2.6e+001	2.5e+001	7.9e-001	6.2e-001
pu240	2.9e+001	2.8e+001	4.3e+000	8.7e-001	1.4e+000	1.3e+000	3.8e+000	9.4e-002	1.7e-001	1.6e-001	4.4e+000	2.2e-002
pu241	3.2e+000	2.1e-003	1.5e+005	2.3e+000	2.0e-004	2.0e-004	-1.5e+000	-5.6e-006	3.9e-005	3.9e-005	-1.5e+000	-1.9e-006
pu242	2.7e-001	2.7e-001	-3.7e-001	-7.2e-004	2.6e-001	2.6e-001	-3.9e-001	-1.9e-003	2.5e-001	2.5e-001	-4.0e-001	-3.1e-003
ra226	8.0e-002	8.0e-002	-1.3e-001	-7.2e-005	2.1e-001	2.1e-001	4.7e-001	1.9e-003	2.8e-001	2.8e-001	7.1e-001	6.2e-003
ra228	9.0e-008	9.0e-008	0.0e+000	0.0e+000	2.8e-007	2.8e-007	3.6e-001	1.9e-009	4.1e-007	4.1e-007	4.9e-001	6.2e-009
se 79	1.4e-001	1.4e-001	7.3e-001	7.2e-004	7.5e-002	7.5e-002	6.7e-001	9.4e-004	4.9e-002	4.9e-002	6.1e-001	9.3e-004
sm151	7.9e-001	0.0e+000	N/A	5.7e-001	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
sn126	1.3e-001	1.2e-001	8.1e-001	7.2e-004	1.0e-001	1.0e-001	0.0e+000	0.0e+000	8.9e-002	8.8e-002	4.5e-001	1.2e-003
tc 99	3.8e+000	3.7e+000	5.3e-001	1.4e-002	3.4e+000	3.4e+000	5.9e-001	3.8e-002	3.2e+000	3.2e+000	3.1e-001	3.1e-002
th229	1.1e-002	1.2e-002	-8.7e-001	-7.2e-005	5.1e-002	5.1e-002	0.0e+000	0.0e+000	7.8e-002	7.8e-002	0.0e+000	0.0e+000
th230	9.2e-002	9.2e-002	-2.2e-001	-1.4e-004	2.2e-001	2.2e-001	4.5e-001	1.9e-003	2.9e-001	2.9e-001	7.0e-001	6.2e-003
th232	9.0e-008	9.0e-008	0.0e+000	0.0e+000	2.8e-007	2.8e-007	3.6e-001	1.9e-009	4.1e-007	4.1e-007	4.9e-001	6.2e-009
u233	2.5e-002	2.5e-002	-8.0e-001	-1.4e-004	6.7e-002	6.7e-002	0.0e+000	0.0e+000	9.3e-002	9.3e-002	1.1e-001	3.1e-004
u234	6.7e-001	6.7e-001	9.0e-001	4.3e-003	6.3e-001	6.3e-001	9.6e-001	1.1e-002	6.1e-001	6.0e-001	1.0e+000	1.9e-002
u235	1.6e-002	1.6e-002	-6.4e-001	-7.2e-005	1.8e-002	1.8e-002	-5.6e-001	-1.9e-004	1.8e-002	1.8e-002	-5.6e-001	-3.1e-004
u236	1.3e-001	1.3e-001	7.9e-001	7.2e-004	1.3e-001	1.3e-001	0.0e+000	0.0e+000	1.4e-001	1.3e-001	7.5e-001	3.1e-003
u238	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000
zr 93	3.5e-001	3.5e-001	5.8e-001	1.4e-003	3.4e-001	3.4e-001	2.9e-001	1.9e-003	3.4e-001	3.4e-001	2.9e-001	3.1e-003
36 Iso. Totals	1.5e+002	1.4e+002	8.5e+000	0.0e+000	5.4e+001	5.3e+001	7.3e-001	0.0e+000	3.3e+001	3.2e+001	7.3e-001	0.0e+000

Table 7.2.1-5. Effects of 5000 Year Criticality on the Radionuclide Inventory of a PWR Fuel Assembly (Ref. 5.54)

	20,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	45,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	65,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total
Ac227	8.8e-003	5.2e-003	7.0e+001	3.1e-003	1.2e-002	1.0e-002	2.0e+001	3.0e-003	1.4e-002	1.3e-002	1.0e+001	4.0e-003
Am241	2.7e+000	1.6e-003	1.7e+005	2.3e+000	1.9e-004	2.0e-004	-7.5e+000	-2.8e-005	3.6e-005	3.9e-005	-7.4e+000	-9.0e-006
Am242m	2.4e-003	0.0e+000	N/A	2.0e-003	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Am243	4.4e-001	3.1e-001	4.4e+001	1.1e-001	4.2e-002	2.9e-002	4.4e+001	2.4e-002	6.4e-003	4.5e-003	4.3e+001	6.0e-003
C 14	3.5e-006	3.0e-006	1.7e+001	4.3e-007	1.7e-007	1.4e-007	1.7e+001	4.5e-008	1.5e-008	1.3e-008	1.7e+001	6.0e-009
Cm244	1.6e-002	0.0e+000	N/A	1.3e-002	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Cm245	1.4e-003	1.5e-003	-7.1e+000	-9.3e-005	1.9e-004	2.0e-004	-7.0e+000	-2.6e-005	3.6e-005	3.9e-005	-7.4e+000	-9.0e-006
Cm246	7.4e-005	4.9e-005	5.1e+001	2.1e-005	1.9e-006	1.3e-006	5.2e+001	1.2e-006	1.0e-007	6.7e-008	5.2e+001	1.1e-007
Cs135	2.1e-001	2.0e-001	4.4e+000	7.6e-003	2.1e-001	2.0e-001	4.5e+000	1.7e-002	2.1e-001	2.0e-001	4.5e+000	2.8e-002
I129	9.0e-003	8.8e-003	2.0e+000	1.5e-004	9.0e-003	8.8e-003	2.0e+000	3.4e-004	9.0e-003	8.8e-003	2.0e+000	5.6e-004
Nb 93m	3.5e-001	3.5e-001	2.0e+000	5.9e-003	3.5e-001	3.4e-001	2.0e+000	1.3e-002	3.5e-001	3.4e-001	2.1e+000	2.2e-002
Nb 94	4.1e-005	1.2e-005	2.5e+002	2.5e-005	1.8e-005	5.0e-006	2.5e+002	2.4e-005	8.9e-006	2.5e-006	2.5e+002	2.0e-005
Np237	3.8e-001	3.8e-001	1.0e+000	3.4e-003	3.8e-001	3.8e-001	1.1e+000	7.5e-003	3.8e-001	3.8e-001	1.3e+000	1.5e-002
Pa231	8.8e-003	5.2e-003	7.0e+001	3.1e-003	1.2e-002	1.0e-002	2.0e+001	3.8e-003	1.4e-002	1.3e-002	1.0e+001	4.0e-003
Pb210	1.0e-001	1.0e-001	-9.9e-001	-8.5e-004	2.2e-001	2.1e-001	2.3e+000	9.4e-003	2.9e-001	2.8e-001	3.6e+000	3.1e-002
Pd107	2.7e-002	2.6e-002	1.9e+000	4.2e-004	2.7e-002	2.6e-002	1.9e+000	9.4e-004	2.7e-002	2.6e-002	2.3e+000	1.9e-003
Pu238	3.0e+000	0.0e+000	N/A	2.5e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Pu239	9.6e+001	9.2e+001	3.6e+000	2.8e+000	4.7e+001	4.5e+001	3.8e+000	3.2e+000	2.6e+001	2.5e+001	4.0e+000	3.1e+000
Pu240	2.3e+001	1.9e+001	2.6e+001	4.1e+000	1.7e+000	1.3e+000	2.6e+001	6.4e-001	2.0e-001	1.6e-001	2.6e+001	1.3e-001
Pu241	2.6e+000	1.5e-003	1.7e+005	2.2e+000	1.9e-004	2.0e-004	-7.5e+000	-2.8e-005	3.6e-005	3.9e-005	-7.4e+000	-9.0e-006
Pu242	2.7e-001	2.7e-001	-1.1e+000	-2.5e-003	2.5e-001	2.6e-001	-1.2e+000	-5.6e-003	2.5e-001	2.5e-001	-1.6e+000	-1.2e-002
Ra226	1.0e-001	1.0e-001	-9.9e-001	-8.5e-004	2.2e-001	2.1e-001	2.8e+000	1.1e-002	2.9e-001	2.8e-001	3.9e+000	3.4e-002
Ra228	1.1e-007	1.1e-007	0.0e+000	0.0e+000	3.8e-007	2.8e-007	1.4e+000	7.5e-009	4.2e-007	4.1e-007	1.7e+000	2.2e-008
Se 79	1.3e-001	1.3e-001	3.2e+000	3.4e-003	7.7e-002	7.5e-002	3.1e+000	4.3e-003	5.1e-002	4.9e-002	3.1e+000	4.6e-003
Sm151	8.0e-001	0.0e+000	N/A	6.8e-001	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Sn126	1.2e-001	1.2e-001	2.5e+000	2.5e-003	1.0e-001	1.0e-001	2.0e+000	3.8e-003	9.1e-002	8.8e-002	2.5e+000	6.8e-003
Tc 99	3.8e+000	3.7e+000	2.2e+000	6.8e-002	3.5e+000	3.4e+000	2.1e+000	1.3e-001	3.3e+000	3.2e+000	1.9e+000	1.9e-001
Th229	1.6e-002	1.6e-002	-6.1e-001	-8.5e-005	5.1e-002	5.1e-002	-3.9e-001	-3.8e-004	7.8e-002	7.8e-002	1.3e-001	3.1e-004
Th230	1.1e-001	1.1e-001	-8.8e-001	-8.5e-004	2.3e-001	2.2e-001	2.7e+000	1.1e-002	3.0e-001	2.9e-001	3.8e+000	3.4e-002
Th232	1.1e-007	1.1e-007	0.0e+000	0.0e+000	2.8e-007	2.8e-007	1.4e+000	7.5e-009	4.2e-007	4.1e-007	1.7e+000	2.2e-008
U233	3.1e-002	3.1e-002	-1.9e+000	-5.1e-004	6.7e-002	6.7e-002	-1.5e-001	-1.9e-004	9.3e-002	9.3e-002	3.2e-001	9.3e-004
U234	6.9e-001	6.6e-001	5.3e+000	3.0e-002	6.6e-001	6.3e-001	5.3e+000	6.2e-002	6.3e-001	6.0e-001	5.2e+000	9.6e-002
U235	1.6e-002	1.6e-002	-1.9e+000	-2.5e-004	1.8e-002	1.8e-002	-1.1e+000	-3.8e-004	1.8e-002	1.8e-002	-1.6e+000	-9.3e-004
U236	1.3e-001	1.3e-001	1.6e+000	1.7e-003	1.4e-001	1.3e-001	2.2e+000	5.6e-003	1.4e-001	1.3e-001	2.2e+000	9.3e-003
U238	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000
Zr 93	3.5e-001	3.5e-001	2.0e+000	5.9e-003	3.5e-001	3.4e-001	2.0e+000	1.3e-002	3.5e-001	3.4e-001	2.1e+000	2.2e-002
36 Iso. Totals	1.4e+002	1.2e+002	1.5e+001	0.0e+000	5.5e+001	5.3e+001	4.2e+000	0.0e+000	3.3e+001	3.2e+001	3.7e+000	0.0e+000

Table 7.2.1-6. Effects of 10,000 Year Criticality on the Radionuclide Inventory of a PWR Fuel Assembly (Ref. 5.54)

	25,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	45,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total	65,000 yr Act. (Ci) Critical	Act. (Ci) Decay Only	% Diff. Isotope	% Diff. Total
Ac227	1.4e-002	6.3e-003	1.2e+002	8.0e-003	1.5e-002	1.0e-002	4.9e+001	9.2e-003	1.6e-002	1.3e-002	2.4e+001	9.6e-003
Am241	2.1e+000	1.1e-003	2.0e+005	2.2e+000	1.7e-004	2.0e-004	-1.4e+001	-5.5e-005	3.4e-005	3.9e-005	-1.5e+001	-1.8e-005
Am242m	1.9e-003	0.0e+000	N/A	2.0e-003	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Am243	4.1e-001	1.9e-001	1.1e+002	2.2e-001	6.3e-002	2.9e-002	1.1e+002	6.3e-002	9.5e-003	4.5e-003	1.1e+002	1.6e-002
C14	2.4e-006	1.6e-006	4.8e+001	8.0e-007	2.1e-007	1.4e-007	4.9e+001	1.3e-007	1.9e-008	1.3e-008	4.8e+001	1.9e-008
Cm244	1.5e-002	0.0e+000	N/A	1.6e-002	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Cm245	8.8e-004	1.0e-003	-1.4e+001	-1.5e-004	1.7e-004	2.0e-004	-1.4e+001	-5.5e-005	3.4e-005	3.9e-005	-1.5e+001	-1.8e-005
Cm246	5.2e-005	2.4e-005	1.2e+002	2.9e-005	2.8e-006	1.3e-006	1.2e+002	2.8e-006	1.5e-007	6.7e-008	1.2e+002	2.5e-007
Cs135	2.2e-001	2.0e-001	8.4e+000	1.7e-002	2.2e-001	2.0e-001	9.0e+000	3.4e-002	2.2e-001	2.0e-001	8.5e+000	5.3e-002
I129	9.2e-003	8.8e-003	4.1e+000	3.7e-004	9.2e-003	8.8e-003	4.1e+000	6.8e-004	9.2e-003	8.8e-003	4.0e+000	1.1e-003
Nb 93m	3.6e-001	3.4e-001	4.1e+000	1.4e-002	3.5e-001	3.4e-001	4.1e+000	2.6e-002	3.5e-001	3.4e-001	3.8e+000	4.0e-002
Nb 94	7.4e-005	1.0e-005	6.4e+002	6.5e-005	3.7e-005	5.0e-006	6.4e+002	6.1e-005	1.9e-005	2.5e-006	6.4e+002	5.0e-005
Np237	3.9e-001	3.8e-001	2.1e+000	8.2e-003	3.9e-001	3.8e-001	2.1e+000	1.5e-002	3.8e-001	3.8e-001	2.4e+000	2.8e-002
Pa231	1.4e-002	6.3e-003	1.2e+002	8.0e-003	1.5e-002	1.0e-002	4.9e+001	9.2e-003	1.6e-002	1.3e-002	2.4e+001	9.6e-003
Pb210	1.3e-001	1.3e-001	-7.9e-001	-1.0e-003	2.2e-001	2.1e-001	4.7e+000	1.9e-002	3.1e-001	2.8e-001	1.1e+001	9.9e-002
Pd107	2.7e-002	2.6e-002	3.8e+000	1.0e-003	2.7e-002	2.6e-002	3.8e+000	1.9e-003	2.7e-002	2.6e-002	4.2e+000	3.4e-003
Pu238	3.1e+000	0.0e+000	N/A	3.1e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Pu239	8.7e+001	8.0e+001	8.6e+000	7.8e+000	4.9e+001	4.5e+001	8.9e+000	7.5e+000	2.8e+001	2.5e+001	9.1e+000	7.1e+000
Pu240	1.8e+001	1.1e+001	6.9e+001	7.7e+000	2.2e+000	1.3e+000	6.8e+001	1.7e+000	2.7e-001	1.6e-001	6.9e+001	3.4e-001
Pu241	2.1e+000	1.0e-003	2.1e+005	2.3e+000	1.7e-004	2.0e-004	-1.4e+001	-5.5e-005	3.4e-005	3.9e-005	-1.5e+001	-1.8e-005
Pu242	2.6e-001	2.7e-001	-2.6e+000	-7.1e-003	2.5e-001	2.6e-001	-2.7e+000	-1.3e-002	2.4e-001	2.5e-001	-2.8e+000	-2.2e-002
Ra226	1.3e-001	1.3e-001	-7.9e-001	-1.0e-003	2.2e-001	2.1e-001	4.7e+000	1.9e-002	3.1e-001	2.8e-001	1.1e+001	9.9e-002
Ra228	1.5e-007	1.5e-007	6.8e-001	1.0e-009	2.8e-007	2.8e-007	2.2e+000	1.1e-008	4.2e-007	4.1e-007	2.9e+000	3.7e-008
Se 79	1.2e-001	1.1e-001	6.1e+000	7.1e-003	7.9e-002	7.5e-002	6.3e+000	8.8e-003	5.2e-002	4.9e-002	6.3e+000	9.6e-003
Sm151	8.1e-001	0.0e+000	N/A	8.2e-001	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000	0.0e+000
Sn126	1.2e-001	1.2e-001	5.1e+000	6.1e-003	1.1e-001	1.0e-001	4.9e+000	9.4e-003	9.3e-002	8.8e-002	5.0e+000	1.4e-002
Tc 99	3.8e+000	3.6e+000	4.1e+000	1.5e-001	3.5e+000	3.4e+000	4.1e+000	2.6e-001	3.3e+000	3.2e+000	3.8e+000	3.7e-001
Th229	2.3e-002	2.3e-002	-1.7e+000	-4.1e-004	5.1e-002	5.1e-002	-1.2e+000	-1.1e-003	7.8e-002	7.8e-002	-1.3e-001	-3.1e-004
Th230	1.4e-001	1.4e-001	0.0e+000	0.0e+000	2.3e-001	2.2e-001	5.0e+000	2.1e-002	3.1e-001	2.9e-001	7.3e+000	6.5e-002
Th232	1.5e-007	1.5e-007	6.8e-001	1.0e-009	2.8e-007	2.8e-007	2.2e+000	1.1e-008	4.2e-007	4.1e-007	2.9e+000	3.7e-008
U233	3.7e-002	3.9e-002	-3.1e+000	-1.2e-003	6.7e-002	6.7e-002	-6.0e-001	-7.5e-004	9.3e-002	9.3e-002	3.2e-001	9.3e-004
U234	7.2e-001	6.5e-001	1.1e+001	7.4e-002	6.9e-001	6.3e-001	1.1e+001	1.3e-001	6.6e-001	6.0e-001	1.1e+001	2.0e-001
U235	1.6e-002	1.6e-002	-3.6e+000	-6.1e-004	1.7e-002	1.8e-002	-2.8e+000	-9.4e-004	1.8e-002	1.8e-002	-2.7e+000	-1.5e-003
U236	1.4e-001	1.3e-001	3.1e+000	4.1e-003	1.4e-001	1.3e-001	4.5e+000	1.1e-002	1.4e-001	1.3e-001	4.5e+000	1.9e-002
U238	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000	1.5e-001	1.5e-001	0.0e+000	0.0e+000
Zr 93	3.6e-001	3.4e-001	4.1e+000	1.4e-002	3.6e-001	3.4e-001	4.1e+000	2.6e-002	3.5e-001	3.4e-001	3.8e+000	4.0e-002
36 Iso. Total	1.2e+002	9.8e+001	2.4e+001	0.0e+000	5.8e+001	5.3e+001	9.9e+000	0.0e+000	3.5e+001	3.2e+001	8.5e+000	0.0e+000

7.2.2 Compositions as a Function of Duration for Internal Criticality

Number densities for the fuel accounting for burnup and production of isotopes were calculated for a base case with decay out to 15,000 years and for the criticalities lasting 1000, 5000 and 10,000 years. The SAS2H and ORIGEN-S case descriptions which support these number density calculations are provided in Sections 7.5.1 and 7.5.2 of Reference 5.53. The grams/assembly compositions are taken from Attachments XI and XII of Reference 5.53. The grams/assembly output per appropriate time step ("initial" decay column for criticality cases) in conjunction with the assembly volume was used to calculate the number density of each of the required isotopes using a LOTUS 1-2-3 spreadsheet. The equation for number density is shown below (Ref. 5.20, p. 34):

$$N = \rho N_A / M$$

where, ρ is the physical density in g/cm^3, calculated as grams/assembly ÷ assembly volume (51575.24 cm^3, Ref. 5.54 Att. VIII),
N_A is Avagadro's Number - 0.602252E+24 atoms/mole (Ref. 5.43), and
M is the gram atomic weight.

The units of the resulting number density is in atoms/cm^3. The required units for subsequent use are atoms/barn-cm where 1 barn equals 10^{-24} cm^2. The calculations in the spreadsheet drops the E+24 from Avagadro's Number to account for the conversion. As a conservatism in the criticality calculations which will use these number densities, the values are adjusted up to a 96% theoretical density.

The Principal Isotopes previously established (Ref. 5.46, p. 4-4) were used with the addition of Cd, Gd-157, Xe-131, and Cs-133. These four additional isotopes were identified in the top 15 fission product absorber list for 1000 and 5000 year criticalities as described in Section 7.4.4. These four isotopes were added to provide a indication of realistic reactivity changes due to burnup in the long term low power criticality being analyzed.

The grams/assembly (Ref. 5.53, Attachments XI and XII) for each isotope and the results of the number density calculations are shown in Attachment II which is the LOTUS 1-2-3 spreadsheet used to generate the values.

The burnup associated with each of the criticality durations is shown in the Table 7.2.2-1 along with the masses of the major fissile isotopes (U-235 and Pu-239), Pu-240 (actinide absorber) and fission products absorbers. Note that while the mass of Pu-239 decreased by 19% (partially offset by U-235 mass increase), the mass of major absorbers such as Pu-240, Sm-149, and Eu-151 decreased by 41%, 51%, and 10%, respectively. The mass of the Pu isotopes decreased due to absorption and decay, while the mass of these two fission products decreased by absorption.

Table 7.2.2-1. Burnup and Composition Changes Associated with Criticality Duration

Duration of Criticality (years)	0	1000	5000	10,000
Burnup (MWd)	0	37.95	189.76	379.52
Mass of U-235 (g)	7.21E+3	7.23E+3	7.29E+3	7.35E+3
Mass of Pu-239 (g)	1.72E+3	1.68E+3	1.54E+3	1.40E+3
Mass of Pu-240 (g)	1.38E+2	1.30E+2	1.03E+2	8.09E+1
Mass of Sm-149 (g)	1.42E+0	1.18E+0	7.88E-1	6.96E-1
Mass of Nd-143 (g)	2.69E+2	2.70E+2	2.73E+2	2.77E+2
Mass of Eu-151 (g)	6.22E+0	6.12E+0	5.87E+0	5.60E+0
Mass of Rh-103 (g)	1.44E+2	1.44E+2	1.45E+2	1.47E+2
Mass of Xe-131 (g)	1.38E+2	1.38E+2	1.40E+2	1.42E+2

7.2.3 Check of Reactivity Changes With Time Due to Internal Criticality

The AUCF waste package design model in MCNP consists of ½ of the package with a reflective plane along the axis to represent the entire package. The AUCF waste package containment barriers are modeled as separate units in the MCNP model. The composition, thicknesses, radii, and lengths of the containment barriers are modeled explicitly as listed in Table 4.1-2. The outer containment barrier's skirt was not modeled in detail, since the skirt would not effect the criticality results. For this degraded model, no basket structure remains and a uniform mixture of iron oxide, water, and boron surrounds the fuel assemblies. The fuel assemblies are uniformly stacked together, with no separation, at the bottom of the waste package. The fuel assemblies in the AUCF waste package are modeled in a lattice. Each fuel assembly is treated as a heterogeneous system with the fuel pins, control rod guide tubes, and instrument guide tube modeled explicitly. The properties of the design basis B&W 15×15 Mark B5 assembly are used in the analyses as listed in Table 4.1-1. A cross-sectional view from the MCNP model is shown in Figure 7.2.3-1. The non-fuel material compositions were taken from a previous QAP-3-9 analysis on material compositions (Ref. 5.5).

A degraded configuration with 5371.1 kg of Fe and 1.6 kg of B was identified as appropriate for determination of the reactivity effect of burnup because it represented the Fe, B combination at the earliest possible time of criticality (the last case in Table 7.4-2 of Reference 5.54, with the specific Fe, B amounts given in Attachment II, p. II-3 of that document). To be consistent with previous calculations (Ref. 5.54, p. 10), the masses were rounded to whole percentages. The moderator was modeled as 26% Fe_2O_3 (based on the mass conversion equation in Reference 5.54, p. VIII-6: Fe mass=20.94 x void %) displacing water in the void space within the waste package with 5% of the original B-10 (based on total mass of B in Reference 5.54, p. VIII-5: 30.474 kg) also incorporated into the moderator. The calculation for the number densities for the

moderator composition is shown in Attachment II.

The fuel compositions described in Section 7.2.2 were inserted into the MCNP model and the cases were run to generate values of k_{eff} as a function of criticality duration. The results of the cases are shown in Table 7.2.3-1. The corresponding attachments containing the input and relevant output for each case are shown in parentheses.

Table 7.2.3-1. MCNP Case Results to Demonstrate Reactivity Changes Due to an Internal Criticality

Criticality Duration (years)	0	1000	5000	10,000
k_{eff}	0.8967 ± 0.0020 (III)	0.8989 ± 0.0019 (IV)	0.9006 ± 0.0021 (V)	0.9002 ± 0.0022 (VI)

The slight increase in k_{eff} with burnup comparing 0 and 10,000 years can be attributed to the higher relative burnup/decay of absorbers compared to fissile isotopes as discussed in Section 7.2.1.

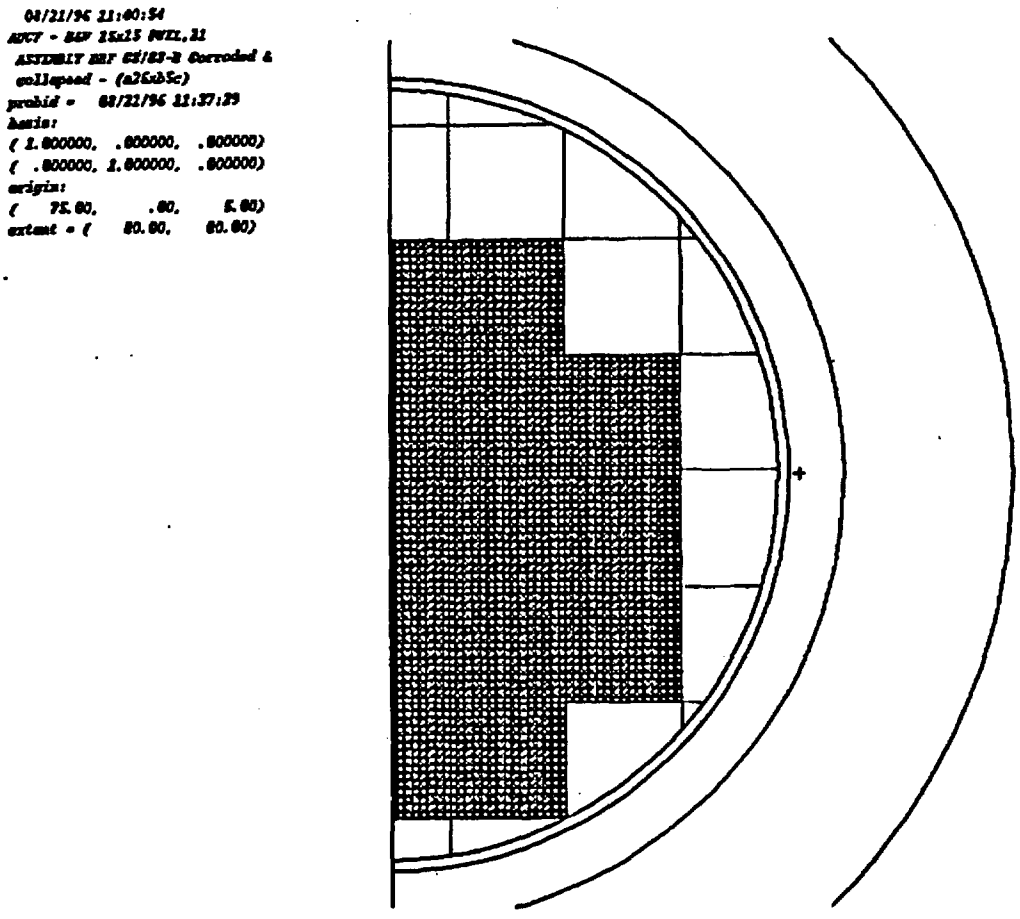

Figure 7.2.3-1. MCNP Model of 21 PWR AUCF WP with Fully Degraded Basket

7.3 External Criticality, Basic Parameters

7.3.1 Geometry and Material Composition

The concentrations of water and UO_2 used for this analysis are chosen with the following considerations:

- The maximum porosity of the rock beneath the repository site, in the saturated zone, is taken to be the sample maximum, 40%, explained in the footnote to Table 4.1-4. Since the sample size was over 100, the probability of some random location exceeding this value is taken to be less than 0.01. (This is conservative, since the probability that 1% of the true population exceed a porosity of 40% is $0.99^{126} = 0.28$. Restated in probability terms, the probability that the 99 percentile of the true population is greater than 40% porosity is 0.28. It should be noted, however, that the sample comes from a limited number of boreholes, so there could be a greater variation than is estimated here.) If a value of porosity larger than 40% were selected, the probability would have to be reduced by a factor smaller than 0.01. Since there are no new probability calculations in this analysis to which to apply such a factor, it is reasonably conservative to take 40% as the porosity.
- The water volume percent plus UO_2 volume percent should equal the porosity.
- The very conservative value of 8% UO_2 by volume with 32% water by volume is equivalent to 32% UO_2 by weight according to the formula in the third footnote to Table 7.5-1 of Reference 5.52; this weight percent is higher than any known natural uranium deposit of 1m radius. There are smaller size regions of well known uranium deposits (e.g., Oklo, Cigar Lake, Pena Blanca) which have higher concentrations (Ref. 5.52, p. 26, and references cited therein).

Of the alternative concentrations evaluated in Reference 5.52 (Table 7.5-1), the parameter set falls between the 4th and 7th cases, indicating a critical mass above 10.1 metric tons of U, but less than 18 tons. Such a large mass implies a very small probability of accumulation, according to the methodology of Reference 5.52; in fact, several of the cases in Reference 5.52, Table 7.5-1, have a higher probability, according to the probabilities given in Table 7.6-1 of Reference 5.52. This apparent contradiction, of taking a case which the methodology estimates to have a significantly lower probability, results from the principal inadequacy of the methodology of Reference 5.52, which is the lack of correlation between size of reducing zone and the maximum amount of UO_2 it can extract or concentrate. The cases in Reference 5.52 which appear to have higher probabilities than the one selected here, actually require a porosity higher than is consistent with physical reality; with additional data on the joint distribution of concentration of UO_2 (or grade) and areal extent (or deposit size) these cases with apparently higher probability may be seen to be impossible and not considered any further.

The compositions in the form of number densities for UO_2, 30.6% porosity tuff, and water were taken from Attachment VIII of Reference 5.55 and entered into a LOTUS 1-2-3 spreadsheet which is included as Attachment VII. The 30.6% porosity tuff number densities were converted to those representative of 40% porosity tuff by the ratio (1-0.4)/(1-0.306). The corresponding

weight percents of the components in the UO_2 feed were calculated by multiplying the component atom density by the component atomic weight and dividing by the sum of this product for all the components. The homogeneous mixture number densities for the combination of 40% porosity tuff with 8 volume percent UO_2 and 32 volume percent H_2O occupying the pore/fracture space (porosity) were calculated as shown in the spreadsheet by multiplying the UO_2 number densities by 0.08 and the water number densities by 0.32.

The critical radius for a similar composition in a spherical geometry was found to be 140 cm (Ref. 5.55, p. 35).

7.3.2 Relation Between Power and Temperature

For this analysis the relation between the steady state power output of an external criticality and the resulting temperature is determined primarily by heat conduction from the spherical mass to the distant environment. Since there are no free surfaces in the external far-field, there can be no cooling by radiation. It is further assumed that cooling by convection is small by comparison with conduction, for the reasons given in Assumption 4.3.5. The temperature is then determined by solving the steady state heat conduction equation; the details of this process are given in Attachment I. The results are as follows.

Within a sphere generating total power P, uniformly throughout its volume, at a power density of $3P/(4\pi R^3)$, where R is the radius of the sphere, the solution for temperature given in Attachment I is:

$$T = T_s + P(1-r^2/R^2)/(8k\pi R),$$

where k is the thermal conductivity in W/m·K, r is the distance from the center of the sphere, and T_s is the temperature of the surface of the sphere, assumed to be constant (Assumption 4.3.7). The consequence of this general result is that the temperature at the center of the sphere is:

$$T_c = T_s + P/(8k\pi R),$$

and the average temperature (computed in Attachment I) is:

$$T_{av} = T_s + P/(20k\pi R).$$

If the power, P, is parabolically distributed throughout the sphere, with peak power at the center, the power density will be, $15P(1-r^2/R^2)/(8\pi R^3)$, which is normalized so that multiplying the power density by $4\pi r^2$ and integrating over r from 0 to R gives P. The general solution for temperature within the sphere is derived in Attachment I as:

$$T = T_s + 7P/(32k\pi R) - 15P[r^2/(6R^2) - r^4/(20R^4)]/(8k\pi R),$$

which leads to the center temperature:

$$T_c = T_s + 7P/(32k\pi R),$$

and the average temperature:

$$T_{av} = T_s + P/(14k\pi R).$$

For any spherically symmetric power density inside the sphere, the solution for the temperature outside the sphere can be used to determine the surface temperature in terms of the temperature of the rock far from the sphere, T_∞:

$$T_s = T_\infty + P/(4k\pi R).$$

7.3.3 Maximum Possible Power and Temperature

The maximum possible temperature under isobaric conditions is the boiling temperature of water, at 50 atmospheres (735 psia, 5.07 MPa) pressure (hydrostatic pressure at approximately 500 meters below the water table, Assumption 4.3.6) because bulk boiling will drive the power down based on previous results (Ref. 5.55, p. 40). The saturated temperature and density of liquid water at 50 atm pressure were linearly interpolated from the values in Table 4.1-5 to be 265 °C (508.7 °F) and 0.776 g/cm^3 (48.45 lb/ft^3). The depth from the surface to the saturated zone is taken to be 611 m (approximate, from Ref 5.18, Fig 2.3-7). The temperature of the rock can be determined from the following relation (Ref. 5.44, p. 6-168) assuming that the last thermal gradient extends 500 m below the saturated zone level (total of 1111 m; see Assumption 4.3.6):

$$T_\infty = 18.7\ °C + 0.019\ °C/m\ (0 \text{ to } 150\ m) + 0.018\ °C/m\ (150 \text{ to } 400\ m) + 0.030\ °C/m\ (400 \text{ to } 541\ m),$$

$$T_\infty = 47.4\ °C.$$

The average thermal conductivity, k, of the rock at a depth of 535.2 m has been estimated to be 1.38 W/m·K (Ref. 5.31, p. 6). This value will be used for the tuff in this analysis.

Based on the temperature equations for a parabolic power density in a sphere in Section 7.3.2, the average temperature can be determined from the following equation:

$$T_{av} = T_\infty + P/(4k\pi R) + P/(14k\pi R).$$

Power corresponding to a given average temperature can be determined by manipulating this equation to the following form:

$$P = (T_{av} - T_\infty) \cdot (1/(4k\pi R) + 1/(14k\pi R))^{-1}.$$

Using the values described above and limiting the power based on an average temperature of 265 °C, a value of 4.1 kW is calculated for the maximum power.

7.3.4 Maximum Sustainable Power, Temperature, and Duration

Maximum mobilization rate of uranium and plutonium in SNF:

It is assumed that mobilization is much slower than dissolution so that removal is solubility limited (Assumption 4.3.20).

WP area (horizontal cross section through the axis) = 6.62 m^2.

Infiltration rate = 10 mm/yr (or 1 mm/yr with 10x concentration) (Ref. 5.18 and Assumption 4.3.16).

Solubility of U and Pu = 2000 ppm (g UO_2/ton water) (conservatively taken to be approximately the maximum of solubility for both U and Pu, Ref. 5.18, p. 6-29).

Mass mobilized/yr = (2000 g UO_2/ton water) x (6.62x0.01 tons/yr) = 132 g/yr, for a single waste package.

For reference: Time to remove 10 tons of U plus Pu: $10^7/132$ = 75,800 years (note: more than 1 waste package of SNF).

Maximum sustainable power:

Approximately 1.23 g/day of U-235 is consumed per megawatt of power if the fissions are induced primarily by thermal neutrons (Ref. 5.20, p. 78) and the production of other fissile isotopes is ignored. The maximum infiltration rate of UO_2 was calculated to be 132 g/year per WP above and the weight fraction of U-235 in the UO_2 was calculated to be 0.017 as shown in the spreadsheet included in Attachment VII. Multiplying these two numbers together provides a U-235 infiltration rate of 2.244 g/year which would support a burnup of 1.824 MWd. Dividing the burnup possible for the maximum infiltration rate by the number of days in the year (365.25) provides a maximum steady state power of 0.004995 MW (4.995 kW) which can be maintained by the criticality. This result indicates that 22% more fissile material could enter the critical volume than could be consumed based on the temperature limited power calculated above.

However, the Oklo experience suggests that a natural reactor can only be burned down to an effective enrichment $^{235}U/(^{238}U+^{235}U)$ of 1.37% (see Assumption 4.3.8) so the sustainable power is limited to:

$$4995*(1.94-1.37)/1.94 = 1468 \text{ W},$$

where 1.94 is the % fissile content in the design basis fuel after discharge (Ref. 5.52, p. 40).

The criticality duration is determined by the 100,000 year hydrologic cycle divided into four subcycles having power levels determined by the cycle average for that 25,000 year time period.

25,000 years at 132 g/yr UO_2 infiltration rate and power of 1468 W (125 °C)
25,000 years at 2/3*(132 g/yr) UO_2 infiltration rate and power of 979 W (99.0 °C)
25,000 years at 1/3*(132 g/yr) UO_2 infiltration rate and power of 489 W (73.0 °C)
25,000 years at 0 g/yr UO_2 infiltration rate and power of 0 W (47.4 °C)

The temperatures indicated above are the average temperatures of the critical spheres as calculated from the equations listed in Section 7.3.2. This cycle requires 6.6 metric tons of UO_2 from a second waste package to sustain the criticality under this scenario.

7.4 External Criticality, Neutronics Evaluation

The neutronic evaluation procedure for the far-field criticality involves five tasks as indicated below:

1) MCNP model and k_{eff} calculation based on initial composition.

2) SAS2H model and burn calculation for 1, 10, 100, 1000, 5000, and 10,000 year events.

3) ORIGEN-S decay calculations for the 1000, 5000, and 10,000 year events.

4) Spreadsheet calculations of compositions from various duration criticality events.

5) MCNP calculations (recomputation of k_{eff}) based on compositions from the various duration criticality events.

The details of each task, along with the results, are provided in the following five subsections.

7.4.1 Reference MCNP Calculation for Initial Composition

A reference MCNP case using the initial homogeneous composition was set up based on a previously developed MCNP model (Ref. 5.55, Sections 7.4.2, 7.4.3). The model is composed of an inner spherical region 140 cm in radius containing the tuff/water/UO_2 mixture and an outer reflector region 60 cm thick containing a 40% porosity tuff/water mixture. This initial case was run based on compositions representative of a temperature of 300 K. A second case was run based on the ambient conditions described in Section 7.3.1 in which water densities were adjusted to a density of 0.990 g/cm^3 corresponding to a temperature of 50 °C (323 K) and a pressure of 5.07 MPa (50 atm). A third case was run based on the average temperature of 538 K (265 °C) in the fuel region which corresponds to the 4 kW power level. Cross sections are not available for exactly the 4 kW power conditions so the closest available were used. Hydrogen thermal cross section data representative of 400 K (lwtr.02t) was used for the reflector and of 500 K (lwtr.03t) for the inner region. Cross sections for H, O, U-235, and U-238 representative of 600 K were used in the inner region. The k_{eff} results are shown in Table 7.4.1-1. The input and pertinent output are included in Attachments IX, X, and XI. These results indicate that the temperature calculated for a 4 kW power level would drive the criticality on a negative transient

(reduce power). Determination of actual powers would require dynamic analysis which is beyond the scope of the present report and the capability of MCNP with the limited temperature dependance of the current library. These results do indicate that operation at this temperature (power) will provide conservative overestimates of any radioisotopes which may be produced.

Table 7.4.1-1. Variation of k_{eff} with Temperature for an External Criticality

Temperature (K)	300	323	538
$k_{eff} \pm 2\sigma$	0.9776 ± 0.0016	0.9772 ± 0.0015	0.9424 ± 0.0020

The previous external criticality analysis (Ref. 5.55) used a fresh fuel bias and uncertainty of -0.015 in k_{eff}, because power level and duration of criticalities were not considered. The burnup of fuel and the production of fission products will introduce additional bias and uncertainty. For this analysis, an additional bias and uncertainty of -0.005 in k_{eff} is applied to account for burnup effects. This bias and uncertainty is applied uniformly to all results, fresh and burned, in order to provide a consistent comparison base between results. As will be shown in Section 7.4.5, the additional bias and uncertainty of -0.005 in k_{eff} bounds the worth of fission products at 1000 years. With the application of a total bias and uncertainty of -0.020 in k_{eff}, the 300 K and the 323 K cases would be slightly supercritical.

7.4.2 SAS2H Burnup Calculations

SAS2H cases were set up for critical events lasting 1, 10, 100, 1000, 5000 and 10,000 years at a power level which was rounded to 4 kW corresponding to the scenario described in Section 7.3.4 where power is limited by the boiling point of water. The material descriptions in weight fractions and densities were taken directly from print table 40 in the MCNP case output included in Attachment XI. The isotopes and corresponding weight fractions from Attachment XI are listed in Table 7.4.2-1. The density of the tuff/water/UO_2 region is 2.6344 g/cm^3 and the density of the reflector region is 1.9053 g/cm^3. The temperatures for materials are entered in Kelvin and are 538 K (265 °C) for the fuel region and 323 K (50 °C) for the reflector region. SAS2H does not have a spherical geometry option. The most suitable cell geometry option available in SAS2H for the burnup calculation is an infinite slab (symmslabcell option). The fuel region is modeled as a 280 cm thick slab and a 60 cm thick reflector region is added on each side. Because three regions are required in the model, the reflector is broken into two regions. The volume of the fuel region is calculated as $4/3\pi(140\text{ cm})^3$ and is entered as "volfueltot=1.1494E7." All grams and curies tables for the isotopes in the output are normalized to this volume.

Table 7.4.2-1. Isotopic/Elemental Weight Fractions for External Criticality SAS2H Cases

Material ID	Weight Fraction	Material ID	Weight Fraction	Material ID	Weight Fraction	Material ID	Weight Fraction
Tuff/Water/UO_2 Region							
1001	0.01055	8016	0.40755	11023	0.00570	12000	0.00354
13027	0.04434	14000	0.20193	19000	0.01370	20000	0.01439
26000	0.00494	92234	0.00007	92235	0.00567	92236	0.00136
92238	0.28593	93237	0.00033	-	-	-	-
Tuff/Water Reflector Region							
1001	0.02326	8016	0.57779	11023	0.00789	12000	0.00490
13027	0.06130	14000	0.27919	19000	0.01894	20000	0.01989
26000	0.00683	-	-	-	-	-	-

The operating time was adjusted for each of the burn cases. A five year (1826.25 day) down time was added to the end of each case to provide decay compositions for comparison with those from the follow-on ORIGEN-S cases described in Section 7.4.3. Note that the infiltration of UO_2 during the criticality cannot be modeled in SAS2H and is accounted for in the number density calculations described in Section 7.4.4.

The input and relevant output from each of the six SAS2H cases are listed in Attachments XIII through XVIII.

As a check of the effect of burn step size, the 1000 year case with a step size of 100 years was compared with the 1000 year print of the 10,000 year case with a step size of 1000 years. The order of ranking per absorption rate of the top 15 fission products listed in the "fraction of total absorption rate" tables in the outputs for the 1000 year time print included in Attachments XVI and XVIII are the same and the absorption rates vary between cases less than 3%. The actinides "nuclide concentrations" in gram atoms for the same times also indicate that the major nuclides U-233, U-234, U-235, U-236, U-238, and Np-237 match. The Pu isotopes are overpredicted by 4% or less in the 10,000 year case (1000 year timesteps). These results are acceptable and conservative.

The burnup associated with each of the criticality durations is shown in the Table 7.4.2-2 along with the masses of the major fissile isotopes (U-235 and Pu-239).

Table 7.4.2-2. Burnup and Fissile Composition Changes Associated with Criticality Duration

Duration of Criticality (Years)	1	10	100	1000	5000	10,000
Burnup (MWd)	1.461E00	1.461E01	1.461E02	1.461E03	7.305E03	1.461E04
Mass of U-235 (kg)	1.72E02	1.72E02	1.71E02	1.70E02	1.63E02	1.56E02
Mass of Pu-239 (kg)	1.18E-3	1.21E-2	1.19E-1	1.15E00	5.18E00	9.03E00

A SAS2H case was set up for critical event corresponding to the 100,000 year hydrologic cycle described in Section 7.3.4 where power is limited by a time dependent UO_2 infiltration rate. The case models three 25,000 year periods of decreasing power as described in Section 7.3.4 followed by a 25,000 year decay period. The base material description was the same as described above. The average temperature for each period was set with the temkcyc variable for the corresponding power level. The total burnup for this case is 2.681E4 MWd. At the end of the 75,000 years at power the U-235 and Pu-239 masses are 154 and 5.81 kg, respectively. The input and summarized output for this case is included in Attachment XIX.

7.4.3 ORIGEN-S Decay Calculations

Simple, decay only, ORIGEN-S cases were set up with decay times out to 999,999 years for the 1000, 5000, and 10,000 year duration criticality cases. The input was the same for each case except for titles which include the criticality duration for the 1000 and 5000 year cases. The entire output (including echo of input) is included in Attachments XX through XXII for the 1000, 5000, and 10,000 year duration criticalities, respectively. The ORIGEN-S case was run immediately after the corresponding SAS2H case and utilized the final binary cross section file on unit 21 from the SAS2H case. The case correspondence by attachment number is XVI/XX, XVII/XXI, and XVIII/XXII. The fact that the correct library is used (unit 21) is verified by comparing the final downtime print of concentrations in the SAS2H output with the concentrations in the corresponding decay times in the ORIGEN-S output (compositions will match). The library contains only the final cycle step (1 position in library). The library unit number and data position are entered in the input (3$$ card).

The decay times are grouped in 10 steps with the units changing from days to years as appropriate. The activity of isotopes of concern are shown in Tables 7.4.3-1, -2, and -3. The activities are listed for 0, 10,000, 20,000, 50,000, 100,000, and 250,000 year decay times. Data for additional decay times and isotopes can be found in the outputs included in Attachments XX through XXII. Because the SAS2H case was set up on the appropriate volume, the activities and masses listed in the output are per critical volume.

The same ORIGEN decay case was run in conjunction with the 100,000 year geologic cycle and the activity of isotopes of concern are shown in Table 7.4.3-4. Data for additional decay times and isotopes can be found in the output included in Attachment XXIII. The input and output for the case is included in Attachment XXIII and was run in conjunction with the SAS2H case

included in Attachment XIX.

7.4.4 Burnup Compositions

Number densities for the homogeneous mixtures accounting for burnup and production of isotopes were calculated for each criticality from 1 to 10,000 years duration as well as the 100,000 year geologic cycle criticality. The tuff composition portion of the mixture remained constant. The component densities for UO_2 with burnup and fission products were calculated from the grams/assembly output for the "initial" decay column of data from the SAS2H outputs included in Attachments XIII through XIX by dividing by the volume of the criticality. The component density was incorporated into the equation for number density as shown below (Ref. 5.20, p. 34):

$$N = \rho N_A / M$$

where, ρ is the physical density in g/cm^3, N_A is Avagadro's Number - 0.602252E+24 atoms/mole (Ref. 5.43), and M is the gram atomic weight.

The units of the resulting number density is in atoms/cm^3. The required units for subsequent use are atoms/barn-cm where 1 barn equals 10^{-24} cm^2. The calculations in the spreadsheet (Attachment VII) drop the E+24 from Avagadro's Number to account for the conversion.

The top 15 fission products from the standpoint of absorption were identified from the "fraction of total absorption rate" tables for the last burn step of each case which can be found in the SAS2H outputs included in Attachments XIII through XIX. Two exceptions to this were made in the 1 and 10 year duration criticality cases. Pm-147 and Eu-155 show up in the top 15 absorbers for these cases but no cross sections exist in the MCNP library. Sm-147 and Gd-155, which are the daughter products of Pm-147 and Eu-155, respectively, were substituted. An isotopic cross section for Cd-113 is not available in the MCNP cross sections, so the Cd isotopes from 110 to 116 were summed and the Cd elemental cross section was used in all cases. In addition, the mass of Xe-135 was not printed in the SAS2H outputs because it falls below a threshold for listing, even though its absorption rate is significant and it shows up in the absorption rate tables. The Xe-135 mass used in the 1 year and 10 year compositions was taken from the first "nuclide concentrations, grams" for fission products in the charge column in the 1000 year duration criticality ORIGEN-S case (Attachment XX), which has a significantly lower print threshold. Because of its short half-life (~ 9 hours) the mass of Xe-135 will remain relatively constant through all the cases. The value was rounded to 8.7E-5 grams of X-135.

Two variations of the number density calculations were run to account for the extreme UO_2 infiltration cases of 132 g/year and 0 g/year after initiation of the criticality. In the maximum infiltration rate case, the number densities for the UO_2 feed isotopes U-234, U-235, U-236, U-238, and Np-237 were multiplied by the quantity (132 g/fuel region volume (cm^3)/10.96 g/cm^3)

Table 7.4.3-1. Additional TSPA-95 Radionuclide Inventory (in Ci) Generated by a 1000 Year External Criticality (initial inventory at the end of criticality with subsequent decay)

Isotope	Initial	10,000yr	20,000yr	50,000yr	100,000yr	250,000yr
ac227	7.62E-03	7.65E-02	1.32E-01	2.44E-01	3.26E-01	3.68E-01
am241	8.40E-02	1.01E-08	1.14E-15	3.53E-18	5.97E-20	2.90E-25
am242m	7.96E-05	3.56E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
am243	1.19E-08	4.66E-09	1.82E-09	1.08E-10	9.83E-13	7.34E-19
c 14	5.01E-06	1.49E-06	4.46E-07	1.18E-08	2.79E-11	3.66E-19
cm244	5.20E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
cm245	2.08E-16	9.20E-17	4.07E-17	3.52E-18	5.96E-20	2.90E-25
cm246	3.19E-19	7.37E-20	1.70E-20	2.10E-22	1.38E-25	0.00E+00
cs135	6.67E-02	6.65E-02	6.63E-02	6.57E-02	6.48E-02	6.19E-02
i129	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.13E-03
nb 93m	6.26E-02	6.38E-02	6.35E-02	6.27E-02	6.13E-02	5.72E-02
nb 94	1.92E-06	1.36E-06	9.68E-07	3.47E-07	6.30E-08	3.76E-10
np237	7.03E+00	7.01E+00	6.99E+00	6.92E+00	6.81E+00	6.48E+00
pa231	7.87E-03	7.65E-02	1.32E-01	2.43E-01	3.26E-01	3.68E-01
pb210	2.15E-02	1.02E+00	2.07E+00	4.57E+00	7.27E+00	8.69E+00
pd107	7.17E-04	7.16E-04	7.16E-04	7.13E-04	7.10E-04	6.98E-04
pu238	9.54E+01	7.82E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
pu239	7.15E+01	5.36E+01	4.02E+01	1.70E+01	4.03E+00	5.40E-02
pu240	1.25E+00	4.33E-01	1.51E-01	6.34E-03	3.22E-05	4.24E-12
pu241	2.25E-01	9.21E-17	4.07E-17	3.53E-18	5.97E-20	2.90E-25
pu242	8.70E-08	9.05E-08	8.88E-08	8.40E-08	7.66E-08	5.80E-08
ra226	2.28E-02	1.02E+00	2.07E+00	4.57E+00	7.27E+00	8.70E+00
ra228	1.31E-07	1.45E-06	2.78E-06	6.74E-06	1.33E-05	3.31E-05
se 79	3.12E-03	3.06E-03	2.99E-03	2.81E-03	2.53E-03	1.85E-03
sm151	1.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
sn126	1.03E-02	9.66E-03	9.01E-03	7.32E-03	5.17E-03	1.83E-03
tc 99	6.76E-01	6.54E-01	6.33E-01	5.74E-01	4.87E-01	2.98E-01
th229	1.30E-03	1.19E-01	3.37E-01	1.10E+00	2.23E+00	4.35E+00
th230	1.21E-01	1.27E+00	2.30E+00	4.73E+00	7.17E+00	8.58E+00
th232	1.32E-07	1.45E-06	2.78E-06	6.74E-06	1.33E-05	3.31E-05
u233	3.04E-02	3.28E-01	6.12E-01	1.39E+00	2.46E+00	4.46E+00
u234	1.34E+01	1.31E+01	1.28E+01	1.20E+01	1.08E+01	8.09E+00
u235	3.67E-01	3.68E-01	3.68E-01	3.69E-01	3.70E-01	3.70E-01
u236	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.67E+00	2.66E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
zr 93	6.41E-02	6.38E-02	6.35E-02	6.27E-02	6.13E-02	5.72E-02
Total	2.10E+02	8.50E+01	7.50E+01	6.00E+01	5.50E+01	5.70E+01

Table 7.4.3-2. Additional TSPA-95 Radionuclide Inventory (in Ci) Generated By a 5000 Year External Criticality (initial inventory at the end of criticality with subsequent decay)

Isotope	Initial	10,000yr	20,000yr	50,000yr	100,000yr	250,000yr
ac227	3.97E-02	9.99E-02	1.49E-01	2.48E-01	3.23E-01	3.63E-01
am241	3.62E+00	4.14E-07	1.94E-13	1.24E-14	2.09E-16	1.02E-21
am242m	5.17E-03	2.31E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
am243	6.76E-06	2.64E-06	1.03E-06	6.13E-08	5.56E-10	4.16E-16
c 14	1.99E-05	5.94E-06	1.77E-06	4.70E-08	1.11E-10	1.45E-18
cm244	3.28E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
cm245	7.28E-13	3.22E-13	1.43E-13	1.23E-14	2.09E-16	1.02E-21
cm246	6.12E-15	1.41E-15	3.27E-16	4.03E-18	2.65E-21	7.53E-31
cs135	3.34E-01	3.33E-01	3.32E-01	3.29E-01	3.24E-01	3.10E-01
i129	5.83E-03	5.83E-03	5.83E-03	5.82E-03	5.81E-03	5.77E-03
nb 93m	3.17E-01	3.15E-01	3.14E-01	3.09E-01	3.03E-01	2.83E-01
nb 94	1.08E-05	7.70E-06	5.47E-06	1.96E-06	3.56E-07	2.12E-09
np237	6.98E+00	6.96E+00	6.94E+00	6.87E+00	6.76E+00	6.44E+00
pa231	3.97E-02	9.98E-02	1.49E-01	2.48E-01	3.23E-01	3.63E-01
pb210	3.61E-01	1.53E+00	2.61E+00	5.15E+00	7.89E+00	9.21E+00
pd107	5.05E-03	5.04E-03	5.04E-03	5.02E-03	4.99E-03	4.91E-03
pu238	9.40E+01	5.08E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
pu239	3.22E+02	2.41E+02	1.81E+02	7.64E+01	1.81E+01	2.43E-01
pu240	2.45E+01	8.53E+00	2.97E+00	1.25E-01	6.34E-04	8.34E-11
pu241	4.61E+00	3.23E-13	1.43E-13	1.24E-14	2.09E-16	1.02E-21
pu242	2.07E-05	2.06E-05	2.02E-05	1.91E-05	1.74E-05	1.32E-05
ra226	3.61E-01	1.53E+00	2.61E+00	5.16E+00	7.89E+00	9.21E+00
ra228	6.67E-07	2.02E-06	3.38E-06	7.45E-06	1.42E-05	3.45E-05
se 79	1.55E-02	1.52E-02	1.49E-02	1.40E-02	1.26E-02	9.19E-03
sm151	1.53E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
sn126	5.69E-02	5.31E-02	4.95E-02	4.02E-02	2.84E-02	1.01E-02
tc 99	3.35E+00	3.24E+00	3.14E+00	2.84E+00	2.41E+00	1.47E+00
th229	2.85E-02	1.96E-01	4.31E-01	1.19E+00	2.30E+00	4.36E+00
th230	6.12E-01	1.79E+00	2.84E+00	5.32E+00	7.78E+00	9.09E+00
th232	6.67E-07	2.02E-06	3.38E-06	7.45E-06	1.42E-05	3.45E-05
u233	1.48E-01	4.38E-01	7.16E-01	1.47E+00	2.52E+00	4.47E+00
u234	1.42E+01	1.39E+01	1.36E+01	1.27E+01	1.14E+01	8.48E+00
u235	3.53E-01	3.56E-01	3.58E-01	3.62E-01	3.64E-01	3.64E-01
u236	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.73E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
zr 93	3.17E-01	3.15E-01	3.14E-01	3.09E-01	3.03E-01	2.83E-01
Total	5.00E+02	2.90E+02	2.20E+02	1.20E+02	7.50E+01	6.10E+01

Table 7.4.3-3. Additional TSPA-95 Radionuclide Inventory (in Ci) Generated By a 10,000 Year External Criticality (initial inventory at the end of criticality with subsequent decay)

Isotope	Initial	10,000yr	20,000yr	50,000yr	100,000yr	250,000yr
ac227	8.05E-02	1.30E-01	1.71E-01	2.55E-01	3.21E-01	3.56E-01
am241	1.21E+01	1.38E-06	3.08E-12	2.43E-13	4.11E-15	2.00E-20
am242m	1.79E-02	8.02E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
am243	6.91E-05	2.70E-05	1.05E-05	6.27E-07	5.69E-09	4.25E-15
c 14	3.08E-05	9.18E-06	2.74E-06	7.26E-08	1.71E-10	2.25E-18
cm244	3.35E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
cm245	1.43E-11	6.33E-12	2.80E-12	2.42E-13	4.11E-15	1.99E-20
cm246	2.26E-13	5.22E-14	1.21E-14	1.49E-16	9.79E-20	2.79E-29
cs135	6.70E-01	6.68E-01	6.66E-01	6.60E-01	6.50E-01	6.21E-01
i129	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.18E-02
nb 93m	6.25E-01	6.22E-01	6.20E-01	6.11E-01	5.98E-01	5.58E-01
nb 94	2.74E-05	1.95E-05	1.38E-05	4.97E-06	9.01E-07	5.37E-09
np237	6.93E+00	6.91E+00	6.89E+00	6.82E+00	6.71E+00	6.39E+00
pa231	8.04E-02	1.30E-01	1.71E-01	2.55E-01	3.21E-01	3.56E-01
pb210	9.53E-01	2.18E+00	3.28E+00	5.88E+00	8.64E+00	9.83E+00
pd107	1.31E-02	1.30E-02	1.30E-02	1.30E-02	1.29E-02	1.27E-02
pu238	9.30E+01	1.76E-23	0.00E+00	0.00E+00	0.00E+00	0.00E+00
pu239	5.61E+02	4.21E+02	3.16E+02	1.33E+02	3.16E+01	4.24E-01
pu240	7.28E+01	2.53E+01	8.81E+00	3.70E-01	1.88E-03	2.48E-10
pu241	1.36E+01	6.34E-12	2.81E-12	2.43E-13	4.11E-15	2.00E-20
pu242	1.51E-04	1.49E-04	1.47E-04	1.39E-04	1.26E-04	9.57E-05
ra226	9.53E-01	2.18E+00	3.28E+00	5.88E+00	8.65E+00	9.83E+00
ra228	1.35E-06	2.75E-06	4.16E-06	8.37E-06	1.54E-05	3.64E-05
se 79	3.09E-02	3.03E-02	2.97E-02	2.78E-02	2.51E-02	1.83E-02
sm151	1.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
sn126	1.24E-01	1.15E-01	1.08E-01	8.75E-02	6.18E-02	2.19E-02
tc 99	6.62E+00	6.41E+00	6.20E+00	5.62E+00	4.77E+00	2.91E+00
th229	9.73E-02	3.02E-01	5.49E-01	1.30E+00	2.37E+00	4.38E+00
th230	1.24E+00	2.45E+00	3.52E+00	6.04E+00	8.53E+00	9.70E+00
th232	1.35E-06	2.75E-06	4.16E-06	8.37E-06	1.54E-05	3.64E-05
u233	2.85E-01	5.68E-01	8.37E-01	1.57E+00	2.59E+00	4.48E+00
u234	1.51E+01	1.48E+01	1.45E+01	1.35E+01	1.21E+01	8.96E+00
u235	3.38E-01	3.43E-01	3.47E-01	3.53E-01	3.56E-01	3.57E-01
u236	2.83E+00	2.84E+00	2.85E+00	2.85E+00	2.84E+00	2.83E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
zr 93	6.25E-01	6.22E-01	6.20E-01	6.11E-01	5.98E-01	5.58E-01
Total	8.10E+02	4.90E+02	3.70E+02	1.90E+02	9.50E+01	6.60E+01

Table 7.4.3-4. Additional TSPA-95 Radionuclide Inventory (in Ci) Generated By a 100,000 Year External Criticality (initial inventory at the end of criticality with subsequent decay)

Isotope	Initial	10,000yr	20,000yr	50,000yr	100,000yr	250,000yr
ac227	3.40E-01	3.39E-01	3.38E-01	3.39E-01	3.42E-01	3.44E-01
am241	3.03E-01	3.44E-08	5.18E-14	3.99E-15	6.75E-17	3.28E-22
am242m	5.40E-05	2.41E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
am243	8.31E-06	3.24E-06	1.27E-06	7.54E-08	6.84E-10	5.11E-16
c 14	5.62E-06	1.68E-06	5.00E-07	1.33E-08	3.13E-11	4.10E-19
cm244	4.94E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
cm245	2.35E-13	1.04E-13	4.60E-14	3.98E-15	6.74E-17	3.27E-22
cm246	2.84E-15	6.56E-16	1.52E-16	1.87E-18	1.23E-21	3.42E-31
cs135	1.21E+00	1.21E+00	1.21E+00	1.20E+00	1.18E+00	1.13E+00
i129	2.18E-02	2.18E-02	2.18E-02	2.17E-02	2.17E-02	2.15E-02
nb 93m	1.13E+00	1.12E+00	1.12E+00	1.10E+00	1.08E+00	1.01E+00
nb 94	1.03E-04	7.31E-05	5.19E-05	1.86E-05	3.38E-06	2.02E-08
np237	6.72E+00	6.70E+00	6.67E+00	6.61E+00	6.50E+00	6.20E+00
pa231	3.40E-01	3.39E-01	3.38E-01	3.39E-01	3.42E-01	3.44E-01
pb210	7.06E+00	7.73E+00	8.32E+00	9.63E+00	1.09E+01	1.02E+01
pd107	2.33E-02	2.33E-02	2.33E-02	2.32E-02	2.31E-02	2.27E-02
pu238	1.12E+01	5.30E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
pu239	3.60E+02	2.70E+02	2.03E+02	8.56E+01	2.03E+01	2.72E-01
pu240	1.33E+01	4.64E+00	1.61E+00	6.78E-02	3.45E-04	4.53E-11
pu241	3.05E-01	1.04E-13	4.60E-14	3.99E-15	6.75E-17	3.28E-22
pu242	4.65E-05	4.56E-05	4.48E-05	4.24E-05	3.86E-05	2.92E-05
ra226	7.06E+00	7.73E+00	8.32E+00	9.63E+00	1.09E+01	1.03E+01
ra228	1.06E-05	1.21E-05	1.35E-05	1.80E-05	2.53E-05	4.74E-05
se 79	5.22E-02	5.11E-02	5.01E-02	4.70E-02	4.23E-02	3.09E-02
sm151	2.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
sn126	1.73E-01	1.61E-01	1.50E-01	1.22E-01	8.63E-02	3.05E-02
tc 99	1.06E+01	1.03E+01	9.94E+00	9.01E+00	7.65E+00	4.67E+00
th229	1.57E+00	1.77E+00	1.98E+00	2.55E+00	3.34E+00	4.79E+00
th230	7.23E+00	7.88E+00	8.44E+00	9.71E+00	1.07E+01	1.01E+01
th232	1.06E-05	1.21E-05	1.35E-05	1.80E-05	2.53E-05	4.74E-05
u233	1.80E+00	2.01E+00	2.21E+00	2.75E+00	3.50E+00	4.86E+00
u234	1.48E+01	1.45E+01	1.42E+01	1.33E+01	1.19E+01	8.79E+00
u235	3.32E-01	3.35E-01	3.37E-01	3.41E-01	3.44E-01	3.44E-01
u236	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.98E+00	2.97E+00
u238	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00
zr 93	1.13E+00	1.12E+00	1.12E+00	1.10E+00	1.08E+00	1.01E+00
Total	4.50E+02	3.40E+02	2.80E+02	1.60E+02	9.60E+01	7.00E+01

and the resulting product was added to the number density calculated from the mass entered from the SAS2H output shown in the spreadsheet. Oxygen was adjusted for the additional material while also being adjusted down for the displaced water. Hydrogen was adjusted down to account for the displaced water by the volume fraction of UO_2 added (quantity described above). In the 0 g/yr infiltration rate case, number densities were calculated directly from the SAS2H masses for actinides and fission products and the water number densities were maintained constant.

The calculations and results are shown in the LOTUS 1-2-3 spreadsheet included in Attachment VII.

7.4.5 Check of Reactivity Changes With Time Due to Criticality

The MCNP base case for 538 K described in Section 7.4.1 was used with the number densities calculated in the previous section for the 3 criticality durations from 1000 to 10,000 years. The results of the MCNP cases are shown in Table 7.4.5-1 (Attachment numbers shown in parentheses). These cases demonstrate that the system reactivity is not significantly affected by the continued infiltration of material or by the burnup of fissile material and generation of fission products. The burnup is only 1.45 GWd/MTU (1.461E4 GWd/ 10.1 MTU) even after 10,000 years and at the maximum infiltration rate only adds 1.3 metric tons of UO_2. As indicated by the results in Reference 5.55, very large changes in the characteristics of these very large thermal systems are required to significantly change the k_{eff} value.

Table 7.4.5-1. MCNP Case Results to Demonstrate Reactivity Changes with Time

Time (years)	132 g/yr UO_2 Infiltration	0 g/yr UO_2 Infiltration
0.00	0.9424 ± 0.0020 (XI)	-
1000	0.9395 ± 0.0019 (XXV)	0.9373 ± 0.0018 (XXVIII)
5000	0.9417 ± 0.0016 (XXVI)	0.9348 ± 0.0016 (XXIX)
10,000	0.9453 ± 0.0019 (XXVII)	0.9336 ± 0.0016 (XXX)

Two additional cases were run for the 1000 year duration criticality with high UO_2 infiltration. In one case the fission products were removed providing a k_{eff} of 0.9440 ± 0.0018 (XXXI). In the other case Pu-238, Pu-239, and U-233 were removed providing a k_{eff} of 0.9349 ± 0.0016 (XXXII). This represents a nominal worth compared to the reference case above (XXV) of -0.48% and 0.49% for fission products and Pu, respectively at 1000 years. These same two cases were also run for the 10,000 year duration criticality with high UO_2 infiltration. For the case with fission products removed, a k_{eff} of 0.9556 ± 0.0019 (XXXIII) was calculated and for the case with Pu-238, Pu-239, and U-233 removed, a k_{eff} of 0.9090 ± 0.0018 (XXXIV) was calculated. This represents a nominal worth compared to the reference case above (XXVII) of -1.09% and +3.84% for fission products and Pu, respectively at 10,000 years.

In order to demonstrate that the top 15 fission product absorbers were sufficient to cover fission

product effects, the next 16 highest fission product absorbers were reviewed for inclusion in an additional case based on the 10,000 year duration criticality with high UO_2 infiltration. The "fraction of total absorption rate" table for the last burn step of the 10,000 year duration case which can be found in the SAS2H output included in Attachments XVIII provides the absorption data. Five of these next highest fission product absorbers do not have cross sections available for MCNP and were discarded. The other eleven of these absorbers were added to the 10,000 year composition in the MCNP case providing a k_{eff} of 0.9448 ± 0.0018 (XXXV). Comparison of this result with that which included only 15 fission products demonstrates that the 15 fission products are sufficient.

The MCNP base case for 323 K (50 °C) described in Section 7.4.1 was used with the number densities calculated in the previous section for the 100,000 year hydrologic cycle. The results of the MCNP cases are a k_{eff} of 0.9994 ± 0.0019 (XXXVI) for the UO_2 infiltration case and 0.9477 ± 0.0017 (XXXVII) for no UO_2 infiltration. Note that these calculations are performed at 323 K while those reported above were performed at 538 K, representative of the respective power levels. At the variable infiltration rate, 6.6 metric tons of UO_2 are added displacing water over the 75,000 years of operation.

7.5 Probability Estimates

7.5.1 Summary of Prior Probability Estimates

The principal contribution to the probability of internal criticality (Refs. 5.8 and 5.9) came from a combination of the following events or processes:

- A given waste package has sufficiently reactive fuel.
- Hydraulically conductive fracture, or focusing, over the waste package.
- Increased infiltration rate (at least 10 times present value) within some time, T_1.
- Given the increased flow, the waste package barriers are breached within some time, T_2, after T_1.
- Given the barrier breach, a sufficient quantity of neutron absorber is removed from the waste package within some time, T_3, after $T_1 + T_2$.
- Water which has filled the waste package does not corrode through the inner barrier at the bottom of the waste package lying on its side.

The result, for the uncanistered fuel waste package was an expectation of less than 1 criticality in 80,000 years (Ref. 5.8, p. 55).

The principal contribution to the probability of external criticality (Ref. 5.52) came from a combination of the following events or processes:

- The number of waste packages having sufficient fissile content to provide a critical mass for a reducing zone in the repository far-field.
- The probability that a fissile bearing stream from a waste package having sufficient fissile content will encounter a single reducing zone, based on the distribution of

organic/carbonaceous deposits on the Colorado Plateau.

- The probability of the reducing zone being of sufficient size (based on the random juxtaposition of individual organic/carbonaceous deposits) to trap a critical mass.

The result is that the expected number of external criticalities from commercial SNF, over an arbitrarily long time period, is less than $2x10^{-7}$ (Ref. 5.52, p. 41, which was the highest value found in that analysis, although it was for a configuration different from the principal case in this analysis).

7.5.2 Data Needs for Future Probability Estimates

The following paragraphs identify the items of information which are expected to become available within the next year and will enable improvement of the accuracy of the probability estimates.

Internal criticality:

- Actual fracture density data from the Yucca Mountain tunnel at the repository horizon to more realistically estimate the probability of dripping on a given waste package and the associated concentration factor.
- Improved model of aqueous corrosion rate of the corrosion resistant inner barrier of the waste package, particularly as a function of temperature. This will facilitate the calculation of a probability density function for the criticality duration which is based on the length of time water can be contained in the WP to a depth sufficient to provide moderator for a critical mass of assemblies, including consideration of the increased temperature caused by the criticality (e.g., a peak temperature of 57°C versus the drift wall temperature of less than 50 °C beyond 10,000 years given in the TSPA-95 data (Ref 5.18).
- Improved model for corrosion of borated stainless steel and the metal borides contained in the stainless steel matrix.

External criticality:

- Fissile mobilization rate, which consists of the waste form dissolution rate and the solubility of the fissile species (since the solution is the medium for the removal of the fissile material from the waste package).
- Systematic identification of organic (carbonaceous) deposits and other reducing zones in tuff, characterizing their size and density. These parameters could replace the hypothetical log combination methodology used in Reference 5.52, particularly at the base of tuff layers.
- Identification of exceptionally high permeability formations below the water table which could focus the fissile bearing water from more than one waste package at a time (assuming that it could reach the water table without any lateral spreading).
- More data on the areal extent of highest grade ores at Oklo, to be used to generate a joint probability distribution for the occurrence of possible values of concentration and size, which will, in turn be used for an alternative estimate of the maximum possible size and concentration of any individual reducing zone. This may also serve to eliminate the

possibility of the high uranium, high water cases which were considered in Reference 5.52, but were rejected for the nominal case in this analysis for the reasons given in Section 7.3.1, above.

8. Conclusions

In compliance with the M&O Quality Administrative Procedures, the design results presented in this document should not be used for procurement, fabrication, or construction unless properly identified, tracked as TBV, and controlled by the appropriate procedures.

The purpose of this probabilistic evaluation was to estimate the consequences of a criticality event, both internal and external to a waste package. As a result of the calculations performed in this analysis, it can be concluded that:

- Maximum power determined by the boiling temperature of water is less than 5 kW.
- Duration is nominally less than 10,000 years, but can be cycled up to 100,000 years.
- Maximum sustainable power, as determined by the inflow of the worst case high concentration of fissile bearing water, is less than 1.5 kW.
- Change in k_{eff} over the duration of the criticality is small, for nominal 10,000 year duration and even for 100,000 year cycling due to temperature and UO_2 infiltration limited power.
- Increase in radionuclide inventory is small (both for a single package and for the number of packages which are likely to go critical).

9. Attachments -

List of Attachments

Attachment	Description	Date	Number of Pages
I	Derivation of Power-Temperature Relationship	8/28/96	2
II	LOTUS 1-2-3 Spreadsheet - Number Densities for Internal Criticality (ucfcalcs.wk4 sheet F)	8/30/96	4
III	MCNP Case - Internal Criticality 0 Year Duration (a26xb5cO.sum)	8/22/96	10
IV	MCNP Case - Internal Criticality 1000 Year Duration (a26xb5dO.sum)	8/23/96	10
V	MCNP Case - Internal Criticality 5000 Year Duration (a26xb5eO.sum)	8/22/96	10
VI	MCNP Case - Internal Criticality 10,000 Year Duration (a26xb5fO.sum)	8/22/96	10
VII	LOTUS 1-2-3 Spreadsheet - Tuff/Water/UO2 Mixture Number Densities (leshpher2.wk4 Sheet C)	8/29/96	10
VIII	LOTUS 1-2-3 Spreadsheet - Internal Criticality Radionuclide Inventory Comparisons	9/4/96	3
IX	MCNP Case - External Criticality 0 Year Duration, 300K (sp40aO.sum)	8/22/96	4
X	MCNP Case - External Criticality 0 Year Duration, 323K (sp40a2O.sum)	8/23/96	4
XI	MCNP Case - External Criticality 0 Year Duration, 538K (sp40a1O.sum)	8/22/96	4
XII	Not Used	n/a	n/a
XIII	SAS2H Case - External Criticality 1 Year Duration (tuff7.sum)	8/29/96	54
XIV	SAS2H Case - External Criticality 10 Year Duration (tuff6.sum)	8/29/96	56
XV	SAS2H Case - External Criticality 100 Year Duration (tuff5.sum)	8/29/96	59
XVI	SAS2H Case - External Criticality 1000 Year Duration (tuff3.sum)	8/29/96	100

Attachment	Description	Date	Number of Pages
XVII	SAS2H Case - External Criticality 5000 Year Duration (tuff2.sum)	8/29/96	64
XVIII	SAS2H Case - External Criticality 10,000 Year Duration (tuff1.sum)	8/29/96	102
XIX	SAS2H Case - External Criticality 100,000 Year Hydrologic Cycle (tuff9.sum)	9/3/96	231
XX	ORIGEN-S Case - Decay of 1000 Year Criticality (origen3.output)	8/28/96	231
XXI	ORIGEN-S Case - Decay of 5000 Year Criticality (origen2.output)	8/28/96	231
XXII	ORIGEN-S Case - Decay of 10,000 Year Criticality (origen1.output)	8/28/96	231
XXIII	ORIGEN-S Case - Decay of 100,000 Year Hydrologic Cycle Criticality (origen9.output)	8/29/96	231
XXIV	Not Used	n/a	n/a
XXV	MCNP Case - External Criticality 1000 Year Duration, 538K, UO_2 infiltration (sp40e1O.sum)	8/30/96	4
XXVI	MCNP Case - External Criticality 5000 Year Duration, 538K, UO_2 infiltration (sp40f1P.sum)	8/22/96	4
XXVII	MCNP Case - External Criticality 10,000 Year Duration, 538K, UO_2 infiltration (sp40g1O.sum)	8/30/96	4
XXVIII	MCNP Case - External Criticality 1000 Year Duration, 538K, No UO_2 infiltration (sp40e1nO.sum)	8/30/96	4
XXIX	MCNP Case - External Criticality 5000 Year Duration, 538K, No UO_2 infiltration (sp40f1nP.sum)	8/22/96	4
XXX	MCNP Case - External Criticality 10,000 Year Duration, 538K, No UO_2 infiltration (sp40g1nO.sum)	8/30/96	4
XXXI	MCNP Case - External Criticality 1000 Year Duration, 538K, UO_2 infiltration, No FP (sp40e1yO.sum)	8/30/96	4
XXXII	MCNP Case - External Criticality 1000 Year Duration, 538K, UO_2 infiltration, No U-233, Pu-238, Pu-239 (sp40e1zO.sum)	8/30/96	4
XXXIII	MCNP Case - External Criticality 10,000 Year Duration, 538K, UO_2 infiltration, No FP (sp40g1yO.sum)	8/30/96	4

Attachment	Description	Date	Number of Pages
XXXIV	MCNP Case - External Criticality 10,000 Year Duration, 538K, UO_2 infiltration, No U-233, Pu-238, Pu-239 (sp40g1zO.sum)	8/30/96	4
XXXV	MCNP Case - External Criticality 10,000 Year Duration, 538K, UO_2 infiltration, Extended FP (sp40g1xO.sum)	8/30/96	4
XXXVI	MCNP Case - External Criticality 100,000 Year Duration, 323K, UO_2 infiltration (sp40lO.sum)	8/30/96	4
XXXVII	MCNP Case - External Criticality 100,000 Year Duration, 323K, No UO_2 infiltration (sp40lnO.sum)	8/30/96	4

Derivation of Power-Temperature Relationship for External Criticality

The following formulas are valid in any consistent set of units. However SI (or MKS) is recommended, for which the units of distance is meters, temperature is Kelvin or Centigrade, and thermal conductivity is W/m·C.

The heat conduction equation in spherical coordinates, assuming spherical symmetry so that the derivatives with respect to angle are zero, and the system is in a steady state, is given in Reference 5.14, p. 6, Eq. 1-3(c):

$$\frac{1}{r}\frac{d^2}{dr^2}(rT) = -\frac{\dot{q}}{k},$$

where $\dot{q}$ is the power (heat generation rate) per unit volume and k is the thermal conductivity. Three forms of the solution are of interest:

Outside a sphere

There are no heat sources outside the sphere, so the right side of the heat conduction equation is zero. The solution is of the form:

$$T = c_1 + c_2/r.$$

This assumes a fixed temperature at large distances from the sphere, $c_1 = T_\infty$.

At the surface of the sphere, the temperature gradient is determined by the heat outflow per unit area. If the power generated inside the sphere is P, the boundary condition at the surface of the sphere (r=R) becomes:

$$\frac{dT}{dr}\Big|_{r=R} = -\frac{P}{4\pi k R^2},$$

which is satisfied if $c_2 = P/(4\pi k)$, so that the solution outside the sphere becomes:

$$T = T_\infty + P/(4k\pi r),$$

so that the temperature at the surface is determined by the temperature at infinity and the total power generated within the sphere as:

$$T_s = T_\infty + P/(4k\pi R).$$

Inside a sphere which is homogeneously heated

If the total power generated is P, homogeneously distributed in a sphere of radius R, the power per unit volume is $3P/(4\pi R^3)$. Integrating the heat conduction equation gives the solution:

$$T = T_s + P(1-r^2/R^2)/(8k\pi R),$$

where the two integration constants have been determined by the conditions that the temperature be finite at the center of the sphere (r=0) and that the temperature at the surface (r=R) be T_s.

The average temperature is computed by multiplying by $4\pi r^2$ and integrating from r=0 to r=R, and dividing the result by the volume of the sphere, $4\pi R^3/3$, to get:

$$T_{av} = T_s + P/(20k\pi R).$$

Inside a sphere with parabolic power density

The parabolic power density normalized to integrate to the total power P through the volume of a sphere of radius R is:

$$15P(1-r^2/R^2)/(8\pi R^3).$$

Using this power density on the right side of the heat conduction equation leads to the solution:

$$T = T_s + 7P/(32k\pi R) - 15P[r^2/(6R^2) - r^4/(20R^4)]/(8k\pi R),$$

where the two integration constants have been determined in the same manner as for the homogeneously heated case described above. Averaging this form over the sphere gives:

$$T_{av} = T_s + P/(14k\pi R).$$

BAS2H Number Density Worksheet: Consequence Analysis - Internal Criticality

Number Density = (mass/assembly) / (volume) * (Na) / (Aw) * correction to 95% density for fresh fu

Avogadro's Number [Na 0.602252

Atomic Weight [Aw]

Volume= PI X .468122 X .468122 X 360.172 X 206
= 81575.34

BAS2H UO2 density=10.206

Isotope List:

U mass=.454kg Correction to 95% density

UO2 mass= 526.38 kg 1.8300278

(REF. 5.43)

	Element	Symbol	Isotope	MCNP ID	Atomic Wei	ORIGINS ID
8	Oxygen	O	O-16	8016.80C	15.99492	
42	Molybdenu	Mo	nat.	42000.80C	95.94	
		Mo	Mo-95	42095.80C	94.90584	mo 95
43	Technetium	Tc	Tc-99*	43099.80C	98.90628	tc 99
44	Ruthenium	Ru	Ru-101	44101.80C	100.9056	ru101
45	Rhodium	Rh	Rh-103	45103.80C	102.9055	rh103
47	Silver	Ag	Ag-109	47109.80C	106.9048	ag109
48	Cadmium	Cd	nat.	48000.80C	112.4	
55	Cesium	Cs	Cs-133	55133.80C	132.9054	cs133
		Cs	Cs-135	55135.80C	134.9058	cs135
60	Neodymiu	Nd	Nd-143	60143.80C	142.9098	nd143
		Nd	Nd-145	60145.80C	144.9125	nd145
62	Samarium	Sm	Sm-147	62147.80C	146.9149	sm147
		Sm	Sm-149	62149.80C	148.9172	sm149
		Sm	Sm-150	62150.80C	149.9173	sm150
		Sm	Sm-151	62151.80C	150.9199	sm151
		Sm	Sm-152	62152.80C	151.9198	sm152
63	Europium	Eu	Eu-151	63151.85C	150.9198	eu151
		Eu	Eu-153	63153.85C	152.9212	eu153
		Eu	Eu-154	63154.80C	153.9231	eu154
64	Gadolinium	Gd	nat.	64000.35C	157.25	
		Gd	Gd-155	64155.80C	154.9227	gd155
		Gd	Gd-157	64157.80C	156.924	gd157
72	Hafnium	Hf	nat.	72000.80C	178.49	
92	Uranium	U	U-233	92233.80C	233.0395	u233
		U	U-234	92234.80C	234.0409	u234
		U	U-235	92235.80C	235.0439	u235
		U	U-236	92236.80C	236.0456	u236
		U	U-238	92238.80C	238.0508	u238
93	Neptunium	Np	Np-237	93237.85C	237.0481	np237
94	Plutonium	Pu	Pu-238	94238.80C	238.0495	pu238
		Pu	Pu-239	94239.85C	239.0521	pu239
		Pu	Pu-240	94240.80C	240.0538	pu240
		Pu	Pu-241	94241.80C	241.0567	pu241
		Pu	Pu-242	94242.80C	242.0587	pu242
		Pu	Pu-243	94243.35C	243.062	pu243
95	Americium	Am	Am-241	95241.80C	241.0567	am241
		Am	Am-242m	95242.80C	242.0595	am242m
		Am	Am-243	95243.80C	243.0614	am243
96	Curium	Cm	Cm-243	96243.35C	243.0614	cm243
		Cm	Cm-245	96245.35C	245.0654	cm245
		Cm	Cm-248	96248.35C	248.0722	cm248
	Xenon	Xe	Xe-131 *	54131.80c	130.9051	* AW from Chart of the Nuclides
		Xe	Xe-135 *	54135.80c	134.9063	

Number Density = grams/assembly / Assembly Volume * Avogadro's Number / Atomic Weight
* (Density Correction to 95% TD) * (Isotopic Correction Factor)

Time Effects Curve

BURNUP: PWR 20 GWd/MT PWR B&W 15x15, 3.60% , Burnup 20 GWd/MTHM

ENRICHMENT: 3.60% DECAY TIME: 15,000 YEARS

DECAY TIME: 15,000 YEARS Volume 81575.34 per 3.6% 20 G

ISOTOPE	GRAMS/	fraction		Aw	MCNP ID	Number Density
O 16	62377.28	0.120501	1	15.99492	8016.80C	4.6947E-02
mo 95	224	0.000433	1	94.90584	42095.80C	2.8413E-05
tc 99	219	0.000423	1	98.90628	43099.80C	2.6855E-05
ru101	218	0.000421	1	100.9056	44101.80C	2.6008E-05
rh103	144	0.000278	1	102.9055	45103.80C	1.6948E-05
ag109	21.9	0.000042	1	106.9048	47109.80C	2.4209E-06
nd143	269	0.00052	1	142.9098	60143.80C	2.2660E-05
nd145	203	0.000392	1	144.9125	60145.80C	1.6964E-05
sm147	89.7	0.000173	1	146.9149	62147.80C	7.3501E-06
sm149	1.42	2.7E-06	1	148.9172	62149.80C	1.1479E-07
sm150	80.4	0.000155	1	149.9173	62150.80C	6.4561E-06
sm151	0	0	1	150.9199	62151.80C	0.0000E+00
eu151	0.22	0.000012	1	150.9198	63151.85C	4.9615E-07
sm152	37.4	0.000072	1	151.9198	62152.80C	2.9636E-06
eu153	27	0.000052	1	152.9212	63153.85C	2.1255E-06
gd155	3.18	6.1E-06	1	154.9227	64155.80C	2.4790E-07
u233	2.43	4.7E-06	1	233.0395	92233.80C	1.8553E-07
u234	107	0.000207	1	234.0409	92234.80C	5.8037E-06
u235	7310	0.013828	1	235.0439	92235.80C	3.8828E-04
u236	1840	0.003748	1	236.0456	92236.80C	0.0940E-05
u238	442000	0.853857	1	238.0508	92238.80C	2.2352E-02
np237	841	0.001045	1	237.0481	93237.85C	3.7474E-05
pu238	0	0	1	238.0495	94238.80C	0.0000E+00
pu239	1720	0.003323	1	239.0521	94239.85C	8.6617E-05
pu240	139	0.000267	1	240.0538	94240.80C	6.8205E-06
pu241	2.34E-05	4.3E-11	1	241.0567	94241.80C	1.1985E-12
pu242	68.9	0.000133	1	242.0587	94242.80C	3.4268E-06
am241	7.04E-04	1.4E-08	1	241.0567	95241.80C	3.5168E-11
am242m	0	0	1	242.0595	95242.80C	0.0000E+00
am243	2.46	4.8E-06	1	243.0614	95243.80C	1.3164E-07
total	517851.3	1			Total	7.8057E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-3) * 11.8503E-3 fraction of O in UO2

62377.28

Effective density = 10.83682

Time Effects Curve

BURNUP: PWR 20 GWd/MT PWR B&W 15x15, 3.60% , Burnup 20 GWd/MTHM

ENRICHMENT: 3.60% DECAY TIME: 16000 YEARS

DECAY TIME: 16000 YEARS Volume 81575.34 per 3.6% 20 GWd/MT

CRITICALITY DURATION 0 Years 0 yr crit

ISOTOPE	GRAMS/	%		Aw	MCNP ID	Number Density
O 16	62377.28	0.120385	1	15.99492	8016.80C	4.6947E-02
mo 95	224	0.000432	1	94.90584	42095.80C	2.8413E-05
tc 99	219	0.000423	1	98.90628	43099.80C	2.6855E-05
ru101	218	0.000421	1	100.9056	44101.80C	2.6008E-05
rh103	144	0.000278	1	102.9055	45103.80C	1.6948E-05
ag109	21.8	0.000042	1	106.9048	47109.80C	2.4209E-06
nd143	269	0.000519	1	142.9098	60143.80C	2.2660E-05
nd145	203	0.000392	1	144.9125	60145.80C	1.6964E-05
sm147	8.87E+01	0.017%	1	146.9149	62147.80C	7.3501E-06
sm149	1.42E+00	0.000%	1	148.9172	62149.80C	1.1479E-07
sm150	8.94E+01	0.016%	1	149.9173	62150.80C	6.4561E-06

For Time Effects Cases, the Isotopic Correction Factor is set to 1.0.

Number Density Calculation for 26 volume% Fe2O3 in Water
density of Fe2O3 is 5.24 g/cc from Handbook of Chemistry and Physics (Ref. 5.17)
Note: O is O-16 66 Edition, page B-104
AW of Fe= 55.847 AW of O= 15.99492 from Nuclear Chemical Engineering (Ref. 5.43)

Molecular Density = 5.24 X .602252 / (2x55.847 + 3x15.9949)
= 0.019763 ND for 26%
ND of Fe=2x.019762= 0.039527 0.010277
ND of O=3x.019762= 0.05929 0.0154165

Water Number Density
ND of H= 0.066878 from Material Compositions and Number Densities...
ND of O= 0.033439 BBA000000-01717-0200-00002 Rev 00

	ND for 74%
H	0.0494897
O	0.0247449

Total ND for O = .024745+.015414= 0.040160

B-10 Number Density (Assume no volume effect)
mass of B= 30.474 kg from Second WP Probabilistic Criticality Analysis...
void space 5.714E6 cc BBA000000-01717-0200-00005 REV 00 (Ref. 5.54)

AW of B-10 10.0129 from page I-10 of Material Compositions and Number Densities...
WT Fractio .368/1.8= 0.16 BBA000000-01717-0200-00002 Rev 00 (Ref. 5.5)

ND of B-10=30.474E3*.16/5.714E6*.602252/10.0129= 5.7740E-05
ND for 5%
2.8870E-06

TOTAL ND =sum of O, Fe, H, B-10 0.09093

mass density=1.60x.74 + 5.24x.26= 2.1624

sm151	0.00E+00	0.000%	1	150.9199	62151.50C	0.0000E+00
eu151	6.32E+00	0.001%	1	150.9198	63151.55C	4.9815E-07
sm152	3.74E+01	0.007%	1	151.9193	62152.50C	2.9636E-06
eu153	2.70E+01	0.005%	1	152.9212	63153.55C	2.1265E-06
gd155	3.16E+00	0.001%	1	154.9227	64155.50C	2.4710E-07
gd157	3.11E-02	0.000%	1	156.924	64157.50C	2.3858E-09
cd(113)	1.77E+01	0.003%	1	112.4	48000.50C	1.8989E-06
xe131	1.38E+02	0.027%	1	130.9051	54131.50C	1.3891E-05
cs133	3.41E+02	0.066%	1	132.9054	55133.50C	3.0687E-05
u233	2.43E+00	0.000%	1	233.0395	92233.50C	1.2553E-07
u234	1.07E+02	0.021%	1	234.0409	92234.50C	5.5037E-06
u235	7.21E+03	1.391%	1	235.0439	92235.50C	3.6826E-04
u236	1.94E+03	0.374%	1	236.0456	92236.50C	9.8940E-05
u238	4.42E+05	85.304%	1	238.0508	92238.50C	2.2352E-02
np237	5.41E+02	0.104%	1	237.0481	93237.55C	2.7474E-05
pu238	0.00E+00	0.000%	1	238.0495	94238.50C	0.0000E+00
pu239	1.72E+03	0.332%	1	239.0521	94239.55C	8.8817E-05
pu240	1.36E+02	0.027%	1	240.0539	94240.50C	6.9305E-06
pu241	2.34E-05	0.000%	1	241.0567	94241.50C	1.1986E-12
pu242	6.69E+01	0.013%	1	242.0587	94242.50C	3.4266E-06
am241	7.04E-04	0.000%	1	241.0567	95241.50C	3.5158E-11
am242m	0.00E+00	0.000%	1	242.0595	95242.50C	0.0000E+00
am243	2.46E+00	0.000%	1	243.0614	95243.50C	1.2164E-07
total	518148.1	100.00%			Total	7.010280E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29
Effective density = 10.04845

Time Effects Curve
BURNUP: PWR 20 GWd/MT PWR B&W 15x15, 3.00% , Burnup 20 GWd/MTHM
ENRICHMENT: 3.00% DECAY TIME: 15000 YEARS
DECAY TIME: 15000 YEARS Volume 51876.34 pwr 3.0% 20 GWd/MT
CRITICALITY DURATION 1000 Years 1000 yr crit

ISOTOPE	GRAMS/	%		Aw	MCNP ID	Number Density
O 16	62377.29	0.120385	1	15.99492	8016.50C	4.8947E-02
mo 95	225	0.000434	1	94.90584	42095.50C	2.8540E-06
tc 99	220	0.000425	1	98.90628	43099.50C	2.6777E-05
ru101	219	0.000423	1	100.9056	44101.50C	2.6127E-05
rh103	144	0.000278	1	102.9055	45103.50C	1.6948E-06
ag109	21.9	0.000042	1	108.9048	47109.50C	2.4208E-08
nd143	270	0.000521	1	142.9098	60143.50C	2.2744E-05
nd145	2.04E+02	0.039%	1	144.9125	60145.50C	1.6947E-05
sm147	9.01E+01	0.017%	1	146.9149	62147.50C	7.3829E-06
sm149	1.18E+00	0.000%	1	148.9172	62149.50C	9.5390E-08
sm150	8.06E+01	0.016%	1	149.9173	62150.50C	6.4862E-06
sm151	3.01E-02	0.000%	1	150.9199	62151.50C	2.4010E-09
eu151	6.12E+00	0.001%	1	150.9198	63151.55C	4.8817E-07
sm152	3.75E+01	0.007%	1	151.9198	62152.50C	2.9715E-06
eu153	2.71E+01	0.005%	1	152.9212	63153.55C	2.1334E-06
gd155	2.73E+00	0.001%	1	154.9227	64155.50C	2.1214E-07
gd157	2.39E-02	0.000%	1	156.924	64157.50C	1.8105E-09
cd(113)	1.76E+01	0.003%	1	112.4	48000.50C	1.8107E-06
xe131	1.38E+02	0.027%	1	130.9051	54131.50C	1.3891E-05
cs133	3.42E+02	0.066%	1	132.9054	55133.50C	3.0678E-05
u233	2.86E+00	0.000%	1	233.0395	92233.50C	1.3328E-07
u234	1.06E+02	0.021%	1	234.0409	92234.50C	5.5552E-06
u235	7.23E+03	1.395%	1	235.0439	92235.50C	3.7030E-04
u236	1.95E+03	0.378%	1	236.0456	92236.50C	9.9960E-05

u238	4.42E+05	85.304%	1	238.0508	92238.80C	2.2352E-02
np237	5.41E+02	0.104%	1	237.0481	93237.85C	2.7474E-05
pu238	1.89E-01	0.000%	1	238.0495	94238.80C	8.5484E-09
pu239	1.68E+03	0.324%	1	239.0521	94239.85C	8.4602E-05
pu240	1.30E+02	0.025%	1	240.0539	94240.80C	6.5183E-06
pu241	3.14E-02	0.000%	1	241.0567	94241.80C	1.5891E-09
pu242	6.88E+01	0.013%	1	242.0587	94242.80C	3.4117E-06
am241	7.84E-01	0.000%	1	241.0567	95241.80C	3.7655E-08
am242m	1.90E-04	0.000%	1	242.0595	95242.80C	9.4492E-12
am243	2.40E+00	0.000%	1	243.0614	95243.80C	1.1687E-07
total	518148.1	100.00%			Total	7.910317E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29

Effective density = 10.04645

Time Effects Curve

BURNUP: PWR 20 GWd/MT PWR B&W 15x15, 3.60% , Burnup 20 GWd/MTHM

ENRICHMENT: 3.60% DECAY TIME: 16000 YEARS

DECAY TIME: 16000 YEARS Volume 518148.34 pwr 3.0% 20 GWd/MT

CRITICALITY DURATION 8000 Years 8000 yr crit

ISOTOPE	GRAMS/	%		Aw	MCNP ID	Number Density
O 16	62377.29	0.120385	1	15.99492	8016.80C	4.8947E-02
mo 95	229	0.000442	1	94.90584	42095.80C	2.8047E-05
tc 99	220	0.000425	1	98.90628	43099.80C	2.6777E-05
ru101	223	0.00043	1	100.9064	44101.80C	2.6604E-05
rh103	145	0.00028	1	102.9055	45103.80C	1.6943E-05
ag109	22.2	0.000043	1	108.9048	47109.80C	2.4540E-06
nd143	273	0.000527	1	142.9098	60143.80C	2.2997E-05
nd145	2.07E+02	0.040%	1	144.9125	60145.80C	1.7166E-05
sm147	9.16E+01	0.018%	1	146.9149	62147.80C	7.6066E-06
sm149	7.88E-01	0.000%	1	148.9172	62148.80C	6.3701E-08
sm150	8.21E+01	0.016%	1	149.9173	62150.80C	6.6826E-06
sm151	3.04E-02	0.000%	1	150.9199	62151.80C	2.4349E-09
eu151	5.87E+00	0.001%	1	150.9198	63151.85C	4.6823E-07
sm152	3.77E+01	0.007%	1	151.9196	62152.80C	2.9874E-06
eu153	2.77E+01	0.005%	1	152.9212	63153.85C	2.1806E-06
gd155	1.51E+00	0.000%	1	154.9227	64155.80C	1.1733E-07
gd157	1.63E-02	0.000%	1	156.924	64157.80C	1.2504E-09
cd(112)	1.63E+01	0.004%	1	112.4	48000.80C	1.8000E-06
xe131	1.40E+02	0.027%	1	130.9061	54131.80C	1.3876E-06
cs133	3.47E+02	0.067%	1	132.9054	55133.80C	3.1431E-05
u233	3.16E+00	0.001%	1	233.0395	92233.80C	1.6324E-07
u234	1.13E+02	0.022%	1	234.0409	92234.80C	5.7609E-06
u235	7.29E+03	1.407%	1	235.0439	92235.80C	3.7337E-04
u236	2.62E+03	0.506%	1	236.0456	92236.80C	1.6302E-04
u238	4.42E+05	85.304%	1	238.0508	92238.80C	2.2352E-02
np237	5.46E+02	0.105%	1	237.0481	93237.85C	2.7728E-05
pu238	1.74E-01	0.000%	1	238.0495	94238.80C	8.7863E-09
pu239	1.54E+03	0.297%	1	239.0521	94239.85C	7.7832E-05
pu240	1.83E+02	0.020%	1	240.0539	94240.80C	9.1653E-06
pu241	2.54E-02	0.000%	1	241.0567	94241.80C	1.2855E-09
pu242	6.74E+01	0.013%	1	242.0587	94242.80C	3.3420E-06
am241	7.77E-01	0.000%	1	241.0567	95241.80C	3.8603E-08
am242m	2.27E-04	0.000%	1	242.0595	95242.80C	1.1288E-11
am243	2.21E+00	0.000%	1	243.0614	95243.80C	1.0946E-07
total	518133.8	100.00%			Total	7.910378E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29

Effective density = 10.04817

Time Effects Curve

BURNUP: PWR 30 GWd/MT PWR B&W 15x15, 3.00% , Burnup 20 GWd/MTHM

ENRICHMENT: 3.00% DECAY TIME: 18000 YEARS

DECAY TIME: 18000 YEARS Volume 61575.24 per 3.0% 30 GWd/MT

CRITICALITY| DURATION 10,000 Years 10,000 yr cell

ISOTOPE	GRAMS/	%		Aw	MCNP ID	Number Density
O 16	62377.39	0.120385	1	15.99492	8016.80C	4.69417E-02
mo 95	233	0.00045	1	94.90584	42095.80C	2.9535E-05
tc 99	221	0.000427	1	99.90828	43099.80C	2.69999E-05
ru101	227	0.000438	1	100.9056	44101.80C	2.70812E-05
rh103	147	0.000284	1	102.9055	45103.80C	1.7197E-05
ag109	22.8	0.000043	1	108.9048	47109.80C	2.4871E-06
nd143	277	0.000535	1	142.9098	60143.80C	2.3234E-05
nd145	2.11E+02	0.041%	1	144.9125	60145.80C	1.7528E-05
sm147	9.34E+01	0.018%	1	146.9149	62147.80C	7.6533E-06
sm149	6.86E-01	0.000%	1	148.9172	62149.80C	5.6264E-08
sm150	8.32E+01	0.016%	1	149.9173	62150.80C	6.8909E-06
sm151	3.06E-02	0.000%	1	150.9199	62151.80C	2.4408E-09
eu151	6.60E+00	0.001%	1	150.9198	63151.55C	4.4669E-07
sm152	3.78E+01	0.007%	1	151.9199	62152.80C	3.0032E-06
eu153	2.84E+01	0.005%	1	152.9212	63153.55C	2.2357E-06
gd155	7.60E-01	0.000%	1	154.9227	64155.80C	5.8058E-08
gd157	1.65E-02	0.000%	1	156.924	64157.80C	1.1891E-09
cd(113)	1.69E+01	0.004%	1	112.4	48000.80C	2.6221E-06
te131	1.42E+02	0.027%	1	130.9061	94131.80C	1.3059E-05
te132	3.93E+02	0.064%	1	132.9054	85133.80C	3.1974E-05
u233	9.68E+00	0.001%	1	233.0395	92233.80C	2.6043E-07
u234	7.16E+02	0.022%	1	234.0409	92234.80C	6.0647E-06
u235	7.35E+03	1.410%	1	235.0439	92235.80C	3.7645E-04
u236	2.09E+03	0.403%	1	236.0456	92236.80C	1.0659E-04
u238	4.42E+05	85.304%	1	238.0508	92238.80C	2.2352E-02
np237	8.80E+02	0.168%	1	237.0481	93237.85C	2.7831E-05
pu238	1.80E-01	0.000%	1	238.0495	94238.80C	5.1027E-09
pu239	1.40E+03	0.270%	1	239.0521	94239.55C	7.0502E-05
pu240	6.69E+01	0.016%	1	240.0539	94240.80C	4.0570E-06
pu241	2.05E-02	0.000%	1	241.0567	94241.80C	1.0238E-09
pu242	8.89E+01	0.013%	1	242.0587	94242.80C	3.3774E-06
am241	6.23E-01	0.000%	1	241.0567	95241.80C	3.1112E-08
am242m	1.88E-04	0.000%	1	242.0595	95242.80C	9.3503E-12
am243	2.05E+00	0.000%	1	243.0614	95243.80C	1.0153E-07
total	518138.2	100.00%			Total	7.016568E-02

oxygen mass/assembly = 484000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2

62377.39

Effective density = 10.04828

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1mcnp     version 4a    ld=10/01/93                          08/20/96 17:19:50
*****************************************************************************                    prebid =   08/20/96 17:19:50
 inp=a26xb5c outp=a26xb5c0

     1-        AUCF - B&W 15x15 FUEL,21 ASSEMBLY BBF CS/SS-B Corroded & collapsed - (a26xb5c)
     2-        c     Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26%/5%B
     3-        c     15000 year decay  0 yr criticality
     4-        c     CELL SPECIFICATIONS
     5-        c       Assembly Sub-lattices - 1/2 Model
     6-        1     0      1  3 -13 -20    FILL=1 (0 -74 0) IMP:N=1
     7-        c     1      0       1  3   -4 -13 -20    FILL=1 (0 -73.8 0) IMP:N=1
     8-        c     2      0       3  4   -5 -13 -20    FILL=1 (0 -73.8 0) IMP:N=1
     9-        c     3      0       3  5 -13 -20         FILL=1 (0 -73.8 0) IMP:N=1
    10-        c       Assembly Sub-lattices - 1/4 Model
    11-        c     1      0       1  3   3  -4 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    12-        c     2      0       3  4   4  -5 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    13-        c     3      0       3  5   5 -13 -20         FILL=1 (0 -12.3 0) IMP:N=1
    14-        c     ASSEMBLY LATTICE DESCRIPTION
    15-        5     1  -2.1024  -41  60 -63  62   IMP:N=1 LAT=1 U=1
    16-              FILL=0:5 0:7 0:0  1 1  1  1  56 56 1  1  56 56 56 1
    17-                                56 56 56 1  56 56 56 1  56 56 1  1
    18-                                1  1  1  1   1  1  1  1     $ 1/2 model
    19-        c     5      1  -2.1024   60 -61  62 -63  IMP:N=1 LAT=1 U=1
    20-        c            FILL=0:3 0:3 0:0  58 58 64 70  58 58 62 70
    21-        c                              60 62 70  1  70 70  1  1 $ 1/4 model
    22-        c     BARRIER CELLS
    23-        c     Basket Material-Lid Gap
    24-        76    3  -1.0000    1 -20  13  -14      IMP:N=1 $ 1/2 model
    25-        c     76    1  -2.1024    1   2 -20  13  -14      IMP:N=1 $ 1/4 model
    26-        c     Inner Barrier
    27-        77    5  -8.1400    1   3  20 -21 -14  IMP:N=1 $ 1/2 model
    28-        c     77    5  -8.1400    1   2   3  20 -21 -14  IMP:N=1 $ 1/4 model
    29-        c     Inner Lid
    30-        78    5  -8.1400    1  14 -15 -21       IMP:N=1 $ 1/2 model
    31-        c     78    5  -8.1400    1   2  14 -15 -21       IMP:N=1 $ 1/4 model
    32-        c      Gap between Inner and Outer Barrier Lids
    33-        79    3  -1.0000    1  15 -16 -21       IMP:N=1 $ 1/2 model
    34-        c     79    1  -2.1024    1   2  15 -16 -21       IMP:N=1 $ 1/4 model
    35-        c      Gap between Inner and Outer Barriers
    36-        80    3  -1.0000   21 -22  1   3 -16  IMP:N=1 $ 1/2 model
    37-        c     80    1  -2.1024   21 -22   1   2   3 -16  IMP:N=1 $ 1/4 model
    38-        c     Outer Barrier
    39-        81    7  -7.8320   22 -24   1   3 -16  IMP:N=1 $ 1/2 model
    40-        c     81    7  -7.8320   22 -24   1   2   3 -16  IMP:N=1 $ 1/4 model
    41-        c     Outer Barrier Lid
    42-        82    7  -7.8320    1 -24  16 -17       IMP:N=1 $ 1/2 model
    43-        c     82    7  -7.8320    1   2 -24  16 -17       IMP:N=1 $ 1/4 model
    44-        c     12" of Water around Container
    45-        83    3  -1.0000   24 -25  1   3 -17  IMP:N=1 $ 1/2 model
    46-        c     83    1  -2.1024   24 -25   1   2   3 -17  IMP:N=1 $ 1/4 model
    47-        c     12" of Water above Container
    48-        84    3  -1.0000   17 -19  1 -25       IMP:N=1 $ 1/2 model
    49-        c     84    1  -2.1024   17 -58   1   2 -59       IMP:N=1 $ 1/4 model
    50-        c     OUTSIDE WORLD
    51-        85    0  -1:-3:19:25  IMP:N=0  $ 1/2 model
    52-        c     85    0  -1:-2:-3:19:25  IMP:N=0  $ 1/4 model
    53-        c     WET PIN LATTICE DESCRIPTION
    54-        86    1  -2.1024  -26 27 -28  29  IMP:N=1 LAT=1  U=56
    55-              FILL -8:8 -8:8 0:0  56 14R  56 2 14R 56  56 2 14R 56
    56-                                  56 2 4R 4 2 2R 4 2 4R 56
```

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57-                                 56 2 2R 4 2 6R 4 2 2R 56  56 2 14R 56
58-                                 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
59-                                 56 2 14R 56
60-                                 56 2 6R 6 2 6R 56
61-                                 56 2 14R 56
62-                                 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
63-                                 56 2 14R 56  56 2 2R 4 2 6R 4 2 2R 56
64-                                 56 2 4R 4 2 2R 4 2 4R 56
65-                                 56 2 14R 56  56 2 14R 56  56 14R
66-        c     MIXED PIN LATTICE DESCRIPTION
67-        c     87    3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=72
68-        c      FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
69-        c                          57 3 4R 5 3 2R 5 3 4R 57
70-        c                          57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
71-        c                          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
72-        c                          57 3 14R 57
73-        c                          57 3 6R 7 3 6R 57
74-        c                          57 3 14R 57
75-        c                          57 3 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
76-        c                          57 3 14R 57  57 2 2R 4 2 6R 4 2 2R 57
77-        c                          57 2 4R 4 2 2R 4 2 4R 57
78-        c                          57 2 14R 57  57 2 14R 57  57 16R
79-        c     DRY PIN LATTICE DESCRIPTION
80-        88    3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=57
81-              FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
82-                                 57 3 4R 5 3 2R 5 3 4R 57
83-                                 57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
84-                                 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
85-                                 57 3 14R 57
86-                                 57 3 6R 7 3 6R 57
87-                                 57 3 14R 57
88-                                 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
89-                                 57 3 14R 57  57 3 2R 5 3 6R 5 3 2R 57
90-                                 57 3 4R 5 3 2R 5 3 4R 57
91-                                 57 3 14R 57  57 3 14R 57  57 16R
92-        c     WET FUEL ROD
93-        89    2   7.0103E-02   -30 -10     INP:N=1 U=2
94-        90    4  -6.5600   -30  10 -11  INP:N=1 U=2
95-        91    1  -2.1024   -30  11     INP:N=1 U=2
96-        92    1  -2.1024    30 -31 -11  INP:N=1 U=2
97-        93    1  -2.1024    30 -31  11  INP:N=1 U=2
98-        94    4  -6.5600    31 -32 -11  INP:N=1 U=2
99-        95    1  -2.1024    31 -32  11  INP:N=1 U=2
100-       96    1  -2.1024    32          INP:N=1 U=2
101-       c     DRY FUEL ROD
102-       97    2   7.0103E-02   -30 -10     INP:N=1 U=3
103-       98    4  -6.5600   -30  10 -11  INP:N=1 U=3
104-       99    3  -0.001225   -30  11     INP:N=1 U=3
105-       100   3  -0.001225    30 -31 -11  INP:N=1 U=3
106-       101   3  -0.001225    30 -31  11  INP:N=1 U=3
107-       102   4  -6.5600    31 -32 -11  INP:N=1 U=3
108-       103   3  -0.001225    31 -32  11  INP:N=1 U=3
109-       104   3  -0.001225    32          INP:N=1 U=3
110-       c     WET CONTROL ROD/GUIDE TUBE
111-       105   1  -2.1024  -33     INP:N=1 U=4  $ He BCRA Rod
112-       c     105   0  -7.8100  -33     INP:N=1 U=4  $ BCRA Rod
113-       106   1  -2.1024   33  -34  INP:N=1 U=4
114-       107   1  -2.1024   34  -35  INP:N=1 U=4  $ He BCRA Cladding
115-       c     107   4  -6.5600   34  -35  INP:N=1 U=4  $ BCRA Cladding
116-       108   1  -2.1024   35  -36  INP:N=1 U=4
```

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109  4  -6.5600   36  -37  INP:N=1 U=4
110  1  -2.1024   37       INP:N=1 U=4
c    DRY CONTROL ROD/GUIDE TUBE
111  3  -0.001225   -33       INP:N=1 U=5  $ No BCRA Rod
c    111   9  -7.8300  -33       INP:N=1 U=5  $ BCRA Rod
112  3  -0.001225   33  -34  INP:N=1 U=5
113  3  -0.001225   34  -35  INP:N=1 U=5  $ No BCRA Cladding
c    113   4  -6.5600   34  -35  INP:N=1 U=5  $ BCRA Cladding
114  3  -0.001225   35  -36  INP:N=1 U=5
115  4  -6.5600   36  -37  INP:N=1 U=5
116  3  -0.001225   37       INP:N=1 U=5
c    WET INSTRUMENTATION TUBE
117  1  -2.1024  -38       INP:N=1 U=6
118  4  -6.5600   38 -39     INP:N=1 U=6
119  1  -2.1024   39       INP:N=1 U=6
c    DRY INSTRUMENTATION TUBE
120  3  -0.001225  -38       INP:N=1 U=7
121  4  -6.5600   38 -39     INP:N=1 U=7
122  3  -0.001225   39       INP:N=1 U=7
c    FUEL CELL BASKET STRUCTURE
c    Code: boron in [B=] all panels [all], left [l], bottom, [b], right [r], to
c    FUEL CELL BASKET STRUCTURE -          WET - Borated panels
c       WATER GAP     - ASSEMBLY LEFT
123  1  -2.1024   52       INP:N=1 U=8
c    123   1  -2.1024   48       INP:N=1 U=8
c       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
c    124   6  -7.8320  -48  52     INP:N=1 U=8
c       CS TUBE - ASSEMBLY LEFT
c    125   7  -7.8320  -52  56     INP:N=1 U=8
c       SS PANEL - ASSEMBLY LEFT
126  8  -7.7700  -52       INP:N=1 U=8
c       WATER GAP     - ASSEMBLY BOTTOM
127  1  -2.1024   53       INP:N=1 U=9
c    127   1  -2.1024   49       INP:N=1 U=9
c       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
c    128   6  -7.8320  -49  53     INP:N=1 U=9
c       CS TUBE - ASSEMBLY BOTTOM
c    129   7  -7.8320  -53  57     INP:N=1 U=9
c       SS PANEL - ASSEMBLY BOTTOM
130  8  -7.7700  -53       INP:N=1 U=9
c       WATER GAP     - ASSEMBLY RIGHT
131  1  -2.1024  -54       INP:N=1 U=10
c    131   1  -2.1024  -50       INP:N=1 U=10
c       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
c    132   6  -7.8320   50 -54     INP:N=1 U=10
c       CS TUBE - ASSEMBLY RIGHT
c    133   7  -7.8320   54 -58     INP:N=1 U=10
c       SS PANEL - ASSEMBLY RIGHT
134  8  -7.7700   54       INP:N=1 U=10
c       WATER GAP     - ASSEMBLY TOP
135  1  -2.1024  -55       INP:N=1 U=11
c    135   1  -2.1024  -51       INP:N=1 U=11
c       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
c    136   6  -7.8320   51 -55     INP:N=1 U=11
c       CS TUBE - ASSEMBLY TOP
c    137   7  -7.8320   55 -59     INP:N=1 U=11
c       SS PANEL - ASSEMBLY TOP
138  8  -7.7700   55       INP:N=1 U=11
c    FUEL CELL BASKET STRUCTURE -          DRY - Borated panels
c       GAP     - ASSEMBLY LEFT
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177-        139   3  -0.001225   52                INP:N=1 U=12
178-        C     139   3  -0.001225   48                INP:N=1 U=12
179-        C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180-        C     140   6  -7.8320  -48  52          INP:N=1 U=12
181-        C        CS TUBE - ASSEMBLY LEFT
182-        C     141   7  -7.8320  -52  56          INP:N=1 U=12
183-        C        SS PANEL - ASSEMBLY LEFT
184-        142   8  -7.7700  -52                INP:N=1 U=12
185-        C        GAP     - ASSEMBLY BOTTOM
186-        143   3  -0.001225   53                INP:N=1 U=13
187-        C     143   3  -0.001225   49                INP:N=1 U=13
188-        C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189-        C     144   6  -7.8320  -49  53          INP:N=1 U=13
190-        C        CS TUBE - ASSEMBLY BOTTOM
191-        C     145   7  -7.8320  -53  57          INP:N=1 U=13
192-        C        SS PANEL - ASSEMBLY BOTTOM
193-        146   8  -7.7700  -53                INP:N=1 U=13
194-        C        GAP     - ASSEMBLY RIGHT
195-        147   3  -0.001225  -54                INP:N=1 U=14
196-        C     147   3  -0.001225  -50                INP:N=1 U=14
197-        C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198-        C     148   6  -7.8320   50 -54          INP:N=1 U=14
199-        C        CS TUBE - ASSEMBLY RIGHT
200-        C     149   7  -7.8320   54 -58          INP:N=1 U=14
201-        C        SS PANEL - ASSEMBLY RIGHT
202-        150   8  -7.7700   54                INP:N=1 U=14
203-        C        GAP     - ASSEMBLY TOP
204-        151   3  -0.001225  -55                INP:N=1 U=15
205-        C     151   3  -0.001225  -51                INP:N=1 U=15
206-        C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207-        C     152   6  -7.8320   51 -55          INP:N=1 U=15
208-        C        CS TUBE - ASSEMBLY TOP
209-        C     153   7  -7.8320   55 -59          INP:N=1 U=15
210-        C        SS PANEL - ASSEMBLY TOP
211-        154   8  -7.7700   55                INP:N=1 U=15
212-        C     FUEL CELL BASKET STRUCTURE -          WET - Unborated panels
213-        C        WATER GAP     - ASSEMBLY LEFT
214-        155   1  -2.1024   52                INP:N=1 U=16
215-        C     155   1  -2.1024   48                INP:N=1 U=16
216-        C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217-        C     156   6  -7.8320  -48  52          INP:N=1 U=16
218-        C        CS TUBE - ASSEMBLY LEFT
219-        C     157   7  -7.8320  -52  56          INP:N=1 U=16
220-        C        PANEL - ASSEMBLY LEFT
221-        158   1  -2.1024  -52                INP:N=1 U=16
222-        C        WATER GAP     - ASSEMBLY BOTTOM
223-        159   1  -2.1024   53                INP:N=1 U=17
224-        C     159   1  -2.1024   49                INP:N=1 U=17
225-        C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226-        C     160   6  -7.8320  -49  53          INP:N=1 U=17
227-        C        CS TUBE - ASSEMBLY BOTTOM
228-        C     161   7  -7.8320  -53  57          INP:N=1 U=17
229-        C        PANEL - ASSEMBLY BOTTOM
230-        162   1  -2.1024  -53                INP:N=1 U=17
231-        C        WATER GAP     - ASSEMBLY RIGHT
232-        163   1  -2.1024  -54                INP:N=1 U=18
233-        C     163   1  -2.1024  -50                INP:N=1 U=18
234-        C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235-        C     164   6  -7.8320   50 -54          INP:N=1 U=18
236-        C        CS TUBE - ASSEMBLY RIGHT
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237-      C     165   7  -7.8320   54 -58        INP:N=1 U=18
238-      C        PANEL - ASSEMBLY RIGHT
239-      166   1  -2.1024   54                INP:N=1 U=18
240-      C        WATER GAP      - ASSEMBLY TOP
241-      167   1  -2.1024  -55                INP:N=1 U=19
242-      C     167   1  -2.1024  -51                INP:N=1 U=19
243-      C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
244-      C     168   6  -7.8320   51 -55       INP:N=1 U=19
245-      C        CS TUBE - ASSEMBLY TOP
246-      C     169   7  -7.8320   55 -59       INP:N=1 U=19
247-      C        PANEL - ASSEMBLY TOP
248-      170   1  -2.1024   53                INP:N=1 U=19
249-      C     FUEL CELL BASKET STRUCTURE -                    BRY - Unborated panels
250-      C        GAP    - ASSEMBLY LEFT
251-      171   3  -0.001225   52                INP:N=1 U=20
252-      C     171   3  -0.001225   48                INP:N=1 U=20
253-      C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
254-      C     172   6  -7.8320  -48  52       INP:N=1 U=20
255-      C        CS TUBE - ASSEMBLY LEFT
256-      C     173   7  -7.8320  -52  56       INP:N=1 U=20
257-      C        PANEL - ASSEMBLY LEFT
258-      174   3  -0.001225  -52                INP:N=1 U=20
259-      C        GAP    - ASSEMBLY BOTTOM
260-      175   3  -0.001225   53                INP:N=1 U=21
261-      C     175   3  -0.001225   49                INP:N=1 U=21
262-      C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
263-      C     176   6  -7.8320  -49  53       INP:N=1 U=21
264-      C        CS TUBE - ASSEMBLY BOTTOM
265-      C     177   7  -7.8320  -53  57       INP:N=1 U=21
266-      C        PANEL - ASSEMBLY BOTTOM
267-      178   3  -0.001225  -53                INP:N=1 U=21
268-      C        GAP    - ASSEMBLY RIGHT
269-      179   3  -0.001225  -54                INP:N=1 U=22
270-      C     179   3  -0.001225  -50                INP:N=1 U=22
271-      C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
272-      C     180   6  -7.8320   50 -54       INP:N=1 U=22
273-      C        CS TUBE - ASSEMBLY RIGHT
274-      C     181   7  -7.8320   54 -58       INP:N=1 U=22
275-      C        PANEL - ASSEMBLY RIGHT
276-      182   3  -0.001225   54                INP:N=1 U=22
277-      C        GAP    - ASSEMBLY TOP
278-      183   3  -0.001225  -55                INP:N=1 U=23
279-      C     183   3  -0.001225  -51                INP:N=1 U=23
280-      C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
281-      C     184   6  -7.8320   51 -55       INP:N=1 U=23
282-      C        CS TUBE - ASSEMBLY TOP
283-      C     185   7  -7.8320   55 -59       INP:N=1 U=23
284-      C        PANEL - ASSEMBLY TOP
285-      186   3  -0.001225   55                INP:N=1 U=23
286-
287-      C     SURFACE SPECIFICATIONS
288-      1*    PX    0.0
289-      C     2*    PY    0.00        $ For 1/4 Model
290-      3*    PZ    0.00
291-      C     4     PX   12.30        $ For Collapsed Model
292-      C     5     PX   34.90        $ For Collapsed Model
293-      C     6     PY   12.30        $ Water Level Surface
294-      C     7     PY   34.90        $ Water Level Surface
295-      C     8     PY  -12.30        $ Water Level Surface
296-      C     9     PY  -34.90        $ Water Level Surface
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297-      10   PZ  180.0860     $ TOP ACTIVE FUEL
298-      11   PZ  201.2360     $ TOP FUEL HARDWARE
299-      C    12   PZ  226.75        $ TOP TUBE - (Shielding Model)
300-      13   PZ  228.75       $ TOP OF BASKET MATERIAL
301-      14   PZ  229.25       $ TOP RING/WATER GAP
302-      15   PZ  231.75       $ TOP INNER LID
303-      16   PZ  234.75       $ TOP LID GAP
304-      17   PZ  245.75       $ TOP OUTER LID
305-      C    18   PZ  268.25        $ TOP SKIRT - (Shielding Model)
306-      19   PZ  298.75       $ TOP REFLECTOR REGION
307-      20   CZ   71.095      $ ID OF INNER BARRIER
308-      21   CZ   73.095      $ OD OF INNER BARRIER
309-      22   CZ   73.10       $ ID OF OUTER BARRIER
310-      C    23   CZ   76.45        $ ID OF SKIRT LIP - (Shielding Model)
311-      24   CZ   83.10       $ OD OF OUTER BARRIER
312-      25   CZ  113.60       $ OD OF REFLECTOR REGION
313-      C    PIN LATTICE BOUNDS
314-      26   PX  0.72136
315-      27   PX -0.72136
316-      28   PY  0.72136
317-      29   PY -0.72136
318-      C     FUEL ROD
319-      30   CZ  0.468122
320-      31   CZ  0.478790
321-      32   CZ  0.566100
322-      C     CONTROL ROD/GUIDE TUBE
323-      33   CZ  0.45340  $ 0.49022
324-      34   CZ  0.46990  $ 0.50292
325-      35   CZ  0.54610  $ 0.56007
326-      36   CZ  0.62230  $ 0.63246
327-      37   CZ  0.67310
328-      C     INSTRUMENTATION TUBE
329-      38   CZ  0.56007
330-      39   CZ  0.62611
331-      C    ASSEMBLY LATTICE BOUNDS Actual
332-      44   PX  -10.65  $ ACTUAL 10.82025
333-      45   PY  -10.65
334-      46   PX   10.65
335-      47   PY   10.65
336-      C    48   PX  -11.0  $ Corrosion Expansion Cards
337-      C    49   PY  -11.0
338-      C    50   PX   11.0
339-      C    51   PY   11.0
340-      52   PX  -10.650001  $ UCF Intact Inside Tube ID
341-      53   PY  -10.650001
342-      54   PX   10.650001
343-      55   PY   10.650001
344-      56   PX  -11.95   $ UCF Intact Outside Tube ID
345-      57   PY  -11.95
346-      58   PX   11.95
347-      59   PY   11.95
348-      C    FUEL CELL LATTICE BOUNDS
349-      60   PX  -10.65    $ ACTUAL 12.30
350-      61   PX   10.65
351-      62   PY  -10.65
352-      63   PY   10.65
353-      C    45 degree planes
354-      64   P    1. -1.  0. 0.
355-      65   P    1.  1.  0. 0.
356-      C    EXTRA CARDS
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357-
358-        MODE  N
359-        C     VOL   88J
360-        KCODE   4000 1. 7 97
361-        C       KSRC   -4.3  -5.7 1.   -2.8  -5.7 5.   -1.4  -5.7 10.   0.   -5.7  5.
362-        C        1.44 -5.7 3.   2.88 -5.7 8.   4.32 -5.7  9.
363-        C       -5.7  -4.3 2.  -4.3  -4.3 1.  -2.8  -4.3 5.  -1.4  -4.3 10.
364-        C        0.   -4.3 5.   1.44 -4.3 3.   2.88 -4.3 8.   4.32 -4.3  9.
365-        C       -5.7  -2.9 2.  -4.3  -2.9 1.                 -1.4  -2.9 10.
366-        C        0.   -2.9 5.                  2.88 -2.9 8.   4.32 -2.0  9.
367-        C       -5.7  -1.4 2.  -4.3  -1.4 1.  -2.8  -1.4 5.  -1.4  -1.4 10.
368-        C        0.   -1.4 5.   1.44 -1.4 3.   2.88 -1.4 8.   4.32 -1.4  9.
369-        C       -5.7   0.0 2.  -4.3   0.0 1.  -2.8   0.0 5.  -1.4   0.0 10.
370-        C                       1.44  0.0 3.   2.88  0.0 8.   4.32  0.0  9.
371-        C       -5.7   1.4 2.                  -2.8   1.4 5.  -1.4   1.4 10.
372-        C        0.    1.4 5.   1.44  1.4 3.   2.88  1.4 8.   4.32  1.4  9.
373-        C       -5.7   2.9 2.  -4.3   2.9 1.  -2.8   2.9 5.  -1.4   2.9 10.
374-        C        0.    2.9 5.   1.44  2.9 3.   2.88  2.9 8.   4.32  2.9  9.
375-        C       -5.7   4.3 2.  -4.3   4.3 1.  -2.8   4.3 5.  -1.4   4.3 10.
376-        C        0.    4.3 5.   1.44  4.3 3.   2.88  4.3 8.   4.32  4.3  9.
377-        C      MATERIAL SPECIFICATIONS
378-        C        WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379-        M1    1001.50C  6.9490-2     8016.50C  4.8160-2  26000.55C 1.8277-2
380-              5010.50C  2.8870-6
381-        MT1   LWTR.01T
382-        C        3.00%/20 GWD  15000 yr decay  0 yr crit
383-        M2          8016.50C     4.6947E-02
384-             42095.50C   2.8413E-05
385-             43099.50C   2.8655E-05
386-             44101.50C   2.6008E-05
387-             45103.50C   1.6846E-05
388-             47109.50C   2.4208E-06
389-             60143.50C   2.2660E-05
390-             60145.50C   1.6864E-05
391-             62147.50C   7.3301E-06
392-             62149.50C   1.1479E-07
393-             62150.50C   6.6361E-06
394-             63151.55C   4.9615E-07
395-             62152.50C   2.9636E-06
396-             63153.55C   2.1255E-06
397-             64155.50C   2.4710E-07
398-             64157.50C   2.3858E-09
399-             68000.50C   1.8989E-06
400-             54131.50C   1.2691E-05
401-             55133.50C   3.0887E-05
402-             92233.50C   1.2553E-07
403-             92234.50C   5.5037E-06
404-             92235.50C   3.6928E-04
405-             92236.50C   9.8940E-05
406-             92238.50C   2.2352E-02
407-             93237.55C   2.7474E-05
408-             94239.55C   8.6617E-05
409-             94240.50C   6.9205E-06
410-             94241.50C   1.1184E-12
411-             94242.50C   2.4264E-06
412-             95241.50C   5.5158E-11
413-             95243.50C   1.2184E-07
414-        C        WATER AT 300 K d=1.0000 g/cc
415-        M3    1001.50C  6.6878-2     8016.50C  3.3439-2
416-        MT3   LWTR.01T
```

```
417-        c          Air d=0.001225 g/cc
418-        c     M3    7014.50c  -0.80   8016.50c  -0.20
419-        c          ZIRCALOY-4 d=6.56 g/cc
420-        M4    8016.50c -0.0012  24000.50c -0.0010  26000.55c -0.0020
421-             40000.50c -0.9818  50000.35c -0.0140
422-        c          ALLOY B25 d=8.14 g/cc
423-        M5    6000.50c -0.0005  13027.50c -0.0020  14000.50c -0.0050
424-             16032.50c -0.0003  22000.50c -0.0090  24000.50c -0.2150
425-             25055.50c -0.0100  26000.55c -0.2857  28000.50c -0.4200
426-             29000.50c -0.0225  42000.50c -0.0300
427-        c         Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
428-        c     M6    6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
429-        c          16032.50c -0.00035  25055.50c -0.0090
430-        c          26000.55c -0.98535
431-        c         A516 CARBON STEEL d=7.832 g/cc
432-        M7    6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
433-             16032.50c -0.00035  25055.50c -0.0090
434-             26000.55c -0.98535
435-        c         SS316B6A  1.6%  d=7.77 g/cc
436-        M8    5010.50c -0.00288  5011.50c -0.013120
437-              6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.0075
438-             15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
439-             25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
440-             42000.50c -0.02500
441-        c         SS316B3A 0.87wt% B d=7.83 g/cc
442-        c     M9    5010.50c -0.001566 5011.50c -0.007134
443-        c          6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.00750
444-        c         15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
445-        c         25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
446-        c         42000.50c -0.02500
447-        c         Al 6063 d=2.69 g/cc
448-        c     M10  12000.50c -0.00675  13027.50c -0.98125  14000.50c -0.00400
449-        c          22000.50c -0.00150  24000.50c -0.00100  25055.50c -0.00100
450-        c          26000.55c -0.00350  29000.50c -0.00100
451-        c     TALLIES
452-        PRINT
453-
1      initial source from file   srctp


tproblem summary

     run terminated when    97 kcode cycles were done.
+                                                                                    08/20/96 19:10:37
     AUCF - 8X8 15x15 FUEL,21 ASSEMBLY BBF CE/BS-B Corroded & collapsed - (a26xb5c)      probid =  08/20/96 17:19:50
0
 neutron creation      tracks      weight        energy                neutron loss        tracks      weight        energy
                                   (per source particle)                                             (per source particle)

 source               387087    1.0024E+00    2.0572E+00             escape                   5    7.0869E-06    1.8240E-05
                                                                     energy cutoff            0    0.            0.
                                                                     time cutoff              0    0.            0.
 weight window           0      0.            0.                     weight window            0    0.            0.
 cell importance         0      0.            0.                     cell importance          0    0.            0.
 weight cutoff           6      4.9996E-02    6.1536E-06             weight cutoff       387745    4.9806E-02    6.3240E-06
 energy importance       0      0.            0.                     energy importance        0    0.            0.
 dxtran                  0      0.            0.                     dxtran                   0    0.            0.
 forced collisions       0      0.            0.                     forced collisions        0    0.            0.
 exp. transform          0      0.            0.                     exp. transform           0    0.            0.
```

```
upscattering              0    0.             7.3602E-08        downscattering            0    0.             1.9223E+00
                                                                capture                   0    6.5791E-01     3.5810E-02
(n,xn)                 1324    2.7042E-03     2.1498E-03        loss to (n,xn)          661    1.3507E-03     1.1386E-02
fission                   0    0.             0.                loss to fission           0    3.4598E-01     8.9877E-02
   total             388411    1.0551E+00     2.0594E+00           total             388411    1.0551E+00     2.0594E+00

  number of neutrons banked                      663        average lifetime, shakes              cutoffs
  neutron tracks per source particle      1.0034E+00          escape            1.9585E+04          tco   1.0000E+34
  neutron collisions per source particle  4.4254E+01          capture           2.3100E+03          eco    .0000E+00
  total neutron collisions                  17904367          capture or escape 2.3101E+03          wc1  -5.0000E-01
  net multiplication              1.0014E+00   .0001          any termination   2.4720E+03          wc2  -2.5000E-01

computer time so far in this run   110.41 minutes           maximum number ever in bank         2
computer time in mcrun             110.31 minutes           bank overflows to backup file       0
source particles per minute            3.5090E+03           field length                        0
random numbers generated                251075470           most random numbers used was     8243 in history   186679

range of sampled source weights = 9.5648E-01 to 1.1034E+00
1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5c)      probid =  08/20/96 17:19:50

the initial fission neutron source distribution was read from the srctp file named srctp   .
the criticality problem was scheduled to skip   7 cycles and run a total of   97 cycles with nominally     4000 neutrons per cycle.
this problem has run   7 inactive cycles with    27818 neutron histories and   90 active cycles with     359269 neutron histories.

this calculation has completed the requested number of keff cycles using a total of      387087 fission neutron source histories.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

the following cells with fissionable material had no neutron tracks entering:
    97

the following cells with fissionable material had no neutron collisions:
    97

the following cells with fissionable material had no fission source points:
    97

warning.     1 fissionable cells had no tracks entering,   1 cells had no collisions, and   1 cells had no fission source points.
               the keff results could be too small because these cells with fissionable material were not sampled.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

         the k( collision) cycle values appear normally distributed at the 95 percent confidence level
         the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
         the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

.................................................................................................................................
| the final estimated combined collision/absorption/track-length keff =  .89668 with an estimated standard deviation of  .00102 |
| the estimated 68, 95, & 99 percent keff confidence intervals are  .89565 to  .89770,  .89464 to  .89871, and  .89398 to  .89938 |
| the estimated collision/absorption neutron removal lifetime = 2.31E-05 seconds with an estimated standard deviation of 4.98E-08 |
.................................................................................................................................
```

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.89604	.00130	.89474 to .89734	.89346 to .89862	.89262 to .89946	
absorption	.89705	.00120	.89584 to .89825	.89464 to .89945	.89386 to .90023	
track length	.89634	.00139	.89495 to .89773	.89357 to .89910	.89267 to .90000	
col/absorp	.89641	.00107	.89534 to .89748	.89448 to .89874	.89378 to .89943	.6478
abs/trk len	.89676	.00102	.89573 to .89778	.89472 to .89879	.89406 to .89945	.2675
col/trk len	.89615	.00124	.89492 to .89739	.89369 to .89862	.89289 to .89942	.6950
col/abs/trk len	.89668	.00102	.89565 to .89770	.89464 to .89871	.89398 to .89938	

```
1mcnp     version 4a     ld=10/01/93                          08/22/96 17:36:25
**********************************************************************                probid =   08/22/96 17:36:25
 inp=a26xb5d outp=a26xb5d0

      AUCF - B&W 15x15 FUEL,21 ASSEMBLY BEF CS/SS-B Corroded & collapsed - (a26xb5d)
      c     Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26X/5XB
      c     15000 year decay  1000 yr criticality
      c     CELL SPECIFICATIONS
      c       Assembly Sub-lattices - 1/2 Model
      1     0      1  3 -13 -20   FILL=1 (0 -74 0) IMP:N=1
      c     1     0      1  3  -4 -13 -20   FILL=1 (0 -73.8 0) IMP:N=1
      c     2     0      3  4  -5 -13 -20   FILL=1 (0 -73.8 0) IMP:N=1
      c     3     0      3  5 -13 -20       FILL=1 (0 -73.8 0) IMP:N=1
      c       Assembly Sub-lattices - 1/4 Model
      c     1     0      1  2  3  -4 -13 -20   FILL=1 (0 -12.3 0) IMP:N=1
      c     2     0      2  3  4  -5 -13 -20   FILL=1 (0 -12.3 0) IMP:N=1
      c     3     0      2  3  5 -13 -20       FILL=1 (0 -12.3 0) IMP:N=1
      c     ASSEMBLY LATTICE DESCRIPTION
      5     1  -2.1024  -61  60 -63  62  IMP:N=1 LAT=1 U=1
            FILL=0:3 0:7 0:0  1 1  1  1  56 56 1  1  56 56 56 1
                              56 56 56 1  56 56 56 1  56 56 1  1
                              1 1  1  1   1 1 1 1        $ 1/2 model
      c     5     1  -2.1024   60 -61  62 -63  IMP:N=1 LAT=1 U=1
            FILL=0:3 0:3 0:0  58 58 44 70  58 58 62 70
                              60 62 70  1  70 70  1  1 $ 1/4 model
      c
      c     BARRIER CELLS
      c     Basket Material-Lid Gap
      76    3  -1.0000    1 -20  13  -14      IMP:N=1 $ 1/2 model
      c     76    1  -2.1024    1   2 -20  13  -14      IMP:N=1 $ 1/4 model
      c     Inner Barrier
      77    5  -8.1400    1   3  20 -21 -14  IMP:N=1 $ 1/2 model
      c     77    5  -8.1400    1   2   3  20 -21 -14  IMP:N=1 $ 1/4 model
      c     Inner Lid
      78    5  -8.1400    1  14 -15 -21       IMP:N=1 $ 1/2 model
      c     78    5  -8.1400    1   2  14 -15 -21       IMP:N=1 $ 1/4 model
      c      Gap between Inner and Outer Barrier Lids
      79    3  -1.0000    1  15 -16 -21       IMP:N=1 $ 1/2 model
      c     79    1  -2.1024    1   2  15 -16 -21       IMP:N=1 $ 1/4 model
      c      Gap between Inner and Outer Barriers
      80    3  -1.0000   21 -22   1   3 -16  IMP:N=1 $ 1/2 model
      c     80    1  -2.1024   21 -22   1   2   3 -16  IMP:N=1 $ 1/4 model
      c     Outer Barrier
      81    7  -7.8320   22 -24   1   3 -16  IMP:N=1 $ 1/2 model
      c     81    7  -7.8320   22 -24   1   2   3 -16  IMP:N=1 $ 1/4 model
      c     Outer Barrier Lid
      82    7  -7.8320    1 -24  16 -17       IMP:N=1 $ 1/2 model
      c     82    7  -7.8320    1   2 -24  16 -17       IMP:N=1 $ 1/4 model
      c     12" of Water around Container
      83    3  -1.0000   24 -25   1   3 -17  IMP:N=1 $ 1/2 model
      c     83    1  -2.1024   24 -25   1   2   3 -17  IMP:N=1 $ 1/4 model
      c     12" of Water above Container
      84    3  -1.0000   17 -19   1 -25       IMP:N=1 $ 1/2 model
      c     84    1  -2.1024   17 -58   1   2 -59       IMP:N=1 $ 1/4 model
      c     OUTSIDE WORLD
      85    0  -1:-3:19:25  IMP:N=0  $ 1/2 model
      c     85    0  -1:-2:-3:19:25  IMP:N=0  $ 1/4 model
      c     WET PIN LATTICE DESCRIPTION
      86    1  -2.1024  -26 27 -28  29  IMP:N=1 LAT=1  U=56
            FILL -8:8 -8:8 0:0  56 14R  56 2 14R 56  56 2 14R 56
                                56 2 4R 4 2 2R 4 2 4R 56
```

```
 57-                                56 2 2R 4 2 4R 4 2 2R 56  56 2 14R 56
 58-                                56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 59-                                56 2 14R 56
 60-                                56 2 4R 6 2 4R 56
 61-                                56 2 14R 56
 62-                                56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 63-                                56 2 14R 56  56 2 2R 4 2 4R 4 2 2R 56
 64-                                56 2 4R 4 2 2R 4 2 4R 56
 65-                                56 2 14R 56  56 2 14R 56  56 16R
 66-        C     MIXED PIN LATTICE DESCRIPTION
 67-        C     87   3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=72
 68-        C      FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
 69-        C                          57 3 4R 5 3 2R 5 3 4R 57
 70-        C                          57 3 2R 5 3 4R 5 3 2R 57  57 3 14R 57
 71-        C                          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 72-        C                          57 3 14R 57
 73-        C                          57 3 4R 7 3 4R 57
 74-        C                          57 3 14R 57
 75-        C                          57 3 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
 76-        C                          57 3 14R 57  57 2 2R 4 2 4R 4 2 2R 57
 77-        C                          57 3 4R 4 2 2R 4 2 4R 57
 78-        C                          57 2 14R 57  57 2 14R 57  57 16R
 79-        C     DRY PIN LATTICE DESCRIPTION
 80-        88    3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=57
 81-              FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
 82-                                57 3 4R 5 3 2R 5 3 4R 57
 83-                                57 3 2R 5 3 4R 5 3 2R 57  57 3 14R 57
 84-                                57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 85-                                57 3 14R 57
 86-                                57 3 4R 7 3 4R 57
 87-                                57 3 14R 57
 88-                                57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 89-                                57 3 14R 57  57 3 2R 5 3 4R 5 3 2R 57
 90-                                57 3 4R 5 3 2R 5 3 4R 57
 91-                                57 3 14R 57  57 3 14R 57  57 16R
 92-        C     WET FUEL ROD
 93-        89    2   7.0103E-02   -30 -10      INP:N=1 U=2
 94-        90    4  -6.5600   -30  10 -11 INP:N=1 U=2
 95-        91    1  -2.1024   -30  11      INP:N=1 U=2
 96-        92    1  -2.1024    30 -31 -11 INP:N=1 U=2
 97-        93    1  -2.1024    30 -31  11 INP:N=1 U=2
 98-        94    4  -6.5600    31 -32 -11 INP:N=1 U=2
 99-        95    1  -2.1024    31 -32  11 INP:N=1 U=2
100-        96    1  -2.1024    32         INP:N=1 U=2
101-        C     DRY FUEL ROD
102-        97    2   7.0103E-02   -30 -10      INP:N=1 U=3
103-        98    4  -6.5600   -30  10 -11 INP:N=1 U=3
104-        99    3  -0.001225   -30  11      INP:N=1 U=3
105-        100   3  -0.001225    30 -31 -11 INP:N=1 U=3
106-        101   3  -0.001225    30 -31  11 INP:N=1 U=3
107-        102   4  -6.5600    31 -32 -11 INP:N=1 U=3
108-        103   3  -0.001225    31 -32  11 INP:N=1 U=3
109-        104   3  -0.001225    32         INP:N=1 U=3
110-        C     WET CONTROL ROD/GUIDE TUBE
111-        105   1  -2.1024  -33       INP:N=1 U=4  $ No BCRA Rod
112-        C     105   9  -7.8300  -33       INP:N=1 U=4  $ BCRA Rod
113-        106   1  -2.1024  33  -34  INP:N=1 U=4
114-        107   1  -2.1024  34  -35  INP:N=1 U=4  $ No BCRA Cladding
115-        C     107   4  -6.5600  34  -35  INP:N=1 U=4  $ BCRA Cladding
116-        108   1  -2.1024  35  -36  INP:N=1 U=4
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117-        109   4  -6.5600   36  -37  INP:N=1 U=4
118-        110   1  -2.1024   37       INP:N=1 U=4
119-        C     DRY CONTROL ROD/GUIDE TUBE
120-        111   3  -0.001225  -33       INP:N=1 U=5  $ No DCRA Rod
121-        C     111   9  -7.8300  -33       INP:N=1 U=5  $ DCRA Rod
122-        112   3  -0.001225   33  -34  INP:N=1 U=5
123-        113   3  -0.001225   34  -35  INP:N=1 U=5  $ No DCRA Cladding
124-        C     113   4  -6.5600   34  -35  INP:N=1 U=5  $ DCRA Cladding
125-        114   3  -0.001225   35  -36  INP:N=1 U=5
126-        115   4  -6.5600   36  -37  INP:N=1 U=5
127-        116   3  -0.001225   37       INP:N=1 U=5
128-        C     WET INSTRUMENTATION TUBE
129-        117   1  -2.1024  -38       INP:N=1 U=6
130-        118   4  -6.5600   38 -39     INP:N=1 U=6
131-        119   1  -2.1024   39       INP:N=1 U=6
132-        C     DRY INSTRUMENTATION TUBE
133-        120   3  -0.001225  -38       INP:N=1 U=7
134-        121   4  -6.5600   38 -39     INP:N=1 U=7
135-        122   3  -0.001225   39       INP:N=1 U=7
136-        C     FUEL CELL BASKET STRUCTURE
137-        C     Code: boron in [B=] all panels [all], left [l], bottom [b], right [r], to
138-        C     FUEL CELL BASKET STRUCTURE -          WET - Borated panels
139-        C        WATER GAP     - ASSEMBLY LEFT
140-        123   1  -2.1024   52                INP:N=1 U=8
141-        C     123   1  -2.1024   48                INP:N=1 U=8
142-        C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
143-        C     124   6  -7.8320  -48  52     INP:N=1 U=8
144-        C        CS TUBE - ASSEMBLY LEFT
145-        C     125   7  -7.8320  -52  56     INP:N=1 U=8
146-        C        SS PANEL - ASSEMBLY LEFT
147-        126   8  -7.7700  -52          INP:N=1 U=8
148-        C        WATER GAP     - ASSEMBLY BOTTOM
149-        127   1  -2.1024   53                INP:N=1 U=9
150-        C     127   1  -2.1024   49                INP:N=1 U=9
151-        C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
152-        C     128   6  -7.8320  -49  53     INP:N=1 U=9
153-        C        CS TUBE - ASSEMBLY BOTTOM
154-        C     129   7  -7.8320  -53  57     INP:N=1 U=9
155-        C        SS PANEL - ASSEMBLY BOTTOM
156-        130   8  -7.7700  -53          INP:N=1 U=9
157-        C        WATER GAP     - ASSEMBLY RIGHT
158-        131   1  -2.1024  -54          INP:N=1 U=10
159-        C     131   1  -2.1024  -50                INP:N=1 U=10
160-        C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
161-        C     132   6  -7.8320   50 -54     INP:N=1 U=10
162-        C        CS TUBE - ASSEMBLY RIGHT
163-        C     133   7  -7.8320   54 -58     INP:N=1 U=10
164-        C        SS PANEL - ASSEMBLY RIGHT
165-        134   8  -7.7700   54          INP:N=1 U=10
166-        C        WATER GAP     - ASSEMBLY TOP
167-        135   1  -2.1024  -55          INP:N=1 U=11
168-        C     135   1  -2.1024  -51                INP:N=1 U=11
169-        C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
170-        C     136   6  -7.8320   51 -55     INP:N=1 U=11
171-        C        CS TUBE - ASSEMBLY TOP
172-        C     137   7  -7.8320   55 -59     INP:N=1 U=11
173-        C        SS PANEL - ASSEMBLY TOP
174-        138   8  -7.7700   55          INP:N=1 U=11
175-        C     FUEL CELL BASKET STRUCTURE -          DRY - Borated panels
176-        C        GAP     - ASSEMBLY LEFT
```

```
177-      139  3  -8.001225   52                    INP:N=1 U=12
178-      C    139   3  -8.001225   48                    INP:N=1 U=12
179-      C       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180-      C    140   6  -7.8320  -48  52          INP:N=1 U=12
181-      C       CS TUBE - ASSEMBLY LEFT
182-      C    141   7  -7.8320  -52  56          INP:N=1 U=12
183-      C       SS PANEL - ASSEMBLY LEFT
184-      142  8  -7.7700  -52                INP:N=1 U=12
185-      C       GAP     - ASSEMBLY BOTTOM
186-      143  3  -8.001225   53                    INP:N=1 U=13
187-      C    143   3  -8.001225   49                    INP:N=1 U=13
188-      C       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189-      C    144   6  -7.8320  -49  53          INP:N=1 U=13
190-      C       CS TUBE - ASSEMBLY BOTTOM
191-      C    145   7  -7.8320  -53  57          INP:N=1 U=13
192-      C       SS PANEL - ASSEMBLY BOTTOM
193-      146  8  -7.7700  -53                INP:N=1 U=13
194-      C       GAP     - ASSEMBLY RIGHT
195-      147  3  -8.001225  -54                    INP:N=1 U=14
196-      C    147   3  -8.001225  -50                    INP:N=1 U=14
197-      C       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198-      C    148   6  -7.8320   50 -54          INP:N=1 U=14
199-      C       CS TUBE - ASSEMBLY RIGHT
200-      C    149   7  -7.8320   54 -58          INP:N=1 U=14
201-      C       SS PANEL - ASSEMBLY RIGHT
202-      150  8  -7.7700   54                INP:N=1 U=14
203-      C       GAP     - ASSEMBLY TOP
204-      151  3  -8.001225  -55                    INP:N=1 U=15
205-      C    151   3  -8.001225  -51                    INP:N=1 U=15
206-      C       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207-      C    152   6  -7.8320   51 -55          INP:N=1 U=15
208-      C       CS TUBE - ASSEMBLY TOP
209-      C    153   7  -7.8320   55 -59          INP:N=1 U=15
210-      C       SS PANEL - ASSEMBLY TOP
211-      154  8  -7.7700   55                INP:N=1 U=15
212-      C    FUEL CELL BASKET STRUCTURE -          WET - Unborated panels
213-      C       WATER GAP     - ASSEMBLY LEFT
214-      155  1  -2.1024   52                    INP:N=1 U=16
215-      C    155   1  -2.1024   48                    INP:N=1 U=16
216-      C       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217-      C    156   6  -7.8320  -48  52          INP:N=1 U=16
218-      C       CS TUBE - ASSEMBLY LEFT
219-      C    157   7  -7.8320  -52  56          INP:N=1 U=16
220-      C       PANEL - ASSEMBLY LEFT
221-      158  1  -2.1024  -52                INP:N=1 U=16
222-      C       WATER GAP     - ASSEMBLY BOTTOM
223-      159  1  -2.1024   53                    INP:N=1 U=17
224-      C    159   1  -2.1024   49                    INP:N=1 U=17
225-      C       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226-      C    160   6  -7.8320  -49  53          INP:N=1 U=17
227-      C       CS TUBE - ASSEMBLY BOTTOM
228-      C    161   7  -7.8320  -53  57          INP:N=1 U=17
229-      C       PANEL - ASSEMBLY BOTTOM
230-      162  1  -2.1024  -53                INP:N=1 U=17
231-      C       WATER GAP     - ASSEMBLY RIGHT
232-      163  1  -2.1024  -54                    INP:N=1 U=18
233-      C    163   1  -2.1024  -50                    INP:N=1 U=18
234-      C       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235-      C    164   6  -7.8320   50 -54          INP:N=1 U=18
236-      C       CS TUBE - ASSEMBLY RIGHT
```

```
c     165   7  -7.8320   54 -58        INP:N=1 U=18
c        PANEL - ASSEMBLY RIGHT
166   1  -2.1024   54                INP:N=1 U=18
c        WATER GAP      - ASSEMBLY TOP
167   1  -2.1024  -55                INP:N=1 U=19
c     167   1  -2.1024  -51                INP:N=1 U=19
c        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
c     168   6  -7.8320   51 -55       INP:N=1 U=19
c        CS TUBE - ASSEMBLY TOP
c     169   7  -7.8320   55 -59       INP:N=1 U=19
c        PANEL - ASSEMBLY TOP
170   1  -2.1024   55            INP:N=1 U=19
c     FUEL CELL BASKET STRUCTURE -            DRY - Unborated panels
c        GAP      - ASSEMBLY LEFT
171   3  -0.001225   52                INP:N=1 U=20
c     171   3  -0.001225   48                INP:N=1 U=20
c        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
c     172   6  -7.8320  -48  52       INP:N=1 U=20
c        CS TUBE - ASSEMBLY LEFT
c     173   7  -7.8320  -52  56       INP:N=1 U=20
c        PANEL - ASSEMBLY LEFT
174   3  -0.001225  -52            INP:N=1 U=20
c        GAP      - ASSEMBLY BOTTOM
175   3  -0.001225   53                INP:N=1 U=21
c     175   3  -0.001225   49                INP:N=1 U=21
c        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
c     176   6  -7.8320  -49  53       INP:N=1 U=21
c        CS TUBE - ASSEMBLY BOTTOM
c     177   7  -7.8320  -53  57       INP:N=1 U=21
c        PANEL - ASSEMBLY BOTTOM
178   3  -0.001225  -53            INP:N=1 U=21
c        GAP      - ASSEMBLY RIGHT
179   3  -0.001225  -54                INP:N=1 U=22
c     179   3  -0.001225  -50                INP:N=1 U=22
c        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
c     180   6  -7.8320   50 -54       INP:N=1 U=22
c        CS TUBE - ASSEMBLY RIGHT
c     181   7  -7.8320   54 -58       INP:N=1 U=22
c        PANEL - ASSEMBLY RIGHT
182   3  -0.001225   54            INP:N=1 U=22
c        GAP      - ASSEMBLY TOP
183   3  -0.001225  -55                INP:N=1 U=23
c     183   3  -0.001225  -51                INP:N=1 U=23
c        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
c     184   6  -7.8320   51 -55       INP:N=1 U=23
c        CS TUBE - ASSEMBLY TOP
c     185   7  -7.8320   55 -59       INP:N=1 U=23
c        PANEL - ASSEMBLY TOP
186   3  -0.001225   55            INP:N=1 U=23

c     SURFACE SPECIFICATIONS
1*    PX    0.0
c     2*    PY    0.00       $ For 1/4 Model
3*    PZ    0.00
c     4     PX   12.30       $ For Collapsed Model
c     5     PX   36.90       $ For Collapsed Model
c     6     PY   12.30       $ Water Level Surface
c     7     PY   36.90       $ Water Level Surface
c     8     PY  -12.30       $ Water Level Surface
c     9     PY  -36.90       $ Water Level Surface
```

```
297-        10   PZ  180.0860     $ TOP ACTIVE FUEL
298-        11   PZ  201.2360     $ TOP FUEL HARDWARE
299-        C    12   PZ  226.75          $ TOP TUBE - (Shielding Model)
300-        13   PZ  228.75       $ TOP OF BASKET MATERIAL
301-        14   PZ  229.25       $ TOP RING/WATER GAP
302-        15   PZ  231.75       $ TOP INNER LID
303-        16   PZ  234.75       $ TOP LID GAP
304-        17   PZ  243.75       $ TOP OUTER LID
305-        C    18   PZ  248.25          $ TOP SKIRT - (Shielding Model)
306-        19   PZ  298.75       $ TOP REFLECTOR REGION
307-        20   CZ   71.095      $ ID OF INNER BARRIER
308-        21   CZ   73.095      $ OD OF INNER BARRIER
309-        22   CZ   73.10       $ ID OF OUTER BARRIER
310-        C    23   CZ   76.45          $ ID OF SKIRT LIP - (Shielding Model)
311-        24   CZ   83.10       $ OD OF OUTER BARRIER
312-        25   CZ  113.60       $ OD OF REFLECTOR REGION
313-        C    PIN LATTICE BOUNDS
314-        26   PX  0.72136
315-        27   PX -0.72136
316-        28   PY  0.72136
317-        29   PY -0.72136
318-        C     FUEL ROD
319-        30   CZ  0.468122
320-        31   CZ  0.478790
321-        32   CZ  0.546100
322-        C     CONTROL ROD/GUIDE TUBE
323-        33   CZ  0.45340  $ 0.49022
324-        34   CZ  0.46990  $ 0.50292
325-        35   CZ  0.54610  $ 0.56007
326-        36   CZ  0.62230  $ 0.63248
327-        37   CZ  0.67310
328-        C     INSTRUMENTATION TUBE
329-        38   CZ  0.56007
330-        39   CZ  0.62611
331-        C    ASSEMBLY LATTICE BOUNDS Actual
332-        44   PX  -10.65  $ ACTUAL 10.82025
333-        45   PY  -10.65
334-        46   PX   10.65
335-        47   PY   10.65
336-        C    48   PX  -11.0  $ Corrosion Expansion Cards
337-        C    49   PY  -11.0
338-        C    50   PX   11.0
339-        C    51   PY   11.0
340-        52   PX  -10.650001  $ UCF Intact Inside Tube ID
341-        53   PY  -10.650001
342-        54   PX   10.650001
343-        55   PY   10.650001
344-        56   PX  -11.95   $ UCF Intact Outside Tube ID
345-        57   PY  -11.95
346-        58   PX   11.95
347-        59   PY   11.95
348-        C     FUEL CELL LATTICE BOUNDS
349-        60   PX  -10.65     $ ACTUAL 12.30
350-        61   PX   10.65
351-        62   PY  -10.65
352-        63   PY   10.65
353-        C    45 degree planes
354-        64   P    1. -1.  0. 0.
355-        65   P    1.  1.  0. 0.
356-        C    EXTRA CARDS
```

```
357-
358-        NODE  N
359-        C     VOL    88J
360-        KCODE   4000 1. 7 97
361-        C       KSRC   -4.3  -5.7 1.   -2.8  -5.7 5.   -1.4  -5.7 10.   0.   -5.7  5.
362-        C        1.44 -5.7 3.    2.88 -5.7 8.    4.32 -5.7  9.
363-        C       -5.7  -4.3 2.   -4.3  -4.3 1.   -2.8  -4.3 5.   -1.4  -4.3 10.
364-        C        0.   -4.3 5.    1.44 -4.3 3.    2.88 -4.3 8.    4.32 -4.3  9.
365-        C       -5.7  -2.9 2.   -4.3  -2.9 1.                    -1.4  -2.9 10.
366-        C        0.   -2.9 5.                    2.88 -2.9 8.    4.32 -2.0  9.
367-        C       -5.7  -1.4 2.   -4.3  -1.4 1.   -2.8  -1.4 5.   -1.4  -1.4 10.
368-        C        0.   -1.4 5.    1.44 -1.4 3.    2.88 -1.4 8.    4.32 -1.4  9.
369-        C       -5.7   0.0 2.   -4.3   0.0 1.   -2.8   0.0 5.   -1.4   0.0 10.
370-        C                        1.44  0.0 3.    2.88  0.0 8.    4.32  0.0  9.
371-        C       -5.7   1.4 2.                    -2.8   1.4 5.   -1.4   1.4 10.
372-        C        0.    1.4 5.    1.44  1.4 3.    2.88  1.4 8.    4.32  1.4  9.
373-        C       -5.7   2.9 2.   -4.3   2.9 1.   -2.8   2.9 5.   -1.4   2.9 10.
374-        C        0.    2.9 5.    1.44  2.9 3.    2.88  2.9 8.    4.32  2.0  9.
375-        C       -5.7   4.3 2.   -4.3   4.3 1.   -2.8   4.3 5.   -1.4   4.3 10.
376-        C        0.    4.3 5.    1.44  4.3 3.    2.88  4.3 8.    4.32  4.3  9.
377-        C      MATERIAL SPECIFICATIONS
378-        C          WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379-        M1    1001.50C  4.9490-2    8016.50C  4.0160-2  26000.55C 1.0277-2
380-              5010.50C  2.8870-6
381-        MT1   LWTR.01T
382-        C        3.00%/20 BWD  15000 yr decay  1000 yr crit
383-        M2          8016.50C     4.6947E-02
384-              42095.50C   2.8540E-05
385-              43099.50C   2.4777E-05
386-              44101.50C   2.6127E-05
387-              45103.50C   1.6846E-05
388-              47109.50C   2.4208E-06
389-              60143.50C   2.2744E-05
390-              60145.50C   1.6947E-05
391-              62147.50C   7.3829E-06
392-              62149.50C   9.5390E-08
393-              62150.50C   6.4882E-06
394-              62151.50C   2.4010E-09
395-              63151.55C   4.6817E-07
396-              62152.50C   2.9715E-06
397-              63153.55C   2.1334E-06
398-              64155.50C   2.1214E-07
399-              64157.50C   1.8105E-09
400-              48000.50C   1.9107E-06
401-              54131.50C   1.2691E-05
402-              55133.50C   2.0978E-05
403-              92233.50C   1.3328E-07
404-              92234.50C   5.5552E-06
405-              92235.50C   3.7030E-04
406-              92236.50C   9.9960E-05
407-              92238.50C   2.2352E-02
408-              93237.55C   2.7474E-05
409-              94238.50C   8.5466E-09
410-              94239.55C   8.4602E-05
411-              94240.50C   6.5193E-06
412-              94241.50C   1.5681E-09
413-              94242.50C   3.4187E-06
414-              95241.50C   5.7655E-08
415-              95242.50C   9.4492E-12
416-              95243.50C   1.1887E-07
```

```
417-        c          WATER AT 300 K d=1.0000 g/cc
418-        M3    1001.50c  6.6878-2    8016.50c  3.3439-2
419-        MT3   LWTR.01T
420-        c          Air d=0.001225 g/cc
421-        c     M3    7014.50c  -0.80   8016.50c  -0.20
422-        c          ZIRCALOY-4 d=6.56 g/cc
423-        M4    8016.50c -0.0012  24000.50c -0.0010  26000.55c -0.0020
424-             40000.50c -0.9818  50000.55c -0.0140
425-        c          ALLOY 825 d=8.14 g/cc
426-        M5    6000.50c -0.0005  13027.50c -0.0020  14000.50c -0.0050
427-             16032.50c -0.0003  22000.50c -0.0090  24000.50c -0.2150
428-             25055.50c -0.0100  26000.55c -0.2857  28000.50c -0.4200
429-             29000.50c -0.0225  42000.50c -0.0300
430-        c          Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431-        c     M6    6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
432-        c          16032.50c -0.00035  25055.50c -0.0090
433-        c          26000.55c -0.98535
434-        c          A516 CARBON STEEL d=7.832 g/cc
435-        M7    6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
436-             16032.50c -0.00035  25055.50c -0.0090
437-             26000.55c -0.98535
438-        c          SS316L6A  1.6%  d=7.77 g/cc
439-        M8    5010.50c -0.00288  5011.50c -0.013120
440-             6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.0075
441-             15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
442-             25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
443-             42000.50c -0.02500
444-        c          SS316L83A 0.87wt% B d=7.83 g/cc
445-        c     M9    5010.50c -0.001566 5011.50c -0.007134
446-        c          6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.00750
447-        c          15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
448-        c          25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
449-        c          42000.50c -0.02500
450-        c          Al 6063 d=2.69 g/cc
451-        c     M10  12000.50c -0.00675  13027.50c -0.98125  14000.50c -0.00400
452-        c          22000.50c -0.00150  24000.50c -0.00100  25055.50c -0.00100
453-        c          26000.55c -0.00330  29000.50c -0.00100
454-        c     TALLIES
455-        PRINT
456-
1      initial source from file   srctp
1problem summary

     run terminated when    97 kcode cycles were done.
+                                                                                    08/22/96 21:47:49
     AUCF - BEW 15x15 FUEL,21 ASSEMBLY BIF CS/SS-B Corroded & collapsed - (a26xb5d)      probid =   08/22/96 17:36:25
0
 neutron creation    tracks    weight      energy          neutron loss        tracks    weight      energy
                               (per source particle)                                       (per source particle)

 source              387082    1.0026E+00  2.0569E+00      escape                 7      4.2712E-06  2.1235E-05
                                                           energy cutoff          0      0.          0.
                                                           time cutoff            0      0.          0.
 weight window          0      0.          0.              weight window          0      0.          0.
 cell importance        0      0.          0.              cell importance        0      0.          0.
 weight cutoff          0      1.0178E-02  2.3040E-06      weight cutoff     387754      3.0286E-02  6.6705E-06
 energy importance      0      0.          0.              energy importance      0      0.          0.
 dxtran                 0      0.          0.              dxtran                 0      0.          0.
 forced collisions      0      0.          0.              forced collisions      0      0.          0.
 exp. transform         0      0.          0.              exp. transform         0      0.          0.
```

```
upscattering             0   0.           7.4166E-08        downscattering           0   0.           1.9217E+00
                                                            capture                  0   6.5703E-01   3.6044E-02
(n,xn)                1349   2.7469E-03   2.0453E-03        loss to (n,xn)         674   1.3724E-03   1.1617E-02
fission                  0   0.           0.                loss to fission          0   3.4660E-01   8.9473E-02
   total            388431   1.0553E+00   2.0589E+00           total            388431   1.0553E+00   2.0589E+00

  number of neutrons banked                      675        average lifetime, shakes          cutoffs
  neutron tracks per source particle      1.0035E+00          escape            9.9733E+03       tco   1.0000E+34
  neutron collisions per source particle  4.6435E+01          capture           2.3235E+03       eco    .0000E+00
  total neutron collisions                  17974161          capture or escape 2.3235E+03       wc1  -5.0000E-01
  net multiplication               1.0014E+00  .0001          any termination   2.4866E+03       wc2  -2.5000E-01

computer time so far in this run   115.30 minutes           maximum number ever in bank        2
computer time in mcrun             115.19 minutes           bank overflows to backup file      0
source particles per minute            3.3603E+03           field length                       0
random numbers generated                251752202           most random numbers used was   11029 in history   177534

range of sampled source weights = 9.4496E-01 to 1.1287E+00
1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY BBF CS/SS-B Corroded & collapsed ~ (a26xb5d)       probid =   08/22/96 17:36:25

the initial fission neutron source distribution was read from the srctp file named srctp    .
the criticality problem was scheduled to skip   7 cycles and run a total of   97 cycles with nominally     4000 neutrons per cycle.
this problem has run   7 inactive cycles with    27659 neutron histories and   90 active cycles with    359423 neutron histories.

this calculation has completed the requested number of keff cycles using a total of      387082 fission neutron source histories.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

the following cells with fissionable material had no neutron tracks entering:
    97

the following cells with fissionable material had no neutron collisions:
    97

the following cells with fissionable material had no fission source points:
    97

warning.     1 fissionable cells had no tracks entering,   1 cells had no collisions, and   1 cells had no fission source points.
               the keff results could be too small because these cells with fissionable material were not sampled.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

        the k( collision) cycle values appear normally distributed at the 95 percent confidence level
        the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
        the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

..............................................................................................................................
| the final estimated combined collision/absorption/track-length keff =  .89888 with an estimated standard deviation of  .00096 . |
| the estimated 68, 95, & 99 percent keff confidence intervals are  .89792 to  .89984,  .89696 to  .90080, and  .89634 to  .90142 |
| the estimated collision/absorption neutron removal lifetime = 2.33E-05 seconds with an estimated standard deviation of 5.63E-08 |
..............................................................................................................................
```

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.89997	.00113	.89884 to .90110	.89772 to .90222	.89698 to .90296	
absorption	.89758	.00111	.89647 to .89870	.89537 to .89980	.89464 to .90052	
track length	.90063	.00134	.89928 to .90197	.89795 to .90330	.89708 to .90418	
col/absorp	.89874	.00097	.89778 to .89971	.89682 to .90067	.89619 to .90130	.4106
abs/trk len	.89872	.00099	.89773 to .89971	.89675 to .90069	.89611 to .90134	.2656
col/trk len	.90011	.00112	.89899 to .90123	.89788 to .90235	.89715 to .90307	.7102
col/abs/trk len	.89888	.00096	.89792 to .89984	.89696 to .90080	.89634 to .90142	

```
1mcnp     version 4a     ld=10/01/93                          08/20/96 21:00:04
**********************************************************************************                    prebld =   08/20/96 21:00:04
 inp=a26xb5e outp=a26xb5e0

     1-        AUCF - B&W 15x15 FUEL,21 ASSEMBLY BRF CS/BS-B Corroded & collapsed - (a26xb5e)
     2-        c     Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26X/5XB
     3-        c     15000 year decay  1000 yr criticality
     4-        c     CELL SPECIFICATIONS
     5-        c       Assembly Sub-lattices - 1/2 Model
     6-        1     0        1  3 -13 -20    FILL=1 (0 -74 0) IMP:N=1
     7-        c     1     0        1  3  -4 -13 -20    FILL=1 (0 -73.6 0) IMP:N=1
     8-        c     2     0        3  4  -5 -13 -20    FILL=1 (0 -73.6 0) IMP:N=1
     9-        c     3     0        3  5 -13 -20        FILL=1 (0 -73.6 0) IMP:N=1
    10-        c       Assembly Sub-lattices - 1/4 Model
    11-        c     1     0        1  2  3  -4 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    12-        c     2     0        2  3  4  -5 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    13-        c     3     0        2  3  5 -13 -20        FILL=1 (0 -12.3 0) IMP:N=1
    14-        c     ASSEMBLY LATTICE DESCRIPTION
    15-        5     1  -2.1024  -61  40 -43   42  IMP:N=1 LAT=1 U=1
    16-              FILL=0:3 0:7 0:0  1 1  1  1  56 56 1  1  56 56 56 1
    17-                                56 56 56 1  56 56 56 1  56 56 1  1
    18-                                1  1  1  1  1  1  1  1      $ 1/2 model
    19-        c     5     1  -2.1024  40 -41  42 -43  IMP:N=1 LAT=1 U=1
    20-        c           FILL=0:3 0:3 0:0  58 58 64 70  58 58 62 70
    21-        c                              40 62 70  1  70 70  1  1 $ 1/4 model
    22-        c     BARRIER CELLS
    23-        c     Basket Material-Lid Gap
    24-        76    3  -1.0000    1 -20  13   -14      IMP:N=1 $ 1/2 model
    25-        c     76    1  -2.1024    1   2 -20  13  -14      IMP:N=1 $ 1/4 model
    26-        c     Inner Barrier
    27-        77    6  -8.1400    1   3  20 -21 -14  IMP:N=1 $ 1/2 model
    28-        c     77    3  -8.1400    1   2   3  20 -21 -14  IMP:N=1 $ 1/4 model
    29-        c     Inner Lid
    30-        78    3  -8.1400    1  14 -15 -21      IMP:N=1 $ 1/2 model
    31-        c     78    3  -8.1400    1   2  14 -15 -21      IMP:N=1 $ 1/4 model
    32-        c      Gap between Inner and Outer Barrier Lids
    33-        79    3  -1.0000    1  15 -16 -21      IMP:N=1 $ 1/2 model
    34-        c     79    1  -2.1024    1   2  15 -16 -21      IMP:N=1 $ 1/4 model
    35-        c      Gap between Inner and Outer Barriers
    36-        80    3  -1.0000   21 -22   1   3 -16  IMP:N=1 $ 1/2 model
    37-        c     80    1  -2.1024   21 -22   1   2   3 -16  IMP:N=1 $ 1/4 model
    38-        c     Outer Barrier
    39-        81    7  -7.8320   22 -24   1   3 -16  IMP:N=1 $ 1/2 model
    40-        c     81    7  -7.8320   22 -24   1   2   3 -16  IMP:N=1 $ 1/4 model
    41-        c     Outer Barrier Lid
    42-        82    7  -7.8320    1 -24  16 -17      IMP:N=1 $ 1/2 model
    43-        c     82    7  -7.8320    1   2 -24  16 -17      IMP:N=1 $ 1/4 model
    44-        c     12" of Water around Container
    45-        83    3  -1.0000   24 -25   1   3 -17  IMP:N=1 $ 1/2 model
    46-        c     83    1  -2.1024   24 -25   1   2   3 -17  IMP:N=1 $ 1/4 model
    47-        c     12" of Water above Container
    48-        84    3  -1.0000   17 -19   1 -25      IMP:N=1 $ 1/2 model
    49-        c     84    1  -2.1024   17 -58   1   2 -59      IMP:N=1 $ 1/4 model.
    50-        c     OUTSIDE WORLD
    51-        85    0  -1:-3:19:25  IMP:N=0  $ 1/2 model
    52-        c     85    0  -1:-2:-3:19:25  IMP:N=0  $ 1/4 model
    53-        c     WET PIN LATTICE DESCRIPTION
    54-        86    1  -2.1024  -26 27 -28  29  IMP:N=1 LAT=1  U=56
    55-              FILL -8:8 -8:8 0:0  56 16R  56 2 14R 56  56 2 14R 56
    56-                                  56 2 4R 4 2 2R 4 2 4R 56
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 57-                                56 2 2R 4 2 4R 4 2 2R 56  56 2 14R 56
 58-                                56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 59-                                56 2 14R 56
 60-                                56 2 6R 4 2 6R 56
 61-                                56 2 14R 56
 62-                                56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 63-                                56 2 14R 56  56 2 2R 4 2 6R 4 2 2R 56
 64-                                56 2 4R 4 2 2R 4 2 4R 56
 65-                                56 2 14R 56  56 2 14R 56  56 16R
 66-        C     MIXED PIN LATTICE DESCRIPTION
 67-        C     87   3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=72
 68-        C      FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
 69-        C                          57 3 4R 5 3 2R 5 3 4R 57
 70-        C                          57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
 71-        C                          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 72-        C                          57 3 14R 57
 73-        C                          57 3 6R 7 3 6R 57
 74-        C                          57 3 14R 57
 75-        C                          57 3 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
 76-        C                          57 3 14R 57  57 2 2R 4 2 6R 4 2 2R 57
 77-        C                          57 3 4R 4 2 2R 4 2 4R 57
 78-        C                          57 3 14R 57  57 2 14R 57  57 16R
 79-        C     DRY PIN LATTICE DESCRIPTION
 80-        88    3  -0.001225  -26 27 -28  29  INP:N=1 LAT=1  U=57
 81-              FILL -8:8 -8:8 0:0  57 16R  57 3 14R 57  57 3 14R 57
 82-                                57 3 4R 5 3 2R 5 3 4R 57
 83-                                57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
 84-                                57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 85-                                57 3 14R 57
 86-                                57 3 6R 7 3 6R 57
 87-                                57 3 14R 57
 88-                                57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 89-                                57 3 14R 57  57 3 2R 5 3 6R 5 3 2R 57
 90-                                57 3 4R 5 3 2R 5 3 4R 57
 91-                                57 3 14R 57  57 3 14R 57  57 16R
 92-        C     WET FUEL ROD
 93-        89    2   7.8104E-02   -30 -10      INP:N=1 U=2
 94-        90    4  -6.5600    -30  10 -11  INP:N=1 U=2
 95-        91    1  -2.1024    -30  11      INP:N=1 U=2
 96-        92    1  -2.1024     30 -31 -11  INP:N=1 U=2
 97-        93    1  -2.1024     30 -31  11  INP:N=1 U=2
 98-        94    4  -6.5600     31 -32 -11  INP:N=1 U=2
 99-        95    1  -2.1024     31 -32  11  INP:N=1 U=2
100-        96    1  -2.1024     32          INP:N=1 U=2
101-        C     DRY FUEL ROD
102-        97    2   7.8104E-02   -30 -10      INP:N=1 U=3
103-        98    4  -6.5600    -30  10 -11  INP:N=1 U=3
104-        99    3  -0.001225    -30  11      INP:N=1 U=3
105-        100   3  -0.001225     30 -31 -11  INP:N=1 U=3
106-        101   3  -0.001225     30 -31  11  INP:N=1 U=3
107-        102   4  -6.5600     31 -32 -11  INP:N=1 U=3
108-        103   3  -0.001225     31 -32  11  INP:N=1 U=3
109-        104   3  -0.001225     32          INP:N=1 U=3
110-        C     WET CONTROL ROD/GUIDE TUBE
111-        105   1  -2.1024   -33          INP:N=1 U=4  $ No BCRA Rod
112-        C     105   0  -7.8300   -33      INP:N=1 U=4  $ BCRA Rod
113-        106   1  -2.1024   33  -34  INP:N=1 U=4
114-        107   1  -2.1024   34  -35  INP:N=1 U=4  $ No BCRA Cladding
115-        C     107   4  -6.5600   34  -35  INP:N=1 U=4  $ BCRA Cladding
116-        108   1  -2.1024   35  -36  INP:N=1 U=4
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109   4  -6.5600   36  -37  INP:N=1 U=4
110   1  -2.1024   37       INP:N=1 U=4
C     DRY CONTROL ROD/GUIDE TUBE
111   3  -0.001225  -33       INP:N=1 U=5  $ No BCRA Rod
C     111   0  -7.8300  -33       INP:N=1 U=5  $ BCRA Rod
112   3  -0.001225   33  -34  INP:N=1 U=5
113   3  -0.001225   34  -35  INP:N=1 U=5  $ No BCRA Cladding
C     113   4  -6.5600   34  -35  INP:N=1 U=5  $ BCRA Cladding
114   3  -0.001225   35  -36  INP:N=1 U=5
115   4  -6.5600   36  -37  INP:N=1 U=5
116   3  -0.001225   37       INP:N=1 U=5
C     WET INSTRUMENTATION TUBE
117   1  -2.1024  -38       INP:N=1 U=6
118   4  -6.5600   38 -39     INP:N=1 U=6
119   1  -2.1024   39       INP:N=1 U=6
C     DRY INSTRUMENTATION TUBE
120   3  -0.001225  -38       INP:N=1 U=7
121   4  -6.5600   38 -39     INP:N=1 U=7
122   3  -0.001225   39       INP:N=1 U=7
C     FUEL CELL BASKET STRUCTURE
C     Code: boron in [B=] all panels [all], left [l], bottom, [b], right [r], to
C     FUEL CELL BASKET STRUCTURE -        WET - Borated panels
C        WATER GAP     - ASSEMBLY LEFT
123   1  -2.1024   52       INP:N=1 U=8
C     123   1  -2.1024   48       INP:N=1 U=8
C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
124   6  -7.8320  -48  52     INP:N=1 U=8
C        CS TUBE - ASSEMBLY LEFT
125   7  -7.8320  -52  56     INP:N=1 U=8
C        SS PANEL - ASSEMBLY LEFT
126   8  -7.7700  -52       INP:N=1 U=8
C        WATER GAP     - ASSEMBLY BOTTOM
127   1  -2.1024   53       INP:N=1 U=9
C     127   1  -2.1024   49       INP:N=1 U=9
C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
128   6  -7.8320  -49  53     INP:N=1 U=9
C        CS TUBE - ASSEMBLY BOTTOM
129   7  -7.8320  -53  57     INP:N=1 U=9
C        SS PANEL - ASSEMBLY BOTTOM
130   8  -7.7700  -53       INP:N=1 U=9
C        WATER GAP     - ASSEMBLY RIGHT
131   1  -2.1024  -54       INP:N=1 U=10
C     131   1  -2.1024  -50       INP:N=1 U=10
C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
132   6  -7.8320   50 -54     INP:N=1 U=10
C        CS TUBE - ASSEMBLY RIGHT
133   7  -7.8320   54 -58     INP:N=1 U=10
C        SS PANEL - ASSEMBLY RIGHT
134   8  -7.7700   54       INP:N=1 U=10
C        WATER GAP     - ASSEMBLY TOP
135   1  -2.1024  -55       INP:N=1 U=11
C     135   1  -2.1024  -51       INP:N=1 U=11
C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
136   6  -7.8320   51 -55     INP:N=1 U=11
C        CS TUBE - ASSEMBLY TOP
137   7  -7.8320   55 -59     INP:N=1 U=11
C        SS PANEL - ASSEMBLY TOP
138   8  -7.7700   55       INP:N=1 U=11
C     FUEL CELL BASKET STRUCTURE -        DRY - Borated panels
C        GAP     - ASSEMBLY LEFT
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177-        139  3  -0.001225   52                    INP:N=1 U=12
178-        C    139   3  -0.001225   48                    INP:N=1 U=12
179-        C       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180-        C    140   6  -7.8320  -48  52          INP:N=1 U=12
181-        C       CS TUBE - ASSEMBLY LEFT
182-        C    141   7  -7.8320  -52  56          INP:N=1 U=12
183-        C       SS PANEL - ASSEMBLY LEFT
184-        142  8  -7.7700  -52                INP:N=1 U=12
185-        C       GAP     - ASSEMBLY BOTTOM
186-        143  3  -0.001225   53                    INP:N=1 U=13
187-        C    143   3  -0.001225   49                    INP:N=1 U=13
188-        C       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189-        C    144   6  -7.8320  -49  53          INP:N=1 U=13
190-        C       CS TUBE - ASSEMBLY BOTTOM
191-        C    145   7  -7.8320  -53  57          INP:N=1 U=13
192-        C       SS PANEL - ASSEMBLY BOTTOM
193-        146  8  -7.7700  -53                INP:N=1 U=13
194-        C       GAP     - ASSEMBLY RIGHT
195-        147  3  -0.001225  -54                    INP:N=1 U=14
196-        C    147   3  -0.001225  -50                    INP:N=1 U=14
197-        C       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198-        C    148   6  -7.8320   50 -54          INP:N=1 U=14
199-        C       CS TUBE - ASSEMBLY RIGHT
200-        C    149   7  -7.8320   54 -58          INP:N=1 U=14
201-        C       SS PANEL - ASSEMBLY RIGHT
202-        150  8  -7.7700   54                INP:N=1 U=14
203-        C       GAP     - ASSEMBLY TOP
204-        151  3  -0.001225  -55                    INP:N=1 U=15
205-        C    151   3  -0.001225  -51                    INP:N=1 U=15
206-        C       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207-        C    152   6  -7.8320   51 -55          INP:N=1 U=15
208-        C       CS TUBE - ASSEMBLY TOP
209-        C    153   7  -7.8320   55 -59          INP:N=1 U=15
210-        C       SS PANEL - ASSEMBLY TOP
211-        154  8  -7.7700   55                INP:N=1 U=15
212-        C    FUEL CELL BASKET STRUCTURE -          WET - Unborated panels
213-        C       WATER GAP     - ASSEMBLY LEFT
214-        155  1  -2.1024   52                    INP:N=1 U=16
215-        C    155   1  -2.1024   48                    INP:N=1 U=16
216-        C       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217-        C    156   6  -7.8320  -48  52          INP:N=1 U=16
218-        C       CS TUBE - ASSEMBLY LEFT
219-        C    157   7  -7.8320  -52  56          INP:N=1 U=16
220-        C       PANEL - ASSEMBLY LEFT
221-        158  1  -2.1024  -52                INP:N=1 U=16
222-        C       WATER GAP     - ASSEMBLY BOTTOM
223-        159  1  -2.1024   53                    INP:N=1 U=17
224-        C    159   1  -2.1024   49                    INP:N=1 U=17
225-        C       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226-        C    160   6  -7.8320  -49  53          INP:N=1 U=17
227-        C       CS TUBE - ASSEMBLY BOTTOM
228-        C    161   7  -7.8320  -53  57          INP:N=1 U=17
229-        C       PANEL - ASSEMBLY BOTTOM
230-        162  1  -2.1024  -53                INP:N=1 U=17
231-        C       WATER GAP     - ASSEMBLY RIGHT
232-        163  1  -2.1024  -54                    INP:N=1 U=18
233-        C    163   1  -2.1024  -50                    INP:N=1 U=18
234-        C       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235-        C    164   6  -7.8320   50 -54          INP:N=1 U=18
236-        C       CS TUBE - ASSEMBLY RIGHT
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c     165   7  -7.8320   54 -58        INP:N=1 U=18
c        PANEL - ASSEMBLY RIGHT
      166  1  -2.1024   54              INP:N=1 U=18
c        WATER GAP     - ASSEMBLY TOP
      167  1  -2.1024  -55              INP:N=1 U=19
c     167   1  -2.1024  -51                    INP:N=1 U=19
c        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
c     168   6  -7.8320   51 -55        INP:N=1 U=19
c        CS TUBE - ASSEMBLY TOP
c     169   7  -7.8320   55 -59        INP:N=1 U=19
c        PANEL - ASSEMBLY TOP
      170  1  -2.1024   55              INP:N=1 U=19
c     FUEL CELL BASKET STRUCTURE -                DRY - Unborated panels
c        GAP     - ASSEMBLY LEFT
      171  3  -0.001225   52            INP:N=1 U=20
c     171   3  -0.001225   48                    INP:N=1 U=20
c        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
c     172   6  -7.8320  -48  52         INP:N=1 U=20
c        CS TUBE - ASSEMBLY LEFT
c     173   7  -7.8320  -52  56         INP:N=1 U=20
c        PANEL - ASSEMBLY LEFT
      174  3  -0.001225  -52            INP:N=1 U=20
c        GAP     - ASSEMBLY BOTTOM
      175  3  -0.001225   53            INP:N=1 U=21
c     175   3  -0.001225   49                    INP:N=1 U=21
c        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
c     176   6  -7.8320  -49  53         INP:N=1 U=21
c        CS TUBE - ASSEMBLY BOTTOM
c     177   7  -7.8320  -53  57         INP:N=1 U=21
c        PANEL - ASSEMBLY BOTTOM
      178  3  -0.001225  -53            INP:N=1 U=21
c        GAP     - ASSEMBLY RIGHT
      179  3  -0.001225  -54            INP:N=1 U=22
c     179   3  -0.001225  -50                    INP:N=1 U=22
c        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
c     180   6  -7.8320   50 -54        INP:N=1 U=22
c        CS TUBE - ASSEMBLY RIGHT
c     181   7  -7.8320   54 -58        INP:N=1 U=22
c        PANEL - ASSEMBLY RIGHT
      182  3  -0.001225   54            INP:N=1 U=22
c        GAP     - ASSEMBLY TOP
      183  3  -0.001225  -55            INP:N=1 U=23
c     183   3  -0.001225  -51                    INP:N=1 U=23
c        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
c     184   6  -7.8320   51 -55        INP:N=1 U=23
c        CS TUBE - ASSEMBLY TOP
c     185   7  -7.8320   55 -59        INP:N=1 U=23
c        PANEL - ASSEMBLY TOP
      186  3  -0.001225   55            INP:N=1 U=23

c     SURFACE SPECIFICATIONS
      1*  PX    0.0
c     2*  PY    0.00        $ For 1/4 Model
      3*  PZ    0.00
c     4   PX   12.30        $ For Collapsed Model
c     5   PX  -36.90        $ For Collapsed Model
c     6   PY   12.30        $ Water Level Surface
c     7   PY  -36.90        $ Water Level Surface
c     8   PY   12.30        $ Water Level Surface
c     9   PY  -36.90        $ Water Level Surface
```

```
10   PZ  180.0860     $ TOP ACTIVE FUEL
11   PZ  201.2360     $ TOP FUEL HARDWARE
C    12   PZ  226.75        $ TOP TUBE - (Shielding Model)
13   PZ  228.75       $ TOP OF BASKET MATERIAL
14   PZ  229.25       $ TOP RING/WATER GAP
15   PZ  231.75       $ TOP INNER LID
16   PZ  234.75       $ TOP LID GAP
17   PZ  245.75       $ TOP OUTER LID
C    18   PZ  268.25        $ TOP SKIRT - (Shielding Model)
19   PZ  298.75       $ TOP REFLECTOR REGION
20   CZ   71.095      $ ID OF INNER BARRIER
21   CZ   73.095      $ OD OF INNER BARRIER
22   CZ   75.10       $ ID OF OUTER BARRIER
C    23   CZ    76.45       $ ID OF SKIRT LIP - (Shielding Model)
24   CZ   83.10       $ OD OF OUTER BARRIER
25   CZ  113.40       $ OD OF REFLECTOR REGION
C    PIN LATTICE BOUNDS
26   PX  0.72136
27   PX -0.72136
28   PY  0.72136
29   PY -0.72136
C     FUEL ROD
30   CZ  0.468122
31   CZ  0.478790
32   CZ  0.546100
C     CONTROL ROD/GUIDE TUBE
33   CZ  0.45340  $ 0.49022
34   CZ  0.46990  $ 0.50292
35   CZ  0.54610  $ 0.56007
36   CZ  0.62230  $ 0.63246
37   CZ  0.67310
C     INSTRUMENTATION TUBE
38   CZ  0.56007
39   CZ  0.62611
C    ASSEMBLY LATTICE BOUNDS Actual
44   PX  -10.65  $ ACTUAL 10.82025
45   PY  -10.65
46   PX   10.65
47   PY   10.65
C    48   PX  -11.0  $ Corrosion Expansion Cards
C    49   PY  -11.0
C    50   PX   11.0
C    51   PY   11.0
52   PX  -10.650001  $ UCF Intact Inside Tube ID
53   PY  -10.650001
54   PX   10.650001
55   PY   10.650001
56   PX  -11.95   $ UCF Intact Outside Tube ID
57   PY  -11.95
58   PX   11.95
59   PY   11.95
C    FUEL CELL LATTICE BOUNDS
60   PX  -10.65    $ ACTUAL 12.30
61   PX   10.65
62   PY  -10.65
63   PY   10.65
C    45 degree planes
64   P    1. -1.  0. 0.
65   P    1.  1.  0. 0.
C    EXTRA CARDS
```

```
357-
358-        MODE  N
359-        C     VOL   88J
360-        KCODE   4000 1. 7 97
361-        C       KSRC  -4.3  -5.7 1.  -2.8  -5.7 5.  -1.4  -5.7 10.   0.   -5.7  5.
362-        C        1.44 -5.7 3.   2.88 -5.7 8.   4.32 -5.7  9.
363-        C       -5.7  -4.3 2.  -4.3  -4.3 1.  -2.8  -4.3  5.  -1.4  -4.3 10.
364-        C        0.   -4.3 5.   1.44 -4.3 3.   2.88 -4.3  8.   4.32 -4.3  9.
365-        C       -5.7  -2.9 2.  -4.3  -2.9 1.                 -1.4  -2.9 10.
366-        C        0.   -2.9 5.                  2.88 -2.9  8.   4.32 -2.8  9.
367-        C       -5.7  -1.4 2.  -4.3  -1.4 1.  -2.8  -1.4  5.  -1.4  -1.4 10.
368-        C        0.   -1.4 5.   1.44 -1.4 3.   2.88 -1.4  8.   4.32 -1.4  9.
369-        C       -5.7   0.0 2.  -4.3   0.0 1.  -2.8   0.0  5.  -1.4   0.0 10.
370-        C                                1.44  0.0 3.   2.88  0.0  8.   4.32  0.0  9.
371-        C       -5.7   1.4 2.                 -2.8   1.4  5.  -1.4   1.4 10.
372-        C        0.    1.4 5.   1.44  1.4 3.   2.88  1.4  8.   4.32  1.4  9.
373-        C       -5.7   2.9 2.  -4.3   2.9 1.  -2.8   2.9  5.  -1.4   2.9 10.
374-        C        0.    2.9 5.   1.44  2.9 3.   2.88  2.9  8.   4.32  2.9  9.
375-        C       -5.7   4.3 2.  -4.3   4.3 1.  -2.8   4.3  5.  -1.4   4.3 10.
376-        C        0.    4.3 5.   1.44  4.3 3.   2.88  4.3  8.   4.32  4.3  9.
377-        C       MATERIAL SPECIFICATIONS
378-        C          WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379-        M1     1001.50C  4.9490-2     8016.50C  4.0160-2  26000.55C 1.0277-2
380-               5010.50C  2.8870-6
381-        MT1    LWTR.01T
382-        C          3.00X/20 BWD  15000 yr decay  5000 yr crit
383-        N2         8016.50C      4.6947E-02
384-               42095.50C    2.9047E-05
385-               43099.50C    2.6777E-05
386-               44101.50C    2.6604E-05
387-               45103.50C    1.6963E-05
388-               47109.50C    2.4540E-06
389-               60143.50C    2.2997E-05
390-               60145.50C    1.7194E-05
391-               62147.50C    7.5058E-06
392-               62149.50C    4.3701E-08
393-               62150.50C    6.5926E-06
394-               62151.50C    2.4249E-09
395-               63151.55C    4.6823E-07
396-               62152.50C    2.9874E-06
397-               63153.55C    2.1806E-06
398-               64155.50C    1.1733E-07
399-               64157.50C    1.2504E-09
400-               48000.50C    1.9600E-06
401-               54131.50C    1.2873E-05
402-               55133.50C    3.1431E-05
403-               92233.50C    1.6324E-07
404-               92234.50C    5.7609E-06
405-               92235.50C    3.7337E-04
406-               92236.50C    1.0302E-04
407-               92238.50C    2.2352E-02
408-               93237.55C    2.7728E-05
409-               94238.50C    8.7993E-09
410-               94239.55C    7.7552E-05
411-               94240.50C    5.1653E-06
412-               94241.50C    1.2685E-09
413-               94242.50C    2.3520E-06
414-               95241.50C    3.8803E-08
415-               95242.50C    1.1289E-11
416-               95243.50C    1.0946E-07
```

```
417-        c          WATER AT 300 K d=1.0000 g/cc
418-        M3     1001.50c  6.6878-2     8016.50c  3.3439-2
419-        MT3    LWTR.01T
420-        c          Air d=0.001225 g/cc
421-        c    M3     7014.50c  -0.80    8016.50c  -0.20
422-        c          ZIRCALOY-4 d=6.56 g/cc
423-        M4     8016.50c -0.0012  24000.50c -0.0010  26000.55c -0.0020
424-              40000.50c -0.9818  50000.35c -0.0140
425-        c          ALLOY 825 d=8.14 g/cc
426-        M5     6000.50c -0.0005  13027.50c -0.0020  14000.50c -0.0050
427-              16032.50c -0.0003  22000.50c -0.0090  24000.50c -0.2150
428-              25055.50c -0.0100  26000.55c -0.2857  28000.50c -0.4200
429-              29000.50c -0.0225  42000.50c -0.0300
430-        c          Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431-        c    M6     6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
432-        c          16032.50c -0.00035  25055.50c -0.0090
433-        c          26000.55c -0.98535
434-        c          A516 CARBON STEEL d=7.832 g/cc
435-        M7     6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
436-              16032.50c -0.00035  25055.50c -0.0090
437-              26000.55c -0.98535
438-        c          SS316L6A  1.6%  d=7.77 g/cc
439-        M8     5010.50c -0.00288  5011.50c -0.013120
440-               6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.0075
441-              15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
442-              25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
443-              42000.50c -0.02500
444-        c          SS316L3A 0.87wt% B d=7.83 g/cc
445-        c    M9     5010.50c -0.001566 5011.50c -0.007134
446-        c           6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.00750
447-        c          15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
448-        c          25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
449-        c          42000.50c -0.02500
450-        c          Al 6063 d=2.69 g/cc
451-        c    M10   12000.50c -0.00675  13027.50c -0.98125  14000.50c -0.00400
452-        c          22000.50c -0.00150  24000.50c -0.00100  25055.50c -0.00100
453-        c          26000.55c -0.00350  29000.50c -0.00100
454-        c     TALLIES
455-        PRINT
456-
1     initial source from file   arctp

1problem summary

      run terminated when    97 kcode cycles were done.                                                    08/20/96 22:55:23
      AUCF - BAW 15x15 FUEL,21 ASSEMBLY BBF CS/SS-B Corroded & collapsed - (a26xb5e)      probid =   08/20/96 21:00:04
```

neutron creation	tracks	weight (per source particle)	energy (per source particle)	neutron loss	tracks	weight (per source particle)	energy (per source particle)
source	388004	9.9999E-01	2.0600E+00	escape	10	1.7170E-05	3.6994E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.1088E-02	7.4122E-06	weight cutoff	388630	5.1257E-02	5.9796E-06
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.

```
forced collisions          0    0.            0.                forced collisions        0      0.            0.
exp. transform             0    0.            0.                exp. transform           0      0.            0.
upscattering               0    0.            7.5977E-08        downscattering           0      0.            1.9258E+00
                                                                capture                  0      6.3312E-01    3.5701E-02
(n,xn)                  1269    2.5713E-03    2.0152E-03        loss to (n,xn)         633      1.2827E-03    1.0840E-02
fission                    0    0.            0.                loss to fission          0      3.4797E-01    8.9545E-02
   total              389273    1.0536E+00    2.0620E+00           total            389273      1.0536E+00    2.0620E+00

  number of neutrons banked                         436         average lifetime, shakes              cutoffs
  neutron tracks per source particle         1.0033E+00           escape           9.2675E+03          tco   1.0000E+34
  neutron collisions per source particle     4.6989E+01           capture          2.3781E+03          eco    .0000E+00
  total neutron collisions                     18231800           capture or escape 2.3782E+03         wc1  -5.0000E-01
  net multiplication                    1.0013E+00  .0001         any termination  2.5508E+03          wc2  -2.5000E-01

computer time so far in this run   115.20 minutes           maximum number ever in bank        2
computer time in mcrun             115.10 minutes           bank overflows to backup file      0
source particles per minute          3.3711E+03             field length                       0
random numbers generated              254604968             most random numbers used was   10424 in history    346341
1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e)       probid =   08/20/96 21:00:04

the initial fission neutron source distribution was read from the srctp file named srctp   .
the criticality problem was scheduled to skip   7 cycles and run a total of   97 cycles with nominally     4000 neutrons per cycle.
this problem has run   7 inactive cycles with    27651 neutron histories and   90 active cycles with     360353 neutron histories.

this calculation has completed the requested number of keff cycles using a total of      388004 fission neutron source histories.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
the following cells with fissionable material had no neutron tracks entering:
    97

the following cells with fissionable material had no neutron collisions:
    97

the following cells with fissionable material had no fission source points:
    97

warning.     1 fissionable cells had no tracks entering,   1 cells had no collisions, and   1 cells had no fission source points.
               the keff results could be too small because these cells with fissionable material were not sampled.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

         the k( collision) cycle values appear normally distributed at the 95 percent confidence level
         the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
         the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

..........................................................................................................................
| the final estimated combined collision/absorption/track-length keff =  .90061 with an estimated standard deviation of  .00107 |
| the estimated 68, 95, & 99 percent keff confidence intervals are  .89955 to  .90168,  .89849 to  .90274, and  .89780 to  .90343 |
| the estimated collision/absorption neutron removal lifetime = 2.38E-05 seconds with an estimated standard deviation of 5.97E-08 |
```

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.90078	.00131	.89946 to .90209	.89816 to .90340	.89731 to .90425	
absorption	.90042	.00118	.89924 to .90159	.89808 to .90276	.89731 to .90352	
track length	.90126	.00162	.89964 to .90288	.89803 to .90449	.89698 to .90554	
col/absorp	.90056	.00106	.89950 to .90163	.89844 to .90268	.89775 to .90337	.4650
abs/trk len	.90066	.00108	.89958 to .90174	.89851 to .90280	.89781 to .90351	.2902
col/trk len	.90079	.00132	.89947 to .90212	.89816 to .90343	.89730 to .90429	.7969
col/abs/trk len	.90061	.00107	.89955 to .90168	.89849 to .90274	.89780 to .90343	

```
1mcnp     version 4a    ld=10/01/93                          08/20/96 22:55:24
**************************************************************************** probid =  08/20/96 22:55:24
 inp=a26xb5f outp=a26xb5f0

     1-        AUCF - BZW 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5f)
     2-        c     Advanced Unconsistered Fuel Waste Package, collapsed basket 10k 26%/5%B
     3-        c     15000 year decay  10000 yr criticality
     4-        c     CELL SPECIFICATIONS
     5-        c       Assembly sub-lattices - 1/2 Model
     6-        1     0       1  3 -13 -20    FILL=1 (0 -74 0) IMP:N=1
     7-        c     1     0       1  3  -4 -13 -20    FILL=1 (0 -73.8 0) IMP:N=1
     8-        c     2     0       3  4  -5 -13 -20    FILL=1 (0 -73.8 0) IMP:N=1
     9-        c     3     0       3  5 -13 -20        FILL=1 (0 -73.8 0) IMP:N=1
    10-        c       Assembly sub-lattices - 1/4 Model
    11-        c     1     0       1  2  3  -4 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    12-        c     2     0       2  3  4  -5 -13 -20    FILL=1 (0 -12.3 0) IMP:N=1
    13-        c     3     0       2  3  5 -13 -20        FILL=1 (0 -12.3 0) IMP:N=1
    14-        c     ASSEMBLY LATTICE DESCRIPTION
    15-        5     1  -2.1024  -61  60 -63  62  IMP:N=1 LAT=1 U=1
    16-              FILL=0:3 0:7 0:0  1 1  1  1  56 56 1  1  56 56 56 1
    17-                                56 56 56 1  56 56 56 1  56 56 1  1
    18-                                1 1  1  1   1 1 1 1        $ 1/2 model
    19-        c     5     1  -2.1024   60 -61  62 -63  IMP:N=1 LAT=1 U=1
    20-        c           FILL=0:3 0:3 0:0  58 58 64 70  58 58 62 70
    21-        c                              60 62 70  1  70 70  1  1 $ 1/4 model
    22-        c     BARRIER CELLS
    23-        c     Basket Material-Lid Gap
    24-        76    3  -1.0000    1 -20  13  -14     IMP:N=1 $ 1/2 model
    25-        c     76    1  -2.1024    1  2 -20  13  -14     IMP:N=1 $ 1/4 model
    26-        c     Inner Barrier
    27-        77    3  -8.1400    1  3  20 -21 -14  IMP:N=1 $ 1/2 model
    28-        c     77    5  -8.1400    1  2  3  20 -21 -14  IMP:N=1 $ 1/4 model
    29-        c     Inner Lid
    30-        78    3  -8.1400    1  14 -15 -21      IMP:N=1 $ 1/2 model
    31-        c     78    5  -8.1400    1  2  14 -15 -21      IMP:N=1 $ 1/4 model
    32-        c      Gap between Inner and Outer Barrier Lids
    33-        79    3  -1.0000    1  15 -16 -21      IMP:N=1 $ 1/2 model
    34-        c     79    1  -2.1024    1  2  15 -16 -21      IMP:N=1 $ 1/4 model
    35-        c      Gap between Inner and Outer Barriers
    36-        80    3  -1.0000   21 -22   1  3 -16  IMP:N=1 $ 1/2 model
    37-        c     80    1  -2.1024   21 -22   1  2  3 -16  IMP:N=1 $ 1/4 model
    38-        c     Outer Barrier
    39-        81    7  -7.8320   22 -24   1  3 -16  IMP:N=1 $ 1/2 model
    40-        c     81    7  -7.8320   22 -24   1  2  3 -16  IMP:N=1 $ 1/4 model
    41-        c     Outer Barrier Lid
    42-        82    7  -7.8320    1 -24  16 -17      IMP:N=1 $ 1/2 model
    43-        c     82    7  -7.8320    1  2 -24  16 -17      IMP:N=1 $ 1/4 model
    44-        c     12" of Water around Container
    45-        83    3  -1.0000   24 -25   1  3 -17  IMP:N=1 $ 1/2 model
    46-        c     83    1  -2.1024   24 -25   1  2  3 -17  IMP:N=1 $ 1/4 model
    47-        c     12" of Water above Container
    48-        84    3  -1.0000   17 -19   1 -25      IMP:N=1 $ 1/2 model
    49-        c     84    1  -2.1024   17 -58   1  2 -59      IMP:N=1 $ 1/4 model
    50-        c     OUTSIDE WORLD
    51-        85    0  -1:-3:19:25  IMP:N=0  $ 1/2 model
    52-        c     85    0  -1:-2:-3:19:25  IMP:N=0  $ 1/4 model
    53-        c     WET BIN LATTICE DESCRIPTION
    54-        86    1  -2.1024  -26 27 -28  29  IMP:N=1 LAT=1  U=56
    55-              FILL -8:8 -8:8 0:0  56 16R  56 2 14R 56  56 2 14R 56
    56-                                  56 2 4R 4 2 2R 4 2 4R 56
```

```
                                 56 2 2R 4 2 6R 4 2 2R 56  56 2 14R 56
                                 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
                                 56 2 14R 56
                                 56 2 6R 6 2 6R 56
                                 56 2 14R 56
                                 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
                                 56 2 14R 56  56 2 2R 4 2 6R 4 2 2R 56
                                 56 2 6R 4 2 2R 4 2 4R 56
                                 56 2 14R 56  56 2 14R 56  56 14R
c       MIXED PIN LATTICE DESCRIPTION
c       87  3  -8.001225  -26 27 -28  29  INP:N=1 LAT=1  U=72
c        FILL -8:8 -8:8 0:0  57 14R  57 3 14R 57  57 3 14R 57
c                                 57 3 4R 5 3 2R 5 3 4R 57
c                                 57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
c                                 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
c                                 57 3 14R 57
c                                 57 3 6R 7 3 6R 57
c                                 57 2 14R 57
c                                 57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
c                                 57 2 14R 57  57 2 2R 4 2 6R 4 2 2R 57
c                                 57 2 4R 4 2 2R 4 2 4R 57
c                                 57 2 14R 57  57 2 14R 57  57 14R
c       DRY PIN LATTICE DESCRIPTION
c       88  3  -8.001225  -26 27 -28  29  INP:N=1 LAT=1  U=57
        FILL -8:8 -8:8 0:0  57 14R  57 3 14R 57  57 3 14R 57
                                 57 3 4R 5 3 2R 5 3 4R 57
                                 57 3 2R 5 3 6R 5 3 2R 57  57 3 14R 57
                                 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
                                 57 3 14R 57
                                 57 3 6R 7 3 6R 57
                                 57 3 14R 57
                                 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
                                 57 3 14R 57  57 3 2R 5 3 6R 5 3 2R 57
                                 57 3 4R 5 3 2R 5 3 4R 57
                                 57 3 14R 57  57 3 14R 57  57 14R

c       WET FUEL ROD
89      2   7.0106E-02   -30 -10      INP:N=1 U=2
90      4  -6.5600   -30  10 -11  INP:N=1 U=2
91      1  -2.1024   -30  11      INP:N=1 U=2
92      1  -2.1024    30 -31 -11  INP:N=1 U=2
93      1  -2.1024    30 -31  11  INP:N=1 U=2
94      4  -6.5600    31 -32 -11  INP:N=1 U=2
95      1  -2.1024    31 -32  11  INP:N=1 U=2
96      1  -2.1024    32          INP:N=1 U=2
c       DRY FUEL ROD
97      2   7.0106E-02   -30 -10      INP:N=1 U=3
98      4  -6.5600   -30  10 -11  INP:N=1 U=3
99      3  -0.001225   -30  11      INP:N=1 U=3
100     3  -0.001225    30 -31 -11  INP:N=1 U=3
101     3  -0.001225    30 -31  11  INP:N=1 U=3
102     4  -6.5600    31 -32 -11  INP:N=1 U=3
103     3  -0.001225    31 -32  11  INP:N=1 U=3
104     3  -0.001225    32          INP:N=1 U=3
c       WET CONTROL ROD/GUIDE TUBE
105     1  -2.1024  -33          INP:N=1 U=4  $ No BCRA Rod
c       105  0  -7.8300  -33          INP:N=1 U=4  $ BCRA Rod
106     1  -2.1024   33 -34  INP:N=1 U=4
107     1  -2.1024   34 -35  INP:N=1 U=4  $ No BCRA Cladding
c       107  4  -6.5600   34 -35  INP:N=1 U=4  $ BCRA Cladding
108     1  -2.1024   35 -36  INP:N=1 U=4
```

```
109   4  -6.5600   36  -37  INP:N=1 U=4
110   1  -2.1024   37       INP:N=1 U=4
C     DRY CONTROL ROD/GUIDE TUBE
111   3  -0.001225  -33        INP:N=1 U=5  $ No BCRA Rod
C     111   9  -7.8300  -33        INP:N=1 U=5  $ BCRA Rod
112   3  -0.001225   33  -34  INP:N=1 U=5
113   3  -0.001225   34  -35  INP:N=1 U=5  $ No BCRA Cladding
C     113   4  -6.5600   34  -35  INP:N=1 U=5  $ BCRA Cladding
114   3  -0.001225   35  -36  INP:N=1 U=5
115   4  -6.5600   36  -37   INP:N=1 U=5
116   3  -0.001225   37       INP:N=1 U=5
C     WET INSTRUMENTATION TUBE
117   1  -2.1024  -38       INP:N=1 U=6
118   4  -6.5600   38 -39      INP:N=1 U=6
119   1  -2.1024   39       INP:N=1 U=6
C     DRY INSTRUMENTATION TUBE
120   3  -0.001225  -38        INP:N=1 U=7
121   4  -6.5600   38 -39      INP:N=1 U=7
122   3  -0.001225   39       INP:N=1 U=7
C     FUEL CELL BASKET STRUCTURE
C     Code: boron in [B=] all panels [all], left [l], bottom, [b], right [r], to
C     FUEL CELL BASKET STRUCTURE -        WET - Borated panels
C        WATER GAP      - ASSEMBLY LEFT
123   1  -2.1024   52            INP:N=1 U=8
C     123   1  -2.1024   48            INP:N=1 U=8
C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
124   6  -7.8320  -48  52      INP:N=1 U=8
C        CS TUBE - ASSEMBLY LEFT
125   7  -7.8320  -52  56      INP:N=1 U=8
C        SS PANEL - ASSEMBLY LEFT
126   8  -7.7700  -52            INP:N=1 U=8
C        WATER GAP      - ASSEMBLY BOTTOM
127   1  -2.1024   53            INP:N=1 U=9
C     127   1  -2.1024   49            INP:N=1 U=9
C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
128   6  -7.8320  -49  53      INP:N=1 U=9
C        CS TUBE - ASSEMBLY BOTTOM
129   7  -7.8320  -53  57      INP:N=1 U=9
C        SS PANEL - ASSEMBLY BOTTOM
130   8  -7.7700  -53            INP:N=1 U=9
C        WATER GAP      - ASSEMBLY RIGHT
131   1  -2.1024  -54            INP:N=1 U=10
C     131   1  -2.1024  -50            INP:N=1 U=10
C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
132   6  -7.8320   50 -54      INP:N=1 U=10
C        CS TUBE - ASSEMBLY RIGHT
133   7  -7.8320   54 -58      INP:N=1 U=10
C        SS PANEL - ASSEMBLY RIGHT
134   8  -7.7700   54            INP:N=1 U=10
C        WATER GAP      - ASSEMBLY TOP
135   1  -2.1024  -55            INP:N=1 U=11
C     135   1  -2.1024  -51            INP:N=1 U=11
C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
136   6  -7.8320   51 -55      INP:N=1 U=11
C        CS TUBE - ASSEMBLY TOP
137   7  -7.8320   55 -59      INP:N=1 U=11
C        SS PANEL - ASSEMBLY TOP
138   8  -7.7700   55            INP:N=1 U=11
C     FUEL CELL BASKET STRUCTURE -        DRY - Borated panels
C        GAP      - ASSEMBLY LEFT
```

```
177-        139   3  -0.001225   52                INP:N=1 U=12
178-        C     139   3  -0.001225   48                INP:N=1 U=12
179-        C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180-        C     140   6  -7.8320  -48  52        INP:N=1 U=12
181-        C        CS TUBE - ASSEMBLY LEFT
182-        C     141   7  -7.8320  -52  56        INP:N=1 U=12
183-        C        SS PANEL - ASSEMBLY LEFT
184-        142   8  -7.7700  -52            INP:N=1 U=12
185-        C        GAP     - ASSEMBLY BOTTOM
186-        143   3  -0.001225   53                INP:N=1 U=13
187-        C     143   3  -0.001225   49                INP:N=1 U=13
188-        C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189-        C     144   6  -7.8320  -49  53        INP:N=1 U=13
190-        C        CS TUBE - ASSEMBLY BOTTOM
191-        C     145   7  -7.8320  -53  57        INP:N=1 U=13
192-        C        SS PANEL - ASSEMBLY BOTTOM
193-        146   8  -7.7700  -53            INP:N=1 U=13
194-        C        GAP     - ASSEMBLY RIGHT
195-        147   3  -0.001225  -54                INP:N=1 U=14
196-        C     147   3  -0.001225  -50                INP:N=1 U=14
197-        C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198-        C     148   6  -7.8320   50 -54        INP:N=1 U=14
199-        C        CS TUBE - ASSEMBLY RIGHT
200-        C     149   7  -7.8320   54 -58        INP:N=1 U=14
201-        C        SS PANEL - ASSEMBLY RIGHT
202-        150   8  -7.7700   54            INP:N=1 U=14
203-        C        GAP     - ASSEMBLY TOP
204-        151   3  -0.001225  -55                INP:N=1 U=15
205-        C     151   3  -0.001225  -51                INP:N=1 U=15
206-        C        OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207-        C     152   6  -7.8320   51 -55        INP:N=1 U=15
208-        C        CS TUBE - ASSEMBLY TOP
209-        C     153   7  -7.8320   55 -59        INP:N=1 U=15
210-        C        SS PANEL - ASSEMBLY TOP
211-        154   8  -7.7700   55            INP:N=1 U=15
212-        C     FUEL CELL BASKET STRUCTURE -          WET - Unborated panels
213-        C        WATER GAP     - ASSEMBLY LEFT
214-        155   1  -2.1024   52            INP:N=1 U=16
215-        C     155   1  -2.1024   48                INP:N=1 U=16
216-        C        OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217-        C     156   6  -7.8320  -48  52        INP:N=1 U=16
218-        C        CS TUBE - ASSEMBLY LEFT
219-        C     157   7  -7.8320  -52  56        INP:N=1 U=16
220-        C        PANEL - ASSEMBLY LEFT
221-        158   1  -2.1024  -52            INP:N=1 U=16
222-        C        WATER GAP     - ASSEMBLY BOTTOM
223-        159   1  -2.1024   53            INP:N=1 U=17
224-        C     159   1  -2.1024   49                INP:N=1 U=17
225-        C        OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226-        C     160   6  -7.8320  -49  53        INP:N=1 U=17
227-        C        CS TUBE - ASSEMBLY BOTTOM
228-        C     161   7  -7.8320  -53  57        INP:N=1 U=17
229-        C        PANEL - ASSEMBLY BOTTOM
230-        162   1  -2.1024  -53            INP:N=1 U=17
231-        C        WATER GAP     - ASSEMBLY RIGHT
232-        163   1  -2.1024  -54            INP:N=1 U=18
233-        C     163   1  -2.1024  -50                INP:N=1 U=18
234-        C        OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235-        C     164   6  -7.8320   50 -54        INP:N=1 U=18
236-        C        CS TUBE - ASSEMBLY RIGHT
```

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237-        c     165   7  -7.8320   54 -58        INP:N=1 U=18
238-        c       PANEL - ASSEMBLY RIGHT
239-        166   1  -2.1024   54                INP:N=1 U=18
240-        c       WATER GAP     - ASSEMBLY TOP
241-        167   1  -2.1024  -55                INP:N=1 U=19
242-        c     167   1  -2.1024  -51                INP:N=1 U=19
243-        c       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
244-        c     168   6  -7.8320   51 -55       INP:N=1 U=19
245-        c       CS TUBE - ASSEMBLY TOP
246-        c     169   7  -7.8320   55 -59       INP:N=1 U=19
247-        c       PANEL - ASSEMBLY TOP
248-        170   1  -2.1024   55                INP:N=1 U=19
249-        c     FUEL CELL BASKET STRUCTURE -                DRY - Unborated panels
250-        c       GAP     - ASSEMBLY LEFT
251-        171   3  -0.001225   52                INP:N=1 U=20
252-        c     171   3  -0.001225   48                INP:N=1 U=20
253-        c       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
254-        c     172   6  -7.8320  -48  52       INP:N=1 U=20
255-        c       CS TUBE - ASSEMBLY LEFT
256-        c     173   7  -7.8320  -52  54       INP:N=1 U=20
257-        c       PANEL - ASSEMBLY LEFT
258-        174   3  -0.001225  -52                INP:N=1 U=20
259-        c       GAP     - ASSEMBLY BOTTOM
260-        175   3  -0.001225   53                INP:N=1 U=21
261-        c     175   3  -0.001225   49                INP:N=1 U=21
262-        c       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
263-        c     176   6  -7.8320  -49  53       INP:N=1 U=21
264-        c       CS TUBE - ASSEMBLY BOTTOM
265-        c     177   7  -7.8320  -53  57       INP:N=1 U=21
266-        c       PANEL - ASSEMBLY BOTTOM
267-        178   3  -0.001225  -53                INP:N=1 U=21
268-        c       GAP     - ASSEMBLY RIGHT
269-        179   3  -0.001225  -54                INP:N=1 U=22
270-        c     179   3  -0.001225  -50                INP:N=1 U=22
271-        c       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
272-        c     180   6  -7.8320   50 -54       INP:N=1 U=22
273-        c       CS TUBE - ASSEMBLY RIGHT
274-        c     181   7  -7.8320   54 -58       INP:N=1 U=22
275-        c       PANEL - ASSEMBLY RIGHT
276-        182   3  -0.001225   54                INP:N=1 U=22
277-        c       GAP     - ASSEMBLY TOP
278-        183   3  -0.001225  -55                INP:N=1 U=23
279-        c     183   3  -0.001225  -51                INP:N=1 U=23
280-        c       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
281-        c     184   6  -7.8320   51 -55       INP:N=1 U=23
282-        c       CS TUBE - ASSEMBLY TOP
283-        c     185   7  -7.8320   55 -59       INP:N=1 U=23
284-        c       PANEL - ASSEMBLY TOP
285-        186   3  -0.001225   55                INP:N=1 U=23
286-
287-        c     SURFACE SPECIFICATIONS
288-        1*    PX    0.0
289-        c     2*    PY    0.00        $ For 1/4 Model
290-        3*    PZ    0.00
291-        c     4     PX   12.30        $ For Collapsed Model
292-        c     5     PX   36.90        $ For Collapsed Model
293-        c     6     PY   12.30        $ Water Level Surface
294-        c     7     PY   36.90        $ Water Level Surface
295-        c     8     PY  -12.30        $ Water Level Surface
296-        c     9     PY  -36.90        $ Water Level Surface
```

```
10   PZ  180.0860     $ TOP ACTIVE FUEL
11   PZ  201.2360     $ TOP FUEL HARDWARE
c    12   PZ   226.75          $ TOP TUBE - (Shielding Model)
13   PZ  228.75       $ TOP OF GASKET MATERIAL
14   PZ  229.95       $ TOP RING/WATER GAP
15   PZ  231.75       $ TOP INNER LID
16   PZ  234.75       $ TOP LID GAP
17   PZ  245.75       $ TOP OUTER LID
c    18   PZ  268.25          $ TOP SKIRT - (Shielding Model)
19   PZ  298.75       $ TOP REFLECTOR REGION
20   CZ   71.095      $ ID OF INNER BARRIER
21   CZ   73.895      $ OD OF INNER BARRIER
22   CZ   73.10       $ ID OF OUTER BARRIER
c    23   CZ   76.45          $ ID OF SKIRT LIP - (Shielding Model)
24   CZ   83.10       $ OD OF OUTER BARRIER
25   CZ  113.60       $ OD OF REFLECTOR REGION
c    PIN LATTICE BOUNDS
26   PX  0.72136
27   PX -0.72136
28   PY  0.72136
29   PY -0.72136
c     FUEL ROD
30   CZ  0.468122
31   CZ  0.478790
32   CZ  0.546100
c     CONTROL ROD/GUIDE TUBE
33   CZ  0.43340  $ 0.49022
34   CZ  0.46990  $ 0.50292
35   CZ  0.54610  $ 0.56007
36   CZ  0.62230  $ 0.63246
37   CZ  0.67310
c     INSTRUMENTATION TUBE
38   CZ  0.56007
39   CZ  0.62611
c    ASSEMBLY LATTICE BOUNDS Actual
44   PX  -10.65  $ ACTUAL 10.82025
45   PY  -10.65
46   PX   10.65
47   PY   10.65
c    48   PX  -11.0  $ Corrosion Expansion Cards
c    49   PY  -11.0
c    50   PX   11.0
c    51   PY   11.0
52   PX  -10.650001  $ UCF Intact Inside Tube ID
53   PY  -10.650001
54   PX   10.650001
55   PY   10.650001
56   PX  -11.95   $ UCF Intact Outside Tube ID
57   PY  -11.95
58   PX   11.95
59   PY   11.95
c    FUEL CELL LATTICE BOUNDS
60   PX  -10.65     $ ACTUAL 12.30
61   PX   10.65
62   PY  -10.65
63   PY   10.65
c    45 degree planes
64   P    1. -1.  0. 0.
65   P    1. 1.  0. 0.
c    EXTRA CARDS
```

```
357-
358-        MODE  N
359-        C     VOL   BBJ
360-        KCODE   4000 1. 7 97
361-        C       KSRC   -4.3  -5.7 1.  -2.8  -5.7 5.  -1.4  -5.7 10.   0.   -5.7  5.
362-        C        1.44 -5.7 3.  2.88 -5.7 8.   4.32 -5.7  9.
363-        C       -5.7  -4.3 2.  -4.3  -4.3 1.  -2.8  -4.3  5.  -1.4  -4.3 10.
364-        C        0.   -4.3 5.   1.44 -4.3 3.   2.88 -4.3  8.   4.32 -4.3  9.
365-        C       -5.7  -2.9 2.  -4.3  -2.9 1.                 -1.4  -2.9 10.
366-        C        0.   -2.9 5.                   2.88 -2.9  8.   4.32 -2.0  9.
367-        C       -5.7  -1.4 2.  -4.3  -1.4 1.  -2.8  -1.4  5.  -1.4  -1.4 10.
368-        C        0.   -1.4 5.   1.44 -1.4 3.   2.88 -1.4  8.   4.32 -1.4  9.
369-        C       -5.7   0.0 2.  -4.3   0.0 1.  -2.8   0.0  5.  -1.4   0.0 10.
370-        C                       1.44  0.0 3.   2.88  0.0  8.   4.32  0.0  9.
371-        C       -5.7   1.4 2.                  -2.8   1.4  5.  -1.4   1.4 10.
372-        C        0.    1.4 5.   1.44  1.4 3.   2.88  1.4  8.   4.32  1.4  9.
373-        C       -5.7   2.9 2.  -4.3   2.9 1.  -2.8   2.9  5.  -1.4   2.9 10.
374-        C        0.    2.9 5.   1.44  2.9 3.   2.88  2.9  8.   4.32  2.9  9.
375-        C       -5.7   4.3 2.  -4.3   4.3 1.  -2.8   4.3  5.  -1.4   4.3 10.
376-        C        0.    4.3 5.   1.44  4.3 3.   2.88  4.3  8.   4.32  4.3  9.
377-        C      MATERIAL SPECIFICATIONS
378-        C         WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379-        M1    1001.50C  4.9490-2    8016.50C  4.8160-2  26000.55C 1.0277-2
380-              5010.50C  2.8870-6
381-        MT1   LWTR.01T
382-        C         3.00%/20 GWD  15000 yr decay  10000 yr crit
383-        M2        8016.50C     4.6947E-02
384-              42095.50C   2.9533E-05
385-              43099.50C   2.4899E-05
386-              44101.50C   2.7082E-05
387-              45103.50C   1.7197E-05
388-              47109.50C   2.4871E-06
389-              60143.50C   2.3334E-05
390-              60145.50C   1.7528E-05
391-              62147.50C   7.4533E-06
392-              62149.50C   5.4264E-08
393-              62150.50C   6.4809E-06
394-              62151.50C   2.4408E-09
395-              63151.55C   4.4669E-07
396-              62152.50C   3.0032E-06
397-              63153.55C   2.2357E-06
398-              64155.50C   1.9056E-08
399-              64157.50C   1.1891E-09
400-              48000.50C   2.0221E-06
401-              54131.50C   1.3059E-05
402-              55133.50C   2.1974E-05
403-              92233.50C   2.0043E-07
404-              92234.50C   5.9447E-04
405-              92235.50C   3.7645E-04
406-              92236.50C   1.0659E-04
407-              92238.50C   2.2352E-02
408-              93237.55C   5.7931E-05
409-              94238.50C   9.1027E-09
410-              94239.55C   7.0502E-03
411-              94240.50C   4.0570E-06
412-              94241.50C   1.0238E-09
413-              94242.50C   5.2774E-06
414-              95241.50C   5.1112E-08
415-              95242.50C   9.2503E-12
416-              95243.50C   1.0153E-07
```

```
417-        c          WATER AT 300 K d=1.0000 g/cc
418-        M3    1001.50c  6.6878-2     8016.50c  3.3439-2
419-        MT3   LWTR.01T
420-        c          Air d=0.001225 g/cc
421-        c     M3      7014.50c  -0.80    8016.50c  -0.20
422-        c          ZIRCALOY-4 d=6.56 g/cc
423-        M4    8016.50c -0.0012  24000.50c -0.0010  26000.55c -0.0020
424-             40000.50c -0.9818  50000.35c -0.0140
425-        c          ALLOY 825 d=8.14 g/cc
426-        M5    6000.50c -0.0005  13027.50c -0.0020  14000.50c -0.0050
427-             16032.50c -0.0003  22000.50c -0.0090  24000.50c -0.2150
428-             25055.50c -0.0100  26000.55c -0.2857  28000.50c -0.4200
429-             29000.50c -0.0225  42000.50c -0.0300
430-        c          Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431-        c     M6     6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
432-        c          16032.50c -0.00035  25055.50c -0.0090
433-        c          26000.55c -0.98535
434-        c          A516 CARBON STEEL d=7.832 g/cc
435-        M7    6000.50c -0.00220  14000.50c -0.002750  15031.50c -0.00035
436-             16032.50c -0.00035  25055.50c -0.0090
437-             26000.55c -0.98535
438-        c          SS316B6A  1.6%  d=7.77 g/cc
439-        M8    5010.50c -0.00288  5011.50c -0.013120
440-              6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.0075
441-             15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
442-             25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
443-             42000.50c -0.02500
444-        c          SS316B3A 0.67wt% B d=7.83 g/cc
445-        c     M9     5010.50c -0.001564 5011.50c -0.007134
446-        c              6000.50c -0.00030  7014.50c -0.00100 14000.50c -0.00750
447-        c             15031.50c -0.00045 16032.50c -0.00030 24000.50c -0.19000
448-        c             25055.50c -0.02000 26000.55c -0.60445 28000.50c -0.13500
449-        c             42000.50c -0.02500
450-        c          Al 6063 d=2.69 g/cc
451-        c     M10   12000.50c -0.00675  13027.50c -0.98125  14000.50c -0.00400
452-        c             22000.50c -0.00150  24000.50c -0.00100  25055.50c -0.00100
453-        c             26000.55c -0.00350  29000.50c -0.00100
454-        c     TALLIES
455-        PRINT
456-
1      initial source from file   srctp
1problem summary

     run terminated when    97 kcode cycles were done.
+                                                                                    08/21/96 00:50:24
     AUCF - REV 15x15 FUEL,21 ASSEMBLY BBF CS/SS-B Corroded & collapsed - (a26xb5f)      probid =   08/20/96 22:55:24
0
```

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	388354	9.9909E-01	2.0536E+00	escape	7	9.1811E-06	2.6297E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.1206E-02	5.3136E-06	weight cutoff	389025	5.1889E-02	1.0547E-05
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.

```
 upscattering              0    0.             7.6094E-08          downscattering           0    0.             1.9191E+00
                                                                   capture                  0    6.5097E-01     3.5891E-02
 (n,xn)                 1352    2.7427E-03     2.2046E-03          loss to (n,xn)         674    1.3673E-03     1.1601E-02
 fission                   0    0.             0.                  loss to fission          0    3.4880E-01     8.9234E-02
    total             389706    1.0530E+00     2.0559E+00             total            389706    1.0530E+00     2.0559E+00

   number of neutrons banked                         678       average lifetime, shakes            cutoffs
   neutron tracks per source particle         1.0035E+00         escape            2.1281E+04        tco   1.0000E+34
   neutron collisions per source particle     4.7025E+01         capture           2.3934E+03        eco    .0000E+00
   total neutron collisions                     18262445         capture or escape 2.3936E+03        wc1  -5.0000E-01
   net multiplication                  1.0014E+00  .0001         any termination   2.5626E+03        wc2  -2.5000E-01

 computer time so far in this run   114.87 minutes             maximum number ever in bank        2
 computer time in mcrun             114.77 minutes             bank overflows to backup file      0
 source particles per minute            3.3838E+03             field length                       0
 random numbers generated                255297822             most random numbers used was    9706 in history   186745

 range of sampled source weights = 9.5034E-01 to 1.1019E+00
1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5f)       probid =   08/20/96 22:55:24

 the initial fission neutron source distribution was read from the srctp file named srctp   .
 the criticality problem was scheduled to skip   7 cycles and run a total of   97 cycles with nominally     4000 neutrons per cycle.
 this problem has run   7 inactive cycles with    27794 neutron histories and   90 active cycles with     360560 neutron histories.

 this calculation has completed the requested number of keff cycles using a total of      388354 fission neutron source histories.

 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

 the following cells with fissionable material had no neutron tracks entering:
     97

 the following cells with fissionable material had no neutron collisions:
     97

 the following cells with fissionable material had no fission source points:
     97

 warning.      1 fissionable cells had no tracks entering,    1 cells had no collisions, and    1 cells had no fission source points.
                 the keff results could be too small because these cells with fissionable material were not sampled.

 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

 the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

          the k( collision) cycle values appear normally distributed at the 95 percent confidence level
          the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
          the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

 ..................................................................................................................................
 |                                                                                                                                |
 | the final estimated combined collision/absorption/track-length keff =  .90019 with an estimated standard deviation of   .00108 |
 |                                                                                                                                |
 | the estimated 68, 95, & 99 percent keff confidence intervals are   .89910 to   .90127,   .89803 to   .90235, and   .89732 to   .90305 |
 |                                                                                                                                |
 | the estimated collision/absorption neutron removal lifetime = 2.39E-05 seconds with an estimated standard deviation of 5.71E-08 |
 |                                                                                                                                |
 ..................................................................................................................................
```

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.90068	.00127	.89941 to .90196	.89815 to .90322	.89732 to .90405	
absorption	.90008	.00132	.89876 to .90140	.89746 to .90270	.89660 to .90356	
track length	.89966	.00142	.89824 to .90108	.89683 to .90249	.89591 to .90342	
col/absorp	.90040	.00109	.89931 to .90149	.89822 to .90258	.89751 to .90329	.4081
abs/trk len	.89989	.00111	.89879 to .90100	.89769 to .90210	.89697 to .90282	.2980
col/trk len	.90039	.00126	.89913 to .90165	.89789 to .90290	.89707 to .90371	.7472
col/abs/trk len	.90019	.00108	.89910 to .90127	.89803 to .90235	.89732 to .90305	

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1											****** Base	Case at 300 K	*****	case sp40a	
2		Number Density Worksheet:			Isotope List					Far Field Criticality - 8%		UO2 in beginning - 40% Porosity Tuff w/ water			
3											Tuff Porosit	40%		Years Critical	0
4											Volume	11494000.00		UO2 added	0
5		Element	Symbol	Isotope	MCNP ID	Atomic Weight					UO2%	8%			Number
6	1	Hydrogen	H	H-1	1001.50C	1.007825				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
7			D	H-2	1002.55C	2.014102				SM149	0	148.91718		62149.50c	0.0000E+00
8			T	H-3	1003.50C	3.01605				SM151	0	150.919919		62151.50c	0.0000E+00
9	2	Helium	He	nat.	2000.01C	4.0026				ND143	0	142.909779		60143.50c	0.0000E+00
10			He	He-4	2004.50C	4.002631				RH103	0	102.905511		45103.50c	0.0000E+00
11	3	Lithium	Li	Li-6	3006.50C	6.015125				EU151	0	150.919838		63151.55c	0.0000E+00
12			Li	Li-7	3007.55C	7.016004				GD157	0	156.924025		64157.50c	0.0000E+00
13	4	Beryllium	Be	Be-9	4009.50C	9.012188				GD155	0	154.922664		64155.50c	0.0000E+00
14	5	Boron	B	B-10	5010.50C	10.01294				CD(113)	0	112.4		48000.50c	0.0000E+00
15			B	B-11	5011.56C	11.00931				XE131	0	130.905069		54131.50c	0.0000E+00
16	6	Carbon	C	nat.	6000.50C	12.01115				CS133	0	132.905355		55133.50c	0.0000E+00
17			C	C-12	6012.50C	12				TC99	0	98.90628		43099.50c	0.0000E+00
18	7	Nitrogen	N	N-14	7014.50C	14.00307				SM147	0	146.914867		62147.50c	0.0000E+00
19	8	Oxygen	O	O-16	8016.50C	15.99492				XE135	0	134.9063		54135.50c	0.0000E+00
20	9	Fluorine	F	F-19	9019.50C	18.9984				ND145	0	144.912538		60145.50c	0.0000E+00
21	11	Sodium	Na	Na-23	11023.50C	22.98977				MO95	0	94.905839		42095.50c	0.0000E+00
22	12	Magnesium	Mg	nat.	12000.50C	24.312				U233	0	233.039522		92233.50c	0.0000E+00
23	13	Aluminum	Al	Al-27	13027.50C	26.98154				U234	0	234.040904		92234.50c	4.6944E-07
24	14	Silicon	Si	nat.	14000.50C	28.086				U235	0	235.043915		92235.50c	3.8253E-05
25	15	Phosphoru	P	P-31	15031.50C	30.97376				U236	0	236.045637		92236.50c	9.1532E-06
26	16	Sulfur	S	S-32	16032.50C	31.97207				U238	0	238.05077		92238.50c	1.9055E-03
27	17	Chlorine	Cl	nat.	17000.50C	35.452				NP237	0	237.048056		92237.55c	2.1629E-06
28	19	Potasium	K	nat.	19000.50C	39.102				PU238	0	238.049511		94238.50c	0.0000E+00
29	20	Calcium	Ca	nat.	20000.50C	40.08				PU239	0	239.052146		94239.55c	0.0000E+00
30	22	Titanium	Ti	nat.	22000.50C	47.9				PU240	0	240.053882		94240.50c	0.0000E+00
31	23	Venadium	V	nat.	23000.50C	50.942				O	0	15.994915		8016.50c	4.2818E-02
32	24	Chromium	Cr	nat.	24000.50C	51.996			water	H		1.00782519		1001.50c	2.1396E-02
33	25	Manganese	Mn	Mn-55	25055.50C	54.93805				O		15.994915			
34	26	Iron	Fe	nat.	26000.55C	55.847			Tuff	O		15.994915			
35	27	Cobalt	Co	Co-59	27059.50C	58.93319				Na		22.9897707		11023.50c	3.9366E-04
36	28	Nickel	Ni	nat.	28000.50C	58.71				Mg		24.312		12000.50c	2.3128E-04
37	29	Copper	Cu	nat.	29000.50C	63.54				Al		26.9815389		13027.50c	2.6070E-03
38	30	Zinc	Zn	nat.		65.37				Si		28.086		14000.50c	1.1406E-02
39	33	Arsenic	As	As-75	33075.35C	74.9216				K		39.102		19000.50c	5.5591E-04
40	38	Strontium	Sr	nat.		87.62				Ca		40.08		20000.50c	5.6949E-04
41	40	Zirconium	Zr	nat.	40000.50C	91.22				Fe		55.847		26000.55c	1.4037E-04
42	41	Niobium	Nb	Nb-93	41093.50C	92.90638				TOTAL	0				9.20735E-02
43	42	Molybdenu	Mo	nat.	42000.50C	95.94									
44			Mo	Mo-95	42095.50c	94.90584					***** Base Case at 50 C (323 K) Case sp40a2				
45	43	Technetium	Tc	Tc-99*	43099.50c	98.90628									
46	44	Ruthenium	Ru	Ru-101	44101.50c	100.9056				Far Field Criticality - 8%		UO2 in beginning - 40% Porosity Tuff w/ water			
47	45	Rhodium	Rh	Rh-103	45103.50C	102.9055					Tuff Porosit	40%		Years Critical	0
48	47	Silver	Ag	Ag-109	47109.50C	108.9048					Volume	11494000.00		UO2 added	0
49	48	Cadmium	Cd	nat.	48000.50C	112.4					UO2%	8%	T=50 C de	0.99	Number
50	49	Indium	In	nat.		114.82				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
51	50	Tin	Sn	nat.	50000.35C	118.69				SM149	0	148.91718		62149.50c	0.0000E+00
52	54	Xenon	Xe	Xe-131 *	54131.50c	130.9051	* AW from Chart of the Nuclides			SM151	0	150.919919		62151.50c	0.0000E+00
53			Xe	Xe-135 *	54135.50c	134.9063				ND143	0	142.909779		60143.50c	0.0000E+00
54	55	Cesium	Cs	Cs-133	55133.50c	132.9054				RH103	0	102.905511		45103.50c	0.0000E+00
55			Cs	Cs-135	55135.50c	134.9058				EU151	0	150.919838		63151.55c	0.0000E+00

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
56	56	Barium	Ba	nat.		137.34				GD157	0	156.924025		64157.50c	0.0000E+00
57	57	Lanthanum	La	nat.		138.91				GD155	0	154.922664		64155.50c	0.0000E+00
58	58	Cerium	Ce	nat.		140.12				CD(113)	0	112.4		48000.50c	0.0000E+00
59	60	Neodymiu	Nd	Nd-143	60143.50c	142.9098				XE131	0	130.905069		54131.50c	0.0000E+00
60			Nd	Nd-145	60145.50c	144.9125				CS133	0	132.905355		55133.50c	0.0000E+00
61										TC99	0	98.90628		43099.50c	0.0000E+00
62										SM147	0	146.914867		62147.50c	0.0000E+00
63										XE135	0	134.9063		54135.50c	0.0000E+00
64										ND145	0	144.912538		60145.50c	0.0000E+00
65		Number Density Worksheet:			Isotope List (Continued)					MO95	0	94.905839		42095.50c	0.0000E+00
66										U233	0	233.039522		92233.50c	0.0000E+00
67										U234	0	234.040904		92234.50c	4.6944E-07
68		Element	Symbol	Isotope	MCNP ID	Atomic Weight				U235	0	235.043915		92235.53c	3.8253E-05
69	62	Samarium	Sm	Sm-147		146.9149				U236	0	236.045637		92236.50c	9.1532E-06
70			Sm	Sm-149	62149.50C	148.9172				U238	0	238.05077		92238.53c	1.9055E-03
71			Sm	Sm-150		149.9173				NP237	0	237.048056		93237.50c	2.1829E-06
72			Sm	Sm-151		150.9199				PU238	0	238.049511		94238.50c	0.0000E+00
73			Sm	Sm-152		151.9198				PU239	0	239.052146		94239.55c	0.0000E+00
74	63	Europium	Eu	Eu-151	63151.55C	150.9196				PU240	0	240.053882		94240.50c	0.0000E+00
75			Eu	Eu-153	63153.55C	152.9212				O	0	15.994915		8016.53c	4.2711E-02
76			Eu	Eu-154	63154.50C	153.9231				H		1.00782519		1001.53c	2.1182E-02
77	64	Gadolinium	Gd	nat.	64000.35C	157.25				O		15.994915			
78			Gd	Gd-155	64155.50C	154.9227				O		15.994915			
79			Gd	Gd-157	64157.50C	156.924				Na		22.9897707		11023.50c	3.9366E-04
80	72	Hafnium	Hf	nat.	72000.50C	178.49				Mg		24.312		12000.50c	2.3128E-04
81	73	Tantalum	Ta	Ta-181	73181.50C	180.948				Al		26.9815389		13027.50c	2.6070E-03
82	74	Tungsten	W	nat.	74000.55C	183.85				Si		28.086		14000.50c	1.1406E-02
83	82	Lead	Pb	nat.	82000.50C	207.19				K		39.102		19000.50c	5.5591E-04
84	92	Uranium	U	U-233	92233.50C	233.0395				Ca		40.08		20000.50c	5.6949E-04
85			U	U-234	92234.50C	234.0409				Fe		55.847		26000.55c	1.4037E-04
86			U	U-235	92235.50C	235.0439				TOTAL	0				8.17526E-02
87			U	U-236	92236.50C	236.0456				****** 100,000 year hydrologic cycle cases - years critical indicated below is full power equivalent c					
88			U	U-238	92238.50C	238.0508				Far Field Criticality - 8%		UO2 in beginning - 40% Porosity Tuff w/ water			w/ UO2 additio
89	93	Neptunium	Np	Np-237	93237.55C	237.0481					Tuff Porosi	40%		Years Critical	50000
90	94	Plutonium	Pu	Pu-238	94238.50C	238.0495					Volume	11494000.00		UO2 added	0.052391664
91			Pu	Pu-239	94239.55C	239.0521					UO2%	8%	T=50 C de	0.99	Number
92			Pu	Pu-240	94240.50C	240.0539				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
93			Pu	Pu-241	94241.50C	241.0567				SM149	6.79E+00	148.91718		62149.50c	3.0928E-09
94			Pu	Pu-242	94242.50C	242.0587				SM150	1.85E+02	149.917276		62150.50c	6.4659E-08
95			Pu	Pu-243	94243.35C	243.062				ND143	9.53E+02	142.909779		60143.50c	3.4941E-07
96	95	Americium	Am	Am-241	95241.50C	241.0567				RH103	3.99E+02	102.905511		45103.50c	2.0316E-07
97			Am	Am-242m	95242.50C	242.0595				EU151	3.76E+01	150.919838		63151.55c	1.3054E-08
98			Am	Am-243	95243.50C	243.0614				KR83	5.03E+01	82.914137		36083.50c	3.1787E-08
99	96	Curium	Cm	Cm-243	96243.35C	243.0614				GD155	6.66E-01	154.922664		64155.50c	2.2525E-10
100			Cm	Cm-245	96245.35C	245.0654				CS135	1.05E+03	134.90577		55135.50c	4.0782E-07
101			Cm	Cm-248	96248.35C	248.0722				XE131	4.50E+02	130.905069		54131.50c	1.8012E-07
102	36	Krypton	Kr	Kr-83	36083.50C	82.91414				CS133	1.06E+03	132.905355		55133.50c	4.1790E-07
103										TC99	6.21E+02	98.90628		43099.50c	3.2898E-07
104		Number Density Worksheet:								SM147	3.89E+02	146.914867		62147.50c	1.3874E-07
105										SM152	7.57E+01	151.919756		62152.50c	2.6109E-08
106		Number Density = (Weight %) * (Density) * (Na) / (Aw)								ND145	6.66E+02	144.912538		60145.50c	2.4081E-07
107		Avogadro's Number [Na		0.602252						MO95	7.23E+02	94.905839		42095.50c	3.9916E-07
108		Atomic Weight [Aw]								U233	1.87E+02	233.039522		92233.50c	4.2045E-08
109										U234	2.38E+03	234.040904		92234.50c	8.4027E-07
110										U235	1.54E+05	235.043915		92235.50c	5.9382E-05

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
111	TUFF & Water Number		Densities							U236	4.62E+04	236.045637		92236.50c	1.6250E-05
112										U238	8.63E+06	238.05077		92238.50c	3.1474E-03
113		H2O	H	6.6861260E-02						NP237	9.53E+03	237.048056		93237.50c	3.5361E-06
114			O	3.3430630E-02						PU238	0.00E+00	238.049511		94238.50c	0.0000E+00
115	40% Porosi	Tuff	O	2.8209363E-02						PU239	5.81E+03	239.052146		94239.55c	1.2735E-06
116			Na	3.9366415E-04						PU240	5.97E+01	240.053882		94240.50c	1.2813E-08
117	Multiply 30.6%		Mg	2.3127847E-04						O	0	15.994915		SUM 8016.50c	4.3539E-02
118	Porosity Tuff by		Al	2.6069628E-03						H		1.00782519		1001.50c	1.7714E-02
119	(1-0.4)/(1-0.306)		Si	1.1406406E-02						O		15.994915			
120			K	5.5590692E-04						O		15.994915			
121			Ca	5.6949182E-04						Na		22.9897707		11023.50c	3.9366E-04
122			Fe	1.4036533E-04						Mg		24.312		12000.50c	2.3128E-04
123										Al		26.9815389		13027.50c	2.6070E-03
124										Si		28.086		14000.50c	1.1406E-02
125		Feed	3.0% / 20 G	WD/ml						K		39.102		19000.50c	5.5591E-04
126				Full Density	wt fraction					Ca		40.08		20000.50c	5.6949E-04
127		UO2	O	4.8888950E-02	0.116494					Fe		55.847		26000.55c	1.4037E-04
128			U-234	5.8680620E-06	0.000208					TOTAL	8854835				8.03881E-02
129			U-235	4.7816080E-04	0.01703										
130			U-236	1.1441480E-04	0.004092										
131			U-238	2.3818750E-02	0.859195					Far Field Cr	ticality - 8%	UO2 in beginning - 40% Porosity Tuff w/ water			
132			Np-237	2.7286570E-05	0.00098						Tuff Porosi	40%		Years Critical	50000
133					1						Volume	11494000.00		UO2 added	0.052391664
134											UO2%	8%	T=265 C d	0.776	Number
135										ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
136										SM149	8.79E+00	148.91718		62149.50c	3.0828E-09
137										SM150	1.85E+02	149.917276		62150.50c	6.4859E-08
138										ND143	9.53E+02	142.909779		60143.50c	3.4941E-07
139										RH103	3.99E+02	102.905511		45103.50c	2.0316E-07
140										EU151	3.76E+01	150.919838		63151.55c	1.3054E-08
141										KR83	5.03E+01	82.914137		36083.50c	3.1787E-08
142										GD155	6.66E-01	154.922664		64155.50c	2.2525E-10
143										CS135	1.05E+03	134.90577		55135.50c	4.0782E-07
144										XE131	4.50E+02	130.905069		54131.50c	1.8012E-07
145										CS133	1.06E+03	132.905355		55133.50c	4.1790E-07
146										TC99	6.21E+02	98.90628		43099.50c	3.2898E-07
147										SM147	3.89E+02	146.914867		62147.50c	1.3874E-07
148										SM152	7.6E+01	151.919756		62152.50c	2.6109E-08
149										ND145	6.66E+02	144.912538		60145.50c	2.4081E-07
150										MO95	7.23E+02	94.905839		42095.50c	3.9916E-07
151										U233	1.67E+02	233.039522		92233.50c	4.2045E-08
152										U234	2.38E+03	234.040904		92234.50c	8.4027E-07
153										U235	1.54E+05	235.043915		92235.53c	5.9382E-05
154										U236	4.62E+04	236.045637		92236.50c	1.6250E-05
155										U238	8.63E+06	238.05077		92238.53c	3.1474E-03
156										NP237	9.53E+03	237.048056		93237.50c	3.5361E-06
157										PU239	0.00E+00	238.049511		94238.50c	0.0000E+00
158										PU239	5.81E+03	239.052146		94239.55c	1.2735E-06
159										PU240	5.97E+01	240.053882		94240.50c	1.2813E-08
160										O	0	15.994915		SUM 8016.50c	4.1624E-02
161										H		1.00782519		1001.50c	1.3885E-02
162										O		15.994915			
163										O		15.994915			
164										Na		22.9897707		11023.50c	3.9366E-04
165										Mg		24.312		12000.50c	2.3128E-04

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
166										Al		26.9815389		13027.50c	2.6070E-03
167										Si		28.086		14000.50c	1.1406E-02
168										K		39.102		19000.50c	5.5591E-04
169										Ca		40.08		20000.50c	5.6949E-04
170										Fe		55.847		26000.55c	1.4037E-04
171										TOTAL	8854835				7.48445E-02
172														*** case sp40in	
173										Far Field Criticality - 8%		UO2 in beginning - 40% Porosity Tuff w/ water			no additional U
174											Tuff Porosit	40%		Years Critical	50000
175											Volume	11494000.00		UO2 added	0.052391664
176											UO2%	8%	T=50 C de	0.99	Number
177										ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
178										SM149	8.79E+00	148.91718		62149.50c	3.0928E-09
179										SM150	1.85E+02	149.917276		62150.50c	6.4659E-08
180										ND143	9.53E+02	142.909779		60143.50c	3.4941E-07
181										RH103	3.99E+02	102.905511		45103.50c	2.0316E-07
182										EU151	3.76E+01	150.919838		63151.55c	1.3054E-08
183										KR83	5.03E+01	82.914137		36083.50c	3.1787E-08
184										GD155	6.66E-01	154.922664		64155.50c	2.2525E-10
185										CS135	1.05E+03	134.90577		55135.50c	4.0782E-07
186										XE131	4.50E+02	130.905069		54131.50c	1.8012E-07
187										CS133	1.06E+03	132.905355		55133.50c	4.1790E-07
188										TC99	6.21E+02	98.90628		43099.50c	3.2698E-07
189										SM147	3.89E+02	146.914867		62147.50c	1.3874E-07
190										SM152	7.6E+01	151.919758		62152.50c	2.6109E-08
191										ND145	6.66E+02	144.912538		60145.50c	2.4081E-07
192										MO95	7.23E+02	94.905839		42095.50c	3.9916E-07
193										U233	1.87E+02	233.039522		92233.50c	4.2045E-08
194										U234	2.38E+03	234.040904		92234.50c	5.3283E-07
195										U235	1.54E+05	235.043915		92235.50c	3.4330E-05
196										U236	4.62E+04	236.045637		92236.50c	1.0255E-05
197										U238	8.63E+06	238.05077		92238.50c	1.8995E-03
198										NP237	9.53E+03	237.048058		93237.50c	2.1065E-06
199										PU238	0.00E+00	238.049511		94238.50c	0.0000E+00
200										PU239	5.81E+03	239.052146		94239.55c	1.2735E-06
201										PU240	5.87E+01	240.053882		94240.50c	1.2813E-08
202										O	0	15.994915		SUM 8016.50c	4.2711E-02
203										H		1.00782519		1001.50c	2.1182E-02
204										O		15.994915			
205										O		15.994915			
206										Na		22.9897707		11023.50c	3.9366E-04
207										Mg		24.312		12000.50c	2.3128E-04
208										Al		26.9815389		13027.50c	2.6070E-03
209										Si		28.086		14000.50c	1.1406E-02
210										K		39.102		19000.50c	5.5591E-04
211										Ca		40.08		20000.50c	5.6949E-04
212										Fe		55.847		26000.55c	1.4037E-04
213										TOTAL	8854835				8.17479E-02
214															
215															
216															
217															
218															
219															
220															

C	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1			***** Base case at	Power T=265 C	case sp40e1					Backcheck of	nitial composition from SAS2H which was based on MCNP wt. fractions				
2		Far Field Criticality - 8% UO2		in beginning - 40%	Porosity Tuff w/ water				Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water					*** These # densities were not	
3			Tuff Porosity=	40%		Years Critical	0			Tuff Porosity=	40%		Years Critical	0	
4			Volume	11494000.00		UO2 added	0			Volume	11494000.00		UO2 added	0	
5			UO2%	8%	T=265 C den=	0.776	Number			UO2%	8%	T=265 C d	0.776	Number	
6		ISOTOPE	Gm/Critical %	Aw	Wt%	MCNP ID	Density		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
7		SM149	0	148.91718		62149.50c	0.0000E+00		SM149	0	148.91718		62149.50c	0.0000E+00	
8		SM151	0	150.919919		62151.50c	0.0000E+00		SM151	0	150.919919		62151.50c	0.0000E+00	
9		ND143	0	142.909779		60143.50c	0.0000E+00		ND143	0	142.909779		60143.50c	0.0000E+00	
10		RH103	0	102.905511		45103.50c	0.0000E+00		RH103	0	102.905511		45103.50c	0.0000E+00	
11		EU151	0	150.919838		63151.55c	0.0000E+00		EU151	0	150.919838		63151.55c	0.0000E+00	
12		GD157	0	156.924025		64157.50c	0.0000E+00		GD157	0	156.924025		64157.50c	0.0000E+00	
13		GD155	0	154.922664		64155.50c	0.0000E+00		GD155	0	154.922664		64155.50c	0.0000E+00	
14		CD(113)	0	112.4		48000.50c	0.0000E+00		CD(113)	0	112.4		48000.50c	0.0000E+00	
15		XE131	0	130.905069		54131.50c	0.0000E+00		XE131	0	130.905069		54131.50c	0.0000E+00	
16		CS133	0	132.905355		55133.50c	0.0000E+00		CS133	0	132.905355		55133.50c	0.0000E+00	
17		TC99	0	98.90628		43099.50c	0.0000E+00		TC99	0	98.90628		43099.50c	0.0000E+00	
18		SM147	0	146.914867		62147.50c	0.0000E+00		SM147	0	146.914867		62147.50c	0.0000E+00	
19		XE135	0	134.9063		54135.50c	0.0000E+00		XE135	0	134.9063		54135.50c	0.0000E+00	
20		ND145	0	144.912538		60145.50c	0.0000E+00		ND145	0	144.912538		60145.50c	0.0000E+00	
21		MO95	0	94.905839		42095.50c	0.0000E+00		MO95	0	94.905839		42095.50c	0.0000E+00	
22		U233	0	233.039522		92233.50c	0.0000E+00		U233	0	233.039522		92233.50c	0.0000E+00	
23		U234	0	234.040904		92234.50c	4.6944E-07		U234	2119.55337	234.040904		92234.50c	4.7453E-07	
24		U235	0	235.043915		92235.53c	3.8253E-05		U235	171683.823	235.043915		92235.53c	3.8273E-05	
25		U236	0	236.045637		92236.50c	9.1532E-06		U236	41179.894	236.045637		92236.50c	9.1411E-06	
26		U238	0	238.05077		92238.53c	1.9055E-03		U238	8657769.92	238.05077		92238.53c	1.9057E-03	
27		NP237	0	237.048056		93237.50c	2.1829E-06		NP237	9992.18017	237.048056		93237.50c	2.2087E-06	
28		PU238	0	238.049511		94238.50c	0.0000E+00		PU238	0	238.049511		94238.50c	0.0000E+00	
29		PU239	0	239.052146		94239.55c	0.0000E+00		PU239	0	239.052146		94239.55c	0.0000E+00	
30		PU240	0	240.053882		94240.50c	0.0000E+00		PU240	0	240.053882		94240.50c	0.0000E+00	
31		O	0	15.994915		8016.53c	4.0422E-02		O	0	15.994915		8016.53c	4.0422E-02	
32	water	H		1.00782519		1001.53c	1.6603E-02		H		1.00782519		1001.53c	1.6603E-02	
33		O		15.994915					O		15.994915				
34	Tuff	O		15.994915					O		15.994915				
35		Na		22.9897707		11023.50c	3.9366E-04		Na		22.9897707		11023.50c	3.9366E-04	
36		Mg		24.312		12000.50c	2.3128E-04		Mg		24.312		12000.50c	2.3128E-04	
37		Al		26.9815389		13027.50c	2.6070E-03		Al		26.9815389		13027.50c	2.6070E-03	
38		Si		28.086		14000.50c	1.1406E-02		Si		28.086		14000.50c	1.1406E-02	
39		K		39.102		19000.50c	5.5591E-04		K		39.102		19000.50c	5.5591E-04	
40		Ca		40.08		20000.50c	5.6949E-04		Ca		40.08		20000.50c	5.6949E-04	
41		Fe		55.847		26000.55c	1.4037E-04		Fe		55.847		26000.55c	1.4037E-04	
42		TOTAL	0				7.48946E-02		TOTAL	8842745.38				7.48946E-02	
43															
44			***** Cases w/ UO2 addition at 132 g/year *****					******	Assume no additional UO2 infiltration after criticality initiation.*****						
45				case names sp40(alpha)1							MCNP case names sp40(alpha) in				
46		Far Field Criticality - 8% UO2		in beginning - 40%	Porosity Tuff w/ water				Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
47			Tuff Porosity=	40%		Years Critical	1			Tuff Porosity=	40%		Years Critical	1	
48			Volume	11494000.00		UO2 added	1.04783E-06			Volume	11494000.00		UO2 added	0	
49			UO2%	8%	T=265 C den=	0.776	Number			UO2%	8%	T=265 C d	0.776	Number	
50		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
51		SM149	1.05E-02	148.91718		62149.50c	3.8945E-12		SM149	1.05E-02	148.91718		62149.50c	3.8945E-12	
52		SM151	4.62E-03	150.919919		62150.50c	1.6040E-12		SM151	4.62E-03	150.919919		62150.50c	1.6040E-12	
53		ND143	5.84E-02	142.909779		60143.50c	2.1412E-11		ND143	5.84E-02	142.909779		60143.50c	2.1412E-11	
54		RH103	1.76E-02	102.905511		45103.50c	9.1143E-12		RH103	1.76E-02	102.905511		45103.50c	9.1143E-12	
55		SM152	2.75E-03	151.919756		62152.50c	9.4847E-13		SM152	2.75E-03	151.919756		62152.50c	9.4847E-13	
56		GD157	7.73E-06	156.924025		64157.50c	2.5811E-14		GD157	7.73E-06	156.924025		64157.50c	2.5811E-14	
57		GD155	3.58E-04	154.922664		64155.50c	1.2118E-13		GD155	3.58E-04	154.922664		64155.50c	1.2118E-13	
58		CD(113)	6.62E-04	112.4		48000.50c	3.0860E-13		CD(113)	6.62E-04	112.4		48000.50c	3.0860E-13	
59		XE131	2.44E-02	130.905069		54131.50c	8.7665E-12		XE131	2.44E-02	130.905069		54131.50c	8.7665E-12	
60		CS133	6.18E-02	132.905355		55133.50c	2.4364E-11		CS133	6.18E-02	132.905355		55133.50c	2.4364E-11	
61		TC99	3.98E-02	98.90628		43099.50c	2.1085E-11		TC99	3.98E-02	98.90628		43099.50c	2.1085E-11	
62		SM147	2.08E-02	146.914867		62147.50c	7.4290E-12		SM147	2.08E-02	146.914867		62147.50c	7.4290E-12	
63		XE135	8.7E-05	134.9063		54135.50c	3.3790E-14		XE135	8.7E-05	134.9063		54135.50c	3.3790E-14	

C	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
64		ND145	3.79E-02	144.912538		60145.50c	1.3704E-11		ND145	3.79E-02	144.912538		60145.50c	1.3704E-11	
65		KR83	2.92E-03	82.914137		36083.50c	1.8453E-12		KR83	2.92E-03	82.914137		36083.50c	1.8453E-12	
66		U233	2.84E-03	233.039522		92233.50c	6.3855E-13		U233	2.84E-03	233.039522		92233.50c	6.3855E-13	
67		U234	2.12E+03	234.040904		92234.50c	4.7463E-07		U234	2.12E+03	234.040904		92234.50c	4.7463E-07	
68		U235	1.72E+05	235.043915		92235.53c	3.8343E-05		U235	1.72E+05	235.043915		92235.53c	3.8343E-05	
69		U236	4.12E+04	236.045637		92236.50c	9.1455E-06		U236	4.12E+04	236.045637		92236.50c	9.1455E-06	
70		U238	8.66E+06	238.05077		92238.53c	1.9061E-03		U238	8.66E+06	238.05077		92238.53c	1.9061E-03	
71		NP237	9.99E+03	237.048056		93237.50c	2.2082E-06		NP237	9.99E+03	237.048056		93237.50c	2.2082E-06	
72		PU238	4.39E-02	238.049511		94238.50c	9.6628E-12		PU238	4.39E-02	238.049511		94238.50c	9.6628E-12	
73		PU239	1.18E+00	239.052146		94239.55c	2.5864E-10		PU239	1.18E+00	239.052146		94239.55c	2.5864E-10	
74		PU240	5.81E-06	240.053882		94240.50c	1.2682E-15		PU240	5.81E-06	240.053882		94240.50c	1.2682E-15	
75		O	0	15.994915		SUM 8016.53c	4.0422E-02		O	0	15.994915		8016.53c	4.0422E-02	
76		H		1.00782519		1001.53c	1.6603E-02		H		1.00782519		1001.53c	1.6603E-02	
77		O		15.994915					O		15.994915				
78		O		15.994915					O		15.994915				
79		Na		22.9897707		11023.50c	3.9366E-04		Na		22.9897707		11023.50c	3.9366E-04	
80		Mg		24.312		12000.50c	2.3128E-04		Mg		24.312		12000.50c	2.3128E-04	
81		Al		26.9815389		13027.50c	2.6070E-03		Al		26.9815389		13027.50c	2.6070E-03	
82		Si		28.086		14000.50c	1.1406E-02		Si		28.086		14000.50c	1.1406E-02	
83		K		39.102		19000.50c	5.5591E-04		K		39.102		19000.50c	5.5591E-04	
84		Ca		40.08		20000.50c	5.6949E-04		Ca		40.08		20000.50c	5.6949E-04	
85		Fe		55.847		26000.55c	1.4037E-04		Fe		55.847		26000.55c	1.4037E-04	
86		TOTAL	8885311.5098				7.48853E-02		TOTAL	8885311.51				7.48854E-02	
87	se sp40i														
88		Far Field Criticality - 8% UO2 in beginning - 40% Porosity full w/ water							Far Field Criticality - 8% UO2 in beginning - 40% Porosity full w/ water						
89			Full Porosity=	40%		Years Critical	10			Full Porosity=	40%		Years Critical	10	
90			Volume	11494000.00		UO2 added	0.000010783			Volume	11494000.00		UO2 added	0	
91			UO2%	8% T=265 C dens		0.776	Number			UO2%	8% T=265 C d		0.776	Number	
92		ISOTOPE	Gm/Critical	Aw Wt%		MCNP ID	Density		ISOTOPE	Gm/Critical	Aw Wt%		MCNP ID	Density	
93		SM149	1.05E-01	148.91718		62149.50c	3.6945E-11		SM149	1.05E-01	148.91718		62149.50c	3.6945E-11	
94		SM151	4.10E-02	150.919919		62151.50c	1.4235E-11		SM151	4.10E-02	150.919919		62151.50c	1.4235E-11	
95		ND143	5.51E-01	142.909779		60143.50c	2.0202E-10		ND143	5.51E-01	142.909779		60143.50c	2.0202E-10	
96		RH103	2.09E-01	102.905511		45103.50c	1.0642E-10		RH103	2.09E-01	102.905511		45103.50c	1.0642E-10	
97		SM152	2.75E-02	151.919756		62152.50c	9.4847E-12		SM152	2.75E-02	151.919756		62152.50c	9.4847E-12	
98		GD157	7.32E-04	156.924025		64157.50c	2.4442E-13		GD157	7.32E-04	156.924025		64157.50c	2.4442E-13	
99		GD155	3.58E-03	154.922664		64155.50c	1.2108E-12		GD155	3.58E-03	154.922664		64155.50c	1.2108E-12	
100		CD(113)	6.65E-03	112.4		48000.50c	3.1000E-12		CD(113)	6.65E-03	112.4		48000.50c	3.1000E-12	
101		XE131	2.48E-01	130.905069		54131.50c	9.0266E-11		XE131	2.48E-01	130.905069		54131.50c	9.0266E-11	
102		CS133	5.83E-01	132.905355		55133.50c	2.2084E-10		CS133	5.83E-01	132.905355		55133.50c	2.2084E-10	
103		TC99	3.96E-01	98.90628		43099.50c	2.0979E-10		TC99	3.96E-01	98.90628		43099.50c	2.0979E-10	
104		SM147	2.19E-01	146.914867		62147.50c	7.7928E-11		SM147	2.19E-01	146.914867		62147.50c	7.7928E-11	
105		XE135	8.7E-05	134.9063		54135.50c	3.3790E-14		XE135	8.7E-05	134.9063		54135.50c	3.3790E-14	
106		ND145	3.72E-01	144.912538		60145.50c	1.3451E-10		ND145	3.72E-01	144.912538		60145.50c	1.3451E-10	
107		MO95	3.86E-01	94.905839		42095.50c	2.1311E-10		MO95	3.86E-01	94.905839		42095.50c	2.1311E-10	
108		U233	3.15E-02	233.039522		92233.50c	7.0825E-12		U233	3.15E-02	233.039522		92233.50c	7.0825E-12	
109		U234	2.12E+03	234.040904		92234.50c	4.7489E-07		U234	2.12E+03	234.040904		92234.50c	4.7463E-07	
110		U235	1.72E+05	235.043915		92235.53c	3.8348E-05		U235	1.72E+05	235.043915		92235.53c	3.8343E-05	
111		U236	4.12E+04	236.045637		92236.50c	9.1467E-06		U236	4.12E+04	236.045637		92236.50c	9.1455E-06	
112		U238	8.66E+06	238.05077		92238.53c	1.9064E-03		U238	8.66E+06	238.05077		92238.53c	1.9061E-03	
113		NP237	9.99E+03	237.048056		93237.50c	2.2085E-06		NP237	9.99E+03	237.048056		93237.50c	2.2082E-06	
114		PU238	4.27E-01	238.049511		94238.50c	9.3987E-11		PU238	4.27E-01	238.049511		94238.50c	9.3987E-11	
115		PU239	1.21E+01	239.052146		94239.55c	2.6522E-09		PU239	1.21E+01	239.052146		94239.55c	2.6522E-09	
116		PU240	6.00E-04	240.053882		94240.50c	1.3096E-13		PU240	6.00E-04	240.053882		94240.50c	1.3096E-13	
117		O	0	15.994915		SUM 8016.53c	4.0422E-02		O	0	15.994915		8016.53c	4.0422E-02	
118		H		1.00782519		1001.53c	1.6602E-02		H		1.00782519		1001.53c	1.6603E-02	
119		O		15.994915					O		15.994915				
120		O		15.994915					O		15.994915				
121		Na		22.9897707		11023.50c	3.9366E-04		Na		22.9897707		11023.50c	3.9366E-04	
122		Mg		24.312		12000.50c	2.3128E-04		Mg		24.312		12000.50c	2.3128E-04	
123		Al		26.9815389		13027.50c	2.6070E-03		Al		26.9815389		13027.50c	2.6070E-03	
124		Si		28.086		14000.50c	1.1406E-02		Si		28.086		14000.50c	1.1406E-02	
125		K		39.102		19000.50c	5.5591E-04		K		39.102		19000.50c	5.5591E-04	
126		Ca		40.08		20000.50c	5.6949E-04		Ca		40.08		20000.50c	5.6949E-04	

C	P	Q	R	S	T	U	V	W
127		Fe		55.847		26000.55c	1.4037E-04	
128		TOTAL	8885325.7071				7.48853E-02	
129								
130		Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
131			Tuff Porosity=	40%		Years Critical	100	
132			Volume	11494000.00		UO2 added	0.0001047833	
133			UO2%	8%	T=265 C dens=	0.776	Number	
134		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
135		SM149	9.89E-01	148.91718		62149.50c	3.4798E-10	
136		SM151	2.95E-01	150.919919		62151.50c	1.0242E-10	
137		ND143	5.52E+00	142.909779		60143.50c	2.0239E-09	
138		RH103	2.12E+00	102.905511		45103.50c	1.0795E-09	
139		EU151	1.28E-01	150.919838		63151.55c	4.4440E-11	
140		GD157	6.71E-03	156.924025		64157.50c	2.2405E-12	
141		GD155	3.26E-02	154.922664		64155.50c	1.1026E-11	
142		CD(113)	6.65E-02	112.4		48000.50c	3.1000E-11	
143		XE131	2.49E+00	130.905069		54131.50c	9.9667E-10	
144		CS133	5.84E+00	132.905355		55133.50c	2.3024E-09	
145		TC99	3.96E+00	98.90628		43099.50c	2.0979E-09	
146		SM147	2.10E+00	146.914867		62147.50c	7.4896E-10	
147		XE135	8.7E-05	134.9063		54135.50c	3.3790E-14	
148		ND145	3.72E+00	144.912638		60145.50c	1.3451E-09	
149		MO95	4.00E+00	94.905839		42095.50c	2.2084E-09	
150		U233	3.18E-01	233.039522		92233.50c	7.1500E-11	
151		U234	2.12E+03	234.040904		92234.50c	4.7624E-07	
152		U235	1.71E+05	235.043915		92235.53c	3.8170E-05	
153		U236	4.12E+04	236.045637		92236.50c	9.1575E-06	
154		U238	8.66E+06	238.05077		92238.53c	1.9086E-03	
155		NP237	9.99E+03	237.048056		93237.50c	2.2110E-06	
156		PU238	3.07E+00	238.049511		94238.50c	6.7574E-10	
157		PU239	1.19E+02	239.052146		94239.55c	2.6083E-08	
158		PU240	5.87E-02	240.053882		94240.50c	1.2813E-11	
159		O	0	15.994915		SUM 8016.53c	4.0424E-02	
160		H		1.00782519		1001.53c	1.6598E-02	
161		O		15.994915				
162		O		15.994915				
163		Na		22.9897707		11023.50c	3.9366E-04	
164		Mg		24.312		12000.50c	2.3128E-04	
165		Al		26.9815389		13027.50c	2.6070E-03	
166		Si		28.086		14000.50c	1.1406E-02	
167		K		39.102		19000.50c	5.5591E-04	
168		Ca		40.08		20000.50c	5.6949E-04	
169		Fe		55.847		26000.55c	1.4037E-04	
170		TOTAL	8884463.7146				7.48847E-02	
171								
172		Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
173	2		Tuff Porosity=	40%		Years Critical	1000	
174			Volume	11494000.00		UO2 added	0.0010478333	
175			UO2%	8%	T=265 C dens=	0.776	Number	
176		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
177		SM149	5.77E+00	148.91718		62149.50c	2.0302E-09	
178		SM151	5.49E-01	150.919919		62151.50c	1.9060E-10	
179		ND143	5.50E+01	142.909779		60143.50c	2.0165E-08	
180		RH103	2.13E+01	102.905511		45103.50c	1.0845E-08	
181		EU151	3.50E+00	150.919838		63151.55c	1.2151E-09	
182		GD157	3.34E-02	156.924025		64157.50c	1.1152E-11	
183		GD155	2.79E-01	154.922664		64155.50c	9.4362E-11	
184		CD(113)	6.89E-01	112.4		48000.50c	3.2119E-10	
185		XE131	2.49E+01	130.905069		54131.50c	9.9667E-09	
186		CS133	5.84E+01	132.905355		55133.50c	2.3024E-08	
187		TC99	3.95E+01	98.90628		43099.50c	2.0926E-08	
188		SM147	2.17E+01	146.914867		62147.50c	7.7393E-09	
189		SM152	2.92E+00	151.919756		62152.50c	1.0071E-09	

C	X	Y	Z	AA	AB	AC	AD
127	Fe		55.847		26000.55c	1.4037E-04	
128	TOTAL	8885325.71				7.48854E-02	
129							
130	Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
131		Tuff Porosity=	40%		Years Critical	100	
132		Volume	11494000.00		UO2 added	0	
133		UO2%	8%	T=265 C d	0.776	Number	
134	ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
135	SM149	9.89E-01	148.91718		62149.50c	3.4798E-10	
136	SM151	2.95E-01	150.919919		62151.50c	1.0242E-10	
137	ND143	5.52E+00	142.909779		60143.50c	2.0239E-09	
138	RH103	2.12E+00	102.905511		45103.50c	1.0795E-09	
139	EU151	1.28E-01	150.919838		63151.55c	4.4440E-11	
140	GD157	6.71E-03	156.924025		64157.50c	2.2405E-12	
141	GD155	3.26E-02	154.922664		64155.50c	1.1026E-11	
142	CD(113)	6.65E-02	112.4		48000.50c	3.1000E-11	
143	XE131	2.49E+00	130.905069		54131.50c	9.9667E-10	
144	CS133	5.84E+00	132.905355		55133.50c	2.3024E-09	
145	TC99	3.96E+00	98.90628		43099.50c	2.0979E-09	
146	SM147	2.10E+00	146.914867		62147.50c	7.4896E-10	
147	XE135	8.7E-05	134.9063		54135.50c	3.3790E-14	
148	ND145	3.72E+00	144.912638		60145.50c	1.3451E-09	
149	MO95	4.00E+00	94.905839		42095.50c	2.2084E-09	
150	U233	3.18E-01	233.039522		92233.50c	7.1500E-11	
151	U234	2.12E+03	234.040904		92234.50c	4.7463E-07	
152	U235	1.71E+05	235.043915		92235.53c	3.8120E-05	
153	U236	4.12E+04	236.045637		92236.50c	9.1455E-06	
154	U238	8.66E+06	238.05077		92238.53c	1.9061E-03	
155	NP237	9.99E+03	237.048056		93237.50c	2.2082E-06	
156	PU238	3.07E+00	238.049511		94238.50c	6.7574E-10	
157	PU239	1.19E+02	239.052146		94239.55c	2.6083E-08	
158	PU240	5.87E-02	240.053882		94240.50c	1.2813E-11	
159	O	0	15.994915		8016.53c	4.0422E-02	
160	H		1.00782519		1001.53c	1.6603E-02	
161	O		15.994915				
162	O		15.994915				
163	Na		22.9897707		11023.50c	3.9366E-04	
164	Mg		24.312		12000.50c	2.3128E-04	
165	Al		26.9815389		13027.50c	2.6070E-03	
166	Si		28.086		14000.50c	1.1406E-02	
167	K		39.102		19000.50c	5.5591E-04	
168	Ca		40.08		20000.50c	5.6949E-04	
169	Fe		55.847		26000.55c	1.4037E-04	
170	TOTAL	8884463.71				7.48852E-02	
171							
172	Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
173		Tuff Porosity=	40%		Years Critical	1000	
174		Volume	11494000.00		UO2 added	0	
175		UO2%	8%	T=265 C d	0.776	Number	
176	ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
177	SM149	5.77E+00	148.91718		62149.50c	2.0302E-09	
178	SM151	5.49E-01	150.919919		62151.50c	1.9060E-10	
179	ND143	5.50E+01	142.909779		60143.50c	2.0165E-08	
180	RH103	2.13E+01	102.905511		45103.50c	1.0845E-08	
181	EU151	3.50E+00	150.919838		63151.55c	1.2151E-09	
182	GD157	3.34E-02	156.924025		64157.50c	1.1152E-11	
183	GD155	2.79E-01	154.922664		64155.50c	9.4362E-11	
184	CD(113)	6.89E-01	112.4		48000.50c	3.2119E-10	
185	XE131	2.49E+01	130.905069		54131.50c	9.9667E-09	
186	CS133	5.84E+01	132.905355		55133.50c	2.3024E-08	
187	TC99	3.95E+01	98.90628		43099.50c	2.0926E-08	
188	SM147	2.17E+01	146.914867		62147.50c	7.7393E-09	
189	SM152	2.92E+00	151.919756		62152.50c	1.0071E-09	

C	P	D	R	S	T	U	V	W
190		ND145	3.71E+01	144.912538		60145.50c	1.3415E-08	SUM FP
191		MO95	4.01E+01	94.905839		42095.50c	2.2139E-08	1.331E-07
192		U233	3.16E+00	233.039522		92233.50c	7.1050E-10	
193		U234	2.15E+03	234.040904		92234.50c	4.6749E-07	
194		U235	1.70E+05	235.043915		92235.53c	3.8308E-05	
195		U236	4.14E+04	236.045637		92236.50c	9.3058E-06	
196		U238	8.65E+06	238.05077		92238.53c	1.9289E-03	
197		NP237	9.97E+03	237.048056		93237.50c	2.2324E-06	
198		PU238	5.57E+00	238.049511		94238.50c	1.2260E-09	
199		PU239	1.15E+03	239.052146		94239.55c	2.5206E-07	
200		PU240	5.49E+00	240.053882		94240.50c	1.1983E-09	
201		O	0	15.994915		SUM 8016.53c	4.0446E-02	
202		H		1.00782519		1001.53c	1.6549E-02	
203		O		15.994915				
204		O		15.994915				
205		Na		22.9897707		11023.50c	3.9366E-04	
206		Mg		24.312		12000.50c	2.3128E-04	
207		Al		26.9815389		13027.50c	2.6070E-03	
208		Si		28.086		14000.50c	1.1406E-02	
209		K		39.102		19000.50c	5.5591E-04	
210		Ca		40.08		20000.50c	5.6949E-04	
211		Fe		55.847		26000.55c	1.4037E-04	
212		TOTAL	8874995.9604				7.48784E-02	
213								
214		Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
215			Tuff Porosity=	40%		Years Critical	5000	
216			Volume	11494000.00		UO2 added	0.0052391664	
217			UO2%	8%	T=265 C den=	0.776	Number	
218		ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
219		SM149	7.89E+00	148.91716		62149.50c	2.7761E-09	
220		SM150	4.54E+01	149.917276		62150.50c	1.5868E-08	
221		ND143	2.70E+02	142.909779		60143.50c	9.8994E-08	
222		RH103	1.09E+02	102.905511		45103.50c	5.5500E-08	
223		EU151	1.65E+01	150.919838		63151.55c	5.7285E-09	
224		GD157	5.42E-02	156.924025		64157.50c	1.8097E-11	
225		GD155	6.99E-01	154.922664		64155.50c	2.3841E-10	
226		CD(113)	3.96E+00	112.4		48000.50c	1.8479E-09	
227		XE131	1.24E+02	130.905069		54131.50c	4.9633E-08	
228		CS133	2.91E+02	132.905355		55133.50c	1.1472E-07	
229		TC99	1.96E+02	98.90628		43099.50c	1.0383E-07	
230		SM147	1.08E+02	146.914867		62147.50c	3.8518E-08	
231		SM152	1.69E+01	151.919756		62152.50c	5.8288E-09	
232		ND145	1.84E+02	144.912538		60145.50c	6.6530E-08	
233		MO95	1.99E+02	94.905839		42095.50c	1.0987E-07	
234		U233	1.53E+01	233.039522		92233.50c	3.4401E-09	
235		U234	2.28E+03	234.040904		92234.50c	6.4119E-07	
236		U235	1.63E+05	235.043916		92235.53c	3.8842E-05	
237		U236	4.25E+04	236.045637		92236.50c	1.0034E-05	
238		U238	8.65E+06	238.05077		92238.53c	2.0287E-03	
239		NP237	9.90E+03	237.048056		93237.50c	2.3313E-06	
240		PU238	5.49E+00	238.049511		94238.50c	1.2084E-09	
241		PU239	5.18E+03	239.052146		94239.55c	1.1354E-06	
242		PU240	1.08E+02	240.053882		94240.50c	2.3573E-08	
243		O	0	15.994915		SUM 8016.53c	4.0542E-02	
244		H		1.00782519		1001.53c	1.6331E-02	
245		O		15.994915				
246		O		15.994915				
247		Na		22.9897707		11023.50c	3.9366E-04	
248		Mg		24.312		12000.50c	2.3128E-04	
249		Al		26.9815389		13027.50c	2.6070E-03	
250		Si		28.086		14000.50c	1.1406E-02	
251		K		39.102		19000.50c	5.5591E-04	
252		Ca		40.08		20000.50c	5.6949E-04	

X	Y	Z	AA	AB	AC	AD
ND145	3.71E+01	144.912538		60145.50c	1.3415E-08	
MO95	4.01E+01	94.905839		42095.50c	2.2139E-08	
U233	3.16E+00	233.039522		92233.50c	7.1050E-10	
U234	2.15E+03	234.040904		92234.50c	4.6134E-07	
U235	1.70E+05	235.043915		92235.53c	3.7897E-05	
U236	4.14E+04	236.045637		92236.50c	9.1899E-06	
U238	8.65E+06	238.05077		92238.53c	1.9039E-03	
NP237	9.97E+03	237.048056		93237.50c	2.2036E-06	
PU238	5.57E+00	238.049511		94238.50c	1.2260E-09	
PU239	1.15E+03	239.052146		94239.55c	2.5206E-07	
PU240	5.49E+00	240.053882		94240.50c	1.1983E-09	
O	0	15.994915		8016.53c	4.0422E-02	
H		1.00782519		1001.53c	1.6603E-02	
O		15.994915				
O		15.994915				
Na		22.9897707		11023.50c	3.9366E-04	
Mg		24.312		12000.50c	2.3128E-04	
Al		26.9815389		13027.50c	2.6070E-03	
Si		28.086		14000.50c	1.1406E-02	
K		39.102		19000.50c	5.5591E-04	
Ca		40.08		20000.50c	5.6949E-04	
Fe		55.847		26000.55c	1.4037E-04	
TOTAL	8874995.96				7.48831E-02	
Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water						
	Tuff Porosity=	40%		Years Critical	5000	
	Volume	11494000.00		UO2 added	0	
	UO2%	8%	T=265 C d	0.776	Number	
ISOTOPE	Gm/Critical	Aw	Wt%	MCNP ID	Density	
SM149	7.89E+00	148.91716		62149.50c	2.7761E-09	
SM150	4.54E+01	149.917276		62150.50c	1.5868E-08	
ND143	2.70E+02	142.909779		60143.50c	9.8994E-08	
RH103	1.09E+02	102.905511		45103.50c	5.5500E-08	
EU151	1.65E+01	150.919838		63151.55c	5.7285E-09	
GD157	5.42E-02	156.924025		64157.50c	1.8097E-11	
GD155	6.99E-01	154.922664		64155.50c	2.3841E-10	
CD(113)	3.96E+00	112.4		48000.50c	1.8479E-09	
XE131	1.24E+02	130.905069		54131.50c	4.9633E-08	
CS133	2.91E+02	132.905355		55133.50c	1.1472E-07	
TC99	1.96E+02	98.90628		43099.50c	1.0383E-07	
SM147	1.08E+02	146.914867		62147.50c	3.8518E-08	
SM152	1.69E+01	151.919756		62152.50c	5.8288E-09	
ND145	1.84E+02	144.912538		60145.50c	6.6530E-08	
MO95	1.99E+02	94.905839		42095.50c	1.0987E-07	
U233	1.53E+01	233.039522		92233.50c	3.4401E-09	
U234	2.28E+03	234.040904		92234.50c	5.1045E-07	
U235	1.63E+05	235.043916		92235.53c	3.8337E-05	
U236	4.25E+04	236.045637		92236.50c	9.4341E-06	
U238	8.65E+06	238.05077		92238.53c	1.9039E-03	
NP237	9.90E+03	237.048056		93237.50c	2.1883E-06	
PU238	5.49E+00	238.049511		94238.50c	1.2084E-09	
PU239	5.18E+03	239.052146		94239.55c	1.1354E-06	
PU240	1.08E+02	240.053882		94240.50c	2.3573E-08	
O	0	15.994915		8016.53c	4.0422E-02	
H		1.00782519		1001.53c	1.6603E-02	
O		15.994915				
O		15.994915				
Na		22.9897707		11023.50c	3.9366E-04	
Mg		24.312		12000.50c	2.3128E-04	
Al		26.9815389		13027.50c	2.6070E-03	
Si		28.086		14000.50c	1.1406E-02	
K		39.102		19000.50c	5.5591E-04	
Ca		40.08		20000.50c	5.6949E-04	

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237-        c     165   7  -7.8320   54 -58        INP:N=1 U=18
238-        c       PANEL - ASSEMBLY RIGHT
239-        166   1  -2.1024   54                INP:N=1 U=18
240-        c       WATER GAP      - ASSEMBLY TOP
241-        167   1  -2.1024  -55                INP:N=1 U=19
242-        c     167   1  -2.1024  -51                INP:N=1 U=19
243-        c       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
244-        c     168   6  -7.8320   51 -55       INP:N=1 U=19
245-        c       CS TUBE - ASSEMBLY TOP
246-        c     169   7  -7.8320   55 -59       INP:N=1 U=19
247-        c       PANEL - ASSEMBLY TOP
248-        170   1  -2.1024   55                INP:N=1 U=19
249-        c     FUEL CELL BASKET STRUCTURE -                DRY - Unborated panels
250-        c       GAP      - ASSEMBLY LEFT
251-        171   3  -0.001225   52                INP:N=1 U=20
252-        c     171   3  -0.001225   48                INP:N=1 U=20
253-        c       OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
254-        c     172   6  -7.8320  -48  52       INP:N=1 U=20
255-        c       CS TUBE - ASSEMBLY LEFT
256-        c     173   7  -7.8320  -52  56       INP:N=1 U=20
257-        c       PANEL - ASSEMBLY LEFT
258-        174   3  -0.001225  -52                INP:N=1 U=20
259-        c       GAP      - ASSEMBLY BOTTOM
260-        175   3  -0.001225   53                INP:N=1 U=21
261-        c     175   3  -0.001225   49                INP:N=1 U=21
262-        c       OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
263-        c     176   6  -7.8320  -49  53       INP:N=1 U=21
264-        c       CS TUBE - ASSEMBLY BOTTOM
265-        c     177   7  -7.8320  -53  57       INP:N=1 U=21
266-        c       PANEL - ASSEMBLY BOTTOM
267-        178   3  -0.001225  -53                INP:N=1 U=21
268-        c       GAP      - ASSEMBLY RIGHT
269-        179   3  -0.001225  -54                INP:N=1 U=22
270-        c     179   3  -0.001225  -50                INP:N=1 U=22
271-        c       OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
272-        c     180   6  -7.8320   50 -54       INP:N=1 U=22
273-        c       CS TUBE - ASSEMBLY RIGHT
274-        c     181   7  -7.8320   54 -58       INP:N=1 U=22
275-        c       PANEL - ASSEMBLY RIGHT
276-        182   3  -0.001225   54                INP:N=1 U=22
277-        c       GAP      - ASSEMBLY TOP
278-        183   3  -0.001225  -55                INP:N=1 U=23
279-        c     183   3  -0.001225  -51                INP:N=1 U=23
280-        c       OXIDATION LAYER CS TUBE - ASSEMBLY TOP
281-        c     184   6  -7.8320   51 -55       INP:N=1 U=23
282-        c       CS TUBE - ASSEMBLY TOP
283-        c     185   7  -7.8320   55 -59       INP:N=1 U=23
284-        c       PANEL - ASSEMBLY TOP
285-        186   3  -0.001225   55                INP:N=1 U=23
286-
287-        c     SURFACE SPECIFICATIONS
288-        1*    PX    0.0
289-        c     2*    PY    0.00        $ For 1/4 Model
290-        3*    PZ    0.00
291-        c     4     PX   12.30        $ For Collapsed Model
292-        c     5     PX   36.90        $ For Collapsed Model
293-        c     6     PY   12.30        $ Water Level Surface
294-        c     7     PY   36.90        $ Water Level Surface
295-        c     8     PY  -12.30        $ Water Level Surface
296-        c     9     PY  -36.90        $ Water Level Surface
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C	P	O	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
316		SM150	9.83E+01	149.917276		62150.50c	3.4356E-08								
317		KR83	2.78E+01	82.914137		36083.50c	1.7568E-08								
318		CS135	5.81E+02	134.90577		55135.50c	2.2566E-07								
319		GD157	7.02E-02	156.924025		64157.50c	2.3440E-11								
320		RU101	3.40E+02	100.905578		44101.50c	1.7655E-07								
321		EU153	1.90E+01	152.921242		63153.55c	6.5102E-09								
322		PR141	5.30E+02	140.907648		59141.50c	1.9706E-07								
323		SM151	6.13E-01	150.919919		62151.50c	2.1282E-10								
324		AG109	1.05E+01	106.904756		47109.50c	5.0518E-09								
325		PD105	9.04E+01	104.90508		46105.50c	4.5152E-08								
326		ZR93	2.49E+02	92.905876		40093.50c	1.4043E-07								
327		GD152	7.10E+00	151.919788		64152.50c	2.4486E-09								
328		PD108	1.45E+01	107.903894		46108.50c	7.0411E-09								
329		U233	2.95E+01	233.039572		92233.50c	8.8326E-09								
330		U234	2.43E+03	234.040904		92234.50c	6.0552E-07								
331		U235	1.56E+05	235.043915		92235.53c	3.9787E-05								
332		U236	4.37E+04	236.045637		92236.50c	1.0899E-05								
333		U238	6.64E+06	238.05077		92238.53c	2.1513E-03								
334		NP237	9.83E+03	237.048056		93237.50c	2.4587E-06								
335		PU238	5.43E+00	238.049511		94238.50c	1.1952E-09								
336		PU239	9.03E+03	239.052146		94239.55c	1.9793E-06								
337		PU240	3.21E+02	240.053882		94240.50c	7.0065E-08								
338		O	0	15.994915		SUM 8016.53c	4.0662E-02								
339		H		1.00782519		1001.53c	1.6050E-02								
340		O		15.994915											
341		O		15.994915											
342		Na		22.9897707		11023.50c	3.9366E-04								
343		Mg		24.312		12000.50c	2.3128E-04								
344		Al		26.9815389		13027.50c	2.6070E-03								
345		Si		28.086		14000.50c	1.1406E-02								
346		K		39.102		19000.50c	5.5591E-04								
347		Ca		40.08		20000.50c	6.6949E-04								
348		Fe		55.847		26000.55c	1.4037E-04								
349		TOTAL	8566338.8062				7.48351E-02								

Internal Criticality Radionuclide Inventory Comparisons

				Total Ci of 36 Isotopes per assembly					
	30	400	15000	16000	20000	25000	45000	65000	
PWR Thermal/Shielding DBF, Decay Only					1.73E+02				
PWR Criticality DBF, Decay Only	1.18E+04	1.14E+03	1.45E+02	1.40E+02	1.20E+02	9.80E+01	5.30E+01	3.20E+01	
PWR Criticality DBF, 1000 yr Criticality				1.50E+02			5.40E+01	3.30E+01	
PWR Criticality DBF, 5000 yr Criticality					1.40E+02		5.50E+01	3.30E+01	
PWR Criticality DBF, 10000 yr Criticality						1.20E+02	5.80E+01	3.50E+01	

					Total Ci of 36 TSPA 95 Isotopes Per Unit Burnup				
	Incremental					Age of Fuel (years)			
PWR Thermal/Shielding DBF, Decay Only	Burnup (GWd)	30	400	15000	16000	20000	25000	45000	65000
PWR Criticality DBF, Decay Only	9.280	1274.58	122.40	15.60	15.09	12.93	10.56	5.71	3.45
PWR Criticality DBF, 1000 yr Criticality	0.038				263.16			26.32	26.32
PWR Criticality DBF, 5000 yr Criticality	0.190					105.40		10.54	5.27
PWR Criticality DBF, 10000 yr Criticality	0.380						57.97	13.17	7.90

PWR DBF ISOTOPE	Imported Data from CDB-R Therm/Shld decay only 20000 yrs CURIES/MTIHM	(CI/MTHM*.464) CURIES/ASSY
AC227	6.77E-03	3.14E-03
AM241	1.45E-01	6.74E-02
AM242M	7.23E-39	3.35E-39
AM243	5.67E+00	2.63E+00
C 14	1.45E-01	6.71E-02
CM244	1.19E-10	5.51E-11
CM245	1.45E-01	6.73E-02
CM246	1.04E-02	4.80E-03
CS135	6.90E-01	3.20E-01
I129	4.50E-02	2.09E-02
NB 93M	2.83E+00	1.31E+00
NB 94	7.40E-01	3.43E-01
NP237	1.75E+00	8.10E-01
PA231	6.77E-03	3.14E-03
PB210	5.10E-01	2.37E-01
PD107	1.66E-01	7.68E-02
PU238	1.42E-38	6.59E-39
PU239	2.44E+02	1.13E+02
PU240	8.62E+01	4.00E+01
PU241	1.45E-01	6.74E-02
PU242	2.45E+00	1.14E+00
RA226	5.10E-01	2.37E-01
RA228	4.65E-07	2.16E-07
SE 79	4.77E-01	2.21E-01
SM151	0.00E+00	0.00E+00
SN126	9.83E-01	4.56E-01
TC 99	1.70E+01	7.90E+00
TH229	7.91E-02	3.67E-02
TH230	5.71E-01	2.65E-01
TH232	4.64E-07	2.15E-07
U233	1.44E-01	6.66E-02
U234	3.39E+00	1.57E+00
U235	2.23E-02	1.03E-02
U236	5.30E-01	2.46E-01
U238	3.11E-01	1.44E-01
ZR 93	2.97E+00	1.38E+00
36 TSPA Total	3.73E+02	1.73E+02

PWR Crit. DBF Isotopes	16000 yr 1k crit	20000 yr 5k crit	From Ref. 5.53 25000 yr 10k crit	45000 yr 1k crit	5k crit
ac227	4.9E-03	8.8E-03	1.4E-02	1.0E-02	1.2E-02
am241	2.6E+00	2.7E+00	2.1E+00	2.0E-04	1.9E-04
am242m	2.0E-03	2.4E-03	1.9E-03	0.0E+00	0.0E+00
am243	4.8E-01	4.4E-01	4.1E-01	3.1E-02	4.2E-02
c 14	4.9E-06	3.5E-06	2.4E-06	1.5E-07	1.7E-07
cm244	1.7E-02	1.6E-02	1.5E-02	0.0E+00	0.0E+00
cm245	2.1E-03	1.4E-03	8.8E-04	2.0E-04	1.9E-04
cm248	9.6E-05	7.4E-05	5.2E-05	1.4E-06	1.9E-06
cs135	2.0E-01	2.1E-01	2.2E-01	2.0E-01	2.1E-01
i129	8.8E-03	9.0E-03	9.2E-03	8.8E-03	9.0E-03
nb 93m	3.5E-01	3.5E-01	3.6E-01	3.4E-01	3.5E-01
nb 94	1.9E-05	4.1E-05	7.4E-05	7.1E-06	1.8E-05
np237	3.8E-01	3.8E-01	3.9E-01	3.8E-01	3.8E-01
pa231	4.9E-03	8.8E-03	1.4E-02	1.0E-02	1.2E-02
pb210	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.2E-01
pd107	2.6E-02	2.7E-02	2.7E-02	2.6E-02	2.7E-02
pu238	2.9E+00	3.0E+00	3.1E+00	0.0E+00	0.0E+00
pu239	1.0E+02	9.6E+01	8.7E+01	4.5E+01	4.7E+01
pu240	2.9E+01	2.3E+01	1.8E+01	1.4E+00	1.7E+00
pu241	3.2E+00	2.6E+00	2.1E+00	2.0E-04	1.9E-04
pu242	2.7E-01	2.7E-01	2.6E-01	2.6E-01	2.5E-01
ra226	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.2E-01
ra228	9.0E-08	1.1E-07	1.5E-07	2.8E-07	2.8E-07
se 79	1.4E-01	1.3E-01	1.2E-01	7.5E-02	7.7E-02
sm151	7.9E-01	8.0E-01	8.1E-01	0.0E+00	0.0E+00
sn126	1.3E-01	1.2E-01	1.2E-01	1.0E-01	1.0E-01
tc 99	3.8E+00	3.8E+00	3.8E+00	3.4E+00	3.5E+00
th229	1.1E-02	1.6E-02	2.3E-02	5.1E-02	5.1E-02
th230	9.2E-02	1.1E-01	1.4E-01	2.2E-01	2.3E-01
th232	9.0E-08	1.1E-07	1.5E-07	2.8E-07	2.8E-07
u233	2.5E-02	3.1E-02	3.7E-02	6.7E-02	6.7E-02
u234	6.7E-01	6.9E-01	7.2E-01	6.3E-01	6.6E-01
u235	1.6E-02	1.6E-02	1.6E-02	1.8E-02	1.8E-02
u236	1.3E-01	1.3E-01	1.4E-01	1.3E-01	1.4E-01
u238	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01
zr 93	3.5E-01	3.5E-01	3.6E-01	3.4E-01	3.5E-01
	1.5E+02	1.4E+02	1.2E+02	5.4E+01	5.5E+01

								decay only				
	65000 yr				Ref. 5.53	Ref. 5.53	Ref. 5.53	Ref. 5.54	Ref. 5.54	Ref. 5.54	Ref. 5.54	Ref. 5.54
10k crit	1k crit	5k crit	10k crit		30 yr	400 yr	15000 yr	16000 yr	20000 yr	25000 yr	45000 yr	65000 yr
1.5E-02	1.3E-02	1.4E-02	1.6E-02		1.1E-05	1.2E-04	4.0E-03	4.3E-03	5.2E-03	6.3E-03	1.0E-02	1.3E-02
1.7E-04	3.9E-05	3.6E-05	3.4E-05		1.1E+03	7.9E+02	2.4E-03	2.2E-03	1.6E-03	1.1E-03	2.0E-04	3.9E-05
0.0E+00	0.0E+00	0.0E+00	0.0E+00		3.9E+00	6.3E-01	4.6E-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
6.3E-02	4.8E-03	6.4E-03	9.5E-03		2.0E+00	1.9E+00	4.9E-01	4.5E-01	3.1E-01	1.9E-01	2.9E-02	4.5E-03
2.1E-07	1.3E-08	1.5E-08	1.9E-08		3.3E-05	3.2E-05	5.4E-06	4.8E-06	3.0E-06	1.6E-06	1.4E-07	1.3E-08
0.0E+00	0.0E+00	0.0E+00	0.0E+00		3.9E+01	2.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
1.7E-04	3.9E-05	3.6E-05	3.4E-05		7.9E-03	7.6E-03	2.3E-03	2.1E-03	1.5E-03	1.0E-03	2.0E-04	3.9E-05
2.8E-06	7.3E-08	1.0E-07	1.5E-07		9.2E-04	8.7E-04	1.0E-04	8.8E-05	4.9E-05	2.4E-05	1.3E-06	6.7E-08
2.2E-01	2.0E-01	2.1E-01	2.2E-01		2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01
9.2E-03	8.8E-03	9.0E-03	9.2E-03		8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03
3.6E-01	3.4E-01	3.5E-01	3.5E-01		2.6E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.4E-01	3.4E-01	3.4E-01
3.7E-05	3.6E-06	8.9E-06	1.9E-05		2.3E-05	2.3E-05	1.4E-05	1.4E-05	1.2E-05	1.0E-05	5.0E-06	2.5E-06
3.9E-01	3.8E-01	3.8E-01	3.8E-01		9.7E-02	2.2E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01
1.5E-02	1.3E-02	1.4E-02	1.6E-02		2.2E-05	1.3E-04	4.0E-03	4.3E-03	5.2E-03	6.3E-03	1.0E-02	1.3E-02
2.2E-01	2.8E-01	2.9E-01	3.1E-01		2.9E-07	1.6E-04	7.5E-02	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.8E-01
2.7E-02	2.6E-02	2.7E-02	2.7E-02		2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02
0.0E+00	0.0E+00	0.0E+00	0.0E+00		4.1E+02	2.3E+01	4.6E-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
4.9E+01	2.6E+01	2.6E+01	2.8E+01		1.6E+02	1.6E+02	1.1E+02	1.0E+02	9.2E+01	8.0E+01	4.5E+01	2.5E+01
2.2E+00	1.7E-01	2.0E-01	2.7E-01		1.5E+02	1.5E+02	3.1E+01	2.8E+01	1.9E+01	1.1E+01	1.3E+00	1.6E-01
1.7E-04	3.9E-05	3.6E-05	3.4E-05		9.8E+03	7.8E-03	2.3E-03	2.1E-03	1.5E-03	1.0E-03	2.0E-04	3.9E-05
2.5E-01	2.5E-01	2.5E-01	2.4E-01		2.8E-01	2.8E-01	2.7E-01	2.7E-01	2.7E-01	2.7E-01	2.6E-01	2.5E-01
2.2E-01	2.8E-01	2.9E-01	3.1E-01		1.1E-06	1.8E-04	7.5E-02	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.8E-01
2.8E-07	4.1E-07	4.2E-07	4.2E-07		1.1E-10	1.8E-09	8.4E-08	9.0E-08	1.1E-07	1.5E-07	2.8E-07	4.1E-07
7.9E-02	4.9E-02	5.1E-02	5.2E-02		1.9E-01	1.9E-01	1.4E-01	1.4E-01	1.3E-01	1.1E-01	7.5E-02	4.9E-02
0.0E+00	0.0E+00	0.0E+00	0.0E+00		1.3E+02	7.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
1.1E-01	8.9E-02	9.1E-02	9.3E-02		1.4E-01	1.4E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01	1.0E-01	8.8E-02
3.5E+00	3.2E+00	3.3E+00	3.3E+00		3.9E+00	3.9E+00	3.8E+00	3.7E+00	3.7E+00	3.6E+00	3.4E+00	3.2E+00
5.1E-02	7.8E-02	7.8E-02	7.8E-02		4.8E-08	4.5E-06	1.0E-02	1.2E-02	1.6E-02	2.3E-02	5.1E-02	7.8E-02
2.3E-01	2.9E-01	3.0E-01	3.1E-01		1.6E-04	2.3E-03	8.7E-02	9.2E-02	1.1E-01	1.4E-01	2.2E-01	2.9E-01
2.8E-07	4.1E-07	4.2E-07	4.2E-07		1.5E-10	1.8E-09	8.4E-08	9.0E-08	1.1E-07	1.5E-07	2.8E-07	4.1E-07
6.7E-02	9.3E-02	9.3E-02	9.3E-02		2.2E-05	2.9E-04	2.3E-02	2.5E-02	3.1E-02	3.9E-02	6.7E-02	9.3E-02
6.9E-01	6.1E-01	6.3E-01	6.6E-01		5.4E-01	6.8E-01	6.7E-01	6.7E-01	6.6E-01	6.5E-01	6.3E-01	6.0E-01
1.7E-02	1.8E-02	1.8E-02	1.8E-02		1.4E-02	1.4E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	1.8E-02	1.8E-02
1.4E-01	1.4E-01	1.4E-01	1.4E-01		9.2E-02	9.3E-02	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01
1.5E-01	1.5E-01	1.5E-01	1.5E-01		1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01
3.6E-01	3.4E-01	3.5E-01	3.5E-01		3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.4E-01	3.4E-01	3.4E-01
5.8E+01	3.3E+01	3.3E+01	3.5E+01		1.2E+04	1.1E+03	1.4E+02	1.4E+02	1.2E+02	9.8E+01	5.3E+01	3.2E+01

```
1mcnp     version 4a    ld=10/01/93                    07/26/96 08:40:39
 ***********************************************************************                probid =   07/26/96 08:40:39
 inp=sp40a outp=sp40a.0

    1-        Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years  300K
    2-        C    Calico Hills Tuff 1.5095 g/cc  .40 porosity -  sphere surrounded by tuff
    3-        C    Water and UO2 offset each other in porous space
    4-        C     CELL SPECIFICATIONS
    5-        C     INNER WATER REGION
    6-        1     1  8.20735-2   -1   IMP:N=1
    7-        2     2  8.42302-2  1 -2  IMP:N=1
    8-        C     OUTSIDE WORLD
    9-        3     0  2   IMP:N=0
   10-
   11-        C     SURFACE SPECIFICATIONS
   12-        1     SO  140        $ INNER FUEL ZONE
   13-        2     SO  200        $ TUFF REFLECTOR
   14-
   15-        MODE  N
   16-        KCODE  4000 1. 30 130
   17-        C     KSRC   0 0 1  0 0 10  0 0 -20  0 0 29  0 20 5  0 0 -5  -10 0 -10
   18-        C       0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5  -16 5 5 0 10 10 17
   19-        C      MATERIAL SPECIFICATIONS
   20-        c        32 vol% water in calico Hills tuff - 8 vol% UO2
   21-        c        3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
   22-        m1       1001.50c 2.1396-2   8016.50c 4.2818-2  11023.50c 3.9366-4
   23-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   24-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   25-                92234.50c 4.6944-7  92235.50c 3.8253-5  92236.50c 9.1532-6
   26-                92238.50c 1.9055-3  93237.50c 2.1829-6
   27-        mt1     lwtr.01t
   28-        c        40 vol% water in calico Hills tuff
   29-        m2       1001.50c 2.6744-2   8016.50c 4.1582-2  11023.50c 3.9366-4
   30-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   31-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   32-        mt2     lwtr.01t
   33-        PRINT
1     initial source from file   srctp

 original number of points                          4015
    points not in any cell                     0
    points in cells of zero importance         0
    points in void cells                       0
    points in ambiguous cells                  0
 total points rejected                              0
 points remaining                                4015
 points after expansion or contraction           4001
 nominal source size                             4000

 initial guess for k(eff.)                    1.000000

 cycles to skip before tallying                    30

 number of keff cycles that can be stored         260

 total fission nuber data are being used.
1material composition                                                          print table 40

 material
  number     component nuclide, atom fraction
```

```
    1          1001,   .26069      8016,   .52170      11023,   .00480      12000,   .00282
              13027,   .03176     14000,   .13897      19000,   .00677      20000,   .00694
              26000,   .00171     92234,   .00001      92235,   .00047      92236,   .00011
              92238,   .02322     93237,   .00003
associated thermal s(a,b) data sets:    lwtr.01t
    2          1001,   .31751      8016,   .49367      11023,   .00467      12000,   .00275
              13027,   .03095     14000,   .13542      19000,   .00660      20000,   .00676
              26000,   .00167
associated thermal s(a,b) data sets:    lwtr.01t


material
 number     component nuclide, mass fraction

    1          1001,   .01323      8016,   .42028      11023,   .00555      12000,   .00345
              13027,   .04317     14000,   .19658      19000,   .01334      20000,   .01401
              26000,   .00481     92234,   .00007      92235,   .00552      92236,   .00133
              92238,   .27836     93237,   .00032
    2          1001,   .02344      8016,   .57845      11023,   .00787      12000,   .00489
              13027,   .06118     14000,   .27861      19000,   .01890      20000,   .01985
              26000,   .00682
1cell volumes and masses                                                                    print table 50

        cell      atom          gram          input        calculated                          reason volume
                density        density        volume         volume          mass       pieces   not calculated

    1     1  8.20735E-02   2.70602E+00    .00000E+00   1.14940E+07   3.11031E+07      1
    2     2  8.42302E-02   1.90934E+00    .00000E+00   2.20163E+07   4.20366E+07      1
    3     3   .00000E+00    .00000E+00    .00000E+00    .00000E+00    .00000E+00      0      infinite
1problem summary

     run terminated when   130 kcode cycles were done.
+                                                                                   07/26/96 11:15:45
     Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years  300K                probid =   07/26/96 08:40:39
0
 neutron creation     tracks      weight        energy            neutron loss        tracks      weight        energy
                                (per source particle)                                            (per source particle)

 source               519712    1.0006E+00    2.0304E+00          escape                 71    7.8193E-05    4.8272E-05
                                                                   energy cutoff           0    0.            0.
                                                                   time cutoff             0    0.            0.
 weight window            0     0.            0.                  weight window           0    0.            0.
 cell importance          0     0.            0.                  cell importance         0    0.            0.
 weight cutoff            0     5.8391E-02    2.5613E-05          weight cutoff      519894    5.8323E-02    2.4633E-05
 energy importance        0     0.            0.                  energy importance       0    0.            0.
 dxtran                   0     0.            0.                  dxtran                  0    0.            0.
 forced collisions        0     0.            0.                  forced collisions       0    0.            0.
 exp. transform           0     0.            0.                  exp. transform          0    0.            0.
 upscattering             0     0.            1.9735E-07          downscattering          0    0.            1.9368E+00
                                                                   capture                 0    6.0074E-01    5.8408E-02
 (n,xn)                 505     7.4376E-04    5.4034E-04          loss to (n,xn)        252    3.7112E-04    3.1107E-03
 fission                  0     0.            0.                  loss to fission         0    4.0018E-01    3.2580E-02
     total           520217     1.0597E+00    2.0310E+00              total          520217    1.0597E+00    2.0310E+00

   number of neutrons banked                    253        average lifetime, shakes                cutoffs
   neutron tracks per source particle     1.0010E+00          escape          2.0960E+04          tco   1.0000E+34
```

```
  neutron collisions per source particle 7.7830E+01        capture           9.3384E+03        eco    .0000E+00
  total neutron collisions               40449082           capture or escape 9.3393E+03        wc1  -5.0000E-01
  net multiplication              1.0004E+00  .0000         any termination   1.0085E+04        wc2  -2.5000E-01

 computer time so far in this run    89.99 minutes          maximum number ever in bank        2
 computer time in mcrun              89.95 minutes          bank overflows to backup file      0
 source particles per minute            5.7777E+03          field length                       0
 random numbers generated               466116603           most random numbers used was    12366 in history   242791

 range of sampled source weights = 9.5102E-01 to 1.0692E+00
1neutron  activity in each cell                                                                  print table 126

                 tracks     population   collisions   collisions     number       flux       average     average
       cell     entering                              * weight     weighted     weighted   track weight  track mfp
                                                    (per history)   energy       energy     (relative)     (cm)

    1     1      577532       519965     35423477    4.9823E+01   2.5818E-04   5.2493E-01   8.1462E-01   2.1899E+00
    2     2       75241        36493      5025605    5.1939E+00   4.7126E-05   2.2736E-01   5.9409E-01   1.3345E+00
1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years  300K                 probid =   07/26/96 08:40:39

 the initial fission neutron source distribution was read from the srctp file named srctp   .
 the criticality problem was scheduled to skip  30 cycles and run a total of  130 cycles with nominally     4000 neutrons per cycle.
 this problem has run  30 inactive cycles with   120293 neutron histories and  100 active cycles with      399419 neutron histories.

 this calculation has completed the requested number of keff cycles using a total of      519712 fission neutron source histories.
 all cells with fissionable material were sampled and had fission neutron source points.

 the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

          the k( collision) cycle values appear normally distributed at the 95 percent confidence level
          the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
          the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

 ------------------------------------------------------------------------------------------------------------------------
 |  the final estimated combined collision/absorption/track-length keff =  .97755 with an estimated standard deviation of  .00081
 |  the estimated 68, 95, & 99 percent keff confidence intervals are  .97674 to  .97835,  .97593 to  .97916, and  .97541 to  .97968
 |  the estimated collision/absorption neutron removal lifetime = 9.36E-05 seconds with an estimated standard deviation of 1.75E-07
 ------------------------------------------------------------------------------------------------------------------------

 the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

       keff estimator       keff      standard deviation      68% confidence        95% confidence        99% confidence        corr

            collision      .97699          .00138          .97561 to  .97838     .97424 to  .97974     .97334 to  .98064
           absorption      .97847          .00110          .97736 to  .97957     .97627 to  .98066     .97556 to  .98138
         track length      .97663          .00134          .97529 to  .97797     .97397 to  .97929     .97310 to  .98016
           col/absorp      .97788          .00082          .97706 to  .97870     .97624 to  .97952     .97571 to  .98005     -.1060
          abs/trk len      .97770          .00080          .97690 to  .97851     .97610 to  .97930     .97558 to  .97983     -.1259
          col/trk len      .97645          .00135          .97510 to  .97780     .97376 to  .97914     .97288 to  .98002      .9838
       col/abs/trk len     .97755          .00081          .97674 to  .97835     .97593 to  .97916     .97541 to  .97968
```

```
1mcnp     version 4a     ld=10/01/93                          08/23/96 10:15:41
 ************************************************************************                probid =   08/23/96 10:15:41
 inp=sp40a2 outp=sp40a20

    1-        Far-Field Consequence Study - 32% N2O/ 8% UO2 (sp40a2) 0 Years  300K
    2-        C    Calico Hills Tuff 1.5095 g/cc  .40 porosity -  sphere surrounded by tuff
    3-        C    Water and UO2 offset each other in porous space  50 C uniform
    4-        C     CELL SPECIFICATIONS
    5-        C     INNER WATER REGION
    6-        1     1  8.17526-2   -1   IMP:N=1
    7-        2     2  8.38290-2  1 -2  IMP:N=1
    8-        C     OUTSIDE WORLD
    9-        3     0  2   IMP:N=0
   10-
   11-        C     SURFACE SPECIFICATIONS
   12-        1     SO  140        $ INNER FUEL ZONE
   13-        2     SO  200        $ TUFF REFLECTOR
   14-
   15-        MODE  N
   16-        KCODE  4000 1. 30 130
   17-        C     KSRC   0 0 1  0 0 10  0 0 -20  0 0 29  0 20 5  0 0 -5  -10 0 -10
   18-        C       0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5  -16 5 5 0 10 10 17
   19-        C      MATERIAL SPECIFICATIONS
   20-        c        32 (x .99 at 50 C) vol% water in calico Hills tuff - 8 vol% UO2
   21-        c        3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
   22-        m1       1001.50c 2.1182-2   8016.50c 4.2711-2  11023.50c 3.9366-4
   23-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   24-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   25-                92234.50c 4.6944-7  92235.50c 3.8253-5  92236.50c 9.1532-6
   26-                92238.50c 1.9055-3  93237.50c 2.1829-6
   27-        mt1     lwtr.01t
   28-        c        40 (x .99 at 50 C) vol% water in calico Hills tuff
   29-        m2       1001.50c 2.6477-2   8016.50c 4.1448-2  11023.50c 3.9366-4
   30-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   31-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   32-        mt2     lwtr.01t
   33-        PRINT
1      initial source from file   srctp

 original number of points                          4048
    points not in any cell                     0
    points in cells of zero importance         0
    points in void cells                       0
    points in ambiguous cells                  0
 total points rejected                               0
 points remaining                                 4048
 points after expansion or contraction            3997
 nominal source size                              4000

 initial guess for k(eff.)                     1.000000

 cycles to skip before tallying                      30

 number of keff cycles that can be stored           260

 total fission nubar data are being used.
imaterial composition                                                    print table 40

 material
  number     component nuclide, atom fraction
```

```
    1          1001,   .25910      8016,   .52244      11023,   .00482      12000,   .00283
              13027,   .03189     14000,   .13952      19000,   .00680      20000,   .00697
              26000,   .00172     92234,   .00001      92235,   .00047      92236,   .00011
              92238,   .02331     93237,   .00003
associated thermal s(a,b) data sets:    lwtr.01t
    2          1001,   .31585      8016,   .49444      11023,   .00470      12000,   .00276
              13027,   .03110     14000,   .13606      19000,   .00663      20000,   .00679
              26000,   .00167
associated thermal s(a,b) data sets:    lwtr.01t


 material
  number     component nuclide, mass fraction

    1          1001,   .01312      8016,   .41972      11023,   .00556      12000,   .00345
              13027,   .04322     14000,   .19681      19000,   .01335      20000,   .01402
              26000,   .00482     92234,   .00007      92235,   .00552      92236,   .00133
              92238,   .27869     93237,   .00032
    2          1001,   .02326      8016,   .57779      11023,   .00789      12000,   .00490
              13027,   .06130     14000,   .27919      19000,   .01894      20000,   .01989
              26000,   .00683
1cell volumes and masses                                                                          print table 50

        cell     atom          gram          input        calculated                          reason volume
               density       density        volume         volume          mass       pieces   not calculated

    1     1  8.17526E-02   2.70282E+00    .00000E+00   1.14940E+07   3.10664E+07     1
    2     2  8.38290E-02   1.90533E+00    .00000E+00   2.20163E+07   4.19483E+07     1
    3     3   .00000E+00    .00000E+00    .00000E+00    .00000E+00    .00000E+00     0      infinite
1problem summary

      run terminated when   130 kcode cycles were done.
+                                                                                    08/23/96 13:47:25
      Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a2) 0 Years  300K          probid =  08/23/96 10:15:41
0
 neutron creation     tracks      weight        energy          neutron loss        tracks      weight        energy
                                (per source particle)                                          (per source particle)

 source              518810    1.0023E+00    2.0305E+00        escape                 113    1.2903E-04    1.2917E-04
                                                               energy cutoff            0    0.            0.
                                                               time cutoff              0    0.            0.
 weight window            0    0.            0.                weight window            0    0.            0.
 cell importance          0    0.            0.                cell importance          0    0.            0.
 weight cutoff            0    5.8402E-02    3.2972E-05        weight cutoff       518942    5.8636E-02    3.3741E-05
 energy importance        0    0.            0.                energy importance        0    0.            0.
 dxtran                   0    0.            0.                dxtran                   0    0.            0.
 forced collisions        0    0.            0.                forced collisions        0    0.            0.
 exp. transform           0    0.            0.                exp. transform           0    0.            0.
 upscattering             0    0.            1.9681E-07        downscattering           0    0.            1.9372E+00
                                                               capture                  0    6.0199E-01    5.8119E-02
 (n,xn)                 488    7.1361E-04    4.8042E-04        loss to (n,xn)         243    3.5546E-04    2.9646E-03
 fission                  0    0.            0.                loss to fission          0    4.0030E-01    3.2620E-02
    total            519298    1.0614E+00    2.0310E+00           total            519298    1.0614E+00    2.0310E+00

   number of neutrons banked                    245        average lifetime, shakes                cutoffs
   neutron tracks per source particle     1.0009E+00         escape            2.1238E+04          tco    1.0000E+34
```

```
  neutron collisions per source particle 7.7862E+01        capture          9.3706E+03        eco    .0000E+00
  total neutron collisions                   40395375       capture or escape 9.3722E+03       wc1  -5.0000E-01
  net multiplication                1.0004E+00  .0000       any termination   1.0137E+04       wc2  -2.5000E-01

 computer time so far in this run    89.65 minutes         maximum number ever in bank        2
 computer time in mcrun              89.61 minutes         bank overflows to backup file      0
 source particles per minute          5.7894E+03           field length                       0
 random numbers generated              465318405           most random numbers used was    12040 in history   376270

 range of sampled source weights = 9.2915E-01 to 1.0650E+00
1neutron  activity in each cell                                                                  print table 126

          cell    tracks entering   population   collisions   collisions * weight (per history)   number weighted energy   flux weighted energy   average track weight (relative)   average track mfp (cm)

    1     1        578169           519055       35184913     4.9712E+01   2.6018E-04   5.2471E-01   8.1658E-01   2.2038E+00
    2     2         77612            37548        5210462     5.3914E+00   4.6338E-05   2.2143E-01   5.9394E-01   1.3362E+00

    total          655781           556603       40395375     5.5103E+01
1keff results for: Far-Field Consequence Study - 32% H20/ 8% UO2 (sp40a2) 0 Years  300K                  probid =   08/23/96 10:15:41

 the initial fission neutron source distribution was read from the srctp file named srctp   .
 the criticality problem was scheduled to skip  30 cycles and run a total of  130 cycles with nominally     4000 neutrons per cycle.
 this problem has run  30 inactive cycles with   119746 neutron histories and  100 active cycles with      399064 neutron histories.

 this calculation has completed the requested number of keff cycles using a total of      518810 fission neutron source histories.
 all cells with fissionable material were sampled and had fission neutron source points.

 the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

          the k( collision) cycle values appear normally distributed at the 95 percent confidence level
          the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
          the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

 ------------------------------------------------------------------------------------------------------------------------------
 |  the final estimated combined collision/absorption/track-length keff =  .97716 with an estimated standard deviation of  .00073
 |  the estimated 68, 95, & 99 percent keff confidence intervals are  .97643 to  .97789,  .97571 to  .97861, and  .97524 to  .97909
 |  the estimated collision/absorption neutron removal lifetime = 9.37E-05 seconds with an estimated standard deviation of 1.80E-07
 ------------------------------------------------------------------------------------------------------------------------------

 the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

      keff estimator      keff      standard deviation      68% confidence        95% confidence        99% confidence        corr

          collision      .97733          .00132          .97600 to  .97866     .97469 to  .97997     .97383 to  .98083
         absorption      .97701          .00099          .97602 to  .97800     .97504 to  .97897     .97440 to  .97961
       track length      .97708          .00134          .97573 to  .97842     .97440 to  .97975     .97353 to  .98062
        col/absorp       .97713          .00072          .97641 to  .97785     .97569 to  .97857     .97522 to  .97904     -.1824
        abs/trk len      .97703          .00073          .97630 to  .97776     .97558 to  .97849     .97510 to  .97896     -.1692
        col/trk len      .97731          .00134          .97597 to  .97865     .97464 to  .97998     .97377 to  .98085      .9845
```

col/abs/trk len	.97716	.00073	.97643 to .97789	.97571 to .97861	.97524 to .97909

```
lacnp     version 4a    ld=10/01/93                          07/26/96 12:01:33
*****************************************************************************                probid =   07/26/96 12:01:33
 inp=sp40a1 outp=sp40a1.0

    1-        Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a1) 0 Years  600K
    2-        C    Calico Hills Tuff 1.5095 g/cc  .40 porosity -  sphere surrounded by tuff
    3-        C    Water and UO2 offset each other in porous space / H2O @ 500k
    4-        C     CELL SPECIFICATIONS
    5-        C     INNER WATER REGION
    6-        1     1  7.48846-2   -1   IMP:N=1
    7-        2     2  8.38290-2  1 -2  IMP:N=1
    8-        C     OUTSIDE WORLD
    9-        3     0  2   IMP:N=0
   10-
   11-        C     SURFACE SPECIFICATIONS
   12-        1     SO  140        $ INNER FUEL ZONE
   13-        2     SO  200        $ TUFF REFLECTOR
   14-
   15-        MODE  N
   16-        KCODE  4000 1. 30 130
   17-        C     KSRC   0 0 1  0 0 10  0 0 -20  0 0 29  0 20 5  0 0 -5  -10 0 -10
   18-        C       0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5  -16 5 5 0 10 10 17
   19-        C      MATERIAL SPECIFICATIONS
   20-        c        32 (x .776 at 265 C) vol% water in calico Hills tuff - 8 vol% UO2
   21-        c        3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
   22-        m1       1001.53c 1.6603-2   8016.53c 4.0422-2  11023.50c 3.9366-4
   23-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   24-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   25-                92234.50c 4.6944-7  92235.53c 3.8253-5  92236.50c 9.1532-6
   26-                92238.53c 1.9055-3  93237.50c 2.1829-6
   27-        mt1     lwtr.03t
   28-        c        40 (x .99 at 50 C) vol% water in calico Hills tuff
   29-        m2       1001.53c 2.6477-2   8016.53c 4.1448-2  11023.50c 3.9366-4
   30-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   31-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   32-        mt2     lwtr.02t
   33-        PRINT
1     initial source from file   srctp

 original number of points                          4001
    points not in any cell                     0
    points in cells of zero importance         0
    points in void cells                       0
    points in ambiguous cells                  0
 total points rejected                               0
 points remaining                                 4001
 points after expansion or contraction            4000
 nominal source size                              4000

 initial guess for k(eff.)                     1.000000

 cycles to skip before tallying                      30

 number of keff cycles that can be stored           260

 total fission nubar data are being used.

 warning.    lwtr.02t and   lwtr.03t are both called for.
1material composition                                                    print table 40
```

```
material
 number     component nuclide, atom fraction

    1          1001,   .22172      8016,   .53979      11023,   .00526      12000,   .00309
              13027,   .03481     14000,   .15232      19000,   .00742      20000,   .00760
              26000,   .00187     92234,   .00001      92235,   .00051      92236,   .00012
              92238,   .02545     93237,   .00003
associated thermal s(a,b) data sets:    lwtr.03t
    2          1001,   .31585      8016,   .49444      11023,   .00470      12000,   .00276
              13027,   .03110     14000,   .13606      19000,   .00663      20000,   .00679
              26000,   .00167
associated thermal s(a,b) data sets:    lwtr.02t


material
 number     component nuclide, mass fraction

    1          1001,   .01055      8016,   .40755      11023,   .00570      12000,   .00354
              13027,   .04434     14000,   .20193      19000,   .01370      20000,   .01439
              26000,   .00494     92234,   .00007      92235,   .00567      92236,   .00136
              92238,   .28593     93237,   .00033
    2          1001,   .02326      8016,   .57779      11023,   .00789      12000,   .00490
              13027,   .06130     14000,   .27919      19000,   .01894      20000,   .01989
              26000,   .00683
1cell volumes and masses                                                                    print table 50

        cell      atom          gram          input        calculated                          reason volume
                density        density        volume         volume          mass       pieces   not calculated

    1     1  7.48846E-02   2.63436E+00    .00000E+00   1.14940E+07   3.02795E+07      1
    2     2  8.38290E-02   1.90533E+00    .00000E+00   2.20163E+07   4.19483E+07      1
    3     3   .00000E+00    .00000E+00    .00000E+00    .00000E+00    .00000E+00      0      infinite
1problem summary

     run terminated when   130 kcode cycles were done.
+                                                                                   07/26/96 14:46:59
     Far-Field Consequence Study - 32% H20/ 8% UO2 (sp40a1) 0 Years  600K          probid =  07/26/96 12:01:33
0
 neutron creation     tracks      weight        energy          neutron loss        tracks      weight        energy
                                (per source particle)                                          (per source particle)

 source               519688    1.0006E+00    2.0277E+00       escape                 112    1.1480E-04    1.1651E-04
                                                               energy cutoff            0    0.            0.
                                                               time cutoff              0    0.            0.
 weight window             0    0.            0.               weight window            0    0.            0.
 cell importance           0    0.            0.               cell importance          0    0.            0.
 weight cutoff             0    6.4155E-02    1.7917E-05       weight cutoff       519866    6.4103E-02    3.9674E-05
 energy importance         0    0.            0.               energy importance        0    0.            0.
 dxtran                    0    0.            0.               dxtran                   0    0.            0.
 forced collisions         0    0.            0.               forced collisions        0    0.            0.
 exp. transform            0    0.            0.               exp. transform           0    0.            0.
 upscattering              0    0.            3.4039E-07       downscattering           0    0.            1.9255E+00
                                                               capture                  0    6.1590E-01    6.2459E-02
 (n,xn)                  538    7.8906E-04    5.5245E-04       loss to (n,xn)         268    3.9334E-04    3.2773E-03
 fission                   0    0.            0.               loss to fission          0    3.8503E-01    3.6840E-02
     total            520226    1.0655E+00    2.0283E+00           total           520226    1.0655E+00    2.0283E+00
```

```
number of neutrons banked                    270        average lifetime, shakes              cutoffs
neutron tracks per source particle     1.0010E+00         escape          3.0559E+04            tco   1.0000E+34
neutron collisions per source particle 7.9711E+01         capture         9.5684E+03            eco    .0000E+00
total neutron collisions             41424645             capture or escape 9.5708E+03          wc1  -5.0000E-01
net multiplication              1.0004E+00  .0000        any termination  1.0408E+04            wc2  -2.5000E-01

computer time so far in this run    95.66 minutes        maximum number ever in bank        2
computer time in mcrun              95.62 minutes        bank overflows to backup file      0
source particles per minute          5.4349E+03          field length                       0
random numbers generated             480822729           most random numbers used was    12386 in history   367999

range of sampled source weights = 9.0744E-01 to 1.0579E+00
1neutron  activity in each cell                                                                  print table 126

        cell     tracks      population   collisions   collisions     number       flux       average     average
        cell     entering                              * weight     weighted     weighted   track weight  track mfp
                                                      (per history) energy      energy     (relative)    (cm)

    1     1      599158      519957      34357801     4.8313E+01  3.0916E-04  5.0477E-01  8.0256E-01  2.5043E+00
    2     2      102454       48279       7066844     7.2108E+00  4.6390E-05  1.9975E-01  5.7956E-01  1.3152E+00

   total         701612      568236      41424645     5.5524E+01
1keff results for: Far-Field Consequence Study - 32% N2O/ 8% UO2 (sp40a1) 0 Years  600K                probid =   07/26/96 12:01:33

the initial fission neutron source distribution was read from the srctp file named srctp .
the criticality problem was scheduled to skip  30 cycles and run a total of  130 cycles with nominally     4000 neutrons per cycle.
this problem has run  30 inactive cycles with   119927 neutron histories and  100 active cycles with      399761 neutron histories.

this calculation has completed the requested number of keff cycles using a total of      519688 fission neutron source histories.
all cells with fissionable material were sampled and had fission neutron source points.

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

        the k( collision) cycle values appear normally distributed at the 95 percent confidence level
        the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
        the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff =  .94240 with an estimated standard deviation of  .00099

the estimated 68, 95, & 99 percent keff confidence intervals are  .94141 to  .94339,  .94042 to  .94437, and  .93978 to  .94502

the estimated collision/absorption neutron removal lifetime = 9.56E-05 seconds with an estimated standard deviation of 2.03E-07

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

      keff estimator      keff      standard deviation      68% confidence        95% confidence        99% confidence        corr

          collision      .94224          .00151          .94073 to  .94375     .93924 to  .94524     .93826 to  .94622
         absorption      .94255          .00119          .94136 to  .94375     .94017 to  .94493     .93940 to  .94571
       track length      .94207          .00153          .94054 to  .94361     .93902 to  .94513     .93802 to  .94613
          col/absorp     .94244          .00099          .94145 to  .94342     .94047 to  .94440     .93983 to  .94504      .1015
```

abs/trk len	.94238	.00099	.94139 to .94336	.94042 to .94434	.93978 to .94498	.0842
col/trk len	.94227	.00152	.94075 to .94379	.93924 to .94529	.93826 to .94628	.9876
col/abs/trk len	.94240	.00099	.94141 to .94339	.94042 to .94437	.93978 to .94502	

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h    will be called
      SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group    latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ftuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
                                13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                92238 28.593 93237 0.033 1 1.0 538   end
      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-135     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                26000 0.683 2 1.0 323.   end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                26000 0.683 3 1.0 323.   end
```

```
'
' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
end comp
'
' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
'
'  fuel-pin-cell geometry:
'
symmslabcell  340.  280. 1 3 281. 2 end
'
' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
'
'
'  assembly and cycle parameters:
'
npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e2 down=1.82625e3
   end
0 * normal termination *
1   oooooooooo    rrrrrrrrrrr    !!!!!!!!!!!     gggggggggg    eeeeeeeeeeee   nn          nn   ssssssssss
   oooooooooooo   rrrrrrrrrrrr   !!!!!!!!!!!    gggggggggggg   eeeeeeeeeeee   nnn         nn  ssssssssssss
   oo          oo  rr         rr        !!      gg         gg  ee             nnnn        nn  ss         ss
   oo          oo  rr         rr        !!      gg             ee             nn nn       nn  ss
   oo          oo  rr         rr        !!      gg             ee             nn   nn     nn  ss
   oo          oo  rrrrrrrrrrrr         !!      gg    gggggg   eeeeeeeee      nn    nn    nn  ssssssssssss
   oo          oo  rrrrrrrrrrrr         !!      gg    gggggg   eeeeeeeee      nn     nn   nn   ssssssssssss
   oo          oo  rr        rr         !!      gg         gg  ee             nn      nn  nn              ss
   oo          oo  rr         rr        !!      gg         gg  ee             nn       nn nn              ss
   oo          oo  rr         rr        !!      gg         gg  ee             nn        nnnn  ss          ss
   oooooooooooo   rr          rr  !!!!!!!!!!!    gggggggggggg   eeeeeeeeeeee   nn         nnn  ssssssssssss
    oooooooooo    rr          rr  !!!!!!!!!!!     gggggggggg    eeeeeeeeeeee   nn          nn   ssssssssss
0

   dddddddddddd      ssssssssss    vv          vv  !!!!!!!!!!!!     ssssssssss
   dddddddddddddd   ssssssssssss   vv          vv  !!!!!!!!!!!!   ssssssssssss
   dd          dd  aa          aa  vv          vv        !!       ss          ss
   dd          dd  aa          aa  vv          vv        !!       ss
   dd          dd  aa          aa  vv          vv        !!       ss
   dd          dd  aaaaaaaaaaaaaa  vv          vv        !!       ssssssssssss
   dd          dd  aaaaaaaaaaaaaa   vv        vv         !!        ssssssssssss
   dd          dd  aa          aa     vv    vv            !!                  ss
   dd          dd  aa          aa      vv  vv             !!                  ss
   dd          dd  aa          aa       vv vv             !!       ss         ss
   dddddddddddddd  aa          aa        vvv      !!!!!!!!!!!!   ssssssssssss
   dddddddddddd    aa          aa         v       !!!!!!!!!!!!     ssssssssss
0

     0000000      88888888888              //   22222222222    88888888888              //   99999999999    666666666666
    000000000    8888888888888             //  2222222222222  8888888888888             //  9999999999999  6666666666666
   00       00   88          88            //  22          22 88          88            //  99         99  66
  00         00  88          88           //               22 88          88           //  99         99  66
  00         00  88          88          //                22 88          88          //  99         99  66
  00         00   88888888888            //               22   88888888888            //  9999999999999  666666666666
  00         00   88888888888           //              22    88888888888           //   999999999999  6666666666666
  00         00  88          88        //             22     88          88        //               99  66         66
  00         00  88          88       //            22       88          88       //                99  66         66
   00       00   88          88      //           22         88          88      //                 99  66         66
    000000000    8888888888888     //           2222222222222  8888888888888     //  9999999999999  6666666666666
     0000000      88888888888    //            2222222222222   88888888888    //   999999999999    66666666666
```

```
0
        11        7777777777777                  5555555555555   5555555555555                  5555555555555   88888888888
       111        777777777777                   5555555555555   5555555555555                  5555555555555   8888888888888
      1111        77        77        :::        55              55                  :::       55              88          88
        11              77          :::        55              55                  :::       55              88          88
        11             77           :::        55              55                  :::       55              88          88
        11            77                        555555555555    555555555555                  555555555555     88888888888
        11            77                        5555555555555   5555555555555                  5555555555555   88888888888
        11           77           :::                     55              55      :::                     55   88          88
        11           77           :::                     55              55      :::                     55   88          88
        11          77            :::        55          55  55          55      :::        55          55   88          88
    11111111        77                        5555555555555   5555555555555                  5555555555555   8888888888888
    11111111        77                         555555555555    555555555555                   555555555555    88888888888
1
0                                  888888888888    cccccccccccc      888888888    ll            eeeeeeeeeeeeee
                                  88888888888888  cccccccccccccc    888888888888  ll            eeeeeeeeeeeeee
                                  88          88  cc          cc    88          88  ll            ee
                                  88              cc              88          88  ll            ee
                                  88              cc              88          88  ll            ee
                                  888888888888    cc              888888888888    ll            eeeeeeeeee
                                   88888888888888 cc              888888888888    ll            eeeeeeeeee
                                             88   cc              88          88  ll            ee
                                             88   cc              88          88  ll            ee
                                  88          88  cc          cc  88          88  ll            ee
                                  88888888888888  cccccccccccccc  88          88  llllllllllll    eeeeeeeeeeeeee
                                   888888888888    cccccccccccc   88          88  llllllllllll    eeeeeeeeeeeeee
```

program verification information

code system: scale version: 4.3

program: o0o004

creation date: 03/13/96

library: /usr1/ornl/Scale/bin

test code: origens

version: 3.0

jobname: davis

date of execution: 08/28/96

time of execution: 17:55:58

```
                        *****                                                    *****
                        *****                                                    *****
                        ************************************************************
                        ************************************************************
                        ************************************************************
1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       54q array has     12 entries.
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***************************************************************************
          *                                                                         *
          *            prelim lwr origen-s binary working library--id = 1143        *
          *          made from modified card-image origen-s libraries of scale 4.2  *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                         *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                         *
          *                  fission product yields are from endf/b-v               *
          *                                                                         *
          *              photon libraries use an 18-energy-group structure          *
          *             the photon data are from the master photon data base,       *
          *              produced to include bremsstrahlung from uo2 matrix         *
          *                                                                         *
          *        see information above this box (if present) for later updates    *
          *                                                                         *
          ***************************************************************************
          *                                                                         *
```

```
0        ****************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ****************************************************************************
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page    1
0                                        nuclide concentrations, grams
                                         basis =single reactor assembly
             initial  1E-18 d
   na 23   1.73E+05  1.73E+05
   al 27   1.35E+06  1.35E+06
 total     1.52E+06  1.52E+06
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides         page    2
0                                        nuclide concentrations, grams
                                         basis =single reactor assembly
             initial  1E-18 d
    u234   2.12E+03  2.12E+03
    u235   1.72E+05  1.72E+05
    u236   4.12E+04  4.12E+04
    u238   8.66E+06  8.66E+06
   np237   9.99E+03  9.99E+03
 total     8.88E+06  8.88E+06
1  sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                 page    3
      power=    .00mw, burnup=      0.mwd, flux= 3.00E+08n/cm**2-sec
0                                        basis =
0  (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        18.3 d        36.5 d        54.8 d        73.1 d        73.1 d
   productions  1.023182E+06  1.023182E+06  1.023183E+06  1.023183E+06  1.023183E+06  1.023183E+06
   absorptions  8.460824E+05  8.460847E+05  8.460852E+05  8.460858E+05  8.460863E+05  8.460863E+05
   k infinity   1.209317E+00  1.209314E+00  1.209314E+00  1.209314E+00  1.209313E+00  1.209313E+00
0                 initial        18.3 d        36.5 d        54.8 d        73.1 d        73.1 d
   actinide
   absorptions  8.423173E+05  8.423174E+05  8.423176E+05  8.423178E+05  8.423180E+05  8.423180E+05
   non-actinide
   abs. fracs.  4.450083E-03  4.452646E-03  4.453003E-03  4.453421E-03  4.453838E-03  4.453838E-03
1  sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products      page    4
0                                        fraction of total absorption rate
      power=    .00mw, burnup=      0.mwd, flux= 3.00E+08n/cm**2-sec
0            initial   18.3 d    36.5 d    54.8 d    73.1 d    73.1 d

   xe135      .00E+00  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06
   sm149      .00E+00  3.01E-07  6.68E-07  1.04E-06  1.40E-06  1.40E-06
   sm151      .00E+00  1.54E-08  3.22E-08  4.91E-08  6.59E-08  6.59E-08
   nd143      .00E+00  2.56E-09  8.54E-09  1.59E-08  2.37E-08  2.37E-08
   gd157      .00E+00  3.74E-09  7.67E-09  1.16E-08  1.55E-08  1.55E-08
   cd113      .00E+00  3.18E-09  6.42E-09  9.65E-09  1.29E-08  1.29E-08
   pm147      .00E+00  1.47E-09  4.39E-09  7.73E-09  1.12E-08  1.12E-08
   rh105      .00E+00  8.28E-09  8.28E-09  8.28E-09  8.28E-09  8.28E-09
   xe131      .00E+00  1.16E-09  3.30E-09  5.64E-09  8.03E-09  8.03E-09
   cs133      .00E+00  1.14E-09  3.05E-09  5.04E-09  7.03E-09  7.03E-09
   rh103      .00E+00  5.01E-10  1.82E-09  3.73E-09  6.06E-09  6.07E-09
   tc 99      .00E+00  1.07E-09  2.44E-09  3.82E-09  5.21E-09  5.21E-09
   eu155      .00E+00  1.18E-09  2.34E-09  3.50E-09  4.65E-09  4.65E-09
```

```
     nd145      .00E+00  1.04E-09  2.10E-09  3.17E-09  4.23E-09  4.23E-09
     pr143      .00E+00  1.61E-09  2.36E-09  2.66E-09  2.78E-09  2.78E-09
     sm152      .00E+00  5.54E-10  1.11E-09  1.66E-09  2.22E-09  2.22E-09
     xe133      .00E+00  1.81E-09  2.01E-09  2.03E-09  2.03E-09  2.03E-09
     kr 83      .00E+00  4.42E-10  8.90E-10  1.34E-09  1.79E-09  1.79E-09
     cs135      .00E+00  4.04E-10  8.29E-10  1.25E-09  1.68E-09  1.68E-09
     ru101      .00E+00  3.25E-10  6.50E-10  9.75E-10  1.30E-09  1.30E-09
     ce141      .00E+00  5.08E-10  8.58E-10  1.10E-09  1.26E-09  1.26E-09
     eu153      .00E+00  2.36E-10  5.15E-10  7.93E-10  1.07E-09  1.07E-09
     la139      .00E+00  2.48E-10  4.98E-10  7.47E-10  9.96E-10  9.96E-10
     pm149      .00E+00  9.59E-10  9.62E-10  9.62E-10  9.62E-10  9.62E-10
     nd147      .00E+00  6.46E-10  8.50E-10  9.15E-10  9.35E-10  9.35E-10
     pr141      .00E+00  5.22E-11  1.87E-10  3.78E-10  6.06E-10  6.06E-10
     pd105      .00E+00  1.05E-10  2.24E-10  3.43E-10  4.62E-10  4.62E-10
     zr 93      .00E+00  1.03E-10  2.09E-10  3.15E-10  4.22E-10  4.22E-10
     mo 95      .00E+00  7.52E-12  5.27E-11  1.57E-10  3.28E-10  3.28E-10
     gd155      .00E+00  1.81E-11  7.23E-11  1.62E-10  2.88E-10  2.88E-10
      i129      .00E+00  6.40E-11  1.33E-10  2.04E-10  2.78E-10  2.78E-10
     ru103      .00E+00  9.82E-11  1.69E-10  2.21E-10  2.58E-10  2.58E-10
     mo 97      .00E+00  5.33E-11  1.10E-10  1.67E-10  2.23E-10  2.23E-10
     ag109      .00E+00  3.84E-11  7.86E-11  1.19E-10  1.59E-10  1.59E-10
     pm151      .00E+00  1.09E-10  1.09E-10  1.09E-10  1.09E-10  1.09E-10
     ce144      .00E+00  2.61E-11  5.10E-11  7.48E-11  9.77E-11  9.77E-11
     sm147      .00E+00  2.65E-12  1.69E-11  4.69E-11  9.39E-11  9.39E-11
     zr 95      .00E+00  3.01E-11  5.48E-11  7.51E-11  9.18E-11  9.18E-11
     ru102      .00E+00  2.29E-11  4.58E-11  6.87E-11  9.16E-11  9.16E-11
     sr 90      .00E+00  2.09E-11  4.18E-11  6.26E-11  8.34E-11  8.34E-11
      y 91      .00E+00  2.71E-11  4.97E-11  6.80E-11  8.27E-11  8.27E-11
     ce142      .00E+00  2.05E-11  4.12E-11  6.18E-11  8.25E-11  8.25E-11
     nd148      .00E+00  1.99E-11  3.99E-11  5.98E-11  7.98E-11  7.98E-11
     nd146      .00E+00  1.66E-11  3.32E-11  4.99E-11  6.65E-11  6.65E-11
     ba138      .00E+00  1.41E-11  2.83E-11  4.25E-11  5.67E-11  5.67E-11
     pd108      .00E+00  1.37E-11  2.75E-11  4.12E-11  5.50E-11  5.50E-11
     in115      .00E+00  1.10E-11  2.46E-11  3.84E-11  5.22E-11  5.22E-11
     ba140      .00E+00  2.97E-11  4.07E-11  4.48E-11  4.63E-11  4.63E-11
     xe132      .00E+00  9.05E-12  2.12E-11  3.33E-11  4.55E-11  4.55E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page    5
0                                   fraction of total absorption rate
          power=     .00mw, burnup=      0.mwd, flux= 3.00E+08n/cm**2-sec
0                 initial    18.3 d    36.5 d    54.8 d    73.1 d    73.1.d

     nb 95      .00E+00  4.55E-12  1.53E-11  2.89E-11  4.35E-11  4.35E-11
     ce140      .00E+00  4.43E-12  1.48E-11  2.74E-11  4.08E-11  4.08E-11
     sm153      .00E+00  3.79E-11  3.79E-11  3.79E-11  3.79E-11  3.79E-11
     eu151      .00E+00  2.20E-12  9.19E-12  2.10E-11  3.76E-11  3.76E-11
      y 89      .00E+00  2.93E-12  1.08E-11  2.26E-11  3.75E-11  3.75E-11
     zr 91      .00E+00  2.63E-12  1.00E-11  2.12E-11  3.54E-11  3.54E-11
     mo 98      .00E+00  8.46E-12  1.69E-11  2.54E-11  3.38E-11  3.38E-11
     eu156      .00E+00  1.91E-11  2.78E-11  3.16E-11  3.32E-11  3.32E-11
     mo100      .00E+00  8.09E-12  1.62E-11  2.43E-11  3.24E-11  3.24E-11
     pd107      .00E+00  7.96E-12  1.59E-11  2.39E-11  3.19E-11  3.19E-11
     xe134      .00E+00  7.83E-12  1.57E-11  2.36E-11  3.14E-11  3.14E-11
     zr 92      .00E+00  6.33E-12  1.28E-11  1.92E-11  2.57E-11  2.57E-11
     nd144      .00E+00  1.62E-12  6.40E-12  1.42E-11  2.49E-11  2.49E-11
     kr 87      .00E+00  2.26E-11  2.26E-11  2.26E-11  2.26E-11  2.20E-11
     zr 96      .00E+00  5.21E-12  1.04E-11  1.56E-11  2.08E-11  2.08E-11
     ru104      .00E+00  4.96E-12  9.93E-12  1.49E-11  1.99E-11  1.99E-11
     sr 89      .00E+00  6.73E-12  1.20E-11  1.61E-11  1.92E-11  1.92E-11
     nd150      .00E+00  4.44E-12  8.88E-12  1.33E-11  1.78E-11  1.78E-11
     cs137      .00E+00  4.37E-12  8.74E-12  1.31E-11  1.75E-11  1.75E-11
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ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.74E-11
xe136	.00E+00	4.25E-12	8.49E-12	1.27E-11	1.70E-11	1.70E-11
i127	.00E+00	3.07E-12	7.59E-12	1.22E-11	1.70E-11	1.70E-11
la140	.00E+00	9.71E-12	1.39E-11	1.54E-11	1.60E-11	1.60E-11
mo 99	.00E+00	1.30E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
br 81	.00E+00	3.23E-12	6.46E-12	9.69E-12	1.29E-11	1.29E-11
zr 94	.00E+00	2.76E-12	5.51E-12	8.27E-12	1.10E-11	1.10E-11
rb 85	.00E+00	2.47E-12	4.98E-12	7.50E-12	1.00E-11	1.00E-11
te130	.00E+00	1.92E-12	3.85E-12	5.77E-12	7.69E-12	7.69E-12
sm154	.00E+00	1.88E-12	3.75E-12	5.63E-12	7.50E-12	7.50E-12
kr 85	.00E+00	1.84E-12	3.69E-12	5.55E-12	7.39E-12	7.39E-12
rb 87	.00E+00	1.82E-12	3.66E-12	5.49E-12	7.32E-12	7.32E-12
cd111	.00E+00	1.07E-12	2.95E-12	4.97E-12	7.02E-12	7.02E-12
i131	.00E+00	5.34E-12	6.49E-12	6.73E-12	6.78E-12	6.78E-12
se 77	.00E+00	1.26E-12	2.69E-12	4.13E-12	5.56E-12	5.56E-12
kr 84	.00E+00	8.70E-13	1.74E-12	2.61E-12	3.48E-12	3.48E-12
ru106	.00E+00	8.64E-13	1.70E-12	2.51E-12	3.29E-12	3.29E-12
sb121	.00E+00	6.31E-13	1.32E-12	2.01E-12	2.69E-12	2.69E-12
se 79	.00E+00	6.52E-13	1.30E-12	1.96E-12	2.61E-12	2.61E-12
te127m	.00E+00	5.77E-13	1.31E-12	1.98E-12	2.57E-12	2.57E-12
kr 86	.00E+00	4.73E-13	9.47E-13	1.42E-12	1.89E-12	1.89E-12
sb123	.00E+00	4.65E-13	9.36E-13	1.41E-12	1.89E-12	1.89E-12
te128	.00E+00	4.25E-13	8.53E-13	1.28E-12	1.71E-12	1.71E-12
te129m	.00E+00	5.59E-13	9.49E-13	1.22E-12	1.40E-12	1.40E-12
se 80	.00E+00	3.05E-13	6.10E-13	9.15E-13	1.22E-12	1.22E-12
ba137	.00E+00	8.52E-14	3.07E-13	6.64E-13	1.16E-12	1.16E-12
gd156	.00E+00	1.07E-13	3.46E-13	6.43E-13	9.66E-13	9.66E-13
dy161	.00E+00	1.44E-13	3.89E-13	6.51E-13	9.15E-13	9.15E-13
tb159	.00E+00	1.82E-13	3.76E-13	5.69E-13	7.63E-13	7.63E-13
sb125	.00E+00	1.57E-13	3.36E-13	5.19E-13	7.01E-13	7.01E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 6
0 fraction of total absorption rate
power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec
0

	initial	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
li 6	.00E+00	1.73E-13	3.46E-13	5.19E-13	6.92E-13	6.92E-13
cd112	.00E+00	1.62E-13	3.37E-13	5.13E-13	6.89E-13	6.89E-13
sn117	.00E+00	1.36E-13	2.75E-13	4.13E-13	5.51E-13	5.51E-13
sn119	.00E+00	1.12E-13	2.25E-13	3.37E-13	4.50E-13	4.50E-13
sn115	.00E+00	8.49E-14	1.89E-13	2.94E-13	3.99E-13	3.99E-13
sr 88	.00E+00	8.64E-14	1.74E-13	2.61E-13	3.48E-13	3.48E-13
sm150	.00E+00	2.92E-14	9.62E-14	2.02E-13	3.46E-13	3.46E-13
sg111	.00E+00	2.61E-13	3.09E-13	3.18E-13	3.19E-13	3.19E-13
eu157	.00E+00	2.95E-13	2.95E-13	2.95E-13	2.95E-13	2.95E-13
pd110	.00E+00	6.31E-14	1.26E-13	1.89E-13	2.53E-13	2.53E-13
cd114	.00E+00	6.16E-14	1.23E-13	1.85E-13	2.46E-13	2.46E-13
pd106	.00E+00	1.57E-14	6.19E-14	1.38E-13	2.42E-13	2.42E-13
se 82	.00E+00	5.91E-14	1.18E-13	1.77E-13	2.36E-13	2.36E-13
gd158	.00E+00	5.69E-14	1.14E-13	1.71E-13	2.28E-13	2.28E-13
sn126	.00E+00	4.71E-14	9.42E-14	1.41E-13	1.88E-13	1.88E-13
se 78	.00E+00	4.50E-14	9.03E-14	1.36E-13	1.81E-13	1.81E-13
cd115m	.00E+00	5.82E-14	1.02E-13	1.35E-13	1.60E-13	1.60E-13
pm148m	.00E+00	6.01E-15	3.23E-14	8.12E-14	1.49E-13	1.49E-13
sn124	.00E+00	3.68E-14	7.37E-14	1.11E-13	1.47E-13	1.47E-13
dy162	.00E+00	3.48E-14	6.97E-14	1.05E-13	1.39E-13	1.39E-13
dy164	.00E+00	3.11E-14	6.23E-14	9.34E-14	1.25E-13	1.25E-13
eu154	.00E+00	2.67E-14	5.38E-14	8.14E-14	1.09E-13	1.09E-13
as 75	.00E+00	2.69E-14	5.40E-14	8.11E-14	1.08E-13	1.08E-13
y 90	.00E+00	1.58E-14	3.56E-14	5.54E-14	7.51E-14	7.51E-14
sn118	.00E+00	1.51E-14	3.02E-14	4.54E-14	6.05E-14	6.05E-14

cs136	.00E+00	3.45E-14	4.77E-14	5.27E-14	5.47E-14	5.47E-14
cd116	.00E+00	1.28E-14	2.55E-14	3.83E-14	5.10E-14	5.10E-14
sn122	.00E+00	1.25E-14	2.49E-14	3.74E-14	4.98E-14	4.98E-14
ba136	.00E+00	5.16E-15	1.60E-14	2.91E-14	4.29E-14	4.29E-14
sn120	.00E+00	9.38E-15	1.88E-14	2.81E-14	3.75E-14	3.75E-14
kr 82	.00E+00	7.80E-15	1.65E-14	2.52E-14	3.39E-14	3.39E-14
cs134	.00E+00	7.60E-15	1.53E-14	2.31E-14	3.10E-14	3.10E-14
dy163	.00E+00	7.67E-15	1.53E-14	2.30E-14	3.07E-14	3.07E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	3.00E-14
sn125	.00E+00	2.15E-14	2.73E-14	2.88E-14	2.93E-14	2.92E-14
ge 73	.00E+00	7.17E-15	1.45E-14	2.17E-14	2.90E-14	2.90E-14
ru 99	.00E+00	5.42E-15	1.25E-14	1.96E-14	2.67E-14	2.67E-14
zr 90	.00E+00	1.04E-15	5.05E-15	1.21E-14	2.23E-14	2.23E-14
te125	.00E+00	1.06E-15	4.62E-15	1.09E-14	2.01E-14	2.01E-14
xe130	.00E+00	4.76E-15	9.70E-15	1.46E-14	1.96E-14	1.96E-14
mo 96	.00E+00	3.41E-15	7.09E-15	1.08E-14	1.44E-14	1.44E-14
pm148	.00E+00	1.05E-15	4.31E-15	8.63E-15	1.33E-14	1.33E-14
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	1.27E-14
ge 76	.00E+00	2.66E-15	5.33E-15	7.99E-15	1.07E-14	1.07E-14
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	9.95E-15
te132	.00E+00	9.30E-15	9.49E-15	9.49E-15	9.49E-15	9.49E-15
gd160	.00E+00	1.69E-15	3.37E-15	5.06E-15	6.75E-15	6.75E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	5.39E-15
te126	.00E+00	9.22E-16	2.08E-15	3.33E-15	4.60E-15	4.60E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7
0 fraction of total absorption rate
power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec
0

	initial	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
sn123	.00E+00	9.65E-16	1.84E-15	2.63E-15	3.35E-15	3.35E-15
sb126	.00E+00	1.91E-15	2.60E-15	2.85E-15	2.94E-15	2.94E-15
ru100	.00E+00	6.49E-16	1.30E-15	1.96E-15	2.63E-15	2.63E-15
ho165	.00E+00	5.26E-16	1.06E-15	1.59E-15	2.12E-15	2.12E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	2.07E-15
sr 87	.00E+00	3.04E-16	6.09E-16	9.13E-16	1.22E-15	1.22E-15
sb124	.00E+00	3.98E-16	7.21E-16	9.83E-16	1.20E-15	1.20E-15
i130	.00E+00	7.10E-16	7.11E-16	7.11E-16	7.11E-16	7.08E-16
nb 94	.00E+00	1.75E-16	3.51E-16	5.26E-16	7.01E-16	7.01E-16
in117	.00E+00	6.07E-16	6.07E-16	6.07E-16	6.07E-16	6.07E-16
ge 74	.00E+00	1.47E-16	2.93E-16	4.40E-16	5.86E-16	5.86E-16
te124	.00E+00	4.65E-17	1.42E-16	2.78E-16	4.47E-16	4.47E-16
in113	.00E+00	2.49E-17	1.00E-16	2.26E-16	4.02E-16	4.02E-16
ge 72	.00E+00	8.33E-17	1.86E-16	2.89E-16	3.92E-16	3.92E-16
eu152	.00E+00	8.17E-17	1.66E-16	2.57E-16	3.57E-16	3.57E-16
se 76	.00E+00	5.68E-17	1.19E-16	1.80E-16	2.42E-16	2.42E-16
sr 86	.00E+00	2.60E-17	7.85E-17	1.68E-16	2.26E-16	2.26E-16
rb 86	.00E+00	1.18E-16	1.78E-16	2.08E-16	2.23E-16	2.23E-16
dy165	.00E+00	2.08E-16	2.08E-16	2.08E-16	2.08E-16	2.07E-16
ba135	.00E+00	3.50E-17	7.35E-17	1.15E-16	1.61E-16	1.61E-16
tb160	.00E+00	4.73E-17	8.72E-17	1.21E-16	1.49E-16	1.49E-16
cd118	.00E+00	1.19E-16	1.19E-16	1.19E-16	1.19E-16	1.12E-16
ge 75	.00E+00	8.51E-17	8.51E-17	8.51E-17	8.51E-17	8.39E-17
xe128	.00E+00	1.36E-17	2.73E-17	4.09E-17	5.46E-17	5.46E-17
er166	.00E+00	9.94E-18	2.45E-17	3.92E-17	5.39E-17	5.39E-17
nd142	.00E+00	7.24E-18	1.63E-17	2.77E-17	4.22E-17	4.22E-17
gd152	.00E+00	7.41E-18	1.52E-17	2.33E-17	3.20E-17	3.20E-17
gd154	.00E+00	1.97E-18	7.50E-18	1.66E-17	2.95E-17	2.95E-17
sm148	.00E+00	4.19E-19	3.84E-18	1.29E-17	2.91E-17	2.91E-17
in119m	.00E+00	2.97E-17	2.97E-17	2.97E-17	2.97E-17	2.80E-17
cd110	.00E+00	3.68E-18	8.09E-18	1.32E-17	1.90E-17	1.90E-17

ba134	.00E+00	1.22E-18	4.73E-18	1.06E-17	1.88E-17	1.88E-17
kr 80	.00E+00	4.07E-18	8.19E-18	1.23E-17	1.64E-17	1.64E-17
dy160	.00E+00	9.41E-19	3.55E-18	7.55E-18	1.27E-17	1.27E-17
pd104	.00E+00	4.32E-19	1.64E-18	4.18E-18	8.50E-18	8.50E-18
br 79	.00E+00	3.76E-19	1.02E-18	1.94E-18	3.13E-18	3.13E-18
te122	.00E+00	4.26E-19	9.68E-19	1.52E-18	2.07E-18	2.07E-18
in119	.00E+00	2.32E-18	2.32E-18	2.32E-18	2.32E-18	1.54E-18
be 9	.00E+00	3.43E-19	6.85E-19	1.02E-18	1.37E-18	1.37E-18
pr142	.00E+00	6.42E-19	7.95E-19	1.01E-18	1.27E-18	1.27E-18
xe129	.00E+00	1.03E-19	3.39E-19	7.15E-19	1.24E-18	1.24E-18
ag107	.00E+00	6.99E-20	2.83E-19	6.39E-19	1.13E-18	1.13E-18
nb 93	.00E+00	1.76E-19	3.56E-19	5.36E-19	7.22E-19	7.22E-19
sn116	.00E+00	1.53E-19	3.16E-19	4.82E-19	6.55E-19	6.55E-19
li 7	.00E+00	1.33E-19	2.66E-19	3.99E-19	5.32E-19	5.32E-19
te123	.00E+00	7.98E-20	1.80E-19	3.03E-19	4.42E-19	4.42E-19
er167	.00E+00	5.32E-20	1.06E-19	1.60E-19	2.13E-19	2.13E-19
cd109	.00E+00	3.33E-21	9.98E-21	1.33E-20	2.00E-20	2.00E-20
cs134m	.00E+00	.00E+00	3.33E-21	6.65E-21	9.98E-21	9.98E-21

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 8
0 fraction of total absorption rate
power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec

0	initial	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
cd108	.00E+00	3.33E-21	6.65E-21	6.65E-21	9.98E-21	9.98E-21

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 9
power= 4.000E-03mw, burnup=2.9220E-01mwd, flux= 3.00E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
h 1	.00E+00	4.40E-09	8.81E-09	1.32E-08	1.76E-08	1.76E-08
h 2	.00E+00	1.31E-11	2.61E-11	3.92E-11	5.22E-11	5.22E-11
h 3	.00E+00	9.56E-14	1.91E-13	2.86E-13	3.81E-13	3.81E-13
h 4	.00E+00	3.87E-37	7.72E-37	1.16E-36	1.54E-36	.00E+00
he 3	.00E+00	1.34E-16	5.37E-16	1.21E-15	2.15E-15	2.15E-15
he 4	.00E+00	7.28E-10	1.46E-09	2.18E-09	2.91E-09	2.91E-09
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
na 22	.00E+00	5.68E-13	1.13E-12	1.68E-12	2.23E-12	2.23E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	.00E+00	3.64E-08	3.64E-08	3.64E-08	3.64E-08	3.63E-08
na 24m	.00E+00	5.99E-15	5.99E-15	5.99E-15	5.99E-15	5.99E-30
na 25	.00E+00	2.88E-30	5.76E-30	8.64E-30	1.15E-29	6.08E-31
mg 24	.00E+00	7.55E-07	1.55E-06	2.34E-06	3.13E-06	3.13E-06
mg 25	.00E+00	9.58E-14	1.92E-13	2.87E-13	3.83E-13	3.83E-13
mg 26	.00E+00	1.31E-11	2.61E-11	3.92E-11	5.22E-11	5.22E-11
mg 27	.00E+00	2.18E-12	2.18E-12	2.18E-12	2.18E-12	1.60E-12
mg 28	.00E+00	4.41E-24	4.41E-24	4.41E-24	4.41E-24	4.40E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	.00E+00	2.70E-10	2.70E-10	2.70E-10	2.70E-10	7.33E-11
al 29	.00E+00	3.80E-32	1.52E-31	3.42E-31	6.08E-31	3.89E-31
al 30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 28	.00E+00	2.20E-06	4.40E-06	6.60E-06	8.79E-06	8.79E-06
si 29	.00E+00	1.41E-16	5.64E-16	1.27E-15	2.26E-15	2.26E-15
si 30	.00E+00	9.70E-27	7.76E-26	2.62E-25	6.21E-25	6.21E-25
si 31	.00E+00	6.95E-39	5.56E-38	1.88E-37	4.45E-37	4.37E-37
si 32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10

```
      power= 4.000E-03mw, burnup=2.9220E-01mwd, flux= 3.00E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
```

	charge	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
he 4	.00E+00	2.54E-06	5.08E-06	7.63E-06	1.02E-05	1.02E-05
th226	.00E+00	5.65E-31	2.72E-30	6.90E-30	1.34E-29	1.34E-29
th227	.00E+00	8.47E-18	6.06E-17	1.82E-16	3.85E-16	3.85E-16
th228	.00E+00	3.89E-17	2.14E-16	6.13E-16	1.32E-15	1.32E-15
th229	.00E+00	1.04E-14	7.46E-14	2.28E-13	4.93E-13	4.93E-13
th230	.00E+00	1.28E-06	2.55E-06	3.83E-06	5.11E-06	5.11E-06
th231	.00E+00	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	.00E+00	2.58E-07	5.16E-07	7.74E-07	1.03E-06	1.03E-06
th233	.00E+00	2.39E-18	4.78E-18	7.17E-18	9.57E-18	8.39E-18
th234	.00E+00	2.19E-07	3.49E-07	4.26E-07	4.71E-07	4.71E-07
pa231	.00E+00	3.60E-08	7.50E-08	1.14E-07	1.53E-07	1.53E-07
pa232	.00E+00	6.18E-16	1.29E-15	1.96E-15	2.63E-15	2.63E-15
pa233	.00E+00	5.45E-07	8.86E-07	1.10E-06	1.23E-06	1.23E-06
pa234m	.00E+00	7.40E-12	1.18E-11	1.44E-11	1.59E-11	1.59E-11
pa234	.00E+00	3.31E-12	5.26E-12	6.42E-12	7.10E-12	7.10E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	5.48E-28	2.63E-27	6.69E-27	1.29E-26	1.29E-26
u231	.00E+00	6.12E-23	2.84E-22	6.26E-22	1.04E-21	1.04E-21
u232	.00E+00	1.86E-13	5.56E-13	1.11E-12	1.84E-12	1.84E-12
u233	.00E+00	1.38E-07	4.79E-07	9.49E-07	1.50E-06	1.50E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	.00E+00	2.74E-06	3.16E-06	3.22E-06	3.23E-06	3.23E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.29E-07	2.90E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	2.85E-13	5.62E-13	8.30E-13	1.09E-12	1.09E-12
np236m	.00E+00	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.15E-12
np236	.00E+00	1.02E-11	2.05E-11	3.07E-11	4.10E-11	4.10E-11
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	.00E+00	1.57E-06	1.58E-06	1.58E-06	1.58E-06	1.58E-06
np239	.00E+00	4.73E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.69E-15	9.74E-15	9.74E-15	9.74E-15	9.29E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.39E-11	2.87E-11	4.33E-11	5.77E-11	5.77E-11
pu237	.00E+00	9.13E-18	3.94E-17	8.62E-17	1.46E-16	1.46E-16
pu238	.00E+00	7.86E-06	1.73E-05	2.67E-05	3.62E-05	3.62E-05
pu239	.00E+00	2.08E-04	4.63E-04	7.19E-04	9.74E-04	9.74E-04
pu240	.00E+00	4.61E-11	2.14E-10	5.08E-10	9.28E-10	9.28E-10
pu241	.00E+00	1.42E-17	1.37E-16	4.97E-16	1.22E-15	1.22E-15
pu242	.00E+00	1.26E-24	2.52E-23	1.39E-22	4.61E-22	4.61E-22
pu243	.00E+00	2.77E-33	5.52E-32	3.05E-31	1.01E-30	1.00E-30
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
0 flux		3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E-07

```
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
```

```
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *         made from modified card-image origen-s libraries of scale 4.2 *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                   .other identification and sizes of library.
0                    data set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   11
        power=    .00mw, burnup=       1.mwd, flux= 2.82E+08n/cm**2-sec
0                                        basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        91.3 d       109.6 d       127.8 d       146.1 d       146.1 d
     productions  1.090702E+06  1.090702E+06  1.090703E+06  1.090703E+06  1.090703E+06  1.090703E+06
     absorptions  8.934394E+05  8.934399E+05  8.934406E+05  8.934413E+05  8.934419E+05  8.934419E+05
     k infinity   1.220790E+00  1.220790E+00  1.220789E+00  1.220789E+00  1.220788E+00  1.220788E+00
0                 initial        91.3 d       109.6 d       127.8 d       146.1 d       146.1 d
     actinide
     absorptions  8.900519E+05  8.900521E+05  8.900524E+05  8.900527E+05  8.900529E+05  8.900529E+05
     non-actinide
```

abs. fracs. 3.791451E-03 3.791869E-03 3.792226E-03 3.792703E-03 3.793120E-03 3.793120E-03

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 12

0 fraction of total absorption rate

power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec

0

	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
sm149	1.42E-06	1.79E-06	2.17E-06	2.54E-06	2.91E-06	2.91E-06
xe135	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06
sm151	6.68E-08	8.38E-08	1.01E-07	1.18E-07	1.35E-07	1.35E-07
nd143	2.40E-08	3.21E-08	4.04E-08	4.87E-08	5.69E-08	5.69E-08
gd157	1.57E-08	1.97E-08	2.37E-08	2.76E-08	3.16E-08	3.16E-08
cd113	1.31E-08	1.63E-08	1.96E-08	2.29E-08	2.61E-08	2.61E-08
pm147	1.11E-08	1.45E-08	1.79E-08	2.13E-08	2.46E-08	2.46E-08
rh103	6.05E-09	8.69E-09	1.16E-08	1.46E-08	1.77E-08	1.77E-08
xe131	7.97E-09	1.04E-08	1.27E-08	1.51E-08	1.75E-08	1.75E-08
cs133	6.97E-09	8.95E-09	1.09E-08	1.29E-08	1.49E-08	1.49E-08
tc 99	5.15E-09	6.52E-09	7.88E-09	9.25E-09	1.06E-08	1.06E-08
eu155	4.64E-09	5.78E-09	6.91E-09	8.03E-09	9.14E-09	9.14E-09
nd145	4.22E-09	5.28E-09	6.34E-09	7.40E-09	8.46E-09	8.46E-09
rh105	8.35E-09	8.33E-09	8.33E-09	8.33E-09	8.33E-09	8.33E-09
sm152	2.20E-09	2.75E-09	3.30E-09	3.85E-09	4.40E-09	4.40E-09
kr 83	1.80E-09	2.26E-09	2.71E-09	3.16E-09	3.61E-09	3.61E-09
cs135	1.67E-09	2.09E-09	2.52E-09	2.94E-09	3.36E-09	3.36E-09
pr143	2.79E-09	2.84E-09	2.86E-09	2.86E-09	2.87E-09	2.87E-09
ru101	1.28E-09	1.60E-09	1.92E-09	2.24E-09	2.56E-09	2.56E-09
eu153	1.07E-09	1.35E-09	1.63E-09	1.91E-09	2.18E-09	2.18E-09
xe133	2.05E-09	2.05E-09	2.05E-09	2.05E-09	2.05E-09	2.05E-09
la139	1.00E-09	1.26E-09	1.51E-09	1.76E-09	2.01E-09	2.01E-09
pr141	6.10E-10	8.66E-10	1.14E-09	1.42E-09	1.72E-09	1.72E-09
mo 95	3.26E-10	5.65E-10	8.69E-10	1.23E-09	1.65E-09	1.65E-09
ce141	1.27E-09	1.38E-09	1.46E-09	1.51E-09	1.54E-09	1.54E-09
gd155	2.93E-10	4.56E-10	6.55E-10	8.89E-10	1.16E-09	1.16E-09
pm149	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10
nd147	9.27E-10	9.33E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10
pd105	4.60E-10	5.78E-10	6.96E-10	8.15E-10	9.33E-10	9.33E-10
zr 93	4.18E-10	5.23E-10	6.28E-10	7.34E-10	8.39E-10	8.39E-10
i129	2.81E-10	3.56E-10	4.32E-10	5.09E-10	5.86E-10	5.86E-10
mo 97	2.25E-10	2.82E-10	3.39E-10	3.96E-10	4.53E-10	4.53E-10
sm147	9.31E-11	1.57E-10	2.37E-10	3.34E-10	4.48E-10	4.48E-10
ru103	2.59E-10	2.86E-10	3.06E-10	3.20E-10	3.30E-10	3.30E-10
ag109	1.58E-10	1.97E-10	2.37E-10	2.76E-10	3.16E-10	3.16E-10
ru102	9.24E-11	1.15E-10	1.39E-10	1.62E-10	1.85E-10	1.85E-10
ce144	9.81E-11	1.20E-10	1.41E-10	1.61E-10	1.80E-10	1.80E-10
sr 90	8.43E-11	1.05E-10	1.26E-10	1.47E-10	1.68E-10	1.68E-10
ce142	8.34E-11	1.04E-10	1.25E-10	1.46E-10	1.67E-10	1.67E-10
nd148	8.01E-11	1.00E-10	1.20E-10	1.40E-10	1.60E-10	1.60E-10
eu151	3.80E-11	5.97E-11	8.62E-11	1.18E-10	1.54E-10	1.54E-10
nd146	6.72E-11	8.40E-11	1.01E-10	1.18E-10	1.34E-10	1.34E-10
zr 95	9.09E-11	1.04E-10	1.16E-10	1.25E-10	1.32E-10	1.32E-10
y 91	8.36E-11	9.56E-11	1.05E-10	1.13E-10	1.19E-10	1.19E-10
y 89	3.78E-11	5.51E-11	7.43E-11	9.49E-11	1.17E-10	1.17E-10
ba138	5.74E-11	7.17E-11	8.61E-11	1.00E-10	1.15E-10	1.15E-10
zr 91	3.57E-11	5.25E-11	7.14E-11	9.18E-11	1.14E-10	1.14E-10
pm151	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10
pd108	5.43E-11	6.78E-11	8.12E-11	9.47E-11	1.08E-10	1.08E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 13

0 fraction of total absorption rate

power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec

0

	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d

in115	5.22E-11	6.61E-11	8.00E-11	9.39E-11	1.08E-10	1.08E-10
ce140	4.13E-11	5.52E-11	6.93E-11	8.34E-11	9.75E-11	9.75E-11
nd144	2.52E-11	3.88E-11	5.50E-11	7.38E-11	9.51E-11	9.51E-11
xe132	4.54E-11	5.76E-11	6.98E-11	8.19E-11	9.41E-11	9.41E-11
nb 95	4.35E-11	5.78E-11	7.12E-11	8.33E-11	9.41E-11	9.41E-11
mo 98	3.34E-11	4.18E-11	5.02E-11	5.85E-11	6.69E-11	6.69E-11
mo100	3.23E-11	4.03E-11	4.84E-11	5.65E-11	6.45E-11	6.45E-11
pd107	3.21E-11	4.00E-11	4.80E-11	5.60E-11	6.39E-11	6.39E-11
xe134	3.17E-11	3.97E-11	4.76E-11	5.56E-11	6.35E-11	6.35E-11
zr 92	2.59E-11	3.24E-11	3.90E-11	4.55E-11	5.20E-11	5.20E-11
ba140	4.65E-11	4.71E-11	4.73E-11	4.74E-11	4.74E-11	4.74E-11
zr 96	2.04E-11	2.55E-11	3.06E-11	3.57E-11	4.08E-11	4.08E-11
ru104	1.98E-11	2.48E-11	2.98E-11	3.47E-11	3.97E-11	3.97E-11
sm153	3.82E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11
i127	1.69E-11	2.17E-11	2.65E-11	3.14E-11	3.64E-11	3.64E-11
nd150	1.78E-11	2.22E-11	2.66E-11	3.11E-11	3.55E-11	3.55E-11
cs137	1.74E-11	2.18E-11	2.61E-11	3.05E-11	3.48E-11	3.48E-11
eu156	3.35E-11	3.42E-11	3.45E-11	3.46E-11	3.46E-11	3.46E-11
xe136	1.71E-11	2.14E-11	2.57E-11	3.00E-11	3.43E-11	3.43E-11
sr 89	1.95E-11	2.20E-11	2.39E-11	2.54E-11	2.66E-11	2.66E-11
br 81	1.29E-11	1.61E-11	1.94E-11	2.26E-11	2.58E-11	2.58E-11
zr 94	1.09E-11	1.37E-11	1.64E-11	1.92E-11	2.19E-11	2.19E-11
kr 87	2.23E-11	2.30E-11	2.30E-11	2.30E-11	2.30E-11	2.15E-11
rb 85	1.00E-11	1.25E-11	1.51E-11	1.76E-11	2.01E-11	2.01E-11
ce143	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11
la140	1.59E-11	1.61E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
te130	7.78E-12	9.73E-12	1.17E-11	1.36E-11	1.56E-11	1.56E-11
cd111	7.09E-12	9.16E-12	1.12E-11	1.33E-11	1.54E-11	1.54E-11
sm154	7.55E-12	9.44E-12	1.13E-11	1.32E-11	1.51E-11	1.51E-11
kr 85	7.45E-12	9.31E-12	1.12E-11	1.30E-11	1.48E-11	1.48E-11
rb 87	7.31E-12	9.14E-12	1.10E-11	1.28E-11	1.46E-11	1.46E-11
mo 99	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
se 77	5.63E-12	7.08E-12	8.54E-12	9.99E-12	1.14E-11	1.14E-11
kr 84	3.45E-12	4.31E-12	5.17E-12	6.04E-12	6.90E-12	6.90E-12
i131	6.79E-12	6.80E-12	6.80E-12	6.80E-12	6.80E-12	6.80E-12
ru106	3.25E-12	3.99E-12	4.70E-12	5.40E-12	6.07E-12	6.07E-12
sb121	2.68E-12	3.36E-12	4.04E-12	4.73E-12	5.41E-12	5.41E-12
se 79	2.64E-12	3.30E-12	3.96E-12	4.62E-12	5.29E-12	5.29E-12
ba137	1.17E-12	1.81E-12	2.58E-12	3.49E-12	4.54E-12	4.54E-12
te127m	2.59E-12	3.12E-12	3.60E-12	4.02E-12	4.39E-12	4.39E-12
kr 86	1.91E-12	2.39E-12	2.87E-12	3.35E-12	3.83E-12	3.83E-12
sb123	1.88E-12	2.36E-12	2.84E-12	3.33E-12	3.82E-12	3.82E-12
te128	1.71E-12	2.14E-12	2.56E-12	2.99E-12	3.42E-12	3.42E-12
se 80	1.23E-12	1.54E-12	1.85E-12	2.16E-12	2.47E-12	2.47E-12
gd156	9.52E-13	1.28E-12	1.61E-12	1.95E-12	2.28E-12	2.28E-12
dy161	9.25E-13	1.19E-12	1.46E-12	1.72E-12	1.99E-12	1.99E-12
te129m	1.41E-12	1.54E-12	1.62E-12	1.68E-12	1.72E-12	1.72E-12
tb159	7.62E-13	9.55E-13	1.15E-12	1.34E-12	1.53E-12	1.53E-12
sb125	6.99E-13	8.79E-13	1.06E-12	1.23E-12	1.40E-12	1.40E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 14

0 fraction of total absorption rate

power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec

0	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
li 6	7.01E-13	8.76E-13	1.05E-12	1.23E-12	1.40E-12	1.40E-12
cd112	6.93E-13	8.69E-13	1.05E-12	1.22E-12	1.40E-12	1.40E-12
sm150	3.47E-13	5.32E-13	7.55E-13	1.02E-12	1.32E-12	1.32E-12
sn117	5.54E-13	6.93E-13	8.32E-13	9.71E-13	1.11E-12	1.11E-12
pd106	2.40E-13	3.71E-13	5.29E-13	7.11E-13	9.19E-13	9.19E-13
sn119	4.55E-13	5.68E-13	6.82E-13	7.96E-13	9.09E-13	9.09E-13

sn115	4.04E-13	5.10E-13	6.15E-13	7.21E-13	8.27E-13	8.27E-13
sr 88	3.51E-13	4.39E-13	5.27E-13	6.15E-13	7.03E-13	7.03E-13
pm148m	1.50E-13	2.31E-13	3.21E-13	4.19E-13	5.22E-13	5.22E-13
pd110	2.51E-13	3.13E-13	3.75E-13	4.38E-13	5.00E-13	5.00E-13
cd114	2.43E-13	3.04E-13	3.65E-13	4.26E-13	4.86E-13	4.86E-13
se 82	2.38E-13	2.98E-13	3.58E-13	4.17E-13	4.77E-13	4.77E-13
gd158	2.27E-13	2.84E-13	3.41E-13	3.98E-13	4.54E-13	4.54E-13
sn126	1.91E-13	2.38E-13	2.86E-13	3.34E-13	3.81E-13	3.81E-13
se 78	1.81E-13	2.27E-13	2.72E-13	3.18E-13	3.63E-13	3.63E-13
ag111	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13
eu157	2.97E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13
sn124	1.46E-13	1.82E-13	2.19E-13	2.55E-13	2.91E-13	2.91E-13
dy162	1.40E-13	1.74E-13	2.09E-13	2.43E-13	2.78E-13	2.78E-13
dy164	1.26E-13	1.57E-13	1.89E-13	2.20E-13	2.51E-13	2.51E-13
eu154	1.10E-13	1.39E-13	1.69E-13	1.98E-13	2.28E-13	2.28E-13
as 75	1.08E-13	1.35E-13	1.62E-13	1.90E-13	2.17E-13	2.17E-13
cd115m	1.61E-13	1.80E-13	1.94E-13	2.04E-13	2.12E-13	2.12E-13
y 90	7.60E-14	9.60E-14	1.16E-13	1.36E-13	1.56E-13	1.56E-13
sn118	5.96E-14	7.45E-14	8.93E-14	1.04E-13	1.19E-13	1.19E-13
cd116	5.05E-14	6.32E-14	7.58E-14	8.84E-14	1.01E-13	1.01E-13
sn122	5.02E-14	6.27E-14	7.52E-14	8.77E-14	1.00E-13	1.00E-13
ba136	4.28E-14	5.70E-14	7.13E-14	8.56E-14	9.99E-14	1.00E-13
zr 90	2.25E-14	3.58E-14	5.23E-14	7.18E-14	9.44E-14	9.44E-14
te125	2.01E-14	3.22E-14	4.73E-14	6.53E-14	8.64E-14	8.64E-14
sn120	3.76E-14	4.70E-14	5.63E-14	6.57E-14	7.51E-14	7.51E-14
kr 82	3.41E-14	4.29E-14	5.17E-14	6.04E-14	6.92E-14	6.92E-14
cs134	3.12E-14	3.93E-14	4.75E-14	5.58E-14	6.42E-14	6.42E-14
dy163	3.08E-14	3.84E-14	4.61E-14	5.37E-14	6.13E-14	6.13E-14
ge 73	2.92E-14	3.66E-14	4.39E-14	5.13E-14	5.86E-14	5.86E-14
cs136	5.43E-14	5.51E-14	5.54E-14	5.55E-14	5.56E-14	5.55E-14
ru 99	2.66E-14	3.38E-14	4.10E-14	4.82E-14	5.54E-14	5.54E-14
xe130	1.98E-14	2.48E-14	2.99E-14	3.49E-14	3.99E-14	3.99E-14
pm148	1.31E-14	1.76E-14	2.22E-14	2.67E-14	3.13E-14	3.12E-14
ru105	2.97E-14	2.96E-14	2.96E-14	2.96E-14	2.96E-14	2.95E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.93E-14	2.93E-14	2.92E-14
mo 96	1.44E-14	1.81E-14	2.17E-14	2.54E-14	2.91E-14	2.91E-14
ge 76	1.07E-14	1.34E-14	1.60E-14	1.87E-14	2.14E-14	2.14E-14
gd160	6.76E-15	8.44E-15	1.01E-14	1.18E-14	1.35E-14	1.35E-14
rb 88	1.28E-14	1.29E-14	1.29E-14	1.29E-14	1.29E-14	1.28E-14
i135	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.00E-14
te126	4.62E-15	5.91E-15	7.21E-15	8.50E-15	9.80E-15	9.80E-15
te132	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15
sn123	3.30E-15	3.94E-15	4.52E-15	5.05E-15	5.53E-15	5.53E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 15
0 fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec
0

	Initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
ru100	2.66E-15	3.34E-15	4.03E-15	4.72E-15	5.42E-15	5.42E-15
te134	5.46E-15	5.85E-15	5.85E-15	5.85E-15	5.85E-15	5.09E-15
ho165	2.12E-15	2.65E-15	3.18E-15	3.71E-15	4.24E-15	4.24E-15
sb126	2.95E-15	2.98E-15	3.00E-15	3.00E-15	3.00E-15	3.00E-15
sr 87	1.23E-15	1.53E-15	1.84E-15	2.15E-15	2.45E-15	2.45E-15
in117m	2.09E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15
sb124	1.19E-15	1.37E-15	1.51E-15	1.62E-15	1.71E-15	1.71E-15
in113	4.02E-16	6.28E-16	9.04E-16	1.23E-15	1.61E-15	1.61E-15
nb 94	6.97E-16	8.72E-16	1.05E-15	1.22E-15	1.40E-15	1.40E-15
te124	4.52E-16	6.49E-16	8.67E-16	1.10E-15	1.35E-15	1.35E-15
ge 74	5.93E-16	7.41E-16	8.89E-16	1.04E-15	1.19E-15	1.19E-15
eu152	3.61E-16	4.74E-16	6.03E-16	7.51E-16	9.22E-16	9.22E-16

ge 72	3.96E-16	5.00E-16	6.04E-16	7.09E-16	8.13E-16	8.13E-16
1130	7.11E-16	7.14E-16	7.14E-16	7.15E-16	7.15E-16	7.10E-16
in117	6.15E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16
sr 86	2.28E-16	3.11E-16	3.96E-16	4.81E-16	5.68E-16	5.68E-16
se 76	2.45E-16	3.08E-16	3.71E-16	4.33E-16	4.96E-16	4.96E-16
ba135	1.61E-16	2.09E-16	2.61E-16	3.17E-16	3.76E-16	3.76E-16
rb 86	2.25E-16	2.33E-16	2.37E-16	2.39E-16	2.40E-16	2.40E-16
tb160	1.51E-16	1.75E-16	1.95E-16	2.12E-16	2.27E-16	2.27E-16
dy165	2.10E-16	2.09E-16	2.09E-16	2.09E-16	2.09E-16	2.06E-16
sm148	2.92E-17	5.32E-17	8.55E-17	1.26E-16	1.76E-16	1.76E-16
nd142	4.27E-17	6.09E-17	8.30E-17	1.09E-16	1.40E-16	1.40E-16
gd154	2.98E-17	4.65E-17	6.71E-17	9.16E-17	1.20E-16	1.20E-16
er166	5.43E-17	6.91E-17	8.40E-17	9.88E-17	1.14E-16	1.14E-16
xe128	5.51E-17	6.90E-17	8.28E-17	9.67E-17	1.11E-16	1.11E-16
cd118	1.14E-16	1.20E-16	1.20E-16	1.20E-16	1.20E-16	1.07E-16
ge 75	8.50E-17	8.64E-17	8.64E-17	8.64E-17	8.64E-17	8.26E-17
ba134	1.88E-17	2.95E-17	4.25E-17	5.80E-17	7.61E-17	7.61E-17
gd152	3.24E-17	4.16E-17	5.17E-17	6.27E-17	7.49E-17	7.49E-17
cd110	1.92E-17	2.57E-17	3.29E-17	4.07E-17	4.92E-17	4.92E-17
pd104	8.40E-18	1.46E-17	2.31E-17	3.40E-17	4.73E-17	4.73E-17
dy160	1.27E-17	1.88E-17	2.58E-17	3.35E-17	4.18E-17	4.18E-17
kr 80	1.66E-17	2.07E-17	2.49E-17	2.91E-17	3.32E-17	3.32E-17
in119m	2.83E-17	3.01E-17	3.01E-17	3.01E-17	3.01E-17	2.50E-17
br 79	3.13E-18	4.59E-18	6.32E-18	8.32E-18	1.06E-17	1.06E-17
xe129	1.24E-18	1.91E-18	2.73E-18	3.70E-18	4.82E-18	4.82E-18
ag107	1.14E-18	1.79E-18	2.57E-18	3.50E-18	4.57E-18	4.57E-18
te122	2.05E-18	2.60E-18	3.16E-18	3.71E-18	4.27E-18	4.27E-18
be 9	1.34E-18	1.68E-18	2.01E-18	2.35E-18	2.69E-18	2.69E-18
pr142	1.28E-18	1.57E-18	1.88E-18	2.21E-18	2.54E-18	2.52E-18
nb 93	7.25E-19	9.13E-19	1.11E-18	1.31E-18	1.52E-18	1.52E-18
sn116	6.45E-19	8.19E-19	1.00E-18	1.19E-18	1.38E-18	1.38E-18
te123	4.43E-19	5.98E-19	7.65E-19	9.47E-19	1.14E-18	1.14E-18
li 7	5.40E-19	6.75E-19	8.09E-19	9.43E-19	1.08E-18	1.08E-18
in119	1.56E-18	2.35E-18	2.35E-18	2.35E-18	2.35E-18	7.42E-19
er167	2.15E-19	2.69E-19	3.26E-19	3.79E-19	4.33E-19	4.33E-19
cd109	2.01E-20	2.35E-20	2.69E-20	3.36E-20	3.69E-20	3.69E-20
cd108	1.01E-20	1.34E-20	1.68E-20	2.01E-20	2.35E-20	2.35E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16

0 fraction of total absorption rate

power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec

0

	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
cs134m	1.01E-20	1.34E-20	1.68E-20	1.68E-20	2.01E-20	2.01E-20

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 17

power= 4.000E-03mw, burnup=5.8440E-01mwd, flux= 2.82E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
h 1	1.76E-08	2.19E-08	2.62E-08	3.05E-08	3.48E-08	3.48E-08
h 2	5.22E-11	6.50E-11	7.77E-11	9.04E-11	1.03E-10	1.03E-10
h 3	3.81E-13	4.73E-13	5.65E-13	6.57E-13	7.48E-13	7.48E-13
h 4	.00E+00	1.92E-36	2.29E-36	2.67E-36	3.04E-36	.00E+00
he 3	2.15E-15	3.35E-15	4.81E-15	6.52E-15	8.50E-15	8.50E-15
he 4	2.91E-09	3.62E-09	4.33E-09	5.04E-09	5.75E-09	5.75E-09
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.50E-10	4.35E-10	5.20E-10	6.05E-10	6.91E-10	6.91E-10
ne 21	2.62E-18	4.03E-18	5.71E-18	7.66E-18	9.88E-18	9.88E-18
ne 22	5.99E-14	9.31E-14	1.33E-13	1.80E-13	2.34E-13	2.34E-13
ne 23	6.56E-17	7.10E-15	7.10E-15	7.10E-15	7.10E-15	5.66E-19

na 22	2.23E-12	2.75E-12	3.27E-12	3.78E-12	4.28E-12	4.28E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.63E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.05E-08
na 24m	5.99E-30	5.05E-15	5.05E-15	5.05E-15	5.05E-15	5.05E-30
na 25	6.08E-31	1.39E-29	1.66E-29	1.93E-29	2.20E-29	6.06E-32
mg 24	3.13E-06	3.80E-06	4.47E-06	5.14E-06	5.81E-06	5.81E-06
mg 25	3.83E-13	4.77E-13	5.70E-13	6.64E-13	7.58E-13	7.58E-13
mg 26	5.22E-11	6.50E-11	7.77E-11	9.04E-11	1.03E-10	1.03E-10
mg 27	1.60E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12	1.14E-12
mg 28	4.40E-24	4.32E-24	4.32E-24	4.32E-24	4.32E-24	4.30E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.33E-11	2.28E-10	2.28E-10	2.28E-10	2.28E-10	1.67E-11
al 29	3.89E-31	9.14E-31	1.30E-30	1.75E-30	2.27E-30	9.29E-31
al 30	.00E+00	7.01E-45	7.01E-45	1.40E-44	1.40E-44	.00E+00
si 28	8.79E-06	1.06E-05	1.25E-05	1.44E-05	1.62E-05	1.62E-05
si 29	2.26E-15	3.51E-15	5.00E-15	6.73E-15	8.70E-15	8.70E-15
si 30	6.21E-25	1.21E-24	2.09E-24	3.30E-24	4.90E-24	4.90E-24
si 31	4.37E-37	8.72E-37	1.50E-36	2.37E-36	3.51E-36	3.39E-36
si 32	.00E+00	.00E+00	.00E+00	.00E+00	1.40E-45	1.40E-45
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		2.82E+08	2.82E+08	2.82E+08	2.82E+08	2.82E-07

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 18
power= 4.000E-03mw, burnup=5.8440E-01mwd, flux= 2.82E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
he 4	1.02E-05	1.27E-05	1.53E-05	1.78E-05	2.04E-05	2.04E-05
th226	1.34E-29	2.17E-29	3.24E-29	4.55E-29	6.08E-29	6.08E-29
th227	3.85E-16	6.77E-16	1.06E-15	1.54E-15	2.11E-15	2.11E-15
th228	1.32E-15	2.42E-15	3.98E-15	6.09E-15	8.81E-15	8.81E-15
th229	4.93E-13	8.84E-13	1.41E-12	2.07E-12	2.88E-12	2.88E-12
th230	5.11E-06	6.39E-06	7.66E-06	8.94E-06	1.02E-05	1.02E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	1.03E-06	1.29E-06	1.55E-06	1.81E-06	2.07E-06	2.07E-06
th233	8.39E-18	1.19E-17	1.43E-17	1.66E-17	1.90E-17	1.46E-17
th234	4.71E-07	4.98E-07	5.14E-07	5.23E-07	5.29E-07	5.29E-07
pa231	1.53E-07	1.92E-07	2.31E-07	2.70E-07	3.09E-07	3.09E-07
pa232	2.63E-15	3.30E-15	3.97E-15	4.64E-15	5.31E-15	5.29E-15
pa233	1.23E-06	1.32E-06	1.37E-06	1.40E-06	1.42E-06	1.42E-06
pa234m	1.59E-11	1.68E-11	1.73E-11	1.76E-11	1.78E-11	1.78E-11
pa234	7.10E-12	7.50E-12	7.74E-12	7.88E-12	7.97E-12	7.97E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.29E-26	2.10E-26	3.14E-26	4.40E-26	5.89E-26	5.89E-26
u231	1.04E-21	1.46E-21	1.94E-21	2.43E-21	2.94E-21	2.94E-21
u232	1.84E-12	2.74E-12	3.81E-12	5.05E-12	6.46E-12	6.46E-12
u233	1.50E-06	2.10E-06	2.73E-06	3.38E-06	4.04E-06	4.04E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.23E-06	3.16E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.90E-07	3.22E-07	3.22E-07	3.22E-07	3.22E-07	2.51E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.09E-12	1.33E-12	1.57E-12	1.79E-12	2.01E-12	2.01E-12
np236m	2.15E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.08E-12
np236	4.10E-11	5.09E-11	6.08E-11	7.07E-11	8.06E-11	8.06E-11
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.58E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06

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     np239   4.75E-05  4.65E-05  4.65E-05  4.65E-05  4.65E-05  4.65E-05
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   9.29E-15  9.48E-15  9.48E-15  9.48E-15  9.48E-15  8.63E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   5.77E-11  7.15E-11  8.51E-11  9.85E-11  1.12E-10  1.12E-10
     pu237   1.46E-16  2.11E-16  2.83E-16  3.61E-16  4.42E-16  4.42E-16
     pu238   3.62E-05  4.55E-05  5.48E-05  6.42E-05  7.35E-05  7.35E-05
     pu239   9.74E-04  1.23E-03  1.48E-03  1.73E-03  1.98E-03  1.98E-03
     pu240   9.28E-10  1.47E-09  2.14E-09  2.92E-09  3.83E-09  3.83E-09
     pu241   1.22E-15  2.42E-15  4.21E-15  6.73E-15  1.01E-14  1.01E-14
     pu242   4.61E-22  1.15E-21  2.42E-21  4.53E-21  7.79E-21  7.79E-21
     pu243   1.00E-30  2.46E-30  5.18E-30  9.69E-30  1.67E-29  1.63E-29
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.82E+08  2.82E+08  2.82E+08  2.82E+08  2.82E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *          made from modified card-image origen-s libraries of scale 4.2     *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
```

```
          *                                                                    *
0         ************************************************************************
0                   .other identification and sizes of library.
0                     date set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   19
        power=    .00mw, burnup=      1.mwd, flux= 2.74E+08n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        164.4 d        182.6 d        200.9 d        219.2 d        219.2 d
     productions  1.122439E+06   1.122440E+06   1.122440E+06   1.122440E+06   1.122441E+06   1.122441E+06
     absorptions  9.157813E+05   9.157819E+05   9.157824E+05   9.157831E+05   9.157836E+05   9.157836E+05
     k infinity   1.225663E+00   1.225662E+00   1.225662E+00   1.225662E+00   1.225661E+00   1.225661E+00
0                 initial        164.4 d        182.6 d        200.9 d        219.2 d        219.2 d
     actinide
     absorptions  9.125454E+05   9.125456E+05   9.125458E+05   9.125460E+05   9.125463E+05   9.125463E+05
     non-actinide
     abs. fracs.  3.533483E-03   3.533840E-03   3.534257E-03   3.534734E-03   3.535092E-03   3.535092E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   20
0                                   fraction of total absorption rate
        power=    .00mw, burnup=      1.mwd, flux= 2.74E+08n/cm**2-sec
0             initial   164.4 d   182.6 d   200.9 d   219.2 d   219.2 d

     sm149     2.93E-06  3.30E-06  3.67E-06  4.05E-06  4.42E-06  4.42E-06
     xe135     2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06
     sm151     1.36E-07  1.53E-07  1.70E-07  1.87E-07  2.04E-07  2.04E-07
     nd143     5.72E-08  6.55E-08  7.39E-08  8.22E-08  9.06E-08  9.06E-08
     gd157     3.18E-08  3.58E-08  3.97E-08  4.37E-08  4.77E-08  4.77E-08
     cd113     2.63E-08  2.96E-08  3.29E-08  3.62E-08  3.94E-08  3.94E-08
     pm147     2.45E-08  2.77E-08  3.09E-08  3.41E-08  3.72E-08  3.72E-08
     rh103     1.77E-08  2.09E-08  2.42E-08  2.75E-08  3.09E-08  3.09E-08
     xe131     1.74E-08  1.98E-08  2.22E-08  2.46E-08  2.69E-08  2.69E-08
     cs133     1.48E-08  1.68E-08  1.88E-08  2.07E-08  2.27E-08  2.27E-08
     tc 99     1.06E-08  1.19E-08  1.33E-08  1.47E-08  1.60E-08  1.60E-08
     eu155     9.13E-09  1.02E-08  1.13E-08  1.24E-08  1.35E-08  1.35E-08
     nd145     8.46E-09  9.52E-09  1.06E-08  1.16E-08  1.27E-08  1.27E-08
     rh105     8.36E-09  8.36E-09  8.36E-09  8.36E-09  8.36E-09  8.36E-09
     sm152     4.38E-09  4.93E-09  5.48E-09  6.02E-09  6.57E-09  6.57E-09
     kr 83     3.63E-09  4.08E-09  4.54E-09  4.99E-09  5.45E-09  5.45E-09
     cs135     3.36E-09  3.78E-09  4.20E-09  4.62E-09  5.05E-09  5.05E-09
     ru101     2.54E-09  2.86E-09  3.18E-09  3.49E-09  3.81E-09  3.81E-09
     mo 95     1.65E-09  2.11E-09  2.62E-09  3.16E-09  3.73E-09  3.73E-09
     eu153     2.18E-09  2.46E-09  2.74E-09  3.02E-09  3.29E-09  3.29E-09
     la139     2.02E-09  2.27E-09  2.52E-09  2.77E-09  3.03E-09  3.03E-09
     pr141     1.72E-09  2.02E-09  2.33E-09  2.63E-09  2.94E-09  2.94E-09
     pr143     2.87E-09  2.87E-09  2.87E-09  2.87E-09  2.87E-09  2.87E-09
     gd155     1.17E-09  1.47E-09  1.81E-09  2.19E-09  2.60E-09  2.60E-09
     xe133     2.06E-09  2.06E-09  2.06E-09  2.06E-09  2.06E-09  2.06E-09
     ce141     1.55E-09  1.57E-09  1.59E-09  1.60E-09  1.61E-09  1.61E-09
     pd105     9.31E-10  1.05E-09  1.17E-09  1.28E-09  1.40E-09  1.40E-09
     zr 93     8.36E-10  9.41E-10  1.05E-09  1.15E-09  1.26E-09  1.26E-09
     sm147     4.46E-10  5.76E-10  7.22E-10  8.83E-10  1.06E-09  1.06E-09
     pm149     9.80E-10  9.80E-10  9.80E-10  9.80E-10  9.80E-10  9.80E-10
     nd147     9.33E-10  9.33E-10  9.33E-10  9.33E-10  9.33E-10  9.33E-10
```

i129	5.89E-10	6.67E-10	7.45E-10	8.23E-10	9.01E-10	9.01E-10
mo 97	4.53E-10	5.11E-10	5.68E-10	6.25E-10	6.82E-10	6.82E-10
ag109	3.15E-10	3.54E-10	3.93E-10	4.33E-10	4.72E-10	4.72E-10
ru103	3.31E-10	3.38E-10	3.44E-10	3.48E-10	3.50E-10	3.50E-10
eu151	1.55E-10	1.96E-10	2.42E-10	2.93E-10	3.49E-10	3.49E-10
ru102	1.85E-10	2.09E-10	2.32E-10	2.55E-10	2.78E-10	2.78E-10
sr 90	1.69E-10	1.90E-10	2.11E-10	2.32E-10	2.53E-10	2.53E-10
ce142	1.68E-10	1.89E-10	2.10E-10	2.31E-10	2.52E-10	2.52E-10
ce144	1.81E-10	1.99E-10	2.17E-10	2.33E-10	2.50E-10	2.49E-10
nd148	1.61E-10	1.81E-10	2.01E-10	2.21E-10	2.41E-10	2.41E-10
y 89	1.17E-10	1.40E-10	1.63E-10	1.87E-10	2.11E-10	2.11E-10
zr 91	1.14E-10	1.37E-10	1.61E-10	1.85E-10	2.10E-10	2.10E-10
nd144	9.56E-11	1.19E-10	1.45E-10	1.73E-10	2.04E-10	2.04E-10
nd146	1.35E-10	1.52E-10	1.69E-10	1.86E-10	2.02E-10	2.02E-10
ba138	1.15E-10	1.30E-10	1.44E-10	1.59E-10	1.73E-10	1.73E-10
in115	1.08E-10	1.22E-10	1.36E-10	1.50E-10	1.64E-10	1.64E-10
pd108	1.08E-10	1.21E-10	1.34E-10	1.48E-10	1.61E-10	1.61E-10
ce140	9.79E-11	1.12E-10	1.24E-10	1.40E-10	1.55E-10	1.55E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 21
0 fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
0

	initial	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
zr 95	1.32E-10	1.38E-10	1.43E-10	1.47E-10	1.50E-10	1.50E-10
xe132	9.40E-11	1.06E-10	1.18E-10	1.30E-10	1.43E-10	1.43E-10
y 91	1.20E-10	1.25E-10	1.29E-10	1.32E-10	1.35E-10	1.35E-10
nb 95	9.40E-11	1.03E-10	1.12E-10	1.18E-10	1.24E-10	1.24E-10
pm151	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10
mo 98	6.65E-11	7.49E-11	8.32E-11	9.15E-11	9.98E-11	9.98E-11
mo100	6.44E-11	7.25E-11	8.05E-11	8.86E-11	9.67E-11	9.67E-11
pd107	6.41E-11	7.21E-11	8.00E-11	8.80E-11	9.60E-11	9.60E-11
xe134	6.38E-11	7.17E-11	7.97E-11	8.77E-11	9.57E-11	9.57E-11
zr 92	5.22E-11	5.87E-11	6.52E-11	7.18E-11	7.83E-11	7.83E-11
zr 96	4.04E-11	4.55E-11	5.05E-11	5.56E-11	6.07E-11	6.07E-11
ru104	3.97E-11	4.46E-11	4.96E-11	5.45E-11	5.95E-11	5.95E-11
i127	3.63E-11	4.13E-11	4.63E-11	5.14E-11	5.65E-11	5.65E-11
nd150	3.55E-11	4.00E-11	4.44E-11	4.88E-11	5.33E-11	5.33E-11
cs137	3.48E-11	3.91E-11	4.34E-11	4.77E-11	5.20E-11	5.20E-11
xe136	3.44E-11	3.87E-11	4.30E-11	4.73E-11	5.16E-11	5.16E-11
ba140	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11
br 81	2.58E-11	2.90E-11	3.22E-11	3.55E-11	3.87E-11	3.87E-11
sm153	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
zr 94	2.18E-11	2.46E-11	2.73E-11	3.00E-11	3.28E-11	3.28E-11
rb 85	2.01E-11	2.26E-11	2.52E-11	2.77E-11	3.02E-11	3.02E-11
sr 89	2.67E-11	2.77E-11	2.84E-11	2.90E-11	2.94E-11	2.94E-11
cd111	1.54E-11	1.75E-11	1.96E-11	2.17E-11	2.38E-11	2.38E-11
te130	1.56E-11	1.76E-11	1.96E-11	2.15E-11	2.35E-11	2.35E-11
sm154	1.51E-11	1.70E-11	1.89E-11	2.08E-11	2.27E-11	2.27E-11
kr 85	1.49E-11	1.67E-11	1.86E-11	2.04E-11	2.22E-11	2.22E-11
rb 87	1.46E-11	1.64E-11	1.83E-11	2.01E-11	2.19E-11	2.19E-11
kr 87	2.16E-11	2.31E-11	2.31E-11	2.31E-11	2.31E-11	2.08E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.75E-11
se 77	1.15E-11	1.30E-11	1.44E-11	1.59E-11	1.74E-11	1.74E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
kr 84	6.87E-12	7.73E-12	8.59E-12	9.45E-12	1.03E-11	1.03E-11
ba137	4.56E-12	5.76E-12	7.08E-12	8.55E-12	1.02E-11	1.02E-11
ru106	6.03E-12	6.68E-12	7.30E-12	7.90E-12	8.48E-12	8.48E-12
sb121	5.40E-12	6.08E-12	6.76E-12	7.44E-12	8.12E-12	8.12E-12

se 79	5.31E-12	5.98E-12	6.64E-12	7.31E-12	7.97E-12	7.97E-12
i131	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12
sb123	3.81E-12	4.30E-12	4.79E-12	5.28E-12	5.78E-12	5.78E-12
kr 86	3.84E-12	4.32E-12	4.80E-12	5.28E-12	5.76E-12	5.76E-12
te127m	4.41E-12	4.74E-12	5.04E-12	5.31E-12	5.54E-12	5.54E-12
te128	3.42E-12	3.85E-12	4.27E-12	4.70E-12	5.13E-12	5.13E-12
se 80	2.48E-12	2.79E-12	3.10E-12	3.41E-12	3.72E-12	3.72E-12
gd156	2.27E-12	2.60E-12	2.93E-12	3.27E-12	3.60E-12	3.60E-12
dy161	2.00E-12	2.26E-12	2.53E-12	2.79E-12	3.06E-12	3.06E-12
sm150	1.32E-12	1.66E-12	2.04E-12	2.46E-12	2.92E-12	2.92E-12
tb159	1.53E-12	1.72E-12	1.91E-12	2.11E-12	2.30E-12	2.30E-12
li 6	1.41E-12	1.59E-12	1.76E-12	1.94E-12	2.11E-12	2.11E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 22

0 fraction of total absorption rate

0 power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec

	initial	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
cd112	1.40E-12	1.58E-12	1.75E-12	1.93E-12	2.11E-12	2.11E-12
sb125	1.40E-12	1.57E-12	1.74E-12	1.91E-12	2.07E-12	2.07E-12
pd106	9.16E-13	1.15E-12	1.40E-12	1.67E-12	1.97E-12	1.97E-12
te129m	1.73E-12	1.76E-12	1.78E-12	1.79E-12	1.80E-12	1.80E-12
sn117	1.11E-12	1.25E-12	1.39E-12	1.53E-12	1.67E-12	1.67E-12
sn119	9.14E-13	1.03E-12	1.14E-12	1.26E-12	1.37E-12	1.37E-12
sn115	8.31E-13	9.38E-13	1.04E-12	1.15E-12	1.26E-12	1.26E-12
sr 88	7.05E-13	7.94E-13	8.82E-13	9.70E-13	1.06E-12	1.06E-12
pm148m	5.25E-13	6.30E-13	7.37E-13	8.45E-13	9.54E-13	9.54E-13
pd110	4.99E-13	5.61E-13	6.23E-13	6.85E-13	7.47E-13	7.47E-13
cd114	4.84E-13	5.44E-13	6.05E-13	6.65E-13	7.25E-13	7.25E-13
se 82	4.79E-13	5.39E-13	5.99E-13	6.58E-13	7.18E-13	7.18E-13
gd158	4.53E-13	5.10E-13	5.67E-13	6.23E-13	6.80E-13	6.80E-13
sn126	3.83E-13	4.31E-13	4.79E-13	5.27E-13	5.75E-13	5.75E-13
se 78	3.64E-13	4.09E-13	4.55E-13	5.00E-13	5.46E-13	5.46E-13
sn124	2.90E-13	3.26E-13	3.63E-13	3.99E-13	4.35E-13	4.35E-13
dy162	2.78E-13	3.13E-13	3.47E-13	3.81E-13	4.16E-13	4.16E-13
dy164	2.53E-13	2.84E-13	3.15E-13	3.47E-13	3.78E-13	3.78E-13
eu154	2.29E-13	2.60E-13	2.91E-13	3.23E-13	3.55E-13	3.55E-13
as 75	2.17E-13	2.44E-13	2.71E-13	2.98E-13	3.25E-13	3.25E-13
ag111	3.16E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.95E-13
y 90	1.57E-13	1.77E-13	1.96E-13	2.16E-13	2.36E-13	2.36E-13
cd115m	2.13E-13	2.19E-13	2.23E-13	2.27E-13	2.29E-13	2.29E-13
zr 90	9.47E-14	1.20E-13	1.49E-13	1.81E-13	2.16E-13	2.16E-13
te125	8.63E-14	1.10E-13	1.37E-13	1.67E-13	2.00E-13	2.00E-13
sn118	1.18E-13	1.33E-13	1.48E-13	1.63E-13	1.77E-13	1.77E-13
ba136	9.98E-14	1.14E-13	1.29E-13	1.43E-13	1.57E-13	1.57E-13
cd116	1.01E-13	1.13E-13	1.26E-13	1.38E-13	1.51E-13	1.51E-13
sn122	1.01E-13	1.13E-13	1.26E-13	1.38E-13	1.51E-13	1.51E-13
sn120	7.52E-14	8.45E-14	9.39E-14	1.03E-13	1.13E-13	1.13E-13
kr 82	6.94E-14	7.82E-14	8.70E-14	9.58E-14	1.05E-13	1.05E-13
cs134	6.44E-14	7.30E-14	8.16E-14	9.03E-14	9.92E-14	9.92E-14
dy163	6.14E-14	6.90E-14	7.66E-14	8.42E-14	9.18E-14	9.18E-14
ge 73	5.88E-14	6.62E-14	7.36E-14	8.09E-14	8.83E-14	8.83E-14
ru 99	5.53E-14	6.26E-14	6.99E-14	7.73E-14	8.47E-14	8.47E-14
xe130	4.01E-14	4.51E-14	5.02E-14	5.52E-14	6.03E-14	6.03E-14
cs136	5.54E-14	5.54E-14	5.55E-14	5.55E-14	5.55E-14	5.54E-14
pm148	3.11E-14	3.53E-14	3.97E-14	4.40E-14	4.83E-14	4.82E-14
mo 96	2.90E-14	3.27E-14	3.64E-14	4.01E-14	4.37E-14	4.37E-14
ge 76	2.14E-14	2.41E-14	2.68E-14	2.94E-14	3.21E-14	3.21E-14
sn125	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14
ru105	2.94E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.91E-14

gd160	1.35E-14	1.51E-14	1.68E-14	1.85E-14	2.02E-14	2.02E-14
te126	9.81E-15	1.11E-14	1.24E-14	1.37E-14	1.50E-14	1.50E-14
rb 88	1.29E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	1.28E-14
i135	1.00E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	9.98E-15
te132	9.58E-15	9.59E-15	9.59E-15	9.59E-15	9.59E-15	9.58E-15
ru100	5.45E-15	6.16E-15	6.87E-15	7.59E-15	8.32E-15	8.32E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 23

0 fraction of total absorption rate

0 power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec

	initial	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
sn123	5.49E-15	5.92E-15	6.31E-15	6.67E-15	6.99E-15	6.99E-15
ho165	4.24E-15	4.77E-15	5.30E-15	5.82E-15	6.35E-15	6.35E-15
te134	5.12E-15	5.89E-15	5.89E-15	5.89E-15	5.89E-15	4.78E-15
sr 87	2.46E-15	2.77E-15	3.08E-15	3.39E-15	3.70E-15	3.70E-15
in113	1.60E-15	2.03E-15	2.50E-15	3.03E-15	3.60E-15	3.60E-15
sb126	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15
te124	1.36E-15	1.62E-15	1.89E-15	2.17E-15	2.46E-15	2.46E-15
in117m	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15
nb 94	1.39E-15	1.57E-15	1.74E-15	1.92E-15	2.09E-15	2.09E-15
sb124	1.71E-15	1.79E-15	1.85E-15	1.89E-15	1.93E-15	1.93E-15
eu152	9.26E-16	1.12E-15	1.35E-15	1.61E-15	1.90E-15	1.90E-15
ge 74	1.19E-15	1.34E-15	1.49E-15	1.64E-15	1.79E-15	1.79E-15
ga 72	8.17E-16	9.21E-16	1.03E-15	1.13E-15	1.24E-15	1.24E-15
sr 86	5.70E-16	6.57E-16	7.44E-16	8.31E-16	9.19E-16	9.19E-16
se 76	4.98E-16	5.62E-16	6.25E-16	6.88E-16	7.51E-16	7.51E-16
i130	7.11E-16	7.16E-16	7.16E-16	7.16E-16	7.16E-16	7.09E-16
ba135	3.76E-16	4.38E-16	5.04E-16	5.73E-16	6.45E-16	6.45E-16
in117	6.17E-16	6.17E-16	6.17E-16	6.17E-16	6.17E-16	6.16E-16
sm148	1.76E-16	2.35E-16	3.03E-16	3.80E-16	4.66E-16	4.66E-16
nd142	1.40E-16	1.75E-16	2.15E-16	2.58E-16	3.07E-16	3.07E-16
gd154	1.21E-16	1.53E-16	1.90E-16	2.31E-16	2.76E-16	2.76E-16
tb160	2.28E-16	2.40E-16	2.50E-16	2.59E-16	2.67E-16	2.67E-16
rb 86	2.41E-16	2.42E-16	2.42E-16	2.42E-16	2.42E-16	2.42E-16
dy165	2.07E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	2.03E-16
ba134	7.61E-17	9.67E-17	1.20E-16	1.46E-16	1.74E-16	1.74E-16
er166	1.14E-16	1.29E-16	1.44E-16	1.59E-16	1.74E-16	1.74E-16
xe128	1.11E-16	1.25E-16	1.39E-16	1.53E-16	1.67E-16	1.67E-16
gd152	7.54E-17	8.89E-17	1.04E-16	1.21E-16	1.39E-16	1.39E-16
pd104	4.71E-17	6.29E-17	8.13E-17	1.02E-16	1.26E-16	1.26E-16
cd118	1.08E-16	1.21E-16	1.21E-16	1.21E-16	1.21E-16	1.02E-16
cd110	4.94E-17	5.85E-17	6.81E-17	7.84E-17	8.93E-17	8.93E-17
ge 75	8.31E-17	8.69E-17	8.69E-17	8.69E-17	8.69E-17	8.04E-17
dy160	4.17E-17	5.05E-17	5.97E-17	6.93E-17	7.91E-17	7.91E-17
kr 80	3.33E-17	3.75E-17	4.17E-17	4.59E-17	5.00E-17	5.00E-17
br 79	1.06E-17	1.31E-17	1.60E-17	1.90E-17	2.24E-17	2.24E-17
in119m	2.51E-17	3.02E-17	3.02E-17	3.02E-17	3.02E-17	2.17E-17
xe129	4.82E-18	6.10E-18	7.52E-18	9.10E-18	1.08E-17	1.08E-17
ag107	4.59E-18	5.81E-18	7.16E-18	8.66E-18	1.03E-17	1.03E-17
te122	4.26E-18	4.82E-18	5.38E-18	5.95E-18	6.51E-18	6.51E-18
be 9	2.67E-18	3.00E-18	3.33E-18	3.67E-18	4.00E-18	4.00E-18
pr142	2.53E-18	2.88E-18	3.22E-18	3.57E-18	3.92E-18	3.89E-18
nb 93	1.53E-18	1.75E-18	1.98E-18	2.23E-18	2.48E-18	2.48E-18
sn116	1.37E-18	1.57E-18	1.78E-18	1.98E-18	2.20E-18	2.20E-18
te123	1.14E-18	1.35E-18	1.56E-18	1.78E-18	2.01E-18	2.01E-18
li 7	1.09E-18	1.22E-18	1.36E-18	1.49E-18	1.63E-18	1.63E-18
er167	4.35E-19	4.89E-19	5.43E-19	6.00E-19	6.54E-19	6.54E-19
in119	7.45E-19	2.36E-18	2.36E-18	2.36E-18	2.36E-18	3.40E-19
cd109	3.71E-20	4.04E-20	4.38E-20	4.72E-20	5.05E-20	5.05E-20
cd108	2.36E-20	2.36E-20	2.70E-20	3.03E-20	3.37E-20	3.37E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 24
0 fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
0 initial 164.4 d 182.6 d 200.9 d 219.2 d 219.2 d

cs134m 2.02E-20 2.36E-20 2.70E-20 3.03E-20 3.03E-20 3.03E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 25
power= 4.000E-03mw, burnup=8.7659E-01mwd, flux= 2.74E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
h 1	3.48E-08	3.91E-08	4.33E-08	4.76E-08	5.18E-08	5.18E-08
h 2	1.03E-10	1.16E-10	1.28E-10	1.41E-10	1.54E-10	1.54E-10
h 3	7.48E-13	8.39E-13	9.29E-13	1.02E-12	1.11E-12	1.11E-12
h 4	.00E+00	3.41E-36	3.78E-36	4.14E-36	4.51E-36	.00E+00
he 3	8.50E-15	1.07E-14	1.32E-14	1.59E-14	1.89E-14	1.89E-14
he 4	5.75E-09	6.45E-09	7.16E-09	7.86E-09	8.57E-09	8.57E-09
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-10	7.75E-10	8.60E-10	9.44E-10	1.03E-09	1.03E-09
ne 21	9.88E-18	1.23E-17	1.50E-17	1.80E-17	2.12E-17	2.12E-17
ne 22	2.34E-13	2.94E-13	3.61E-13	4.34E-13	5.14E-13	5.14E-13
na 23	5.66E-19	7.04E-15	7.04E-15	7.04E-15	7.04E-15	5.25E-21
na 22	4.28E-12	4.78E-12	5.26E-12	5.74E-12	6.22E-12	6.22E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.05E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08	2.82E-08
na 24m	5.05E-30	4.68E-15	4.68E-15	4.68E-15	4.68E-15	4.68E-30
na 25	6.06E-32	2.44E-29	2.71E-29	2.97E-29	3.24E-29	6.81E-33
mg 24	5.81E-06	6.43E-06	7.05E-06	7.67E-06	8.29E-06	8.29E-06
mg 25	7.58E-13	8.51E-13	9.43E-13	1:04E-12	1.13E-12	1.13E-12
mg 26	1.03E-10	1.16E-10	1.28E-10	1.41E-10	1.54E-10	1.54E-10
mg 27	1.14E-12	2.10E-12	2.10E-12	2.10E-12	2.10E-12	8.34E-13
mg 28	4.30E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.26E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.67E-11	2.11E-10	2.11E-10	2.11E-10	2.11E-10	4.24E-12
al 29	9.29E-31	2.80E-30	3.42E-30	4.10E-30	4.84E-30	1.27E-30
al 30	.00E+00	2.24E-44	2.94E-44	4.34E-44	5.89E-44	.00E+00
si 28	1.62E-05	1.79E-05	1.96E-05	2.14E-05	2.31E-05	2.31E-05
si 29	8.70E-15	1.09E-14	1.33E-14	1.60E-14	1.88E-14	1.88E-14
si 30	4.90E-24	6.93E-24	9.43E-24	1.25E-23	1.61E-23	1.61E-23
si 31	3.39E-36	4.98E-36	6.78E-36	8.96E-36	1.16E-35	1.09E-35
si 32	1.40E-45	2.80E-45	4.20E-45	7.01E-45	1.12E-44	1.12E-44
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 26
power= 4.000E-03mw, burnup=8.7659E-01mwd, flux= 2.74E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
he 4	2.04E-05	2.30E-05	2.56E-05	2.81E-05	3.07E-05	3.07E-05
th226	6.08E-29	7.78E-29	9.72E-29	1.19E-28	1.43E-28	1.43E-28
th227	2.11E-15	2.77E-15	3.53E-15	4.39E-15	5.33E-15	5.34E-15
th228	8.81E-15	1.22E-14	1.64E-14	2.13E-14	2.72E-14	2.72E-14
th229	2.88E-12	3.83E-12	4.93E-12	6.18E-12	7.57E-12	7.57E-12
th230	1.02E-05	1.15E-05	1.28E-05	1.41E-05	1.53E-05	1.53E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	2.07E-06	2.32E-06	2.58E-06	2.84E-06	3.10E-06	3.10E-06
th233	1.46E-17	2.13E-17	2.37E-17	2.61E-17	2.84E-17	1.92E-17
th234	5.29E-07	5.32E-07	5.34E-07	5.35E-07	5.36E-07	5.36E-07

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     pa231   3.09E-07  3.48E-07  3.87E-07  4.26E-07  4.65E-07  4.65E-07
     pa232   5.29E-15  5.98E-15  6.65E-15  7.32E-15  7.99E-15  7.96E-15
     pa233   1.42E-06  1.43E-06  1.44E-06  1.45E-06  1.45E-06  1.45E-06
     pa234m  1.78E-11  1.79E-11  1.80E-11  1.81E-11  1.81E-11  1.81E-11
     pa234   7.97E-12  8.02E-12  8.05E-12  8.06E-12  8.07E-12  8.07E-12
     pa235    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      u230   5.89E-26  7.54E-26  9.42E-26  1.15E-25  1.38E-25  1.38E-25
      u231   2.94E-21  3.41E-21  3.91E-21  4.43E-21  4.94E-21  4.94E-21
      u232   6.46E-12  8.02E-12  9.75E-12  1.16E-11  1.37E-11  1.37E-11
      u233   4.04E-06  4.71E-06  5.38E-06  6.06E-06  6.74E-06  6.74E-06
      u234   9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
      u235   7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
      u236   1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02
      u237   3.15E-06  3.12E-06  3.11E-06  3.11E-06  3.11E-06  3.11E-06
      u238   3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
      u239   2.51E-07  3.19E-07  3.19E-07  3.19E-07  3.19E-07  2.19E-07
      u240    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   2.01E-12  2.22E-12  2.42E-12  2.62E-12  2.81E-12  2.81E-12
     np236m  2.08E-12  2.06E-12  2.06E-12  2.06E-12  2.06E-12  2.05E-12
     np236   8.06E-11  9.04E-11  1.00E-10  1.10E-10  1.20E-10  1.20E-10
     np237   4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01
     np238   1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.55E-06
     np239   4.65E-05  4.61E-05  4.61E-05  4.61E-05  4.61E-05  4.61E-05
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   8.63E-15  9.37E-15  9.37E-15  9.37E-15  9.37E-15  8.14E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.12E-10  1.25E-10  1.38E-10  1.50E-10  1.63E-10  1.63E-10
     pu237   4.42E-16  5.24E-16  6.08E-16  6.95E-16  7.82E-16  7.82E-16
     pu238   7.35E-05  8.28E-05  9.20E-05  1.01E-04  1.11E-04  1.11E-04
     pu239   1.98E-03  2.22E-03  2.47E-03  2.72E-03  2.97E-03  2.97E-03
     pu240   3.83E-09  4.87E-09  6.02E-09  7.29E-09  8.69E-09  8.69E-09
     pu241   1.01E-14  1.44E-14  1.98E-14  2.63E-14  3.42E-14  3.42E-14
     pu242   7.79E-21  1.25E-20  1.92E-20  2.81E-20  3.99E-20  3.99E-20
     pu243   1.63E-29  2.65E-29  4.05E-29  5.95E-29  8.44E-29  8.19E-29
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.74E+08  2.74E+08  2.74E+08  2.74E+08  2.74E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
```

```
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *       see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
          ***********************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   27
         power=    .00mw, burnup=      1.mwd, flux= 2.71E+08n/cm**2-sec
0                                                basis =
0    (note, k-infinities, slad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial          237.4 d        255.7 d        274.0 d        292.2 d        292.2 d
     productions  1.134699E+06   1.134700E+06   1.134700E+06   1.134700E+06   1.134701E+06   1.134701E+06
     absorptions  9.243443E+05   9.243449E+05   9.243456E+05   9.243463E+05   9.243468E+05   9.243468E+05
     k infinity   1.227572E+00   1.227571E+00   1.227571E+00   1.227570E+00   1.227570E+00   1.227570E+00
0                 initial          237.4 d        255.7 d        274.0 d        292.2 d        292.2 d
     actinide
     absorptions  9.211681E+05   9.211683E+05   9.211683E+05   9.211688E+05   9.211689E+05   9.211689E+05
     non-actinide
     abs. fracs.  3.436208E-03   3.436625E-03   3.437161E-03   3.437379E-03   3.437996E-03   3.437996E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products      page   28
0                                  fraction of total absorption rate
         power=    .00mw, burnup=      1.mwd, flux= 2.71E+08n/cm**2-sec
0                initial  237.4 d   255.7 d   274.0 d   292.2 d   292.2 d

     sm149      4.43E-06  4.81E-06  5.18E-06  5.56E-06  5.93E-06  5.93E-06
     xe135      2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06
     sm151      2.04E-07  2.21E-07  2.39E-07  2.56E-07  2.73E-07  2.73E-07
     nd143      9.67E-08  9.91E-08  1.07E-07  1.16E-07  1.24E-07  1.24E-07
     gd157      4.78E-08  5.18E-08  5.58E-08  5.97E-08  6.37E-08  6.37E-08
     sm113      3.95E-08  4.28E-08  4.61E-08  4.94E-08  5.27E-08  5.27E-08
     pm147      3.72E-08  4.03E-08  4.33E-08  4.63E-08  4.93E-08  4.93E-08
     rh103      3.09E-08  3.43E-08  3.77E-08  4.11E-08  4.45E-08  4.45E-08
```

xe131	2.69E-08	2.93E-08	3.17E-08	3.40E-08	3.64E-08	3.64E-08
cs133	2.27E-08	2.46E-08	2.66E-08	2.86E-08	3.06E-08	3.06E-08
tc 99	1.60E-08	1.73E-08	1.87E-08	2.01E-08	2.14E-08	2.14E-08
eu155	1.35E-08	1.46E-08	1.56E-08	1.67E-08	1.77E-08	1.77E-08
nd145	1.27E-08	1.38E-08	1.48E-08	1.59E-08	1.69E-08	1.69E-08
sm152	6.56E-09	7.11E-09	7.65E-09	8.20E-09	8.75E-09	8.75E-09
rh105	8.37E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09
kr 83	5.46E-09	5.91E-09	6.37E-09	6.82E-09	7.28E-09	7.28E-09
cs135	5.04E-09	5.47E-09	5.89E-09	6.31E-09	6.73E-09	6.73E-09
mo 95	3.72E-09	4.32E-09	4.94E-09	5.57E-09	6.22E-09	6.22E-09
ru101	3.80E-09	4.12E-09	4.44E-09	4.75E-09	5.07E-09	5.07E-09
gd155	2.61E-09	3.05E-09	3.53E-09	4.04E-09	4.58E-09	4.58E-09
eu153	3.29E-09	3.37E-09	3.85E-09	4.13E-09	4.40E-09	4.40E-09
pr141	2.94E-09	3.25E-09	3.56E-09	3.87E-09	4.18E-09	4.18E-09
la139	3.03E-09	3.28E-09	3.53E-09	3.79E-09	4.04E-09	4.04E-09
pr143	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09
xe133	2.07E-09	2.07E-09	2.07E-09	2.07E-09	2.07E-09	2.07E-09
sm147	1.06E-09	1.25E-09	1.46E-09	1.68E-09	1.92E-09	1.92E-09
pd105	1.40E-09	1.52E-09	1.64E-09	1.75E-09	1.87E-09	1.87E-09
zr 93	1.25E-09	1.36E-09	1.46E-09	1.57E-09	1.67E-09	1.67E-09
ce141	1.61E-09	1.61E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09
i129	9.83E-10	9.81E-10	1.06E-09	1.14E-09	1.22E-09	1.22E-09
pm149	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10
nd147	9.31E-10	9.31E-10	9.32E-10	9.32E-10	9.32E-10	9.31E-10
mo 97	6.83E-10	7.40E-10	7.97E-10	8.54E-10	9.11E-10	9.11E-10
ag109	4.71E-10	5.11E-10	5.50E-10	5.89E-10	6.29E-10	6.29E-10
eu151	3.49E-10	4.10E-10	4.76E-10	5.47E-10	6.22E-10	6.22E-10
ru102	2.78E-10	3.02E-10	3.25E-10	3.48E-10	3.71E-10	3.71E-10
ru103	3.51E-10	3.53E-10	3.54E-10	3.55E-10	3.56E-10	3.56E-10
nd144	2.04E-10	2.36E-10	2.70E-10	3.06E-10	3.44E-10	3.44E-10
sr 90	2.53E-10	2.74E-10	2.95E-10	3.16E-10	3.37E-10	3.37E-10
ce142	2.52E-10	2.73E-10	2.95E-10	3.16E-10	3.37E-10	3.37E-10
nd148	2.41E-10	2.61E-10	2.81E-10	3.01E-10	3.21E-10	3.21E-10
zr 91	2.10E-10	2.36E-10	2.61E-10	2.87E-10	3.14E-10	3.14E-10
y 89	2.12E-10	2.37E-10	2.61E-10	2.87E-10	3.12E-10	3.12E-10
ce144	2.50E-10	2.65E-10	2.80E-10	2.94E-10	3.07E-10	3.07E-10
nd146	2.03E-10	2.20E-10	2.37E-10	2.53E-10	2.70E-10	2.70E-10
ba138	1.73E-10	1.88E-10	2.02E-10	2.17E-10	2.31E-10	2.31E-10
in115	1.64E-10	1.78E-10	1.92E-10	2.06E-10	2.20E-10	2.20E-10
pd108	1.61E-10	1.74E-10	1.87E-10	2.01E-10	2.14E-10	2.14E-10
ce140	1.55E-10	1.69E-10	1.83E-10	1.98E-10	2.12E-10	2.12E-10

1 sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2 fission products page 29
8 fraction of total absorption rate
0 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec

	initial	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
xe132	1.43E-10	1.55E-10	1.67E-10	1.79E-10	1.91E-10	1.91E-10
zr 95	1.50E-10	1.53E-10	1.55E-10	1.57E-10	1.58E-10	1.58E-10
y 91	1.35E-10	1.37E-10	1.39E-10	1.41E-10	1.42E-10	1.42E-10
nb 95	1.24E-10	1.29E-10	1.33E-10	1.37E-10	1.40E-10	1.40E-10
mo 98	9.96E-11	1.08E-10	1.16E-10	1.25E-10	1.33E-10	1.33E-10
mo100	9.66E-11	1.05E-10	1.13E-10	1.21E-10	1.29E-10	1.29E-10
pd107	9.60E-11	1.04E-10	1.12E-10	1.20E-10	1.28E-10	1.28E-10
xe134	9.58E-11	1.04E-10	1.12E-10	1.20E-10	1.28E-10	1.28E-10
pm151	1.10E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.10E-10
zr 92	7.84E-11	8.50E-11	9.15E-11	9.81E-11	1.05E-10	1.05E-10
zr 96	6.05E-11	6.55E-11	7.05E-11	7.56E-11	8.06E-11	8.06E-11
ru104	5.95E-11	6.44E-11	6.93E-11	7.43E-11	7.92E-11	7.93E-11
i127	5.65E-11	6.16E-11	6.67E-11	7.19E-11	7.71E-11	7.71E-11
nd150	5.33E-11	5.77E-11	6.22E-11	6.66E-11	7.10E-11	7.10E-11

cs137	5.20E-11	5.63E-11	6.06E-11	6.49E-11	6.92E-11	6.92E-11
xe136	5.17E-11	5.60E-11	6.03E-11	6.46E-11	6.89E-11	6.89E-11
br 81	3.87E-11	4.19E-11	4.51E-11	4.84E-11	5.16E-11	5.16E-11
ba140	4.75E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11	4.75E-11
zr 94	3.27E-11	3.94E-11	3.82E-11	4.09E-11	4.36E-11	4.36E-11
rb 85	3.02E-11	3.28E-11	3.53E-11	3.79E-11	4.04E-11	4.04E-11
sm153	3.02E-11	3.02E-11	3.02E-11	3.02E-11	3.02E-11	3.02E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
cd111	2.38E-11	2.59E-11	2.80E-11	3.01E-11	3.21E-11	3.21E-11
te130	2.35E-11	2.55E-11	2.74E-11	2.94E-11	3.13E-11	3.13E-11
sr 89	2.04E-11	2.08E-11	2.01E-11	2.03E-11	2.06E-11	2.06E-11
sm154	2.27E-11	2.46E-11	2.65E-11	2.84E-11	3.03E-11	3.03E-11
kr 85	2.23E-11	2.41E-11	2.59E-11	2.77E-11	2.95E-11	2.95E-11
rb 87	2.19E-11	2.38E-11	2.56E-11	2.74E-11	2.92E-11	2.92E-11
se 77	1.74E-11	1.89E-11	2.03E-11	2.18E-11	2.33E-11	2.33E-11
kr 87	2.09E-11	2.32E-11	2.32E-11	2.32E-11	2.32E-11	2.01E-11
ba137	1.82E-11	1.19E-11	1.38E-11	1.58E-11	1.80E-11	1.80E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
kr 84	1.03E-11	1.11E-11	1.20E-11	1.29E-11	1.37E-11	1.37E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
sb121	8.11E-12	8.79E-12	9.47E-12	1.02E-11	1.08E-11	1.08E-11
se 79	7.99E-12	8.44E-12	9.32E-12	9.99E-12	1.07E-11	1.07E-11
ru106	8.44E-12	9.02E-12	9.56E-12	1.01E-11	1.06E-11	1.06E-11
sb123	5.77E-12	6.27E-12	6.76E-12	7.26E-12	7.76E-12	7.76E-12
kr 86	5.77E-12	6.25E-12	6.73E-12	7.22E-12	7.70E-12	7.70E-12
te128	5.13E-12	5.56E-12	5.98E-12	6.41E-12	6.84E-12	6.84E-12
i131	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12
te127m	5.55E-12	5.76E-12	5.95E-12	6.12E-12	6.27E-12	6.27E-12
sm150	2.92E-12	3.42E-12	3.96E-12	4.54E-12	5.15E-12	5.15E-12
se 80	3.72E-12	4.03E-12	4.34E-12	4.65E-12	4.96E-12	4.96E-12
gd156	3.59E-12	3.92E-12	4.26E-12	4.59E-12	4.92E-12	4.92E-12
dy161	3.06E-12	3.33E-12	3.59E-12	3.86E-12	4.13E-12	4.13E-12
pd106	1.97E-12	2.29E-12	2.62E-12	2.98E-12	3.35E-12	3.35E-12
tb159	2.30E-12	2.49E-12	2.68E-12	2.87E-12	3.06E-12	3.06E-12

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 30

0 fraction of total absorption rate

0 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec

	initial	237.4 d	255.7 d	274.8 d	292.2 d	292.2 d
li 6	2.12E-12	2.30E-12	2.47E-12	2.65E-12	2.83E-12	2.83E-12
cd112	2.11E-12	2.29E-12	2.46E-12	2.64E-12	2.81E-12	2.81E-12
sb125	2.07E-12	2.23E-12	2.39E-12	2.55E-12	2.71E-12	2.71E-12
sn117	1.67E-12	1.81E-12	1.95E-12	2.09E-12	2.23E-12	2.23E-12
sn119	1.37E-12	1.49E-12	1.60E-12	1.72E-12	1.83E-12	1.83E-12
te129m	1.00E-12	1.01E-12	1.01E-12	1.01E-12	1.02E-12	1.02E-12
sn115	1.26E-12	1.37E-12	1.47E-12	1.58E-12	1.68E-12	1.68E-12
sr 88	1.06E-12	1.15E-12	1.24E-12	1.33E-12	1.41E-12	1.41E-12
pm148m	0.56E-13	1.06E-12	1.17E-12	1.28E-12	1.39E-12	1.39E-12
pd110	7.46E-13	8.08E-13	8.71E-13	9.33E-13	9.95E-13	9.95E-13
cd114	7.24E-13	7.84E-13	8.44E-13	9.05E-13	9.65E-13	9.65E-13
se 82	7.19E-13	7.79E-13	8.39E-13	8.99E-13	9.59E-13	9.59E-13
gd158	6.79E-13	7.36E-13	7.92E-13	8.49E-13	9.06E-13	9.06E-13
sn126	5.76E-13	6.25E-13	6.73E-13	7.21E-13	7.69E-13	7.69E-13
se 78	5.46E-13	5.92E-13	6.37E-13	6.83E-13	7.28E-13	7.28E-13
sn124	4.34E-13	4.70E-13	5.07E-13	5.43E-13	5.79E-13	5.79E-13
dy162	4.16E-13	4.50E-13	4.85E-13	5.19E-13	5.53E-13	5.53E-13
dy164	3.79E-13	4.10E-13	4.41E-13	4.73E-13	5.04E-13	5.04E-13
eu154	3.56E-13	3.88E-13	4.21E-13	4.53E-13	4.89E-13	4.89E-13
as 75	3.25E-13	3.53E-13	3.80E-13	4.07E-13	4.34E-13	4.34E-13

zr 90	2.17E-13	2.55E-13	2.96E-13	3.41E-13	3.88E-13	3.88E-13
te125	2.00E-13	2.36E-13	2.75E-13	3.16E-13	3.61E-13	3.61E-13
y 90	2.37E-13	2.57E-13	2.77E-13	2.96E-13	3.16E-13	3.16E-13
ag111	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.96E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.95E-13
sn118	1.77E-13	1.92E-13	2.06E-13	2.21E-13	2.36E-13	2.36E-13
cd115m	2.30E-13	2.32E-13	2.33E-13	2.34E-13	2.35E-13	2.35E-13
ba136	1.57E-13	1.72E-13	1.86E-13	2.00E-13	2.15E-13	2.15E-13
sn122	1.51E-13	1.64E-13	1.76E-13	1.89E-13	2.01E-13	2.01E-13
cd116	1.51E-13	1.63E-13	1.76E-13	1.88E-13	2.01E-13	2.01E-13
sn120	1.13E-13	1.22E-13	1.31E-13	1.41E-13	1.50E-13	1.50E-13
kr 82	1.05E-13	1.14E-13	1.22E-13	1.31E-13	1.40E-13	1.40E-13
cs134	9.93E-14	1.08E-13	1.17E-13	1.26E-13	1.36E-13	1.36E-13
dy163	9.19E-14	9.95E-14	1.07E-13	1.15E-13	1.22E-13	1.22E-13
ge 73	8.84E-14	9.58E-14	1.03E-13	1.11E-13	1.18E-13	1.18E-13
ru 99	8.46E-14	9.20E-14	9.95E-14	1.07E-13	1.15E-13	1.15E-13
xe130	6.04E-14	6.54E-14	7.05E-14	7.56E-14	8.06E-14	8.06E-14
pm148	4.81E-14	5.23E-14	5.64E-14	6.05E-14	6.45E-14	6.44E-14
mo 96	4.37E-14	4.74E-14	5.11E-14	5.47E-14	5.84E-14	5.84E-14
cs136	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14
ge 76	3.21E-14	3.48E-14	3.75E-14	4.02E-14	4.29E-14	4.29E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.91E-14
ru105	2.91E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.89E-14
gd160	2.82E-14	2.18E-14	2.35E-14	2.52E-14	2.69E-14	2.69E-14
te126	1.50E-14	1.63E-14	1.76E-14	1.89E-14	2.02E-14	2.02E-14
rb 88	1.28E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	1.27E-14
ru100	8.33E-15	9.07E-15	9.81E-15	1.06E-14	1.13E-14	1.13E-14
i135	1.00E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	9.92E-15
te132	9.59E-15	9.60E-15	9.61E-15	9.61E-15	9.61E-15	9.59E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 31
0 fraction of total absorption rate
0 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec

	Initial	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
ho165	6.35E-15	6.88E-15	7.41E-15	7.93E-15	8.46E-15	8.46E-15
sn123	6.97E-15	7.26E-15	7.52E-15	7.76E-15	7.98E-15	7.98E-15
in113	3.60E-15	4.22E-15	4.89E-15	5.61E-15	6.38E-15	6.38E-15
sr 87	3.70E-15	4.01E-15	4.32E-15	4.63E-15	4.93E-15	4.93E-15
te134	4.79E-15	5.00E-15	5.00E-15	5.00E-15	5.00E-15	4.46E-15
te124	2.47E-15	2.76E-15	3.05E-15	3.35E-15	3.65E-15	3.65E-15
eu152	1.91E-15	2.24E-15	2.62E-15	3.04E-15	3.51E-15	3.51E-15
sb126	3.81E-15	3.82E-15	3.82E-15	3.82E-15	3.82E-15	3.82E-15
nb 94	2.89E-15	2.26E-15	2.44E-15	2.61E-15	2.78E-15	2.78E-15
ge 74	1.79E-15	1.94E-15	2.09E-15	2.24E-15	2.39E-15	2.39E-15
in117m	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15
sb124	1.93E-15	1.87E-15	1.99E-15	2.01E-15	2.03E-15	2.03E-15
ge 72	1.24E-15	1.34E-15	1.45E-15	1.55E-15	1.66E-15	1.66E-15
sr 86	9.20E-16	1.01E-15	1.10E-15	1.18E-15	1.27E-15	1.27E-15
se 76	7.52E-16	8.15E-16	8.79E-16	9.42E-16	1.00E-15	1.00E-15
ba135	6.45E-16	7.21E-16	8.01E-16	8.83E-16	9.69E-16	9.69E-16
sm148	4.66E-16	5.61E-16	6.64E-16	7.77E-16	8.99E-16	8.99E-16
i130	7.10E-16	7.17E-16	7.17E-16	7.17E-16	7.17E-16	7.08E-16
in117	6.18E-16	6.18E-16	6.18E-16	6.18E-16	6.18E-16	6.17E-16
nd142	3.87E-16	3.60E-16	4.18E-16	4.80E-16	5.46E-16	5.46E-16
gd154	2.76E-16	3.26E-16	3.79E-16	4.38E-16	5.00E-16	5.00E-16
ba134	1.74E-16	2.05E-16	2.39E-16	2.75E-16	3.14E-16	3.14E-16
tb160	2.67E-16	2.74E-16	2.79E-16	2.84E-16	2.88E-16	2.88E-16
pd104	1.26E-16	1.52E-16	1.81E-16	2.13E-16	2.47E-16	2.47E-16
rb 86	2.42E-16	2.43E-16	2.43E-16	2.43E-16	2.43E-16	2.43E-16
gd152	1.39E-16	1.60E-16	1.83E-16	2.08E-16	2.35E-16	2.35E-16

er166	1.74E-16	1.89E-16	2.04E-16	2.19E-16	2.34E-16	2.34E-16
xe128	1.67E-16	1.81E-16	1.95E-16	2.09E-16	2.23E-16	2.23E-16
dy163	2.03E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	1.99E-16
cd110	8.94E-17	1.01E-16	1.13E-16	1.25E-16	1.38E-16	1.38E-16
dy160	7.91E-17	8.92E-17	9.95E-17	1.10E-16	1.21E-16	1.21E-16
cd118	1.02E-16	1.21E-16	1.21E-16	1.21E-16	1.21E-16	9.61E-17
fe 75	8.06E-17	8.71E-17	8.71E-17	8.71E-17	8.71E-17	7.78E-17
kr 80	5.01E-17	5.43E-17	5.85E-17	6.27E-17	6.69E-17	6.69E-17
br 79	2.24E-17	2.60E-17	2.99E-17	3.41E-17	3.85E-17	3.85E-17
xe129	1.08E-17	1.27E-17	1.48E-17	1.70E-17	1.93E-17	1.93E-17
in119m	2.17E-17	3.03E-17	3.03E-17	3.03E-17	3.03E-17	1.85E-17
ag107	1.03E-17	1.21E-17	1.40E-17	1.61E-17	1.83E-17	1.83E-17
te122	6.51E-18	7.06E-18	7.63E-18	8.23E-18	8.81E-18	8.81E-18
ba 9	3.99E-18	4.32E-18	4.65E-18	4.98E-18	5.32E-18	5.32E-18
pr142	3.90E-18	4.28E-18	4.63E-18	4.98E-18	5.33E-18	5.28E-18
nb 93	2.48E-18	2.76E-18	3.04E-18	3.35E-18	3.67E-18	3.67E-18
sn116	2.19E-18	2.42E-18	2.66E-18	2.88E-18	3.12E-18	3.12E-18
te123	2.01E-18	2.25E-18	2.49E-18	2.74E-18	2.99E-18	2.99E-18
li 7	1.63E-18	1.77E-18	1.90E-18	2.04E-18	2.18E-18	2.18E-18
er167	6.55E-19	7.09E-19	7.63E-19	8.17E-19	8.74E-19	8.74E-19
in119	3.41E-19	2.37E-18	2.37E-18	2.37E-18	2.37E-18	1.65E-19
cd109	5.06E-20	5.74E-20	6.07E-20	6.41E-20	6.75E-20	6.75E-20
cd108	3.37E-20	3.71E-20	3.71E-20	4.05E-20	4.39E-20	4.39E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 32
0 fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec

	initial	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
cs134m	3.04E-20	3.37E-20	3.71E-20	4.05E-20	4.39E-20	4.05E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 33
power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
h 1	5.18E-08	5.41E-08	6.03E-08	6.46E-08	6.68E-08	6.08E-08
h 2	1.54E-10	1.66E-10	1.79E-10	1.92E-10	2.04E-10	2.04E-10
h 3	1.11E-12	1.20E-12	1.29E-12	1.38E-12	1.46E-12	1.46E-12
h 4	.00E+00	4.87E-36	5.24E-36	5.60E-36	5.96E-36	.00E+00
he 3	1.89E-14	2.22E-14	2.57E-14	2.94E-14	3.34E-14	3.34E-14
he 4	8.57E-09	9.27E-09	9.97E-09	1.07E-08	1.16E-08	1.16E-08
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.03E-09	1.11E-09	1.20E-09	1.28E-09	1.37E-09	1.37E-09
ne 21	2.12E-17	2.46E-17	2.82E-17	3.21E-17	3.62E-17	3.62E-17
ne 22	5.14E-13	6.00E-13	6.92E-13	7.90E-13	8.94E-13	8.94E-13
ne 23	5.25E-21	7.03E-15	7.03E-15	7.03E-15	7.03E-15	4.64E-23
na 22	6.22E-12	6.68E-12	7.14E-12	7.60E-12	8.04E-12	8.04E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.82E-08	2.77E-08	2.77E-08	2.77E-08	2.77E-08	2.73E-08
na 24m	4.68E-30	4.55E-15	4.55E-15	4.55E-15	4.55E-15	4.55E-30
na 25	4.81E-33	3.49E-29	3.73E-29	4.02E-29	4.28E-29	3.31E-34
mg 24	8.29E-06	8.89E-06	9.49E-06	1.01E-05	1.07E-05	1.07E-05
mg 25	1.13E-12	1.22E-12	1.32E-12	1.41E-12	1.50E-12	1.50E-12
mg 26	1.54E-10	1.66E-10	1.79E-10	1.92E-10	2.04E-10	2.04E-10
mg 27	8.54E-13	2.10E-12	2.10E-12	2.10E-12	2.10E-12	6.11E-13
mg 28	4.24E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.25E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.24E-12	2.05E-10	2.05E-10	2.05E-10	2.05E-10	1.11E-12
al 29	1.27E-30	5.60E-30	6.44E-30	7.34E-30	8.29E-30	1.40E-30
al 30	.00E+00	7.29E-44	8.69E-44	1.02E-43	1.23E-43	.00E+00

si 28	2.31E-05	2.48E-05	2.64E-05	2.81E-05	2.98E-05	2.98E-05
si 29	1.88E-14	2.19E-14	2.52E-14	2.87E-14	3.25E-14	3.25E-14
si 30	1.61E-23	2.03E-23	2.52E-23	3.08E-23	3.71E-23	3.71E-23
si 31	1.09E-35	1.46E-35	1.81E-35	2.21E-35	2.67E-35	2.68E-35
si 32	1.12E-44	1.54E-44	2.10E-44	2.80E-44	3.64E-44	3.64E-44
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

0
1

gas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 34
power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	237.4 d	255.7 d	276.8 d	292.2 d	292.2 d
he 4	3.07E-05	3.33E-05	3.59E-05	3.85E-05	4.11E-05	4.11E-05
ra222	2.97E-30	3.45E-30	4.01E-30	4.62E-30	5.28E-30	5.35E-30
ra223	2.81E-15	3.40E-15	4.05E-15	4.76E-15	5.53E-15	5.53E-15
ra224	1.33E-16	1.67E-16	2.06E-16	2.51E-16	3.01E-16	3.01E-16
ra225	3.11E-17	3.82E-17	4.60E-17	5.46E-17	6.39E-17	6.39E-17
ra226	4.23E-11	4.96E-11	5.76E-11	6.61E-11	7.52E-11	7.52E-11
ra228	6.48E-17	5.24E-17	6.07E-17	6.95E-17	7.90E-17	7.90E-17
th226	1.43E-28	1.68E-28	1.96E-28	2.26E-28	2.58E-28	2.57E-28
th227	5.34E-15	6.58E-15	7.51E-15	8.74E-15	1.01E-14	1.01E-14
th228	2.72E-14	3.39E-14	4.17E-14	5.05E-14	6.05E-14	6.05E-14
th229	7.97E-12	9.11E-12	1.08E-11	1.26E-11	1.46E-11	1.46E-11
th230	1.53E-05	1.66E-05	1.79E-05	1.92E-05	2.06E-05	2.06E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	3.70E-06	3.36E-06	3.61E-06	3.87E-06	4.13E-06	4.13E-06
th233	1.92E-17	3.08E-17	3.31E-17	3.55E-17	3.79E-17	2.26E-17
th234	5.36E-07	5.36E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	4.65E-07	5.04E-07	5.43E-07	5.82E-07	6.21E-07	6.21E-07
pa232	7.96E-15	8.46E-15	9.33E-15	1.00E-14	1.07E-14	1.06E-14
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.08E-12	8.08E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.38E-25	1.63E-25	1.90E-25	2.19E-25	2.49E-25	2.49E-25
u231	4.94E-21	5.43E-21	5.94E-21	6.46E-21	6.97E-21	6.96E-21
u232	1.37E-11	1.59E-11	1.82E-11	2.07E-11	2.33E-11	2.33E-11
u233	6.74E-06	7.42E-06	8.10E-06	8.79E-06	9.47E-06	9.47E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.11E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.19E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	1.93E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.61E-12	2.99E-12	3.17E-12	3.34E-12	3.51E-12	3.51E-12
np236m	2.05E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	2.03E-12
np236	1.20E-10	1.29E-10	1.39E-10	1.49E-10	1.59E-10	1.59E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.61E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	8.14E-15	9.33E-15	9.33E-15	9.33E-15	9.33E-15	7.73E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.63E-10	1.75E-10	1.87E-10	1.99E-10	2.11E-10	2.11E-10
pu237	7.02E-16	8.69E-16	9.37E-16	1.05E-15	1.16E-15	1.16E-15
pu238	1.11E-04	1.20E-04	1.29E-04	1.38E-04	1.48E-04	1.48E-04
pu239	2.97E-03	3.22E-03	3.46E-03	3.71E-03	3.96E-03	3.96E-03

```
     pu240   8.69E-09  1.02E-08  1.18E-08  1.36E-08  1.55E-08  1.55E-08
     pu241   3.42E-14  4.35E-14  5.43E-14  6.68E-14  8.10E-14  8.10E-14
     pu242   3.99E-20  5.50E-20  7.41E-20  9.77E-20  1.27E-19  1.27E-19
1
     sas2h: fer-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   35
       power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                            basis = single reactor assembly
             charge   237.4 d   255.7 d   274.0 d   292.2 d   292.2 d
     pu243   8.19E-29  1.16E-28  1.56E-28  2.06E-28  2.66E-28  2.66E-28
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.71E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
library information...

          cross-section data taken from position number  1 of library on unit 15.

          pass   5
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "prestas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                   fission product yields are from endf/b-v               *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
          *        use information above this box (if present) for later updates     *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
```

```
0        ****************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft15f001
0               8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ****************************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   36
      powers=    .00mw, burnup=      1.mwd, flux= 2.70E+08n/cm**2-sec
0                                                  basis =
0   (note, k-infinities, eled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial        310.5 d        328.8 d        347.0 d        365.3 d
    productions   1.138348E+06   1.138348E+06   1.138348E+06   1.138349E+06   1.138349E+06
    absorptions   9.268934E+05   9.268941E+05   9.268948E+05   9.268954E+05   9.268959E+05
    k infinity    1.228132E+00   1.228132E+00   1.228131E+00   1.228131E+00   1.228130E+00
0                   initial        310.5 d        328.8 d        347.0 d        365.3 d
    actinide
    absorptions   9.237305E+05   9.237308E+05   9.237310E+05   9.237313E+05   9.237315E+05
    non-actinide
    abs. fracs.   3.412426E-03   3.412783E-03   3.413260E-03   3.413677E-03   3.414033E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products      page   37
0                                  fraction of total absorption rate
      powers=    .00mw, burnup=      1.mwd, flux= 2.70E+08n/cm**2-sec
0                initial   310.5 d    328.8 d    347.0 d    365.3 d

    sm149      5.94E-06   6.31E-06   6.69E-06   7.06E-06   7.44E-06
    xe135      2.33E-06   2.34E-06   2.34E-06   2.34E-06   2.34E-06
    sm151      2.73E-07   2.90E-07   3.07E-07   3.24E-07   3.41E-07
    nd143      1.24E-07   1.33E-07   1.41E-07   1.49E-07   1.58E-07
    gd157      6.38E-08   6.77E-08   7.17E-08   7.57E-08   7.97E-08
    cd113      5.27E-08   5.60E-08   5.93E-08   6.26E-08   6.59E-08
    pm147      4.93E-08   5.22E-08   5.51E-08   5.79E-08   6.07E-08
    rh103      4.45E-08   4.79E-08   5.14E-08   5.48E-08   5.82E-08
    xe131      3.64E-08   3.88E-08   4.11E-08   4.35E-08   4.59E-08
    cs133      3.05E-08   3.25E-08   3.45E-08   3.64E-08   3.84E-08
    tc 99      2.14E-08   2.28E-08   2.41E-08   2.55E-08   2.68E-08
    eu155      1.77E-08   1.87E-08   1.98E-08   2.08E-08   2.18E-08
    nd145      1.69E-08   1.80E-08   1.91E-08   2.01E-08   2.12E-08
    sm152      8.74E-09   9.29E-09   9.84E-09   1.04E-08   1.09E-08
    kr 83      7.28E-09   7.74E-09   8.19E-09   8.65E-09   9.10E-09
    mo 95      6.22E-09   6.88E-09   7.55E-09   8.23E-09   8.92E-09
    cs135      6.73E-09   7.15E-09   7.57E-09   8.00E-09   8.42E-09
    rh105      6.37E-09   6.37E-09   6.37E-09   6.37E-09   6.37E-09
    gd155      4.59E-09   5.17E-09   5.78E-09   6.42E-09   7.10E-09
    ru101      5.07E-09   5.38E-09   5.70E-09   6.02E-09   6.33E-09
    eu153      4.40E-09   4.68E-09   4.96E-09   5.24E-09   5.51E-09
    pr141      4.18E-09   4.49E-09   4.81E-09   5.12E-09   5.43E-09
    la139      4.06E-09   4.29E-09   4.53E-09   4.80E-09   5.05E-09
    sm147      1.92E-09   2.17E-09   2.44E-09   2.72E-09   3.01E-09
    pr143      2.88E-09   2.88E-09   2.88E-09   2.88E-09   2.88E-09
    pd105      1.87E-09   1.99E-09   2.11E-09   2.23E-09   2.34E-09
    zr 93      1.67E-09   1.78E-09   1.88E-09   1.99E-09   2.09E-09
    xe133      2.07E-09   2.07E-09   2.07E-09   2.07E-09   2.07E-09
    ce141      1.62E-09   1.62E-09   1.62E-09   1.63E-09   1.63E-09
    i129       1.22E-09   1.30E-09   1.37E-09   1.45E-09   1.53E-09
    mo 97      9.12E-10   9.69E-10   1.03E-09   1.08E-09   1.14E-09
    pm149      9.82E-10   9.82E-10   9.82E-10   9.82E-10   9.82E-10
```

eu151	6.22E-10	7.03E-10	7.88E-10	8.78E-10	9.73E-10
nd147	9.31E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10
ag109	6.28E-10	6.67E-10	7.07E-10	7.46E-10	7.85E-10
nd144	3.44E-10	3.83E-10	4.24E-10	4.66E-10	5.10E-10
ru102	3.71E-10	3.95E-10	4.18E-10	4.41E-10	4.64E-10
ce142	3.37E-10	3.58E-10	3.79E-10	4.00E-10	4.21E-10
zr 91	3.36E-10	3.40E-10	3.67E-10	3.94E-10	4.21E-10
sr 90	3.37E-10	3.58E-10	3.79E-10	4.00E-10	4.20E-10
y 89	3.12E-10	3.37E-10	3.63E-10	3.89E-10	4.14E-10
nd148	3.21E-10	3.42E-10	3.62E-10	3.82E-10	4.02E-10
ru103	3.56E-10	3.57E-10	3.57E-10	3.57E-10	3.58E-10
ce144	3.07E-10	3.20E-10	3.33E-10	3.45E-10	3.56E-10
nd146	2.70E-10	2.87E-10	3.04E-10	3.21E-10	3.38E-10
ba138	2.31E-10	2.46E-10	2.60E-10	2.75E-10	2.89E-10
in115	2.20E-10	2.34E-10	2.48E-10	2.62E-10	2.76E-10
ce140	2.12E-10	2.26E-10	2.40E-10	2.55E-10	2.69E-10
pd108	2.14E-10	2.27E-10	2.41E-10	2.54E-10	2.67E-10

1 sas2h: far-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 38
0 fraction of total absorption rate
0 power= .80mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec

	initial	310.5 d	328.8 d	347.8 d	365.3 d
xe132	1.91E-10	2.03E-10	2.15E-10	2.28E-10	2.40E-10
mo 98	1.33E-10	1.41E-10	1.49E-10	1.58E-10	1.66E-10
zr 95	1.58E-10	1.60E-10	1.61E-10	1.61E-10	1.62E-10
mo100	1.29E-10	1.37E-10	1.45E-10	1.53E-10	1.61E-10
xe134	1.28E-10	1.36E-10	1.44E-10	1.52E-10	1.60E-10
pd107	1.28E-10	1.36E-10	1.44E-10	1.52E-10	1.60E-10
nb 95	1.40E-10	1.42E-10	1.44E-10	1.46E-10	1.47E-10
y 91	1.42E-10	1.43E-10	1.43E-10	1.44E-10	1.44E-10
zr 92	1.05E-10	1.11E-10	1.18E-10	1.24E-10	1.31E-10
pm151	1.10E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
zr 96	8.05E-11	8.56E-11	9.06E-11	9.56E-11	1.01E-10
ru104	7.92E-11	8.42E-11	8.91E-11	9.41E-11	9.90E-11
i127	7.70E-11	8.22E-11	8.75E-11	9.27E-11	9.79E-11
nd150	7.10E-11	7.55E-11	7.99E-11	8.44E-11	8.88E-11
cs137	6.92E-11	7.35E-11	7.78E-11	8.20E-11	8.63E-11
xe136	6.89E-11	7.32E-11	7.76E-11	8.19E-11	8.62E-11
br 81	5.16E-11	5.48E-11	5.80E-11	6.12E-11	6.45E-11
zr 94	4.36E-11	4.63E-11	4.91E-11	5.18E-11	5.45E-11
rb 85	4.04E-11	4.30E-11	4.55E-11	4.81E-11	5.06E-11
ba140	4.75E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11
cd111	3.22E-11	3.42E-11	3.63E-11	3.84E-11	4.05E-11
te130	3.14E-11	3.33E-11	3.53E-11	3.72E-11	3.92E-11
sm153	3.82E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11
sm154	3.63E-11	3.72E-11	3.41E-11	3.60E-11	3.79E-11
kr 85	2.95E-11	3.13E-11	3.31E-11	3.49E-11	3.67E-11
rb 87	2.92E-11	3.11E-11	3.29E-11	3.47E-11	3.66E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
sr 89	3.04E-11	3.06E-11	3.07E-11	3.07E-11	3.08E-11
ce 77	2.33E-11	2.47E-11	2.62E-11	2.77E-11	2.91E-11
ba137	1.80E-11	2.03E-11	2.27E-11	2.53E-11	2.80E-11
kr 87	2.01E-11	2.32E-11	2.32E-11	2.32E-11	2.32E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
kr 84	1.37E-11	1.46E-11	1.54E-11	1.63E-11	1.71E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
sb121	1.08E-11	1.15E-11	1.22E-11	1.29E-11	1.35E-11
se 79	1.07E-11	1.13E-11	1.20E-11	1.27E-11	1.33E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
ru106	1.06E-11	1.11E-11	1.15E-11	1.20E-11	1.24E-11

sb123	7.76E-12	8.26E-12	8.76E-12	9.27E-12	9.77E-12
kr 86	7.70E-12	8.18E-12	8.66E-12	9.15E-12	9.63E-12
te128	6.84E-12	7.27E-12	7.70E-12	8.12E-12	8.55E-12
sm150	5.15E-12	5.81E-12	6.50E-12	7.24E-12	8.01E-12
i131	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12
te127m	4.27E-12	4.40E-12	4.52E-12	4.63E-12	4.72E-12
gd156	4.92E-12	5.25E-12	5.58E-12	5.91E-12	6.24E-12
se 80	4.97E-12	5.28E-12	5.59E-12	5.90E-12	6.21E-12
dy161	4.13E-12	4.39E-12	4.66E-12	4.92E-12	5.19E-12
pd106	3.35E-12	3.75E-12	4.16E-12	4.58E-12	5.03E-12
tb159	3.06E-12	3.26E-12	3.45E-12	3.64E-12	3.83E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 39
0 fraction of total absorption rate
0 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec

	initial 310.5 d	328.8 d	347.0 d	365.3 d
li 6	2.83E-12	3.00E-12	3.18E-12	3.36E-12	3.53E-12
cd112	2.82E-12	2.99E-12	3.17E-12	3.35E-12	3.52E-12
sb125	2.71E-12	2.86E-12	3.01E-12	3.16E-12	3.31E-12
sn117	2.23E-12	2.37E-12	2.51E-12	2.65E-12	2.78E-12
sn119	1.83E-12	1.95E-12	2.06E-12	2.17E-12	2.29E-12
sn115	1.69E-12	1.79E-12	1.90E-12	2.01E-12	2.11E-12
te129m	1.82E-12	1.82E-12	1.82E-12	1.82E-12	1.82E-12
pm148m	1.39E-12	1.49E-12	1.60E-12	1.70E-12	1.80E-12
sr 88	1.41E-12	1.50E-12	1.59E-12	1.68E-12	1.77E-12
pd110	9.94E-13	1.06E-12	1.12E-12	1.18E-12	1.24E-12
cd114	9.44E-13	1.02E-12	1.08E-12	1.15E-12	1.21E-12
se 82	9.40E-13	1.02E-12	1.08E-12	1.14E-12	1.20E-12
gd158	9.05E-13	9.62E-13	1.02E-12	1.08E-12	1.13E-12
sn126	7.69E-13	8.17E-13	8.65E-13	9.14E-13	9.62E-13
se 78	7.28E-13	7.74E-13	8.19E-13	8.65E-13	9.11E-13
sn124	5.79E-13	6.15E-13	6.51E-13	6.87E-13	7.23E-13
dy162	5.53E-13	5.88E-13	6.22E-13	6.56E-13	6.90E-13
dy164	5.04E-13	5.36E-13	5.67E-13	5.98E-13	6.30E-13
eu154	4.89E-13	5.23E-13	5.58E-13	5.93E-13	6.29E-13
zr 90	3.88E-13	4.39E-13	4.92E-13	5.49E-13	6.09E-13
te125	3.41E-13	4.08E-13	4.38E-13	4.11E-13	3.66E-13
se 75	4.34E-13	4.61E-13	4.88E-13	5.15E-13	5.43E-13
y 90	3.17E-13	3.36E-13	3.56E-13	3.76E-13	3.96E-13
ag111	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.95E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13
sn118	2.56E-13	2.50E-13	2.65E-13	2.80E-13	2.95E-13
ba136	2.15E-13	2.29E-13	2.43E-13	2.58E-13	2.72E-13
sn122	2.01E-13	2.14E-13	2.26E-13	2.39E-13	2.52E-13
cd116	2.01E-13	2.13E-13	2.26E-13	2.38E-13	2.51E-13
cd115m	2.35E-13	2.36E-13	2.36E-13	2.36E-13	2.37E-13
sn120	1.50E-13	1.60E-13	1.69E-13	1.78E-13	1.88E-13
kr 82	1.40E-13	1.49E-13	1.58E-13	1.67E-13	1.75E-13
cs134	1.36E-13	1.45E-13	1.54E-13	1.64E-13	1.73E-13
dy163	1.22E-13	1.30E-13	1.38E-13	1.43E-13	1.53E-13
ge 73	1.18E-13	1.25E-13	1.33E-13	1.40E-13	1.48E-13
ru 99	1.14E-13	1.22E-13	1.30E-13	1.37E-13	1.45E-13
xe130	8.07E-14	8.57E-14	9.08E-14	9.59E-14	1.01E-13
pm148	6.44E-14	6.84E-14	7.23E-14	7.62E-14	8.00E-14
mo 96	5.84E-14	6.21E-14	6.58E-14	6.94E-14	7.31E-14
cs136	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14
ge 76	4.29E-14	4.55E-14	4.82E-14	5.09E-14	5.36E-14
gd160	2.69E-14	2.85E-14	3.02E-14	3.19E-14	3.36E-14
ru105	2.88E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14
sn125	2.91E-14	2.91E-14	2.92E-14	2.92E-14	2.92E-14

```
     te126     2.02E-14  2.15E-14  2.29E-14  2.42E-14  2.55E-14
     ru100     1.13E-14  1.21E-14  1.28E-14  1.36E-14  1.44E-14
     rb 85     1.27E-14  1.30E-14  1.30E-14  1.30E-14  1.30E-14
     ho165     8.46E-15  8.99E-15  9.51E-15  1.00E-14  1.06E-14
      i135     9.93E-15  1.02E-14  1.02E-14  1.02E-14  1.02E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  40
0                        fraction of total absorption rate
          power=    .00mw, burnup=    1.mwd, flux= 2.70E+08n/cm**2-sec
0                initial   310.5 d    328.8 d    347.0 d    365.3 d

     in113     6.38E-15  7.19E-15  8.06E-15  8.97E-15  9.93E-15
     te132     9.59E-15  9.61E-15  9.61E-15  9.61E-15  9.61E-15
     sn123     7.07E-15  8.17E-15  8.35E-15  8.51E-15  8.66E-15
     sr 87     4.04E-15  5.24E-15  5.55E-15  5.86E-15  6.17E-15
     eu152     3.51E-15  4.03E-15  4.61E-15  5.25E-15  5.94E-15
     te134     4.47E-15  5.90E-15  5.90E-15  5.90E-15  5.90E-15
     te124     3.46E-15  3.96E-15  4.27E-15  4.57E-15  4.88E-15
     nb 94     2.78E-15  2.96E-15  3.13E-15  3.31E-15  3.48E-15
     sb126     3.02E-15  3.02E-15  3.02E-15  3.02E-15  3.02E-15
     ge 74     2.39E-15  2.54E-15  2.69E-15  2.84E-15  2.99E-15
     in117m    2.10E-15  2.11E-15  2.11E-15  2.11E-15  2.11E-15
     ge 72     1.66E-15  1.76E-15  1.87E-15  1.97E-15  2.08E-15
     sb124     2.03E-15  2.04E-15  2.06E-15  2.07E-15  2.07E-15
     sr 86     1.27E-15  1.34E-15  1.45E-15  1.53E-15  1.62E-15
     sm148     8.99E-16  1.03E-15  1.17E-15  1.32E-15  1.47E-15
     ba135     9.69E-16  1.06E-15  1.15E-15  1.25E-15  1.35E-15
     se 76     1.01E-15  1.07E-15  1.13E-15  1.20E-15  1.26E-15
     nd142     5.46E-16  6.18E-16  6.93E-16  7.73E-16  8.58E-16
     gd154     5.00E-16  5.68E-16  6.39E-16  7.16E-16  7.97E-16
      i130     7.08E-16  7.17E-16  7.18E-16  7.18E-16  7.18E-16
     in117     4.17E-16  4.19E-16  4.19E-16  4.19E-16  4.19E-16
     ba134     3.14E-16  3.54E-16  4.01E-16  4.49E-16  4.99E-16
     pd104     2.47E-16  2.85E-16  3.25E-16  3.67E-16  4.13E-16
     gd152     2.36E-16  2.66E-16  2.99E-16  3.35E-16  3.74E-16
     tb160     2.88E-16  2.91E-16  2.96E-16  2.97E-16  2.99E-16
     er166     2.34E-16  2.49E-16  2.64E-16  2.79E-16  2.93E-16
     xe128     2.23E-16  2.38E-16  2.52E-16  2.66E-16  2.80E-16
     rb 86     2.43E-16  2.43E-16  2.43E-16  2.43E-16  2.43E-16
     dy165     1.99E-16  2.10E-16  2.10E-16  2.10E-16  2.10E-16
     cd110     1.39E-16  1.52E-16  1.66E-16  1.81E-16  1.96E-16
     dy160     1.21E-16  1.32E-16  1.42E-16  1.54E-16  1.65E-16
     cd118     9.62E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16
     ge 73     7.78E-17  8.72E-17  8.72E-17  8.72E-17  8.72E-17
     kr 80     6.69E-17  7.11E-17  7.53E-17  7.94E-17  8.36E-17
     br 79     3.85E-17  4.32E-17  4.82E-17  5.35E-17  5.90E-17
     in119m    1.86E-17  3.03E-17  3.03E-17  3.03E-17  3.03E-17
     xe129     1.93E-17  2.18E-17  2.45E-17  2.73E-17  3.03E-17
     ag107     1.83E-17  2.07E-17  2.32E-17  2.58E-17  2.86E-17
     te122     8.00E-18  9.38E-18  9.96E-18  1.05E-17  1.11E-17
     pr142     5.28E-18  5.68E-18  6.04E-18  6.39E-18  6.74E-18
     be  9     5.31E-18  5.64E-18  5.98E-18  6.31E-18  6.64E-18
     nb 93     3.67E-18  4.01E-18  4.37E-18  4.75E-18  5.16E-18
     sn116     3.11E-18  3.36E-18  3.61E-18  3.86E-18  4.12E-18
     te123     2.99E-18  3.25E-18  3.51E-18  3.78E-18  4.05E-18
     li  7     2.18E-18  2.31E-18  2.45E-18  2.59E-18  2.72E-18
     in119     1.65E-19  2.37E-18  2.37E-18  2.37E-18  2.37E-18
     er167     8.74E-19  9.29E-19  9.84E-19  1.04E-18  1.09E-18
     ad109     6.62E-20  6.95E-20  7.26E-20  7.57E-20  7.88E-20
     cd108     4.40E-20  4.68E-20  4.96E-20  5.23E-20  5.51E-20
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  41
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0                                   fraction of total absorption rate
        power=     .00mw, burnup=     .1mwd, flux= 2.70E+08n/cm**2-sec
0             initial   310.5 d   328.8 d   347.0 d   365.3 d

    cs134m    4.02E-20  4.57E-20  4.84E-20  5.12E-20  5.40E-20
    ag110     9.08E-24  1.40E-21  1.43E-21  1.50E-21  1.55E-21
    sn116     5.77E-22  6.18E-22  6.59E-22  7.00E-22  7.42E-22
    in120     4.33E-28  3.98E-22  3.98E-22  3.98E-22  3.98E-22
    in120m    1.09E-29  4.28E-23  4.28E-23  4.28E-23  4.28E-23
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements          page   42
      power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
            charge   310.5 d   328.8 d   347.0 d   365.3 d
     h  1   6.88E-08  7.31E-08  7.74E-08  8.16E-08  8.59E-08
     h  2   2.04E-10  2.17E-10  2.29E-10  2.42E-10  2.55E-10
     h  3   1.46E-12  1.55E-12  1.64E-12  1.73E-12  1.82E-12
     h  4    .00E+00  6.32E-36  6.68E-36  7.03E-36  7.39E-36
    he  3   3.34E-14  3.76E-14  4.21E-14  4.69E-14  5.18E-14
    he  4   1.14E-08  1.21E-08  1.28E-08  1.35E-08  1.42E-08
    he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20   1.37E-09  1.43E-09  1.54E-09  1.62E-09  1.70E-09
    ne 21   3.42E-17  4.06E-17  4.52E-17  5.00E-17  5.51E-17
    ne 22   8.94E-13  1.00E-12  1.12E-12  1.24E-12  1.37E-12
    ne 23   4.64E-23  7.03E-15  7.03E-15  7.03E-15  7.03E-15
    na 22   8.04E-12  8.49E-12  8.92E-12  9.35E-12  9.78E-12
    na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24   2.73E-08  2.74E-08  2.74E-08  2.74E-08  2.74E-08
    na 24m  4.35E-30  4.51E-15  4.51E-15  4.51E-15  4.51E-15
    na 25   3.31E-34  4.54E-29  4.80E-29  5.07E-29  5.33E-29
    mg 24   1.07E-05  1.13E-05  1.19E-05  1.25E-05  1.31E-05
    mg 25   1.50E-12  1.59E-12  1.69E-12  1.78E-12  1.87E-12
    mg 26   2.04E-10  2.17E-10  2.29E-10  2.42E-10  2.55E-10
    mg 27   6.11E-13  7.10E-12  7.10E-12  7.10E-12  7.10E-12
    mg 28   4.25E-24  4.29E-24  4.29E-24  4.29E-24  4.29E-24
    al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
    al 28   1.11E-12  2.03E-10  2.03E-10  2.03E-10  2.03E-10
    al 29   1.40E-30  1.29E-30  1.03E-29  1.15E-29  1.26E-29
    al 30    .00E+00  1.53E-43  1.75E-43  2.12E-43  2.40E-43
    si 28   2.98E-05  3.14E-05  3.31E-05  3.47E-05  3.64E-05
    si 29   5.25E-14  5.64E-14  6.06E-14  6.49E-14  6.95E-14
    si 30   3.71E-23  4.43E-23  5.23E-23  6.12E-23  7.10E-23
    si 31   2.48E-35  3.18E-35  3.76E-35  4.40E-35  5.10E-35
    si 32   3.64E-44  4.67E-44  5.89E-44  7.29E-44  8.97E-44
  totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux               2.70E+08  2.70E+08  2.70E+08  2.70E+08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides               page   43
      power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
            charge   310.5 d   328.8 d   347.0 d   365.3 d
    he  4   4.11E-05  4.37E-05  4.63E-05  4.89E-05  5.15E-05
    ra222   5.35E-30  5.97E-30  6.70E-30  7.47E-30  8.28E-30
    ra223   5.53E-15  6.56E-15  7.25E-15  8.19E-15  9.19E-15
    ra224   3.01E-16  5.58E-16  6.20E-16  6.89E-16  7.65E-16
    ra225   6.39E-17  7.40E-17  8.48E-17  9.64E-17  1.09E-16
    ra226   7.32E-11  8.49E-11  9.51E-11  1.06E-10  1.17E-10
    ra228   7.90E-17  8.90E-17  9.95E-17  1.11E-16  1.22E-16
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    th226   2.57E-28  2.91E-28  3.27E-28  3.65E-28  4.04E-28
    th227   1.01E-14  1.15E-14  1.30E-14  1.46E-14  1.63E-14
    th228   6.05E-14  7.15E-14  8.38E-14  9.74E-14  1.12E-13
    th229   1.46E-11  1.68E-11  1.90E-11  2.15E-11  2.61E-11
    th230   2.04E-05  2.17E-05  2.30E-05  2.43E-05  2.55E-05
    th231   3.02E-09  3.02E-09  3.02E-09  3.02E-09  3.02E-09
    th232   4.13E-06  4.39E-06  4.65E-06  4.91E-06  5.16E-06
    th233   2.24E-17  4.02E-17  4.26E-17  4.50E-17  4.73E-17
    th234   5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07
    pa231   6.21E-07  6.60E-07  6.99E-07  7.38E-07  7.77E-07
    pa232   1.06E-14  1.13E-14  1.20E-14  1.27E-14  1.34E-14
    pa233   1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06
    pa234m  1.01E-11  1.01E-11  1.01E-11  1.01E-11  1.01E-11
    pa234   8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12
    pa235    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     u230   2.49E-25  2.82E-25  3.17E-25  3.53E-25  3.92E-25
     u231   6.96E-21  7.48E-21  7.99E-21  8.51E-21  9.02E-21
     u232   2.33E-11  2.61E-11  2.90E-11  3.21E-11  3.53E-11
     u233   9.47E-06  1.02E-05  1.08E-05  1.15E-05  1.22E-05
     u234   9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
     u235   7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
     u236   1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02
     u237   3.09E-06  3.09E-06  3.09E-06  3.09E-06  3.09E-06
     u238   3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
     u239   1.93E-07  3.17E-07  3.17E-07  3.17E-07  3.17E-07
     u240    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    np235   3.51E-12  3.67E-12  3.82E-12  3.97E-12  4.12E-12
    np236m  2.03E-12  2.05E-12  2.05E-12  2.05E-12  2.05E-12
    np236   1.59E-10  1.68E-10  1.78E-10  1.88E-10  1.97E-10
    np237   4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01
    np238   1.55E-06  1.55E-06  1.55E-06  1.55E-06  1.55E-06
    np239   4.59E-05  4.59E-05  4.59E-05  4.59E-05  4.59E-05
    np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    np240   7.73E-15  9.32E-15  9.32E-15  9.32E-15  9.32E-15
    np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    pu236   2.11E-10  2.22E-10  2.34E-10  2.45E-10  2.57E-10
    pu237   1.14E-15  1.32E-15  1.31E-15  1.40E-15  1.49E-15
    pu238   1.48E-04  1.57E-04  1.66E-04  1.75E-04  1.84E-04
    pu239   3.96E-03  4.20E-03  4.43E-03  4.70E-03  4.94E-03
    pu240   1.55E-08  1.73E-08  1.96E-08  2.18E-08  2.42E-08
    pu241   8.10E-14  9.72E-14  1.15E-13  1.36E-13  1.38E-13
    pu242   1.27E-19  1.61E-19  2.03E-19  2.52E-19  3.09E-19
1
    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   44
      power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge   310.5 d   328.8 d   347.8 d   365.3 d
    pu243   2.56E-28  3.39E-28  4.26E-28  5.19E-28  6.50E-28
    pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
  totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0   flux               2.70E+08  2.70E+08  2.70E+08  2.70E+08
0  .results on logical unit no. 71, position  1, for time step  4, subcase 6, (run position 1, case position 1)
   title: sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements        page   45
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
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0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na 23   1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05
    mg 24   3.14E-04  3.14E-04  3.14E-04  3.14E-04  3.14E-04  3.14E-04  3.14E-04
    al 27   1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06
    si 28   1.02E-03  1.02E-03  1.02E-03  1.02E-03  1.02E-03  1.02E-03  1.02E-03
  total     1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   46
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                          element radioactivity, curies
                                           basis =single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  totals    2.55E+01  1.13E-06  9.10E-07  7.36E-07  5.97E-07  4.83E-07  3.95E-07
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   47
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                          element thermal power, watts
                                           basis =single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na      1.70E-01  1.52E-08  1.22E-08  9.77E-09  7.83E-09  6.27E-09  5.02E-09
  totals    4.76E-01  1.52E-08  1.22E-08  9.77E-09  7.83E-09  6.27E-09  5.02E-09
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   48
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                          nuclide gamma power, watts
                                           basis =single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na 22   1.75E-08  1.40E-08  1.12E-08  8.98E-09  7.19E-09  5.76E-09  4.61E-09
  total     3.31E-01  1.40E-08  1.12E-08  8.98E-09  7.19E-09  5.76E-09  4.61E-09
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page   49
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    he  4   5.15E-05  9.51E-05  1.39E-04  1.82E-04  2.24E-04  2.70E-04  3.13E-04
    th230   2.55E-05  4.68E-05  6.81E-05  8.94E-05  1.11E-04  1.32E-04  1.53E-04
    th232   5.16E-06  9.47E-06  1.38E-05  1.81E-05  2.24E-05  2.67E-05  3.10E-05
    th234   5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07
    pa231   7.77E-07  1.38E-06  1.98E-06  2.58E-06  3.19E-06  3.79E-06  4.39E-06
    pa233   1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06
    u233    1.22E-05  2.50E-05  3.79E-05  5.07E-05  6.35E-05  7.64E-05  8.92E-05
    u234    9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
    u235    7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
    u236    1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02
    u238    3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
   np237    4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.22E+01
   pu238    1.84E-04  1.85E-04  1.84E-04  1.82E-04  1.81E-04  1.80E-04  1.79E-04
   pu239    4.94E-03  4.99E-03  4.99E-03  4.99E-03  4.99E-03  4.99E-03  4.99E-03
  total     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page   50
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0                                          element concentrations, gram atoms
                                           basis = single reactor assembly
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     he     5.15E-05  9.51E-05  1.39E-04  1.82E-04  2.24E-04  2.70E-04  3.13E-04
     th     3.13E-05  5.68E-05  8.24E-05  1.08E-04  1.34E-04  1.59E-04  1.85E-04
```

pa	2.23E-06	2.84E-06	3.44E-06	4.04E-06	4.64E-06	5.25E-06	5.85E-06
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
pu	5.13E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 51
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.06E-04	3.61E-04	5.55E-04	7.29E-04	9.04E-04	1.08E-03	1.25E-03
ra226	2.45E-08	6.92E-08	1.89E-07	3.25E-07	4.98E-07	7.08E-07	9.55E-07
th230	5.88E-03	1.68E-02	1.57E-02	2.66E-02	2.55E-02	3.04E-02	3.53E-02
th231	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07
th232	1.20E-03	2.20E-03	3.19E-03	4.19E-03	5.19E-03	6.19E-03	7.19E-03
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.79E-04	3.19E-04	4.58E-04	5.97E-04	7.36E-04	8.75E-04	1.01E-03
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u233	2.84E-03	5.83E-03	8.82E-03	1.18E-02	1.48E-02	1.78E-02	2.08E-02
u234	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03
u235	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05
u236	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06
np237	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu238	4.39E-02	4.40E-02	4.37E-02	4.34E-02	4.31E-02	4.28E-02	4.26E-02
pu239	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
pu240	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.80E-06	5.80E-06
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 52
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.06E-04	3.61E-04	5.55E-04	7.29E-04	9.04E-04	1.08E-03	1.25E-03
ra	2.45E-08	6.92E-08	1.89E-07	3.25E-07	4.98E-07	7.08E-07	9.55E-07
th	7.20E-03	1.31E-02	1.90E-02	2.49E-02	3.08E-02	3.67E-02	4.24E-02
pa	5.19E-04	6.58E-04	7.97E-04	9.36E-04	1.08E-03	1.21E-03	1.35E-03
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.23E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.23E+00
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 53
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	1.05E-07	4.38E-07	9.07E-07	1.54E-06	2.32E-06	3.24E-06	4.34E-06
pb211	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
pb212	2.02E-08	9.61E-08	2.07E-07	3.54E-07	4.64E-07	5.89E-07	7.05E-07
pb214	2.55E-08	8.02E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
bi211	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
bi212	2.02E-08	9.61E-08	2.07E-07	3.54E-07	4.64E-07	5.89E-07	7.05E-07
bi214	2.55E-08	8.02E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
po214	2.55E-08	8.02E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
po215	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
po216	2.02E-08	9.61E-08	2.07E-07	3.54E-07	4.64E-07	5.89E-07	7.05E-07
po218	2.55E-08	8.02E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07

rn219	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
rn220	2.02E-08	9.61E-08	2.07E-07	3.54E-07	4.64E-07	5.89E-07	7.05E-07
rn222	2.55E-08	8.02E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
ra223	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
ra224	2.02E-08	9.61E-08	2.07E-07	3.54E-07	4.64E-07	5.89E-07	7.05E-07
ra226	2.63E-08	8.82E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
ac227	1.34E-07	4.39E-07	9.09E-07	1.54E-06	2.32E-06	3.26E-06	4.34E-06
th227	1.14E-07	4.33E-07	8.97E-07	1.52E-06	2.29E-06	3.22E-06	4.29E-06
th228	2.10E-08	9.60E-08	2.07E-07	3.53E-07	4.63E-07	5.87E-07	7.02E-07
th230	1.21E-04	2.22E-04	3.23E-04	4.24E-04	5.25E-04	6.26E-04	7.27E-04
th231	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	6.48E-06	1.51E-05	2.16E-05	2.82E-05	3.48E-05	4.14E-05	4.79E-05
pa233	7.04E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03
u232	1.81E-07	4.17E-07	4.88E-07	7.42E-07	8.86E-07	9.86E-07	1.07E-06
u233	2.74E-05	5.62E-05	8.51E-05	1.14E-04	1.43E-04	1.72E-04	2.00E-04
u234	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
u235	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
u236	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np237	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00
pu236	3.16E-05	2.60E-05	2.13E-05	1.75E-05	1.43E-05	1.17E-05	9.61E-06
pu238	7.52E-01	7.53E-01	7.49E-01	7.44E-01	7.39E-01	7.34E-01	7.29E-01
pu239	7.33E-02	7.40E-02	7.40E-02	7.40E-02	7.40E-02	7.40E-02	7.40E-02
pu240	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06
total	3.28E+03	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 54
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

element thermal power, watts
basis weingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	4.78E-10	2.10E-09	4.62E-09	7.34E-09	1.07E-08	1.46E-08	1.87E-08
pb	4.45E-10	1.83E-09	3.81E-09	6.45E-09	9.69E-09	1.35E-08	1.79E-08
bi	4.86E-09	2.03E-08	4.22E-08	7.13E-08	1.07E-07	1.49E-07	1.98E-07
po	6.36E-09	3.44E-08	7.22E-08	1.22E-07	1.81E-07	2.51E-07	3.29E-07
rn	5.97E-09	2.48E-08	5.18E-08	8.72E-08	1.30E-07	1.81E-07	2.39E-07
ra	5.18E-09	2.15E-08	4.48E-08	7.55E-08	1.13E-07	1.57E-07	2.06E-07
th	1.61E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.63E-03	1.63E-03
pa	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02
u	7.35E+00	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01
np	7.11E+00	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01
pu	2.72E-02	2.73E-02	2.71E-02	2.69E-02	2.68E-02	2.66E-02	2.65E-02
totals	1.47E+01	7.98E-01	7.97E-01	7.97E-01	7.97E-01	7.97E-01	7.97E-01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 55
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide gamma power, watts
basis weingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
bi214	2.28E-10	7.88E-10	1.67E-09	2.87E-09	4.40E-09	6.26E-09	8.44E-09
th230	1.21E-09	2.21E-09	3.22E-09	4.23E-09	5.23E-09	6.24E-09	7.24E-09
th231	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	2.01E-09	3.57E-09	5.13E-09	6.69E-09	8.25E-09	9.81E-09	1.14E-08
pa233	9.33E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03
pa234m	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04
pa234	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05

u234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
u235	3.66E-04	3.66E-04	3.66E-04	3.66E-04	3.66E-04	3.66E-04	3.66E-04
u236	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np237	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03
pu238	6.47E-06	6.49E-06	6.43E-06	6.38E-06	6.32E-06	6.27E-06	6.21E-06
pu239	3.52E-07	3.55E-07	3.55E-07	3.55E-07	3.55E-07	3.55E-07	3.55E-07
total	3.97E+00	1.18E-02	1.18E-02	1.18E-02	1.18E-02	1.18E-02	1.18E-02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 56
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	2.09E-06	2.00E-06	1.91E-06	1.82E-06	1.74E-06	1.66E-06	1.58E-06
ge 73	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07
as 75	5.67E-06	5.67E-06	5.67E-06	5.67E-06	5.67E-06	5.67E-06	5.67E-06
se 76	1.88E-05	1.88E-05	1.88E-05	1.88E-05	1.88E-05	1.88E-05	1.88E-05
se 77	4.68E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05
se 78	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
se 79	2.28E-04	2.28E-04	2.28E-04	2.28E-04	2.28E-04	2.28E-04	2.28E-04
se 80	6.79E-04	6.79E-04	6.79E-04	6.79E-04	6.79E-04	6.79E-04	6.79E-04
br 81	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
se 82	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03
kr 83	2.92E-03	2.92E-03	2.92E-03	2.92E-03	2.92E-03	2.92E-03	2.92E-03
kr 84	5.87E-03	5.87E-03	5.87E-03	5.87E-03	5.87E-03	5.87E-03	5.87E-03
kr 85	1.43E-03	1.36E-03	1.29E-03	1.22E-03	1.15E-03	1.09E-03	1.04E-03
rb 85	5.45E-03	5.53E-03	5.60E-03	5.66E-03	5.73E-03	5.79E-03	5.85E-03
kr 86	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
rb 87	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02
sr 88	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02
y 89	2.26E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02	2.81E-02
sr 90	3.39E-02	3.32E-02	3.25E-02	3.19E-02	3.12E-02	3.06E-02	3.00E-02
y 90	8.72E-06	8.63E-06	8.45E-06	8.28E-06	8.11E-06	7.95E-06	7.79E-06
zr 90	4.10E-04	1.10E-03	1.77E-03	2.43E-03	3.08E-03	3.72E-03	4.34E-03
zr 91	2.74E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02
zr 92	3.61E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02
zr 93	2.64E-02	2.64E-02	2.64E-02	2.64E-02	2.64E-02	2.64E-02	2.64E-02
zr 94	3.95E-02	3.95E-02	3.95E-02	3.95E-02	3.95E-02	3.95E-02	3.95E-02
mo 95	2.49E-02	3.94E-02	4.02E-02	4.02E-02	4.02E-02	4.02E-02	4.02E-02
zr 96	3.94E-02	3.94E-02	3.94E-02	3.94E-02	3.94E-02	3.94E-02	3.94E-02
mo 96	3.67E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06
mo 97	3.58E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02
mo 98	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
tc 99	3.98E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02
ru 99	1.36E-06	1.49E-06	1.60E-06	1.71E-06	1.82E-06	1.93E-06	2.04E-06
mo100	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02
ru101	3.39E-02	3.39E-02	3.39E-02	3.39E-02	3.39E-02	3.39E-02	3.39E-02
ru102	2.87E-02	2.87E-02	2.87E-02	2.87E-02	2.87E-02	2.87E-02	2.87E-02
rh103	1.79E-02	2.12E-02	2.12E-02	2.12E-02	2.12E-02	2.12E-02	2.12E-02
ru104	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02
pd105	8.13E-03	8.18E-03	8.18E-03	8.18E-03	8.18E-03	8.18E-03	8.18E-03
ru106	2.36E-03	1.34E-03	7.39E-04	4.30E-04	2.44E-04	1.38E-04	7.83E-05
pd106	6.97E-04	1.92E-03	2.50E-03	2.83E-03	3.01E-03	3.12E-03	3.18E-03
pd107	1.24E-03	1.24E-03	1.24E-03	1.24E-03	1.24E-03	1.24E-03	1.24E-03
pd108	5.94E-04	5.94E-04	5.94E-04	5.94E-04	5.94E-04	5.94E-04	5.94E-04
ag109	2.98E-04	2.99E-04	2.99E-04	2.99E-04	2.99E-04	2.99E-04	2.99E-04
pd110	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04
cd111	1.55E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04	1.60E-04
cd112	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04

cd113	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
cd113m	2.10E-06	2.02E-06	1.94E-06	1.86E-06	1.79E-06	1.72E-06	1.45E-06
cd114	1.11E-04	1.11E-04	1.11E-04	1.11E-04	1.11E-04	1.11E-04	1.11E-04
in115	8.51E-05	8.65E-05	8.65E-05	8.65E-05	8.65E-05	8.65E-05	8.65E-05
sn115	4.32E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06
cd116	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 57
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4410E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
sn117	8.95E-05	8.96E-05	8.96E-05	8.96E-05	8.96E-05	8.96E-05	8.96E-05
sn118	9.16E-05	9.16E-05	9.16E-05	9.16E-05	9.16E-05	9.16E-05	9.16E-05
sn119	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
sn120	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
sn121m	6.65E-07	6.58E-07	6.51E-07	6.44E-07	6.38E-07	6.31E-07	6.24E-07
sb121	1.19E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04
sn122	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04
sb123	1.28E-04	1.33E-04	1.34E-04	1.34E-04	1.34E-04	1.35E-04	1.35E-04
sn124	2.15E-04	2.15E-04	2.15E-04	2.15E-04	2.15E-04	2.15E-04	2.15E-04
sb125	2.16E-04	1.77E-04	1.43E-04	1.16E-04	9.38E-05	7.59E-05	6.14E-05
te125	2.60E-05	4.73E-05	1.02E-04	1.29E-04	1.52E-04	1.70E-04	1.85E-04
te125m	2.27E-06	2.49E-06	2.03E-06	1.65E-06	1.35E-06	1.08E-06	8.73E-07
sn126	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04
te126	2.01E-06	2.06E-06	2.06E-06	2.06E-06	2.06E-06	2.06E-06	2.07E-06
i127	9.74E-04	1.05E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03
te128	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03
i129	4.30E-03	6.46E-03	6.46E-03	6.46E-03	6.46E-03	6.46E-03	6.46E-03
te130	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02
xe130	1.86E-06	1.86E-06	1.86E-06	1.86E-06	1.86E-06	1.86E-06	1.86E-06
xe131	2.44E-02	2.52E-02	2.52E-02	2.52E-02	2.52E-02	2.52E-02	2.52E-02
xe132	3.72E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02
cs133	6.18E-02	6.32E-02	6.32E-02	6.32E-02	6.32E-02	6.32E-02	6.32E-02
xe134	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02
cs135	5.95E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02
xe136	5.63E-02	5.63E-02	5.63E-02	5.63E-02	5.63E-02	5.63E-02	5.63E-02
ba136	4.52E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05
cs137	5.58E-02	5.47E-02	5.36E-02	5.26E-02	5.16E-02	5.06E-02	4.97E-02
ba137	6.55E-04	1.72E-03	2.76E-03	3.78E-03	4.79E-03	5.77E-03	6.74E-03
ba138	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02
la139	5.81E-02	5.81E-02	5.81E-02	5.81E-02	5.81E-02	5.81E-02	5.81E-02
ce140	5.76E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02	6.07E-02
pr141	4.72E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02
ce142	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02
nd143	5.84E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02	6.19E-02
ce144	3.41E-02	1.02E-02	7.75E-03	5.70E-03	1.76E-03	8.41E-04	4.01E-04
nd144	1.73E-02	3.52E-02	4.37E-02	4.77E-02	4.96E-02	5.06E-02	5.10E-02
nd145	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.79E-02
nd146	2.06E-02	2.07E-02	2.07E-02	2.07E-02	2.07E-02	2.07E-02	2.07E-02
pm147	1.84E-02	1.36E-02	1.25E-02	1.00E-02	8.04E-03	6.45E-03	5.18E-03
sm147	2.43E-03	6.27E-03	9.54E-03	1.18E-02	1.38E-02	1.54E-02	1.67E-02
nd148	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
sm149	1.05E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02
nd150	6.57E-03	6.57E-03	6.57E-03	6.57E-03	6.57E-03	6.57E-03	6.57E-03
sm150	7.53E-06	7.53E-06	7.53E-06	7.53E-06	7.53E-06	7.53E-06	7.53E-06
sm151	4.62E-03	4.51E-03	4.58E-03	4.55E-03	4.52E-03	4.50E-03	4.47E-03
eu151	1.78E-05	4.75E-05	7.70E-05	1.06E-04	1.35E-04	1.64E-04	1.93E-04
sm152	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03
eu153	1.68E-03	1.70E-03	1.70E-03	1.70E-03	1.70E-03	1.70E-03	1.70E-03

sm154	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04
eu155	3.33E-04	2.94E-04	2.60E-04	2.30E-04	2.03E-04	1.80E-04	1.59E-04
gd155	2.53E-05	6.40E-05	9.81E-05	1.28E-04	1.55E-04	1.79E-04	2.00E-04
gd156	1.48E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04

1 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 58
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0 nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
gd157	7.73E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05
gd158	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05
tb159	1.35E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05
gd160	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06
dy161	1.26E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06
total	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00

1 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 59
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0 nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	2.03E-02	1.93E-02	1.84E-02	1.76E-02	1.68E-02	1.60E-02	1.53E-02
se 79	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06
kr 85	5.62E-01	5.33E-01	5.05E-01	4.78E-01	4.53E-01	4.29E-01	4.07E-01
sr 90	4.78E+00	4.69E+00	4.59E+00	4.50E+00	4.41E+00	4.32E+00	4.23E+00
y 90	4.74E+00	4.69E+00	4.59E+00	4.50E+00	4.41E+00	4.32E+00	4.23E+00
y 91	1.99E+02	5.43E+00	1.48E-01	4.01E-03	1.09E-04	2.96E-06	8.03E-08
zr 93	6.63E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05
nb 93m	1.42E-06	3.70E-06	5.91E-06	8.04E-06	1.01E-05	1.21E-05	1.40E-05
zr 95	2.14E+02	7.94E+00	2.94E-01	1.09E-02	4.03E-04	1.49E-05	5.54E-07
nb 95	2.09E+02	1.69E+01	6.46E-01	2.40E-02	8.88E-04	3.29E-05	1.22E-06
tc 99	6.81E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04
rh102	1.69E-06	1.38E-06	1.13E-06	9.27E-07	7.60E-07	6.23E-07	5.10E-07
ru106	7.83E+00	4.44E+00	2.52E+00	1.43E+00	8.08E-01	4.58E-01	2.60E-01
rh106	7.83E+00	4.44E+00	2.52E+00	1.43E+00	8.08E-01	4.58E-01	2.60E-01
pd107	4.39E-07	4.39E-07	4.39E-07	4.39E-07	4.39E-07	4.39E-07	4.39E-07
cd113m	4.72E-04	4.54E-04	4.35E-04	4.18E-04	4.01E-04	3.85E-04	3.70E-04
sn119m	8.83E-04	4.30E-04	2.09E-04	1.02E-04	4.96E-05	2.42E-05	1.18E-05
sn121	4.68E-01	2.74E-05	2.71E-05	2.69E-05	2.66E-05	2.63E-05	2.60E-05
sn121m	3.57E-05	3.54E-05	3.50E-05	3.46E-05	3.43E-05	3.39E-05	3.35E-05
sn123	4.99E-02	9.75E-03	1.90E-03	3.72E-04	7.26E-05	1.42E-05	2.77E-06
sb125	2.26E-01	1.05E-01	1.50E-01	1.21E-01	9.83E-02	7.94E-02	6.44E-02
te125m	4.10E-02	4.49E-02	3.66E-02	2.97E-02	2.40E-02	1.94E-02	1.57E-02
sn126	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
sb126	3.05E-03	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
sb126m	5.79E-03	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
te127	4.46E+00	9.77E-02	1.41E-02	2.04E-03	2.94E-04	4.24E-05	6.13E-06
te127m	6.44E-01	9.98E-02	1.44E-02	2.08E-03	3.00E-04	4.33E-05	6.25E-06
i129	1.11E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06
cs134	1.37E-04	1.19E-04	8.99E-05	6.80E-05	5.14E-05	3.88E-05	2.93E-05
cs135	6.05E-05	6.07E-05	6.07E-05	6.07E-05	6.07E-05	6.07E-05	6.07E-05
cs137	4.05E+00	4.74E+00	4.67E+00	4.38E+00	4.49E+00	4.61E+00	4.32E+00
ba137m	4.00E+00	4.69E+00	4.61E+00	4.32E+00	4.44E+00	4.16E+00	4.08E+00
ce144	1.08E+02	5.17E+01	2.47E+01	1.18E+01	5.61E+00	2.68E+00	1.28E+00
pr144	1.08E+02	5.17E+01	2.47E+01	1.18E+01	5.61E+00	2.68E+00	1.28E+00
pr144m	1.52E+00	7.24E-01	3.45E-01	1.65E-01	7.86E-02	3.75E-02	1.79E-02
pm147	1.71E+01	1.44E+01	1.16E+01	9.30E+00	7.46E+00	5.98E+00	4.80E+00
sm151	1.32E-01	1.21E-01	1.21E-01	1.20E-01	1.19E-01	1.18E-01	1.18E-01
eu154	8.29E-06	7.75E-06	7.25E-06	6.78E-06	6.34E-06	5.92E-06	5.54E-06

eu155	1.64E-01	1.45E-01	1.28E-01	1.13E-01	1.00E-01	8.86E-02	7.83E-02
total	1.97E+04	1.81E+02	8.67E+01	5.47E+01	3.87E+01	3.02E+01	2.55E+01

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sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 60
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	6.83E-07	6.32E-07	6.22E-07	5.93E-07	5.66E-07	5.40E-07	5.16E-07
kr	1.29E+01	7.99E-04	7.57E-04	7.17E-04	6.80E-04	6.44E-04	6.10E-04
sr	2.80E+01	1.41E-02	5.47E-03	5.23E-03	5.12E-03	5.01E-03	4.91E-03
y	2.72E+01	4.35E-02	2.60E-02	2.49E-02	2.44E-02	2.39E-02	2.34E-02
zr	1.20E+01	6.00E-02	1.48E-03	9.49E-05	2.04E-06	8.28E-08	1.03E-08
nb	2.14E+01	8.89E-02	3.10E-03	7.15E-04	4.27E-06	1.40E-07	8.28E-09
tc	6.47E+00	3.46E-07	3.46E-07	3.46E-07	3.46E-07	3.46E-07	3.46E-07
ru	7.06E-01	1.90E-03	1.57E-04	8.68E-05	4.81E-05	2.72E-05	1.54E-05
rh	3.00E-01	4.27E-02	2.41E-02	1.37E-02	7.75E-03	4.39E-03	2.49E-03
cd	6.84E-02	1.04E-06	4.78E-07	4.55E-07	4.36E-07	4.19E-07	4.02E-07
sn	1.87E+00	3.07E-05	4.10E-06	1.26E-06	2.94E-07	9.83E-08	5.59E-08
sb	7.51E+00	5.07E-04	4.75E-04	3.84E-04	3.11E-04	2.52E-04	2.04E-04
te	9.30E+00	2.61E-04	9.78E-05	2.89E-05	2.08E-05	1.64E-05	1.32E-05
cs	1.81E+01	5.29E-03	5.19E-03	5.09E-03	4.99E-03	4.90E-03	4.80E-03
ba	1.12E+01	1.77E-02	1.73E-02	1.70E-02	1.67E-02	1.63E-02	1.60E-02
ce	4.34E+00	3.43E-02	1.61E-02	7.70E-03	3.67E-03	1.75E-03	8.35E-04
pr	3.72E+00	3.80E-01	1.81E-01	8.44E-02	4.12E-02	1.97E-02	9.37E-03
pm	3.18E-01	5.30E-03	4.25E-03	3.41E-03	2.74E-03	2.20E-03	1.76E-03
sm	2.00E-02	1.43E-05	1.42E-05	1.41E-05	1.40E-05	1.39E-05	1.38E-05
eu	8.23E-03	1.13E-04	9.97E-05	8.82E-05	7.79E-05	6.89E-05	6.89E-05
totals	2.38E+02	6.69E-01	2.66E-01	1.65E-01	1.08E-01	7.92E-02	6.46E-02

1

sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 61
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	7.43E-06	7.04E-06	6.67E-06	6.32E-06	5.99E-06	5.68E-06	5.38E-06
y 90	4.77E-08	4.72E-08	4.63E-08	4.53E-08	4.44E-08	4.35E-08	4.26E-08
zr 95	9.30E-01	3.44E-02	1.28E-03	4.73E-05	1.75E-06	6.48E-08	2.40E-09
nb 95	9.48E-01	7.63E-02	2.93E-03	1.09E-04	4.03E-06	1.49E-07	5.52E-09
rh102	2.16E-08	1.77E-08	1.45E-08	1.19E-08	9.73E-09	7.97E-09	6.53E-09
rh106	9.56E-03	5.42E-03	3.07E-03	1.74E-03	9.87E-04	5.60E-04	3.17E-04
sb125	5.82E-04	4.77E-04	3.06E-04	2.13E-04	2.53E-04	2.05E-04	1.66E-04
te125m	8.64E-06	9.48E-06	7.73E-06	6.26E-06	5.07E-06	4.10E-06	3.32E-06
sn126	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09
sb126	4.28E-05	2.30E-08	2.30E-08	2.30E-08	2.30E-08	2.30E-08	2.30E-08
sb126m	4.88E-05	9.27E-08	9.27E-08	9.27E-08	9.27E-08	9.27E-08	9.26E-08
cs134	1.45E-06	1.10E-06	8.29E-07	6.26E-07	4.73E-07	3.58E-07	2.70E-07
ba137m	1.63E-02	1.60E-02	1.57E-02	1.54E-02	1.51E-02	1.48E-02	1.45E-02
ce144	1.22E-02	5.83E-03	2.78E-03	1.32E-03	6.32E-04	3.01E-04	1.44E-04
pr144	1.86E-02	8.86E-03	4.23E-03	2.02E-03	9.61E-04	4.59E-04	2.19E-04
pr144m	1.13E-04	5.37E-05	2.56E-05	1.22E-05	5.82E-06	2.78E-06	1.32E-06
pm147	4.44E-07	3.75E-07	3.01E-07	2.41E-07	1.94E-07	1.55E-07	1.25E-07
sm151	1.02E-08	1.02E-08	1.01E-08	1.01E-08	1.00E-08	9.96E-09	9.89E-09
eu154	6.16E-08	5.76E-08	5.39E-08	5.04E-08	4.71E-08	4.40E-08	4.12E-08
eu155	6.30E-05	5.57E-05	4.92E-05	4.35E-05	3.84E-05	3.40E-05	3.00E-05
total	1.28E+02	1.49E-01	3.04E-02	2.10E-02	1.80E-02	1.63E-02	1.54E-02

1

sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
0

element gamma power, watts

basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	7.04E-06	6.67E-06	6.32E-06	5.99E-06	5.68E-06	5.38E-06
y	9.80E+00	1.17E-04	5.21E-06	1.31E-07	4.88E-08	4.36E-08	4.26E-08
zr	4.79E+00	3.44E-02	1.28E-03	4.73E-05	1.75E-06	6.48E-08	2.40E-09
nb	9.09E+00	7.64E-02	2.93E-03	1.09E-04	4.03E-06	1.49E-07	5.70E-09
rh	9.50E-02	5.43E-03	3.07E-03	1.74E-03	9.87E-04	5.60E-04	3.17E-04
sn	1.23E+00	4.37E-07	1.01E-07	3.09E-08	1.51E-08	1.10E-08	9.69E-09
sb	5.15E+00	4.77E-04	3.66E-04	3.13E-04	2.53E-04	2.05E-04	1.66E-04
te	5.57E+00	2.30E-05	9.10E-06	6.46E-06	5.10E-06	4.10E-06	3.32E-06
cs	8.75E+00	1.10E-06	8.29E-07	6.26E-07	4.73E-07	3.58E-07	2.70E-07
ba	4.72E+00	1.60E-02	1.57E-02	1.54E-02	1.51E-02	1.48E-02	1.45E-02
ce	2.05E+00	5.96E-03	2.78E-03	1.32E-03	6.32E-04	3.01E-04	1.44E-04
pr	1.79E+00	8.92E-03	4.85E-03	2.83E-03	9.67E-04	6.61E-04	2.20E-04
pm	8.53E-02	3.87E-07	3.61E-07	2.41E-07	1.94E-07	1.55E-07	1.25E-07
sm	4.44E-03	1.02E-08	1.01E-08	1.01E-08	1.00E-08	9.96E-09	9.89E-09
eu	5.17E-03	5.57E-05	4.92E-05	4.35E-05	3.85E-05	3.40E-05	3.01E-05
totals	1.28E+02	1.49E-01	3.04E-02	2.10E-02	1.80E-02	1.63E-02	1.54E-02

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 1.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	5.14E+11	1.31E+04	1.05E+04	8.41E+03	6.73E+03	5.39E+03	4.32E+03
3.00E-02	1.69E+11	4.17E+03	3.34E+03	2.68E+03	2.14E+03	1.72E+03	1.37E+03
5.50E-02	1.18E+11	2.02E+03	2.26E+03	1.81E+03	1.45E+03	1.16E+03	9.29E+02
8.50E-02	6.09E+10	1.59E+03	1.27E+03	1.02E+03	8.15E+02	6.52E+02	5.23E+02
1.20E-01	4.90E+10	1.08E+03	8.68E+02	6.95E+02	5.57E+02	4.46E+02	3.57E+02
1.70E-01	5.12E+10	1.06E+03	8.53E+02	6.83E+02	5.47E+02	4.38E+02	3.51E+02
3.00E-01	5.87E+10	1.06E+03	8.48E+02	6.79E+02	5.44E+02	4.36E+02	3.49E+02
6.50E-01	2.09E+10	3.66E+04	4.53E+04	3.63E+04	2.91E+04	2.33E+04	1.87E+04
1.13E+00	4.96E+09	4.51E+04	3.61E+04	2.89E+04	2.32E+04	1.86E+04	1.49E+04
1.58E+00	9.03E+11	1.13E-01	9.05E-02	7.25E-02	5.80E-02	4.65E-02	3.72E-02
2.00E+00	1.79E+08	1.00E-02	8.05E-03	4.44E-03	5.16E-03	4.13E-03	3.31E-03
2.40E+00	2.42E+07	2.25E-03	1.80E-03	1.44E-03	1.16E-03	9.27E-04	7.42E-04
2.80E+00	2.13E+11	3.53E-05	2.82E-05	2.26E-05	1.81E-05	1.45E-05	1.16E-05
3.25E+00	1.35E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.02E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.61E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.15E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.18E+12	1.27E+05	1.01E+05	8.12E+04	6.50E+04	5.21E+04	4.17E+04
mev/sec	2.10E+12	8.87E+04	7.10E+04	5.69E+04	4.56E+04	3.65E+04	2.92E+04

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.29E+06	3.28E-02	2.62E-02	2.10E-02	1.68E-02	1.35E-02	1.08E-02
3.00E-02	1.27E+06	3.13E-02	2.51E-02	2.01E-02	1.61E-02	1.29E-02	1.03E-02
5.50E-02	1.62E+06	3.87E-02	3.10E-02	2.49E-02	1.99E-02	1.59E-02	1.28E-02
8.50E-02	1.46E+06	3.37E-02	2.70E-02	2.16E-02	1.73E-02	1.39E-02	1.11E-02
1.20E-01	1.67E+06	3.25E-02	2.60E-02	2.09E-02	1.67E-02	1.34E-02	1.07E-02
1.70E-01	2.38E+06	4.52E-02	3.62E-02	2.90E-02	2.32E-02	1.86E-02	1.49E-02
3.00E-01	4.41E+06	7.94E-02	6.36E-02	5.10E-02	4.08E-02	3.27E-02	2.62E-02

6.50E-01	4.70E+06	9.20E+00	7.37E+00	5.90E+00	4.72E+00	3.78E+00	3.03E+00
1.13E+00	1.40E+06	1.27E+01	1.02E+01	8.14E+00	6.52E+00	5.22E+00	4.18E+00
1.58E+00	3.56E+02	4.45E-05	3.56E-05	2.85E-05	2.29E-05	1.83E-05	1.47E-05
2.00E+00	8.95E+04	9.02E-06	4.02E-06	3.22E-06	2.58E-06	2.07E-06	1.66E-06
2.40E+00	2.17E+04	1.35E-06	1.08E-06	8.67E-07	6.94E-07	5.56E-07	4.45E-07
2.80E+00	1.49E+02	2.47E-08	1.98E-08	1.58E-08	1.27E-08	1.02E-08	8.13E-09
3.25E+00	1.10E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	7.85E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.58E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.25E+08	2.22E+01	1.78E+01	1.42E+01	1.14E+01	9.12E+00	7.31E+00
0 gamma watts	3.37E-01	1.42E-08	1.14E-08	9.12E-09	7.30E-09	5.85E-09	4.69E-09

1 photon spectrum as a function of time for fission products page 44

0 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 1.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	2.53E+14	1.84E+12	9.01E+11	5.85E+11	3.13E+11	2.17E+11	1.69E+11
3.00E-02	1.11E+14	8.29E+11	4.10E+11	2.27E+11	1.38E+11	9.41E+10	7.20E+10
5.50E-02	5.92E+13	4.27E+11	2.10E+11	1.16E+11	7.01E+10	4.75E+10	3.62E+10
8.50E-02	4.11E+13	2.77E+11	1.36E+11	7.40E+10	4.38E+10	2.90E+10	2.15E+10
1.20E-01	3.34E+13	5.94E+11	1.91E+11	9.71E+10	5.20E+10	3.02E+10	1.96E+10
1.70E-01	5.44E+13	1.75E+11	8.49E+10	4.58E+10	2.73E+10	1.83E+10	1.39E+10
3.00E-01	1.10E+14	1.96E+11	9.67E+10	5.21E+10	3.04E+10	1.98E+10	1.45E+10
6.50E-01	2.23E+14	1.61E+12	2.80E+11	1.97E+11	1.71E+11	1.58E+11	1.49E+11
1.13E+00	7.81E+13	2.02E+10	1.80E+10	5.30E+09	2.93E+09	1.74E+09	1.13E+09
1.58E+00	4.88E+13	9.69E+09	4.74E+09	2.34E+09	1.18E+09	6.10E+08	3.32E+08
2.00E+00	1.23E+13	1.71E+10	8.21E+09	3.03E+09	1.89E+09	9.86E+08	4.37E+08
2.40E+00	1.86E+13	3.30E+08	1.73E+08	9.11E+07	4.84E+07	2.59E+07	1.39E+07
2.80E+00	4.23E+12	4.16E+07	2.25E+07	1.22E+07	6.64E+06	3.64E+06	2.00E+06
3.25E+00	2.48E+12	6.96E+06	3.81E+06	1.59E+06	9.03E+05	5.12E+05	2.90E+05
3.75E+00	1.26E+12	2.19E+03	1.24E+03	7.02E+02	3.98E+02	2.26E+02	1.28E+02
4.25E+00	1.40E+12	1.63E-09	1.71E-09	1.77E-09	1.82E-09	1.86E-09	1.89E-09
4.75E+00	6.09E+11	8.17E-10	8.56E-10	8.88E-10	9.13E-10	9.34E-10	9.50E-10
5.50E+00	3.84E+11	6.06E-10	6.35E-10	6.59E-10	6.78E-10	6.93E-10	7.05E-10
0 total	1.84E+15	5.60E+12	2.53E+12	1.33E+12	8.52E+11	6.17E+11	4.97E+11
0 mev/sec	4.40E+14	1.21E+12	3.28E+11	2.05E+11	1.53E+11	1.30E+11	1.14E+11

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	4.34E+08	4.41E+06	2.25E+06	1.46E+06	7.82E+05	5.43E+05	4.22E+05
3.00E-02	8.52E+08	6.22E+06	3.08E+06	1.70E+06	1.03E+06	7.05E+05	5.40E+05
5.50E-02	8.14E+08	5.88E+06	2.89E+06	1.59E+06	9.64E+05	6.53E+05	4.97E+05
8.50E-02	8.74E+08	5.88E+06	2.89E+06	1.57E+06	9.31E+05	6.16E+05	4.58E+05
1.20E-01	1.80E+09	1.38E+07	5.73E+06	2.91E+06	1.56E+06	9.07E+05	5.87E+05
1.70E-01	2.31E+09	7.43E+06	3.57E+06	1.95E+06	1.16E+06	7.69E+05	5.75E+05
3.00E-01	8.21E+09	1.47E+07	7.23E+06	2.91E+06	2.28E+06	1.48E+06	1.08E+06
6.50E-01	3.62E+10	2.29E+08	4.55E+07	3.20E+07	2.79E+07	2.56E+07	2.43E+07
1.13E+00	2.20E+10	5.69E+06	2.82E+06	1.49E+06	8.25E+05	4.89E+05	3.17E+05
1.58E+00	1.61E+10	3.82E+06	1.87E+06	9.23E+05	4.64E+05	2.40E+05	1.31E+05
2.00E+00	6.13E+09	8.57E+06	4.10E+06	1.97E+06	9.43E+05	4.53E+05	2.19E+05
2.40E+00	6.38E+09	1.98E+05	1.04E+05	5.47E+04	2.90E+04	1.55E+04	8.36E+03

2.80E+00	2.96E+09	2.92E+04	1.57E+04	8.53E+03	4.65E+03	2.55E+03	1.40E+03
3.25E+00	2.01E+09	4.03E+03	2.28E+03	1.29E+03	7.34E+02	4.16E+02	2.36E+02
3.75E+00	1.18E+09	2.05E+00	1.16E+00	6.59E-01	3.73E-01	2.12E-01	1.20E-01
4.25E+00	1.48E+09	1.73E-12	1.81E-12	1.88E-12	1.93E-12	1.98E-12	2.01E-12
4.75E+00	4.83E+08	9.70E-13	1.02E-12	1.05E-12	1.08E-12	1.11E-12	1.13E-12
5.50E+00	4.18E+08	8.33E-13	8.73E-13	9.06E-13	9.32E-13	9.52E-13	9.69E-13
total	1.10E+11	3.84E+08	8.20E+07	5.13E+07	3.28E+07	3.25E+07	2.91E+07
gamma watts	7.05E+01	1.95E-01	5.26E-02	3.29E-02	2.49E-02	2.08E-02	1.87E-02

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principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (2.17E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	2.96E+09	2.81E+09	2.66E+09	2.52E+09	2.39E+09	2.27E+09	2.15E+09
sr 90	1.95E+10	1.91E+10	1.87E+10	1.83E+10	1.80E+10	1.76E+10	1.72E+10
y 90	9.48E+10	9.39E+10	9.20E+10	9.01E+10	8.83E+10	8.65E+10	8.47E+10
rh106	2.33E+11	1.32E+11	7.49E+10	4.24E+10	2.41E+10	1.36E+10	7.73E+09
cs137	1.71E+10	1.68E+10	1.65E+10	1.62E+10	1.59E+10	1.55E+10	1.53E+10
ba137m	8.07E+08	7.88E+08	7.73E+08	7.58E+08	7.43E+08	7.29E+08	7.15E+08
ce144	2.09E+11	9.96E+10	4.75E+10	2.26E+10	1.08E+10	5.15E+09	2.46E+09
pr144	2.77E+12	1.32E+12	6.29E+11	3.00E+11	1.43E+11	6.83E+10	3.26E+10
pm147	1.99E+10	1.68E+10	1.35E+10	1.08E+10	8.67E+09	6.95E+09	5.58E+09
eu155	4.34E+08	3.84E+08	3.39E+08	3.00E+08	2.65E+08	2.34E+08	2.07E+08

principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (9.41E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	8.64E+08	8.19E+08	7.76E+08	7.35E+08	6.97E+08	6.60E+08	6.26E+08
sr 90	5.51E+09	5.40E+09	5.29E+09	5.18E+09	5.08E+09	4.97E+09	4.87E+09
y 90	3.09E+10	3.06E+10	3.00E+10	2.93E+10	2.87E+10	2.82E+10	2.76E+10
rh106	7.78E+10	4.41E+10	2.50E+10	1.42E+10	8.03E+09	4.55E+09	2.58E+09
sb125	4.15E+09	3.40E+09	2.75E+09	2.23E+09	1.80E+09	1.46E+09	1.18E+09
te125m	1.75E+09	1.92E+09	1.57E+09	1.27E+09	1.03E+09	8.32E+08	6.73E+08
cs137	4.77E+09	4.68E+09	4.59E+09	4.50E+09	4.42E+09	4.33E+09	4.25E+09
ba137m	1.39E+10	1.35E+10	1.33E+10	1.30E+10	1.28E+10	1.25E+10	1.23E+10
ce144	6.85E+11	2.31E+11	1.10E+11	5.26E+10	2.51E+10	1.20E+10	5.70E+09
pr144	9.15E+11	4.37E+11	2.08E+11	9.93E+10	4.74E+10	2.26E+10	1.08E+10
pr144m	1.87E+10	8.91E+09	4.25E+09	2.03E+09	9.67E+08	4.61E+08	2.20E+08
pm147	4.37E+09	3.69E+09	2.06E+09	2.37E+09	1.91E+09	1.53E+09	1.23E+09

principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (4.75E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	5.30E+08	5.02E+08	4.76E+08	4.51E+08	4.27E+08	4.05E+08	3.84E+08
sr 90	3.26E+09	3.19E+09	3.13E+09	3.06E+09	3.00E+09	2.94E+09	2.88E+09
y 90	2.13E+10	2.11E+10	2.07E+10	2.03E+10	1.99E+10	1.95E+10	1.91E+10
rh106	2.51E+10	1.42E+10	1.77E+10	1.00E+10	5.69E+09	3.23E+09	1.83E+09
cs137	2.78E+09	2.72E+09	2.67E+09	2.62E+09	2.57E+09	2.52E+09	2.47E+09
ce144	7.81E+10	2.34E+10	1.00E+10	7.61E+09	3.63E+09	1.73E+09	6.25E+08
pr144	6.43E+11	3.06E+11	1.46E+11	6.97E+10	3.32E+10	1.59E+10	7.54E+09
pm147	1.84E+09	1.55E+09	1.24E+09	9.98E+08	8.01E+08	6.42E+08	5.15E+08
eu155	1.27E+09	1.12E+09	9.89E+08	8.74E+08	7.73E+08	6.83E+08	6.04E+08

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principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (2.90E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	2.63E+08	2.51E+08	2.38E+08	2.26E+08	2.14E+08	2.03E+08	1.92E+08
sr 90	1.55E+09	1.52E+09	1.49E+09	1.46E+09	1.43E+09	1.40E+09	1.37E+09
y 90	1.24E+10	1.22E+10	1.20E+10	1.17E+10	1.15E+10	1.13E+10	1.10E+10

rh106	3.28E+10	1.86E+10	1.05E+10	5.97E+09	3.38E+09	1.92E+09	1.09E+09
cs137	1.30E+09	1.28E+09	1.25E+09	1.23E+09	1.20E+09	1.18E+09	1.16E+09
ce144	9.90E+10	4.72E+10	2.25E+10	1.07E+10	5.12E+09	2.44E+09	1.17E+09
pr144	3.78E+11	1.80E+11	8.60E+10	4.10E+10	1.96E+10	9.33E+09	4.45E+09
pm147	5.22E+08	4.41E+08	3.54E+08	2.84E+08	2.28E+08	1.83E+08	1.47E+08
eu155	1.92E+09	1.70E+09	1.50E+09	1.33E+09	1.17E+09	1.04E+09	9.17E+08

principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (3.02E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	1.60E+08	1.52E+08	1.44E+08	1.36E+08	1.29E+08	1.22E+08	1.16E+08
sr 90	8.84E+08	8.66E+08	8.48E+08	8.31E+08	8.14E+08	7.97E+08	7.81E+08
y 90	8.69E+09	8.61E+09	8.43E+09	8.26E+09	8.09E+09	7.93E+09	7.77E+09
rh106	2.37E+10	1.34E+10	7.60E+09	4.31E+09	2.44E+09	1.38E+09	7.85E+08
cs137	7.29E+08	7.15E+08	7.01E+08	6.88E+08	6.75E+08	6.62E+08	6.49E+08
ce144	4.86E+11	2.32E+11	1.10E+11	5.27E+10	2.51E+10	1.20E+10	5.71E+09
pr144	2.71E+11	1.29E+11	6.16E+10	2.94E+10	1.40E+10	6.68E+09	3.18E+09
pm147	1.66E+08	1.40E+08	1.12E+08	9.00E+07	7.22E+07	5.80E+07	4.65E+07
eu155	1.10E+09	9.70E+08	8.57E+08	7.58E+08	6.70E+08	5.92E+08	5.23E+08

principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (1.81E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	1.27E+08	1.20E+08	1.14E+08	1.08E+08	1.02E+08	9.71E+07	9.20E+07
sr 90	6.30E+08	6.17E+08	6.05E+08	5.93E+08	5.81E+08	5.69E+08	5.57E+08
y 90	8.96E+09	8.87E+09	8.69E+09	8.51E+09	8.34E+09	8.17E+09	8.00E+09
rh106	2.54E+10	1.44E+10	8.15E+09	4.62E+09	2.62E+09	1.48E+09	8.42E+08
sb125	6.25E+08	5.12E+08	4.19E+08	3.36E+08	2.72E+08	2.20E+08	1.78E+08
cs137	5.15E+08	5.05E+08	4.95E+08	4.86E+08	4.76E+08	4.67E+08	4.58E+08
ce144	1.04E+09	4.98E+08	2.38E+08	1.13E+08	5.41E+07	2.58E+07	1.23E+07
pr144	2.86E+11	1.36E+11	6.51E+10	3.10E+10	1.48E+10	7.06E+09	3.37E+09

principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.98E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	7.67E+07	7.27E+07	6.89E+07	6.53E+07	6.19E+07	5.86E+07	5.55E+07
sr 90	2.86E+08	2.80E+08	2.74E+08	2.69E+08	2.63E+08	2.58E+08	2.53E+08
y 90	9.05E+09	9.05E+09	9.05E+09	9.05E+09	9.26E+09	9.47E+09	8.89E+09
rh106	3.06E+10	1.73E+10	9.83E+09	5.57E+09	3.16E+09	1.79E+09	1.02E+09
sb125	2.37E+08	1.94E+08	1.57E+08	1.27E+08	1.03E+08	8.33E+07	6.74E+07
cs137	2.60E+08	2.55E+08	2.51E+08	2.46E+08	2.41E+08	2.37E+08	2.32E+08
pr144	3.35E+11	1.60E+11	7.62E+10	3.63E+10	1.73E+10	8.27E+09	3.94E+09

principal photon sources in group 8, photons/sec

mean energy = .6300 mev. nuclides exceeding 1.0E-03 of total group release rate (1.58E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
y 90	4.21E+09	4.16E+09	4.08E+09	4.00E+09	3.91E+09	3.83E+09	3.76E+09
rh106	9.45E+10	5.36E+10	3.04E+10	1.72E+10	9.75E+09	5.53E+09	3.13E+09
sb125	5.08E+09	4.16E+09	3.37E+09	2.73E+09	2.21E+09	1.79E+09	1.45E+09
ba137m	1.56E+11	1.52E+11	1.49E+11	1.46E+11	1.44E+11	1.41E+11	1.38E+11
pr144	2.29E+11	1.09E+11	5.20E+10	2.48E+10	1.18E+10	5.64E+09	2.69E+09

principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (1.74E+09) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
y 90	5.48E+08	5.43E+08	5.32E+08	5.21E+08	5.11E+08	5.00E+08	4.90E+08
rh106	8.80E+09	4.99E+09	2.83E+09	1.60E+09	9.09E+08	5.15E+08	2.92E+08
pr144	2.93E+10	1.40E+10	6.65E+09	3.17E+09	1.51E+09	7.22E+08	3.44E+08

principal photon sources in group 10, photons/sec

```
     mean energy = 1.5750 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.10E+08) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  y 90   7.00E+07  6.93E+07  6.79E+07  6.65E+07  6.52E+07  6.39E+07  6.26E+07
 rh106   1.66E+09  9.41E+08  5.33E+08  3.02E+08  1.71E+08  9.71E+07  5.51E+07
 pr144   1.82E+10  8.68E+09  4.14E+09  1.97E+09  9.42E+08  4.49E+08  2.14E+08
0                principal photon sources in group 11, photons/sec
     mean energy = 2.0000 mev.  nuclides exceeding  1.0E-03 of total group release rate (9.86E+08) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  y 90   4.19E+06  4.15E+06  4.06E+06  3.98E+06  3.90E+06  3.82E+06  3.74E+06
 rh106   5.39E+08  3.06E+08  1.73E+08  9.82E+07  5.57E+07  3.16E+07  1.79E+07
 pr144   3.53E+10  1.68E+10  8.03E+09  3.83E+09  1.83E+09  8.79E+08  4.15E+08
1                                                                                                          page 68
0                principal photon sources in group 12, photons/sec
     mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.59E+07) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106   3.01E+08  1.71E+08  9.69E+07  5.49E+07  3.11E+07  1.76E+07  1.00E+07
 pr144   3.34E+08  1.59E+08  7.59E+07  3.62E+07  1.72E+07  8.23E+06  3.92E+06
0                principal photon sources in group 13, photons/sec
     mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.44E+06) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106   5.09E+07  2.88E+07  1.63E+07  9.27E+06  5.25E+06  2.98E+06  1.69E+06
 pr144   2.69E+07  1.28E+07  6.11E+06  2.91E+06  1.39E+06  6.63E+05  3.16E+05
0                principal photon sources in group 14, photons/sec
     mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.12E+05) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106   8.75E+06  4.96E+06  2.81E+06  1.59E+06  9.03E+05  5.12E+05  2.90E+05
0                principal photon sources in group 15, photons/sec
     mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.26E+02) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106   3.86E+03  2.19E+03  1.24E+03  7.02E+02  3.98E+02  2.26E+02  1.28E+02
0                principal photon sources in group 16, photons/sec
     mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.86E-09) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142   1.47E-09  1.47E-09  1.47E-09  1.47E-09  1.47E-09  1.47E-09  1.47E-09
 sm147   6.24E-11  1.41E-10  2.40E-10  3.03E-10  3.54E-10  3.95E-10  4.27E-10
0                principal photon sources in group 17, photons/sec
     mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (9.34E-10) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142   7.36E-10  7.36E-10  7.36E-10  7.36E-10  7.36E-10  7.36E-10  7.36E-10
 sm147   3.13E-11  6.07E-11  1.20E-10  1.52E-10  1.77E-10  1.98E-10  2.14E-10
0                principal photon sources in group 18, photons/sec
     mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.93E-10) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142   5.46E-10  5.46E-10  5.46E-10  5.46E-10  5.46E-10  5.46E-10  5.46E-10
 sm147   2.32E-11  5.98E-11  8.92E-11  1.13E-10  1.32E-10  1.47E-10  1.59E-10
1                                                                                                          page 69
          photon spectrum as a function of time for heavy metals and their daughters

0                    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
                         powers     .00 mw, burnup=      1.mwd, flux= 2.79E+08 n**2-sec
0                            actinide photon release rates, photons/sec
```

basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	1.33E+14	5.50E+11	5.50E+11	5.50E+11	5.50E+11	5.50E+11	5.50E+11
3.00E-02	8.46E+12	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10
5.50E-02	1.09E+13	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10
8.50E-02	5.26E+13	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11
1.20E-01	5.42E+13	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10
1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
3.00E-01	2.07E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
6.50E-01	1.45E+12	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09
1.13E+00	1.88E+12	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08
1.58E+00	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08
2.00E+00	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07
2.40E+00	2.90E+04	2.91E+04	2.93E+04	2.95E+04	2.97E+04	3.01E+04	3.05E+04
2.80E+00	1.75E+04	1.85E+04	1.88E+04	2.14E+04	2.30E+04	2.46E+04	2.60E+04
3.25E+00	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04
3.75E+00	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03
4.25E+00	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03
4.75E+00	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03
5.50E+00	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03
total	2.93E+14	9.52E+11	9.52E+11	9.52E+11	9.52E+11	9.52E+11	9.52E+11
mev/sec	2.51E+13	7.20E+10	7.20E+10	7.20E+10	7.20E+10	7.20E+10	7.20E+10

0
0 actinide energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	3.33E+08	1.37E+06	1.37E+06	1.37E+06	1.37E+06	1.37E+06	1.37E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.77E+05	2.77E+05	2.77E+05	2.77E+05	2.77E+05	2.77E+05
8.50E-02	1.12E+09	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06
1.20E-01	1.63E+09	8.69E+05	8.69E+05	8.69E+05	8.69E+05	8.69E+05	8.69E+05
1.70E-01	7.31E+07	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05
3.00E-01	2.15E+09	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06
6.50E-01	2.36E+08	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06
1.13E+00	5.24E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05
1.58E+00	4.20E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04
2.00E+00	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04
2.40E+00	1.74E+01	1.75E+01	1.76E+01	1.77E+01	1.78E+01	1.80E+01	1.83E+01
2.80E+00	1.23E+01	1.29E+01	1.39E+01	1.50E+01	1.61E+01	1.72E+01	1.82E+01
3.25E+00	8.26E+00	8.26E+00	8.27E+00	8.27E+00	8.27E+00	8.27E+00	8.27E+00
3.75E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00
4.25E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00
4.75E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00
5.50E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00
total	6.27E+09	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07
gamma watts	4.02E+00	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02

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neutron source intensity as a function of time

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	6.26E-16	3.94E-15	1.27E-14	2.73E-14	5.15E-14	8.48E-14	1.35E-13
bi210	1.50E-13	1.00E-12	3.09E-12	6.96E-12	1.31E-11	2.22E-11	3.45E-11

bi211	1.66E-04	6.97E-04	1.44E-03	2.44E-03	3.49E-03	5.18E-03	6.90E-03
bi212	8.84E-06	4.21E-05	9.07E-05	1.46E-04	2.03E-04	2.58E-04	3.09E-04
bi213	2.03E-08	9.90E-08	2.22E-07	3.93E-07	6.13E-07	8.83E-07	1.20E-06
bi214	7.14E-09	2.47E-08	5.23E-08	9.01E-08	1.38E-07	1.96E-07	2.65E-07
po210	5.98E-08	5.89E-07	2.20E-06	5.55E-06	1.13E-05	2.00E-05	3.25E-05
po211	6.59E-07	2.76E-06	5.71E-06	9.67E-06	1.46E-05	2.05E-05	2.73E-05
po212	4.52E-05	2.14E-04	4.45E-04	7.49E-04	1.04E-03	1.32E-03	1.58E-03
po213	2.67E-06	1.31E-05	2.92E-05	5.19E-05	8.09E-05	1.16E-04	1.58E-04
po214	6.36E-05	2.20E-04	4.46E-04	8.02E-04	1.25E-03	1.75E-03	2.36E-03
po215	2.35E-04	9.85E-04	2.04E-03	3.45E-03	5.22E-03	7.32E-03	9.76E-03
po216	3.53E-05	1.68E-04	3.63E-04	5.85E-04	8.12E-04	1.03E-03	1.23E-03
po218	3.02E-05	1.05E-04	2.22E-04	3.82E-04	5.85E-04	8.32E-04	1.12E-03
at217	1.73E-06	8.47E-06	1.90E-05	3.36E-05	5.25E-05	7.55E-05	1.03E-04
rn218	4.99E-15	1.96E-19	7.72E-24	.00E+00	.00E+00	.00E+00	.00E+00
rn219	1.67E-04	7.83E-04	1.62E-03	2.74E-03	4.15E-03	5.82E-03	7.76E-03
rn220	2.80E-05	1.33E-04	2.87E-04	4.63E-04	6.43E-04	8.17E-04	9.78E-04
rn222	2.21E-05	7.65E-05	1.62E-04	2.79E-04	4.27E-04	6.07E-04	8.19E-04
fr221	1.26E-06	6.18E-06	1.38E-05	2.45E-05	3.83E-05	5.51E-05	7.49E-05
fr223	9.02E-11	2.97E-10	6.14E-10	1.04E-09	1.57E-09	2.20E-09	2.93E-09
ra222	3.86E-15	1.52E-19	5.97E-24	2.50E-28	.00E+00	.00E+00	.00E+00
ra223	1.08E-04	4.53E-04	9.39E-04	1.59E-03	2.40E-03	3.37E-03	4.49E-03
ra224	1.98E-05	9.43E-05	2.03E-04	3.27E-04	4.55E-04	5.78E-04	6.91E-04
ra226	1.33E-05	4.47E-05	9.46E-05	1.63E-04	2.50E-04	3.55E-04	4.79E-04
ac225	9.09E-07	4.44E-06	9.94E-06	1.76E-05	2.75E-05	3.94E-05	5.39E-05
ac227	1.02E-06	5.34E-06	6.91E-06	1.17E-05	1.77E-05	2.48E-05	3.30E-05
ac228	1.33E-16	4.33E-16	8.87E-16	1.48E-15	2.20E-15	3.03E-15	3.97E-15
th224	3.48E-15	1.37E-19	5.39E-24	2.26E-28	.00E+00	.00E+00	.00E+00
th227	1.31E-04	5.80E-04	1.04E-03	1.75E-03	2.65E-03	3.72E-03	4.95E-03
th228	1.76E-05	7.94E-05	1.71E-04	2.75E-04	3.83E-04	4.86E-04	5.81E-04
th229	6.62E-07	2.59E-06	5.81E-06	1.03E-05	1.61E-05	2.31E-05	3.15E-05
th230	5.67E-02	1.04E-01	1.51E-01	1.98E-01	2.46E-01	2.93E-01	3.40E-01
th232	2.92E-08	5.36E-08	7.80E-08	1.02E-07	1.27E-07	1.51E-07	1.75E-07
pa231	5.14E-03	9.13E-03	1.31E-02	1.71E-02	2.11E-02	2.51E-02	2.91E-02
u230	2.74E-15	1.08E-19	4.24E-24	1.78E-28	.00E+00	.00E+00	.00E+00
u231	1.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.40E-04	3.22E-04	6.69E-04	5.08E-04	6.84E-04	7.41E-04	8.22E-04
u233	1.45E-02	2.97E-02	4.50E-02	6.02E-02	7.55E-02	9.07E-02	1.06E-01
u234	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03
u235	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
u236	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	1.15E-08	6.77E-09	5.98E-09	2.53E-09	1.37E-09	8.05E-10	4.72E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	3.26E-02	2.69E-02	2.20E-02	1.80E-02	1.48E-02	1.21E-02	9.92E-03
pu237	1.46E-10	1.37E-12	1.28E-14	1.20E-16	1.13E-18	1.05E-20	9.88E-23
pu238	6.52E+02	6.53E+02	6.49E+02	6.45E+02	6.41E+02	6.36E+02	6.32E+02

1 neutron source intensity as a function of time page 71

0 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 48% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	4.99E+01	5.04E+01	5.04E+01	5.04E+01	5.04E+01	5.04E+01	5.04E+01
pu240	9.04E-04	9.04E-04	9.04E-04	9.04E-04	9.04E-04	9.04E-04	9.04E-04
pu241	5.23E-11	5.02E-11	4.82E-11	4.63E-11	4.45E-11	4.27E-11	4.11E-11
pu242	1.66E-16	1.66E-16	1.66E-16	1.66E-16	1.66E-16	1.66E-16	1.66E-16
am239	1.42E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

am240	2.16E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.36E-09	5.80E-09	1.00E-08	1.41E-08	1.80E-08	2.18E-08	2.54E-08
am242m	7.95E-18	7.92E-18	7.88E-18	7.85E-18	7.82E-18	7.79E-18	7.76E-18
am243	6.06E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21
cm241	2.51E-26	4.04E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	3.17E-12	8.85E-13	2.44E-13	6.87E-14	2.06E-14	7.39E-15	3.77E-15
cm243	4.24E-21	4.16E-21	4.07E-21	3.99E-21	3.91E-21	3.83E-21	3.76E-21
cm244	2.61E-24	2.55E-24	2.47E-24	2.39E-24	2.32E-24	2.25E-24	2.18E-24
total	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04

neutron source intensity as a function of time

sas2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.65E-06	2.67E-06	3.88E-06	5.09E-06	6.30E-06	7.52E-06	8.73E-06
pa231	6.65E-07	1.14E-06	1.65E-06	2.15E-06	2.65E-06	3.15E-06	3.65E-06
u232	8.98E-09	1.98E-08	2.88E-08	3.61E-08	4.20E-08	4.67E-08	5.05E-08
u234	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
u235	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00
u236	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
u237	1.22E-09	3.42E-23	1.77E-24	1.70E-24	1.63E-24	1.57E-24	1.50E-24
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12
np238	2.02E-08	2.32E-30	2.31E-30	2.30E-30	2.29E-30	2.29E-30	2.28E-30
np239	1.98E-05	6.28E-32	6.28E-32	6.28E-32	6.28E-32	6.28E-32	6.28E-32
pu236	2.21E-03	1.02E-03	1.49E-03	1.22E-03	1.00E-03	8.19E-04	6.71E-04
pu238	1.20E+02	1.21E+02	1.20E+02	1.19E+02	1.18E+02	1.18E+02	1.17E+02
pu239	2.67E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02
pu240	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03
pu241	1.88E-12	1.81E-12	1.74E-12	1.67E-12	1.60E-12	1.54E-12	1.48E-12
pu242	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13
pu243	1.04E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.23E-13	2.23E-12	3.87E-12	5.44E-12	6.94E-12	8.39E-12	9.77E-12
am242m	3.78E-17	3.76E-17	3.75E-17	3.73E-17	3.72E-17	3.70E-17	3.69E-17
am242	2.17E-16	4.09E-20	4.07E-20	4.05E-20	4.04E-20	4.02E-20	4.00E-20
am243	2.78E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23
am244	5.61E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.38E-11	6.42E-12	1.22E-12	3.43E-13	1.03E-13	3.69E-14	1.88E-14
cm243	9.21E-23	9.03E-23	8.85E-23	8.67E-23	8.49E-23	8.32E-23	8.16E-23
cm244	3.40E-22	3.33E-22	3.32E-22	3.12E-22	3.02E-22	2.93E-22	2.84E-22
cm245	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34
cm246	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35
total	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05
total	1.30E+05	1.30E+05	1.30E+05	1.30E+05	1.30E+05	1.30E+05	1.30E+05

alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

sas2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d

1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	2.458E+03	2.458E+03	2.457E+03	2.456E+03	2.456E+03	2.455E+03	2.454E+03
3	1.85E+00 - 3.00E+00	6.963E+03	6.964E+03	6.961E+03	6.959E+03	6.957E+03	6.954E+03	6.952E+03
4	1.40E+00 - 1.85E+00	1.870E+03	1.870E+03	1.870E+03	1.869E+03	1.868E+03	1.868E+03	1.867E+03
5	9.00E-01 - 1.40E+00	1.052E+03	1.052E+03	1.052E+03	1.051E+03	1.051E+03	1.051E+03	1.050E+03
6	4.00E-01 - 9.00E-01	3.056E+02	3.054E+02	3.055E+02	3.054E+02	3.053E+02	3.052E+02	3.051E+02
7	1.00E-01 - 4.00E-01	4.775E+01	4.776E+01	4.774E+01	4.773E+01	4.771E+01	4.770E+01	4.768E+01
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.270E+04	1.270E+04	1.269E+04	1.269E+04	1.268E+04	1.268E+04	1.268E+04

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spontaneous fission neutron source spectrum as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron spectra, neutrons/sec/basis
basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1 6.43E+00 - 2.00E+01	2.215E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03
2 3.00E+00 - 6.43E+00	2.465E+04	2.465E+04	2.465E+04	2.465E+04	2.465E+04	2.465E+04	2.465E+04
3 1.85E+00 - 3.00E+00	2.666E+04	2.666E+04	2.665E+04	2.665E+04	2.665E+04	2.665E+04	2.665E+04
4 1.40E+00 - 1.85E+00	1.539E+04	1.539E+04	1.539E+04	1.539E+04	1.539E+04	1.539E+04	1.539E+04
5 9.00E-01 - 1.40E+00	2.107E+04	2.107E+04	2.107E+04	2.107E+04	2.107E+04	2.107E+04	2.107E+04
6 4.00E-01 - 9.00E-01	2.313E+04	2.313E+04	2.312E+04	2.312E+04	2.312E+04	2.312E+04	2.312E+04
7 1.00E-01 - 4.00E-01	4.530E+03	4.528E+03	4.528E+03	4.528E+03	4.528E+03	4.528E+03	4.528E+03
8 1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9 3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10 5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11 1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12 3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13 1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14 3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15 1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16 1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17 1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18 1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19 8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20 4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21 3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22 2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23 1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

```
 24 5.00E-08 - 1.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 25 3.00E-08 - 5.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 26 1.00E-08 - 3.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                       1.176E+05 1.176E+05 1.176E+05 1.176E+05 1.176E+05 1.176E+05 1.176E+05
1                                                                                                  page  75
                 total (alpha-n plus spon. fission) neutron source spectrum as a function of time
                                 (using reaction spectra for uranium dioxide)

0                                  sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                                                neutron spectra, neutrons/sec/basis
                                             basis = single reactor assembly

      boundaries, mev    initial   304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d

  1 6.43E+00 - 2.00E+01 2.215E+03 2.214E+03 2.214E+03 2.214E+03 2.214E+03 2.214E+03 2.214E+03
  2 3.00E+00 - 6.43E+00 2.711E+04 2.711E+04 2.711E+04 2.711E+04 2.711E+04 2.711E+04 2.711E+04
  3 1.85E+00 - 3.00E+00 3.362E+04 3.362E+04 3.362E+04 3.361E+04 3.361E+04 3.361E+04 3.361E+04
  4 1.40E+00 - 1.85E+00 1.725E+04 1.726E+04 1.726E+04 1.726E+04 1.726E+04 1.726E+04 1.726E+04
  5 9.00E-01 - 1.40E+00 2.212E+04 2.213E+04 2.213E+04 2.213E+04 2.213E+04 2.213E+04 2.213E+04
  6 4.00E-01 - 9.00E-01 2.343E+04 2.343E+04 2.343E+04 2.343E+04 2.343E+04 2.343E+04 2.343E+04
  7 1.00E-01 - 4.00E-01 4.578E+03 4.576E+03 4.576E+03 4.575E+03 4.575E+03 4.575E+03 4.575E+03
  8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 11 1.00E-04 - 5.50E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 12 3.00E-05 - 1.00E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 13 1.00E-05 - 3.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 14 3.05E-06 - 1.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 15 1.77E-06 - 3.05E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 16 1.30E-06 - 1.77E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 17 1.13E-06 - 1.30E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 18 1.00E-06 - 1.13E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 19 8.00E-07 - 1.00E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 20 4.00E-07 - 8.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 21 3.25E-07 - 4.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 22 2.25E-07 - 3.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 23 1.00E-07 - 2.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 24 5.00E-08 - 1.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 25 3.00E-08 - 5.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 26 1.00E-08 - 3.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                       1.303E+05 1.303E+05 1.303E+05 1.303E+05 1.303E+05 1.303E+05 1.303E+05
1
1                     * gamma sources determined *
0case applies the following photon data base
                      master photon library
                       in binary mode
0    the sources include photons of nuclides for...

       light elements
       actinides
       fission products
1                     gamma source spectrum for gamma lines (sas2)
0                                   1826.25  day time of the requested nuclides
0                        energy interval in mev      photons / second      mev / second
0
                      1.0000E-02 to      5.0000E-02      3.6132E+11        1.0840E+10
                      5.0000E-02 to      1.0000E-01      2.2149E+11        1.6612E+10
                      1.0000E-01 to      2.0000E-01      7.5224E+10        1.1284E+10
```

```
                    2.0000E-01 to     3.0000E-01     2.4711E+10     6.1779E+09
                    3.0000E-01 to     4.0000E-01     1.0664E+11     3.7325E+10
                    4.0000E-01 to     6.0000E-01     1.3794E+10     6.8981E+09
                    6.0000E-01 to     8.0000E-01     1.3357E+11     9.3496E+10
                    8.0000E-01 to     1.0000E+00     1.7698E+09     1.5928E+09
                    1.0000E+00 to     1.3300E+00     1.2218E+09     1.4234E+09
                    1.3300E+00 to     1.6600E+00     3.8588E+08     5.7690E+08
                    1.6600E+00 to     2.0000E+00     1.3192E+08     2.4142E+08
                    2.0000E+00 to     2.5000E+00     3.7967E+08     8.5425E+08
                    2.5000E+00 to     3.0000E+00     2.6432E+06     6.7187E+06
                    3.0000E+00 to     4.0000E+00     2.8191E+05     9.8669E+05
                    4.0000E+00 to     5.0000E+00     5.3042E+03     2.3869E+04
                    5.0000E+00 to     6.5000E+00     2.1242E+03     1.2214E+04
                    6.5000E+00 to     8.0000E+00     4.1589E+02     3.6152E+03
                    8.0000E+00 to     1.0000E+01     8.8185E+01     7.9367E+02
                    totals                           9.4065E+11     1.8733E+11

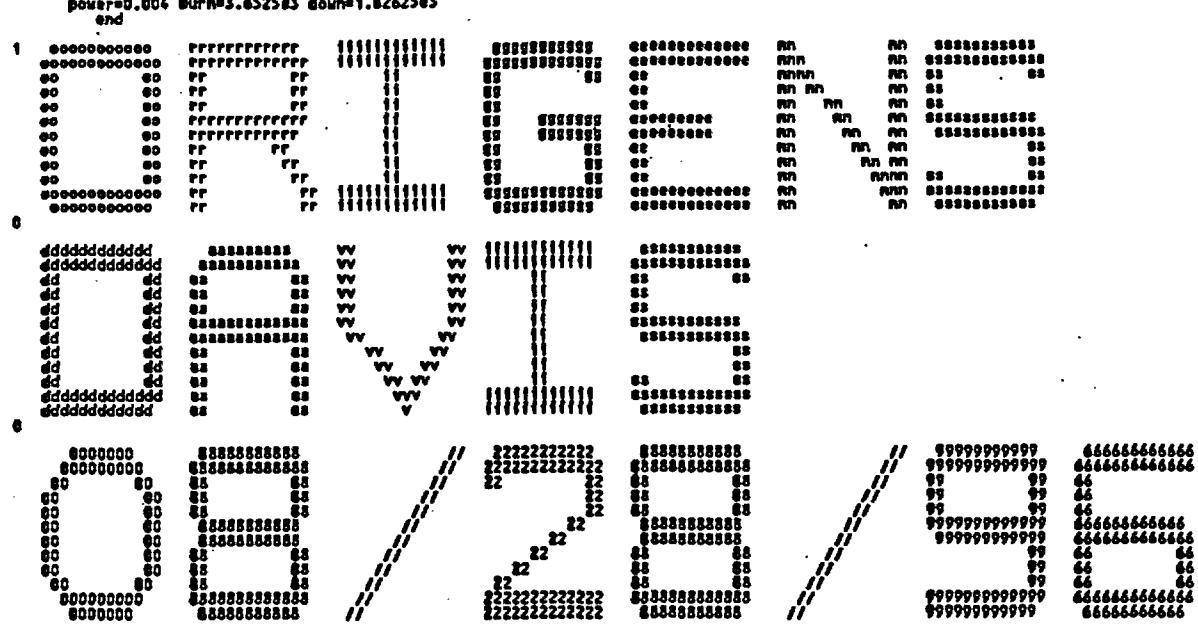
                    total energy from nuclides with spectrum data    =   1.8733E+11
                    total energy from nuclides with no spectrum data =   4.6955E+04

 .results on logical unit no. 71, position  2, for time step  6, subcase 7, (run position 1, case position 2)
 title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
    .terminated logical unit no. 71 with zero flag record.
 * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h     will be called
      SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ftuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.370 12000 0.354
                                 13027 4.434 14000 20.183 19000 1.370 20000 1.439
                                 26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                 92238 28.393 93237 0.033 1 1.0 538   end

      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-135     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 2 1.0 323.   end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 3 1.0 323.   end
```

```
;
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
;
;  fuel-pin-cell geometry:
;
symmslabcell  340.  280. 1 3 281. 2 end
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
;
;
;  assembly and cycle parameters:
;
npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e3 down=1.82625e3
   end
```



```
0

      11        88888888888                    00000000      99999999999                          44     33333333333
     111       8888888888888                  000000000     9999999999999                        444    3333333333333
    1111       88        88        :::       00        00    99        99        :::             4444    33          33
      11       88        88        :::      00         00   99        99        :::            44 44                33
      11       88        88        :::      00         00   99        99        :::           44  44                33
      11        88888888888                 00         00   9999999999999                    44   44          333
      11        88888888888                 00         00    999999999999                   44    44          333
      11       88        88        :::      00         00            99        :::      444444444444            33
      11       88        88        :::      00         00            99        :::      444444444444            33
      11       88        88        :::       00        00            99        :::                44     33       33
  11111111     88888888888                    000000000     9999999999999                      44     333333333333
  11111111      88888888888                    00000000     999999999999                       44      333333333333
1
0
                          88888888888     cccccccccccc     88888888     ||            @@@@@@@@@@@@@
                         8888888888888   cccccccccccccc   88888888888   ||            @@@@@@@@@@@@@
                         88          88  cc          cc   88        88  ||            @@
                         88              cc               88        88  ||            @@
                         88              cc               88        88  ||            @@
                         8888888888888   cc               88888888888888 ||            @@@@@@@@@
                          88888888888888 cc               88888888888888 ||            @@@@@@@@@
                                     88  cc               88        88  ||            @@
                                     88  cc               88        88  ||            @@
                         88          88  cc          cc   88        88  ||            @@
                         8888888888888   cccccccccccccc   88        88  ||||||||||||||  @@@@@@@@@@@@@
                          88888888888     cccccccccccc     88        88  ||||||||||||||  @@@@@@@@@@@@@
```

program verification information

code system: scale version: 4.3

program: e0o004

creation date: 03/13/96

library: /usr1/ornl/Scale/bin

test code: origen2

version: 3.0

jobname: davis

date of execution: 08/28/96

time of execution: 18:09:43

```
                        *****                                                                  *****
                        *****                                                                  *****
                        ************************************************************************
                        ************************************************************************
                        ************************************************************************
1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       34q array has     12 entries.
library information...

         cross-section data taken from position number  1 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ************************************************************************
         *                                                                      *
         *            prelim lwr origen-s binary working library--id = 1143     *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *      data from the light element, actinide, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                      *
         *     neutron flux spectrum factors and cross sections were produced from *
         *    the "prescas2" case updating all nuclides on the scale "burnup" library *
         *                                                                      *
         *                fission product yields are from endf/b-v              *
         *                                                                      *
         *             photon libraries use an 18-energy-group structure        *
         *            the photon data are from the master photon data base,     *
         *             produced to include bremsstrahlung from uo2 matrix       *
         *                                                                      *
         *       sas information above this box (if present) for later updates *
         *                                                                      *
         ************************************************************************
         *                                                                      *
```

```
0          ***********************************************************************
0                    .other identification and sizes of library.
0                     date set name:  ft33f001
0                  8/28/1996    date library was produced
0                       1697    total number of nuclides in library
                         489    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7993    number of nonzero off-diagonal matrix elements
0          ***********************************************************************
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page    1
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
    na 23   1.73E+05  1.73E+05
    al 27   1.35E+06  1.35E+06
  total     1.52E+06  1.52E+06
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides          page    2
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
     u234   2.12E+03  2.12E+03
     u235   1.72E+05  1.72E+05
     u236   4.12E+04  4.12E+04
     u238   8.66E+06  8.66E+06
    np237   9.99E+03  9.99E+03
  total     8.88E+06  8.88E+06
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page    3
        power=     .00mw, burnup=       3.mwd, flux= 3.00E+08n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        182.6 d        365.3 d        547.9 d        730.5 d        730.5 d
     productions  1.023181E+06  1.023186E+06  1.023188E+06  1.023192E+06  1.023196E+06  1.023196E+06
     absorptions  8.460839E+05  8.460916E+05  8.460971E+05  8.461029E+05  8.461086E+05  8.461086E+05
     k infinity   1.209315E+00  1.209307E+00  1.209303E+00  1.209300E+00  1.209296E+00  1.209296E+00
0                 initial        182.6 d        365.3 d        547.9 d        730.5 d        730.5 d
     actinide
     absorptions  8.423189E+05  8.423211E+05  8.423233E+05  8.423256E+05  8.423276E+05  8.423276E+05
     non-actinide
     abs. fracs.  4.449964E-03  4.456222E-03  4.460275E-03  4.464388E-03  4.468620E-03  4.468620E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page    4
                                           fraction of total absorption rate
        power=     .00mw, burnup=       3.mwd, flux= 3.00E+08n/cm**2-sec
0                initial   182.6 d   365.3 d   547.9 d   730.5 d   730.5 d

     sm149       .00E+00  3.59E-06  7.24E-06  1.09E-05  1.45E-05  1.45E-05
     xe135       .00E+00  2.28E-06  2.28E-06  2.28E-06  2.27E-06  2.27E-06
     sm151       .00E+00  1.52E-07  3.06E-07  4.58E-07  6.10E-07  6.10E-07
     nd143       .00E+00  6.47E-08  1.38E-07  2.11E-07  2.85E-07  2.85E-07
     gd157       .00E+00  3.73E-08  7.47E-08  1.12E-07  1.49E-07  1.49E-07
     rh103       .00E+00  2.43E-08  5.05E-08  9.31E-08  1.28E-07  1.28E-07
     cd113       .00E+00  2.18E-08  6.36E-08  9.53E-08  1.27E-07  1.27E-07
     pm147       .00E+00  3.12E-08  6.13E-08  8.78E-08  1.11E-07  1.11E-07
     xe131       .00E+00  2.72E-08  4.59E-08  6.07E-08  9.34E-08  9.34E-08
     cs133       .00E+00  1.75E-08  3.69E-08  5.43E-08  7.28E-08  7.28E-08
     te 99       .00E+00  1.33E-08  2.69E-08  4.06E-08  5.40E-08  5.40E-08
     nd145       .00E+00  1.04E-08  2.08E-08  3.12E-08  4.16E-08  4.16E-08
     eu155       .00E+00  1.14E-08  2.19E-08  3.17E-08  4.08E-08  4.08E-08
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gd155	.00E+00	1.78E-09	6.93E-09	1.52E-08	2.44E-08	2.44E-08
mo 95	.00E+00	2.64E-09	8.99E-09	1.61E-08	2.34E-08	2.34E-08
sm152	.00E+00	5.54E-09	1.11E-08	1.66E-08	2.22E-08	2.22E-08
kr 83	.00E+00	4.45E-09	8.90E-09	1.34E-08	1.78E-08	1.78E-08
cs135	.00E+00	4.10E-09	8.23E-09	1.24E-08	1.65E-08	1.65E-08
ru101	.00E+00	3.25E-09	6.50E-09	9.74E-09	1.30E-08	1.30E-08
sm147	.00E+00	7.92E-10	3.19E-09	6.98E-09	1.20E-08	1.20E-08
pr141	.00E+00	2.27E-09	5.30E-09	8.34E-09	1.14E-08	1.14E-08
eu153	.00E+00	2.75E-09	5.54E-09	8.32E-09	1.11E-08	1.11E-08
la139	.00E+00	2.48E-09	4.96E-09	7.45E-09	9.93E-09	9.93E-09
rh105	.00E+00	8.28E-09	8.28E-09	8.28E-09	8.28E-09	8.27E-09
pd105	.00E+00	1.05E-09	2.12E-09	3.19E-09	4.25E-09	4.25E-09
zr 93	.00E+00	1.02E-09	2.05E-09	3.08E-09	4.11E-09	4.11E-09
eu151	.00E+00	2.17E-10	8.73E-10	1.96E-09	3.49E-09	3.49E-09
i129	.00E+00	7.29E-10	1.49E-09	2.26E-09	3.03E-09	3.03E-09
pr143	.00E+00	2.66E-09	2.66E-09	2.66E-09	2.66E-09	2.66E-09
mo 97	.00E+00	5.61E-10	1.13E-09	1.69E-09	2.26E-09	2.26E-09
xe133	.00E+00	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
ag109	.00E+00	4.80E-10	8.03E-10	1.20E-09	1.61E-09	1.61E-09
nd144	.00E+00	1.43E-10	5.01E-10	9.97E-10	1.58E-09	1.58E-09
ce141	.00E+00	1.54E-09	1.57E-09	1.57E-09	1.57E-09	1.57E-09
pm149	.00E+00	9.62E-10	9.62E-10	9.62E-10	9.62E-10	9.61E-10
nd147	.00E+00	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.43E-10
zr 91	.00E+00	1.57E-10	4.10E-10	6.74E-10	9.40E-10	9.40E-10
ru102	.00E+00	2.29E-10	4.58E-10	6.87E-10	9.16E-10	9.16E-10
y 89	.00E+00	1.61E-10	4.07E-10	6.41E-10	9.15E-10	9.15E-10
ce142	.00E+00	2.05E-10	4.11E-10	6.16E-10	8.22E-10	8.22E-10
sr 90	.00E+00	2.08E-10	4.13E-10	6.16E-10	8.16E-10	8.16E-10
nd148	.00E+00	1.99E-10	3.99E-10	5.98E-10	7.98E-10	7.98E-10
nd146	.00E+00	1.66E-10	3.32E-10	4.99E-10	6.65E-10	6.65E-10
ba138	.00E+00	1.42E-10	2.83E-10	4.25E-10	5.66E-10	5.66E-10
pd108	.00E+00	1.37E-10	2.75E-10	4.12E-10	5.50E-10	5.50E-10
in115	.00E+00	1.34E-10	2.72E-10	4.10E-10	5.49E-10	5.49E-10
ce140	.00E+00	1.18E-10	2.50E-10	3.83E-10	5.15E-10	5.15E-10
ce144	.00E+00	2.15E-10	3.53E-10	3.42E-10	4.98E-10	4.98E-10
xe132	.00E+00	1.18E-10	2.39E-10	3.60E-10	4.81E-10	4.81E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5

0 fraction of total absorption rate

0 powerm .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec

	initial	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
ru103	.00E+00	3.42E-10	3.56E-10	3.56E-10	3.56E-10	3.56E-10
mo 98	.00E+00	8.46E-11	1.69E-10	2.54E-10	3.38E-10	3.38E-10
mo100	.00E+00	8.09E-11	1.62E-10	2.43E-10	3.24E-10	3.24E-10
pd107	.00E+00	7.96E-11	1.59E-10	2.39E-10	3.19E-10	3.19E-10
xe134	.00E+00	7.05E-11	1.57E-10	2.35E-10	3.14E-10	3.14E-10
zr 92	.00E+00	6.37E-11	1.28E-10	1.91E-10	2.55E-10	2.55E-10
zr 96	.00E+00	5.21E-11	1.04E-10	1.56E-10	2.08E-10	2.08E-10
i127	.00E+00	4.54E-11	9.61E-11	1.48E-10	2.00E-10	2.00E-10
ru104	.00E+00	4.96E-11	9.93E-11	1.49E-10	1.99E-10	1.99E-10
nd150	.00E+00	4.44E-11	8.88E-11	1.33E-10	1.78E-10	1.78E-10
cs137	.00E+00	4.35E-11	8.65E-11	1.29E-10	1.71E-10	1.71E-10
xe136	.00E+00	4.25E-11	8.49E-11	1.27E-10	1.70E-10	1.70E-10
zr 95	.00E+00	1.45E-10	1.65E-10	1.67E-10	1.68E-10	1.68E-10
nb 95	.00E+00	1.12E-10	1.47E-10	1.52E-10	1.53E-10	1.53E-10
y 91	.00E+00	1.25E-10	1.40E-10	1.41E-10	1.42E-10	1.42E-10
br 81	.00E+00	2.23E-11	4.44E-11	6.49E-11	1.29E-10	1.29E-10
zr 94	.00E+00	2.73E-11	5.51E-11	8.27E-11	1.10E-10	1.10E-10
ba137	.00E+00	6.96E-12	2.74E-11	6.12E-11	1.08E-10	1.08E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.08E-10

rb 85	.00E+00	2.48E-11	4.98E-11	7.51E-11	1.01E-10	1.01E-10
cd111	.00E+00	1.95E-11	4.02E-11	6.09E-11	6.16E-11	6.16E-11
te130	.00E+00	1.92E-11	3.85E-11	5.77E-11	7.69E-11	7.69E-11
sm154	.00E+00	1.88E-11	3.75E-11	5.63E-11	7.50E-11	7.50E-11
rb 87	.00E+00	1.82E-11	3.65E-11	5.47E-11	7.29E-11	7.29E-11
kr 85	.00E+00	1.81E-11	3.56E-11	5.26E-11	6.90E-11	6.90E-11
se 77	.00E+00	1.36E-11	2.53E-11	3.80E-11	5.07E-11	5.08E-11
ba140	.00E+00	4.72E-11	4.72E-11	4.72E-11	4.72E-11	4.71E-11
sm153	.00E+00	3.79E-11	3.79E-11	3.79E-11	3.79E-11	3.76E-11
kr 84	.00E+00	8.70E-12	1.74E-11	2.61E-11	3.48E-11	3.48E-11
eu156	.00E+00	3.38E-11	3.38E-11	3.38E-11	3.38E-11	3.38E-11
sm150	.00E+00	2.05E-12	7.95E-12	1.77E-11	3.13E-11	3.13E-11
sr 89	.00E+00	2.79E-11	3.02E-11	3.04E-11	3.04E-11	3.04E-11
se 79	.00E+00	6.52E-12	1.30E-11	1.96E-11	2.61E-11	2.61E-11
sb121	.00E+00	6.26E-12	1.26E-11	1.89E-11	2.52E-11	2.52E-11
sb123	.00E+00	6.02E-12	9.64E-12	1.50E-11	2.01E-11	2.01E-11
ru106	.00E+00	7.65E-12	1.27E-11	1.65E-11	1.92E-11	1.92E-11
kr 86	.00E+00	4.73E-12	9.47E-12	1.42E-11	1.89E-11	1.89E-11
ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.73E-11
te128	.00E+00	4.26E-12	8.53E-12	1.28E-11	1.71E-11	1.71E-11
pd106	.00E+00	1.42E-12	5.11E-12	1.04E-11	1.69E-11	1.69E-11
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	1.54E-11
la140	.00E+00	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
gd156	.00E+00	2.06E-12	6.53E-12	9.71E-12	1.31E-11	1.31E-11
mo 99	.00E+00	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
se 80	.00E+00	3.05E-12	6.10E-12	9.15E-12	1.22E-11	1.22E-11
dy161	.00E+00	2.35E-12	5.23E-12	7.95E-12	1.06E-11	1.06E-11
tb159	.00E+00	1.81E-12	3.64E-12	5.47E-12	7.29E-12	7.29E-12
te127m	.00E+00	4.91E-12	6.53E-12	7.03E-12	7.19E-12	7.19E-12
cd112	.00E+00	1.72E-12	3.44E-12	5.20E-12	6.94E-12	6.94E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 6
0 fraction of total absorption rate

0 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec

	initial	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
li 6	.00E+00	1.73E-12	3.44E-12	5.19E-12	6.92E-12	6.92E-12
i131	.00E+00	4.77E-12	4.77E-12	4.77E-12	4.77E-12	4.76E-12
sb125	.00E+00	1.75E-12	3.52E-12	4.71E-12	5.04E-12	5.04E-12
sn117	.00E+00	1.38E-12	2.73E-12	4.13E-12	5.51E-12	5.51E-12
sn119	.00E+00	1.12E-12	2.25E-12	3.38E-12	4.50E-12	4.50E-12
sn115	.00E+00	1.01E-12	2.04E-12	3.07E-12	4.10E-12	4.10E-12
pm148m	.00E+00	7.65E-13	1.64E-12	2.81E-12	3.66E-12	3.65E-12
sr 88	.00E+00	8.71E-13	1.74E-12	2.61E-12	3.49E-12	3.49E-12
pd110	.00E+00	6.31E-13	1.26E-12	1.89E-12	2.53E-12	2.53E-12
cd114	.00E+00	6.16E-13	1.23E-12	1.85E-12	2.47E-12	2.47E-12
zr 90	.00E+00	1.51E-13	6.08E-13	1.37E-12	2.42E-12	2.42E-12
se 82	.00E+00	5.91E-13	1.18E-12	1.77E-12	2.36E-12	2.36E-12
gd158	.00E+00	5.70E-13	1.14E-12	1.71E-12	2.29E-12	2.29E-12
te125	.00E+00	1.40E-13	5.73E-13	1.27E-12	2.21E-12	2.21E-12
sn126	.00E+00	4.71E-13	9.42E-13	1.41E-12	1.88E-12	1.88E-12
se 78	.00E+00	4.51E-13	9.03E-13	1.35E-12	1.81E-12	1.81E-12
te129m	.00E+00	1.74E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
sn124	.00E+00	3.68E-13	7.37E-13	1.11E-12	1.47E-12	1.47E-12
eu154	.00E+00	2.88E-13	6.21E-13	9.07E-13	1.42E-12	1.42E-12
dy162	.00E+00	3.49E-13	6.97E-13	1.05E-12	1.40E-12	1.40E-12
dy164	.00E+00	3.12E-13	6.23E-13	9.34E-13	1.25E-12	1.25E-12
as 75	.00E+00	2.69E-13	5.39E-13	8.08E-13	1.08E-12	1.08E-12
y 90	.00E+00	1.07E-13	2.92E-13	5.85E-13	7.75E-13	7.75E-13
sn118	.00E+00	1.51E-13	3.03E-13	4.54E-13	6.05E-13	6.05E-13
ba136	.00E+00	1.29E-13	2.73E-13	4.17E-13	5.61E-13	5.61E-13

cd116	.00E+00	1.28E-13	2.65E-13	3.03E-13	5.10E-13	5.10E-13
sn122	.00E+00	1.25E-13	2.49E-13	3.74E-13	4.98E-13	4.98E-13
sn120	.00E+00	9.38E-14	1.88E-13	2.81E-13	3.75E-13	3.75E-13
cs134	.00E+00	8.05E-14	1.70E-13	2.67E-13	3.70E-13	3.70E-13
ag111	.00E+00	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13
kr 82	.00E+00	7.71E-14	1.35E-13	2.33E-13	3.11E-13	3.11E-13
dy163	.00E+00	7.67E-14	1.53E-13	2.30E-13	3.07E-13	3.07E-13
ru 99	.00E+00	6.90E-14	1.43E-13	2.21E-13	3.02E-13	3.02E-13
ge 73	.00E+00	7.27E-14	1.46E-13	2.18E-13	2.91E-13	2.91E-13
eu157	.00E+00	2.95E-13	2.95E-13	2.95E-13	2.95E-13	2.89E-13
cd115m	.00E+00	2.22E-13	2.35E-13	2.35E-13	2.35E-13	2.35E-13
xe130	.00E+00	4.74E-14	9.51E-14	1.43E-13	1.90E-13	1.90E-13
pm148	.00E+00	4.32E-14	8.67E-14	1.23E-13	1.36E-13	1.35E-13
mo 96	.00E+00	3.39E-14	6.81E-14	1.02E-13	1.37E-13	1.37E-13
ge 76	.00E+00	2.66E-14	5.33E-14	7.99E-14	1.07E-13	1.07E-13
gd160	.00E+00	1.69E-14	3.38E-14	5.06E-14	6.75E-14	6.75E-14
cs136	.00E+00	5.59E-14	5.59E-14	5.59E-14	5.59E-14	5.58E-14
te126	.00E+00	1.24E-14	2.53E-14	3.82E-14	5.12E-14	5.12E-14
in113	.00E+00	2.47E-15	9.79E-15	2.19E-14	3.86E-14	3.86E-14
eu152	.00E+00	1.29E-15	5.50E-15	1.55E-14	3.40E-14	3.40E-14
ru100	.00E+00	6.77E-15	1.41E-14	2.21E-14	3.07E-14	3.07E-14
sn125	.00E+00	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.93E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	2.77E-14
he165	.00E+00	5.26E-15	1.05E-14	1.58E-14	2.11E-14	2.11E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7

0 fraction of total absorption rate

0 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec

	initial	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
sr 87	.00E+00	3.04E-15	6.08E-15	9.12E-15	1.22E-14	1.22E-14
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	1.15E-14
te124	.00E+00	1.66E-15	4.70E-15	7.83E-15	1.09E-14	1.09E-14
sn123	.00E+00	6.46E-15	8.88E-15	9.79E-15	1.01E-14	1.01E-14
te132	.00E+00	9.49E-15	9.49E-15	9.49E-15	9.49E-15	9.44E-15
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	9.31E-15
nb 94	.00E+00	1.75E-15	3.51E-15	5.26E-15	7.01E-15	7.01E-15
sm148	.00E+00	3.49E-16	1.40E-15	3.74E-15	6.71E-15	6.71E-15
ge 74	.00E+00	1.47E-15	2.93E-15	4.40E-15	5.86E-15	5.86E-15
ba135	.00E+00	4.99E-16	1.33E-15	2.49E-15	3.98E-15	3.98E-15
ge 72	.00E+00	9.64E-16	1.95E-15	2.93E-15	3.91E-15	3.91E-15
gd154	.00E+00	1.88E-16	7.66E-16	1.85E-15	3.45E-15	3.45E-15
sr 86	.00E+00	7.33E-16	1.59E-15	2.45E-15	3.31E-15	3.31E-15
nd142	.00E+00	1.98E-16	7.89E-16	1.80E-15	3.23E-15	3.23E-15
sb126	.00E+00	2.99E-15	2.99E-15	2.99E-15	2.99E-15	2.98E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	2.87E-15
se 74	.00E+00	5.64E-16	1.13E-15	1.70E-15	2.27E-15	2.27E-15
ba134	.00E+00	1.20E-16	4.95E-16	1.15E-15	2.11E-15	2.11E-15
sb124	.00E+00	1.84E-15	2.07E-15	2.10E-15	2.10E-15	2.10E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	2.03E-15
pd104	.00E+00	8.36E-17	4.28E-16	1.04E-15	1.07E-15	1.07E-15
gd152	.00E+00	9.86E-17	3.46E-16	8.94E-16	1.89E-15	1.89E-15
i130	.00E+00	7.11E-16	7.12E-16	7.12E-16	7.13E-16	6.88E-16
cd110	.00E+00	6.76E-17	1.95E-16	3.74E-16	5.08E-16	5.08E-16
in117	.00E+00	6.07E-16	6.07E-16	6.07E-16	6.07E-16	5.96E-16
xe128	.00E+00	1.37E-16	2.75E-16	4.15E-16	5.56E-16	5.56E-16
er166	.00E+00	1.32E-16	2.63E-16	4.05E-16	5.42E-16	5.42E-16
dy160	.00E+00	6.00E-17	1.65E-16	3.81E-16	3.99E-16	3.99E-16
tb160	.00E+00	2.44E-16	2.93E-16	3.04E-16	3.12E-16	3.12E-16
rb 86	.00E+00	2.39E-16	2.40E-16	2.40E-16	2.40E-16	2.40E-16
br 79	.00E+00	1.59E-17	5.87E-17	1.28E-16	2.25E-16	2.25E-16

```
     dy165      .00E+00  2.88E-16  2.89E-16  2.09E-16  2.89E-16  1.74E-16
     kr 80      .00E+00  4.11E-17  8.23E-17  1.24E-16  1.65E-16  1.65E-16
     xe129      .00E+00  7.46E-18  3.00E-17  6.77E-17  1.21E-16  1.21E-16
     ag107      .00E+00  7.08E-18  2.83E-17  6.37E-17  1.13E-16  1.13E-16
     cd118      .00E+00  1.19E-16  1.19E-16  1.19E-16  1.19E-16  6.67E-17
     ge 75      .00E+00  8.51E-17  8.51E-17  8.51E-17  8.51E-17  6.16E-17
     te122      .00E+00  5.41E-18  1.12E-17  1.72E-17  2.35E-17  2.35E-17
     nb 93      .00E+00  1.96E-18  5.07E-18  1.04E-17  1.91E-17  1.91E-17
     be  9      .00E+00  3.42E-18  6.84E-18  1.03E-17  1.37E-17  1.37E-17
     pr142      .00E+00  3.17E-18  6.63E-18  1.01E-17  1.36E-17  1.32E-17
     sn116      .00E+00  1.02E-18  4.23E-18  7.25E-18  1.09E-17  1.09E-17
     te123      .00E+00  1.35E-18  4.03E-18  6.83E-18  9.73E-18  9.74E-18
     in119m     .00E+00  2.97E-17  2.97E-17  2.97E-17  2.97E-17  6.93E-18
     li  7      .00E+00  1.33E-18  2.66E-18  4.00E-18  5.33E-18  5.33E-18
     er167      .00E+00  5.36E-19  1.07E-18  1.62E-18  2.17E-18  2.17E-18
     cd109      .00E+00  4.32E-20  7.65E-20  1.03E-19  1.23E-19  1.23E-19
     cd108      .00E+00  2.66E-20  5.32E-20  8.32E-20  1.10E-19  1.10E-19
     cs134m     .00E+00  2.33E-20  4.99E-20  7.65E-20  1.03E-19  8.65E-20
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page   8
0                                  fraction of total absorption rate
         power=     .00mw, burnup=       3.mwd, flux= 3.00E+08n/cm**2-sec
0                 initial   182.6 d   365.3 d   547.9 d   730.5 d   730.5 d

     in119      .00E+00  2.32E-18  2.32E-18  2.32E-18  2.32E-18  2.66E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page   9
       power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+08n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
                 charge   182.6 d   365.3 d   547.9 d   730.5 d   730.5 d
      h  1       .00E+00  4.40E-08  8.81E-08  1.32E-07  1.76E-07  1.76E-07
      h  2       .00E+00  1.31E-10  2.61E-10  3.92E-10  5.22E-10  5.22E-10
      h  3       .00E+00  9.44E-13  1.86E-12  2.76E-12  3.62E-12  3.62E-12
      h  4       .00E+00  3.82E-36  7.33E-36  1.11E-35  1.47E-35   .00E+00
     he  3       .00E+00  1.33E-14  5.28E-14  1.18E-13  2.08E-13  2.08E-13
     he  4       .00E+00  7.28E-09  1.46E-08  2.18E-08  2.91E-08  2.91E-08
     he  6       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20       .00E+00  8.74E-10  1.75E-09  2.62E-09  3.50E-09  3.50E-09
     ne 21       .00E+00  1.58E-17  6.33E-17  1.43E-16  2.54E-16  2.54E-16
     ne 22       .00E+00  3.64E-13  1.40E-12  3.01E-12  5.14E-12  5.14E-12
     ne 23       .00E+00  7.28E-15  7.28E-15  7.28E-15  7.28E-15  7.28E-30
     na 22       .00E+00  5.35E-12  1.00E-11  1.41E-11  1.77E-11  1.77E-11
     na 23      7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24       .00E+00  3.64E-08  3.64E-08  3.64E-08  3.64E-08  3.52E-08
     na 24m      .00E+00  5.99E-15  5.99E-15  5.99E-15  5.99E-15  5.99E-30
     na 25       .00E+00  2.88E-29  5.78E-29  8.68E-29  1.16E-28  2.08E-41
     mg 24       .00E+00  7.55E-06  1.51E-05  2.27E-05  3.03E-05  3.03E-05
     mg 25       .00E+00  9.59E-13  1.92E-12  2.89E-12  3.86E-12  3.86E-12
     mg 26       .00E+00  1.31E-10  2.61E-10  3.92E-10  5.22E-10  5.22E-10
     mg 27       .00E+00  2.18E-12  2.18E-12  2.18E-12  2.18E-12  9.68E-14
     mg 28       .00E+00  4.41E-24  4.41E-24  4.41E-24  4.41E-24  4.31E-24
     al 27      4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28       .00E+00  2.70E-10  2.70E-10  2.70E-10  2.70E-10  6.00E-16
     al 29       .00E+00  5.80E-30  1.52E-29  3.42E-29  6.88E-29  7.17E-31
     al 30       .00E+00  3.64E-44  2.76E-43  9.39E-43  2.23E-42   .00E+00
     si 28       .00E+00  5.20E-05  5.40E-05  4.59E-05  8.79E-05  8.79E-05
     si 29       .00E+00  1.41E-14  2.44E-14  1.27E-13  2.26E-13  2.26E-13
     si 30       .00E+00  9.70E-24  7.76E-23  2.62E-22  6.21E-22  6.21E-22
     si 31       .00E+00  6.93E-34  5.56E-33  1.88E-32  4.45E-32  3.69E-32
     si 32       .00E+00  5.61E-45  9.81E-44  4.97E-43  1.57E-42  1.57E-42
```

totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E+07

0
1

ess2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10
power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+08n/cm**2-sec
0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
he 4	.00E+00	2.56E-05	5.15E-05	7.79E-05	1.05E-04	1.05E-04
ra222	.00E+00	1.07E-30	8.37E-30	1.88E-29	3.27E-29	3.30E-29
ra223	.00E+00	2.03E-15	9.33E-15	2.20E-14	3.98E-14	3.98E-14
ra224	.00E+00	8.13E-17	5.62E-16	1.72E-15	3.75E-15	3.75E-15
ra225	.00E+00	2.34E-17	1.24E-16	2.99E-16	5.50E-16	5.50E-16
ra226	.00E+00	2.94E-11	1.17E-10	2.64E-10	4.70E-10	4.70E-10
ra228	.00E+00	3.12E-17	1.22E-16	2.70E-16	4.71E-16	4.71E-16
th226	.00E+00	9.63E-29	4.09E-28	9.16E-28	1.60E-27	1.60E-27
th227	.00E+00	3.26E-15	1.50E-14	3.54E-14	6.42E-14	6.42E-14
th228	.00E+00	1.35E-14	1.07E-13	3.28E-13	7.15E-13	7.15E-13
th229	.00E+00	4.93E-12	2.41E-11	5.80E-11	1.07E-10	1.07E-10
th230	.00E+00	1.28E-05	2.55E-05	3.83E-05	5.11E-05	5.11E-05
th231	.00E+00	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	.00E+00	2.58E-06	5.16E-06	7.74E-06	1.03E-05	1.03E-05
th233	.00E+00	2.39E-17	4.78E-17	7.17E-17	9.57E-17	2.59E-17
th234	.00E+00	5.34E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	3.57E-07	7.16E-07	1.08E-06	1.44E-06	1.44E-06
pa232	.00E+00	6.13E-15	1.23E-14	1.85E-14	2.47E-14	2.43E-14
pa233	.00E+00	1.44E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	.00E+00	1.80E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	6.05E-12	6.09E-12	6.09E-12	6.09E-12	6.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	9.14E-24	3.96E-23	8.88E-23	1.55E-24	1.55E-24
u231	.00E+00	4.28E-21	9.70E-21	1.51E-20	2.06E-20	2.05E-20
u232	.00E+00	9.25E-12	3.39E-11	7.21E-11	1.22E-10	1.22E-10
u233	.00E+00	5.38E-06	1.22E-05	1.90E-05	2.59E-05	2.59E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	.00E+00	3.24E-06	3.24E-06	3.24E-06	3.24E-06	3.23E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.29E-07	9.48E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	2.48E-12	4.29E-12	5.40E-12	6.35E-12	6.35E-12
np236m	.00E+00	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.11E-12
np236	.00E+00	1.02E-10	2.05E-10	3.07E-10	4.10E-10	4.10E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	.00E+00	1.58E-06	1.58E-06	1.58E-06	1.58E-06	1.56E-06
np239	.00E+00	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.74E-15	9.74E-15	9.74E-15	9.74E-15	6.08E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.31E-10	2.48E-10	3.32E-10	4.44E-10	4.44E-10
pu237	.00E+00	6.41E-16	1.60E-15	2.57E-15	3.54E-15	3.54E-15
pu238	.00E+00	9.27E-05	1.87E-04	2.80E-04	3.73E-04	3.73E-04
pu239	.00E+00	2.35E-03	5.15E-03	7.75E-03	1.03E-02	1.04E-02
pu240	.00E+00	4.28E-09	2.54E-08	5.72E-08	1.02E-07	1.02E-07
pu241	.00E+00	2.14E-14	1.71E-13	5.77E-13	1.36E-12	1.36E-12
pu242	.00E+00	2.09E-20	3.35E-19	1.70E-18	5.36E-18	5.36E-18

1

ess2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 11

```
        power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+05n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge   182.6 d   365.3 d   547.9 d   730.5 d   730.5 d
     pu243    .00E+00  4.59E-29  7.56E-28  3.73E-27  1.18E-26  1.07E-26
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               3.00E+08  3.00E+08  3.00E+08  3.00E+08  3.00E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *              greim lwr origen-s binary working library--id = 1143        *
          *            made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
          *        neutron flux spectrum factors and cross sections were produced from *
          *       the "presas2" sas2 updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                    fission product yields are from endf/b-v              *
          *                                                                          *
          *                 photon libraries use an 18-energy-group structure        *
          *                the photon data are from the master photon data base,     *
          *                 produced to include bremsstrahlung from uo2 matrix       *
          *                                                                          *
          *          see information above this box (if present) for later updates  *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
0         ****************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/28/1996    date library was produced
0                     4497    total number of nuclides in library
                       689    number of light-element nuclides
```

```
                    129    number of actinide nuclides
                    879    number of fission product nuclides
                   7993    number of nonzero off-diagonal matrix elements
0
0
1   sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   12
      power=    .80mw, burnup=      6.mwd, flux= 2.81E+08n/cm**2-sec
0                                                basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial     913.2 d     1095.8 d     1278.4 d     1461.0 d     1461.1 d
    productions   1.090712E+06  1.090715E+06  1.090719E+06  1.090723E+06  1.090727E+06  1.090727E+06
    absorptions   8.934652E+05  8.934711E+05  8.934772E+05  8.934830E+05  8.934893E+05  8.934893E+05
    k infinity    1.220765E+00  1.220762E+00  1.220758E+00  1.220754E+00  1.220750E+00  1.220750E+00
0                 initial     913.2 d     1095.8 d     1278.4 d     1461.0 d     1461.1 d
    actinide
    absorptions   8.900642E+05  8.900665E+05  8.900688E+05  8.900710E+05  8.900733E+05  8.900733E+05
    non-actinide
    abs. fracs.   3.806531E-03  3.810465E-03  3.814757E-03  3.818750E-03  3.823161E-03  3.823161E-03
1   sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   13
0                                  fraction of total absorption rate
      power=    .80mw, burnup=      6.mwd, flux= 2.81E+08n/cm**2-sec
0             initial   913.2 d  1095.8 d  1278.4 d  1461.0 d  1461.1 d

    sm149     1.47E-05  1.84E-05  2.21E-05  2.58E-05  2.95E-05  2.95E-05
    xe135     2.31E-06  2.31E-06  2.31E-06  2.31E-06  2.31E-06  2.29E-06
    sm151     6.18E-07  7.72E-07  9.25E-07  1.08E-06  1.23E-06  1.23E-06
    nd143     2.88E-07  3.62E-07  4.36E-07  5.10E-07  5.85E-07  5.85E-07
    gd157     1.51E-07  1.89E-07  2.27E-07  2.64E-07  3.02E-07  3.02E-07
    rh103     1.27E-07  1.62E-07  1.96E-07  2.31E-07  2.65E-07  2.65E-07
    cd113     1.29E-07  1.61E-07  1.93E-07  2.25E-07  2.57E-07  2.57E-07
    xe131     9.27E-08  1.16E-07  1.40E-07  1.63E-07  1.87E-07  1.87E-07
    pm147     1.10E-07  1.30E-07  1.48E-07  1.63E-07  1.77E-07  1.77E-07
    cs133     7.22E-08  9.06E-08  1.09E-07  1.27E-07  1.45E-07  1.45E-07
    tc 99     5.35E-08  6.69E-08  8.04E-08  9.38E-08  1.07E-07  1.07E-07
    gd155     2.68E-08  6.10E-08  5.76E-08  7.67E-08  9.79E-08  9.79E-08
    nd145     4.16E-08  5.20E-08  6.24E-08  7.28E-08  8.32E-08  8.32E-08
    eu155     4.07E-08  4.92E-08  5.70E-08  6.42E-08  7.09E-08  7.09E-08
    mo 95     2.32E-08  3.04E-08  3.77E-08  4.49E-08  5.21E-08  5.21E-08
    sm152     2.20E-08  2.75E-08  3.30E-08  3.85E-08  4.40E-08  4.40E-08
    sm147     1.19E-08  1.80E-08  2.49E-08  3.28E-08  4.13E-08  4.13E-08
    kr 83     1.80E-08  2.25E-08  2.70E-08  3.15E-08  3.60E-08  3.60E-08
    cs135     1.44E-08  2.05E-08  2.66E-08  3.07E-08  3.28E-08  3.28E-08
    ru101     1.28E-08  1.60E-08  1.92E-08  2.24E-08  2.56E-08  2.56E-08
    pr141     1.15E-08  1.45E-08  1.76E-08  2.06E-08  2.37E-08  2.37E-08
    eu153     1.11E-08  1.39E-08  1.67E-08  1.94E-08  2.22E-08  2.22E-08
    la139     1.00E-08  1.25E-08  1.50E-08  1.75E-08  2.00E-08  2.00E-08
    eu151     3.53E-09  5.31E-09  7.93E-09  1.05E-08  1.41E-08  1.41E-08
    pd105     4.24E-09  5.30E-09  6.36E-09  7.42E-09  8.48E-09  8.48E-09
    rh105     8.35E-09  8.33E-09  8.33E-09  8.33E-09  8.32E-09  8.32E-09
    zr 93     4.07E-09  5.09E-09  6.11E-09  7.13E-09  8.15E-09  8.15E-09
    i129      3.86E-09  5.84E-09  4.81E-09  5.39E-09  6.16E-09  6.16E-09
    mo 97     2.27E-09  2.83E-09  3.40E-09  3.97E-09  4.54E-09  4.54E-09
    nd144     1.60E-09  2.25E-09  2.93E-09  3.64E-09  4.36E-09  4.36E-09
    os109     1.59E-09  1.99E-09  2.39E-09  2.78E-09  3.18E-09  3.18E-09
    pr143     2.67E-09  2.67E-09  2.67E-09  2.67E-09  2.67E-09  2.67E-09
    zr 91     9.46E-10  1.21E-09  1.48E-09  1.75E-09  2.02E-09  2.02E-09
    xe133     2.01E-09  2.01E-09  2.01E-09  2.01E-09  2.01E-09  2.01E-09
     y 89     9.23E-10  1.18E-09  1.44E-09  1.69E-09  1.95E-09  1.95E-09
    ru102     9.24E-10  1.15E-09  1.39E-09  1.62E-09  1.85E-09  1.85E-09
    se142     8.31E-10  1.04E-09  1.25E-09  1.46E-09  1.66E-09  1.66E-09
    sr 90     8.24E-10  1.02E-09  1.22E-09  1.42E-09  1.61E-09  1.61E-09
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nd148	8.01E-10	1.00E-09	1.20E-09	1.40E-09	1.40E-09	1.40E-09
ce141	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
nd146	6.71E-10	8.39E-10	1.01E-09	1.17E-09	1.34E-09	1.34E-09
ba138	5.73E-10	7.16E-10	8.60E-10	1.00E-09	1.15E-09	1.15E-09
in115	5.49E-10	6.88E-10	8.26E-10	9.64E-10	1.10E-09	1.10E-09
pd102	5.43E-10	6.78E-10	8.13E-10	9.48E-10	1.08E-09	1.08E-09
ce140	5.22E-10	6.56E-10	7.90E-10	9.24E-10	1.06E-09	1.06E-09
pm149	9.74E-10	9.75E-10	9.74E-10	9.74E-10	9.74E-10	9.71E-10
xe132	4.80E-10	6.00E-10	7.21E-10	8.42E-10	9.63E-10	9.63E-10
nd147	9.35E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10	9.34E-10
mo 98	3.34E-10	4.18E-10	5.02E-10	5.85E-10	6.69E-10	6.69E-10

1 sas2h: far-field crit based on 64w 15x15, 3.00wt%, 20gwd/mtu 60% h2o/ 8% uo2 fission products page 14
0 fraction of total absorption rate
0 powerm .00mw, burnup 6.mwd, flux= 2.81E+08n/cm**2-sec

	initial	913.2 d	1093.8 d	1278.4 d	1461.0 d	1461.1 d
mo100	3.23E-10	4.03E-10	4.84E-10	5.65E-10	6.45E-10	6.45E-10
pd107	3.20E-10	4.00E-10	4.80E-10	5.59E-10	6.39E-10	6.39E-10
xe134	3.17E-10	3.96E-10	4.75E-10	5.54E-10	6.34E-10	6.34E-10
ce144	5.00E-10	5.37E-10	5.61E-10	5.76E-10	5.85E-10	5.85E-10
zr 92	2.57E-10	3.22E-10	3.86E-10	4.51E-10	5.15E-10	5.15E-10
ba137	1.09E-10	1.70E-10	2.44E-10	3.30E-10	4.30E-10	4.30E-10
i127	1.99E-10	2.52E-10	3.04E-10	3.56E-10	4.08E-10	4.08E-10
zr 96	2.04E-10	2.55E-10	3.06E-10	3.57E-10	4.08E-10	4.08E-10
ru104	1.98E-10	2.48E-10	2.97E-10	3.47E-10	3.96E-10	3.96E-10
ru103	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10
nd150	1.78E-10	2.22E-10	2.66E-10	3.11E-10	3.55E-10	3.55E-10
xe136	1.71E-10	2.14E-10	2.57E-10	3.00E-10	3.43E-10	3.43E-10
cs137	1.71E-10	2.12E-10	2.53E-10	2.94E-10	3.34E-10	3.34E-10
br 81	1.29E-10	1.61E-10	1.93E-10	2.26E-10	2.58E-10	2.58E-10
zr 94	1.09E-10	1.37E-10	1.64E-10	1.91E-10	2.19E-10	2.19E-10
rb 85	1.01E-10	1.26E-10	1.52E-10	1.78E-10	2.04E-10	2.04E-10
zr 95	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10
cd111	8.24E-11	1.03E-10	1.24E-10	1.45E-10	1.66E-10	1.66E-10
te130	7.78E-11	9.72E-11	1.17E-10	1.36E-10	1.56E-10	1.56E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
sm154	7.55E-11	9.44E-11	1.13E-10	1.32E-10	1.51E-10	1.51E-10
rb 87	7.28E-11	9.10E-11	1.09E-10	1.27E-10	1.46E-10	1.46E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
kr 85	6.96E-11	8.56E-11	1.01E-10	1.16E-10	1.31E-10	1.31E-10
sm150	3.14E-11	4.90E-11	7.06E-11	9.57E-11	1.25E-10	1.25E-10
pm151	1.09E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.07E-10
se 77	5.14E-11	6.43E-11	7.72E-11	9.01E-11	1.03E-10	1.03E-10
kr 84	5.44E-11	6.31E-11	5.17E-11	6.03E-11	6.89E-11	6.89E-11
se 79	2.64E-11	3.30E-11	3.96E-11	4.62E-11	5.28E-11	5.28E-11
sb121	2.51E-11	3.14E-11	3.76E-11	4.39E-11	5.02E-11	5.02E-11
pd106	1.67E-11	2.40E-11	3.17E-11	3.99E-11	4.84E-11	4.84E-11
ba140	4.73E-11	4.74E-11	4.74E-11	4.74E-11	4.74E-11	4.73E-11
sb123	2.00E-11	2.51E-11	3.02E-11	3.54E-11	4.05E-11	4.05E-11
kr 86	1.91E-11	2.39E-11	2.87E-11	3.35E-11	3.82E-11	3.82E-11
sm153	3.79E-11	3.83E-11	3.81E-11	3.81E-11	3.81E-11	3.74E-11
te128	1.79E-11	2.13E-11	2.46E-11	2.99E-11	3.41E-11	3.41E-11
eu156	3.41E-11	3.40E-11	3.40E-11	3.40E-11	3.40E-11	3.40E-11
sr 89	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11
gd156	1.79E-11	1.62E-11	1.95E-11	2.28E-11	2.62E-11	2.62E-11
sr 90	1.23E-11	1.34E-11	1.85E-11	2.16E-11	2.47E-11	2.47E-11
ru106	1.90E-11	2.08E-11	2.21E-11	2.31E-11	2.37E-11	2.37E-11
dy161	1.08E-11	1.35E-11	1.62E-11	1.89E-11	2.16E-11	2.16E-11
ce143	1.74E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.71E-11
la140	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11

tb159	7.29E-12	9.10E-12	1.09E-11	1.27E-11	1.46E-11	1.46E-11
li 6	7.01E-12	8.76E-12	1.05E-11	1.23E-11	1.40E-11	1.40E-11
cd112	6.98E-12	8.72E-12	1.05E-11	1.22E-11	1.40E-11	1.40E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.30E-11
sn117	5.54E-12	6.93E-12	8.31E-12	9.69E-12	1.11E-11	1.11E-11

1 sas2h: far-field crit based on b4w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 15
0 fraction of total absorption rate
0 power= .00mw, burnup= .0 d.mwd, flux= 2.81E+08n/cm**2-sec

	initial	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
kr 87	1.58E-11	2.30E-11	2.30E-11	2.30E-11	2.30E-11	1.08E-11
zr 90	2.44E-12	3.80E-12	5.45E-12	7.40E-12	9.63E-12	9.63E-12
sb125	5.92E-12	7.80E-12	7.96E-12	8.78E-12	9.51E-12	9.51E-12
sn119	4.55E-12	5.69E-12	6.83E-12	7.97E-12	9.11E-12	9.11E-12
sn115	4.15E-12	5.20E-12	6.24E-12	7.28E-12	8.32E-12	8.32E-12
te125	2.21E-12	3.56E-12	4.69E-12	6.19E-12	7.82E-12	7.82E-12
te127m	7.35E-12	7.30E-12	7.32E-12	7.32E-12	7.33E-12	7.33E-12
sr 88	3.51E-12	4.39E-12	5.27E-12	6.15E-12	7.03E-12	7.03E-12
i131	6.77E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.77E-12
pm148m	3.70E-12	4.38E-12	5.02E-12	5.59E-12	6.08E-12	6.08E-12
pd110	2.51E-12	3.13E-12	3.76E-12	4.38E-12	5.01E-12	5.01E-12
cd114	2.44E-12	3.04E-12	3.65E-12	4.26E-12	4.87E-12	4.87E-12
se 82	2.38E-12	2.98E-12	3.58E-12	4.17E-12	4.77E-12	4.77E-12
gd158	2.28E-12	2.85E-12	3.42E-12	4.00E-12	4.57E-12	4.57E-12
sn126	1.91E-12	2.38E-12	2.86E-12	3.34E-12	3.81E-12	3.81E-12
se 78	1.81E-12	2.26E-12	2.71E-12	3.17E-12	3.62E-12	3.62E-12
eu154	1.43E-12	1.89E-12	2.39E-12	2.92E-12	3.40E-12	3.69E-12
sn124	1.46E-12	1.82E-12	2.19E-12	2.55E-12	2.91E-12	2.91E-12
dy162	1.40E-12	1.75E-12	2.09E-12	2.44E-12	2.78E-12	2.78E-12
dy164	1.26E-12	1.58E-12	1.89E-12	2.21E-12	2.52E-12	2.52E-12
se 75	1.08E-12	1.35E-12	1.62E-12	1.89E-12	2.16E-12	2.16E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
y 90	7.84E-13	9.74E-13	1.16E-12	1.35E-12	1.53E-12	1.53E-12
sn118	5.96E-13	7.45E-13	8.94E-13	1.04E-12	1.19E-12	1.19E-12
ba136	5.59E-13	7.03E-13	8.47E-13	9.91E-13	1.14E-12	1.14E-12
cd116	5.05E-13	6.32E-13	7.58E-13	8.84E-13	1.01E-12	1.01E-12
sn122	5.02E-13	6.27E-13	7.52E-13	8.77E-13	1.00E-12	1.00E-12
es134	5.72E-13	6.80E-13	8.02E-13	7.08E-13	8.28E-13	8.27E-13
sn120	5.76E-13	6.70E-13	8.63E-13	6.57E-13	7.51E-13	7.51E-13
ru 99	5.01E-13	5.85E-13	6.72E-13	5.64E-13	6.58E-13	6.58E-13
kr 82	5.46E-13	5.92E-13	4.71E-13	5.50E-13	6.29E-13	6.29E-13
dy163	5.08E-13	5.85E-13	6.61E-13	5.38E-13	6.14E-13	6.14E-13
ge 73	2.93E-13	5.67E-13	4.40E-13	5.14E-13	5.87E-13	5.87E-13
xe130	1.93E-13	2.41E-13	2.90E-13	3.38E-13	3.87E-13	3.87E-13
ag111	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.16E-13
eu157	2.01E-13	2.06E-13	2.06E-13	2.06E-13	2.06E-13	2.00E-13
mo 96	1.36E-13	1.71E-13	2.05E-13	2.40E-13	2.75E-13	2.75E-13
eu152	3.44E-14	4.45E-14	1.09E-13	1.70E-13	2.50E-13	2.50E-13
pm148	1.53E-13	1.79E-13	2.03E-13	2.25E-13	2.43E-13	2.42E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.36E-13
ge 76	1.07E-13	1.34E-13	1.60E-13	1.87E-13	2.14E-13	2.14E-13
in113	3.85E-14	4.97E-14	8.53E-14	1.15E-13	1.49E-13	1.49E-13
gd160	6.76E-14	8.44E-14	1.01E-13	1.18E-13	1.35E-13	1.35E-13
te126	5.13E-14	6.43E-14	7.74E-14	9.04E-14	1.03E-13	1.03E-13
ru100	3.40E-14	6.03E-14	5.02E-14	6.06E-14	7.17E-14	7.17E-14
es136	3.55E-14	3.57E-14	3.57E-14	3.57E-14	3.57E-14	3.55E-14
ho165	2.32E-14	2.64E-14	2.97E-14	2.69E-14	4.22E-14	4.22E-14
sn125	2.02E-14	2.93E-14	2.93E-14	2.93E-14	2.93E-14	2.91E-14
sm148	6.73E-15	1.84E-14	1.48E-14	1.99E-14	2.56E-14	2.56E-14

1 sas2h: far-field crit based on b4w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16

0 fraction of total absorption rate

power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec

0	initial	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
ru105	2.75E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.46E-14
sr 87	1.22E-14	1.53E-14	1.84E-14	2.14E-14	2.45E-14	2.45E-14
te124	1.10E-14	1.41E-14	1.72E-14	2.03E-14	2.35E-14	2.35E-14
gd154	3.48E-15	5.67E-15	8.50E-15	1.20E-14	1.43E-14	1.43E-14
nb 94	6.97E-15	8.72E-15	1.05E-14	1.22E-14	1.40E-14	1.40E-14
gd152	1.02E-15	3.55E-15	5.06E-15	9.31E-15	1.38E-14	1.38E-14
nd142	3.27E-15	5.14E-15	7.43E-15	1.02E-14	1.33E-14	1.33E-14
ba135	3.98E-15	5.80E-15	7.95E-15	1.04E-14	1.32E-14	1.32E-14
ge 74	5.92E-15	7.41E-15	8.89E-15	1.04E-14	1.19E-14	1.19E-14
sn123	9.97E-15	1.01E-14	1.01E-14	1.02E-14	1.02E-14	1.02E-14
rb 88	1.17E-14	1.29E-14	1.29E-14	1.29E-14	1.29E-14	9.98E-15
te132	9.51E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.45E-15
ba134	2.11E-15	3.39E-15	4.99E-15	6.94E-15	9.23E-15	9.24E-15
i135	9.42E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	8.75E-15
pd104	1.95E-15	3.12E-15	4.58E-15	6.31E-15	8.32E-15	8.32E-15
ge 72	3.06E-15	4.05E-15	5.05E-15	6.05E-15	7.04E-15	7.04E-15
sr 86	3.34E-15	4.21E-15	5.08E-15	5.96E-15	6.83E-15	6.83E-15
se 76	2.50E-15	2.88E-15	3.45E-15	4.03E-15	4.61E-15	4.61E-15
sb126	3.00E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.00E-15
sb124	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15
in117m	2.03E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	1.94E-15
cd110	6.03E-16	8.68E-16	1.17E-15	1.39E-15	1.89E-15	1.89E-15
te134	2.91E-15	5.65E-15	5.65E-15	5.85E-15	5.65E-15	1.45E-15
xe128	5.61E-16	7.05E-16	8.51E-16	9.98E-16	1.15E-15	1.15E-15
er166	5.47E-16	8.86E-16	8.24E-16	9.64E-16	1.10E-15	1.10E-15
dy160	5.97E-16	5.17E-16	6.39E-16	7.64E-16	8.90E-16	8.90E-16
br 79	2.26E-16	3.50E-16	5.01E-16	6.78E-16	8.63E-16	8.63E-16
i130	6.90E-16	7.17E-16	7.18E-16	7.19E-16	7.19E-16	5.67E-16
in117	6.06E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16	5.76E-16
xe129	1.21E-16	1.89E-16	2.73E-16	3.72E-16	4.86E-16	4.86E-16
ag107	1.16E-16	1.79E-16	2.57E-16	3.50E-16	4.57E-16	4.57E-16
tb160	3.15E-16	3.21E-16	3.26E-16	3.31E-16	3.37E-16	3.36E-16
kr 80	1.46E-16	2.08E-16	2.49E-16	2.91E-16	3.32E-16	3.32E-16
rb 86	2.41E-16	2.42E-16	2.42E-16	2.42E-16	2.43E-16	2.42E-16
dy165	1.76E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	1.43E-16
nb 93	1.02E-17	3.24E-17	5.10E-17	7.61E-17	1.09E-16	1.09E-16
te122	2.34E-17	2.99E-17	3.66E-17	4.36E-17	5.09E-17	5.09E-17
ge 75	6.24E-17	8.64E-17	8.64E-17	8.64E-17	8.64E-17	5.39E-17
cd118	6.76E-17	1.20E-16	1.20E-16	1.20E-16	1.20E-16	1.77E-17
sn116	1.07E-17	1.48E-17	1.96E-17	2.49E-17	3.08E-17	3.08E-17
be 9	1.34E-17	1.68E-17	2.01E-17	2.35E-17	2.69E-17	2.69E-17
pr142	1.33E-17	1.71E-17	2.06E-17	2.40E-17	2.75E-17	2.62E-17
te123	9.75E-18	1.27E-17	1.57E-17	1.87E-17	2.16E-17	2.16E-17
li 7	5.40E-18	6.75E-18	8.10E-18	9.45E-18	1.08E-17	1.08E-17
er167	2.19E-18	2.74E-18	3.30E-18	3.86E-18	4.43E-18	4.43E-18
in119m	7.02E-18	5.01E-17	5.01E-17	5.01E-17	5.01E-17	1.38E-18
cd108	1.11E-19	1.38E-19	1.64E-19	1.91E-19	2.22E-19	2.22E-19
cd109	1.24E-19	1.41E-19	1.51E-19	1.61E-19	1.68E-19	1.68E-19
cs134m	8.73E-20	1.28E-19	1.51E-19	1.78E-19	2.05E-19	1.44E-19

1 ass2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 17

0 fraction of total absorption rate

power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec

0	initial	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
in119	2.49E-20	2.35E-18	2.35E-18	2.35E-18	2.35E-18	6.71E-21
sn114	.00E+00	3.36E-21	3.36E-21	3.36E-21	3.36E-21	3.36E-21

1 sas2h: far-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 18

power= 4.800E-03mw, burnup=5.6440E+00mwd, flux= 2.81E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
h 1	1.76E-07	2.19E-07	2.42E-07	3.05E-07	3.48E-07	3.48E-07
h 2	5.22E-10	6.50E-10	7.77E-10	9.04E-10	1.03E-09	1.03E-09
h 3	3.62E-12	4.44E-12	5.26E-12	6.02E-12	6.77E-12	6.77E-12
h 4	.00E+00	1.80E-35	2.13E-35	2.44E-35	2.75E-35	.00E+00
he 3	2.08E-13	3.21E-13	4.57E-13	6.15E-13	7.95E-13	7.95E-13
he 4	2.91E-08	3.62E-08	4.33E-08	5.04E-08	5.75E-08	5.75E-08
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.50E-09	4.35E-09	5.20E-09	6.05E-09	6.91E-09	6.91E-09
ne 21	2.54E-16	3.59E-16	5.51E-16	7.39E-16	9.52E-16	9.52E-16
ne 22	5.16E-12	7.70E-12	1.06E-11	1.39E-11	1.75E-11	1.75E-11
ne 23	7.28E-30	7.10E-15	7.10E-15	7.10E-15	7.10E-15	7.10E-30
ne 22	1.77E-11	2.07E-11	2.33E-11	2.56E-11	2.77E-11	2.77E-11
ne 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
ne 24	3.32E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08
ne 24m	5.99E-30	5.05E-15	5.05E-15	5.05E-15	5.05E-15	5.05E-30
ne 25	2.08E-41	1.40E-28	1.67E-28	1.95E-28	2.23E-28	2.41E-43
mg 24	3.03E-05	3.67E-05	4.31E-05	4.95E-05	5.59E-05	5.59E-05
mg 25	3.86E-12	4.80E-12	5.75E-12	6.71E-12	7.66E-12	7.66E-12
mg 26	5.22E-10	6.50E-10	7.77E-10	9.04E-10	1.03E-09	1.03E-09
mg 27	9.98E-14	2.12E-12	2.12E-12	2.12E-12	2.12E-12	4.42E-15
mg 28	4.31E-24	4.32E-24	4.32E-24	4.32E-24	4.32E-24	4.12E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	6.00E-16	2.28E-10	2.28E-10	2.28E-10	2.28E-10	1.08E-21
al 29	7.17E-31	9.14E-29	1.30E-28	1.75E-28	2.27E-28	3.11E-32
al 30	.00E+00	4.23E-42	7.28E-42	1.15E-41	1.70E-41	.00E+00
al 28	8.79E-05	1.06E-04	1.25E-04	1.44E-04	1.62E-04	1.62E-04
al 29	2.26E-13	3.51E-13	5.00E-13	6.73E-13	8.69E-13	8.69E-13
al 30	6.21E-22	1.21E-21	1.09E-21	3.30E-21	4.90E-21	4.90E-21
al 31	3.69E-34	8.72E-34	1.50E-33	2.37E-33	3.51E-33	3.42E-33
al 32	1.37E-42	3.05E-42	7.99E-42	1.48E-41	2.51E-41	2.51E-41
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

6

1 sas2h: far-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 19

power= 4.800E-03mw, burnup=5.6440E+00mwd, flux= 2.81E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
he 4	1.05E-04	1.32E-04	1.59E-04	1.87E-04	2.16E-04	2.16E-04
ra222	3.30E-29	4.82E-29	6.72E-29	8.66E-29	1.12E-28	1.12E-28
ra223	2.08E-14	6.79E-14	9.09E-14	1.24E-13	1.62E-13	1.62E-13
ra224	2.75E-15	6.78E-15	1.09E-14	1.60E-14	2.23E-14	2.23E-14
ra225	2.50E-16	5.77E-16	1.24E-15	1.76E-15	2.32E-15	2.32E-15
ra226	4.70E-10	7.34E-10	1.06E-09	1.44E-09	1.88E-09	1.88E-09
ra228	4.71E-16	7.82E-16	1.02E-15	1.36E-15	1.75E-15	1.75E-15
ac225	3.71E-16	8.93E-16	1.68E-16	1.19E-15	1.47E-15	1.47E-15
ac227	2.07E-11	4.62E-11	6.63E-11	8.07E-11	1.17E-10	1.17E-10
ac228	5.75E-20	8.01E-20	1.24E-19	1.68E-19	2.13E-19	2.13E-19
th226	1.60E-27	2.35E-27	3.28E-27	4.32E-27	5.46E-27	5.46E-27
th227	4.42E-14	1.01E-13	1.67E-13	2.00E-13	2.61E-13	2.61E-13
th228	7.15E-13	1.29E-12	2.07E-12	3.05E-12	4.25E-12	4.25E-12
th229	1.07E-10	1.78E-10	2.69E-10	3.53E-10	4.51E-10	4.51E-10
th230	6.11E-05	6.39E-05	7.64E-05	8.94E-05	1.02E-04	1.02E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09

th232	1.03E-05	1.29E-05	1.53E-05	1.81E-05	2.07E-05	2.07E-05
th233	2.59E-17	1.19E-16	1.43E-16	1.66E-16	1.90E-16	1.38E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.44E-06	1.80E-06	2.16E-06	2.51E-06	2.87E-06	2.87E-06
pa232	2.43E-14	3.09E-14	3.71E-14	4.32E-14	4.94E-14	4.79E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.55E-24	2.28E-24	3.18E-24	4.19E-24	5.29E-24	5.28E-24
u231	2.05E-20	2.52E-20	3.04E-20	3.57E-20	4.10E-20	4.04E-20
u232	1.22E-10	1.83E-10	2.53E-10	3.31E-10	4.16E-10	4.16E-10
u233	2.59E-05	3.27E-05	3.95E-05	4.63E-05	5.32E-05	5.32E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.23E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	9.48E-08	3.22E-07	3.22E-07	3.22E-07	3.22E-07	2.67E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	6.55E-12	7.16E-12	7.61E-12	7.93E-12	8.16E-12	8.16E-12
np236m	2.11E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.00E-12
np236	4.10E-10	5.09E-10	6.08E-10	7.07E-10	8.06E-10	8.06E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.53E-06
np239	4.73E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05	4.60E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	6.08E-15	9.48E-15	9.48E-15	9.48E-15	9.48E-15	3.49E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	4.44E-10	5.22E-10	5.90E-10	6.52E-10	7.06E-10	7.06E-10
pu237	3.94E-15	4.36E-15	5.28E-15	6.20E-15	7.11E-15	7.11E-15
pu238	3.73E-04	4.65E-04	5.56E-04	6.48E-04	7.38E-04	7.38E-04
pu239	1.04E-02	1.29E-02	1.54E-02	1.80E-02	2.05E-02	2.05E-02

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 20

power= 4.000E-03mw, burnup=5.0440E+00mwd, flux= 2.81E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
pu240	1.02E-07	1.59E-07	2.29E-07	3.11E-07	4.05E-07	4.05E-07
pu241	1.34E-12	2.62E-12	4.47E-12	7.04E-12	1.04E-11	1.04E-11
pu242	5.36E-18	1.30E-17	2.67E-17	4.92E-17	8.34E-17	8.34E-17
pu243	1.07E-26	2.78E-26	5.72E-26	1.05E-25	1.78E-25	1.47E-25
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

```
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

        cross-section data taken from position number  3 of library on unit 33.

        pass   1
```

```
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *              prelim iwr origen-s binary working library--id = 1143  *
          *           made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *        neutron flux spectrum factors and cross sections were produced from *
          *       the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                    fission product yields are from endf/b-v         *
          *                                                                     *
          *                 photon libraries use an 18-energy-group structure   *
          *                the photon data are from the master photon data base, *
          *                 produced to include bremsstrahlung from uo2 matrix  *
          *                                                                     *
          *          see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                   .other identification and sizes of library.
0                    data set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   21
        power=    .00mw, burnup=      9.mwd, flux= 2.74E+08n/cm**2-sec
0                                                basis =
0    (note, k-infinities, eled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                    initial       1643.7 d       1826.3 d       2009.0 d       2191.6 d       2191.7 d
     productions   1.122459E+06   1.122463E+06   1.122467E+06   1.122471E+06   1.122474E+06   1.122474E+06
     absorptions   9.158321E+05   9.158383E+05   9.158444E+05   9.158505E+05   9.158566E+05   9.158566E+05
     k infinity    1.225616E+00   1.225612E+00   1.225608E+00   1.225605E+00   1.225601E+00   1.225601E+00
0                    initial       1643.7 d       1826.3 d       2009.0 d       2191.6 d       2191.7 d
     actinide
     absorptions   9.125684E+05   9.125708E+05   9.125731E+05   9.125754E+05   9.125776E+05   9.125776E+05
     non-actinide
     abs. fracs.   3.543583E-03   3.567815E-03   3.571987E-03   3.576040E-03   3.580332E-03   3.580332E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products     page   22
8                                                fraction of total absorption rate
        power=    .00mw, burnup=      9.mwd, flux= 2.74E+08n/cm**2-sec
0                initial  1643.7 d  1826.3 d  2009.0 d  2191.6 d  2191.7 d
```

sm149	2.96E-05	3.33E-05	3.70E-05	4.07E-05	4.44E-05	4.44E-05
xe135	2.31E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.29E-06
sm151	1.24E-06	1.39E-06	1.54E-06	1.69E-06	1.84E-06	1.84E-06
nd143	5.87E-07	6.42E-07	7.36E-07	8.11E-07	8.86E-07	8.86E-07
gd157	3.03E-07	3.41E-07	3.79E-07	4.16E-07	4.54E-07	4.54E-07
rh103	2.45E-07	3.00E-07	3.54E-07	3.48E-07	4.03E-07	4.03E-07
cd113	2.59E-07	2.91E-07	3.23E-07	3.55E-07	3.88E-07	3.88E-07
xe131	1.86E-07	2.10E-07	2.33E-07	2.57E-07	2.80E-07	2.80E-07
cs133	1.45E-07	1.63E-07	1.81E-07	1.99E-07	2.18E-07	2.18E-07
pm147	1.76E-07	1.88E-07	1.98E-07	2.07E-07	2.15E-07	2.15E-07
gd155	9.85E-08	1.22E-07	1.47E-07	1.74E-07	2.03E-07	2.03E-07
tc 99	1.07E-07	1.20E-07	1.34E-07	1.47E-07	1.60E-07	1.60E-07
nd145	8.31E-08	9.35E-08	1.04E-07	1.14E-07	1.25E-07	1.25E-07
eu155	7.09E-08	7.71E-08	8.29E-08	8.83E-08	9.33E-08	9.33E-08
mo 95	5.20E-08	5.92E-08	6.64E-08	7.36E-08	8.08E-08	8.08E-08
sm147	4.11E-08	5.02E-08	5.99E-08	7.01E-08	8.06E-08	8.06E-08
sm152	4.38E-08	4.93E-08	5.48E-08	6.02E-08	6.57E-08	6.57E-08
kr 83	3.61E-08	4.06E-08	4.52E-08	4.97E-08	5.42E-08	5.42E-08
cs135	3.28E-08	3.69E-08	4.10E-08	4.51E-08	4.92E-08	4.92E-08
ru101	2.54E-08	2.84E-08	3.17E-08	3.49E-08	3.81E-08	3.81E-08
pr141	2.38E-08	2.68E-08	2.99E-08	3.30E-08	3.61E-08	3.61E-08
eu153	2.22E-08	2.50E-08	2.78E-08	3.06E-08	3.33E-08	3.33E-08
eu151	1.41E-08	1.79E-08	2.20E-08	2.66E-08	3.17E-08	3.17E-08
la139	2.01E-08	2.26E-08	2.51E-08	2.76E-08	3.01E-08	3.01E-08
pd105	8.46E-09	9.52E-09	1.06E-08	1.16E-08	1.27E-08	1.27E-08
zr 93	8.12E-09	9.14E-09	1.02E-08	1.12E-08	1.22E-08	1.22E-08
i129	6.19E-09	6.97E-09	7.75E-09	8.53E-09	9.31E-09	9.31E-09
rh105	8.35E-09	8.34E-09	8.36E-09	8.34E-09	8.36E-09	8.32E-09
nd144	4.38E-09	5.12E-09	5.86E-09	6.61E-09	7.36E-09	7.36E-09
mo 97	4.55E-09	5.12E-09	5.68E-09	6.25E-09	6.82E-09	6.82E-09
ag109	3.17E-09	3.96E-09	4.96E-09	5.55E-09	6.75E-09	6.75E-09
zr 91	2.02E-09	2.29E-09	2.56E-09	2.83E-09	3.10E-09	3.10E-09
y 89	1.96E-09	2.21E-09	2.47E-09	2.73E-09	2.99E-09	2.99E-09
ru102	1.85E-09	2.09E-09	2.32E-09	2.55E-09	2.78E-09	2.78E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
ce142	1.67E-09	1.88E-09	2.09E-09	2.30E-09	2.51E-09	2.51E-09
nd148	1.61E-09	1.81E-09	2.01E-09	2.21E-09	2.41E-09	2.41E-09
sr 90	1.62E-09	1.81E-09	2.00E-09	2.18E-09	2.37E-09	2.37E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09
nd146	1.35E-09	1.52E-09	1.68E-09	1.85E-09	2.02E-09	2.02E-09
ba138	1.15E-09	1.30E-09	1.44E-09	1.58E-09	1.73E-09	1.73E-09
in115	1.10E-09	1.24E-09	1.38E-09	1.52E-09	1.66E-09	1.66E-09
pd108	1.08E-09	1.21E-09	1.35E-09	1.48E-09	1.61E-09	1.61E-09
ce140	1.06E-09	1.20E-09	1.33E-09	1.47E-09	1.60E-09	1.60E-09
ce141	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
xe132	9.62E-10	1.08E-09	1.20E-09	1.32E-09	1.44E-09	1.44E-09
mo 98	6.65E-10	7.49E-10	8.32E-10	9.15E-10	9.98E-10	9.98E-10
pm149	9.76E-10	9.80E-10	9.80E-10	9.80E-10	9.80E-10	9.73E-10
mo100	6.44E-10	7.25E-10	8.05E-10	8.86E-10	9.67E-10	9.67E-10

1 ass2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 23
0 fraction of total absorption rate
0 powers .00mw, burnup 0.mwd, flux= 2.74E+08n/cm**2-sec
0 initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

pd107	6.41E-10	7.20E-10	8.00E-10	8.79E-10	9.59E-10	9.59E-10
ba137	4.32E-10	5.46E-10	6.69E-10	8.07E-10	9.46E-10	9.46E-10
xe134	6.56E-10	7.16E-10	7.95E-10	8.75E-10	9.54E-10	9.54E-10
nd147	5.30E-10	6.33E-10	6.33E-10	7.33E-10	8.33E-10	8.29E-10
zr 92	5.17E-10	5.81E-10	6.46E-10	7.11E-10	7.75E-10	7.75E-10

i127	4.08E-10	4.40E-10	5.12E-10	5.44E-10	6.16E-10	6.16E-10
zr 96	4.04E-10	4.55E-10	5.05E-10	5.56E-10	6.07E-10	6.07E-10
ce144	5.86E-10	5.93E-10	5.97E-10	5.99E-10	6.01E-10	6.01E-10
ru104	3.96E-10	4.46E-10	4.95E-10	5.45E-10	5.94E-10	5.94E-10
nd150	3.55E-10	4.00E-10	4.44E-10	4.88E-10	5.33E-10	5.33E-10
xe136	3.44E-10	3.87E-10	4.30E-10	4.73E-10	5.16E-10	5.16E-10
cs137	3.33E-10	3.73E-10	4.12E-10	4.51E-10	4.89E-10	4.89E-10
br 81	2.58E-10	2.90E-10	3.22E-10	3.54E-10	3.87E-10	3.87E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.57E-10
zr 94	2.18E-10	2.45E-10	2.73E-10	3.00E-10	3.27E-10	3.27E-10
rb 85	2.04E-10	2.31E-10	2.57E-10	2.84E-10	3.11E-10	3.11E-10
sm150	1.25E-10	1.58E-10	1.95E-10	2.36E-10	2.81E-10	2.81E-10
cd111	1.67E-10	1.88E-10	2.08E-10	2.29E-10	2.50E-10	2.50E-10
te130	1.56E-10	1.76E-10	1.95E-10	2.15E-10	2.35E-10	2.35E-10
sm154	1.51E-10	1.70E-10	1.89E-10	2.08E-10	2.27E-10	2.27E-10
rb 87	1.46E-10	1.64E-10	1.82E-10	2.00E-10	2.18E-10	2.18E-10
kr 85	1.31E-10	1.43E-10	1.39E-10	1.72E-10	1.85E-10	1.85E-10
zr 93	1.45E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.45E-10
se 77	1.03E-10	1.16E-10	1.29E-10	1.42E-10	1.55E-10	1.55E-10
nb 93	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
pm151	1.07E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
kr 84	6.86E-11	7.72E-11	8.58E-11	9.43E-11	1.03E-10	1.03E-10
pd106	4.82E-11	5.69E-11	6.57E-11	7.46E-11	8.35E-11	8.35E-11
se 79	5.31E-11	5.98E-11	6.64E-11	7.31E-11	7.97E-11	7.97E-11
sb121	5.01E-11	5.63E-11	6.26E-11	6.88E-11	7.51E-11	7.51E-11
sb123	6.04E-11	6.55E-11	5.86E-11	5.57E-11	6.08E-11	6.08E-11
kr 86	3.84E-11	4.32E-11	4.80E-11	5.28E-11	5.76E-11	5.76E-11
te128	3.41E-11	3.84E-11	4.27E-11	4.69E-11	5.12E-11	5.12E-11
ba140	4.74E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
gd156	2.60E-11	2.93E-11	3.26E-11	3.59E-11	3.92E-11	3.92E-11
sm153	3.75E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
se 80	2.48E-11	2.79E-11	3.10E-11	3.41E-11	3.71E-11	3.71E-11
eu156	3.42E-11	3.41E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
dy161	2.17E-11	2.44E-11	2.71E-11	2.98E-11	3.25E-11	3.25E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
ru106	2.36E-11	2.41E-11	2.44E-11	2.46E-11	2.48E-11	2.48E-11
tb159	1.45E-11	1.64E-11	1.82E-11	2.00E-11	2.18E-11	2.18E-11
zr 90	9.65E-12	1.22E-11	1.50E-11	1.80E-11	2.14E-11	2.14E-11
li 6	1.41E-11	1.59E-11	1.76E-11	1.94E-11	2.11E-11	2.11E-11
cd112	1.40E-11	1.57E-11	1.75E-11	1.92E-11	2.10E-11	2.10E-11
ce143	1.72E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
sn117	1.11E-11	1.25E-11	1.39E-11	1.53E-11	1.66E-11	1.66E-11
te125	7.82E-12	9.58E-12	1.15E-11	1.34E-11	1.55E-11	1.55E-11

1 cas2h: far-field crit based on k1w 15x15, 3.00wt%, 20gwd/mtu 40% k2o/ 8% uo2 fission products page 24
0 fraction of total absorption rate

0 power	.00mw, burnup= initial	1643.7 d	0.mwd, flux= 2.74E+08n/cm**2-sec 1826.3 d	2009.0 d	2191.4 d	2191.7 d
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sn119	9.15E-12	1.03E-11	1.14E-11	1.26E-11	1.37E-11	1.37E-11
mo 99	1.30E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
sn115	8.37E-12	9.41E-12	1.05E-11	1.15E-11	1.26E-11	1.26E-11
sb125	9.30E-12	1.01E-11	1.07E-11	1.12E-11	1.17E-11	1.17E-11
sr 88	7.85E-12	7.94E-12	8.82E-12	9.70E-12	1.06E-11	1.06E-11
kr 87	1.09E-11	2.31E-11	2.31E-11	2.31E-11	2.31E-11	8.20E-12
pm148m	6.11E-12	6.50E-12	6.88E-12	7.21E-12	7.31E-12	7.30E-12
pd110	4.99E-12	5.61E-12	6.23E-12	6.86E-12	7.48E-12	7.48E-12
te127m	7.35E-12	7.35E-12	7.35E-12	7.35E-12	7.35E-12	7.35E-12
cd114	4.85E-12	5.45E-12	6.06E-12	6.66E-12	7.27E-12	7.27E-12

sr 82	4.79E-12	5.39E-12	5.99E-12	6.58E-12	7.18E-12	7.18E-12
gd158	4.56E-12	5.14E-12	5.71E-12	6.29E-12	6.87E-12	6.87E-12
i131	4.77E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
eu154	3.51E-12	4.11E-12	4.75E-12	5.42E-12	6.12E-12	6.12E-12
sn126	3.83E-12	4.31E-12	4.79E-12	5.27E-12	5.75E-12	5.75E-12
se 78	3.62E-12	4.08E-12	4.53E-12	5.98E-12	5.44E-12	5.44E-12
sn124	2.90E-12	3.26E-12	3.63E-12	3.99E-12	4.35E-12	4.35E-12
dy162	2.79E-12	3.13E-12	3.48E-12	3.82E-12	4.17E-12	4.17E-12
dy164	2.53E-12	2.85E-12	3.16E-12	3.48E-12	3.79E-12	3.79E-12
as 75	2.16E-12	2.43E-12	2.70E-12	2.97E-12	3.24E-12	3.24E-12
y 90	1.54E-12	1.72E-12	1.90E-12	2.08E-12	2.25E-12	2.25E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
sn118	1.18E-12	1.33E-12	1.48E-12	1.63E-12	1.77E-12	1.77E-12
ba136	1.13E-12	1.28E-12	1.42E-12	1.57E-12	1.71E-12	1.71E-12
cd116	1.01E-12	1.13E-12	1.26E-12	1.38E-12	1.51E-12	1.51E-12
sn122	1.01E-12	1.13E-12	1.26E-12	1.38E-12	1.51E-12	1.51E-12
cs134	8.30E-13	9.91E-13	1.07E-12	1.20E-12	1.33E-12	1.33E-12
sn120	7.52E-13	8.45E-13	9.39E-13	1.03E-12	1.13E-12	1.13E-12
ru 99	4.57E-13	7.35E-13	8.56E-13	9.61E-13	1.07E-12	1.07E-12
kr 82	4.31E-13	7.10E-13	7.90E-13	8.69E-13	9.48E-13	9.48E-13
dy163	4.15E-13	6.91E-13	7.68E-13	8.44E-13	9.21E-13	9.21E-13
ge 73	3.89E-13	6.63E-13	7.37E-13	8.10E-13	8.84E-13	8.84E-13
eu152	2.51E-13	3.53E-13	4.79E-13	6.31E-13	8.12E-13	8.12E-13
xe130	2.89E-13	4.38E-13	4.87E-13	5.36E-13	5.85E-13	5.85E-13
mo 96	2.74E-13	3.89E-13	3.44E-13	3.79E-13	4.14E-13	4.14E-13
in113	1.49E-13	1.87E-13	2.29E-13	2.75E-13	3.25E-13	3.25E-13
se 76	2.14E-13	2.41E-13	2.68E-13	2.94E-13	3.21E-13	3.21E-13
ag111	3.15E-13	3.16E-13	3.16E-13	3.16E-13	3.16E-13	3.14E-13
pm148	2.40E-13	2.56E-13	2.71E-13	2.83E-13	2.94E-13	2.91E-13
eu157	2.81E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.74E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
gd160	1.35E-13	1.52E-13	1.68E-13	1.85E-13	2.02E-13	2.02E-13
te126	1.04E-13	1.17E-13	1.30E-13	1.43E-13	1.56E-13	1.56E-13
ru100	7.20E-14	8.37E-14	9.60E-14	1.09E-13	1.22E-13	1.22E-13
ho165	4.23E-14	4.75E-14	5.28E-14	5.80E-14	6.33E-14	6.33E-14
se136	5.54E-14	5.56E-14	5.56E-14	5.56E-14	5.56E-14	5.54E-14
sm148	2.56E-14	3.19E-14	3.87E-14	4.61E-14	5.40E-14	5.40E-14
gd152	1.38E-14	1.96E-14	2.68E-14	3.54E-14	4.61E-14	4.61E-14

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 25
0 fraction of total absorption rate
0 power= .00mw, burnup= 0.mwd, flux= 2.74E+08n/cm**2-sec

	initial	1643.7 d	1826.3 d	2009.0 d	2191.6 d	2191.7 d
gd154	1.63E-14	2.16E-14	2.72E-14	3.39E-14	4.16E-14	4.16E-14
sr 87	2.46E-14	2.77E-14	3.07E-14	3.38E-14	3.69E-14	3.69E-14
te124	2.36E-14	2.67E-14	2.98E-14	3.30E-14	3.61E-14	3.61E-14
nd142	1.34E-14	1.69E-14	2.10E-14	2.54E-14	3.02E-14	3.02E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
ba135	1.32E-14	1.64E-14	1.99E-14	2.37E-14	2.78E-14	2.78E-14
ru105	2.45E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.25E-14
ba134	0.24E-15	1.18E-14	1.49E-14	1.83E-14	2.21E-14	2.21E-14
nb 94	1.39E-14	1.57E-14	1.74E-14	1.92E-14	2.09E-14	2.09E-14
pd104	0.28E-15	1.05E-14	1.31E-14	1.59E-14	1.90E-14	1.90E-14
se 74	1.19E-14	1.34E-14	1.49E-14	1.64E-14	1.79E-14	1.79E-14
se 72	2.98E-15	8.98E-15	9.98E-15	1.10E-14	1.20E-14	1.20E-14
sr 86	6.86E-15	7.74E-15	8.61E-15	9.49E-15	1.04E-14	1.04E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.48E-15	9.59E-15	9.59E-15	9.59E-15	9.59E-15	9.44E-15
rb 88	1.00E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.88E-15
i135	8.79E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.33E-15

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    se 76     4.63E-15  5.21E-15  5.80E-15  6.38E-15  6.96E-15  6.96E-15
    cd110     1.90E-15  2.32E-15  2.77E-15  3.26E-15  3.78E-15  3.78E-15
    sb126     3.01E-15  3.02E-15  3.02E-15  3.02E-15  3.02E-15  3.01E-15
    sb124     2.10E-15  2.11E-15  2.11E-15  2.11E-15  2.11E-15  2.10E-15
    br 79     8.84E-16  1.12E-15  1.38E-15  1.66E-15  1.98E-15  1.98E-15
    in117m    1.95E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  1.85E-15
    xe128     1.15E-15  1.30E-15  1.45E-15  1.61E-15  1.76E-15  1.76E-15
    er166     1.11E-15  1.25E-15  1.39E-15  1.53E-15  1.67E-15  1.67E-15
    dy160     8.88E-16  1.02E-15  1.15E-15  1.28E-15  1.41E-15  1.41E-15
    xe129     4.87E-16  6.17E-16  7.62E-16  9.22E-16  1.10E-15  1.10E-15
    ag107     4.58E-16  5.80E-16  7.16E-16  8.66E-16  1.03E-15  1.03E-15
    te134     1.46E-15  5.89E-15  5.89E-15  5.89E-15  5.89E-15  8.72E-16
     i130     6.68E-16  7.21E-16  7.22E-16  7.23E-16  7.23E-16  6.52E-16
    in117     5.78E-16  6.17E-16  6.17E-16  6.17E-16  6.17E-16  5.49E-16
    kr 80     3.34E-16  3.75E-16  4.17E-16  4.59E-16  5.01E-16  5.01E-16
    tb160     3.38E-16  3.43E-16  3.48E-16  3.54E-16  3.59E-16  3.59E-16
    nb 93     1.09E-16  1.50E-16  2.01E-16  2.62E-16  3.34E-16  3.34E-16
    rb 86     2.43E-16  2.44E-16  2.44E-16  2.44E-16  2.44E-16  2.43E-16
    dy165     1.43E-16  2.11E-16  2.11E-16  2.11E-16  2.11E-16  1.33E-16
    te122     5.05E-17  5.82E-17  6.59E-17  7.39E-17  8.21E-17  8.21E-17
    sn116     3.06E-17  3.70E-17  4.40E-17  5.16E-17  5.97E-17  5.97E-17
    be  9     2.67E-17  3.00E-17  3.33E-17  3.67E-17  4.00E-17  4.00E-17
    pr142     2.62E-17  3.10E-17  3.45E-17  3.80E-17  4.15E-17  3.67E-17
    ge 75     4.41E-17  8.69E-17  8.69E-17  8.69E-17  8.69E-17  3.41E-17
    te123     2.17E-17  2.46E-17  2.76E-17  3.06E-17  3.36E-17  3.36E-17
    cd118     3.79E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16  2.48E-17
    li  7     1.09E-17  1.22E-17  1.36E-17  1.49E-17  1.63E-17  1.63E-17
    er167     4.46E-18  5.02E-18  5.59E-18  6.17E-18  6.75E-18  6.75E-18
    in119m    1.39E-18  3.02E-17  3.02E-17  3.02E-17  3.02E-17  4.21E-19
    sd108     2.22E-19  2.49E-19  2.76E-19  3.07E-19  3.34E-19  3.34E-19
    cs134m    1.45E-19  2.29E-19  2.53E-19  2.80E-19  3.07E-19  1.02E-19
    cd109     1.48E-19  1.75E-19  1.79E-19  1.82E-19  1.85E-19  1.85E-19
1   sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  26
0                                  fraction of total absorption rate
        power=     .00mw, burnup=     9.mwd, flux= 2.74E+08n/cm**2-sec
0             initial  1643.7 d  1826.3 d  2009.0 d  2191.6 d  2191.7 d

    sn114     3.37E-21  3.37E-21  3.37E-21  6.74E-21  6.74E-21  6.74E-21
1
    sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  27
      power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge  1643.7 d  1826.3 d  2009.0 d  2191.6 d  2191.7 d
     h  1    3.48E-07  3.91E-07  4.33E-07  4.76E-07  5.18E-07  5.18E-07
     h  2    1.03E-09  1.16E-09  1.28E-09  1.41E-09  1.54E-09  1.54E-09
     h  3    6.77E-12  7.50E-12  8.20E-12  8.89E-12  9.56E-12  9.56E-12
     h  4     .00E+00  3.85E-35  3.54E-35  3.62E-35  3.89E-35   .00E+00
    he  3    7.95E-13  9.96E-13  1.22E-12  1.44E-12  1.72E-12  1.72E-12
    he  4    5.75E-08  6.45E-08  7.16E-08  7.86E-08  8.57E-08  8.57E-08
    he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20    6.91E-09  7.73E-09  8.60E-09  9.44E-09  1.03E-08  1.03E-08
    ne 21    9.52E-16  1.19E-15  1.45E-15  1.73E-15  2.04E-15  2.04E-15
    ne 22    1.75E-11  2.13E-11  2.53E-11  2.95E-11  3.38E-11  3.38E-11
    ne 23    7.10E-30  7.04E-15  7.04E-15  7.04E-15  7.04E-15  7.04E-30
    na 22    2.77E-11  3.04E-11  3.09E-11  3.22E-11  3.33E-11  3.33E-11
    na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24    2.87E-08  2.85E-08  2.85E-08  2.85E-08  2.85E-08  2.60E-08
    na 24m   5.05E-30  4.68E-15  4.68E-15  4.68E-15  4.68E-15  4.68E-30
    na 25    2.41E-43  2.47E-28  2.74E-28  3.02E-28  3.29E-28  3.62E-43
```

mg 24	5.39E-05	6.19E-05	6.78E-05	7.37E-05	7.97E-05	7.97E-05
mg 25	7.66E-12	8.61E-12	9.56E-12	1.05E-11	1.15E-11	1.15E-11
mg 26	1.03E-09	1.16E-09	1.28E-09	1.41E-09	1.54E-09	1.54E-09
mg 27	4.42E-15	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.25E-14
mg 28	4.12E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.08E-21	2.11E-10	2.11E-10	2.11E-10	2.11E-10	2.08E-25
al 29	3.11E-32	2.80E-28	3.42E-28	4.10E-28	4.84E-28	2.53E-33
al 30	.00E+00	2.38E-41	3.24E-41	4.28E-41	5.52E-41	.00E+00
si 28	1.62E-04	1.79E-04	1.96E-04	2.14E-04	2.31E-04	2.31E-04
si 29	8.69E-13	1.09E-12	1.33E-12	1.60E-12	1.88E-12	1.88E-12
si 30	4.90E-21	6.92E-21	9.43E-21	1.25E-20	1.61E-20	1.61E-20
si 31	2.42E-33	4.98E-33	6.78E-33	8.96E-33	1.16E-32	6.95E-33
si 32	2.51E-41	4.00E-41	6.07E-41	8.65E-41	1.25E-40	1.25E-40
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E+07

0
1

sas2h: fer-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 28
power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	1643.7 d	1826.3 d	2009.0 d	2191.6 d	2191.7 d
he 4	2.16E-04	2.45E-04	2.74E-04	3.03E-04	3.33E-04	3.33E-04
ra222	1.12E-28	1.35E-28	1.61E-28	1.89E-28	2.18E-28	2.18E-28
ra223	1.62E-13	2.05E-13	2.52E-13	3.05E-13	3.62E-13	3.62E-13
ra224	2.23E-14	2.96E-14	3.80E-14	4.73E-14	5.76E-14	5.76E-14
ra225	2.32E-15	2.95E-15	3.66E-15	4.65E-15	5.31E-15	5.31E-15
ra226	1.88E-09	2.38E-09	2.93E-09	3.55E-09	4.22E-09	4.22E-09
ra228	1.75E-15	2.17E-15	2.63E-15	3.13E-15	3.65E-15	3.65E-15
ac225	1.57E-15	2.00E-15	2.47E-15	3.01E-15	3.59E-15	3.59E-15
ac227	1.17E-10	1.47E-10	1.80E-10	2.17E-10	2.57E-10	2.57E-10
ac228	2.13E-19	2.85E-19	3.21E-19	3.81E-19	4.46E-19	4.46E-19
th226	5.46E-27	6.59E-27	7.87E-27	9.22E-27	1.06E-26	1.06E-26
th227	2.61E-13	3.30E-13	4.07E-13	4.91E-13	5.83E-13	5.83E-13
th228	4.25E-12	5.64E-12	7.23E-12	9.00E-12	1.10E-11	1.10E-11
th229	4.51E-10	5.74E-10	7.12E-10	8.65E-10	1.03E-09	1.03E-09
th230	1.02E-04	1.15E-04	1.28E-04	1.41E-04	1.53E-04	1.53E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	2.07E-05	2.32E-05	2.58E-05	2.84E-05	3.10E-05	3.10E-05
th233	1.38E-17	2.13E-16	2.37E-16	2.61E-16	2.84E-16	7.92E-18
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.87E-06	3.23E-06	3.59E-06	3.95E-06	4.31E-06	4.31E-06
pa232	4.79E-14	5.56E-14	6.18E-14	6.80E-14	7.42E-14	7.11E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.28E-24	6.39E-24	7.63E-24	8.93E-24	1.03E-23	1.03E-23
u231	4.04E-20	4.56E-20	5.08E-20	5.60E-20	6.12E-20	6.04E-20
u232	4.16E-10	5.07E-10	6.03E-10	7.04E-10	8.09E-10	8.09E-10
u233	5.32E-05	6.00E-05	6.68E-05	7.36E-05	8.05E-05	8.05E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.13E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.67E-08	3.19E-07	3.19E-07	3.19E-07	3.19E-07	1.06E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.16E-12	8.30E-12	8.40E-12	8.47E-12	8.53E-12	8.53E-12

```
     np236m  2.00E-12  2.06E-12  2.06E-12  2.06E-12  2.06E-12  1.94E-12
     np236   8.06E-10  9.04E-10  1.00E-09  1.10E-09  1.20E-09  1.20E-09
     np237   4.22E+01  4.22E+01  4.22E+01  4.22E+01  4.21E+01  4.21E+01
     np238   1.53E-06  1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.52E-06
     np239   4.40E-05  4.61E-05  4.61E-05  4.61E-05  4.61E-05  4.53E-05
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   3.69E-15  9.37E-15  9.37E-15  9.37E-15  9.37E-15  2.58E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   7.06E-10  7.32E-10  7.93E-10  8.30E-10  8.62E-10  8.62E-10
     pu237   7.11E-15  7.92E-15  8.80E-15  9.69E-15  1.06E-14  1.06E-14
     pu238   7.38E-04  8.28E-04  9.18E-04  1.01E-03  1.10E-03  1.10E-03
     pu239   2.05E-02  2.31E-02  2.56E-02  2.81E-02  3.06E-02  3.06E-02
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   29
       power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge  1643.7 d  1826.3 d  2009.0 d  2191.6 d  2191.7 d
     pu240   4.05E-07  5.12E-07  6.31E-07  7.63E-07  9.06E-07  9.06E-07
     pu241   1.04E-11  1.47E-11  2.00E-11  2.63E-11  3.39E-11  3.39E-11
     pu242   8.34E-17  1.33E-16  2.01E-16  2.93E-16  4.12E-16  4.12E-16
     pu243   1.47E-25  2.81E-25  4.25E-25  6.19E-25  8.71E-25  8.66E-25
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.74E+08  2.74E+08  2.74E+08  2.74E+08  2.74E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *          prelim lwr origen-s binary working library--id = 1143           *
          *        made from modified card-image origen-s libraries of scale 4.2     *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi  *
          *                                                                          *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prexsx2" case updating all nuclides on the scale "burnup" library *
```

```
         *                                                                    *
         *                 fission product yields are from endf/b-v           *
         *                                                                    *
         *            photon libraries use an 18-energy-group structure       *
         *           the photon data are from the master photon data base,    *
         *            produced to include bremsstrahlung from uo2 matrix      *
         *                                                                    *
         *       see information above this box (if present) for later updates *
         *                                                                    *
         **********************************************************************
         *                                                                    *
         **********************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ***********************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  30
      power=    .00mw, burnup=     12.mwd, flux= 2.71E+08n/cm**2-sec
0                                          basis =
0   (note, k-infinities, eled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial       2374.3 d       2556.9 d       2739.5 d       2922.2 d       2922.2 d
    productions   1.134728E+06   1.134732E+06   1.134735E+06   1.134739E+06   1.134743E+06   1.134743E+06
    absorptions   9.244198E+05   9.244260E+05   9.244325E+05   9.244386E+05   9.244447E+05   9.244446E+05
    k infinity    1.227502E+00   1.227698E+00   1.227494E+00   1.227490E+00   1.227486E+00   1.227486E+00
0                 initial       2374.3 d       2556.9 d       2739.5 d       2922.2 d       2922.2 d
    actinide
    absorptions   9.212016E+05   9.212040E+05   9.212063E+05   9.212086E+05   9.212108E+05   9.212108E+05
    non-actinide
    abs. fracs.   3.481328E-03   3.483382E-03   3.489971E-03   3.493965E-03   3.498256E-03   3.498197E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products  page  31
0                                   fraction of total absorption rate
      power=    .00mw, burnup=     12.mwd, flux= 2.71E+08n/cm**2-sec
0             initial  2374.3 d  2556.9 d  2739.5 d  2922.2 d  2922.2 d

    sm149     4.45E-05  4.82E-05  5.19E-05  5.56E-05  5.93E-05  5.93E-05
    sm151     1.84E-06  1.99E-06  2.14E-06  2.29E-06  2.44E-06  2.44E-06
    xe135     2.30E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.30E-06
    nd143     8.87E-07  9.42E-07  1.04E-06  1.11E-06  1.19E-06  1.19E-06
    gd157     4.35E-07  4.92E-07  5.50E-07  5.67E-07  6.05E-07  6.05E-07
    rh103     4.03E-07  4.37E-07  4.72E-07  5.06E-07  5.40E-07  5.40E-07
    cd113     3.88E-07  4.21E-07  4.53E-07  4.85E-07  5.17E-07  5.17E-07
    xe131     2.80E-07  3.03E-07  3.27E-07  3.50E-07  3.74E-07  3.74E-07
    gd155     2.03E-07  2.33E-07  2.65E-07  2.98E-07  3.32E-07  3.32E-07
    cs133     2.17E-07  2.35E-07  2.54E-07  2.72E-07  2.90E-07  2.90E-07
    pm147     2.15E-07  2.22E-07  2.28E-07  2.34E-07  2.38E-07  2.38E-07
    tc 99     1.60E-07  1.73E-07  1.87E-07  2.00E-07  2.13E-07  2.13E-07
    nd145     1.25E-07  1.35E-07  1.45E-07  1.56E-07  1.66E-07  1.66E-07
    sm147     8.05E-08  9.15E-08  1.03E-07  1.14E-07  1.26E-07  1.26E-07
    eu155     9.32E-08  9.79E-08  1.02E-07  1.06E-07  1.10E-07  1.10E-07
    mo 95     8.07E-08  8.79E-08  9.51E-08  1.02E-07  1.10E-07  1.10E-07
    sm152     6.56E-08  7.11E-08  7.66E-08  8.20E-08  8.75E-08  8.75E-08
    kr 83     5.43E-08  5.88E-08  6.33E-08  6.79E-08  7.24E-08  7.24E-08
    cs135     4.91E-08  5.32E-08  5.73E-08  6.14E-08  6.55E-08  6.55E-08
    eu151     3.17E-08  3.72E-08  4.31E-08  4.94E-08  5.61E-08  5.61E-08
    ru101     3.80E-08  4.12E-08  4.43E-08  4.75E-08  5.07E-08  5.07E-08
```

pr141	3.61E-08	3.92E-08	4.22E-08	4.53E-08	4.84E-08	4.84E-08
eu153	3.33E-08	3.61E-08	3.89E-08	4.17E-08	4.45E-08	4.45E-08
la139	3.02E-08	3.27E-08	3.52E-08	3.77E-08	4.02E-08	4.02E-08
pd105	1.27E-08	1.37E-08	1.48E-08	1.59E-08	1.69E-08	1.69E-08
zr 93	1.22E-08	1.32E-08	1.42E-08	1.52E-08	1.62E-08	1.62E-08
i129	9.33E-09	1.01E-08	1.09E-08	1.17E-08	1.24E-08	1.25E-08
nd144	7.37E-09	8.13E-09	8.85E-09	9.64E-09	1.04E-08	1.04E-08
mo 97	6.83E-09	7.40E-09	7.97E-09	8.54E-09	9.11E-09	9.11E-09
rh105	8.33E-09	8.37E-09	8.37E-09	8.37E-09	8.37E-09	8.33E-09
ag109	4.74E-09	5.13E-09	5.53E-09	5.02E-09	4.31E-09	4.31E-09
zr 91	3.10E-09	3.37E-09	3.64E-09	3.91E-09	4.17E-09	4.17E-09
y 89	2.99E-09	3.25E-09	3.51E-09	3.77E-09	4.03E-09	4.03E-09
ru102	2.78E-09	3.02E-09	3.25E-09	3.48E-09	3.71E-09	3.71E-09
ce142	2.51E-09	2.72E-09	2.93E-09	3.14E-09	3.35E-09	3.35E-09
nd148	2.41E-09	2.61E-09	2.81E-09	3.01E-09	3.21E-09	3.21E-09
sr 90	2.37E-09	2.55E-09	2.73E-09	2.91E-09	3.09E-09	3.09E-09
nd146	2.02E-09	2.19E-09	2.36E-09	2.53E-09	2.70E-09	2.70E-09
pr143	2.48E-09	2.68E-09	2.88E-09	3.08E-09	2.68E-09	2.68E-09
ba138	1.73E-09	1.88E-09	2.02E-09	2.16E-09	2.31E-09	2.31E-09
in115	1.66E-09	1.79E-09	1.93E-09	2.07E-09	2.21E-09	2.21E-09
ce140	1.61E-09	1.74E-09	1.88E-09	2.01E-09	2.15E-09	2.15E-09
pd108	1.61E-09	1.74E-09	1.88E-09	2.01E-09	2.14E-09	2.14E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
xe132	1.44E-09	1.56E-09	1.69E-09	1.81E-09	1.93E-09	1.93E-09
ba137	9.38E-10	1.12E-09	1.29E-09	1.48E-09	1.68E-09	1.68E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
mo 98	9.96E-10	1.08E-09	1.16E-09	1.25E-09	1.33E-09	1.33E-09
mo100	9.66E-10	1.05E-09	1.13E-09	1.21E-09	1.29E-09	1.29E-09

1 sas2h: far-field crit based on bdw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 32
0 fraction of total absorption rate

0 powers	.00mw, burnup= initial	12.mwd, 2374.3 d	flux= 2.71E+08n/cm**2-sec 2534.9 d	2739.5 d	2922.2 d	2922.2 d
pd107	9.60E-10	1.04E-09	1.12E-09	1.20E-09	1.28E-09	1.28E-09
xe134	9.56E-10	1.04E-09	1.12E-09	1.19E-09	1.27E-09	1.27E-09
zr 92	7.76E-10	8.41E-10	9.06E-10	9.71E-10	1.04E-09	1.04E-09
pm149	9.73E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.73E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10	9.27E-10
i127	6.16E-10	6.68E-10	7.20E-10	7.72E-10	8.25E-10	8.25E-10
zr 96	6.04E-10	6.55E-10	7.05E-10	7.56E-10	8.06E-10	8.06E-10
ru104	5.94E-10	6.43E-10	6.93E-10	7.42E-10	7.92E-10	7.92E-10
nd150	5.53E-10	5.77E-10	6.22E-10	6.66E-10	7.10E-10	7.10E-10
xe136	5.17E-10	5.60E-10	6.03E-10	6.46E-10	6.89E-10	6.89E-10
cs137	4.89E-10	5.27E-10	5.64E-10	6.01E-10	6.37E-10	6.37E-10
ce144	4.81E-10	5.02E-10	5.03E-10	5.04E-10	5.04E-10	5.04E-10
kr 81	3.86E-10	4.19E-10	4.51E-10	4.83E-10	5.15E-10	5.15E-10
sm150	3.81E-10	3.30E-10	3.82E-10	4.38E-10	4.99E-10	4.99E-10
zr 94	3.27E-10	3.54E-10	3.81E-10	4.09E-10	4.36E-10	4.36E-10
rb 85	3.11E-10	3.38E-10	3.65E-10	3.92E-10	4.20E-10	4.20E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
cd111	2.51E-10	2.72E-10	2.93E-10	3.14E-10	3.35E-10	3.35E-10
te130	2.35E-10	2.55E-10	2.74E-10	2.94E-10	3.13E-10	3.13E-10
sm154	2.27E-10	2.46E-10	2.65E-10	2.84E-10	3.03E-10	3.03E-10
rb 87	2.18E-10	2.37E-10	2.55E-10	2.73E-10	2.91E-10	2.91E-10
kr 85	1.86E-10	1.98E-10	2.10E-10	2.22E-10	2.33E-10	2.33E-10
se 77	1.56E-10	1.69E-10	1.82E-10	1.95E-10	2.08E-10	2.08E-10
zr 93	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
kr 84	1.03E-10	1.11E-10	1.20E-10	1.28E-10	1.37E-10	1.37E-10

pd106	8.34E-11	9.24E-11	1.01E-10	1.11E-10	1.20E-10	1.20E-10
se 79	7.99E-11	8.65E-11	9.32E-11	9.98E-11	1.07E-10	1.07E-10
pm151	1.06E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.06E-10
sb121	7.50E-11	8.13E-11	8.75E-11	9.38E-11	1.00E-10	1.00E-10
sb123	6.08E-11	6.59E-11	7.10E-11	7.61E-11	8.12E-11	8.12E-11
kr 86	5.77E-11	6.25E-11	6.73E-11	7.21E-11	7.70E-11	7.70E-11
te128	5.12E-11	5.55E-11	5.97E-11	6.40E-11	6.83E-11	6.83E-11
pd156	3.91E-11	4.24E-11	4.56E-11	4.89E-11	5.22E-11	5.22E-11
se 80	3.72E-11	4.03E-11	4.34E-11	4.65E-11	4.96E-11	4.96E-11
ba140	4.74E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11	4.74E-11
dy161	3.26E-11	3.53E-11	3.80E-11	4.07E-11	4.34E-11	4.34E-11
sr 90	2.14E-11	2.50E-11	2.89E-11	3.31E-11	3.73E-11	3.73E-11
sm153	3.73E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.73E-11
eu156	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
sr 89	3.09E-11	3.10E-11	3.10E-11	3.10E-11	3.10E-11	3.09E-11
tb159	2.18E-11	2.36E-11	2.54E-11	2.72E-11	2.90E-11	2.90E-11
li 6	2.12E-11	2.30E-11	2.47E-11	2.65E-11	2.83E-11	2.83E-11
cd112	2.10E-11	2.27E-11	2.45E-11	2.62E-11	2.80E-11	2.80E-11
ru106	2.48E-11	2.49E-11	2.49E-11	2.50E-11	2.50E-11	2.50E-11
te125	1.55E-11	1.76E-11	1.98E-11	2.21E-11	2.44E-11	2.44E-11
sn117	1.67E-11	1.80E-11	1.94E-11	2.08E-11	2.22E-11	2.22E-11
sn119	1.37E-11	1.49E-11	1.60E-11	1.72E-11	1.83E-11	1.83E-11

1 sas2h: fer-field crit based on b&w 15x15 3.00wt%, 20gwd/mtu 60% h2o/ 8% uo2 fission products page 33
0 fraction of total absorption rate
0 powers .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec

	initial 2374.3 d	2536.9 d	2739.5 d	2922.2 d	2922.2 d
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
sn115	1.26E-11	1.36E-11	1.47E-11	1.57E-11	1.68E-11
te140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sr 88	1.06E-11	1.15E-11	1.24E-11	1.32E-11	1.41E-11
sb125	1.17E-11	1.20E-11	1.24E-11	1.27E-11	1.30E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
pd110	7.47E-12	8.09E-12	8.71E-12	9.33E-12	9.95E-12
cd114	7.26E-12	7.86E-12	8.47E-12	9.07E-12	9.68E-12
se 82	7.19E-12	7.79E-12	8.39E-12	8.99E-12	9.59E-12
eu154	6.12E-12	6.85E-12	7.61E-12	8.39E-12	9.19E-12
gd158	6.86E-12	7.44E-12	8.02E-12	8.60E-12	9.18E-12
pm148m	7.51E-12	7.75E-12	7.98E-12	8.17E-12	8.35E-12
kr 87	8.22E-12	8.22E-12	8.22E-12	8.22E-12	8.22E-12
sn126	5.76E-12	6.25E-12	6.73E-12	7.21E-12	7.69E-12
te127m	7.36E-12	7.36E-12	7.36E-12	7.36E-12	7.36E-12
se 78	5.44E-12	5.89E-12	6.34E-12	6.80E-12	7.25E-12
i131	6.77E-12	6.79E-12	6.79E-12	6.79E-12	6.77E-12
sn124	4.34E-12	4.70E-12	5.07E-12	5.43E-12	5.79E-12
dy162	4.17E-12	4.51E-12	4.86E-12	5.20E-12	5.55E-12
dy164	3.80E-12	4.12E-12	4.43E-12	4.75E-12	5.07E-12
as 75	3.24E-12	3.51E-12	3.78E-12	4.05E-12	4.32E-12
y 90	2.26E-12	2.43E-12	2.60E-12	2.77E-12	2.94E-12
sn118	1.77E-12	1.92E-12	2.06E-12	2.21E-12	2.36E-12
ba136	1.71E-12	1.85E-12	2.00E-12	2.14E-12	2.29E-12
sn122	1.51E-12	1.64E-12	1.76E-12	1.89E-12	2.01E-12
cd116	1.51E-12	1.63E-12	1.76E-12	1.88E-12	2.01E-12
eu152	8.13E-13	1.03E-12	1.27E-12	1.55E-12	1.87E-12
cs134	1.33E-12	1.44E-12	1.58E-12	1.71E-12	1.84E-12
te129m	1.00E-12	1.00E-12	1.00E-12	1.00E-12	1.00E-12
ru 99	1.07E-12	1.18E-12	1.30E-12	1.41E-12	1.54E-12
sn120	1.13E-12	1.22E-12	1.31E-12	1.41E-12	1.50E-12
kr 82	9.49E-13	1.03E-12	1.11E-12	1.19E-12	1.27E-12
dy163	9.21E-13	9.98E-13	1.07E-12	1.15E-12	1.23E-12

ge 73	8.83E-13	9.59E-13	1.03E-12	1.11E-12	1.18E-12	1.18E-12
xe130	5.86E-13	6.35E-13	6.84E-13	7.33E-13	7.83E-13	7.83E-13
in113	3.25E-13	3.78E-13	4.35E-13	4.96E-13	5.60E-13	5.60E-13
mo 96	4.14E-13	4.49E-13	4.84E-13	5.19E-13	5.55E-13	5.55E-13
ge 76	3.21E-13	3.48E-13	3.75E-13	4.02E-13	4.28E-13	4.28E-13
pm148	2.90E-13	3.02E-13	3.10E-13	3.18E-13	3.24E-13	3.21E-13
ag111	3.14E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.14E-13
eu157	2.75E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.74E-13
gd160	2.02E-13	2.19E-13	2.35E-13	2.52E-13	2.69E-13	2.69E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
te126	1.56E-13	1.69E-13	1.82E-13	1.95E-13	2.09E-13	2.09E-13
ru100	1.23E-13	1.37E-13	1.51E-13	1.67E-13	1.83E-13	1.83E-13
gd152	4.62E-14	5.88E-14	7.35E-14	9.05E-14	1.10E-13	1.10E-13
sm148	5.41E-14	6.25E-14	7.14E-14	8.07E-14	9.05E-14	9.05E-14
ho165	6.33E-14	6.86E-14	7.39E-14	7.91E-14	8.44E-14	8.44E-14
gd154	4.16E-14	5.02E-14	5.98E-14	7.04E-14	8.20E-14	8.20E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 34
0 fraction of total absorption rate
0 powers .00mw, burnups 12.mwd, flux= 2.71E+08n/cm**2-sec

	initial	2374.3 d	2536.9 d	2739.5 d	2922.2 d	2922.2 d
cs136	5.53E-14	5.56E-14	5.56E-14	5.56E-14	5.56E-14	5.56E-14
nd142	3.83E-14	3.58E-14	4.13E-14	4.75E-14	5.40E-14	5.40E-14
sr 87	3.69E-14	4.00E-14	4.31E-14	4.62E-14	4.93E-14	4.93E-14
te124	3.61E-14	3.93E-14	4.24E-14	4.56E-14	4.87E-14	4.87E-14
ba133	2.78E-14	3.23E-14	3.71E-14	4.22E-14	4.76E-14	4.76E-14
ba134	2.21E-14	2.62E-14	3.08E-14	3.57E-14	4.10E-14	4.10E-14
pd104	1.90E-14	2.23E-14	2.60E-14	2.99E-14	3.41E-14	3.41E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
nb 94	2.09E-14	2.26E-14	2.44E-14	2.61E-14	2.78E-14	2.78E-14
ge 74	1.79E-14	1.94E-14	2.09E-14	2.24E-14	2.39E-14	2.39E-14
ru105	2.25E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.25E-14
ge 72	1.20E-14	1.30E-14	1.40E-14	1.50E-14	1.60E-14	1.60E-14
sr 86	1.04E-14	1.13E-14	1.22E-14	1.30E-14	1.39E-14	1.39E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.45E-15	9.60E-15	9.60E-15	9.60E-15	9.60E-15	9.45E-15
se 76	6.97E-15	7.56E-15	8.14E-15	8.73E-15	9.31E-15	9.31E-15
rb 88	8.90E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.90E-15
i135	8.34E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.35E-15
cd110	3.79E-15	4.35E-15	4.95E-15	5.58E-15	6.25E-15	6.25E-15
br 79	1.98E-15	2.32E-15	2.68E-15	3.08E-15	3.50E-15	3.50E-15
sb126	3.01E-15	3.03E-15	3.03E-15	3.03E-15	3.03E-15	3.02E-15
xe128	1.76E-15	1.92E-15	2.08E-15	2.24E-15	2.40E-15	2.40E-15
er166	1.67E-15	1.81E-15	1.95E-15	2.10E-15	2.24E-15	2.24E-15
sb124	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15
dy160	1.41E-15	1.54E-15	1.68E-15	1.82E-15	1.96E-15	1.96E-15
xe129	1.10E-15	1.29E-15	1.50E-15	1.72E-15	1.95E-15	1.95E-15
in117m	1.05E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	1.05E-15
ag107	1.03E-15	1.21E-15	1.40E-15	1.61E-15	1.83E-15	1.83E-15
te134	8.74E-16	5.90E-15	5.90E-15	5.90E-15	5.90E-15	8.74E-16
nb 93	2.34E-16	4.19E-16	5.17E-16	6.29E-16	7.53E-16	7.53E-16
kr 80	5.01E-16	5.43E-16	5.85E-16	6.27E-16	6.69E-16	6.69E-16
i130	6.32E-16	7.25E-16	7.25E-16	7.26E-16	7.26E-16	6.34E-16
in117	5.30E-16	6.19E-16	6.19E-16	6.19E-16	6.19E-16	5.30E-16
tb160	3.59E-16	3.65E-16	3.70E-16	3.75E-16	3.80E-16	3.80E-16
rb 86	2.44E-16	2.45E-16	2.45E-16	2.45E-16	2.45E-16	2.45E-16
dy165	1.23E-16	2.12E-16	2.12E-16	2.12E-16	2.12E-16	1.23E-16
te122	8.20E-17	9.05E-17	9.91E-17	1.08E-16	1.17E-16	1.17E-16
sn114	5.96E-17	6.83E-17	7.76E-17	8.75E-17	9.79E-17	9.79E-17
be 9	3.99E-17	4.32E-17	4.65E-17	4.98E-17	5.32E-17	5.32E-17

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     pr142     3.87E-17  4.50E-17  4.85E-17  5.20E-17  5.55E-17  5.17E-17
     te123     3.36E-17  3.46E-17  3.96E-17  4.36E-17  4.56E-17  4.56E-17
     ge 75     3.41E-17  8.71E-17  8.71E-17  8.71E-17  8.71E-17  3.41E-17
     cd118     2.48E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16  2.48E-17
     li  7     1.43E-17  1.77E-17  1.80E-17  2.04E-17  2.18E-17  2.18E-17
     er167     6.76E-18  7.35E-18  7.94E-18  8.53E-18  9.13E-18  9.13E-18
     cd108     3.34E-19  3.61E-19  3.91E-19  4.18E-19  4.49E-19  4.49E-19
     in119m    4.22E-19  3.03E-17  3.03E-17  3.03E-17  3.03E-17  4.22E-19
     as134m    1.92E-19  3.31E-19  3.58E-19  3.81E-19  4.08E-19  2.56E-19
     cd109     1.86E-19  1.89E-19  1.92E-19  1.92E-19  1.96E-19  1.96E-19
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  35
0                                   fraction of total absorption rate
         power=     .00mw, burnup=     12.mwd, flux= 2.71E+08n/cm**2-sec
0              initial  2374.3 d  2556.9 d  2739.5 d  2922.2 d  2922.2 d

     sn114     6.75E-21  6.75E-21  6.75E-21  6.75E-21  1.81E-20  1.81E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  36
       power= 4.800E-03mw, burnup=1.1688E+01mwd, flux= 2.71E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge  2374.3 d  2556.9 d  2739.5 d  2922.2 d  2922.2 d
      h  1   5.18E-07  5.61E-07  6.03E-07  6.46E-07  6.89E-07  6.89E-07
      h  2   1.54E-09  1.66E-09  1.79E-09  1.92E-09  2.04E-09  2.04E-09
      h  3   9.56E-12  1.02E-11  1.08E-11  1.14E-11  1.20E-11  1.20E-11
      h  4    .00E+00  4.15E-35  4.41E-35  4.66E-35  4.90E-35   .00E+00
     he  3   1.72E-12  1.99E-12  2.29E-12  2.60E-12  2.93E-12  2.93E-12
     he  4   8.57E-08  9.27E-08  9.97E-08  1.07E-07  1.14E-07  1.14E-07
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   1.03E-08  1.11E-08  1.20E-08  1.28E-08  1.37E-08  1.37E-08
     ne 21   2.04E-15  2.36E-15  2.71E-15  3.09E-15  3.48E-15  3.48E-15
     ne 22   3.38E-11  3.84E-11  4.30E-11  4.77E-11  5.26E-11  5.26E-11
     ne 23   7.04E-30  7.03E-15  7.03E-15  7.03E-15  7.03E-15  7.03E-30
     na 22   3.33E-11  3.43E-11  3.52E-11  3.60E-11  3.66E-11  3.66E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   2.60E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08  2.53E-08
     na 24m  4.68E-30  4.55E-15  4.55E-15  4.55E-15  4.55E-15  4.55E-30
     na 25   3.62E-43  3.55E-28  3.82E-28  4.10E-28  4.37E-28  4.82E-43
     mg 24   7.97E-05  8.54E-05  9.12E-05  9.70E-05  1.03E-04  1.03E-04
     mg 25   1.15E-11  1.24E-11  1.34E-11  1.44E-11  1.53E-11  1.53E-11
     mg 26   1.54E-09  1.66E-09  1.79E-09  1.92E-09  2.04E-09  2.04E-09
     mg 27   4.55E-16  2.10E-12  2.10E-12  2.10E-12  2.10E-12  4.54E-16
     mg 28   4.03E-24  4.29E-24  4.29E-24  4.29E-24  4.29E-24  4.03E-24
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.88E-25  2.05E-10  2.05E-10  2.05E-10  2.05E-10  2.88E-25
     al 29   2.53E-33  5.60E-28  6.44E-28  7.34E-28  8.29E-28  4.54E-33
     al 30    .00E+00  6.93E-41  8.60E-41  1.05E-40  1.27E-40   .00E+00
     si 28   2.31E-04  2.48E-04  2.64E-04  2.81E-04  2.98E-04  2.98E-04
     si 29   1.88E-12  2.19E-12  2.52E-12  2.87E-12  3.25E-12  3.25E-12
     si 30   1.61E-20  2.03E-20  2.52E-20  3.08E-20  3.71E-20  3.71E-20
     si 31   6.95E-33  1.46E-32  1.81E-32  2.21E-32  2.67E-32  1.61E-32
     si 32   1.25E-40  1.71E-40  2.28E-40  2.99E-40  3.85E-40  3.85E-40
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                2.71E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides                 page  37
       power= 4.800E-03mw, burnup=1.1688E+01mwd, flux= 2.71E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge  2374.3 d  2556.9 d  2739.5 d  2922.2 d  2922.2 d
```

he 4	3.33E-04	3.46E-04	3.04E-04	4.23E-04	4.57E-04	4.57E-04
pb206	1.19E-13	1.67E-13	2.28E-13	3.05E-13	4.00E-13	4.00E-13
pb207	1.73E-11	2.20E-11	2.74E-11	3.37E-11	4.08E-11	4.08E-11
pb208	7.86E-12	9.23E-12	1.18E-11	1.48E-11	1.82E-11	1.82E-11
pb209	4.90E-17	5.72E-17	6.65E-17	7.65E-17	8.72E-17	8.78E-17
pb210	3.48E-12	4.41E-12	5.49E-12	6.73E-12	8.14E-12	8.14E-12
pb211	7.93E-16	9.28E-16	1.07E-15	1.23E-15	1.39E-15	1.39E-15
pb212	6.97E-15	8.32E-15	9.76E-15	1.13E-14	1.29E-14	1.29E-14
pb214	1.30E-16	1.38E-16	1.83E-16	2.10E-16	2.39E-16	2.32E-16
ra222	2.98E-28	2.44E-28	2.77E-28	3.08E-28	3.40E-28	3.40E-28
ra223	3.62E-13	4.23E-13	4.89E-13	5.19E-13	6.34E-13	6.34E-13
ra224	5.76E-14	6.87E-14	8.06E-14	9.33E-14	1.07E-13	1.07E-13
ra225	5.31E-15	6.23E-15	7.27E-15	8.36E-15	9.53E-15	9.53E-15
ra226	4.22E-09	4.96E-09	5.75E-09	6.60E-09	7.51E-09	7.51E-09
ra228	3.65E-15	4.21E-15	4.80E-15	5.42E-15	6.06E-15	6.06E-15
ac225	3.39E-15	4.22E-15	4.91E-15	5.65E-15	6.44E-15	6.44E-15
ac227	2.57E-10	3.00E-10	3.46E-10	3.96E-10	4.48E-10	4.48E-10
ac228	4.46E-19	5.14E-19	5.86E-19	6.61E-19	7.39E-19	7.39E-19
th226	1.06E-26	1.20E-26	1.35E-26	1.50E-26	1.66E-26	1.66E-26
th227	5.83E-13	6.82E-13	7.88E-13	9.01E-13	1.02E-12	1.02E-12
th228	1.10E-11	1.31E-11	1.53E-11	1.77E-11	2.03E-11	2.03E-11
th229	1.03E-09	1.22E-09	1.41E-09	1.62E-09	1.85E-09	1.85E-09
th230	1.53E-04	1.66E-04	1.79E-04	1.92E-04	2.04E-04	2.04E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	3.10E-05	3.36E-05	3.61E-05	3.87E-05	4.13E-05	4.13E-05
th233	7.92E-16	3.08E-16	3.31E-16	3.55E-16	3.79E-16	1.05E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	4.31E-06	4.67E-06	5.03E-06	5.39E-06	5.75E-06	5.75E-06
pa232	7.11E-14	8.03E-14	8.45E-14	9.27E-14	9.89E-14	9.68E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.61E-11	1.61E-11	1.61E-11	1.61E-11	1.61E-11	1.61E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.03E-23	1.16E-23	1.31E-23	1.46E-23	1.61E-23	1.60E-23
u231	6.84E-20	6.60E-20	7.12E-20	7.44E-20	8.16E-20	8.05E-20
u232	8.09E-10	9.18E-10	9.03E-09	1.15E-09	1.26E-09	1.26E-09
u233	8.05E-05	8.73E-05	9.41E-05	1.01E-04	1.08E-04	1.08E-04
u234	9.86E+00	9.86E+00	9.86E+00	9.86E+00	9.86E+00	9.86E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.89E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06	3.07E-06
u238	3.44E+04	3.64E+04	3.44E+04	3.64E+04	3.64E+04	3.44E+04
u239	1.66E-08	3.18E-07	3.18E-07	3.18E-07	3.18E-07	1.06E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.53E-12	8.53E-12	8.57E-12	8.58E-12	8.59E-12	8.59E-12
np236m	1.94E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.93E-12
np236	1.20E-09	1.29E-09	1.39E-09	1.49E-09	1.59E-09	1.59E-09
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.52E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.51E-06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 38
power= 4.000E-03mw, burnup=1.1688E+01mwd flux= 2.71E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	2374.3 d	2536.9 d	2739.5 d	2922.2 d	2922.2 d
np239	4.83E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.51E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.58E-15	9.33E-15	9.33E-15	9.33E-15	9.33E-15	2.67E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
     pu236   8.62E-10  8.90E-10  9.15E-10  9.37E-10  9.57E-10  9.57E-10
     pu237   1.06E-14  1.14E-14  1.23E-14  1.31E-14  1.40E-14  1.40E-14
     pu238   1.10E-03  1.18E-03  1.27E-03  1.36E-03  1.45E-03  1.45E-03
     pu239   3.06E-02  3.31E-02  3.56E-02  3.82E-02  4.07E-02  4.07E-02
     pu240   9.06E-07  1.06E-06  1.23E-06  1.41E-06  1.60E-06  1.60E-06
     pu241   3.39E-11  4.28E-11  5.30E-11  6.47E-11  7.79E-11  7.79E-11
     pu242   4.12E-16  5.66E-16  7.55E-16  9.90E-16  1.27E-15  1.27E-15
     pu243   6.66E-25  1.19E-24  1.59E-24  2.08E-24  2.68E-24  2.05E-24
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.71E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

         cross-section data taken from position number  1 of library on unit 15.

         pass   5
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ****************************************************************************
         *                                                                          *
         *            prelim lwr origen-s binary working library--id = 1143         *
         *          made from modified card-image origen-s libraries of scale 4.2   *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                          *
         *       neutron flux spectrum factors and cross sections were produced from *
         *      the "pressa2" case updating all nuclides on the scale "burnup" library *
         *                                                                          *
         *                   fission product yields are from endf/b-v               *
         *                                                                          *
         *              photon libraries use an 18-energy-group structure           *
         *             the photon data are from the master photon data base,        *
         *              produced to include bremsstrahlung from uo2 matrix          *
         *                                                                          *
         *        see information above this box (if present) for later updates     *
         *                                                                          *
         ****************************************************************************
         *                                                                          *
0        ****************************************************************************
0                 .other identification and sizes of library.
```

```
0                 data set name:  ft15f001
0               8/28/1996    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7993    number of nonzero off-diagonal matrix elements
0       ********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   39
        power=    .00mw, burnup=     15.mwd, flux= 2.70E+08n/cm**2-sec
0                                                 basis =
0    (note, k-infinities, elad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        3104.9 d        3287.5 d        3470.1 d        3652.7 d
     productions  1.138387E+06  1.138390E+06  1.138394E+06  1.138398E+06  1.138402E+06
     absorptions  9.269936E+05  9.269993E+05  9.270060E+05  9.270122E+05  9.270183E+05
     k infinity   1.228041E+00  1.228037E+00  1.228033E+00  1.228029E+00  1.228025E+00
0                 initial        3104.9 d        3287.5 d        3470.1 d        3652.7 d
     actinide
     absorptions  9.237744E+05  9.237767E+05  9.237790E+05  9.237813E+05  9.237836E+05
     non-actinide
     abs. frac.   3.472745E-03  3.476918E-03  3.481090E-03  3.485322E-03  3.489256E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products      page   40
0                                  fraction of total absorption rate
        power=    .00mw, burnup=     15.mwd, flux= 2.70E+08n/cm**2-sec
0                initial  3104.9 d  3287.5 d  3470.1 d  3652.7 d

     sm149      5.94E-05  6.31E-05  6.67E-05  7.04E-05  7.41E-05
     sm151      2.44E-06  2.59E-06  2.73E-06  2.88E-06  3.03E-06
     xe135      2.30E-06  2.34E-06  2.34E-06  2.34E-06  2.34E-06
     nd143      1.19E-06  1.26E-06  1.34E-06  1.41E-06  1.49E-06
     gd157      6.05E-07  6.42E-07  6.80E-07  7.17E-07  7.54E-07
     rh103      5.40E-07  5.75E-07  6.09E-07  6.44E-07  6.78E-07
     cd113      5.18E-07  5.50E-07  5.82E-07  6.14E-07  6.47E-07
     gd155      3.32E-07  3.68E-07  4.04E-07  4.41E-07  4.80E-07
     xe131      3.74E-07  3.97E-07  4.20E-07  4.44E-07  4.67E-07
     cs133      2.90E-07  3.08E-07  3.26E-07  3.44E-07  3.63E-07
     tc 99      2.13E-07  2.27E-07  2.40E-07  2.53E-07  2.67E-07
     pm147      2.38E-07  2.42E-07  2.46E-07  2.49E-07  2.52E-07
     nd145      1.46E-07  1.77E-07  1.87E-07  1.97E-07  2.08E-07
     sm147      1.26E-07  1.38E-07  1.50E-07  1.63E-07  1.75E-07
     mo 95      1.09E-07  1.17E-07  1.24E-07  1.31E-07  1.38E-07
     eu155      1.10E-07  1.13E-07  1.16E-07  1.19E-07  1.22E-07
     sm152      8.75E-08  9.29E-08  9.84E-08  1.04E-07  1.09E-07
     kr 83      7.24E-08  7.69E-08  8.15E-08  8.60E-08  9.05E-08
     eu151      5.61E-08  6.33E-08  7.09E-08  7.89E-08  8.73E-08
     cs135      6.55E-08  6.96E-08  7.37E-08  7.78E-08  8.19E-08
     ru101      5.06E-08  5.38E-08  5.70E-08  6.01E-08  6.33E-08
     pr141      4.84E-08  5.15E-08  5.45E-08  5.76E-08  6.07E-08
     eu153      4.45E-08  4.72E-08  5.00E-08  5.28E-08  5.56E-08
     la139      4.02E-08  4.27E-08  4.53E-08  4.78E-08  5.03E-08
     pd105      1.69E-08  1.80E-08  1.90E-08  2.01E-08  2.11E-08
     sr 93      1.62E-08  1.72E-08  1.82E-08  1.93E-08  2.03E-08
      i129      1.25E-08  1.32E-08  1.40E-08  1.48E-08  1.56E-08
     nd144      1.04E-08  1.12E-08  1.19E-08  1.27E-08  1.34E-08
     mo 97      9.11E-09  9.68E-09  1.02E-08  1.08E-08  1.14E-08
     rh105      8.34E-09  8.37E-09  8.37E-09  8.37E-09  8.37E-09
     ag109      6.31E-09  6.71E-09  7.10E-09  7.49E-09  7.89E-09
     zr 91      4.18E-09  4.46E-09  4.73E-09  4.98E-09  5.25E-09
      y 89      4.03E-09  4.29E-09  4.54E-09  4.80E-09  5.06E-09
     ru102      3.71E-09  3.95E-09  4.18E-09  4.41E-09  4.64E-09
```

ce142	3.35E-09	3.56E-09	3.77E-09	3.98E-09	4.19E-09
nd148	3.21E-09	3.41E-09	3.62E-09	3.82E-09	4.02E-09
sr 90	3.09E-09	3.26E-09	3.43E-09	3.60E-09	3.77E-09
nd146	2.70E-09	2.87E-09	3.04E-09	3.21E-09	3.38E-09
ba138	2.31E-09	2.45E-09	2.60E-09	2.74E-09	2.89E-09
in115	2.21E-09	2.35E-09	2.49E-09	2.62E-09	2.76E-09
ce140	2.15E-09	2.28E-09	2.42E-09	2.55E-09	2.69E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
pd108	2.14E-09	2.28E-09	2.41E-09	2.54E-09	2.68E-09
ba137	1.68E-09	1.89E-09	2.11E-09	2.34E-09	2.56E-09
xe132	1.93E-09	2.05E-09	2.17E-09	2.29E-09	2.41E-09
sb133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
mo 98	1.33E-09	1.41E-09	1.49E-09	1.58E-09	1.66E-09
mo100	1.29E-09	1.37E-09	1.45E-09	1.53E-09	1.61E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 41

0 fraction of total absorption rate

0 power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec

	initial	3104.9 d	3287.5 d	3470.1 d	3652.7 d
pd107	1.28E-09	1.36E-09	1.44E-09	1.52E-09	1.60E-09
xe134	1.28E-09	1.35E-09	1.43E-09	1.51E-09	1.59E-09
zr 92	1.04E-09	1.10E-09	1.17E-09	1.23E-09	1.29E-09
i127	8.24E-10	8.76E-10	9.29E-10	9.81E-10	1.03E-09
zr 96	8.05E-10	8.56E-10	9.06E-10	9.56E-10	1.01E-09
ru104	7.92E-10	8.41E-10	8.91E-10	9.40E-10	9.90E-10
pm149	9.73E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10
nd150	7.10E-10	7.55E-10	7.99E-10	8.44E-10	8.88E-10
xe136	6.89E-10	7.32E-10	7.75E-10	8.18E-10	8.62E-10
cs137	4.37E-10	6.73E-10	7.09E-10	7.44E-10	7.79E-10
sm150	4.99E-10	5.43E-10	6.31E-10	7.03E-10	7.78E-10
br 81	3.15E-10	5.47E-10	5.80E-10	6.12E-10	6.44E-10
ce144	4.04E-10	4.04E-10	4.04E-10	4.04E-10	4.04E-10
sr 94	4.36E-10	4.63E-10	4.90E-10	5.17E-10	5.45E-10
rb 85	4.20E-10	4.47E-10	4.75E-10	5.03E-10	5.31E-10
cd111	3.35E-10	3.56E-10	3.77E-10	3.98E-10	4.19E-10
te130	3.13E-10	3.33E-10	3.53E-10	3.72E-10	3.92E-10
sm154	3.03E-10	3.22E-10	3.41E-10	3.60E-10	3.79E-10
rb 87	2.91E-10	3.09E-10	3.28E-10	3.46E-10	3.64E-10
ru103	2.58E-10	2.58E-10	2.58E-10	2.58E-10	2.58E-10
kr 85	2.53E-10	2.44E-10	2.55E-10	2.65E-10	2.75E-10
se 77	2.08E-10	2.21E-10	2.34E-10	2.47E-10	2.60E-10
kr 84	1.37E-10	1.46E-10	1.54E-10	1.63E-10	1.71E-10
sr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
pd106	1.20E-10	1.29E-10	1.38E-10	1.47E-10	1.56E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
se 79	1.07E-10	1.13E-10	1.20E-10	1.27E-10	1.33E-10
sb121	1.00E-10	1.06E-10	1.12E-10	1.19E-10	1.25E-10
pm151	1.06E-10	1.13E-10	1.11E-10	1.11E-10	1.11E-10
sb123	8.12E-11	8.63E-11	9.14E-11	9.65E-11	1.02E-10
kr 86	7.70E-11	8.18E-11	8.66E-11	9.14E-11	9.62E-11
te128	6.83E-11	7.25E-11	7.68E-11	8.11E-11	8.53E-11
gd156	5.22E-11	5.55E-11	5.88E-11	6.21E-11	6.54E-11
se 80	4.96E-11	5.28E-11	5.59E-11	5.90E-11	6.21E-11
sr 90	3.75E-11	4.22E-11	4.71E-11	5.23E-11	5.77E-11
dy161	4.24E-11	4.61E-11	4.82E-11	5.16E-11	5.43E-11
ba140	4.74E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11

tb159	2.90E-11	3.08E-11	3.27E-11	3.43E-11	3.63E-11
li 6	2.83E-11	3.00E-11	3.18E-11	3.36E-11	3.53E-11
cd112	2.80E-11	2.98E-11	3.15E-11	3.32E-11	3.50E-11
eu156	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
te125	2.44E-11	2.67E-11	2.91E-11	3.16E-11	3.40E-11
sr 89	3.10E-11	3.10E-11	3.10E-11	3.10E-11	3.10E-11
sn117	2.22E-11	2.36E-11	2.50E-11	2.64E-11	2.78E-11
ru106	2.50E-11	2.51E-11	2.51E-11	2.51E-11	2.51E-11
kr 87	2.22E-12	2.32E-11	2.32E-11	2.32E-11	2.32E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 42
0 fraction of total absorption rate
power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec
0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d

sn119	1.83E-11	1.93E-11	2.06E-11	2.18E-11	2.29E-11
sn115	1.68E-11	1.78E-11	1.89E-11	1.99E-11	2.10E-11
sr 88	1.41E-11	1.50E-11	1.59E-11	1.68E-11	1.77E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sb125	1.29E-11	1.32E-11	1.34E-11	1.36E-11	1.37E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
eu154	9.20E-12	1.00E-11	1.09E-11	1.18E-11	1.27E-11
pd110	9.95E-12	1.06E-11	1.12E-11	1.18E-11	1.24E-11
cd114	9.48E-12	1.03E-11	1.09E-11	1.15E-11	1.21E-11
se 82	9.40E-12	1.02E-11	1.08E-11	1.14E-11	1.20E-11
gd158	9.18E-12	9.77E-12	1.04E-11	1.09E-11	1.15E-11
sn126	7.69E-12	8.17E-12	8.65E-12	9.14E-12	9.62E-12
se 78	7.25E-12	7.70E-12	8.16E-12	8.67E-12	9.06E-12
pm148m	8.34E-12	8.49E-12	8.63E-12	8.76E-12	8.84E-12
te127m	7.37E-12	7.36E-12	7.37E-12	7.37E-12	7.37E-12
sn124	5.79E-12	6.15E-12	6.51E-12	6.87E-12	7.23E-12
dy162	5.53E-12	5.90E-12	6.24E-12	6.59E-12	6.93E-12
i131	6.77E-12	6.79E-12	6.79E-12	6.79E-12	6.79E-12
dy164	5.07E-12	5.39E-12	5.70E-12	6.02E-12	6.34E-12
as 75	4.32E-12	4.59E-12	4.86E-12	5.13E-12	5.40E-12
y 90	2.94E-12	3.10E-12	3.27E-12	3.43E-12	3.59E-12
eu152	1.87E-12	2.22E-12	2.62E-12	3.06E-12	3.46E-12
sn118	2.36E-12	2.50E-12	2.65E-12	2.80E-12	2.95E-12
ba136	2.29E-12	2.43E-12	2.57E-12	2.72E-12	2.86E-12
sn122	2.01E-12	2.14E-12	2.26E-12	2.39E-12	2.52E-12
cd116	2.01E-12	2.13E-12	2.26E-12	2.38E-12	2.51E-12
se134	1.85E-12	1.98E-12	2.11E-12	2.24E-12	2.37E-12
ru 99	1.54E-12	1.66E-12	1.79E-12	1.92E-12	2.06E-12
sn120	1.50E-12	1.60E-12	1.69E-12	1.78E-12	1.88E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
kr 82	1.27E-12	1.35E-12	1.43E-12	1.51E-12	1.59E-12
dy163	1.23E-12	1.30E-12	1.38E-12	1.46E-12	1.53E-12
ge 73	1.18E-12	1.25E-12	1.33E-12	1.40E-12	1.48E-12
xe130	7.83E-13	8.33E-13	8.82E-13	9.32E-13	9.81E-13
in113	5.60E-13	6.27E-13	6.94E-13	7.71E-13	8.48E-13
mo 96	5.55E-13	5.90E-13	6.26E-13	6.62E-13	6.97E-13
ge 76	4.39E-13	4.55E-13	4.82E-13	5.09E-13	5.36E-13
pm148	3.21E-13	3.29E-13	3.34E-13	3.38E-13	3.42E-13
gd160	2.69E-13	2.86E-13	3.02E-13	3.19E-13	3.36E-13
ag111	3.14E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.73E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13
te126	2.09E-13	2.22E-13	2.35E-13	2.48E-13	2.61E-13
ru100	1.83E-13	1.99E-13	2.16E-13	2.34E-13	2.52E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
gd152	1.10E-13	1.32E-13	1.57E-13	1.85E-13	2.16E-13

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     gd154     8.21E-14  9.48E-14  1.09E-13  1.24E-13  1.40E-13
     sm148     9.06E-14  1.01E-13  1.12E-13  1.23E-13  1.34E-13
     ho165     8.44E-14  8.97E-14  9.50E-14  1.00E-13  1.06E-13
1    ass2h: far-field crit based on b&w 15x15  3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   43
0                                  fraction of total absorption rate
         power=     .00mw, burnup=     15.mwd, flux= 2.70E+08n/cm**2-sec
0                 initial  3104.9 d  3287.5 d  3470.1 d  3652.7 d

     nd142     5.41E-14  6.11E-14  6.85E-14  7.64E-14  8.46E-14
     ba135     4.76E-14  5.34E-14  5.95E-14  6.60E-14  7.28E-14
     ba134     4.10E-14  4.67E-14  5.28E-14  5.93E-14  6.62E-14
     sr 87     4.93E-14  5.24E-14  5.54E-14  5.85E-14  6.16E-14
     te124     4.87E-14  5.19E-14  5.50E-14  5.81E-14  6.13E-14
     cs136     5.54E-14  5.56E-14  5.56E-14  5.57E-14  5.57E-14
     pd104     3.41E-14  3.85E-14  4.32E-14  4.82E-14  5.35E-14
     nb 94     2.78E-14  2.96E-14  3.13E-14  3.31E-14  3.48E-14
     ge 74     2.39E-14  2.54E-14  2.69E-14  2.84E-14  2.99E-14
     ru105     2.25E-14  2.94E-14  2.94E-14  2.94E-14  2.94E-14
     sn125     2.90E-14  2.92E-14  2.92E-14  2.92E-14  2.92E-14
     ge 72     1.60E-14  1.70E-14  1.80E-14  1.90E-14  2.00E-14
     sr 86     1.39E-14  1.48E-14  1.57E-14  1.66E-14  1.75E-14
     rb 85     8.90E-15  1.30E-14  1.30E-14  1.30E-14  1.30E-14
     se 76     9.32E-15  9.90E-15  1.05E-14  1.11E-14  1.17E-14
      i135     8.35E-15  1.02E-14  1.02E-14  1.02E-14  1.02E-14
     sn123     1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te132     9.45E-15  9.61E-15  9.61E-15  9.61E-15  9.61E-15
     cd110     6.25E-15  6.96E-15  7.70E-15  8.47E-15  9.29E-15
     te134     5.74E-16  5.90E-15  5.90E-15  5.90E-15  5.90E-15
     br 79     3.50E-15  3.95E-15  4.43E-15  4.93E-15  5.46E-15
     xe128     2.40E-15  2.56E-15  2.73E-15  2.89E-15  3.06E-15
     xe129     1.95E-15  2.21E-15  2.47E-15  2.76E-15  3.05E-15
     sb126     3.02E-15  3.03E-15  3.03E-15  3.03E-15  3.03E-15
     ag107     1.83E-15  2.07E-15  2.32E-15  2.58E-15  2.84E-15
     er166     2.24E-15  2.38E-15  2.52E-15  2.67E-15  2.81E-15
     dy160     1.96E-15  2.11E-15  2.25E-15  2.40E-15  2.55E-15
     sb124     2.11E-15  2.11E-15  2.11E-15  2.11E-15  2.11E-15
     in117m    1.85E-15  2.11E-15  2.11E-15  2.11E-15  2.11E-15
     nb 93     7.56E-16  8.08E-16  8.66E-15  1.23E-15  1.43E-15
     kr 80     6.69E-16  7.11E-16  7.53E-16  7.95E-16  8.37E-16
      i130     6.55E-16  7.27E-16  7.28E-16  7.29E-16  7.29E-16
     in117     5.30E-16  6.19E-16  6.19E-16  6.19E-16  6.19E-16
     tb160     3.80E-16  3.85E-16  3.90E-16  3.96E-16  4.01E-16
     rb 86     2.45E-16  2.46E-16  2.46E-16  2.46E-16  2.46E-16
     dy165     1.23E-16  2.12E-16  2.12E-16  2.13E-16  2.13E-16
     te122     1.17E-16  1.27E-16  1.36E-16  1.46E-16  1.56E-16
     sn116     9.79E-17  1.09E-16  1.20E-16  1.33E-16  1.45E-16
     cd118     2.48E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16
     ge 75     5.42E-17  8.72E-17  8.72E-17  8.72E-17  8.72E-17
     pr142     5.17E-17  5.90E-17  6.24E-17  6.59E-17  6.94E-17
     be  9     5.31E-17  5.64E-17  5.98E-17  6.31E-17  6.64E-17
     te123     4.56E-17  4.86E-17  5.16E-17  5.46E-17  5.76E-17
     in119m    4.22E-19  5.03E-17  5.03E-17  5.03E-17  5.03E-17
     li  7     2.18E-17  2.31E-17  2.45E-17  2.59E-17  2.72E-17
     er167     9.13E-18  9.74E-18  1.03E-17  1.09E-17  1.16E-17
     in119     1.62E-21  2.37E-18  2.37E-18  2.37E-18  2.37E-18
     cd108     4.48E-19  4.77E-19  5.06E-19  5.35E-19  5.63E-19
     as134m    2.38E-19  4.33E-19  4.58E-19  4.84E-19  5.09E-19
1    ass2h: far-field crit based on b&w 15x15  3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   44
0                                  fraction of total absorption rate
         power=     .00mw, burnup=     15.mwd, flux= 2.70E+08n/cm**2-sec
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0              initial  3104.9 d  3287.5 d  3470.1 d  3652.7 d

   cd109      1.95E-19  1.96E-19  1.98E-19  1.99E-19  2.00E-19
   sn114      8.38E-21  9.40E-21  1.03E-20  1.12E-20  1.22E-20
   ag110      2.03E-23  9.36E-21  9.88E-21  1.04E-20  1.09E-20
   in120       .00E+00  3.98E-22  3.98E-22  3.98E-22  3.98E-22
   in120m      .00E+00  4.28E-23  4.28E-23  4.28E-23  4.29E-23
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page  45
     power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge  3104.9 d  3287.5 d  3470.1 d  3652.7 d
    h  1    6.89E-07  7.31E-07  7.74E-07  8.16E-07  8.59E-07
    h  2    2.04E-09  2.17E-09  2.29E-09  2.42E-09  2.55E-09
    h  3    1.20E-11  1.26E-11  1.32E-11  1.37E-11  1.43E-11
    h  4     .00E+00  5.14E-35  5.37E-35  5.59E-35  5.81E-35
   he  3    2.93E-12  3.28E-12  3.64E-12  4.02E-12  4.41E-12
   he  4    1.14E-07  1.21E-07  1.28E-07  1.35E-07  1.42E-07
   he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   ne 20    1.37E-08  1.45E-08  1.54E-08  1.62E-08  1.70E-08
   ne 21    3.48E-15  3.90E-15  4.35E-15  4.81E-15  5.30E-15
   ne 22    5.26E-11  5.75E-11  6.25E-11  6.75E-11  7.27E-11
   ne 23    7.03E-30  7.03E-15  7.03E-15  7.03E-15  7.03E-15
   na 22    3.66E-11  3.72E-11  3.77E-11  3.82E-11  3.86E-11
   na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
   na 24    2.53E-08  2.74E-08  2.74E-08  2.74E-08  2.74E-08
   na 24m   4.55E-30  4.51E-15  4.51E-15  4.51E-15  4.51E-15
   na 25    4.82E-43  4.64E-28  4.92E-28  5.19E-28  5.47E-28
   mg 24    1.03E-04  1.08E-04  1.14E-04  1.20E-04  1.26E-04
   mg 25    1.53E-11  1.63E-11  1.73E-11  1.82E-11  1.92E-11
   mg 26    2.04E-09  2.17E-09  2.29E-09  2.42E-09  2.55E-09
   mg 27    4.94E-16  2.10E-12  2.10E-12  2.10E-12  2.10E-12
   mg 28    4.03E-24  4.29E-24  4.29E-24  4.29E-24  4.29E-24
   al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
   al 28    2.80E-25  2.03E-10  2.03E-10  2.03E-10  2.03E-10
   al 29    4.34E-33  9.29E-28  1.03E-27  1.15E-27  1.26E-27
   al 30     .00E+00  1.51E-40  1.78E-40  2.08E-40  2.42E-40
   si 28    2.98E-04  3.16E-04  3.31E-04  3.47E-04  3.64E-04
   si 29    3.25E-12  3.64E-12  4.04E-12  4.49E-12  4.95E-12
   si 30    3.71E-20  4.43E-20  5.23E-20  6.12E-20  7.10E-20
   si 31    1.41E-32  3.18E-32  3.76E-32  4.40E-32  5.10E-32
   si 32    3.85E-40  4.89E-40  6.11E-40  7.53E-40  9.22E-40
 totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
8  flux               2.70E+08  2.70E+08  2.70E+08  2.70E+08
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides             page  46
     power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
8                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge  3104.9 d  3287.5 d  3470.1 d  3652.7 d
   he  4    4.37E-04  4.89E-04  5.21E-04  5.44E-04  5.67E-04
   pb206    4.00E-13  5.15E-13  6.53E-13  8.18E-13  1.01E-12
   pb207    4.08E-11  4.89E-11  5.79E-11  6.79E-11  7.90E-11
   pb208    1.82E-11  2.22E-11  2.66E-11  3.15E-11  3.69E-11
   pb209    8.78E-17  9.86E-17  1.11E-16  1.24E-16  1.37E-16
   pb210    8.14E-12  9.72E-12  1.15E-11  1.35E-11  1.57E-11
   pb211    1.39E-15  1.54E-15  1.75E-15  1.94E-15  2.14E-15
   pb212    1.29E-14  1.46E-14  1.64E-14  1.82E-14  2.01E-14
   pb214    2.32E-16  2.70E-16  3.03E-16  3.37E-16  3.73E-16
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ra222	3.40E-28	3.72E-28	4.05E-28	4.39E-28	4.73E-28
ra223	6.34E-13	7.13E-13	7.96E-13	8.83E-13	9.74E-13
ra224	1.07E-13	1.21E-13	1.35E-13	1.50E-13	1.66E-13
ra225	9.53E-15	1.08E-14	1.21E-14	1.35E-14	1.50E-14
ra226	7.51E-09	8.48E-09	9.50E-09	1.06E-08	1.17E-08
ra228	6.06E-15	6.72E-15	7.41E-15	8.12E-15	8.85E-15
ac225	6.44E-15	7.28E-15	8.17E-15	9.12E-15	1.01E-14
ac227	4.48E-10	5.03E-10	5.61E-10	6.22E-10	6.86E-10
ac228	7.39E-19	8.21E-19	9.05E-19	9.91E-19	1.08E-18
th226	1.66E-26	1.82E-26	1.98E-26	2.14E-26	2.31E-26
th227	1.02E-12	1.15E-12	1.28E-12	1.42E-12	1.57E-12
th228	2.03E-11	2.29E-11	2.57E-11	2.86E-11	3.15E-11
th229	1.85E-09	2.09E-09	2.35E-09	2.62E-09	2.91E-09
th230	2.04E-04	2.17E-04	2.30E-04	2.43E-04	2.55E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	4.13E-05	4.39E-05	4.65E-05	4.91E-05	5.16E-05
th233	1.05E-17	4.02E-16	4.26E-16	4.50E-16	4.73E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.75E-06	6.11E-06	4.47E-06	6.83E-06	7.19E-06
pa232	9.48E-14	1.05E-13	1.11E-13	1.17E-13	1.24E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.60E-23	1.76E-23	1.92E-23	2.08E-23	2.24E-23
u231	8.05E-20	8.66E-20	9.18E-20	9.69E-20	1.02E-19
u232	1.26E-09	1.38E-09	1.50E-09	1.63E-09	1.75E-09
u233	1.08E-04	1.15E-04	1.21E-04	1.28E-04	1.35E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.07E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06
u238	3.44E+04	3.44E+04	3.44E+04	3.44E+04	3.44E+04
u239	1.06E-08	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.39E-12	8.40E-12	8.40E-12	8.40E-12	8.40E-12
np236m	1.03E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.39E-09	1.48E-09	1.78E-09	1.88E-09	1.97E-09
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06

1 ses2h: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 47

0 power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	3104.9 d	3287.5 d	3470.1 d	3652.7 d
np239	4.51E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.57E-15	9.32E-15	9.32E-15	9.32E-15	9.32E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	9.57E-10	9.74E-10	9.89E-10	1.00E-09	1.01E-09
pu237	1.40E-14	1.48E-14	1.57E-14	1.65E-14	1.74E-14
pu238	1.43E-03	1.53E-03	1.62E-03	1.71E-03	1.79E-03
pu239	4.07E-02	4.32E-02	4.57E-02	4.82E-02	5.07E-02
pu240	1.60E-06	1.81E-06	2.03E-06	2.26E-06	2.50E-06
pu241	7.72E-11	9.28E-11	1.09E-10	1.28E-10	1.48E-10
pu242	1.27E-15	1.62E-15	2.02E-15	2.50E-15	3.05E-15
pu243	2.05E-24	3.40E-24	4.25E-24	5.25E-24	6.42E-24
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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    pu245     .00E+00    .00E+00    .00E+00    .00E+00    .00E+00
    pu246     .00E+00    .00E+00    .00E+00    .00E+00    .00E+00
  totals     3.73E+04   3.73E+04   3.73E+04   3.73E+04   3.73E+04
0   flux                2.70E+08   2.70E+08   2.70E+08   2.70E+08
0 .results on logical unit no. 71, position  1, for time step  4, subcase 6. (run position 1, case position 1)
  title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   48
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                   nuclide concentrations, grams
                                                    basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    h  1    8.59E-07   8.59E-07   8.59E-07   8.59E-07   8.59E-07   8.59E-07   8.59E-07
    he  4   5.68E-07   5.68E-07   5.68E-07   5.68E-07   5.68E-07   5.68E-07   5.68E-07
    na 23   1.73E+05   1.73E+05   1.73E+05   1.73E+05   1.73E+05   1.73E+05   1.73E+05
    mg 24   3.01E-03   3.01E-03   3.01E-03   3.01E-03   3.01E-03   3.01E-03   3.01E-03
    al 27   1.35E+06   1.35E+06   1.35E+06   1.35E+06   1.35E+06   1.35E+06   1.35E+06
    si 28   1.02E-02   1.02E-02   1.02E-02   1.02E-02   1.02E-02   1.02E-02   1.02E-02
  total     1.52E+06   1.52E+06   1.52E+06   1.52E+06   1.52E+06   1.52E+06   1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   49
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                   element radioactivity, curies
                                                    basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na      8.39E+00   4.25E-06   3.46E-06   2.73E-06   2.18E-06   1.75E-06   1.40E-06
  totals    2.55E+01   4.64E-06   3.78E-06   3.08E-06   2.53E-06   2.08E-06   1.71E-06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   50
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                   element thermal power, watts
                                                    basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na      1.70E-01   4.01E-08   4.01E-08   3.86E-08   3.09E-08   2.47E-08   1.98E-08
  totals    4.76E-01   4.01E-08   4.02E-08   3.86E-08   3.09E-08   2.47E-08   1.98E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   51
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                   nuclide gamma power, watts
                                                    basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na 22   6.90E-08   5.52E-08   4.42E-08   3.54E-08   2.84E-08   2.27E-08   1.82E-08
  total     3.31E-01   5.52E-08   4.42E-08   3.54E-08   2.84E-08   2.27E-08   1.82E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page   52
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0                                                   nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    he  4   5.87E-04   6.42E-04   6.97E-04   7.52E-04   8.07E-04   8.62E-04   9.17E-04
   th230    2.55E-04   2.77E-04   2.98E-04   3.19E-04   3.41E-04   3.62E-04   3.83E-04
   th232    5.16E-05   5.59E-05   6.02E-05   6.45E-05   6.88E-05   7.31E-05   7.75E-05
   th234    5.37E-07   5.37E-07   5.37E-07   5.37E-07   5.37E-07   5.37E-07   5.37E-07
   pa231    7.19E-06   7.79E-06   8.40E-06   9.00E-06   9.60E-06   1.02E-05   1.08E-05
   pa233    1.46E-06   1.46E-06   1.46E-06   1.46E-06   1.46E-06   1.46E-06   1.46E-06
    u233    1.35E-04   1.48E-04   1.61E-04   1.74E-04   1.86E-04   1.99E-04   2.12E-04
    u234    9.06E+00   9.06E+00   9.06E+00   9.06E+00   9.06E+00   9.06E+00   9.06E+00
    u235    7.30E+02   7.30E+02   7.30E+02   7.30E+02   7.30E+02   7.30E+02   7.30E+02
    u236    1.74E+02   1.74E+02   1.74E+02   1.74E+02   1.74E+02   1.74E+02   1.74E+02
    u238    3.44E+04   3.44E+04   3.44E+04   3.44E+04   3.44E+04   3.44E+04   3.44E+04
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np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu238	1.79E-03	1.78E-03	1.77E-03	1.76E-03	1.75E-03	1.74E-03	1.73E-03
pu239	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02
pu240	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 53
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	5.87E-04	6.42E-04	6.97E-04	7.52E-04	8.07E-04	8.62E-04	9.17E-04
th	3.88E-04	3.93E-04	3.99E-04	3.84E-04	4.10E-04	4.36E-04	4.61E-04
pa	8.65E-06	9.25E-06	9.85E-06	1.05E-05	1.11E-05	1.17E-05	1.23E-05
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 54
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.35E-03	2.57E-03	2.79E-03	3.01E-03	3.23E-03	3.45E-03	3.67E-03
ra226	2.65E-06	3.11E-06	3.61E-06	4.14E-06	4.71E-06	5.32E-06	5.96E-06
th229	6.66E-07	7.84E-07	9.13E-07	1.05E-06	1.20E-06	1.36E-06	1.53E-06
th230	5.88E-02	6.37E-02	6.85E-02	7.34E-02	7.83E-02	8.32E-02	8.81E-02
th231	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07
th232	1.20E-02	1.30E-02	1.40E-02	1.50E-02	1.60E-02	1.70E-02	1.80E-02
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.66E-03	1.80E-03	1.94E-03	2.08E-03	2.22E-03	2.36E-03	2.50E-03
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u232	4.07E-07	4.46E-07	4.77E-07	5.01E-07	5.20E-07	5.35E-07	5.46E-07
u233	3.15E-02	3.45E-02	3.75E-02	4.04E-02	4.34E-02	4.64E-02	4.94E-02
u234	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03
u235	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05
u236	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06
np237	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu238	4.27E-01	4.24E-01	4.22E-01	4.19E-01	4.16E-01	4.13E-01	4.11E-01
pu239	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
pu240	6.00E-04	6.00E-04	5.99E-04	5.99E-04	5.99E-04	5.99E-04	5.99E-04
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 55
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.35E-03	2.57E-03	2.79E-03	3.01E-03	3.23E-03	3.45E-03	3.67E-03
ra	2.65E-06	3.11E-06	3.61E-06	4.14E-06	4.71E-06	5.32E-06	5.96E-06
th	7.09E-02	7.68E-02	8.27E-02	8.85E-02	9.44E-02	1.00E-01	1.06E-01
pa	2.00E-03	2.14E-03	2.28E-03	2.42E-03	2.56E-03	2.70E-03	2.84E-03
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.25E+01	1.26E+01	1.26E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 56

decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.17E-05	2.41E-05
tl208	2.13E-06	2.46E-06	2.78E-06	3.07E-06	3.33E-06	3.56E-06	3.76E-06
pb210	2.51E-07	3.17E-07	3.94E-07	4.82E-07	5.81E-07	6.93E-07	8.17E-07
pb211	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
pb212	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
pb214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
bi210	2.51E-07	3.18E-07	3.94E-07	4.82E-07	5.81E-07	6.93E-07	8.18E-07
bi211	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
bi212	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
bi214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
po210	2.12E-07	2.71E-07	3.40E-07	4.20E-07	5.10E-07	6.13E-07	7.27E-07
po212	5.79E-06	6.38E-06	6.95E-06	5.47E-06	5.94E-06	6.35E-06	6.70E-06
po214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
po215	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
po216	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
po218	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
rn219	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
rn220	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
rn222	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
ra223	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
ra224	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
ra226	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
ac227	1.13E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.17E-05	2.41E-05
th227	1.10E-05	1.30E-05	1.49E-05	1.70E-05	1.92E-05	2.15E-05	2.39E-05
th228	5.89E-06	6.82E-06	7.70E-06	8.52E-06	9.24E-06	9.87E-06	1.04E-05
th230	1.21E-03	1.31E-03	1.41E-03	1.51E-03	1.62E-03	1.72E-03	1.82E-03
th231	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	7.85E-05	8.51E-05	9.16E-05	9.82E-05	1.05E-04	1.11E-04	1.18E-04
pa233	7.04E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03
u232	8.98E-06	9.84E-06	1.05E-05	1.11E-05	1.15E-05	1.18E-05	1.21E-05
u233	3.03E-04	3.32E-04	3.61E-04	3.90E-04	4.19E-04	4.48E-04	4.76E-04
u234	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
u235	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
u236	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np237	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00
pu236	1.25E-04	1.03E-04	8.41E-05	6.89E-05	5.65E-05	4.63E-05	3.79E-05
pu238	7.31E+00	7.27E+00	7.22E+00	7.18E+00	7.13E+00	7.08E+00	7.04E+00
pu239	7.52E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01
pu240	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04
pu241	3.69E-06	3.54E-06	3.40E-06	3.27E-06	3.14E-06	3.02E-06	2.90E-06
total	5.29E+03	4.74E+01	4.74E+01	4.73E+01	4.73E+01	4.73E+01	4.72E+01

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sas2h: far-field crit based on b4y 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	8.25E-08	9.62E-08	1.09E-07	1.23E-07	1.35E-07	1.47E-07	1.59E-07
pb	5.42E-08	4.37E-08	7.31E-08	8.29E-08	9.30E-08	1.03E-07	1.14E-07
bi	5.78E-07	6.80E-07	7.80E-07	8.85E-07	9.93E-07	1.10E-06	1.22E-06
po	1.17E-06	1.37E-06	1.57E-06	1.77E-06	1.98E-06	2.18E-06	2.39E-06
at	5.64E-09	6.63E-09	7.72E-09	8.90E-09	1.02E-08	1.15E-08	1.30E-08

rn	7.73E-07	9.07E-07	1.04E-06	1.17E-06	1.31E-06	1.43E-06	1.60E-06
fr	5.48E-09	6.44E-09	7.49E-09	8.63E-09	9.85E-09	1.12E-08	1.26E-08
ra	6.75E-07	7.91E-07	9.06E-07	1.02E-06	1.14E-06	1.27E-06	1.39E-06
ac	1.01E-08	1.18E-08	1.36E-08	1.56E-08	1.77E-08	1.99E-08	2.23E-08
th	1.64E-03	1.65E-03	1.65E-03	1.65E-03	1.66E-03	1.66E-03	1.66E-03
pa	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02	3.22E-02
u	7.55E+00	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01
np	7.11E+00	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01
pu	2.66E-01	2.66E-01	2.63E-01	2.61E-01	2.60E-01	2.59E-01	2.57E-01
totals	1.50E+01	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 58
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide gamma power, watts
basis: single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl208	4.23E-08	4.90E-08	5.53E-08	6.12E-08	6.64E-08	7.10E-08	7.49E-08
pb211	4.46E-09	5.27E-09	6.06E-09	6.90E-09	7.79E-09	8.72E-09	9.70E-09
pb212	5.08E-09	5.88E-09	6.66E-09	7.35E-09	7.97E-09	8.52E-09	8.99E-09
pb214	3.88E-09	4.56E-09	5.29E-09	6.07E-09	6.90E-09	7.79E-09	8.73E-09
bi211	3.09E-09	3.65E-09	4.19E-09	4.78E-09	5.39E-09	6.04E-09	6.71E-09
bi212	3.69E-09	4.27E-09	4.82E-09	5.33E-09	5.78E-09	6.18E-09	6.52E-09
bi214	2.34E-08	2.75E-08	3.19E-08	3.66E-08	4.16E-08	4.70E-08	5.27E-08
rn219	3.70E-09	4.36E-09	5.02E-09	5.71E-09	6.45E-09	7.22E-09	8.03E-09
ra223	8.87E-09	1.05E-08	1.20E-08	1.37E-08	1.55E-08	1.73E-08	1.93E-08
th227	7.21E-09	8.53E-09	9.81E-09	1.12E-08	1.26E-08	1.41E-08	1.57E-08
th230	1.21E-08	1.31E-08	1.41E-08	1.51E-08	1.61E-08	1.71E-08	1.81E-08
th231	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05	6.82E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	1.86E-08	2.02E-08	2.17E-08	2.33E-08	2.48E-08	2.64E-08	2.80E-08
pa233	9.33E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03
pa234m	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04
pa234	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05
u234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
u235	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04
u236	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np237	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03
pu238	8.24E-05	8.19E-05	8.14E-05	8.08E-05	8.03E-05	7.98E-05	7.93E-05
pu239	3.61E-06	3.61E-06	3.61E-06	3.61E-06	3.61E-06	3.61E-06	3.61E-06
total	3.97E+00	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 59
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide concentrations, grams
basis: single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	1.65E-05	1.57E-05	1.50E-05	1.43E-05	1.37E-05	1.30E-05	1.24E-05
se 72	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06
se 73	5.53E-06	5.53E-06	5.53E-06	5.53E-06	5.53E-06	5.53E-06	5.53E-06
se 74	4.84E-06	4.84E-06	4.84E-06	4.84E-06	4.84E-06	4.84E-06	4.84E-06
se 75	5.64E-05	5.64E-05	5.64E-05	5.64E-05	5.64E-05	5.64E-05	5.64E-05
se 76	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04
se 77	4.17E-04	4.17E-04	4.17E-04	4.17E-04	4.17E-04	4.17E-04	4.17E-04
se 78	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
se 79	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03
se 80	6.79E-03	6.79E-03	6.79E-03	6.79E-03	6.79E-03	6.79E-03	6.79E-03
br 81	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02
se 82	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02
kr 82	3.25E-06	3.25E-06	3.25E-06	3.25E-06	3.25E-06	3.25E-06	3.25E-06

kr 83	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02
kr 84	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
kr 85	1.07E-02	1.02E-02	9.64E-03	9.14E-03	8.66E-03	8.20E-03	7.77E-03
rb 85	5.71E-02	5.77E-02	5.82E-02	5.87E-02	5.92E-02	5.96E-02	6.01E-02
kr 86	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
rb 87	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
sr 88	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
y 89	2.76E-01	2.81E-01	2.81E-01	2.81E-01	2.81E-01	2.81E-01	2.81E-01
sr 90	3.04E-01	2.98E-01	2.92E-01	2.86E-01	2.80E-01	2.74E-01	2.69E-01
y 90	7.90E-05	7.74E-05	7.59E-05	7.43E-05	7.28E-05	7.13E-05	6.99E-05
zr 90	3.89E-02	4.51E-02	5.12E-02	5.71E-02	6.29E-02	6.86E-02	7.42E-02
zr 91	3.43E-01	3.51E-01	3.51E-01	3.51E-01	3.51E-01	3.51E-01	3.51E-01
zr 92	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01
zr 93	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01
nb 93m	5.05E-07	5.82E-07	6.56E-07	7.28E-07	7.98E-07	8.64E-07	9.29E-07
zr 94	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01
mo 95	3.84E-01	4.01E-01	4.02E-01	4.02E-01	4.02E-01	4.02E-01	4.02E-01
zr 96	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01	3.94E-01
mo 96	3.50E-05	3.50E-05	3.50E-05	3.50E-05	3.50E-05	3.50E-05	3.50E-05
mo 97	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01	3.58E-01
mo 98	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01
tc 99	3.96E-01	3.96E-01	3.96E-01	3.96E-01	3.96E-01	3.96E-01	3.96E-01
ru 99	1.94E-05	2.05E-05	2.15E-05	2.26E-05	2.37E-05	2.48E-05	2.59E-05
mo100	4.10E-01	4.10E-01	4.10E-01	4.10E-01	4.10E-01	4.10E-01	4.10E-01
ru100	3.68E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06	3.68E-06
ru101	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01
ru102	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01
rh103	2.09E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
ru104	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01
pd104	4.54E-06	4.54E-06	4.54E-06	4.54E-06	4.54E-06	4.54E-06	4.54E-06
pd105	7.34E-02	7.34E-02	7.34E-02	7.34E-02	7.34E-02	7.34E-02	7.34E-02
ru106	4.77E-03	2.71E-03	1.53E-03	8.69E-04	4.93E-04	2.79E-04	1.58E-04
pd106	2.78E-02	2.99E-02	3.11E-02	3.17E-02	3.21E-02	3.23E-02	3.24E-02
pd107	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02
pd108	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
ag109	2.99E-03	3.00E-03	3.00E-03	3.00E-03	3.00E-03	3.00E-03	3.00E-03
pd110	2.43E-03	2.43E-03	2.43E-03	2.43E-03	2.43E-03	2.43E-03	2.43E-03
cd111	1.60E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03
cd112	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03

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sas2h: for-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 60
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis weingle reactor assembly

	initial	304.6 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
cd113	1.27E-03	1.27E-03	1.27E-03	1.27E-03	1.27E-03	1.27E-03	1.27E-03
cd113m	1.47E-05	1.41E-05	1.54E-05	1.48E-05	1.42E-05	1.36E-05	1.31E-05
in113	4.43E-06	5.12E-06	5.76E-06	6.38E-06	6.98E-06	7.55E-06	8.09E-06
cd114	1.12E-03	1.12E-03	1.12E-03	1.12E-03	1.12E-03	1.12E-03	1.12E-03
in115	8.52E-04	8.53E-04	8.53E-04	8.53E-04	8.53E-04	8.53E-04	8.53E-04
sn115	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05
cd116	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03
sn117	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04	8.93E-04
sn118	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04
sn119	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
sn120	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
sn121m	6.29E-06	6.22E-06	6.16E-06	6.09E-06	6.03E-06	5.97E-06	5.91E-06
sb121	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
sn122	1.28E-03	1.28E-03	1.28E-03	1.28E-03	1.28E-03	1.28E-03	1.28E-03
sb123	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03

sn124	2.15E-03	2.15E-03	2.15E-03	2.15E-03	2.15E-03	2.15E-03	2.15E-03
te124	9.58E-07	9.79E-07	9.80E-07	9.80E-07	9.80E-07	9.80E-07	9.80E-07
sb125	8.94E-04	7.26E-04	5.88E-04	4.76E-04	3.85E-04	3.11E-04	2.52E-04
te125	1.56E-03	1.73E-03	1.87E-03	1.99E-03	2.08E-03	2.15E-03	2.21E-03
te125m	1.19E-05	1.03E-05	8.35E-06	6.76E-06	5.47E-06	4.42E-06	3.58E-06
sn126	3.54E-03	3.54E-03	3.54E-03	3.54E-03	3.54E-03	3.54E-03	3.54E-03
te126	2.06E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.08E-05	2.08E-05
i127	1.03E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02
te128	2.99E-02	2.99E-02	2.99E-02	2.99E-02	2.99E-02	2.99E-02	2.99E-02
i129	6.41E-02	6.42E-02	6.42E-02	6.42E-02	6.42E-02	6.42E-02	6.42E-02
te130	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
xe130	1.81E-05	1.81E-05	1.81E-05	1.81E-05	1.81E-05	1.81E-05	1.81E-05
xe131	2.48E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
xe132	3.74E-01	3.75E-01	3.75E-01	3.75E-01	3.75E-01	3.75E-01	3.75E-01
cs133	5.83E-01	5.85E-01	5.85E-01	5.85E-01	5.85E-01	5.85E-01	5.85E-01
xe134	6.87E-01	6.87E-01	6.87E-01	6.87E-01	6.87E-01	6.87E-01	6.87E-01
ba134	2.62E-06	3.02E-06	3.33E-06	3.56E-06	3.74E-06	3.87E-06	3.97E-06
cs135	3.79E-01	3.79E-01	3.79E-01	3.79E-01	3.79E-01	3.79E-01	3.79E-01
ba135	9.61E-07	1.11E-06	1.25E-06	1.40E-06	1.54E-06	1.69E-06	1.83E-06
xe136	5.63E-01	5.63E-01	5.63E-01	5.63E-01	5.63E-01	5.63E-01	5.63E-01
ba136	4.75E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04
cs137	5.83E-01	6.94E-01	6.84E-01	4.75E-01	4.66E-01	4.57E-01	4.49E-01
ba137	6.05E-02	7.01E-02	7.95E-02	8.87E-02	9.78E-02	1.07E-01	1.15E-01
ba138	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
la138	3.03E-06	3.03E-06	3.03E-06	3.03E-06	3.03E-06	3.03E-06	3.03E-06
la139	5.78E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01
ce140	5.75E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01	5.78E-01
pr141	5.28E-01	5.35E-01	5.35E-01	5.35E-01	5.35E-01	5.35E-01	5.35E-01
ce142	5.44E-01	5.44E-01	5.44E-01	5.44E-01	5.44E-01	5.44E-01	5.44E-01
nd142	5.71E-07	5.72E-07	5.72E-07	5.72E-07	5.72E-07	5.72E-07	5.72E-07
nd143	5.51E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01
ce144	5.79E-02	2.76E-02	1.32E-02	6.28E-03	2.99E-03	1.43E-03	6.81E-04
nd144	4.56E-01	4.86E-01	5.01E-01	5.08E-01	5.11E-01	5.13E-01	5.13E-01
nd145	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01
nd146	2.86E-01	2.86E-01	2.86E-01	2.86E-01	2.86E-01	2.86E-01	2.86E-01
pm147	7.65E-02	6.21E-02	4.98E-02	4.00E-02	3.21E-02	2.57E-02	2.07E-02
sm147	1.42E-01	1.57E-01	1.69E-01	1.79E-01	1.87E-01	1.93E-01	1.98E-01

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 61
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
nd148	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
sm148	4.73E-06	4.78E-06	4.78E-06	4.78E-06	4.78E-06	4.78E-06	4.78E-06
sm149	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01
nd150	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02
sm150	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04
sm151	4.10E-02	4.07E-02	4.05E-02	4.02E-02	4.00E-02	3.97E-02	3.95E-02
eu151	1.60E-03	1.86E-03	2.12E-03	2.38E-03	2.64E-03	2.89E-03	3.15E-03
sm152	2.73E-02	2.73E-02	2.73E-02	2.73E-02	2.73E-02	2.73E-02	2.73E-02
eu153	1.70E-02	1.70E-02	1.70E-02	1.70E-02	1.70E-02	1.70E-02	1.70E-02
sm154	7.86E-03	7.86E-03	7.86E-03	7.86E-03	7.86E-03	7.86E-03	7.86E-03
eu155	1.87E-03	1.65E-03	1.46E-03	1.29E-03	1.14E-03	1.01E-03	8.90E-04
gd155	1.71E-03	1.93E-03	2.12E-03	2.29E-03	2.44E-03	2.57E-03	2.69E-03
gd156	1.55E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03
gd157	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04	7.32E-04
gd158	3.57E-04	3.57E-04	3.57E-04	3.57E-04	3.57E-04	3.57E-04	3.57E-04
tb159	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04
gd160	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05	4.29E-05

dy161	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05
dy162	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06
dy163	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06
total	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	1.59E-01	1.52E-01	1.45E-01	1.38E-01	1.32E-01	1.26E-01	1.20E-01
se 79	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05
kr 85	4.22E+00	3.99E+00	3.78E+00	3.59E+00	3.40E+00	3.22E+00	3.05E+00
sr 90	4.29E+01	4.21E+01	4.12E+01	4.04E+01	3.95E+01	3.87E+01	3.80E+01
y 90	4.29E+01	4.21E+01	4.12E+01	4.04E+01	3.96E+01	3.88E+01	3.80E+01
y 91	1.98E+02	5.43E+00	1.47E-01	4.00E-03	1.09E-04	2.95E-06	8.02E-08
zr 93	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04
nb 93m	1.20E-04	1.39E-04	1.57E-04	1.74E-04	1.90E-04	2.06E-04	2.21E-04
zr 95	2.18E+02	8.09E+00	3.00E-01	1.11E-02	4.11E-04	1.52E-05	5.64E-07
nb 95	2.18E+02	1.72E+01	6.98E-01	2.44E-02	9.05E-04	3.35E-05	1.24E-06
tc 99	6.77E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03
rh102	7.21E-06	5.91E-06	4.84E-06	3.97E-06	3.25E-06	2.66E-06	2.18E-06
ru106	1.58E+01	8.97E+00	5.08E+00	2.88E+00	1.63E+00	9.26E-01	5.25E-01
rh106	1.58E+01	8.97E+00	5.08E+00	2.88E+00	1.63E+00	9.26E-01	5.25E-01
pd107	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06
cd113m	3.76E-03	3.61E-03	3.46E-03	3.32E-03	3.19E-03	3.06E-03	2.94E-03
sn119m	1.53E-03	7.43E-04	3.62E-04	1.76E-04	8.57E-05	4.17E-05	2.03E-05
sn121	4.68E-01	2.60E-04	2.57E-04	2.54E-04	2.51E-04	2.49E-04	2.46E-04
sn121m	3.38E-04	3.34E-04	3.31E-04	3.27E-04	3.24E-04	3.21E-04	3.17E-04
sn123	9.81E-02	1.14E-02	2.22E-03	4.33E-04	8.45E-05	1.65E-05	3.22E-06
sb125	9.37E-01	7.41E-01	6.16E-01	4.98E-01	4.03E-01	3.26E-01	2.64E-01
te125m	2.15E-01	1.85E-01	1.50E-01	1.22E-01	9.85E-02	7.97E-02	6.45E-02
sn126	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
sb126	3.87E-03	1.41E-05	1.41E-05	1.41E-05	1.41E-05	1.41E-05	1.41E-05
sb126m	5.40E-03	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
te127	4.19E+00	1.07E-01	1.54E-02	2.23E-03	3.21E-04	4.64E-05	6.69E-06
te127m	7.28E-01	1.09E-01	1.57E-02	2.27E-03	3.28E-04	4.73E-05	6.83E-06
i129	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
cs134	2.14E-03	1.63E-03	1.23E-03	9.30E-04	7.03E-04	5.31E-04	4.01E-04
cs135	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04
cs137	4.38E+01	4.30E+01	4.22E+01	4.14E+01	4.06E+01	3.98E+01	3.90E+01
ba137m	4.14E+01	4.06E+01	3.98E+01	3.91E+01	3.83E+01	3.76E+01	3.69E+01
ce144	1.84E+02	8.79E+01	4.19E+01	2.00E+01	9.53E+00	4.55E+00	2.17E+00
pr144	1.84E+02	8.79E+01	4.19E+01	2.00E+01	9.53E+00	4.55E+00	2.17E+00
pr144m	2.58E+00	1.23E+00	5.87E-01	2.80E-01	1.33E-01	6.36E-02	3.04E-02
pm147	7.09E+01	5.76E+01	4.62E+01	3.71E+01	2.98E+01	2.39E+01	1.92E+01
sm151	1.02E+00	1.07E+00	1.07E+00	1.04E+00	1.05E+00	1.05E+00	1.04E+00
eu152	5.90E-05	5.45E-05	5.41E-05	5.18E-05	4.96E-05	4.75E-05	4.55E-05
eu154	1.67E-04	1.56E-04	1.46E-04	1.36E-04	1.28E-04	1.19E-04	1.12E-04
eu155	9.20E-01	8.13E-01	7.19E-01	6.35E-01	5.61E-01	4.96E-01	4.39E-01
total	2.01E+04	4.62E+02	3.13E+02	2.50E+02	2.16E+02	1.95E+02	1.81E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 63
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	3.37E-06	5.13E-06	4.89E-06	4.67E-06	4.45E-06	4.25E-06	4.06E-06
se	3.33E+00	9.00E-09	9.00E-09	9.00E-09	9.00E-09	9.00E-09	9.00E-09
kr	1.30E+01	5.99E-03	5.68E-03	5.38E-03	5.10E-03	4.83E-03	4.58E-03

sr	2.00E+01	5.75E-02	4.80E-02	4.69E-02	4.59E-02	4.50E-02	4.41E-02
y	2.74E+01	2.52E-01	2.29E-01	2.24E-01	2.19E-01	2.15E-01	2.10E-01
zr	1.20E+01	4.08E-02	1.51E-03	5.40E-05	2.14E-06	1.49E-07	7.53E-08
nb	2.13E+01	8.25E-02	3.16E-03	1.17E-04	4.38E-06	1.97E-07	4.42E-08
tc	6.47E+00	3.40E-06	3.40E-06	3.40E-06	3.40E-06	3.40E-06	3.40E-06
ru	7.87E-01	2.17E-03	5.10E-04	1.71E-04	9.71E-05	5.51E-05	3.12E-05
rh	3.77E-01	8.61E-02	4.87E-02	2.76E-02	1.57E-02	8.88E-03	5.03E-03
cd	6.85E-02	4.48E-06	3.77E-06	3.62E-06	3.47E-06	3.33E-06	3.20E-06
sn	1.87E+00	3.63E-05	7.52E-06	1.65E-06	7.12E-07	4.74E-07	4.19E-07
sb	7.51E+00	2.41E-03	1.05E-03	1.58E-03	1.28E-03	1.03E-03	8.37E-04
te	9.30E+00	3.96E-04	1.56E-04	1.07E-04	8.35E-05	6.72E-05	5.63E-05
i	2.88E+01	5.31E-09	5.31E-09	5.31E-09	5.31E-09	5.31E-09	5.31E-09
cs	1.81E+01	4.78E-02	4.69E-02	4.60E-02	4.51E-02	4.42E-02	4.34E-02
ba	1.14E+01	1.59E-01	1.56E-01	1.53E-01	1.50E-01	1.48E-01	1.45E-01
ce	4.41E+00	5.79E-02	2.74E-02	1.31E-02	6.24E-03	2.97E-03	1.42E-03
pr	6.24E+00	6.45E-01	3.08E-01	1.47E-01	7.00E-02	3.34E-02	1.59E-02
pm	3.37E-01	2.11E-02	1.70E-02	1.36E-02	1.09E-02	8.77E-03	7.03E-03
sm	2.01E-02	1.26E-04	1.25E-04	1.25E-04	1.24E-04	1.23E-04	1.22E-04
eu	8.73E-03	6.34E-04	5.60E-04	4.95E-04	4.38E-04	3.87E-04	3.42E-04
totals	2.39E+02	1.46E+00	8.94E-01	6.79E-01	5.70E-01	5.12E-01	4.78E-01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 64
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	5.57E-05	5.28E-05	5.00E-05	4.74E-05	4.49E-05	4.26E-05	4.03E-05
y 90	4.33E-07	4.24E-07	4.15E-07	4.07E-07	3.99E-07	3.90E-07	3.83E-07
zr 95	9.47E-01	3.51E-02	1.30E-03	4.82E-05	1.78E-06	4.61E-08	2.45E-09
nb 95	9.89E-01	7.79E-02	2.98E-03	1.11E-04	4.10E-06	1.52E-07	5.63E-09
rh102	9.23E-08	7.56E-08	4.20E-08	5.08E-08	4.16E-08	3.41E-08	2.79E-08
rh106	1.93E-02	1.10E-02	6.21E-03	3.52E-03	1.99E-03	1.13E-03	6.41E-04
sn121m	1.80E-08	9.91E-09	9.81E-09	9.70E-09	9.60E-09	9.50E-09	9.40E-09
sb125	2.41E-03	1.96E-03	1.58E-03	1.28E-03	1.04E-03	8.40E-04	6.80E-04
te125m	4.53E-05	3.91E-05	3.17E-05	2.57E-05	2.08E-05	1.68E-05	1.36E-05
sn126	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08
sb126	4.31E-05	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07
sb126m	4.97E-05	9.27E-07	9.27E-07	9.27E-07	9.27E-07	9.27E-07	9.27E-07
cs134	1.99E-05	1.30E-05	1.13E-05	8.58E-06	6.48E-06	4.90E-06	3.70E-06
ba137m	1.47E-01	1.44E-01	1.41E-01	1.39E-01	1.36E-01	1.33E-01	1.31E-01
ce144	2.07E-02	9.89E-03	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr144	3.16E-02	1.51E-02	7.18E-03	3.42E-03	1.63E-03	7.79E-04	3.71E-04
pr144m	1.91E-04	9.11E-05	4.35E-05	2.07E-05	9.89E-06	4.72E-06	2.25E-06
pm147	1.84E-06	1.50E-06	1.20E-06	9.63E-07	7.73E-07	6.20E-07	4.97E-07
sm151	9.08E-08	9.03E-08	8.97E-08	8.91E-08	8.85E-08	8.80E-08	8.74E-08
eu152	4.06E-07	3.89E-07	3.73E-07	3.57E-07	3.42E-07	3.27E-07	3.13E-07
eu154	1.24E-06	1.16E-06	1.08E-06	1.01E-06	9.48E-07	8.87E-07	8.29E-07
eu155	3.53E-04	3.12E-04	2.76E-04	2.44E-04	2.15E-04	1.90E-04	1.68E-04
total	1.28E+02	2.97E-01	1.66E-01	1.30E-01	1.42E-01	1.37E-01	1.33E-01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 65
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
0

element gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	5.28E-05	5.00E-05	4.74E-05	4.49E-05	4.26E-05	4.03E-05
y	9.80E+00	1.18E-04	3.58E-06	4.93E-07	4.81E-07	3.91E-07	3.83E-07
zr	4.83E+00	3.51E-02	1.30E-03	4.82E-05	1.78E-06	4.61E-08	2.45E-09
nb	9.13E+00	7.79E-02	2.98E-03	1.11E-04	4.11E-06	1.55E-07	8.28E-09
rh	1.05E-01	1.10E-02	6.21E-03	3.52E-03	1.99E-03	1.13E-03	6.41E-04

sn	1.23E+00	6.03E-07	2.83E-07	1.17E-07	9.67E-08	9.08E-08	8.88E-08
sb	5.16E+00	1.96E-03	1.59E-03	1.28E-03	1.04E-03	8.41E-04	6.81E-04
te	5.57E+00	5.34E-05	3.32E-05	2.59E-05	2.08E-05	1.68E-05	1.36E-05
es	8.75E+00	1.50E-05	1.15E-05	8.58E-06	6.48E-06	4.90E-06	3.70E-06
ba	4.85E+00	1.44E-01	1.41E-01	1.39E-01	1.36E-01	1.33E-01	1.31E-01
ce	2.88E+00	1.00E-02	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr	1.80E+00	1.51E-02	7.22E-03	3.45E-03	1.64E-03	7.84E-04	3.74E-04
pm	8.53E-02	1.55E-06	1.20E-06	9.63E-07	7.73E-07	6.20E-07	4.97E-07
sm	4.44E-03	9.03E-08	8.97E-08	8.91E-08	8.85E-08	8.80E-08	8.74E-08
eu	5.40E-03	3.13E-04	2.77E-04	2.45E-04	2.17E-04	1.92E-04	1.69E-04
totals	1.28E+02	2.97E-01	1.66E-01	1.50E-01	1.42E-01	1.37E-01	1.33E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 15.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	time after discharge 608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	5.14E+11	5.17E+04	4.14E+04	3.32E+04	2.66E+04	2.13E+04	1.70E+04
3.00E-02	1.69E+11	1.65E+04	1.32E+04	1.06E+04	8.46E+03	6.77E+03	5.43E+03
5.50E-02	1.18E+11	1.11E+04	8.91E+03	7.13E+03	5.71E+03	4.58E+03	3.66E+03
8.50E-02	6.89E+10	6.26E+03	5.01E+03	4.01E+03	3.22E+03	2.58E+03	2.06E+03
1.20E-01	4.90E+10	4.28E+03	3.43E+03	2.74E+03	2.20E+03	1.76E+03	1.41E+03
1.70E-01	5.12E+10	4.20E+03	3.36E+03	2.69E+03	2.16E+03	1.73E+03	1.38E+03
3.00E-01	5.87E+10	4.18E+03	3.35E+03	2.68E+03	2.15E+03	1.72E+03	1.38E+03
6.50E-01	2.89E+10	2.23E+05	1.79E+05	1.43E+05	1.15E+05	9.19E+04	7.36E+04
1.13E+00	4.97E+09	1.78E+05	1.43E+05	1.14E+05	9.14E+04	7.32E+04	5.87E+04
1.58E+00	9.03E+11	4.44E-01	3.57E-01	2.86E-01	2.29E-01	1.83E-01	1.47E-01
2.00E+00	1.79E+08	3.96E-02	3.18E-02	2.54E-02	2.04E-02	1.63E-02	1.31E-02
2.40E+00	3.62E+07	8.89E-03	7.12E-03	5.70E-03	4.57E-03	3.66E-03	2.93E-03
2.80E+00	2.13E+11	1.39E-04	1.11E-04	8.93E-05	7.15E-05	5.73E-05	4.59E-05
3.25E+00	1.35E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.82E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.63E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.10E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.18E+12	5.00E+05	4.00E+05	3.20E+05	2.57E+05	2.06E+05	1.65E+05
mev/sec	2.10E+12	3.50E+05	2.80E+05	2.25E+05	1.80E+05	1.44E+05	1.15E+05

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	time after discharge 608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.29E+06	1.29E-01	1.04E-01	8.29E-02	6.64E-02	5.32E-02	4.26E-02
3.00E-02	1.27E+06	1.23E-01	9.89E-02	7.92E-02	6.34E-02	5.08E-02	4.07E-02
5.50E-02	1.62E+06	1.53E-01	1.22E-01	9.81E-02	7.86E-02	6.29E-02	5.04E-02
8.50E-02	1.46E+06	1.33E-01	1.07E-01	8.53E-02	6.83E-02	5.47E-02	4.38E-02
1.20E-01	1.47E+06	1.28E-01	1.03E-01	8.23E-02	6.59E-02	5.28E-02	4.23E-02
1.70E-01	2.18E+06	1.79E-01	1.43E-01	1.15E-01	9.17E-02	7.35E-02	5.88E-02
3.00E-01	4.61E+06	2.13E-01	2.51E-01	2.01E-01	1.61E-01	1.29E-01	1.03E-01
6.50E-01	4.70E+06	2.63E+01	2.91E+01	2.33E+01	1.86E+01	1.49E+01	1.20E+01
1.13E+00	1.68E+06	5.01E+01	4.01E+01	3.21E+01	2.57E+01	2.06E+01	1.65E+01
1.58E+00	3.56E+08	1.76E-04	1.41E-04	1.13E-04	9.02E-05	7.22E-05	5.79E-05
2.00E+00	8.95E+04	1.98E-05	1.59E-05	1.27E-05	1.02E-05	8.16E-06	6.53E-06
2.40E+00	2.17E+04	5.33E-06	4.27E-06	3.42E-06	2.74E-06	2.19E-06	1.76E-06
2.80E+00	1.49E+08	9.74E-08	7.80E-08	6.25E-08	5.01E-08	4.01E-08	3.21E-08
3.25E+00	1.10E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

3.75E+00	1.30E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	7.87E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.51E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.25E+08	8.75E+01	7.01E+01	5.61E+01	4.50E+01	3.60E+01	2.88E+01
0 gamma watts	3.37E-01	5.61E-08	4.49E-08	3.60E-08	2.88E-08	2.31E-08	1.85E-08

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photon spectrum as a function of time for fission products

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 15.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	304.6 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	2.57E+14	4.09E+12	2.53E+12	1.83E+12	1.47E+12	1.28E+12	1.17E+12
3.00E-02	1.12E+14	1.81E+12	1.11E+12	7.88E+11	6.24E+11	5.39E+11	4.92E+11
5.50E-02	5.99E+13	9.26E+11	5.64E+11	3.97E+11	3.14E+11	2.70E+11	2.46E+11
8.50E-02	4.15E+13	5.86E+11	3.30E+11	2.40E+11	1.85E+11	1.56E+11	1.41E+11
1.20E-01	3.41E+13	7.47E+11	4.04E+11	2.42E+11	1.62E+11	1.23E+11	1.03E+11
1.70E-01	5.67E+13	3.67E+11	2.18E+11	1.51E+11	1.17E+11	9.93E+10	8.98E+10
3.00E-01	1.10E+14	4.10E+11	2.62E+11	1.63E+11	1.24E+11	1.04E+11	9.36E+10
6.50E-01	2.25E+14	2.83E+12	1.59E+12	1.45E+12	1.38E+12	1.34E+12	1.30E+12
1.13E+00	7.81E+13	3.94E+10	2.18E+10	1.33E+10	8.99E+09	6.76E+09	5.58E+09
1.58E+00	4.04E+13	1.73E+10	8.72E+09	4.56E+09	2.53E+09	1.53E+09	1.04E+09
2.00E+00	1.23E+13	2.93E+10	1.40E+10	6.74E+09	3.25E+09	1.58E+09	7.75E+08
2.40E+00	1.06E+13	8.16E+08	3.25E+08	1.72E+08	9.22E+07	4.96E+07	2.69E+07
2.80E+00	4.23E+12	8.00E+07	4.34E+07	2.37E+07	1.30E+07	7.14E+06	3.93E+06
3.25E+00	2.48E+12	1.00E+07	5.68E+06	3.22E+06	1.82E+06	1.03E+06	5.86E+05
3.75E+00	1.26E+12	4.42E+03	2.50E+03	1.42E+03	8.05E+02	4.56E+02	2.59E+02
4.25E+00	1.40E+12	1.84E-08	1.89E-08	1.92E-08	1.94E-08	1.96E-08	1.97E-08
4.75E+00	4.09E+11	9.34E-09	9.50E-09	9.63E-09	9.73E-09	9.81E-09	9.87E-09
5.50E+00	3.84E+11	6.93E-09	7.05E-09	7.14E-09	7.22E-09	7.28E-09	7.32E-09
0 total	1.04E+15	1.18E+13	7.06E+12	5.28E+12	4.39E+12	3.92E+12	3.63E+12
0 mev/sec	4.41E+14	2.44E+12	1.38E+12	1.17E+12	1.06E+12	1.00E+12	9.61E+11

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.6 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	6.42E+08	1.02E+07	6.33E+06	4.56E+06	3.67E+06	3.20E+06	2.94E+06
3.00E-02	8.42E+08	1.36E+07	8.35E+06	5.91E+06	4.68E+06	4.04E+06	3.69E+06
5.50E-02	8.24E+08	1.27E+07	7.76E+06	5.46E+06	4.31E+06	3.71E+06	3.38E+06
8.50E-02	8.82E+08	1.24E+07	7.03E+06	5.10E+06	3.93E+06	3.32E+06	2.99E+06
1.20E-01	1.02E+09	2.24E+07	1.21E+07	7.25E+06	4.87E+06	3.70E+06	3.10E+06
1.70E-01	2.32E+09	1.56E+07	9.27E+06	6.40E+06	4.96E+06	4.22E+06	3.82E+06
3.00E-01	8.23E+09	3.07E+07	1.92E+07	1.23E+07	9.33E+06	7.82E+06	7.02E+06
6.50E-01	3.65E+10	4.59E+08	2.58E+08	2.35E+08	2.24E+08	2.17E+08	2.11E+08
1.13E+00	2.20E+10	1.11E+07	6.14E+06	3.74E+06	2.53E+06	1.90E+06	1.57E+06
1.58E+00	1.59E+10	6.80E+06	3.43E+06	1.80E+06	9.97E+05	6.04E+05	4.08E+05
2.00E+00	6.14E+09	1.46E+07	7.01E+06	3.37E+06	1.62E+06	7.89E+05	3.88E+05
2.40E+00	6.37E+09	2.49E+05	1.95E+05	1.03E+05	5.33E+04	2.98E+04	1.61E+04
2.80E+00	2.96E+09	5.60E+04	3.04E+04	1.66E+04	9.08E+03	5.00E+03	2.76E+03
3.25E+00	2.01E+09	6.14E+03	4.61E+03	2.62E+03	1.48E+03	8.40E+02	4.76E+02
3.75E+00	1.18E+09	4.14E+00	2.35E+00	1.33E+00	7.54E-01	4.28E-01	2.42E-01
4.25E+00	1.48E+09	1.98E-11	2.01E-11	2.04E-11	2.06E-11	2.08E-11	2.09E-11
4.75E+00	4.85E+08	1.11E-11	1.13E-11	1.14E-11	1.14E-11	1.16E-11	1.17E-11
5.50E+00	4.18E+08	9.53E-12	9.69E-12	9.82E-12	9.92E-12	1.00E-11	1.01E-11
0 total	1.10E+11	6.10E+08	3.45E+08	2.91E+08	2.65E+08	2.50E+08	2.40E+08

0 gamma watts 7.07E+01 3.91E-01 2.21E-01 1.87E-01 1.70E-01 1.60E-01 1.54E-01

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0 principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (1.28E+12) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	2.22E+10	2.11E+10	2.00E+10	1.89E+10	1.79E+10	1.70E+10	1.61E+10
sr 90	1.75E+11	1.71E+11	1.68E+11	1.64E+11	1.61E+11	1.58E+11	1.55E+11
y 90	8.60E+11	8.42E+11	8.25E+11	8.08E+11	7.92E+11	7.76E+11	7.60E+11
rh106	4.71E+11	2.67E+11	1.51E+11	8.58E+10	4.86E+10	2.76E+10	1.56E+10
cs137	1.55E+11	1.52E+11	1.49E+11	1.46E+11	1.43E+11	1.40E+11	1.38E+11
ba137m	7.25E+09	7.11E+09	6.98E+09	6.84E+09	6.71E+09	6.59E+09	6.46E+09
ce144	3.53E+11	1.69E+11	8.07E+10	3.85E+10	1.83E+10	8.75E+09	4.17E+09
pr144	4.70E+12	2.24E+12	1.07E+12	5.10E+11	2.43E+11	1.16E+11	5.53E+10
pm147	8.24E+10	6.69E+10	5.37E+10	4.31E+10	3.46E+10	2.77E+10	2.23E+10
eu155	2.43E+09	2.15E+09	1.90E+09	1.68E+09	1.49E+09	1.31E+09	1.16E+09

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (5.39E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	6.48E+09	6.14E+09	5.82E+09	5.51E+09	5.23E+09	4.95E+09	4.69E+09
sr 90	4.94E+10	4.84E+10	4.74E+10	4.65E+10	4.55E+10	4.46E+10	4.37E+10
y 90	2.80E+11	2.74E+11	2.69E+11	2.63E+11	2.58E+11	2.53E+11	2.48E+11
rh106	1.57E+11	8.91E+10	5.05E+10	2.86E+10	1.62E+10	9.20E+09	5.22E+09
sb125	1.72E+10	1.40E+10	1.13E+10	9.15E+09	7.40E+09	5.99E+09	4.85E+09
te125m	9.19E+09	7.94E+09	6.44E+09	5.21E+09	4.22E+09	3.41E+09	2.76E+09
cs137	4.31E+10	4.23E+10	4.14E+10	4.07E+10	3.99E+10	3.91E+10	3.84E+10
ba137m	1.25E+11	1.22E+11	1.20E+11	1.18E+11	1.15E+11	1.13E+11	1.11E+11
ce144	8.23E+11	3.93E+11	1.87E+11	8.93E+10	4.26E+10	2.03E+10	9.69E+09
pr144	1.55E+12	7.62E+11	3.54E+11	1.49E+11	8.04E+10	3.84E+10	1.83E+10
pr144m	3.18E+10	1.81E+10	7.22E+09	3.44E+09	1.64E+09	7.83E+08	3.74E+08
pm147	1.81E+10	1.47E+10	1.18E+10	9.48E+09	7.60E+09	6.10E+09	4.90E+09

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (2.70E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	3.97E+09	3.77E+09	3.57E+09	3.38E+09	3.20E+09	3.04E+09	2.88E+09
sr 90	2.92E+10	2.86E+10	2.80E+10	2.75E+10	2.69E+10	2.64E+10	2.58E+10
y 90	1.94E+11	1.90E+11	1.86E+11	1.82E+11	1.78E+11	1.75E+11	1.71E+11
rh106	1.11E+11	6.31E+10	3.58E+10	2.03E+10	1.15E+10	6.52E+09	3.69E+09
cs137	2.51E+10	2.46E+10	2.41E+10	2.37E+10	2.32E+10	2.28E+10	2.23E+10
ce144	1.19E+11	5.68E+10	2.71E+10	1.29E+10	6.16E+09	2.94E+09	1.40E+09
pr144	1.09E+12	5.21E+11	2.48E+11	1.18E+11	5.65E+10	2.69E+10	1.28E+10
pm147	7.61E+09	6.18E+09	4.96E+09	3.98E+09	3.19E+09	2.56E+09	2.06E+09
eu155	7.09E+09	6.27E+09	5.54E+09	4.90E+09	4.33E+09	3.83E+09	3.38E+09

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0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (1.56E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.99E+09	1.89E+09	1.79E+09	1.69E+09	1.60E+09	1.52E+09	1.44E+09
sr 90	1.39E+10	1.36E+10	1.34E+10	1.31E+10	1.28E+10	1.26E+10	1.23E+10
y 90	1.12E+11	1.10E+11	1.07E+11	1.05E+11	1.03E+11	1.01E+11	9.90E+10
rh106	6.62E+10	3.75E+10	2.13E+10	1.21E+10	6.83E+09	3.87E+09	2.20E+09
cs137	1.17E+10	1.15E+10	1.13E+10	1.11E+10	1.09E+10	1.07E+10	1.05E+10
ce144	1.68E+11	8.02E+10	3.83E+10	1.82E+10	8.70E+09	4.15E+09	1.98E+09
pr144	6.62E+11	3.04E+11	1.46E+11	6.97E+10	3.32E+10	1.59E+10	7.56E+09
pm147	2.17E+09	1.76E+09	1.41E+09	1.13E+09	9.09E+08	7.29E+08	5.85E+08
eu155	1.88E+10	9.32E+09	8.41E+09	7.44E+09	6.57E+09	5.81E+09	5.14E+09

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (1.23E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
kr 85	1.20E+09	1.14E+09	1.08E+09	1.02E+09	9.67E+08	9.16E+08	8.68E+08
sr 90	7.93E+09	7.77E+09	7.61E+09	7.45E+09	7.30E+09	7.15E+09	7.01E+09
y 90	7.88E+10	7.72E+10	7.56E+10	7.41E+10	7.26E+10	7.11E+10	6.97E+10
rh106	4.78E+10	2.71E+10	1.54E+10	8.71E+09	4.94E+09	2.80E+09	1.59E+09
cs137	4.58E+09	6.45E+09	6.33E+09	6.21E+09	6.09E+09	5.98E+09	5.86E+09
ce144	8.25E+11	3.93E+11	1.88E+11	8.95E+10	4.27E+10	2.04E+10	9.71E+09
pr144	4.60E+11	2.19E+11	1.05E+11	4.99E+10	2.38E+10	1.13E+10	5.41E+09
pm147	4.87E+08	5.58E+08	4.48E+08	3.59E+08	2.88E+08	2.31E+08	1.86E+08
eu155	4.15E+09	5.43E+09	4.80E+09	4.25E+09	3.75E+09	3.32E+09	2.93E+09

principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (9.93E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
kr 85	9.53E+08	9.03E+08	8.56E+08	8.11E+08	7.68E+08	7.28E+08	6.90E+08
sr 90	5.65E+09	5.54E+09	5.43E+09	5.32E+09	5.21E+09	5.10E+09	5.00E+09
y 90	8.12E+10	7.96E+10	7.80E+10	7.64E+10	7.48E+10	7.33E+10	7.18E+10
rh106	5.13E+10	2.91E+10	1.65E+10	9.34E+09	5.29E+09	3.00E+09	1.70E+09
sb125	2.59E+09	2.10E+09	1.70E+09	1.38E+09	1.11E+09	9.02E+08	7.30E+08
cs137	4.65E+09	4.56E+09	4.47E+09	4.39E+09	4.30E+09	4.22E+09	4.14E+09
pr144	4.86E+11	2.32E+11	1.11E+11	5.27E+10	2.51E+10	1.20E+10	5.72E+09

principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.04E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
kr 85	5.75E+08	5.45E+08	5.17E+08	4.89E+08	4.64E+08	4.39E+08	4.16E+08
sr 90	2.56E+09	2.51E+09	2.46E+09	2.41E+09	2.36E+09	2.31E+09	2.27E+09
y 90	9.82E+10	8.84E+10	8.64E+10	8.48E+10	8.31E+10	8.14E+10	7.98E+10
rh106	6.18E+10	3.51E+10	1.99E+10	1.13E+10	6.38E+09	3.62E+09	2.05E+09
sb125	9.81E+08	7.96E+08	6.44E+08	5.22E+08	4.22E+08	3.42E+08	2.76E+08
cs137	2.35E+09	2.31E+09	2.26E+09	2.22E+09	2.18E+09	2.14E+09	2.10E+09
pr144	5.69E+11	2.71E+11	1.29E+11	6.17E+10	2.94E+10	1.40E+10	6.70E+09

principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.34E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
y 90	3.81E+10	3.74E+10	3.66E+10	3.58E+10	3.51E+10	3.44E+10	3.37E+10
rh106	1.91E+11	1.08E+11	6.13E+10	3.48E+10	1.97E+10	1.12E+10	6.33E+09
sb125	2.10E+10	1.71E+10	1.38E+10	1.12E+10	9.06E+09	7.33E+09	5.93E+09
ba137m	1.40E+12	1.37E+12	1.35E+12	1.32E+12	1.30E+12	1.27E+12	1.25E+12
pr144	3.68E+11	1.85E+11	8.83E+10	4.21E+10	2.01E+10	9.58E+09	4.57E+09

principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (6.76E+09) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
y 90	4.97E+09	4.87E+09	4.77E+09	4.68E+09	4.58E+09	4.49E+09	4.40E+09
rh106	1.78E+10	1.01E+10	5.71E+09	3.24E+09	1.84E+09	1.04E+09	5.90E+08
pr144	4.97E+10	2.37E+10	1.13E+10	5.39E+09	2.57E+09	1.23E+09	5.85E+08

principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 1.0E-03 of total group release rate (1.53E+09) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
y 90	6.35E+08	6.22E+08	6.09E+08	5.97E+08	5.85E+08	5.73E+08	5.61E+08
rh106	2.33E+09	1.90E+09	1.08E+09	6.11E+08	3.46E+08	1.96E+08	1.11E+08
pr144	5.09E+10	1.47E+10	7.03E+09	3.35E+09	1.60E+09	7.63E+08	3.64E+08

principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.58E+09) at 1521.9 d

```
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  y 90    3.80E+07  3.72E+07  3.44E+07  3.57E+07  3.50E+07  3.43E+07  3.36E+07
  rh106   1.09E+09  6.18E+08  3.50E+08  1.99E+08  1.13E+08  6.38E+07  3.62E+07
  pr144   6.00E+10  2.86E+10  1.36E+10  6.50E+09  3.10E+09  1.48E+09  7.06E+08
0                principal photon sources in group 12, photons/sec
   mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.96E+07) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   6.09E+08  3.45E+08  1.96E+08  1.11E+08  6.29E+07  3.56E+07  2.02E+07
  pr144   5.67E+08  2.70E+08  1.29E+08  6.15E+07  2.93E+07  1.40E+07  6.67E+06
1                                                                                                                page 71
0                principal photon sources in group 13, photons/sec
   mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.14E+06) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   1.03E+08  5.83E+07  3.30E+07  1.87E+07  1.06E+07  6.02E+06  3.41E+06
  pr144   4.56E+07  2.18E+07  1.04E+07  4.95E+06  2.36E+06  1.13E+06  5.37E+05
0                principal photon sources in group 14, photons/sec
   mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.03E+06) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   1.77E+07  1.00E+07  5.68E+06  3.22E+06  1.82E+06  1.03E+06  5.86E+05
0                principal photon sources in group 15, photons/sec
   mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.56E+02) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   7.79E+03  4.42E+03  2.50E+03  1.42E+03  8.05E+02  4.56E+02  2.59E+02
0                principal photon sources in group 16, photons/sec
   mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.96E-08) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   1.46E-08  1.46E-08  1.46E-08  1.46E-08  1.46E-08  1.46E-08  1.46E-08
  sm147   3.63E-09  4.02E-09  4.34E-09  4.59E-09  4.79E-09  4.96E-09  5.09E-09
0                principal photon sources in group 17, photons/sec
   mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (9.81E-09) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   7.32E-09  7.32E-09  7.32E-09  7.32E-09  7.32E-09  7.32E-09  7.32E-09
  sm147   1.82E-09  2.02E-09  2.18E-09  2.30E-09  2.40E-09  2.49E-09  2.55E-09
0                principal photon sources in group 18, photons/sec
   mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.28E-09) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   5.43E-09  5.43E-09  5.43E-09  5.43E-09  5.43E-09  5.43E-09  5.43E-09
  sm147   1.35E-09  1.50E-09  1.61E-09  1.71E-09  1.78E-09  1.84E-09  1.89E-09
1                                                                                                                page 72
          photon spectrum as a function of time for heavy metals and their daughters

0                    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gud/mtu 40% h2o/ 8% uo2
                          powers     .00 mw, burnup=     15.mwd, flux= 2.79E+08 n**2-sec
0                              actinide photon release rates, photons/sec
                             basis = single reactor assembly
0
        emean                                    time after discharge
        (mev)      initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
      1.00E-02  1.33E+14  5.89E+11  5.89E+11  5.89E+11  5.88E+11  5.88E+11  5.88E+11
      3.00E-02  8.44E+12  4.62E+10  4.62E+10  4.62E+10  4.62E+10  4.62E+10  4.62E+10
      5.50E-02  1.09E+13  2.02E+10  2.02E+10  2.02E+10  2.02E+10  2.02E+10  2.02E+10
      8.50E-02  5.26E+13  1.51E+11  1.51E+11  1.51E+11  1.51E+11  1.51E+11  1.51E+11
```

1.20E-01	5.42E+13	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10
1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
3.00E-01	2.87E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
6.50E-01	1.45E+12	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09
1.13E+00	1.86E+12	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08
1.58E+00	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08
2.00E+00	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07
2.40E+00	3.35E+04	5.42E+04	5.50E+04	5.58E+04	5.67E+04	5.77E+04	5.87E+04
2.80E+00	9.08E+04	1.02E+05	1.13E+05	1.24E+05	1.33E+05	1.40E+05	1.47E+05
3.25E+00	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.04E+04
3.75E+00	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03
4.25E+00	5.45E+03	5.44E+03	5.44E+03	5.44E+03	5.44E+03	5.44E+03	5.44E+03
4.75E+00	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03
5.50E+00	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03
0 total	2.93E+14	9.92E+11	9.92E+11	9.91E+11	9.91E+11	9.91E+11	9.91E+11
0 mev/sec	2.51E+13	7.24E+10	7.24E+10	7.24E+10	7.24E+10	7.24E+10	7.24E+10

0 actinide energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	3.33E+08	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05
8.50E-02	1.12E+09	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06
1.20E-01	1.63E+09	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05
1.70E-01	7.51E+07	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05
3.00E-01	2.15E+09	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06
6.50E-01	2.36E+08	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06
1.13E+00	5.24E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05
1.58E+00	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04
2.00E+00	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04
2.40E+00	2.01E+01	2.05E+01	2.10E+01	2.15E+01	2.20E+01	2.26E+01	2.32E+01
2.80E+00	6.36E+01	7.16E+01	7.94E+01	8.65E+01	9.28E+01	9.83E+01	1.03E+02
3.25E+00	8.38E+00	8.39E+00	8.39E+00	8.40E+00	8.40E+00	8.41E+00	8.41E+00
3.75E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00
4.25E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00
4.75E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
5.50E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00
0 total	6.27E+09	1.81E+07	1.81E+07	1.81E+07	1.81E+07	1.81E+07	1.81E+07
0 gamma watts	4.02E+00	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02

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neutron source intensity as a function of time

0 sss2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	4.08E-13	7.68E-13	9.56E-13	1.17E-12	1.41E-12	1.69E-12	1.98E-12
bi210	1.55E-10	1.96E-10	2.43E-10	2.98E-10	3.59E-10	4.28E-10	5.05E-10
bi211	1.77E-02	2.08E-02	2.40E-02	2.73E-02	3.08E-02	3.45E-02	3.84E-02
bi212	2.59E-03	3.80E-03	5.39E-03	5.75E-03	4.06E-03	4.34E-03	4.58E-03
bi213	3.06E-06	5.60E-06	4.19E-06	4.03E-06	5.51E-06	6.25E-06	7.04E-06
bi214	7.34E-07	8.62E-07	9.99E-07	1.15E-06	1.31E-06	1.47E-06	1.65E-06
po210	1.61E-04	2.06E-04	2.59E-04	3.19E-04	3.88E-04	4.66E-04	5.53E-04
po211	6.99E-05	8.25E-05	9.49E-05	1.08E-04	1.22E-04	1.37E-04	1.52E-04
po212	1.33E-02	1.54E-02	1.73E-02	1.92E-02	2.08E-02	2.22E-02	2.35E-02
po213	4.03E-04	4.75E-04	5.55E-04	6.37E-04	7.28E-04	8.25E-04	9.29E-04

po214	6.34E-03	7.68E-03	8.90E-03	1.02E-02	1.16E-02	1.31E-02	1.47E-02
po215	2.50E-02	2.95E-02	3.39E-02	3.86E-02	4.35E-02	4.88E-02	5.42E-02
po216	1.04E-02	1.20E-02	1.35E-02	1.50E-02	1.62E-02	1.74E-02	1.83E-02
po218	3.11E-03	3.65E-03	4.24E-03	4.86E-03	5.53E-03	6.24E-03	7.00E-03
at217	2.41E-04	3.08E-04	3.58E-04	4.13E-04	4.72E-04	5.35E-04	6.02E-04
rn218	2.85E-13	1.12E-17	4.41E-22	1.74E-26	.00E+00	.00E+00	.00E+00
rn219	1.98E-02	2.34E-02	2.69E-02	3.07E-02	3.44E-02	3.88E-02	4.31E-02
rn220	8.20E-03	9.49E-03	1.07E-02	1.19E-02	1.29E-02	1.37E-02	1.45E-02
rn222	2.27E-03	2.67E-03	3.09E-03	3.53E-03	4.04E-03	4.56E-03	5.11E-03
fr221	1.91E-04	2.24E-04	2.61E-04	3.01E-04	3.44E-04	3.90E-04	4.39E-04
fr223	7.61E-09	8.86E-09	1.02E-08	1.16E-08	1.31E-08	1.47E-08	1.63E-08
ra222	2.20E-13	8.67E-18	3.41E-22	1.34E-26	.00E+00	.00E+00	.00E+00
ra223	1.15E-02	1.36E-02	1.56E-02	1.78E-02	2.00E-02	2.24E-02	2.50E-02
ra224	5.80E-03	6.71E-03	7.58E-03	8.38E-03	9.09E-03	9.72E-03	1.03E-02
ra226	1.33E-03	1.56E-03	1.81E-03	2.08E-03	2.36E-03	2.67E-03	2.99E-03
ac225	1.37E-04	1.61E-04	1.88E-04	2.17E-04	2.47E-04	2.80E-04	3.16E-04
ac227	8.37E-05	9.97E-05	1.15E-04	1.31E-04	1.47E-04	1.65E-04	1.84E-04
ac228	9.62E-15	1.10E-14	1.24E-14	1.39E-14	1.54E-14	1.69E-14	1.85E-14
th226	1.99E-13	7.82E-18	3.08E-22	1.21E-26	.00E+00	.00E+00	.00E+00
th227	1.26E-02	1.50E-02	1.72E-02	1.96E-02	2.21E-02	2.48E-02	2.75E-02
th228	4.87E-03	5.44E-03	6.37E-03	7.04E-03	7.44E-03	8.17E-03	8.62E-03
th229	8.01E-05	9.43E-05	1.10E-04	1.27E-04	1.45E-04	1.64E-04	1.84E-04
th230	5.67E-01	6.14E-01	6.61E-01	7.09E-01	7.56E-01	8.03E-01	8.50E-01
th232	2.92E-07	3.17E-07	3.41E-07	3.66E-07	3.90E-07	4.14E-07	4.39E-07
pa231	4.76E-02	5.16E-02	5.56E-02	5.96E-02	6.36E-02	6.76E-02	7.15E-02
u230	1.57E-13	6.16E-18	2.42E-22	9.52E-27	.00E+00	.00E+00	.00E+00
u231	1.47E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	6.93E-03	7.59E-03	8.12E-03	8.54E-03	8.87E-03	9.12E-03	9.31E-03
u233	1.40E-01	1.76E-01	1.91E-01	2.06E-01	2.21E-01	2.37E-01	2.52E-01
u234	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03
u235	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
u236	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.41E-08	1.41E-08	8.30E-09	4.88E-09	2.86E-09	1.68E-09	9.87E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	1.29E-01	1.06E-01	8.68E-02	7.11E-02	5.83E-02	4.78E-02	3.91E-02
pu237	1.70E-09	1.39E-11	1.49E-13	1.60E-15	1.31E-17	1.25E-19	1.15E-21
pu238	6.34E+03	6.31E+03	6.26E+03	6.22E+03	6.18E+03	6.14E+03	6.10E+03

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	Initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02
pu240	9.34E-02	9.34E-02	9.34E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02
pu241	4.90E-08	4.70E-08	4.52E-08	4.34E-08	4.17E-08	4.00E-08	3.85E-08
pu242	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12
am239	1.36E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	2.34E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.31E-05	1.72E-05	2.12E-05	2.50E-05	2.86E-05	3.21E-05	3.55E-05
am242m	7.75E-13	7.71E-13	7.68E-13	7.65E-13	7.62E-13	7.59E-13	7.56E-13
am243	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.42E-16
cm241	1.24E-21	1.99E-24	3.21E-27	1.12E-30	.00E+00	.00E+00	.00E+00
cm242	9.00E-08	2.74E-08	7.49E-09	2.08E-09	7.96E-10	3.09E-10	2.77E-10
cm243	1.43E-15	1.41E-15	1.38E-15	1.35E-15	1.32E-15	1.30E-15	1.27E-15
cm244	3.03E-18	2.94E-18	2.84E-18	2.76E-18	2.67E-18	2.58E-18	2.50E-18

	cm245	7.66E-27	7.66E-27	7.66E-27	7.66E-27	7.66E-27	7.66E-27	7.66E-27
0	total	1.88E+04	1.88E+04	1.88E+04	1.87E+04	1.87E+04	1.86E+04	1.86E+04

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.45E-05	1.58E-05	1.70E-05	1.82E-05	1.94E-05	2.06E-05	2.18E-05
pa231	5.97E-06	6.47E-06	6.97E-06	7.47E-06	7.97E-06	8.47E-06	8.97E-06
u232	4.25E-07	4.66E-07	4.99E-07	5.25E-07	5.45E-07	5.60E-07	5.72E-07
u234	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
u235	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00
u236	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
u237	1.22E-09	1.75E-21	1.65E-21	1.59E-21	1.53E-21	1.47E-21	1.41E-21
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11
np238	2.02E-08	2.26E-25	2.25E-25	2.25E-25	2.24E-25	2.23E-25	2.22E-25
np239	1.98E-05	7.70E-27	7.70E-27	7.70E-27	7.70E-27	7.70E-27	7.69E-27
pu236	8.74E-03	7.17E-03	5.87E-03	4.81E-03	3.94E-03	3.23E-03	2.65E-03
pu238	1.17E+03	1.16E+03	1.16E+03	1.15E+03	1.14E+03	1.13E+03	1.13E+03
pu239	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01
pu240	4.21E-01	4.21E-01	4.21E-01	4.21E-01	4.21E-01	4.20E-01	4.20E-01
pu241	1.76E-09	1.69E-09	1.63E-09	1.56E-09	1.50E-09	1.44E-09	1.38E-09
pu242	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09
pu243	1.03E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.03E-09	6.62E-09	8.15E-09	9.61E-09	1.10E-08	1.24E-08	1.37E-08
am242m	3.68E-12	3.67E-12	3.65E-12	3.64E-12	3.62E-12	3.61E-12	3.59E-12
am242	2.09E-12	3.98E-15	3.97E-15	3.95E-15	3.93E-15	3.92E-15	3.90E-15
am243	3.42E-16	3.42E-16	3.42E-16	3.42E-16	3.42E-16	3.42E-16	3.42E-16
am244	6.89E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	4.94E-07	1.37E-07	3.84E-08	1.14E-08	3.97E-09	1.94E-09	1.38E-09
cm243	3.12E-17	3.05E-17	2.99E-17	2.93E-17	2.87E-17	2.82E-17	2.76E-17
cm244	3.95E-16	3.83E-16	3.71E-16	3.59E-16	3.48E-16	3.37E-16	3.27E-16
cm245	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27
cm246	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27
8 total	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05
9 total	1.38E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	3.649E+03	3.642E+03	3.634E+03	3.626E+03	3.618E+03	3.610E+03	3.603E+03
3	1.85E+00 - 3.00E+00	1.034E+04	1.032E+04	1.029E+04	1.027E+04	1.025E+04	1.023E+04	1.021E+04
4	1.40E+00 - 1.85E+00	2.776E+03	2.771E+03	2.765E+03	2.759E+03	2.753E+03	2.747E+03	2.741E+03
5	9.00E-01 - 1.40E+00	1.562E+03	1.559E+03	1.555E+03	1.552E+03	1.549E+03	1.545E+03	1.542E+03
6	4.00E-01 - 9.00E-01	4.536E+02	4.528E+02	4.518E+02	4.508E+02	4.498E+02	4.488E+02	4.479E+02
7	1.00E-01 - 4.00E-01	7.890E+01	7.876E+01	7.861E+01	7.845E+01	7.830E+01	7.815E+01	7.800E+01

8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.885E+04	1.881E+04	1.877E+04	1.873E+04	1.869E+04	1.865E+04	1.861E+04	

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spontaneous fission neutron source spectrum as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.267E+03	2.267E+03	2.266E+03	2.265E+03	2.263E+03	2.261E+03	2.259E+03
2	3.00E+00 - 6.43E+00	2.485E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04
3	1.85E+00 - 3.00E+00	2.708E+04	2.707E+04	2.707E+04	2.706E+04	2.705E+04	2.704E+04	2.703E+04
4	1.40E+00 - 1.85E+00	1.534E+04	1.534E+04	1.534E+04	1.535E+04	1.536E+04	1.537E+04	1.538E+04
5	9.00E-01 - 1.40E+00	2.106E+04	2.106E+04	2.106E+04	2.106E+04	2.107E+04	2.109E+04	2.110E+04
6	4.00E-01 - 9.00E-01	2.347E+04	2.346E+04	2.346E+04	2.346E+04	2.345E+04	2.344E+04	2.343E+04
7	1.00E-01 - 4.00E-01	4.633E+03	4.633E+03	4.632E+03	4.630E+03	4.626E+03	4.621E+03	4.617E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.186E+05

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time

(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.267E+03	2.267E+03	2.266E+03	2.265E+03	2.263E+03	2.261E+03	2.259E+03
2	3.00E+00 - 6.43E+00	2.849E+04	2.849E+04	2.848E+04	2.847E+04	2.846E+04	2.845E+04	2.845E+04
3	1.85E+00 - 3.00E+00	3.741E+04	3.739E+04	3.737E+04	3.734E+04	3.730E+04	3.726E+04	3.723E+04
4	1.40E+00 - 1.85E+00	1.812E+04	1.811E+04	1.811E+04	1.811E+04	1.811E+04	1.812E+04	1.812E+04
5	9.00E-01 - 1.40E+00	2.262E+04	2.262E+04	2.261E+04	2.261E+04	2.262E+04	2.263E+04	2.264E+04
6	4.00E-01 - 9.00E-01	2.392E+04	2.392E+04	2.391E+04	2.391E+04	2.390E+04	2.388E+04	2.388E+04
7	1.00E-01 - 4.00E-01	4.704E+03	4.703E+03	4.702E+03	4.700E+03	4.696E+03	4.691E+03	4.687E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.375E+05	1.375E+05	1.374E+05	1.374E+05	1.374E+05	1.373E+05	1.373E+05

0
1
1 * gamma sources determined *
0case applies the following photon data base
master photon library
in binary mode
0 the sources include photons of nuclides for...

light elements
actinides
fission products

1 gamma source spectrum for gamma lines (sas2)
0 1826.25 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

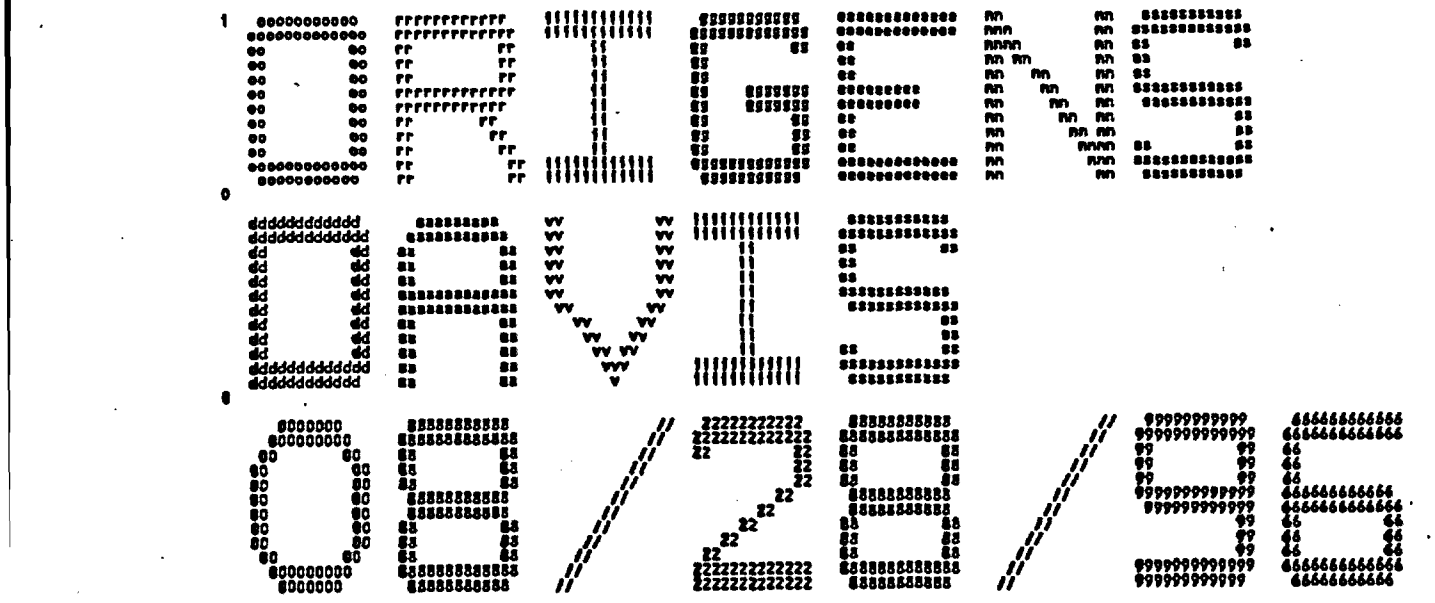
1.0000E-02 to	5.0000E-02	1.1389E+12	3.4166E+10
5.0000E-02 to	1.0000E-01	4.4703E+11	3.3528E+10
1.0000E-01 to	2.0000E-01	2.2869E+11	3.4304E+10
2.0000E-01 to	3.0000E-01	7.1950E+10	1.7988E+10
3.0000E-01 to	4.0000E-01	1.4071E+11	4.9249E+10
4.0000E-01 to	6.0000E-01	4.2383E+10	2.1191E+10
6.0000E-01 to	8.0000E-01	1.1773E+12	8.2409E+11
8.0000E-01 to	1.0000E+00	6.2471E+09	5.6224E+09
1.0000E+00 to	1.3300E+00	4.0598E+09	4.7297E+09
1.3300E+00 to	1.6600E+00	1.0379E+09	1.5517E+09

```
                    1.6600E+00 to     2.0000E+00     2.5559E+08     4.6772E+08
                    2.0000E+00 to     2.5000E+00     6.5386E+08     1.4712E+09
                    2.5000E+00 to     3.0000E+00     4.9296E+06     1.3556E+07
                    3.0000E+00 to     4.0000E+00     5.5379E+05     1.9383E+06
                    4.0000E+00 to     5.0000E+00     5.3567E+03     2.4105E+04
                    5.0000E+00 to     6.5000E+00     2.1440E+03     1.2328E+04
                    6.5000E+00 to     8.0000E+00     4.1954E+02     3.0417E+03
                    8.0000E+00 to     1.0000E+01     8.8927E+01     8.0034E+02
0                   totals                           3.2592E+12     1.0284E+12
0
0                   total energy from nuclides with spectrum data    =   1.0284E+12
0                   total energy from nuclides with no spectrum data =   2.3297E+05
1
0  .results on logical unit no. 71, position  2, for time step  6, subcase 7, (run position 1, case position 2)
   title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
0    .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/05/29 - 09:06:37 )
*   module sas2h     will be called
      SAS2H: Far-Field Crit based on BIU 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ftuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
                                13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                92238 28.593 93237 0.033 1 1.0 538   end
      '

      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-133     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.150 14000 27.919 19000 1.894 20000 1.989
                                26000 0.683 2 1.0 523.   end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.150 14000 27.919 19000 1.894 20000 1.989
                                26000 0.683 3 1.0 523.   end
```

```
'
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'  fuel-pin-cell geometry:
'
symmslabcell  340.  280. 1 3 281. 2 end
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'
'  assembly and cycle parameters:
'
npin/assm=1 fuelngth=280. ncycles=1 mlib/cyc=5 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e4 down=1.82625e3
   end
```



```
0

     11        88888888888                  22222222222   33333333333                  22222222222        11
    111       888888888888                 2222222222222 3333333333333                2222222222222      111
   1111       88        88        :::      22        22  33         33       :::      22        22     1111
     11       88        88        :::                22  33         33       :::                22       11
     11       88        88        :::                22  33         33       :::                22       11
     11        888888888888                        22        333         333                  22        11
     11        888888888888                      22          333         333                22          11
     11       88        88        :::          22                33       :::          22              11
     11       88        88        :::        22                  33       :::        22                11
     11       88        88        :::      22                    33       :::      22                  11
 11111111     888888888888                 2222222222222 3333333333333                2222222222222  11111111
 11111111      88888888888                 2222222222222  333333333333                2222222222222  11111111
1
0
                          ssssssssss    eeeeeeeeeee    ssssssss    ll            ooooooooooooo
                         ssssssssssss  eeeeeeeeeeeee  ssssssssss  ll            ooooooooooooo
                         ss        ss  ee         ee  ss      ss  ll            oo
                         ss            ee             ss      ss  ll            oo
                         ss            ee             ss      ss  ll            oo
                         ssssssssssss  ee             ssssssssssss  ll            oooooooooo
                          ssssssssssss ee             ssssssssssss  ll            oooooooooo
                                    ss ee             ss      ss  ll            oo
                                    ss ee             ss      ss  ll            oo
                         ss        ss  ee         ee  ss      ss  ll            oo
                         ssssssssssss  eeeeeeeeeeeee  ss      ss  llllllllllll  ooooooooooooo
                          ssssssssss    eeeeeeeeeee   ss      ss  llllllllllll  ooooooooooooo
```

program verification information

code system: scale version: 4.3

program: e0o004

creation date: 03/13/96

library: /usr1/ernl/Scale/bin

test code: origens

version: 3.0

jobname: davis

date of execution: 05/28/96

time of execution: 18:23:21

```
                        *****                                                                  *****
                        *****                                                                  *****
                        ***********************************************************************
                        ***********************************************************************
                        ***********************************************************************

1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, sxn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       34q array has     12 entries.
1library information...

         cross-section data taken from position number  1 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ***********************************************************************
         *                                                                     *
         *            prelim lwr origen-s binary working library--id = 1143    *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                     *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "sresas2" case updating all nuclides on the scale "burnup" library *
         *                                                                     *
         *                  fission product yields are from endf/b-v           *
         *                                                                     *
         *              photon libraries use an 18-energy-group structure      *
         *             the photon data are from the master photon data base,   *
         *              produced to include bremsstrahlung from uo2 matrix     *
         *                                                                     *
         *        see information above this box (if present) for later updates *
         *                                                                     *
         ***********************************************************************
         *                                                                     *
```

```
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   date set name:  ft33f001
0                 8/28/1996    date library was produced
0                    1697      total number of nuclides in library
                      689      number of light-element nuclides
                      129      number of actinide nuclides
                      879      number of fission product nuclides
0                    7993      number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   1
0                                        nuclide concentrations, grams
                                         basis =single reactor assembly
              initial  1E-18 d
    na 23   1.73E+05  1.73E+05
    al 27   1.35E+06  1.35E+06
  total     1.52E+06  1.52E+06
1
   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides         page   2
0                                        nuclide concentrations, grams
                                         basis =single reactor assembly
              initial  1E-18 d
     u234   2.12E+03  2.12E+03
     u235   1.72E+05  1.72E+05
     u236   4.12E+04  4.12E+04
     u238   6.66E+06  6.66E+06
    np237   9.99E+03  9.99E+03
  total     6.88E+06  6.88E+06
1  sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                      page   3
       power=    .00mw, burnup=     29.mwd, flux= 3.00E+08n/cm**2-sec
0                                        basis =
0  (note, k-infinities, eled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial       1826.3 d       3652.5 d       5478.8 d       7305.0 d       7305.1 d
   productions   1.023168E+06  1.023204E+06  1.023241E+06  1.023278E+06  1.023315E+06  1.023315E+06
   absorptions   8.460999E+05  8.461583E+05  8.462168E+05  8.462709E+05  8.463270E+05  8.463269E+05
   k infinity    1.209275E+00  1.209235E+00  1.209198E+00  1.209161E+00  1.209125E+00  1.209125E+00
0                  initial       1826.3 d       3652.5 d       5478.8 d       7305.0 d       7305.1 d
   actinide
   absorptions   8.423347E+05  8.423564E+05  8.423781E+05  8.423998E+05  8.424216E+05  8.424216E+05
   non-actinide
   abs. fracs.   4.430142E-03  4.493117E-03  4.533887E-03  4.574358E-03  4.614592E-03  4.614472E-03
1  sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products      page   4
0                                        fraction of total absorption rate
       power=    .00mw, burnup=     29.mwd, flux= 3.00E+08n/cm**2-sec
0                initial  1826.3 d  3652.5 d  5478.8 d  7305.0 d  7305.1 d

   sm149       .00E+00  3.63E-05  7.24E-05  1.08E-04  1.44E-04  1.44E-04
   sm151       .00E+00  1.51E-06  2.96E-06  4.36E-06  5.70E-06  5.70E-06
   nd143       .00E+00  7.23E-07  1.45E-06  2.19E-06  2.92E-06  2.92E-06
   xe135       .00E+00  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.24E-06
   gd157       .00E+00  3.72E-07  7.41E-07  1.11E-06  1.47E-06  1.47E-06
   rh103       .00E+00  3.35E-07  6.81E-07  1.03E-06  1.37E-06  1.37E-06
   gd155       .00E+00  1.44E-07  4.69E-07  8.80E-07  1.33E-06  1.33E-06
   sd113       .00E+00  3.17E-07  6.34E-07  9.49E-07  1.26E-06  1.26E-06
   xe131       .00E+00  2.35E-07  4.72E-07  7.09E-07  9.46E-07  9.46E-07
   cs133       .00E+00  1.83E-07  3.67E-07  5.51E-07  7.35E-07  7.35E-07
   tc 99       .00E+00  1.36E-07  2.71E-07  4.07E-07  5.43E-07  5.43E-07
   sm147       .00E+00  4.04E-08  1.77E-07  3.08E-07  4.43E-07  4.43E-07
   nd145       .00E+00  1.04E-07  2.08E-07  3.12E-07  4.16E-07  4.16E-07
```

eu151	.00E+00	2.17E-08	8.55E-08	1.90E-07	3.33E-07	3.33E-07
mo 95	.00E+00	6.69E-08	1.39E-07	2.12E-07	2.85E-07	2.85E-07
pm147	.00E+00	2.80E-07	2.34E-07	2.69E-07	2.73E-07	2.73E-07
sm152	.00E+00	5.55E-08	1.11E-07	1.67E-07	2.22E-07	2.22E-07
kr 83	.00E+00	4.43E-08	8.91E-08	1.34E-07	1.78E-07	1.78E-07
cs135	.00E+00	4.12E-08	8.26E-08	1.24E-07	1.65E-07	1.65E-07
eu155	.00E+00	8.33E-08	1.23E-07	1.42E-07	1.51E-07	1.51E-07
ru101	.00E+00	3.25E-08	6.50E-08	9.76E-08	1.30E-07	1.30E-07
pr141	.00E+00	2.97E-08	6.01E-08	9.05E-08	1.21E-07	1.21E-07
eu153	.00E+00	2.78E-08	5.57E-08	8.35E-08	1.11E-07	1.11E-07
la139	.00E+00	2.48E-08	4.96E-08	7.45E-08	9.93E-08	9.93E-08
pd105	.00E+00	1.06E-08	2.13E-08	3.20E-08	4.26E-08	4.26E-08
zr 93	.00E+00	1.03E-08	2.06E-08	3.08E-08	4.11E-08	4.11E-08
i129	.00E+00	7.63E-09	1.53E-08	2.30E-08	3.06E-08	3.06E-08
nd144	.00E+00	5.77E-09	1.32E-08	2.06E-08	2.80E-08	2.80E-08
mo 97	.00E+00	5.64E-09	1.13E-08	1.69E-08	2.26E-08	2.26E-08
ag109	.00E+00	4.03E-09	8.06E-09	1.21E-08	1.62E-08	1.62E-08
zr 91	.00E+00	2.54E-09	5.20E-09	7.86E-09	1.05E-08	1.05E-08
y 89	.00E+00	2.44E-09	4.98E-09	7.52E-09	1.01E-08	1.01E-08
ba137	.00E+00	6.58E-10	2.53E-09	5.49E-09	9.41E-09	9.41E-09
ru102	.00E+00	2.29E-09	4.58E-09	6.87E-09	9.16E-09	9.16E-09
rh105	.00E+00	8.28E-09	8.28E-09	8.28E-09	8.28E-09	8.25E-09
ce142	.00E+00	3.05E-09	6.11E-09	9.16E-09	8.21E-09	8.21E-09
nd148	.00E+00	1.99E-09	3.99E-09	5.98E-09	7.98E-09	7.98E-09
nd146	.00E+00	1.66E-09	3.32E-09	4.98E-09	6.65E-09	6.65E-09
sr 90	.00E+00	1.97E-09	3.71E-09	5.24E-09	6.60E-09	6.60E-09
ba138	.00E+00	1.42E-09	2.83E-09	4.25E-09	5.66E-09	5.66E-09
in115	.00E+00	1.38E-09	2.76E-09	4.15E-09	5.53E-09	5.53E-09
pd108	.00E+00	1.38E-09	2.75E-09	4.13E-09	5.51E-09	5.51E-09
ce140	.00E+00	1.21E-09	2.44E-09	3.66E-09	5.29E-09	5.29E-09
xe132	.00E+00	1.21E-09	2.42E-09	3.62E-09	4.83E-09	4.83E-09
mo 98	.00E+00	8.46E-10	1.69E-09	2.54E-09	3.38E-09	3.38E-09
mo100	.00E+00	8.09E-10	1.62E-09	2.43E-09	3.24E-09	3.24E-09
pd107	.00E+00	7.97E-10	1.59E-09	2.39E-09	3.19E-09	3.19E-09
xe134	.00E+00	7.85E-10	1.57E-09	2.35E-09	3.14E-09	3.14E-09
sm150	.00E+00	1.03E-10	7.70E-10	1.73E-09	3.06E-09	3.06E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5
0 fraction of total absorption rate
0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec
initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

pr143	.00E+00	2.66E-09	2.66E-09	2.66E-09	2.66E-09	2.66E-09
zr 92	.00E+00	6.38E-10	1.28E-09	1.91E-09	2.55E-09	2.55E-09
i127	.00E+00	5.14E-10	1.04E-09	1.56E-09	2.09E-09	2.09E-09
zr 96	.00E+00	5.21E-10	1.04E-09	1.56E-09	2.08E-09	2.08E-09
xe133	.00E+00	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
ru104	.00E+00	4.96E-10	9.93E-10	1.49E-09	1.99E-09	1.99E-09
nd150	.00E+00	4.44E-10	8.88E-10	1.33E-09	1.78E-09	1.78E-09
xe136	.00E+00	4.25E-10	8.49E-10	1.27E-09	1.70E-09	1.70E-09
ce141	.00E+00	1.58E-09	1.58E-09	1.58E-09	1.58E-09	1.58E-09
cs137	.00E+00	4.13E-10	7.81E-10	1.11E-09	1.40E-09	1.40E-09
br 81	.00E+00	3.23E-10	6.44E-10	9.48E-10	1.29E-09	1.29E-09
rb 85	.00E+00	2.57E-10	5.30E-10	8.36E-10	1.11E-09	1.11E-09
zr 94	.00E+00	2.76E-10	5.51E-10	8.26E-10	1.10E-09	1.10E-09
pm149	.00E+00	9.62E-10	9.62E-10	9.62E-10	9.62E-10	9.53E-10
nd147	.00E+00	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.40E-10
cd111	.00E+00	2.04E-10	4.10E-10	6.16E-10	8.23E-10	8.23E-10
te130	.00E+00	1.92E-10	3.85E-10	5.77E-10	7.69E-10	7.69E-10
sm154	.00E+00	1.88E-10	3.75E-10	5.63E-10	7.50E-10	7.50E-10
rb 87	.00E+00	1.82E-10	3.65E-10	5.47E-10	7.29E-10	7.29E-10

ce144	.00E+00	5.93E-10	6.00E-10	6.00E-10	6.00E-10	5.99E-10
se 77	.00E+00	1.27E-10	2.54E-10	3.82E-10	5.09E-10	5.09E-10
kr 85	.00E+00	1.57E-10	2.71E-10	2.53E-10	4.13E-10	4.13E-10
ru103	.00E+00	3.56E-10	3.56E-10	3.56E-10	3.56E-10	3.56E-10
kr 84	.00E+00	8.70E-11	1.74E-10	2.61E-10	3.48E-10	3.48E-10
pd106	.00E+00	4.45E-11	1.39E-10	2.52E-10	3.43E-10	3.43E-10
se 79	.00E+00	4.52E-11	1.30E-10	1.96E-10	2.61E-10	2.61E-10
sb121	.00E+00	4.31E-11	1.26E-10	1.89E-10	2.53E-10	2.53E-10
zr 90	.00E+00	1.48E-11	5.70E-11	1.23E-10	2.11E-10	2.11E-10
sb123	.00E+00	5.10E-11	1.03E-10	1.54E-10	2.06E-10	2.06E-10
kr 86	.00E+00	4.73E-11	9.47E-11	1.42E-10	1.89E-10	1.89E-10
te128	.00E+00	4.26E-11	8.53E-11	1.28E-10	1.71E-10	1.71E-10
zr 93	.00E+00	1.68E-10	1.68E-10	1.68E-10	1.68E-10	1.68E-10
nb 95	.00E+00	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	.00E+00	1.42E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10
gd156	.00E+00	3.28E-11	6.62E-11	9.98E-11	1.34E-10	1.34E-10
se 80	.00E+00	3.05E-11	6.10E-11	9.14E-11	1.22E-10	1.22E-10
dy161	.00E+00	2.64E-11	5.31E-11	7.98E-11	1.07E-10	1.07E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.05E-10
te125	.00E+00	1.16E-11	3.43E-11	6.02E-11	8.69E-11	8.69E-11
tb159	.00E+00	1.82E-11	3.65E-11	5.48E-11	7.31E-11	7.31E-11
cd112	.00E+00	1.74E-11	3.48E-11	5.22E-11	6.96E-11	6.96E-11
li 6	.00E+00	1.73E-11	3.46E-11	5.19E-11	6.92E-11	6.92E-11
sn117	.00E+00	1.38E-11	2.76E-11	4.14E-11	5.52E-11	5.52E-11
ba140	.00E+00	4.72E-11	4.72E-11	4.72E-11	4.72E-11	4.70E-11
sn119	.00E+00	1.13E-11	2.25E-11	3.38E-11	4.51E-11	4.51E-11
sn115	.00E+00	1.03E-11	3.06E-11	3.09E-11	4.12E-11	4.12E-11
sm153	.00E+00	3.80E-11	3.80E-11	3.80E-11	3.80E-11	3.70E-11
sr 88	.00E+00	8.72E-12	1.74E-11	2.61E-11	3.49E-11	3.49E-11
eu154	.00E+00	4.71E-12	1.26E-11	2.26E-11	3.40E-11	3.40E-11

1 cas2h: far-field crit based on h2w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 6
0 fraction of total absorption rate
0 powerm .00mw, burnup 29,mwd, flux= 3.00E+08n/cm**2-sec
initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

eu156	.00E+00	3.38E-11	3.39E-11	3.39E-11	3.39E-11	3.39E-11
sr 89	.00E+00	3.04E-11	3.04E-11	3.04E-11	3.04E-11	3.03E-11
ru106	.00E+00	2.50E-11	2.58E-11	2.58E-11	2.59E-11	2.58E-11
pd110	.00E+00	6.32E-12	1.26E-11	1.90E-11	2.53E-11	2.53E-11
cd114	.00E+00	6.18E-12	1.24E-11	1.86E-11	2.49E-11	2.49E-11
eu152	.00E+00	4.70E-13	3.46E-12	1.09E-11	2.41E-11	2.41E-11
gd158	.00E+00	5.76E-12	1.16E-11	1.77E-11	2.38E-11	2.38E-11
se 82	.00E+00	5.01E-12	1.18E-11	1.77E-11	2.36E-11	2.36E-11
sn126	.00E+00	4.71E-12	9.42E-12	1.41E-11	1.88E-11	1.88E-11
se 78	.00E+00	4.52E-12	9.03E-12	1.35E-11	1.81E-11	1.81E-11
ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.68E-11
la140	.00E+00	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
sb125	.00E+00	1.08E-11	1.38E-11	1.46E-11	1.49E-11	1.49E-11
sn124	.00E+00	3.68E-12	7.37E-12	1.11E-11	1.47E-11	1.47E-11
dy162	.00E+00	3.49E-12	7.01E-12	1.05E-11	1.41E-11	1.41E-11
mo 99	.00E+00	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
dy164	.00E+00	2.13E-12	4.27E-12	6.44E-12	1.26E-11	1.26E-11
as 73	.00E+00	2.69E-12	5.39E-12	8.08E-12	1.08E-11	1.08E-11
pm148m	.00E+00	7.01E-12	8.09E-12	8.32E-12	8.66E-12	8.65E-12
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	8.03E-12
te127m	.00E+00	7.36E-12	7.36E-12	7.36E-12	7.36E-12	7.36E-12
i131	.00E+00	6.77E-12	6.77E-12	6.77E-12	6.77E-12	6.75E-12
y 90	.00E+00	1.07E-12	2.52E-12	4.08E-12	6.77E-12	6.27E-12
sn118	.00E+00	1.51E-12	3.03E-12	4.54E-12	6.05E-12	6.05E-12
ba136	.00E+00	1.42E-12	2.87E-12	4.32E-12	5.77E-12	5.77E-12

ru 99	.00E+00	8.41E-13	2.07E-12	3.43E-12	5.54E-12	5.54E-12
cs134	.00E+00	1.07E-12	2.39E-12	3.76E-12	5.13E-12	5.13E-12
cd116	.00E+00	1.28E-12	2.55E-12	3.83E-12	5.10E-12	5.10E-12
sn122	.00E+00	1.25E-12	2.49E-12	3.74E-12	4.98E-12	4.98E-12
sn120	.00E+00	9.38E-13	1.88E-12	2.81E-12	3.75E-12	3.75E-12
kr 82	.00E+00	7.81E-13	1.57E-12	2.36E-12	3.15E-12	3.15E-12
dy163	.00E+00	7.49E-13	1.54E-12	2.32E-12	3.11E-12	3.11E-12
in113	.00E+00	2.30E-13	8.51E-13	1.78E-12	2.95E-12	2.95E-12
se 73	.00E+00	7.28E-13	1.46E-12	2.18E-12	2.91E-12	2.91E-12
xe130	.00E+00	4.78E-13	9.60E-13	1.45E-12	1.94E-12	1.94E-12
te129m	.00E+00	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
gd152	.00E+00	2.62E-14	2.11E-13	7.25E-13	1.75E-12	1.75E-12
mo 96	.00E+00	3.65E-13	7.00E-13	1.06E-12	1.44E-12	1.44E-12
se 76	.00E+00	2.66E-13	5.32E-13	7.99E-13	1.06E-12	1.06E-12
ru100	.00E+00	9.50E-14	2.51E-13	4.67E-13	7.45E-13	7.45E-13
gd154	.00E+00	2.69E-14	1.39E-13	3.69E-13	7.43E-13	7.43E-13
gd160	.00E+00	1.69E-13	3.38E-13	5.07E-13	6.77E-13	6.77E-13
te126	.00E+00	1.29E-13	2.60E-13	3.91E-13	5.24E-13	5.24E-13
sm148	.00E+00	3.96E-14	1.37E-13	2.79E-13	4.60E-13	4.60E-13
pm148	.00E+00	2.80E-13	3.56E-13	3.77E-13	3.82E-13	3.78E-13
nd142	.00E+00	2.10E-14	8.38E-14	1.88E-13	3.35E-13	3.35E-13
ag111	.00E+00	3.20E-13	3.21E-13	3.21E-13	3.21E-13	3.20E-13
ba134	.00E+00	1.50E-14	6.69E-14	1.59E-13	2.93E-13	2.93E-13
ba135	.00E+00	1.99E-14	7.28E-14	1.59E-13	2.78E-13	2.78E-13

1 sas2h: far-field crit based on h2o 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7

0 fraction of total absorption rate

0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec

	initial	1826.3 d	3652.5 d	5478.8 d	7305.0 d	7305.1 d
eu157	.00E+00	2.95E-13	2.96E-13	2.96E-13	2.96E-13	2.74E-13
cd115m	.00E+00	2.35E-13	2.35E-13	2.35E-13	2.35E-13	2.35E-13
pd104	.00E+00	1.39E-14	5.63E-14	1.27E-13	2.27E-13	2.27E-13
ho165	.00E+00	5.28E-14	1.06E-13	1.59E-13	2.13E-13	2.13E-13
te124	.00E+00	2.93E-14	6.00E-14	9.08E-14	1.22E-13	1.22E-13
sr 87	.00E+00	3.04E-14	6.08E-14	9.12E-14	1.22E-13	1.22E-13
nb 94	.00E+00	1.75E-14	3.51E-14	5.26E-14	7.01E-14	7.01E-14
ge 74	.00E+00	1.47E-14	2.93E-14	4.40E-14	5.86E-14	5.86E-14
cs136	.00E+00	5.60E-14	5.61E-14	5.63E-14	5.65E-14	5.62E-14
se 72	.00E+00	9.81E-15	1.96E-14	2.95E-14	3.93E-14	3.93E-14
sr 86	.00E+00	8.48E-15	1.71E-14	2.59E-14	3.47E-14	3.47E-14
cd110	.00E+00	2.77E-15	9.38E-15	1.97E-14	3.37E-14	3.37E-14
sn125	.00E+00	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.92E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	3.10E-14
se 74	.00E+00	3.69E-15	7.14E-14	1.71E-14	2.29E-14	2.29E-14
br 79	.00E+00	1.57E-15	8.44E-15	1.22E-14	2.16E-14	2.16E-14
xe129	.00E+00	7.62E-16	5.05E-15	6.06E-15	1.22E-14	1.22E-14
ag107	.00E+00	7.08E-16	2.83E-15	6.37E-15	1.13E-14	1.13E-14
sn123	.00E+00	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
nb 93	.00E+00	2.00E-16	1.42E-15	4.49E-15	1.01E-14	1.01E-14
te132	.00E+00	9.49E-15	9.49E-15	9.49E-15	9.49E-15	9.34E-15
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	8.70E-15
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	8.18E-15
xe128	.00E+00	1.43E-15	2.02E-15	4.73E-15	6.63E-15	6.63E-15
dy160	.00E+00	1.16E-15	2.58E-15	4.19E-15	6.01E-15	6.01E-15
er166	.00E+00	1.37E-15	3.77E-15	4.19E-15	5.64E-15	5.64E-15
sb126	.00E+00	2.99E-15	3.00E-15	3.01E-15	3.02E-15	3.01E-15
sb124	.00E+00	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	1.82E-15
kr 80	.00E+00	4.12E-16	8.25E-16	1.24E-15	1.65E-15	1.65E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	8.55E-16

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 1130      .00E+00  7.17E-16  7.23E-16  7.30E-16  7.36E-16  6.63E-16
sn116      .00E+00  4.53E-17  1.51E-16  3.17E-16  5.43E-16  5.43E-16
in117      .00E+00  6.07E-16  6.07E-16  6.08E-16  6.08E-16  5.40E-16
tb160      .00E+00  3.46E-16  3.98E-16  4.49E-16  5.01E-16  5.01E-16
te122      .00E+00  6.63E-17  1.57E-16  2.73E-16  4.14E-16  4.14E-16
rb 86      .00E+00  2.41E-16  2.43E-16  2.45E-16  2.47E-16  2.46E-16
be  9      .00E+00  3.42E-17  6.84E-17  1.03E-16  1.37E-16  1.37E-16
pr142      .00E+00  3.46E-17  6.91E-17  1.04E-16  1.38E-16  1.29E-16
dy165      .00E+00  2.10E-16  2.11E-16  2.12E-16  2.14E-16  1.24E-16
te123      .00E+00  2.73E-17  5.73E-17  8.73E-17  1.17E-16  1.17E-16
li  7      .00E+00  1.33E-17  2.66E-17  4.00E-17  5.33E-17  5.33E-17
ge 75      .00E+00  8.51E-17  8.51E-17  8.51E-17  8.51E-17  5.34E-17
cd118      .00E+00  1.19E-16  1.19E-16  1.19E-16  1.19E-16  3.44E-17
er167      .00E+00  5.52E-18  1.14E-17  1.76E-17  2.41E-17  2.41E-17
cd108      .00E+00  2.76E-19  5.85E-19  8.45E-19  1.14E-18  1.14E-18
cs134m     .00E+00  2.56E-19  5.12E-19  7.68E-19  1.02E-18  6.49E-19
in119m     .00E+00  2.97E-17  2.97E-17  2.97E-17  2.97E-17  4.16E-19
cd109      .00E+00  1.76E-19  1.96E-19  2.06E-19  2.13E-19  2.13E-19
1   sas2h: for-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page   8
0                                  fraction of total absorption rate
       power=      .00mw, burnup=     29,mwd, flux= 3.00E+08n/cm**2-sec
0            initial  1826.3 d  3652.5 d  5478.8 d  7305.0 d  7305.1 d

sn114      .00E+00  3.33E-21  1.33E-20  2.66E-20  4.66E-20  4.66E-20
1
    sas2h: for-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page   9
      power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
            charge  1826.3 d  3652.5 d  5478.8 d  7305.0 d  7305.1 d
 h  1      .00E+00  4.41E-07  8.81E-07  1.32E-06  1.76E-06  1.76E-06
 h  2      .00E+00  1.31E-09  2.61E-09  3.92E-09  5.22E-09  5.22E-09
 h  3      .00E+00  8.35E-12  1.47E-11  1.94E-11  2.30E-11  2.30E-11
 h  4      .00E+00  3.38E-35  5.93E-35  7.85E-35  9.30E-35   .00E+00
he  3      .00E+00  1.23E-12  4.50E-12  9.32E-12  1.53E-11  1.53E-11
he  4      .00E+00  7.28E-08  1.46E-07  2.18E-07  2.91E-07  2.91E-07
he  6      .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
na 20      .00E+00  8.74E-09  1.75E-08  2.62E-08  3.50E-08  3.50E-08
na 21      .00E+00  1.58E-15  4.32E-15  1.42E-14  2.53E-14  2.53E-14
na 22      .00E+00  2.56E-11  7.43E-11  1.29E-10  1.85E-10  1.86E-10
na 23      .00E+00  7.28E-15  7.28E-15  7.28E-15  7.28E-15  7.28E-30
na 22      .00E+00  3.15E-11  2.98E-11  4.20E-11  4.26E-11  4.26E-11
na 23     7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
na 24      .00E+00  5.64E-08  5.64E-08  5.64E-08  5.64E-08  5.53E-08
na 24m     .00E+00  5.99E-15  5.99E-15  5.99E-15  5.99E-15  5.99E-30
ns 25      .00E+00  2.93E-28  5.94E-28  9.05E-28  1.22E-27  1.21E-42
mg 24      .00E+00  7.55E-05  1.51E-04  2.27E-04  3.02E-04  3.02E-04
mg 25      .00E+00  9.72E-12  1.98E-11  3.01E-11  4.07E-11  4.07E-11
mg 26      .00E+00  1.31E-09  2.61E-09  3.92E-09  5.22E-09  5.22E-09
mg 27      .00E+00  2.18E-12  2.18E-12  2.18E-12  2.18E-12  4.70E-16
mg 28      .00E+00  4.41E-24  4.41E-24  4.41E-24  4.41E-24  4.14E-24
al 27     4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
si 28      .00E+00  2.70E-10  2.70E-10  2.70E-10  2.70E-10  3.67E-25
si 29      .00E+00  5.80E-28  1.52E-27  3.42E-27  6.08E-27  3.18E-32
si 30      .00E+00  3.49E-41  2.79E-40  9.42E-40  2.23E-39   .00E+00
si 28      .00E+00  2.20E-04  4.40E-04  6.59E-04  8.79E-04  8.79E-04
si 29      .00E+00  1.41E-12  2.64E-12  1.27E-11  2.26E-11  2.26E-11
si 30      .00E+00  9.70E-21  7.76E-20  2.62E-19  6.21E-19  6.21E-19
si 31      .00E+00  4.95E-33  5.54E-32  1.88E-31  4.45E-31  2.68E-31
si 32      .00E+00  6.12E-41  9.75E-40  4.92E-39  1.55E-38  1.55E-38
```

```
  totals     3.75E+04  3.75E+04  3.75E+04  3.75E+04  3.75E+04  3.75E+04
0 flux                3.00E+08  3.00E+08  3.00E+08  3.00E+08  3.00E-07
1
    sas2h: far-ffield crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  10
      power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
                 charge  1826.3 d  3652.5 d  5478.8 d  7305.0 d  7305.1 d
    he  4        .00E+00  2.74E-04  5.67E-04  9.39E-04  1.33E-03  1.33E-03
    pb206        .00E+00  7.11E-14  1.14E-12  3.75E-12  1.79E-11  1.79E-11
    pb207        .00E+00  9.49E-12  7.37E-11  2.61E-10  5.52E-10  5.52E-10
    pb208        .00E+00  3.81E-12  3.76E-11  1.26E-10  2.81E-10  2.81E-10
    pb209        .00E+00  3.42E-17  1.38E-16  5.12E-16  5.56E-16  5.60E-16
    pb210        .00E+00  2.83E-12  1.37E-11  5.10E-11  1.17E-10  1.17E-10
    pb211        .00E+00  5.69E-16  2.16E-15  4.64E-15  7.83E-15  7.83E-15
    pb212        .00E+00  4.63E-15  2.05E-14  4.22E-14  6.61E-14  6.61E-14
    pb214        .00E+00  9.34E-17  3.73E-16  8.40E-16  1.49E-15  1.43E-15
    ra222        .00E+00  1.76E-28  5.20E-28  9.13E-28  1.32E-27  1.32E-27
    ra223        .00E+00  2.99E-13  9.87E-13  2.11E-12  3.58E-12  3.58E-12
    ra224        .00E+00  5.82E-14  1.89E-13  3.49E-13  5.46E-13  5.66E-13
    ra225        .00E+00  3.74E-13  1.51E-12  3.41E-12  6.08E-12  6.08E-12
    ra226        .00E+00  2.93E-09  1.17E-08  2.64E-08  4.68E-08  4.68E-08
    ra228        .00E+00  2.63E-15  8.85E-15  1.70E-14  2.63E-14  2.63E-14
    ac225        .00E+00  2.53E-13  1.02E-12  2.31E-12  4.11E-12  4.11E-12
    ac227        .00E+00  1.60E-10  6.86E-10  1.47E-09  2.49E-09  2.49E-09
    ac228        .00E+00  3.21E-19  1.08E-18  2.08E-18  3.21E-18  3.21E-18
    th226        .00E+00  8.59E-27  2.54E-26  4.45E-26  6.43E-26  6.42E-26
    th227        .00E+00  4.19E-13  1.59E-12  3.41E-12  5.78E-12  5.78E-12
    th228        .00E+00  7.29E-12  3.23E-11  6.66E-11  1.04E-10  1.04E-10
    th229        .00E+00  7.27E-10  2.94E-09  6.64E-09  1.18E-08  1.18E-08
    th230        .00E+00  1.28E-04  3.55E-04  3.83E-04  5.11E-04  5.11E-04
    th231        .00E+00  3.02E-09  3.02E-09  3.02E-09  3.02E-09  3.02E-09
    th232        .00E+00  2.58E-05  5.16E-05  7.74E-05  1.03E-04  1.03E-04
    th233        .00E+00  3.39E-16  4.78E-16  7.17E-16  9.57E-16  2.66E-17
    th234        .00E+00  5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07
    pa231        .00E+00  5.59E-06  7.19E-06  1.08E-05  1.44E-05  1.44E-05
    pa232        .00E+00  6.18E-14  1.24E-13  1.85E-13  2.47E-13  2.37E-13
    pa233        .00E+00  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06
    pa234m       .00E+00  1.81E-11  1.81E-11  1.81E-11  1.81E-11  1.81E-11
    pa234        .00E+00  8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12
    pa235        .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    u230         .00E+00  6.33E-24  2.44E-23  4.32E-23  6.23E-23  6.21E-23
    u231         .00E+00  5.33E-20  1.08E-19  1.62E-19  2.17E-19  2.16E-19
    u232         .00E+00  8.11E-10  1.80E-09  3.16E-09  4.57E-09  4.57E-09
    u233         .00E+00  6.68E-05  1.35E-04  2.03E-04  2.72E-04  2.72E-04
    u234        9.86E+00  9.86E+00  9.86E+00  9.86E+00  9.86E+00  9.86E+00
    u235        7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
    u236        1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02  1.74E+02
    u237         .00E+00  3.24E-06  3.24E-06  3.24E-06  3.24E-06  3.21E-06
    u238        3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
    u239         .00E+00  3.29E-07  3.29E-07  3.29E-07  3.29E-07  1.09E-08
    u240         .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    u241         .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    np235        .00E+00  8.71E-12  9.06E-12  9.08E-12  9.08E-12  9.07E-12
    np236m       .00E+00  2.16E-12  2.16E-12  2.16E-12  2.16E-12  2.03E-12
    np236        .00E+00  1.02E-09  3.03E-09  3.07E-09  4.10E-09  4.10E-09
    np237       4.22E+01  4.22E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
    np238        .00E+00  1.58E-06  1.58E-06  1.58E-06  1.58E-06  1.54E-06
1
    sas2h: far-ffield crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  11
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```
      power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge  1826.3 d  3652.5 d  5478.8 d  7305.0 d  7305.1 d
     np239    .00E+00  4.75E-05  4.75E-05  4.75E-05  4.75E-05  4.67E-05
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240    .00E+00  9.74E-15  9.74E-15  9.74E-15  9.74E-15  2.68E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236    .00E+00  8.16E-10  1.06E-09  1.14E-09  1.14E-09  1.16E-09
     pu237    .00E+00  9.61E-15  1.89E-14  2.78E-14  3.64E-14  3.63E-14
     pu238    .00E+00  9.24E-04  1.81E-03  2.67E-03  3.49E-03  3.49E-03
     pu239    .00E+00  2.53E-02  5.11E-02  7.66E-02  1.02E-01  1.02E-01
     pu240    .00E+00  6.28E-07  2.51E-06  5.66E-06  1.01E-05  1.01E-05
     pu241    .00E+00  2.03E-11  1.53E-10  4.90E-10  1.10E-09  1.10E-09
     pu242    .00E+00  2.03E-16  3.15E-15  1.55E-14  4.75E-14  4.75E-14
     pu243    .00E+00  4.46E-25  4.91E-24  3.59E-23  1.04E-22  7.97E-23
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239    .00E+00  3.56E-28  5.43E-27  2.63E-26  7.04E-26  7.10E-26
     am240    .00E+00  1.63E-25  2.49E-24  1.20E-23  3.66E-23  3.54E-23
     am241    .00E+00  1.84E-12  1.89E-11  9.13E-11  2.76E-10  2.76E-10
     am242m   .00E+00  3.20E-18  9.80E-17  7.13E-16  2.88E-15  2.88E-15
     am242    .00E+00  4.35E-20  4.65E-19  3.22E-18  9.73E-18  9.96E-18
     am243    .00E+00  6.23E-22  2.16E-20  1.76E-19  7.89E-19  7.89E-19
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244    .00E+00  4.90E-30  1.70E-28  1.39E-27  6.21E-27  5.44E-27
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               3.00E+08  3.00E+08  3.00E+08  3.00E+08  3.00E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
library information...

         cross-section data taken from position number  2 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ****************************************************************************
         *                                                                          *
         *            prelim lwr origen-s binary working library--id = 1143         *
         *          made from modified card-image origen-s libraries of scale 4.2   *
         *      data from the light element, actinids, and fission product libraries *
```

```
          *        decay data, including gamma and total energy, are from endf/b-vi        *
          *                                                                                 *
          *      neutron flux spectrum factors and cross sections were produced from       *
          *     the "presas2" case updating all nuclides on the scale "burnup" library     *
          *                                                                                 *
          *                    fission product yields are from endf/b-v                     *
          *                                                                                 *
          *             photon libraries use an 18-energy-group structure                   *
          *            the photon data are from the master photon data base,                *
          *             produced to include bremsstrahlung from uo2 matrix                  *
          *                                                                                 *
          *        see information above this box (if present) for later updates            *
          *                                                                                 *
          ***********************************************************************************
          *                                                                                 *
          ***********************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft339001
0              8/28/1996     date library was produced
0                 1697     total number of nuclides in library
                   689     number of light-element nuclides
                   129     number of actinide nuclides
                   879     number of fission product nuclides
0                 7993     number of nonzero off-diagonal matrix elements
0          ***********************************************************************
0
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   12
         power=    .80mw, burnup=     58.mwd, flux= 2.81E+08n/cm**2-sec
0                                                  basis =
0     (note, k-infinities, sigma and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial        9131.3 d       10957.6 d       12783.8 d       14610.1 d       14610.2 d
      productions  1.090805E+06  1.090842E+06  1.090879E+06  1.090916E+06  1.090953E+06  1.090953E+06
      absorptions  8.937227E+05  8.937811E+05  8.938394E+05  8.938971E+05  8.939546E+05  8.939546E+05
      k infinity   1.220518E+00  1.220480E+00  1.220441E+00  1.220404E+00  1.220367E+00  1.220367E+00
0                  initial        9131.3 d       10957.6 d       12783.8 d       14610.1 d       14610.2 d
      actinide
      absorptions  8.901883E+05  8.902102E+05  8.902321E+05  8.902540E+05  8.902759E+05  8.902759E+05
      non-actinide
      abs. frace.  3.956669E-03  3.995299E-03  4.035652E-03  4.075327E-03  4.115045E-03  4.115045E-03
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   13
0                                   fraction of total absorption rate
         power=    .80mw, burnup=     58.mwd, flux= 2.81E+08n/cm**2-sec
0                initial  9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

      sm149     1.46E-04  1.82E-04  2.17E-04  2.53E-04  2.88E-04  2.88E-04
      sm151     5.78E-06  7.08E-06  8.34E-06  9.55E-06  1.07E-05  1.07E-05
      nd143     2.95E-06  3.69E-06  4.43E-06  5.17E-06  5.91E-06  5.91E-06
      gd155     1.35E-06  1.83E-06  2.31E-06  2.79E-06  3.28E-06  3.28E-06
      gd157     1.49E-06  1.85E-06  2.21E-06  2.56E-06  2.91E-06  2.91E-06
      rh103     1.37E-06  1.71E-06  2.06E-06  2.40E-06  2.75E-06  2.75E-06
      cd113     1.28E-06  1.60E-06  1.91E-06  2.23E-06  2.54E-06  2.54E-06
      xe135     2.27E-06  2.31E-06  2.31E-06  2.31E-06  2.31E-06  2.28E-06
      xe131     9.39E-07  1.17E-06  1.41E-06  1.64E-06  1.88E-06  1.88E-06
      cs133     7.29E-07  9.11E-07  1.09E-06  1.28E-06  1.46E-06  1.46E-06
      eu151     5.57E-07  5.21E-07  7.40E-07  9.04E-07  1.20E-06  1.28E-06
      tc 99     5.37E-07  6.72E-07  8.06E-07  9.40E-07  1.07E-06  1.07E-06
      sm147     4.40E-07  5.75E-07  7.10E-07  8.46E-07  9.81E-07  9.81E-07
      nd145     4.16E-07  5.20E-07  6.24E-07  7.28E-07  8.32E-07  8.32E-07
      mo 95     2.83E-07  3.55E-07  4.27E-07  5.00E-07  5.72E-07  5.72E-07
      sm152     2.20E-07  2.76E-07  3.31E-07  3.86E-07  4.41E-07  4.41E-07
      kr 83     1.80E-07  2.25E-07  2.70E-07  3.15E-07  3.60E-07  3.60E-07
```

cs135	1.44E-07	2.05E-07	2.46E-07	2.87E-07	3.28E-07	3.28E-07
pm147	2.70E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07
ru101	1.28E-07	1.60E-07	1.92E-07	2.24E-07	2.56E-07	2.56E-07
pr141	1.22E-07	1.52E-07	1.83E-07	2.14E-07	2.44E-07	2.44E-07
eu153	1.11E-07	1.39E-07	1.67E-07	1.95E-07	2.22E-07	2.22E-07
la139	1.00E-07	1.25E-07	1.50E-07	1.75E-07	2.00E-07	2.00E-07
eu155	1.51E-07	1.55E-07	1.57E-07	1.58E-07	1.58E-07	1.58E-07
pd105	4.25E-08	5.31E-08	6.37E-08	7.43E-08	8.49E-08	8.49E-08
zr 93	4.07E-08	5.09E-08	6.11E-08	7.13E-08	8.15E-08	8.15E-08
i129	3.10E-08	3.87E-08	4.65E-08	5.42E-08	6.20E-08	6.20E-08
nd144	2.83E-08	3.58E-08	4.33E-08	5.08E-08	5.83E-08	5.83E-08
mo 97	2.27E-08	2.84E-08	3.40E-08	3.97E-08	4.54E-08	4.54E-08
ba137	9.52E-09	1.44E-08	2.00E-08	2.63E-08	3.32E-08	3.32E-08
sp109	1.60E-08	2.00E-08	2.41E-08	2.81E-08	3.22E-08	3.22E-08
zr 91	1.06E-08	1.33E-08	1.59E-08	1.86E-08	2.13E-08	2.13E-08
y 89	1.02E-08	1.27E-08	1.53E-08	1.79E-08	2.04E-08	2.04E-08
ru102	9.23E-09	1.15E-08	1.39E-08	1.62E-08	1.85E-08	1.85E-08
ce142	8.31E-09	1.04E-08	1.25E-08	1.45E-08	1.66E-08	1.66E-08
nd148	8.01E-09	1.00E-08	1.20E-08	1.40E-08	1.60E-08	1.60E-08
nd146	6.71E-09	8.38E-09	1.01E-08	1.17E-08	1.34E-08	1.34E-08
sm150	3.07E-09	4.79E-09	6.08E-09	9.33E-09	1.22E-08	1.22E-08
ba138	5.73E-09	7.16E-09	8.59E-09	1.00E-08	1.15E-08	1.15E-08
in115	5.54E-09	6.92E-09	8.30E-09	9.69E-09	1.11E-08	1.11E-08
pd108	5.45E-09	6.81E-09	8.17E-09	9.53E-09	1.09E-08	1.09E-08
sr 90	6.67E-09	7.88E-09	8.06E-09	9.91E-09	1.07E-08	1.07E-08
ce140	5.35E-09	6.69E-09	8.03E-09	9.37E-09	1.07E-08	1.07E-08
xe132	4.83E-09	6.03E-09	7.24E-09	8.45E-09	9.65E-09	9.65E-09
rh105	8.32E-09	8.34E-09	8.34E-09	8.34E-09	8.34E-09	8.31E-09
mo 98	3.34E-09	4.18E-09	5.01E-09	5.85E-09	6.69E-09	6.69E-09
mo100	3.22E-09	4.03E-09	4.84E-09	5.64E-09	6.45E-09	6.45E-09
pd107	3.21E-09	4.01E-09	4.81E-09	5.61E-09	6.42E-09	6.42E-09
xe134	3.17E-09	3.96E-09	4.75E-09	5.54E-09	6.33E-09	6.33E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 14
0 fraction of total absorption rate
0 powers .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
initial 9131.3 d 10937.6 d 12783.8 d 14610.1 d 14610.2 d

zr 92	2.57E-09	3.22E-09	3.86E-09	4.50E-09	5.15E-09	5.15E-09
i127	2.08E-09	2.60E-09	3.12E-09	3.65E-09	4.17E-09	4.17E-09
zr 96	2.04E-09	2.55E-09	3.06E-09	3.57E-09	4.08E-09	4.08E-09
ru104	1.98E-09	2.48E-09	2.97E-09	3.47E-09	3.96E-09	3.96E-09
nd150	1.78E-09	2.22E-09	2.66E-09	3.11E-09	3.55E-09	3.55E-09
xe136	1.71E-09	2.14E-09	2.57E-09	3.00E-09	3.42E-09	3.42E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09
kr 81	1.29E-09	1.61E-09	1.93E-09	2.26E-09	2.58E-09	2.58E-09
rb 85	1.16E-09	1.41E-09	1.71E-09	2.02E-09	2.32E-09	2.32E-09
cs137	1.48E-09	1.66E-09	1.89E-09	2.10E-09	2.28E-09	2.28E-09
zr 94	1.09E-09	1.37E-09	1.64E-09	1.91E-09	2.19E-09	2.19E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
cd111	8.51E-10	1.04E-09	1.25E-09	1.46E-09	1.66E-09	1.66E-09
ce141	1.59E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
te130	7.77E-10	9.72E-10	1.17E-09	1.36E-09	1.56E-09	1.56E-09
sm154	7.55E-10	9.44E-10	1.13E-09	1.32E-09	1.51E-09	1.51E-09
rb 87	7.28E-10	9.10E-10	1.09E-09	1.27E-09	1.46E-09	1.46E-09
sb 77	5.15E-10	6.44E-10	7.73E-10	9.02E-10	1.03E-09	1.03E-09
pm149	9.67E-10	9.74E-10	9.74E-10	9.74E-10	9.74E-10	9.67E-10
nd147	9.32E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10	9.32E-10
zr 90	2.13E-10	3.20E-10	4.44E-10	5.84E-10	7.36E-10	7.36E-10
pd106	3.42E-10	4.34E-10	5.26E-10	6.18E-10	7.10E-10	7.10E-10
kr 84	3.44E-10	4.30E-10	5.17E-10	6.03E-10	6.89E-10	6.89E-10

ce144	6.02E-10	6.02E-10	6.02E-10	6.02E-10	6.02E-10	6.02E-10
kr 85	4.16E-10	4.60E-10	4.91E-10	5.14E-10	5.31E-10	5.31E-10
se 79	2.64E-10	3.30E-10	3.96E-10	4.62E-10	5.28E-10	5.28E-10
sb121	2.51E-10	3.14E-10	3.77E-10	4.40E-10	5.02E-10	5.02E-10
sb123	2.03E-10	2.54E-10	3.07E-10	3.58E-10	4.10E-10	4.10E-10
kr 86	1.91E-10	2.39E-10	2.87E-10	3.34E-10	3.82E-10	3.82E-10
ru103	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10
te128	1.71E-10	2.13E-10	2.56E-10	2.99E-10	3.41E-10	3.41E-10
gd156	1.32E-10	1.65E-10	1.99E-10	2.33E-10	2.67E-10	2.67E-10
se 80	1.23E-10	1.54E-10	1.85E-10	2.16E-10	2.46E-10	2.46E-10
dy161	1.08E-10	1.35E-10	1.61E-10	1.88E-10	2.16E-10	2.16E-10
te125	8.69E-11	1.14E-10	1.41E-10	1.68E-10	1.95E-10	1.95E-10
zr 95	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
eu152	2.43E-11	4.66E-11	7.23E-11	1.08E-10	1.52E-10	1.52E-10
tb159	7.30E-11	9.13E-11	1.09E-10	1.28E-10	1.46E-10	1.46E-10
Y 91	1.43E-10	1.46E-10	1.46E-10	1.46E-10	1.43E-10	1.43E-10
Li 6	7.00E-11	8.76E-11	1.05E-10	1.23E-10	1.40E-10	1.40E-10
cd112	7.00E-11	8.74E-11	1.05E-10	1.22E-10	1.40E-10	1.40E-10
sn117	5.54E-11	6.93E-11	8.31E-11	9.70E-11	1.11E-10	1.11E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
sn119	4.56E-11	5.70E-11	6.84E-11	7.98E-11	9.11E-11	9.11E-11
eu154	3.43E-11	4.46E-11	5.95E-11	7.29E-11	8.65E-11	8.65E-11
sn115	4.17E-11	5.21E-11	6.26E-11	7.30E-11	8.34E-11	8.34E-11
sr 88	3.51E-11	4.39E-11	5.27E-11	6.15E-11	7.03E-11	7.03E-11
pd110	2.51E-11	3.14E-11	3.77E-11	4.40E-11	5.03E-11	5.03E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 15
0 fraction of total absorption rate
power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
0 initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

cd114	2.46E-11	3.07E-11	3.70E-11	4.32E-11	4.95E-11	4.95E-11
gd158	2.37E-11	3.00E-11	3.63E-11	4.28E-11	4.94E-11	4.94E-11
se 82	2.38E-11	2.98E-11	3.58E-11	4.17E-11	4.77E-11	4.77E-11
ba140	4.72E-11	4.74E-11	4.74E-11	4.74E-11	4.74E-11	4.72E-11
sn126	1.91E-11	2.38E-11	2.86E-11	3.34E-11	3.82E-11	3.82E-11
sm153	3.72E-11	3.81E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
se 78	1.81E-11	2.44E-11	3.71E-11	3.17E-11	3.62E-11	3.62E-11
eu156	3.42E-11	3.41E-11	3.42E-11	3.43E-11	3.62E-11	3.42E-11
sr 89	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11
sn124	1.44E-11	1.82E-11	2.19E-11	2.55E-11	2.92E-11	2.92E-11
dy162	1.41E-11	1.77E-11	2.12E-11	2.48E-11	2.83E-11	2.83E-11
dy164	1.28E-11	1.60E-11	1.93E-11	2.25E-11	2.58E-11	2.58E-11
ru106	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11
as 75	1.08E-11	1.35E-11	1.62E-11	1.89E-11	2.16E-11	2.16E-11
ce143	1.69E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.69E-11
ru 99	5.51E-12	7.76E-12	1.03E-11	1.33E-11	1.66E-11	1.66E-11
la140	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
sb125	1.48E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
gd152	1.77E-12	3.52E-12	6.17E-12	9.91E-12	1.49E-11	1.49E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
sn118	5.06E-12	7.45E-12	8.94E-12	1.04E-11	1.19E-11	1.19E-11
ba136	5.73E-12	7.20E-12	8.66E-12	1.01E-11	1.16E-11	1.16E-11
se134	5.17E-12	6.47E-12	7.82E-12	9.18E-12	1.05E-11	1.05E-11
Y 90	6.34E-12	7.49E-12	8.51E-12	9.41E-12	1.02E-11	1.02E-11
cd116	5.05E-12	6.32E-12	7.58E-12	8.84E-12	1.01E-11	1.01E-11
sn122	5.02E-12	6.27E-12	7.52E-12	8.77E-12	1.00E-11	1.00E-11
pm148m	9.75E-12	9.64E-12	9.65E-12	9.66E-12	9.66E-12	9.64E-12
in115	2.94E-12	4.29E-12	5.79E-12	7.40E-12	9.10E-12	9.10E-12
kr 87	8.14E-12	2.30E-11	2.30E-11	2.29E-11	2.29E-11	8.14E-12

sn120	3.76E-12	4.70E-12	5.43E-12	6.57E-12	7.51E-12	7.51E-12
te127m	7.42E-12	7.43E-12	7.43E-12	7.43E-12	7.43E-12	7.43E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
kr 82	3.17E-12	3.98E-12	4.78E-12	5.59E-12	6.41E-12	6.41E-12
dy163	3.12E-12	3.90E-12	4.69E-12	5.48E-12	6.27E-12	6.27E-12
ge 73	2.93E-12	3.67E-12	4.40E-12	5.14E-12	5.87E-12	5.87E-12
xe130	1.96E-12	2.46E-12	2.97E-12	3.48E-12	4.00E-12	4.00E-12
gd154	7.50E-13	1.28E-12	1.99E-12	2.86E-12	3.92E-12	3.92E-12
mo 96	1.43E-12	1.82E-12	2.21E-12	2.61E-12	3.02E-12	3.02E-12
ru100	7.53E-13	1.09E-12	1.49E-12	1.94E-12	2.46E-12	2.46E-12
ge 76	1.07E-12	1.33E-12	1.60E-12	1.87E-12	2.14E-12	2.14E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
sm148	4.61E-13	6.76E-13	9.50E-13	1.22E-12	1.55E-12	1.55E-12
gd160	4.78E-13	8.47E-13	1.02E-12	1.19E-12	1.56E-12	1.56E-12
nd142	3.39E-13	5.29E-13	7.41E-13	1.03E-12	1.35E-12	1.35E-12
ba134	2.94E-13	4.68E-13	6.81E-13	9.35E-13	1.23E-12	1.23E-12
ba135	2.78E-13	4.30E-13	6.15E-13	8.33E-13	1.08E-12	1.08E-12
te126	5.25E-13	6.59E-13	7.94E-13	9.29E-13	1.07E-12	1.07E-12
pd104	2.24E-13	3.50E-13	5.83E-13	6.84E-13	8.93E-13	8.93E-13
ho165	2.14E-13	2.48E-13	3.22E-13	3.77E-13	4.32E-13	4.32E-13

1 sas2h: far-field crit based on bkw 15x15 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16
0 fraction of total absorption rate
0 powerm .00mw, burnup= 58.mwd, fluxr 2.81E+08n/cm**2-sec
initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

pm148	3.76E-13	3.73E-13	3.73E-13	3.73E-13	3.73E-13	3.70E-13
ag111	3.17E-13	3.18E-13	3.19E-13	3.19E-13	3.19E-13	3.18E-13
eu157	2.76E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.75E-13
te124	1.23E-13	1.54E-13	1.85E-13	2.17E-13	2.48E-13	2.48E-13
sr 87	1.22E-13	1.53E-13	1.84E-13	2.14E-13	2.45E-13	2.45E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.36E-13
nb 94	6.97E-14	8.72E-14	1.05E-13	1.22E-13	1.40E-13	1.40E-13
cd110	3.40E-14	5.16E-14	7.28E-14	9.77E-14	1.26E-13	1.26E-13
ge 74	5.92E-14	7.40E-14	8.89E-14	1.04E-13	1.19E-13	1.19E-13
br 79	2.17E-14	3.39E-14	4.87E-14	6.63E-14	8.65E-14	8.65E-14
ge 72	3.98E-14	4.97E-14	5.97E-14	6.96E-14	7.96E-14	7.96E-14
sr 86	3.50E-14	4.40E-14	5.51E-14	6.22E-14	7.14E-14	7.14E-14
nb 93	1.81E-14	1.88E-14	5.11E-14	4.72E-14	6.75E-14	6.75E-14
se136	5.58E-14	5.63E-14	5.64E-14	5.66E-14	5.67E-14	5.65E-14
xe129	1.22E-14	1.91E-14	3.75E-14	3.74E-14	4.89E-14	4.89E-14
se 76	2.32E-14	2.90E-14	3.49E-14	4.07E-14	4.66E-14	4.66E-14
ag107	1.14E-14	1.79E-14	2.57E-14	3.50E-14	4.58E-14	4.58E-14
sn125	2.01E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.01E-14
ru105	2.27E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.27E-14
xe128	6.69E-15	8.73E-15	1.09E-14	1.33E-14	1.57E-14	1.57E-14
dy160	3.98E-15	7.08E-15	1.02E-14	1.36E-14	1.51E-14	1.51E-14
er166	5.69E-15	7.17E-15	8.68E-15	1.02E-14	1.18E-14	1.18E-14
sn123	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14
te132	9.40E-15	9.56E-15	9.56E-15	9.56E-15	8.56E-15	9.40E-15
rb 88	8.81E-15	1.29E-14	1.29E-14	1.29E-14	1.29E-14	8.82E-15
i135	6.28E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	6.28E-15
kr 83	1.46E-15	2.08E-15	2.50E-15	2.92E-15	2.24E-15	1.46E-15
sb126	3.02E-15	3.05E-15	3.06E-15	3.06E-15	3.07E-15	3.06E-15
sb124	2.11E-15	2.12E-15	2.12E-15	2.12E-15	2.12E-15	2.12E-15
sn116	5.34E-16	8.14E-16	1.15E-15	1.35E-15	2.01E-15	1.01E-15
in117m	1.84E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	1.84E-15
te122	4.12E-16	5.73E-16	7.63E-16	9.75E-16	1.21E-15	1.21E-15
te134	8.64E-16	1.05E-15	1.05E-15	1.05E-15	1.05E-15	8.66E-16
tb160	5.06E-16	5.57E-16	6.08E-16	6.60E-16	7.11E-16	7.11E-16
i130	8.65E-16	7.46E-16	7.52E-16	7.59E-16	7.65E-16	6.89E-16

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     in117      5.47E-16  6.15E-16  6.15E-16  6.15E-16  6.15E-16  5.47E-16
     be  9      1.34E-16  1.68E-16  2.01E-16  2.35E-16  2.69E-16  2.69E-16
     pr142      1.30E-16  1.74E-16  2.08E-16  2.43E-16  2.78E-16  2.59E-16
     rb 86      2.48E-16  2.51E-16  2.53E-16  2.55E-16  2.57E-16  2.56E-16
     te123      1.18E-16  1.48E-16  1.78E-16  2.09E-16  2.39E-16  2.39E-16
     dy165      1.26E-16  2.16E-16  2.18E-16  2.19E-16  2.20E-16  1.28E-16
     li  7      5.40E-17  6.74E-17  8.09E-17  9.44E-17  1.08E-16  1.08E-16
     er167      2.43E-17  3.13E-17  3.86E-17  4.63E-17  5.43E-17  5.43E-17
     ge 75      3.38E-17  8.63E-17  8.63E-17  8.63E-17  8.63E-17  3.38E-17
     cd118      2.47E-17  1.20E-16  1.20E-16  1.20E-16  1.20E-16  2.46E-17
     cd108      1.15E-18  1.45E-18  1.77E-18  2.09E-18  2.42E-18  2.42E-18
     cs134m     6.58E-19  1.28E-18  1.53E-18  1.79E-18  2.04E-18  1.29E-18
     in119m     4.20E-19  3.01E-17  3.01E-17  3.01E-17  3.01E-17  4.19E-19
     cd109      2.18E-19  2.25E-19  2.35E-19  2.42E-19  2.52E-19  2.52E-19
1    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  17
0                                  fraction of total absorption rate
         power=     .00mw, burnup=     58.mwd, flux= 2.81E+08n/cm**2-sec
0              initial  9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

     sn114      4.70E-20  7.72E-20  1.17E-19  1.68E-19  2.32E-19  2.32E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  18
       power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
              charge  9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d
      h  1   1.76E-06  2.19E-06  2.62E-06  3.05E-06  3.48E-06  3.48E-06
      h  2   5.22E-09  6.50E-09  7.77E-09  9.05E-09  1.03E-08  1.03E-08
      h  3   2.30E-11  2.55E-11  2.74E-11  2.89E-11  2.99E-11  2.99E-11
      h  4    .00E+00  1.04E-34  1.11E-34  1.17E-34  1.22E-34   .00E+00
      he  3  1.53E-11  2.21E-11  2.84E-11  3.75E-11  4.57E-11  4.57E-11
      he  4  2.91E-07  3.42E-07  4.33E-07  5.04E-07  5.75E-07  5.75E-07
      he  6   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      ne 20  3.50E-08  4.35E-08  5.20E-08  6.06E-08  6.91E-08  6.91E-08
      ne 21  7.53E-14  3.88E-14  5.49E-14  7.36E-14  9.49E-14  9.49E-14
      ne 22  1.84E-10  2.42E-10  2.97E-10  3.53E-10  4.09E-10  4.09E-10
      ne 23  7.28E-30  7.10E-15  7.10E-15  7.10E-15  7.10E-15  7.10E-30
      na 22  4.26E-11  4.19E-11  4.18E-11  4.17E-11  4.17E-11  4.17E-11
      na 23  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
      na 24  3.33E-08  3.07E-08  3.07E-08  3.07E-08  3.07E-08  2.81E-08
      na 24m 5.99E-30  5.05E-15  5.05E-15  5.05E-15  5.05E-15  5.05E-30
      mg 25  1.21E-42  1.30E-27  1.81E-27  2.14E-27  2.47E-27  2.53E-42
      mg 26  3.02E-06  3.66E-06  4.30E-06  4.93E-06  5.57E-06  5.57E-06
      mg 25  4.07E-11  5.14E-11  6.24E-11  7.36E-11  8.50E-11  8.50E-11
      mg 26  5.22E-09  6.50E-09  7.77E-09  9.05E-09  1.03E-08  1.03E-08
      mg 27  4.70E-16  2.12E-12  2.12E-12  2.12E-12  2.12E-12  4.59E-16
      mg 28  4.14E-24  4.32E-24  4.32E-24  4.32E-24  4.32E-24  4.83E-24
      al 27  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
      al 28  3.67E-25  2.28E-10  2.28E-10  2.28E-10  2.28E-10  3.10E-25
      al 29  3.18E-32  9.14E-27  1.30E-26  1.75E-26  2.27E-26  1.19E-31
      al 30   .00E+00  4.23E-39  7.28E-39  1.15E-38  1.70E-38   .00E+00
      si 28  8.79E-04  1.06E-03  1.25E-03  1.44E-03  1.62E-03  1.62E-03
      si 29  2.24E-11  3.51E-11  5.00E-11  6.73E-11  8.69E-11  8.69E-11
      si 30  6.21E-19  1.21E-18  2.09E-18  3.30E-18  4.89E-18  4.89E-18
      si 31  2.68E-31  8.71E-31  1.50E-30  2.37E-30  3.51E-30  2.11E-30
      si 32  1.55E-38  5.78E-38  7.81E-38  1.44E-37  2.44E-37  2.44E-37
    totals   5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0   flux               2.81E+08  2.81E+08  2.81E+08  2.81E+08  2.81E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  19
```

0 power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	9131.3 d	10957.6 d	12783.8 d	14610.1 d	14610.2 d
he 4	1.33E-03	1.75E-03	2.21E-03	2.70E-03	3.22E-03	3.22E-03
pb206	1.79E-11	4.28E-11	8.69E-11	1.57E-10	2.62E-10	2.62E-10
pb207	5.52E-10	1.06E-09	1.74E-09	2.67E-09	3.86E-09	3.86E-09
pb208	2.81E-10	5.05E-10	7.97E-10	1.16E-09	1.59E-09	1.59E-09
pb209	5.60E-16	8.70E-16	1.25E-15	1.71E-15	2.23E-15	2.24E-15
pb210	1.17E-10	2.20E-10	3.67E-10	5.63E-10	8.13E-10	8.13E-10
pb211	7.85E-15	1.17E-14	1.61E-14	2.10E-14	2.62E-14	2.62E-14
pb212	6.81E-14	9.03E-14	1.14E-13	1.38E-13	1.62E-13	1.62E-13
pb214	1.45E-15	2.33E-15	3.35E-15	4.56E-15	5.95E-15	5.77E-15
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	8.87E-12	1.33E-11	2.33E-11	3.70E-11	5.33E-11	5.53E-11
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	7.17E-14	1.35E-13	2.26E-13	3.46E-13	5.00E-13	5.00E-13
bi211	4.69E-16	6.94E-16	9.35E-16	1.24E-15	1.56E-15	1.56E-15
bi212	6.27E-15	8.57E-15	1.08E-14	1.31E-14	1.53E-14	1.53E-14
bi213	1.26E-16	2.03E-16	2.93E-16	3.99E-16	5.21E-16	5.05E-16
bi214	1.09E-15	1.73E-15	2.69E-15	3.38E-15	4.42E-15	4.34E-15
ra222	1.32E-27	1.66E-27	2.05E-27	2.42E-27	2.80E-27	2.80E-27
ra223	3.58E-12	5.34E-12	7.35E-12	9.57E-12	1.20E-11	1.20E-11
ra224	5.66E-13	7.46E-13	9.44E-13	1.14E-12	1.33E-12	1.33E-12
ra225	6.08E-14	9.51E-14	1.37E-13	1.86E-13	2.44E-13	2.44E-13
ra226	4.68E-08	7.39E-08	1.05E-07	1.43E-07	1.87E-07	1.87E-07
ra228	2.63E-14	3.62E-14	4.63E-14	5.67E-14	6.71E-14	6.71E-14
ac225	6.11E-14	6.42E-14	9.25E-14	1.26E-13	1.65E-13	1.65E-13
ac227	2.49E-09	3.71E-09	5.10E-09	6.64E-09	8.31E-09	8.31E-09
ac228	3.21E-18	4.41E-18	5.65E-18	6.92E-18	8.19E-18	8.19E-18
th224	6.42E-26	8.12E-26	9.98E-26	1.18E-25	1.37E-25	1.36E-25
th227	5.78E-12	8.62E-12	1.19E-11	1.54E-11	1.93E-11	1.93E-11
th228	1.04E-10	1.42E-10	1.80E-10	2.17E-10	2.55E-10	2.55E-10
th229	1.18E-08	1.85E-08	2.66E-08	3.63E-08	4.74E-08	4.74E-08
th230	5.11E-04	6.39E-04	7.66E-04	8.94E-04	1.02E-03	1.02E-03
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	1.03E-04	1.29E-04	1.55E-04	1.81E-04	2.07E-04	2.07E-04
th233	2.66E-17	1.19E-15	1.43E-15	1.66E-15	1.90E-15	5.29E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.44E-05	1.80E-05	2.16E-05	2.52E-05	2.88E-05	2.88E-05
pa232	2.37E-13	3.09E-13	3.71E-13	4.33E-13	4.95E-13	4.76E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.21E-23	7.87E-23	9.47E-23	1.13E-22	1.32E-22	1.32E-22
u231	2.14E-19	2.63E-19	3.16E-19	3.68E-19	4.21E-19	4.16E-19
u232	4.57E-09	5.96E-09	7.33E-09	8.68E-09	1.00E-08	1.00E-08
u233	2.72E-04	3.40E-04	4.08E-04	4.76E-04	5.45E-04	5.45E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.21E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06	3.12E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04

1 ssszh: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 20

0 power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

charge 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

```
      u239   1.09E-08  3.22E-07  3.22E-07  3.22E-07  3.22E-07  1.07E-08
      u240    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   9.07E-12  8.80E-12  8.79E-12  8.79E-12  8.79E-12  8.79E-12
    np236m   2.03E-12  2.09E-12  2.09E-12  2.09E-12  2.09E-12  1.97E-12
     np236   4.10E-09  5.09E-09  4.08E-09  7.07E-09  8.06E-09  8.06E-09
     np237   4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
     np238   1.34E-06  1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.32E-06
     np239   4.67E-05  4.65E-05  4.65E-05  4.65E-05  4.65E-05  4.57E-05
    np240m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   2.48E-15  9.48E-15  9.48E-15  9.48E-15  9.48E-15  2.61E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.16E-09  1.14E-09  1.14E-09  1.13E-09  1.13E-09  1.13E-09
     pu237   3.43E-14  4.31E-14  5.08E-14  5.81E-14  6.51E-14  6.50E-14
     pu238   3.49E-03  4.27E-03  5.02E-03  5.73E-03  6.44E-03  6.44E-03
     pu239   1.02E-01  1.27E-01  1.52E-01  1.77E-01  2.02E-01  2.02E-01
     pu240   1.01E-05  1.57E-05  2.25E-05  3.06E-05  3.98E-05  3.98E-05
     pu241   1.10E-09  2.02E-09  3.29E-09  4.96E-09  7.05E-09  7.05E-09
     pu242   4.75E-14  1.12E-13  2.25E-13  4.04E-13  6.71E-13  6.71E-13
     pu243   7.97E-23  2.40E-22  4.81E-22  8.65E-22  1.43E-21  1.10E-21
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   7.10E-26  1.79E-25  3.53E-25  6.25E-25  1.02E-24  9.12E-25
     am240   3.54E-23  8.19E-23  1.62E-22  2.86E-22  4.67E-22  4.55E-22
     am241   2.76E-10  6.42E-10  1.27E-09  2.24E-09  3.66E-09  3.66E-09
    am242m   2.88E-15  8.38E-15  1.99E-14  4.12E-14  7.70E-14  7.70E-14
     am242   8.96E-18  2.25E-17  4.45E-17  7.88E-17  1.29E-16  1.19E-16
     am243   7.89E-19  2.51E-18  6.50E-18  1.46E-17  2.94E-17  2.94E-17
    am244m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   5.44E-27  1.03E-26  2.00E-26  1.12E-25  2.26E-25  1.98E-25
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    totals   3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
      flux               2.81E+08  2.81E+08  2.81E+08  2.81E+08  2.81E+08
0
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        2q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
```

```
         *                                                                      *
         *          prelim lwr origen-s binary working library--id = 1143       *
         *       made from modified card-image origen-s libraries of scale 4.2  *
         *     data from the light element, actinide, and fission product libraries *
         *       decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                      *
         *     neutron flux spectrum factors and cross sections were produced from *
         *    the "process2" case updating all nuclides on the scale "burnup" library *
         *                                                                      *
         *                  fission product yields are from endf/b-v            *
         *                                                                      *
         *            photon libraries use an 18-energy-group structure         *
         *           the photon data are from the master photon data base,      *
         *            produced to include bremsstrahlung from uo2 matrix        *
         *                                                                      *
         *       see information above this box (if present) for later updates  *
         *                                                                      *
         ************************************************************************
         *                                                                      *
0        ************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  fc33f001
0               8/28/1996    date library was produced
0                  1697    total number of nuclides in library
                    489    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0        ************************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   21
       power=    .00mw, burnup=      88.mwd, flux= 2.74E+08n/cm**2-sec
0                                                   basis =
0   (note, k-infinities, sled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      16436.4 d      18262.7 d      20088.9 d      21915.2 d      21915.2 d
    productions  1.122645E+06  1.122682E+06  1.122719E+06  1.122756E+06  1.122793E+06  1.122793E+06
    absorptions  9.163268E+05  9.163854E+05  9.164438E+05  9.165019E+05  9.165596E+05  9.165596E+05
    k infinity   1.225158E+00  1.225120E+00  1.225083E+00  1.225045E+00  1.225009E+00  1.225009E+00
0                 initial      16436.4 d      18262.7 d      20088.9 d      21915.2 d      21915.2 d
    actinide
    absorptions  9.127919E+05  9.128138E+05  9.128357E+05  9.128577E+05  9.128795E+05  9.128795E+05
    non-actinide
    abs. fracs.  3.857672E-03  3.897429E-03  3.937006E-03  3.976166E-03  4.015088E-03  4.015088E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   22
8                                 fraction of total absorption rate
       power=    .00mw, burnup=      88.mwd, flux= 2.74E+08n/cm**2-sec
0                initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

    sm149     2.89E-04  3.25E-04  3.59E-04  3.94E-04  4.28E-04  4.28E-04
    sm151     1.08E-05  1.19E-05  1.30E-05  1.40E-05  1.50E-05  1.50E-05
    nd143     5.93E-06  6.68E-06  7.42E-06  8.16E-06  8.90E-06  8.90E-06
    gd155     3.30E-06  3.79E-06  4.28E-06  4.77E-06  5.25E-06  5.25E-06
    gd157     2.93E-06  3.27E-06  3.62E-06  3.96E-06  4.30E-06  4.30E-06
    rh103     2.75E-06  3.09E-06  3.43E-06  3.78E-06  4.12E-06  4.12E-06
    cd113     2.55E-06  2.87E-06  3.18E-06  3.49E-06  3.80E-06  3.80E-06
    xe131     1.87E-06  2.11E-06  2.34E-06  2.58E-06  2.81E-06  2.81E-06
    eu151     1.29E-06  1.61E-06  1.96E-06  2.35E-06  2.76E-06  2.76E-06
    xe135     2.29E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06  2.29E-06
    cs133     1.45E-06  1.64E-06  1.82E-06  2.00E-06  2.18E-06  2.18E-06
    tc 99     1.07E-06  1.20E-06  1.34E-06  1.47E-06  1.60E-06  1.60E-06
    sm147     9.78E-07  1.11E-06  1.25E-06  1.38E-06  1.52E-06  1.52E-06
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```
     nd145    8.31E-07 9.35E-07 1.04E-06 1.14E-06 1.25E-06 1.25E-06
     mo 95    5.70E-07 6.42E-07 7.14E-07 7.86E-07 8.58E-07 8.58E-07
     sm152    4.40E-07 4.95E-07 5.50E-07 6.05E-07 6.61E-07 6.61E-07
     kr 83    3.61E-07 4.06E-07 4.51E-07 4.96E-07 5.41E-07 5.41E-07
     cs135    3.28E-07 3.69E-07 4.10E-07 4.51E-07 4.92E-07 4.92E-07
     ru101    2.54E-07 2.86E-07 3.17E-07 3.49E-07 3.81E-07 3.81E-07
     pr141    2.45E-07 2.76E-07 3.06E-07 3.37E-07 3.68E-07 3.68E-07
     eu153    2.22E-07 2.50E-07 2.78E-07 3.06E-07 3.33E-07 3.33E-07
     la139    2.01E-07 2.26E-07 2.51E-07 2.76E-07 3.01E-07 3.01E-07
     pm147    2.71E-07 2.71E-07 2.71E-07 2.71E-07 2.71E-07 2.71E-07
     eu155    1.58E-07 1.58E-07 1.58E-07 1.58E-07 1.58E-07 1.58E-07
     pd105    8.47E-08 9.53E-08 1.06E-07 1.16E-07 1.27E-07 1.27E-07
     zr 93    8.12E-08 9.13E-08 1.01E-07 1.12E-07 1.22E-07 1.22E-07
      i129    6.23E-08 7.00E-08 7.78E-08 8.56E-08 9.34E-08 9.34E-08
     nd144    5.86E-08 6.61E-08 7.37E-08 8.12E-08 8.87E-08 8.87E-08
     mo 97    4.55E-08 5.12E-08 5.68E-08 6.25E-08 6.82E-08 6.82E-08
     ba137    3.34E-08 4.09E-08 4.88E-08 5.73E-08 6.61E-08 6.61E-08
     ag109    3.20E-08 3.61E-08 4.01E-08 4.42E-08 4.82E-08 4.82E-08
     zr 91    2.13E-08 2.40E-08 2.67E-08 2.94E-08 3.21E-08 3.21E-08
      y 89    2.05E-08 2.31E-08 2.56E-08 2.82E-08 3.08E-08 3.08E-08
     ru102    1.85E-08 2.08E-08 2.32E-08 2.55E-08 2.78E-08 2.78E-08
     sm150    1.22E-08 1.36E-08 1.50E-08 1.29E-08 1.72E-08 1.72E-08
     ce142    1.67E-08 1.88E-08 2.09E-08 2.30E-08 2.51E-08 2.51E-08
     nd148    1.60E-08 1.80E-08 2.01E-08 2.21E-08 2.41E-08 2.41E-08
     nd146    1.35E-08 1.51E-08 1.68E-08 1.85E-08 2.02E-08 2.02E-08
     ba138    1.15E-08 1.30E-08 1.44E-08 1.58E-08 1.73E-08 1.73E-08
     in115    1.11E-08 1.25E-08 1.38E-08 1.52E-08 1.66E-08 1.66E-08
     pd108    1.08E-08 1.22E-08 1.36E-08 1.49E-08 1.63E-08 1.63E-08
     ce140    1.03E-08 1.21E-08 1.35E-08 1.48E-08 1.62E-08 1.62E-08
     xe132    9.64E-09 1.09E-08 1.21E-08 1.33E-08 1.45E-08 1.45E-08
     sr 90    9.08E-08 1.15E-08 1.22E-08 1.28E-08 1.35E-08 1.35E-08
     mo 98    6.65E-09 7.48E-09 8.31E-09 9.15E-09 9.98E-09 9.98E-09
     mo100    6.44E-09 7.25E-09 8.05E-09 8.85E-09 9.66E-09 9.66E-09
     pd107    6.43E-09 7.24E-09 8.04E-09 8.84E-09 9.65E-09 9.65E-09
     xe134    6.34E-09 7.13E-09 7.93E-09 8.74E-09 9.54E-09 9.54E-09
     rh103    6.34E-09 6.37E-09 6.37E-09 6.37E-09 6.38E-09 6.34E-09
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   23
0                                  fraction of total absorption rate
         powers     .00mw, burnup=     88.mwd, flux= 2.74E+08n/cm**2-sec
0                 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

     zr 92    5.16E-09 5.81E-09 6.44E-09 7.10E-09 7.75E-09 7.75E-09
      i127    4.16E-09 4.68E-09 5.20E-09 5.73E-09 6.25E-09 6.25E-09
     zr 94    4.04E-09 4.55E-09 5.05E-09 5.56E-09 6.06E-09 6.06E-09
     ru104    3.96E-09 4.46E-09 4.95E-09 5.45E-09 5.94E-09 5.94E-09
     nd150    3.55E-09 4.00E-09 4.44E-09 4.88E-09 5.33E-09 5.33E-09
     xe136    3.44E-09 3.87E-09 4.30E-09 4.73E-09 5.15E-09 5.15E-09
     br 81    2.57E-09 2.90E-09 3.22E-09 3.54E-09 3.86E-09 3.86E-09
     rb 85    2.32E-09 2.64E-09 2.95E-09 3.26E-09 3.57E-09 3.57E-09
     zr 94    2.18E-09 2.43E-09 2.73E-09 3.00E-09 3.27E-09 3.27E-09
     ce137    2.28E-09 2.44E-09 2.59E-09 2.72E-09 2.83E-09 2.83E-09
     pr143    2.68E-09 2.68E-09 2.68E-09 2.68E-09 2.68E-09 2.68E-09
     cd111    1.67E-09 1.88E-09 2.09E-09 2.30E-09 2.51E-09 2.51E-09
     te130    1.56E-09 1.76E-09 1.95E-09 2.15E-09 2.34E-09 2.34E-09
     xe154    1.51E-09 1.70E-09 1.89E-09 2.08E-09 2.27E-09 2.27E-09
     rb 87    1.46E-09 1.64E-09 1.82E-09 2.00E-09 2.18E-09 2.18E-09
     xe133    2.02E-09 2.02E-09 2.02E-09 2.02E-09 2.02E-09 2.02E-09
     ce141    1.60E-09 1.60E-09 1.60E-09 1.60E-09 1.60E-09 1.60E-09
     se 77    1.04E-09 1.17E-09 1.29E-09 1.42E-09 1.55E-09 1.55E-09
     zr 90    7.38E-10 9.03E-10 1.08E-09 1.26E-09 1.45E-09 1.45E-09
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pd106	7.08E-10	8.00E-10	8.92E-10	9.83E-10	1.08E-09	1.08E-09
kr 84	6.86E-10	7.71E-10	8.57E-10	9.43E-10	1.03E-09	1.03E-09
pm149	9.72E-10	9.79E-10	9.79E-10	9.79E-10	9.79E-10	9.72E-10
nd147	9.28E-10	9.32E-10	9.32E-10	9.32E-10	9.32E-10	9.28E-10
se 79	5.51E-10	5.97E-10	6.44E-10	7.30E-10	7.96E-10	7.96E-10
sb121	5.01E-10	5.64E-10	6.27E-10	6.89E-10	7.52E-10	7.52E-10
sb123	4.09E-10	4.60E-10	5.11E-10	5.62E-10	6.13E-10	6.13E-10
ce144	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10
kr 86	3.84E-10	4.32E-10	4.80E-10	5.28E-10	5.76E-10	5.76E-10
kr 85	3.32E-10	3.44E-10	3.53E-10	3.59E-10	3.64E-10	3.64E-10
te126	3.41E-10	3.84E-10	4.26E-10	4.69E-10	5.12E-10	5.12E-10
eu152	1.53E-10	2.05E-10	2.66E-10	3.35E-10	4.12E-10	4.12E-10
gd156	2.65E-10	2.99E-10	3.33E-10	3.68E-10	4.03E-10	4.03E-10
se 80	2.47E-10	2.78E-10	3.09E-10	3.40E-10	3.71E-10	3.71E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.57E-10
dy161	2.17E-10	2.44E-10	2.71E-10	2.98E-10	3.26E-10	3.26E-10
te125	1.95E-10	2.22E-10	2.49E-10	2.76E-10	3.03E-10	3.03E-10
tb159	1.46E-10	1.64E-10	1.82E-10	2.01E-10	2.19E-10	2.19E-10
li 6	1.41E-10	1.58E-10	1.76E-10	1.94E-10	2.11E-10	2.11E-10
cd112	1.40E-10	1.58E-10	1.75E-10	1.93E-10	2.10E-10	2.10E-10
sn117	1.11E-10	1.25E-10	1.39E-10	1.53E-10	1.67E-10	1.67E-10
zr 95	1.65E-10	1.66E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
eu154	8.69E-11	1.01E-10	1.14E-10	1.28E-10	1.43E-10	1.43E-10
sn119	9.16E-11	1.03E-10	1.14E-10	1.26E-10	1.37E-10	1.37E-10
sn115	8.38E-11	9.43E-11	1.05E-10	1.15E-10	1.26E-10	1.26E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
sr 85	7.05E-11	7.93E-11	8.81E-11	9.69E-11	1.06E-10	1.06E-10
gd158	4.93E-11	5.60E-11	6.28E-11	6.95E-11	7.68E-11	7.68E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 24

0 fraction of total absorption rate

0 powers .80mw burnup= 88.mwd flux= 2.74E+08n/cm**2-sec

0 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

pd110	5.01E-11	5.64E-11	6.26E-11	6.89E-11	7.52E-11	7.52E-11
cd114	4.92E-11	5.55E-11	6.18E-11	6.81E-11	7.44E-11	7.44E-11
se 82	4.78E-11	5.28E-11	5.98E-11	6.58E-11	7.18E-11	7.18E-11
sn126	3.84E-11	4.32E-11	4.80E-11	5.28E-11	5.76E-11	5.76E-11
se 78	3.62E-11	4.07E-11	4.53E-11	4.98E-11	5.43E-11	5.43E-11
gd152	1.50E-11	2.15E-11	2.97E-11	3.88E-11	5.18E-11	5.18E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
sn124	2.90E-11	3.26E-11	3.63E-11	3.99E-11	4.35E-11	4.35E-11
dy162	2.84E-11	3.19E-11	3.55E-11	3.92E-11	4.28E-11	4.28E-11
dy164	2.60E-11	2.93E-11	3.26E-11	3.60E-11	3.94E-11	3.94E-11
sm153	2.73E-11	2.82E-11	2.82E-11	2.82E-11	2.82E-11	2.72E-11
eu156	2.43E-11	2.43E-11	2.43E-11	2.43E-11	2.43E-11	2.43E-11
ru 99	1.45E-11	2.02E-11	2.41E-11	2.84E-11	3.31E-11	3.31E-11
as 75	2.16E-11	2.43E-11	2.70E-11	2.97E-11	3.24E-11	3.24E-11
sr 89	2.08E-11	2.09E-11	2.09E-11	2.09E-11	2.09E-11	2.08E-11
ru106	2.54E-11	2.53E-11	2.53E-11	2.53E-11	2.54E-11	2.54E-11
sn118	1.18E-11	1.33E-11	1.48E-11	1.63E-11	1.78E-11	1.78E-11
ba136	1.36E-11	1.50E-11	1.65E-11	1.60E-11	1.75E-11	1.75E-11
ce143	1.70E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.70E-11
in115	9.30E-12	1.09E-11	1.27E-11	1.46E-11	1.65E-11	1.65E-11
xe134	1.06E-11	1.19E-11	1.32E-11	1.46E-11	1.59E-11	1.59E-11
te140	1.33E-11	1.33E-11	1.33E-11	1.33E-11	1.33E-11	1.33E-11
cd116	1.01E-11	1.13E-11	1.26E-11	1.38E-11	1.51E-11	1.51E-11
sn122	1.01E-11	1.13E-11	1.26E-11	1.38E-11	1.51E-11	1.51E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11

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     mo 99      1.29E-11  1.32E-11  1.32E-11  1.32E-11  1.32E-11  1.29E-11
      y 90      1.03E-11  1.10E-11  1.16E-11  1.21E-11  1.26E-11  1.26E-11
     sn120      7.32E-12  8.45E-12  9.39E-12  1.03E-11  1.13E-11  1.13E-11
     pd154      3.03E-12  5.17E-12  6.60E-12  8.20E-12  1.00E-11  1.00E-11
     kr 82      6.43E-12  7.25E-12  8.07E-12  8.90E-12  9.74E-12  9.74E-12
    pm148m      9.69E-12  9.63E-12  9.64E-12  9.63E-12  9.63E-12  9.62E-12
     dy163      6.28E-12  7.08E-12  7.68E-12  8.09E-12  9.51E-12  9.51E-12
     ge 73      5.89E-12  6.63E-12  7.36E-12  8.10E-12  8.84E-12  8.84E-12
     kr 87      8.19E-12  2.31E-11  2.31E-11  2.31E-11  2.31E-11  8.19E-12
    te127m      7.45E-12  7.46E-12  7.46E-12  7.46E-12  7.46E-12  7.46E-12
      i131      6.76E-12  6.78E-12  6.78E-12  6.78E-12  6.78E-12  6.76E-12
     xe130      4.02E-12  4.54E-12  5.07E-12  5.60E-12  6.13E-12  6.13E-12
     ru100      2.47E-12  3.05E-12  3.68E-12  4.38E-12  5.13E-12  5.13E-12
     mo 96      3.81E-12  3.63E-12  3.86E-12  4.29E-12  4.74E-12  4.74E-12
     sm148      1.55E-12  1.91E-12  2.31E-12  2.73E-12  3.23E-12  3.23E-12
     ge 76      2.14E-12  2.41E-12  2.67E-12  2.94E-12  3.21E-12  3.21E-12
     nd143      1.36E-12  1.72E-12  2.12E-12  2.56E-12  3.05E-12  3.05E-12
     ba134      1.23E-12  1.57E-12  1.94E-12  2.35E-12  2.81E-12  2.81E-12
     ba133      1.08E-12  1.37E-12  1.68E-12  2.03E-12  2.42E-12  2.42E-12
     gd160      1.36E-12  1.53E-12  1.69E-12  1.86E-12  2.04E-12  2.04E-12
     pd104      8.89E-13  1.12E-12  1.39E-12  1.68E-12  1.99E-12  1.99E-12
    te129m      1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12
     te126      1.07E-12  1.20E-12  1.34E-12  1.48E-12  1.62E-12  1.42E-12
     ho165      4.32E-13  4.87E-13  5.43E-13  5.99E-13  6.55E-13  6.55E-13
1    sas2h: far-field crit based on b2v 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page   25
0                                  fraction of total absorption rate
0          powerm     .00mw  burnup=     88.mwd/  fluxm 2.74E+08n/cm**2-sec
                 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

     te124      2.49E-13  2.81E-13  3.12E-13  3.44E-13  3.76E-13  3.76E-13
     sr 87      2.46E-13  2.77E-13  3.07E-13  3.38E-13  3.69E-13  3.69E-13
    pm148      3.68E-13  3.69E-13  3.69E-13  3.69E-13  3.69E-13  3.65E-13
     ag111      3.16E-13  3.18E-13  3.18E-13  3.19E-13  3.19E-13  3.17E-13
     cd110      1.27E-13  1.59E-13  1.95E-13  2.34E-13  2.78E-13  2.78E-13
     au197      2.76E-13  2.98E-13  2.98E-13  2.98E-13  2.99E-13  2.76E-13
    cd115m      2.37E-13  2.37E-13  2.37E-13  2.37E-13  2.37E-13  2.37E-13
     nb 94      1.39E-13  1.57E-13  1.74E-13  1.92E-13  2.09E-13  2.09E-13
     br 79      8.66E-14  1.10E-13  1.33E-13  1.64E-13  1.95E-13  1.95E-13
     nb 93      6.76E-14  9.23E-14  1.22E-13  1.56E-13  1.95E-13  1.95E-13
     ge 74      1.19E-13  1.34E-13  1.49E-13  1.64E-13  1.79E-13  1.79E-13
     ge 72      8.00E-14  9.00E-14  1.00E-13  1.10E-13  1.20E-13  1.20E-13
     xe129      4.89E-14  6.19E-14  7.65E-14  9.25E-14  1.10E-13  1.10E-13
     sr 86      7.17E-14  8.10E-14  9.04E-14  9.98E-14  1.09E-13  1.09E-13
     ag107      4.40E-14  5.82E-14  7.38E-14  8.69E-14  1.03E-13  1.03E-13
     se 76      4.49E-14  5.28E-14  5.88E-14  6.48E-14  7.08E-14  7.08E-14
     se136      5.43E-14  5.67E-14  5.68E-14  5.70E-14  5.71E-14  5.69E-14
     sn125      2.90E-14  2.92E-14  2.92E-14  2.92E-14  2.92E-14  2.90E-14
     dy160      1.51E-14  1.79E-14  2.08E-14  2.40E-14  2.73E-14  2.73E-14
     xe128      1.58E-14  1.84E-14  2.12E-14  2.42E-14  2.72E-14  2.72E-14
     ru105      2.26E-14  2.96E-14  2.96E-14  2.96E-14  2.96E-14  2.24E-14
     er166      1.18E-14  1.34E-14  1.50E-14  1.66E-14  1.83E-14  1.83E-14
     sn123      1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te132      9.43E-15  9.59E-15  9.59E-15  9.59E-15  9.59E-15  9.43E-15
     rb 88      8.86E-15  1.30E-14  1.30E-14  1.30E-14  1.30E-14  8.86E-15
      i135      8.32E-15  1.02E-14  1.02E-14  1.02E-14  1.02E-14  8.32E-15
     kr 80      3.35E-15  2.77E-15  4.20E-15  4.62E-15  5.04E-15  5.04E-15
     sn116      1.99E-15  2.50E-15  3.07E-15  3.69E-15  4.38E-15  4.38E-15
     sb126      3.07E-15  3.09E-15  3.10E-15  3.11E-15  3.12E-15  3.10E-15
     te122      1.21E-15  1.47E-15  1.73E-15  2.06E-15  2.39E-15  2.39E-15
     sb124      2.12E-15  2.13E-15  2.13E-15  2.13E-15  2.13E-15  2.13E-15
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     in117m    1.85E-15  2.10E-15  2.10E-15  2.10E-15  2.11E-15  1.83E-15
     tb160     7.14E-16  7.65E-16  8.16E-16  8.68E-16  9.19E-16  9.19E-16
     te134     8.71E-16  3.88E-15  5.88E-15  5.88E-15  5.88E-15  8.71E-16
      i130     6.90E-16  7.73E-16  7.79E-16  7.86E-16  7.92E-16  7.14E-16
     in117     5.50E-16  6.18E-16  6.18E-16  6.19E-16  6.19E-16  5.50E-16
     ba  9     2.66E-16  3.00E-16  3.33E-16  3.66E-16  4.00E-16  4.00E-16
     pr142     2.60E-16  3.13E-16  3.48E-16  3.83E-16  4.18E-16  3.90E-16
     te123     2.40E-16  2.70E-16  3.01E-16  3.32E-16  3.63E-16  3.63E-16
     rb 86     2.57E-16  2.59E-16  2.61E-16  2.64E-16  2.66E-16  2.65E-16
     li  7     1.08E-16  1.22E-16  1.36E-16  1.49E-16  1.63E-16  1.63E-16
     dy165     1.28E-16  2.22E-16  2.23E-16  2.25E-16  2.26E-16  1.31E-16
     er167     5.45E-17  6.29E-17  7.16E-17  8.08E-17  9.02E-17  9.02E-17
     ge 75     3.40E-17  8.68E-17  8.68E-17  8.68E-17  8.68E-17  3.40E-17
     cd118     2.48E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16  2.48E-17
     cd108     2.42E-18  2.76E-18  3.10E-18  3.46E-18  3.82E-18  2.82E-18
     cs134m    1.30E-18  2.29E-18  2.35E-18  2.81E-18  2.86E-18  1.94E-18
     sn114     2.32E-19  3.07E-19  3.84E-19  4.95E-19  6.10E-19  6.10E-19
     in119m    4.21E-19  3.02E-17  3.02E-17  3.02E-17  3.02E-17  4.21E-19
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  26
0                                  fraction of total absorption rate
        power=     .00mw, burnup=     88.mwd, flux= 2.74E+08n/cm**2-sec
              initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

     cd109     2.53E-19  2.63E-19  2.69E-19  2.80E-19  2.90E-19  2.90E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page  27
       power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d
      h  1   3.48E-06  3.91E-06  4.33E-06  4.76E-06  5.18E-06  5.18E-06
      h  2   1.03E-08  1.16E-08  1.28E-08  1.41E-08  1.54E-08  1.54E-08
      h  3   2.99E-11  3.07E-11  3.13E-11  3.17E-11  3.21E-11  3.21E-11
      h  4    .00E+00  1.25E-34  1.27E-34  1.29E-34  1.30E-34   .00E+00
     he  3   4.57E-11  5.42E-11  6.29E-11  7.18E-11  8.07E-11  8.07E-11
     he  4   5.75E-07  6.46E-07  7.16E-07  7.86E-07  8.57E-07  8.57E-07
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   6.91E-08  7.75E-08  8.60E-08  9.45E-08  1.03E-07  1.03E-07
     ne 21   9.49E-14  1.18E-13  1.44E-13  1.72E-13  2.03E-13  2.03E-13
     ne 22   4.89E-10  4.64E-10  5.19E-10  5.74E-10  6.30E-10  6.30E-10
     ne 23   7.10E-30  7.05E-15  7.05E-15  7.05E-15  7.05E-15  7.05E-30
     na 22   4.17E-11  4.15E-11  4.14E-11  4.14E-11  4.14E-11  4.14E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   2.81E-08  2.85E-08  2.85E-08  2.85E-08  2.85E-08  2.60E-08
     na 24m  2.85E-30  4.68E-15  4.68E-15  4.68E-15  4.68E-15  4.68E-30
     na 25   1.53E-42  2.77E-27  3.11E-27  3.46E-27  3.81E-27  1.85E-42
     mg 26   5.57E-04  6.16E-04  6.75E-04  7.34E-04  7.94E-04  7.94E-04
     mg 25   8.50E-11  9.66E-11  1.09E-10  1.21E-10  1.33E-10  1.33E-10
     mg 26   1.03E-08  1.16E-08  1.28E-08  1.41E-08  1.54E-08  1.54E-08
     mg 27   4.59E-16  2.10E-12  2.10E-12  2.10E-12  2.10E-12  4.55E-16
     mg 28   4.05E-24  4.29E-24  4.29E-24  4.29E-24  4.29E-24  4.05E-24
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.10E-25  2.11E-10  2.11E-10  2.11E-10  2.11E-10  2.08E-25
     al 29   1.19E-31  2.00E-26  2.42E-26  4.10E-26  4.84E-26  8.53E-31
     al 30    .00E+00  5.38E-38  5.24E-38  4.28E-38  5.52E-38   .00E+00
     al 28   1.62E-03  1.79E-03  1.96E-03  2.14E-03  2.31E-03  2.31E-03
     al 29   8.69E-11  1.09E-10  1.33E-10  1.60E-10  1.88E-10  1.88E-10
     al 30   4.89E-18  6.92E-18  9.43E-18  1.25E-17  1.61E-17  1.61E-17
     al 31   2.11E-30  4.97E-30  6.77E-30  8.95E-30  1.15E-29  8.95E-30
     al 32   2.44E-37  3.87E-37  5.86E-37  8.50E-37  1.19E-36  1.19E-36
```

```
  totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                2.74E+08  2.74E+08  2.74E+08  2.74E+08  2.74E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   28
       power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec
0                                                   nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
                 charge 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d
     he  4   3.22E-03  3.77E-03  4.35E-03  4.94E-03  5.60E-03  5.60E-03
     pb206   2.42E-10  4.10E-10  6.10E-10  8.72E-10  1.21E-09  1.21E-09
     pb207   3.86E-09  5.32E-09  7.07E-09  9.13E-09  1.15E-08  1.15E-08
     pb208   1.59E-09  2.08E-09  2.66E-09  3.27E-09  3.96E-09  3.96E-09
     pb209   2.26E-15  2.82E-15  3.49E-15  4.22E-15  5.02E-15  5.05E-15
     pb210   8.13E-10  1.12E-09  1.49E-09  1.92E-09  2.42E-09  2.42E-09
     pb211   2.62E-14  3.18E-14  3.77E-14  4.38E-14  5.02E-14  5.02E-14
     pb212   1.62E-13  1.85E-13  2.08E-13  2.31E-13  2.54E-13  2.54E-13
     pb214   5.77E-15  7.52E-15  9.28E-15  1.12E-14  1.33E-14  1.29E-14
     bi208    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     bi209   5.53E-11  7.88E-11  1.08E-10  1.44E-10  1.87E-10  1.87E-10
     bi210m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     bi210   5.00E-13  6.90E-13  9.16E-13  1.18E-12  1.49E-12  1.49E-12
     bi211   1.36E-15  1.89E-15  2.26E-15  2.60E-15  2.97E-15  2.99E-15
     bi212   1.53E-14  1.75E-14  1.97E-14  2.19E-14  2.41E-14  2.41E-14
     bi213   5.05E-16  6.59E-16  8.14E-16  9.85E-16  1.17E-15  1.16E-15
     bi214   4.34E-15  5.59E-15  6.89E-15  8.33E-15  9.91E-15  9.75E-15
     ra222   2.80E-27  3.03E-27  3.49E-27  3.85E-27  4.21E-27  4.21E-27
     ra223   1.20E-11  1.65E-11  1.72E-11  2.00E-11  2.29E-11  2.29E-11
     ra224   1.33E-12  1.53E-12  1.72E-12  1.91E-12  2.09E-12  2.09E-12
     ra225   2.44E-13  3.08E-13  3.87E-13  4.41E-13  5.48E-13  5.48E-13
     ra226   1.67E-07  2.56E-07  2.91E-07  3.32E-07  4.19E-07  4.19E-07
     ra228   6.71E-14  7.76E-14  8.81E-14  9.87E-14  1.09E-13  1.09E-13
     ac225   1.65E-13  2.08E-13  2.57E-13  3.11E-13  3.70E-13  3.70E-13
     ac227   8.31E-09  1.01E-08  1.19E-08  1.39E-08  1.59E-08  1.59E-08
     ac228   6.19E-18  9.47E-18  1.08E-17  1.20E-17  1.33E-17  1.33E-17
     th226   1.36E-25  1.53E-25  1.70E-25  1.88E-25  2.06E-25  2.05E-25
     th227   1.93E-11  2.34E-11  2.78E-11  3.23E-11  3.69E-11  3.69E-11
     th228   2.35E-10  2.91E-10  3.28E-10  3.64E-10  4.00E-10  4.00E-10
     th229   4.74E-08  6.00E-08  7.40E-08  8.96E-08  1.07E-07  1.07E-07
     th230   1.02E-03  1.15E-03  1.28E-03  1.40E-03  1.53E-03  1.53E-03
     th231   3.02E-09  3.03E-09  3.03E-09  3.03E-09  3.03E-09  3.03E-09
     th232   2.07E-04  2.32E-04  2.58E-04  2.84E-04  3.10E-04  3.10E-04
     th233   2.29E-17  2.33E-15  2.37E-15  2.41E-15  2.84E-15  7.02E-17
     th234   5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07  5.37E-07
     pa231   2.88E-05  2.34E-05  2.60E-05  2.96E-05  4.32E-05  4.32E-05
     pa232   4.74E-13  5.46E-13  6.18E-13  6.80E-13  7.42E-13  7.11E-13
     pa233   1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06
     pa234m  1.81E-11  1.81E-11  1.81E-11  1.81E-11  1.81E-11  1.81E-11
     pa234   8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12
     pa235    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     u230    1.32E-22  1.48E-22  1.63E-22  1.82E-22  1.99E-22  1.99E-22
     u231    4.16E-19  4.67E-19  5.19E-19  5.71E-19  6.23E-19  6.15E-19
     u232    1.00E-08  1.14E-08  1.27E-08  1.40E-08  1.53E-08  1.53E-08
     u233    5.45E-04  6.13E-04  6.81E-04  7.49E-04  8.17E-04  8.17E-04
     u234    9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
     u235    7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
     u236    1.74E+02  1.74E+02  1.75E+02  1.75E+02  1.75E+02  1.75E+02
     u237    3.12E-06  3.11E-06  3.11E-06  3.11E-06  3.11E-06  3.09E-06
     u238    3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   29
```

```
0       power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec
                                                 nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d
      u239   1.07E-08  3.19E-07  3.19E-07  3.19E-07  3.19E-07  1.06E-08
      u240    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   8.79E-12  8.48E-12  8.67E-12  8.67E-12  8.67E-12  8.67E-12
     np236m  1.97E-12  2.06E-12  2.06E-12  2.06E-12  2.06E-12  1.94E-12
     np236   8.06E-09  9.04E-09  1.00E-08  1.10E-08  1.20E-08  1.20E-08
     np237   4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
     np238   1.52E-06  1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.52E-06
     np239   4.57E-05  4.61E-05  4.61E-05  4.61E-05  4.61E-05  4.53E-05
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   2.61E-15  9.37E-15  9.37E-15  9.37E-15  9.37E-15  2.58E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.13E-09  1.12E-09  1.12E-09  1.12E-09  1.12E-09  1.12E-09
     pu237   6.50E-14  7.09E-14  7.73E-14  8.34E-14  8.94E-14  8.93E-14
     pu238   6.44E-03  7.10E-03  7.74E-03  8.35E-03  8.94E-03  8.96E-03
     pu239   2.02E-01  2.27E-01  2.52E-01  2.76E-01  3.01E-01  3.01E-01
     pu240   3.98E-05  5.03E-05  6.20E-05  7.49E-05  8.90E-05  8.90E-05
     pu241   7.05E-09  9.54E-09  1.25E-08  1.59E-08  1.97E-08  1.97E-08
     pu242   6.71E-13  1.05E-12  1.55E-12  2.22E-12  3.06E-12  3.06E-12
     pu243   1.10E-21  2.21E-21  3.28E-21  4.69E-21  6.48E-21  4.95E-21
     pu244    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   9.12E-25  1.54E-24  2.26E-24  3.17E-24  4.32E-24  3.07E-24
     am240   4.55E-22  7.07E-22  1.03E-21  1.45E-21  1.98E-21  1.93E-21
     am241   3.66E-09  5.62E-09  8.22E-09  1.16E-08  1.57E-08  1.57E-08
     am242m  7.70E-14  1.33E-13  2.16E-13  3.34E-13  4.97E-13  4.97E-13
     am242   1.19E-16  1.97E-16  2.88E-16  4.06E-16  5.53E-16  5.10E-16
     am243   2.94E-17  5.46E-17  9.46E-17  1.56E-16  2.46E-16  2.46E-16
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.98E-25  4.15E-25  7.21E-25  1.19E-24  1.88E-24  1.44E-24
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.74E+08  2.74E+08  2.74E+08  2.74E+08  2.74E-07
0        1q array has      20 entries.
0       3q array has       1 entries.
0       3q array has       1 entries.
0       3q array has       1 entries.
0       4q array has       1 entries.
0      54q array has      12 entries.
library information...

         cross-section data taken from position number  4 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
```

```
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *              prelim lwr origen-s binary working library--id = 1143  *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *      data from the light element, actinide, and fission product libraries *
        *        decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "process2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                    fission product yields are from endf/b-v         *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *         see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                .other identification and sizes of library.
0                 date set name:  fc33f001
0              8/28/1996    date library was produced
0                 1697    total number of nuclides in library
                   489    number of light-element nuclides
                   129    number of actinide nuclides
                   879    number of fission product nuclides
0                 7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  30
       power=    .00mw, burnup=    117.mwd, flux= 2.71E+08n/cm**2-sec
                                                 basis =
0
0    (note, k-infinities, eled and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      23741.5 d      25567.7 d      27394.8 d      29220.2 d      29220.3 d
     productions  1.135003E+06  1.135040E+06  1.135077E+06  1.135114E+06  1.135151E+06  1.135151E+06
     absorptions  9.251434E+05  9.252036E+05  9.252616E+05  9.253189E+05  9.253764E+05  9.253763E+05
     k infinity   1.226838E+00  1.226801E+00  1.226764E+00  1.226728E+00  1.226692E+00  1.226692E+00
0                 initial      23741.5 d      25567.7 d      27394.8 d      29220.2 d      29220.3 d
     actinide
     absorptions  9.215212E+05  9.215431E+05  9.215651E+05  9.215869E+05  9.216088E+05  9.216088E+05
     non-actinide
     abs. fracs.  3.917515E-03  3.936497E-03  3.995001E-03  4.033267E-03  4.071355E-03  4.071295E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products  page  31
0                                  fraction of total absorption rate
       power=    .00mw, burnup=    117.mwd, flux= 2.71E+08n/cm**2-sec
0              initial 23741.5 d 25567.7 d 27394.8 d 29220.2 d 29220.3 d

     sm149     4.29E-04  4.63E-04  4.97E-04  5.31E-04  5.64E-04  5.64E-04
     sm151     1.50E-05  1.60E-05  1.69E-05  1.78E-05  1.87E-05  1.87E-05
     nd143     8.92E-06  9.66E-06  1.04E-05  1.12E-05  1.19E-05  1.19E-05
     gd155     5.27E-06  5.75E-06  6.24E-06  6.72E-06  7.20E-06  7.20E-06
     gd157     4.51E-06  4.84E-06  4.97E-06  5.30E-06  5.63E-06  5.63E-06
     rh103     4.12E-06  4.46E-06  4.81E-06  5.15E-06  5.50E-06  5.50E-06
     sd115     3.81E-06  4.12E-06  4.42E-06  4.73E-06  5.04E-06  5.04E-06
     eu151     2.76E-06  3.20E-06  3.67E-06  4.18E-06  4.68E-06  4.68E-06
     xe131     2.81E-06  3.04E-06  3.27E-06  3.51E-06  3.74E-06  3.74E-06
```

cs133	2.18E-06	2.36E-06	2.54E-06	2.72E-06	2.90E-06	2.90E-06
xe135	2.29E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.29E-06
tc 99	1.60E-06	1.74E-06	1.87E-06	2.00E-06	2.14E-06	2.14E-06
sm147	1.52E-06	1.65E-06	1.79E-06	1.92E-06	2.05E-06	2.05E-06
nd145	1.25E-06	1.35E-06	1.45E-06	1.56E-06	1.66E-06	1.66E-06
mo 95	8.58E-07	9.30E-07	1.00E-06	1.07E-06	1.15E-06	1.15E-06
sm152	6.40E-07	7.15E-07	7.70E-07	8.26E-07	8.81E-07	8.81E-07
kr 83	5.42E-07	5.87E-07	6.32E-07	6.78E-07	7.23E-07	7.23E-07
cs135	4.91E-07	5.32E-07	5.73E-07	6.14E-07	6.55E-07	6.55E-07
ru101	3.80E-07	4.12E-07	4.43E-07	4.75E-07	5.06E-07	5.06E-07
pr141	3.68E-07	3.99E-07	4.29E-07	4.60E-07	4.91E-07	4.91E-07
eu153	3.33E-07	3.61E-07	3.89E-07	4.17E-07	4.44E-07	4.44E-07
la139	3.01E-07	3.26E-07	3.52E-07	3.77E-07	4.02E-07	4.02E-07
pm147	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07
pd105	1.27E-07	1.38E-07	1.48E-07	1.59E-07	1.69E-07	1.69E-07
zr 93	1.22E-07	1.32E-07	1.42E-07	1.52E-07	1.62E-07	1.62E-07
eu155	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
i129	9.36E-08	1.01E-07	1.09E-07	1.17E-07	1.25E-07	1.25E-07
nd144	8.89E-08	9.64E-08	1.04E-07	1.12E-07	1.19E-07	1.19E-07
ba137	6.62E-08	7.34E-08	8.49E-08	9.66E-08	1.05E-07	1.05E-07
mo 97	6.83E-08	7.39E-08	7.96E-08	8.53E-08	9.10E-08	9.10E-08
ag109	4.82E-08	5.22E-08	5.63E-08	6.04E-08	6.45E-08	6.45E-08
sm150	2.72E-08	3.19E-08	3.69E-08	4.23E-08	4.80E-08	4.80E-08
zr 91	3.21E-08	3.48E-08	3.75E-08	4.02E-08	4.28E-08	4.28E-08
y 89	3.08E-08	3.34E-08	3.60E-08	3.86E-08	4.11E-08	4.11E-08
ru102	2.78E-08	3.01E-08	3.25E-08	3.48E-08	3.71E-08	3.71E-08
ce142	2.51E-08	2.72E-08	2.93E-08	3.14E-08	3.35E-08	3.35E-08
nd148	2.41E-08	2.61E-08	2.81E-08	3.01E-08	3.21E-08	3.21E-08
nd146	2.02E-08	2.19E-08	2.36E-08	2.53E-08	2.70E-08	2.70E-08
ba138	1.73E-08	1.87E-08	2.02E-08	2.16E-08	2.31E-08	2.31E-08
in115	1.46E-08	1.80E-08	1.94E-08	2.08E-08	2.21E-08	2.21E-08
pd108	1.42E-08	1.76E-08	1.90E-08	2.03E-08	2.17E-08	2.17E-08
ce140	1.42E-08	1.75E-08	1.89E-08	2.02E-08	2.16E-08	2.16E-08
xe132	1.45E-08	1.57E-08	1.69E-08	1.81E-08	1.93E-08	1.93E-08
sr 90	1.33E-08	1.38E-08	1.42E-08	1.45E-08	1.48E-08	1.48E-08
mo 98	9.96E-09	1.08E-08	1.16E-08	1.24E-08	1.33E-08	1.33E-08
pd107	9.46E-09	1.05E-08	1.13E-08	1.21E-08	1.29E-08	1.29E-08
mo100	9.45E-09	1.05E-08	1.13E-08	1.21E-08	1.29E-08	1.29E-08
xe134	9.55E-09	1.03E-08	1.11E-08	1.19E-08	1.27E-08	1.27E-08
zr 92	7.76E-09	8.40E-09	9.05E-09	9.69E-09	1.03E-08	1.03E-08

1 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 32
0 fraction of total absorption rate
power= .00mw, burnup= 117.gwd, flux= 2.71E+08n/cm**2-sec
0 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

rh103	8.35E-09	8.39E-09	8.39E-09	8.39E-09	8.39E-09	8.36E-09
i127	6.24E-09	6.77E-09	7.29E-09	7.81E-09	8.33E-09	8.33E-09
zr 96	6.04E-09	6.55E-09	7.05E-09	7.55E-09	8.06E-09	8.06E-09
ru104	5.94E-09	6.43E-09	6.93E-09	7.42E-09	7.92E-09	7.92E-09
nd150	5.33E-09	5.77E-09	6.21E-09	6.66E-09	7.10E-09	7.10E-09
xe136	5.16E-09	5.59E-09	6.02E-09	6.45E-09	6.88E-09	6.88E-09
kr 81	3.86E-09	4.18E-09	4.50E-09	4.83E-09	5.15E-09	5.15E-09
rb 85	3.57E-09	3.89E-09	4.20E-09	4.51E-09	4.83E-09	4.83E-09
zr 94	3.27E-09	3.54E-09	3.81E-09	4.08E-09	4.35E-09	4.35E-09
nd111	2.51E-09	2.72E-09	2.93E-09	3.15E-09	3.36E-09	3.36E-09
cs137	2.83E-09	2.93E-09	3.03E-09	3.11E-09	3.18E-09	3.18E-09
te130	2.35E-09	2.54E-09	2.74E-09	2.93E-09	3.13E-09	3.13E-09
xe154	2.27E-09	2.44E-09	2.65E-09	2.84E-09	3.03E-09	3.03E-09
rb 87	2.18E-09	2.36E-09	2.55E-09	2.73E-09	2.91E-09	2.91E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09

zr 90	1.45E-09	1.65E-09	1.86E-09	2.07E-09	2.29E-09	2.29E-09
se 77	1.56E-09	1.69E-09	1.82E-09	1.95E-09	2.08E-09	2.08E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
pd106	1.07E-09	1.17E-09	1.26E-09	1.35E-09	1.44E-09	1.44E-09
kr 84	1.03E-09	1.11E-09	1.20E-09	1.28E-09	1.37E-09	1.37E-09
se 79	7.98E-10	8.64E-10	9.31E-10	9.97E-10	1.06E-09	1.06E-09
sb121	7.51E-10	8.14E-10	8.77E-10	9.39E-10	1.00E-09	1.00E-09
pm149	9.74E-10	9.81E-10	9.81E-10	9.81E-10	9.80E-10	9.73E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.30E-10	9.30E-10	9.27E-10
sb123	6.13E-10	6.64E-10	7.15E-10	7.66E-10	8.17E-10	8.17E-10
eu152	4.15E-10	4.98E-10	5.91E-10	6.91E-10	7.99E-10	7.99E-10
kr 86	5.76E-10	6.24E-10	6.72E-10	7.20E-10	7.68E-10	7.68E-10
te128	5.12E-10	5.54E-10	5.97E-10	6.40E-10	6.82E-10	6.82E-10
ce144	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.03E-10
kr 85	5.65E-10	5.68E-10	5.70E-10	5.72E-10	5.73E-10	5.73E-10
gd156	4.02E-10	4.36E-10	4.72E-10	5.07E-10	5.42E-10	5.42E-10
se 80	3.72E-10	4.03E-10	4.34E-10	4.65E-10	4.96E-10	4.96E-10
dy161	3.26E-10	3.54E-10	3.81E-10	4.09E-10	4.36E-10	4.36E-10
te125	3.03E-10	3.30E-10	3.57E-10	3.84E-10	4.11E-10	4.11E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
tb159	2.19E-10	2.37E-10	2.56E-10	2.74E-10	2.92E-10	2.92E-10
li 6	2.12E-10	2.29E-10	2.47E-10	2.64E-10	2.82E-10	2.82E-10
cd112	2.10E-10	2.28E-10	2.46E-10	2.63E-10	2.81E-10	2.81E-10
sn117	1.67E-10	1.81E-10	1.94E-10	2.08E-10	2.22E-10	2.22E-10
eu154	1.43E-10	1.57E-10	1.71E-10	1.85E-10	1.99E-10	1.99E-10
sn119	1.38E-10	1.49E-10	1.60E-10	1.72E-10	1.83E-10	1.83E-10
sn115	1.26E-10	1.36E-10	1.47E-10	1.57E-10	1.68E-10	1.68E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
sr 88	1.06E-10	1.15E-10	1.23E-10	1.32E-10	1.41E-10	1.41E-10
gd152	5.19E-11	6.02E-11	6.78E-11	1.02E-10	1.24E-10	1.24E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 33

0 fraction of total absorption rate

0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
initial 23741.5 d 25367.7 d 27394.8 d 29220.2 d 29220.3 d

gd158	7.68E-11	8.39E-11	9.12E-11	9.84E-11	1.06E-10	1.06E-10
pd110	7.51E-11	8.14E-11	8.77E-11	9.40E-11	1.00E-10	1.00E-10
cd114	7.43E-11	8.06E-11	8.70E-11	9.34E-11	9.99E-11	9.99E-11
se 82	7.19E-11	7.78E-11	8.38E-11	8.98E-11	9.58E-11	9.58E-11
sn126	5.77E-11	6.23E-11	6.73E-11	7.21E-11	7.70E-11	7.70E-11
se 78	5.43E-11	5.89E-11	6.34E-11	6.79E-11	7.24E-11	7.24E-11
sn124	4.34E-11	4.71E-11	5.07E-11	5.43E-11	5.79E-11	5.79E-11
dy162	4.28E-11	4.64E-11	5.01E-11	5.38E-11	5.75E-11	5.75E-11
ru 99	3.31E-11	3.81E-11	4.34E-11	4.91E-11	5.31E-11	5.31E-11
dy164	3.94E-11	4.28E-11	4.63E-11	4.97E-11	5.32E-11	5.32E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
as 75	3.24E-11	3.51E-11	3.78E-11	4.05E-11	4.32E-11	4.32E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11	3.73E-11
eu156	3.44E-11	3.44E-11	3.44E-11	3.44E-11	3.44E-11	3.44E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
ru106	2.53E-11	2.53E-11	2.53E-11	2.53E-11	2.53E-11	2.53E-11
in115	1.65E-11	1.84E-11	2.03E-11	2.23E-11	2.43E-11	2.43E-11
sn118	1.77E-11	1.92E-11	2.07E-11	2.21E-11	2.36E-11	2.36E-11
ba136	1.74E-11	1.89E-11	2.04E-11	2.19E-11	2.34E-11	2.34E-11
se134	1.59E-11	1.73E-11	1.86E-11	1.99E-11	2.13E-11	2.13E-11
sn122	1.51E-11	1.64E-11	1.76E-11	1.89E-11	2.01E-11	2.01E-11

cd114	1.51E-11	1.63E-11	1.76E-11	1.88E-11	2.01E-11	2.01E-11
sd154	1.00E-11	1.20E-11	1.42E-11	1.65E-11	1.91E-11	1.91E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sn120	1.13E-11	1.22E-11	1.31E-11	1.41E-11	1.50E-11	1.50E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
y 90	1.27E-11	1.31E-11	1.35E-11	1.38E-11	1.41E-11	1.41E-11
kr 82	9.75E-12	1.06E-11	1.14E-11	1.23E-11	1.31E-11	1.31E-11
mo 99	1.29E-11	1.32E-11	1.31E-11	1.31E-11	1.31E-11	1.29E-11
dy163	9.51E-12	1.03E-11	1.11E-11	1.20E-11	1.28E-11	1.28E-11
se 73	8.85E-12	9.59E-12	1.03E-11	1.11E-11	1.18E-11	1.18E-11
pm148m	9.44E-12	9.63E-12	9.63E-12	9.62E-12	9.62E-12	9.61E-12
ru100	5.14E-12	5.96E-12	6.83E-12	7.77E-12	8.76E-12	8.76E-12
xe130	6.14E-12	6.69E-12	7.23E-12	7.78E-12	8.34E-12	8.34E-12
kr 87	8.20E-12	2.31E-11	2.31E-11	2.31E-11	2.31E-11	8.20E-12
te127m	7.47E-12	7.47E-12	7.47E-12	7.47E-12	7.47E-12	7.47E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
mo 96	4.74E-12	5.19E-12	5.66E-12	6.13E-12	6.61E-12	6.61E-12
sm148	3.23E-12	3.74E-12	4.28E-12	4.87E-12	5.49E-12	5.49E-12
nd142	3.86E-12	3.59E-12	4.16E-12	4.77E-12	5.43E-12	5.43E-12
ba134	2.81E-12	3.31E-12	3.84E-12	4.61E-12	5.03E-12	5.03E-12
ge 76	3.21E-12	3.48E-12	3.75E-12	4.01E-12	4.28E-12	4.28E-12
ba135	2.42E-12	2.83E-12	3.28E-12	3.76E-12	4.28E-12	4.28E-12
pd104	1.99E-12	2.33E-12	2.70E-12	3.10E-12	3.53E-12	3.53E-12
gd160	2.06E-12	2.21E-12	2.38E-12	2.55E-12	2.72E-12	2.72E-12
te126	1.62E-12	1.77E-12	1.91E-12	2.05E-12	2.20E-12	2.20E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ho165	6.55E-13	7.11E-13	7.48E-13	8.23E-13	8.83E-13	8.83E-13

1 sas2h: for-field crit based on b&w 15x15, 5.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 34
6 fraction of total absorption rate
0 power= .00mw, burnup= 117.gwd, flux= 2.71E+08n/cm**2-sec
initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

te124	3.76E-13	4.08E-13	4.40E-13	4.72E-13	5.04E-13	5.04E-13
sr 87	3.69E-13	4.00E-13	4.31E-13	4.62E-13	4.93E-13	4.93E-13
cd110	2.78E-13	3.25E-13	3.76E-13	4.30E-13	4.88E-13	4.88E-13
nb 93	1.95E-13	2.39E-13	2.88E-13	3.42E-13	4.01E-13	4.01E-13
pm148	3.85E-13	3.67E-13	3.67E-13	3.67E-13	3.67E-13	3.63E-13
br 79	1.95E-13	2.29E-13	2.65E-13	3.04E-13	3.46E-13	3.46E-13
ag111	3.17E-13	3.19E-13	3.19E-13	3.19E-13	3.19E-13	3.18E-13
nb 94	2.09E-13	2.26E-13	2.44E-13	2.61E-13	2.78E-13	2.78E-13
au197	2.76E-13	2.99E-13	2.99E-13	2.99E-13	2.99E-13	2.77E-13
ge 74	1.79E-13	1.94E-13	2.09E-13	2.24E-13	2.39E-13	2.39E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.38E-13	2.37E-13
xe129	1.10E-13	1.29E-13	1.50E-13	1.72E-13	1.96E-13	1.96E-13
ag107	1.04E-13	1.22E-13	1.41E-13	1.62E-13	1.84E-13	1.84E-13
ge 72	1.20E-13	1.30E-13	1.40E-13	1.50E-13	1.60E-13	1.60E-13
sr 86	1.10E-13	1.19E-13	1.29E-13	1.39E-13	1.48E-13	1.48E-13
se 76	7.09E-14	7.69E-14	8.30E-14	8.90E-14	9.51E-14	9.51E-14
xe134	5.48E-14	5.72E-14	5.73E-14	5.73E-14	5.76E-14	5.74E-14
dy160	3.73E-14	3.88E-14	3.46E-14	3.05E-14	4.46E-14	4.46E-14
xe128	3.73E-14	3.65E-14	3.39E-14	3.74E-14	4.11E-14	4.11E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
er166	2.83E-14	2.00E-14	2.17E-14	2.34E-14	2.52E-14	2.52E-14
ru105	2.26E-14	2.05E-14	2.05E-14	2.05E-14	2.05E-14	2.26E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.44E-15	9.60E-15	9.60E-15	9.60E-15	9.60E-15	9.44E-15
rb 88	8.88E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.88E-15
i135	8.34E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.34E-15
sn116	4.37E-15	5.11E-15	5.90E-15	6.76E-15	7.67E-15	7.67E-15

kr 80	5.05E-15	5.48E-15	5.90E-15	6.33E-15	6.75E-15	6.75E-15
te122	2.39E-15	2.74E-15	3.12E-15	3.52E-15	3.95E-15	3.95E-15
sb126	3.10E-15	3.13E-15	3.14E-15	3.14E-15	3.15E-15	3.14E-15
sb124	2.13E-15	2.14E-15	2.14E-15	2.14E-15	2.14E-15	2.14E-15
in117m	1.85E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	1.85E-15
tb160	9.20E-16	9.72E-16	1.02E-15	1.08E-15	1.13E-15	1.13E-15
te134	8.72E-16	5.89E-15	5.89E-15	5.89E-15	5.89E-15	8.72E-16
i130	7.14E-16	7.99E-16	8.06E-16	8.12E-16	8.18E-16	7.17E-16
in117	5.51E-16	6.20E-16	6.20E-16	6.20E-16	6.20E-16	5.51E-16
be 9	5.99E-16	4.52E-16	4.65E-16	4.98E-16	5.51E-16	5.51E-16
pr142	3.90E-16	4.53E-16	4.87E-16	5.22E-16	5.57E-16	5.20E-16
te123	3.64E-16	3.95E-16	4.26E-16	4.58E-16	4.90E-16	4.90E-16
rb 86	2.63E-16	2.68E-16	2.70E-16	2.72E-16	2.74E-16	2.73E-16
li 7	1.63E-16	1.77E-16	1.90E-16	2.04E-16	2.17E-16	2.17E-16
dy165	1.31E-16	2.28E-16	2.29E-16	2.30E-16	2.32E-16	1.34E-16
er167	9.04E-17	1.00E-16	1.10E-16	1.21E-16	1.32E-16	1.32E-16
ge 75	3.41E-17	8.70E-17	8.70E-17	8.70E-17	8.70E-17	3.41E-17
cd118	2.48E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16	2.48E-17
cd108	3.82E-18	4.19E-18	4.57E-18	4.95E-18	5.35E-18	5.35E-18
cs134m	1.94E-18	3.31E-18	3.56E-18	3.82E-18	4.08E-18	2.58E-18
sn114	6.14E-19	7.42E-19	8.84E-19	1.04E-18	1.21E-18	1.21E-18
in119m	4.22E-19	3.03E-17	3.03E-17	3.03E-17	3.03E-17	4.22E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35
0 fraction of total absorption rate
power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
0 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

cd109	2.90E-19	2.97E-19	3.07E-19	3.14E-19	3.24E-19	3.24E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 36
power= 4.000E-03mw, burnup=1.1688E+02mwd, flux= 2.71E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly
charge 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

h 1	5.18E-06	5.61E-06	6.04E-06	6.46E-06	6.89E-06	6.89E-06
h 2	1.54E-08	1.66E-08	1.79E-08	1.92E-08	2.04E-08	2.04E-08
h 3	3.21E-11	3.23E-11	3.25E-11	3.26E-11	3.28E-11	3.28E-11
h 4	.00E+00	1.31E-34	1.32E-34	1.33E-34	1.33E-34	.00E+00
he 3	8.07E-11	8.97E-11	9.88E-11	1.08E-10	1.17E-10	1.17E-10
he 4	8.57E-07	9.27E-07	9.98E-07	1.07E-06	1.14E-06	1.14E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.03E-07	1.11E-07	1.20E-07	1.28E-07	1.37E-07	1.37E-07
ne 21	2.03E-13	2.35E-13	2.70E-13	3.08E-13	3.47E-13	3.47E-13
ne 22	6.30E-10	6.85E-10	7.40E-10	7.95E-10	8.50E-10	8.50E-10
ne 23	7.05E-30	7.04E-15	7.04E-15	7.04E-15	7.04E-15	7.04E-30
na 22	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.60E-08	2.77E-08	2.77E-08	2.77E-08	2.77E-08	2.53E-08
na 24m	4.68E-30	4.55E-15	4.55E-15	4.55E-15	4.55E-15	4.55E-30
na 25	3.85E-42	4.15E-27	4.52E-27	4.89E-27	5.27E-27	5.60E-42
mg 24	7.94E-04	8.51E-04	9.08E-04	9.66E-04	1.02E-03	1.02E-03
mg 25	1.33E-10	1.46E-10	1.58E-10	1.71E-10	1.85E-10	1.85E-10
mg 26	1.34E-08	1.66E-08	1.79E-08	1.92E-08	2.04E-08	2.04E-08
mg 27	4.55E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.34E-16
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.88E-25	2.85E-10	2.85E-10	2.85E-10	2.85E-10	2.80E-25
al 29	2.53E-31	5.60E-26	6.44E-26	7.34E-26	8.29E-26	4.34E-31
al 30	.00E+00	6.93E-38	8.60E-38	1.05E-37	1.27E-37	.00E+00
si 28	2.31E-03	2.48E-03	2.64E-03	2.81E-03	2.98E-03	2.98E-03

si 29	1.88E-10	2.19E-10	2.52E-10	2.87E-10	3.25E-10	3.25E-10
si 30	1.41E-17	2.03E-17	2.52E-17	3.08E-17	3.71E-17	3.71E-17
si 31	6.95E-30	1.44E-29	1.81E-29	2.21E-29	2.67E-29	1.41E-29
si 32	1.19E-36	1.43E-36	2.17E-36	2.83E-36	3.64E-36	3.64E-36
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E+08

0
1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 37
power= 4.000E-03mw, burnup=1.1688E+02mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge Z3741.5 d	Z5367.7 d	Z7394.0 d	Z9220.2 d	Z9220.3 d	
he 4	5.60E-03	6.26E-03	6.95E-03	7.67E-03	8.40E-03	8.40E-03
pb206	1.21E-09	1.62E-09	2.13E-09	2.75E-09	3.48E-09	3.48E-09
pb207	1.15E-08	1.42E-08	1.72E-08	2.06E-08	2.43E-08	2.43E-08
pb208	3.96E-09	4.72E-09	5.54E-09	6.43E-09	7.38E-09	7.38E-09
pb209	5.05E-15	5.89E-15	6.83E-15	7.84E-15	8.92E-15	8.92E-15
pb210	2.42E-09	2.98E-09	3.62E-09	4.32E-09	5.10E-09	5.10E-09
pb211	5.02E-14	5.67E-14	6.34E-14	7.02E-14	7.71E-14	7.70E-14
pb212	2.54E-13	2.76E-13	2.99E-13	3.21E-13	3.44E-13	3.44E-13
pb214	1.29E-14	1.56E-14	1.81E-14	2.08E-14	2.37E-14	2.29E-14
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.87E-10	2.38E-10	2.97E-10	3.65E-10	4.44E-10	4.44E-10
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.49E-12	1.84E-12	2.23E-12	2.66E-12	3.14E-12	3.14E-12
bi211	2.99E-15	3.36E-15	3.76E-15	4.16E-15	4.57E-15	4.60E-15
bi212	2.41E-14	2.62E-14	2.84E-14	3.05E-14	3.26E-14	3.26E-14
bi213	1.14E-15	1.38E-15	1.60E-15	1.83E-15	2.08E-15	2.02E-15
bi214	9.75E-15	1.16E-14	1.35E-14	1.54E-14	1.76E-14	1.73E-14
po210	4.11E-11	5.07E-11	6.15E-11	7.35E-11	8.68E-11	8.68E-11
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.31E-20	3.71E-20	4.15E-20	4.60E-20	5.05E-20	5.08E-20
po212	1.27E-24	1.38E-24	1.49E-24	1.60E-24	1.71E-24	1.71E-24
po213	1.71E-24	2.07E-24	2.40E-24	2.75E-24	3.13E-24	3.04E-24
po214	1.34E-21	1.40E-21	1.85E-21	2.13E-21	2.42E-21	2.38E-21
po215	4.12E-20	4.66E-20	5.21E-20	5.77E-20	6.35E-20	6.33E-20
po216	9.61E-19	1.05E-18	1.13E-18	1.22E-18	1.30E-18	1.30E-18
po218	1.54E-15	1.81E-15	2.10E-15	2.41E-15	2.74E-15	2.74E-15
ra222	4.21E-27	4.55E-27	4.90E-27	5.25E-27	5.60E-27	5.60E-27
ra223	2.29E-11	2.59E-11	2.89E-11	3.20E-11	3.52E-11	3.52E-11
ra224	2.09E-12	2.28E-12	2.47E-12	2.65E-12	2.84E-12	2.84E-12
ra225	5.48E-13	6.45E-13	7.44E-13	8.56E-13	9.74E-13	9.74E-13
ra226	4.19E-07	4.91E-07	5.70E-07	6.53E-07	7.43E-07	7.43E-07
ra228	1.09E-13	1.20E-13	1.30E-13	1.41E-13	1.51E-13	1.51E-13
ac225	3.70E-13	4.35E-13	5.04E-13	5.79E-13	6.58E-13	6.58E-13
ac227	1.59E-08	1.80E-08	2.01E-08	2.22E-08	2.44E-08	2.44E-08
ac228	1.33E-17	1.46E-17	1.59E-17	1.72E-17	1.85E-17	1.85E-17
th226	2.05E-25	2.22E-25	2.39E-25	2.56E-25	2.73E-25	2.73E-25
th227	5.69E-11	6.17E-11	6.67E-11	7.17E-11	7.67E-11	7.67E-11
th228	4.00E-10	4.35E-10	4.71E-10	5.06E-10	5.41E-10	5.41E-10
th229	1.67E-07	1.25E-07	1.45E-07	1.67E-07	1.89E-07	1.89E-07
th230	1.53E-03	1.66E-03	1.79E-03	1.92E-03	2.04E-03	2.04E-03
th231	3.03E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09
th232	3.10E-04	3.36E-04	3.61E-04	3.87E-04	4.13E-04	4.13E-04
th233	7.02E-17	5.08E-15	5.31E-15	5.55E-15	7.79E-15	1.05E-14
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	4.32E-05	4.48E-05	5.04E-05	5.40E-05	5.76E-05	5.76E-05
pa232	7.11E-13	8.04E-13	8.66E-13	9.27E-13	9.89E-13	9.48E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11

```
     pa234   8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12  8.09E-12
     pa235    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  38
       powerr 4.000E-03mw, burnup=1.1688E+02mwd, flux= 2.71E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d
       u230   1.99E-22  2.15E-22  2.32E-22  2.48E-22  2.65E-22  2.64E-22
       u231   6.15E-19  6.72E-19  7.24E-19  7.75E-19  8.27E-19  8.16E-19
       u232   1.53E-08  1.66E-08  1.79E-08  1.92E-08  2.05E-08  2.05E-08
       u233   8.17E-04  8.86E-04  9.54E-04  1.02E-03  1.09E-03  1.09E-03
       u234   9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
       u235   7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
       u236   1.75E+02  1.75E+02  1.75E+02  1.75E+02  1.75E+02  1.75E+02
       u237   3.09E-06  3.10E-06  3.10E-06  3.10E-06  3.10E-06  3.07E-06
       u238   3.44E+04  3.44E+04  3.44E+04  3.44E+04  3.44E+04  3.44E+04
       u239   1.06E-08  3.18E-07  3.18E-07  3.18E-07  3.18E-07  1.06E-08
       u240    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
       u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      np235   8.67E-12  8.63E-12  8.63E-12  8.62E-12  8.62E-12  8.62E-12
      np236m  1.94E-12  2.05E-12  2.05E-12  2.05E-12  2.05E-12  1.93E-12
      np236   1.20E-08  1.29E-08  1.39E-08  1.49E-08  1.59E-08  1.59E-08
      np237   4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
      np238   1.52E-06  1.55E-06  1.55E-06  1.55E-06  1.55E-06  1.51E-06
      np239   4.53E-05  4.59E-05  4.59E-05  4.59E-05  4.59E-05  4.51E-05
      np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      np240   2.58E-15  9.33E-15  9.33E-15  9.33E-15  9.33E-15  2.57E-15
      np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      pu236   1.12E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09
      pu237   8.93E-14  9.44E-14  1.00E-13  1.05E-13  1.10E-13  1.10E-13
      pu238   8.94E-03  9.50E-03  1.00E-02  1.06E-02  1.11E-02  1.11E-02
      pu239   3.01E-01  3.26E-01  3.50E-01  3.75E-01  4.00E-01  4.00E-01
      pu240   8.90E-05  1.04E-04  1.21E-04  1.38E-04  1.57E-04  1.57E-04
      pu241   1.97E-08  2.40E-08  2.88E-08  3.41E-08  3.98E-08  3.98E-08
      pu242   3.06E-12  4.13E-12  5.43E-12  7.01E-12  8.89E-12  8.89E-12
      pu243   4.95E-21  8.69E-21  1.14E-20  1.48E-20  1.87E-20  1.43E-20
      pu244    .00E+00   .00E+00   .00E+00  1.40E-45  4.20E-45  4.20E-45
      pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am239   3.87E-24  5.70E-24  7.39E-24  9.40E-24  1.18E-23  1.05E-23
      am240   1.93E-21  2.61E-21  3.39E-21  4.30E-21  5.38E-21  5.24E-21
      am241   1.37E-08  2.09E-08  2.70E-08  3.44E-08  4.30E-08  4.30E-08
      am242m  4.97E-13  7.13E-13  9.06E-13  1.34E-12  1.83E-12  1.81E-12
      am242   5.10E-16  7.34E-16  9.52E-16  1.21E-15  1.52E-15  1.40E-15
      am243   7.46E-16  3.76E-16  5.51E-16  7.01E-16  1.11E-15  1.11E-15
      am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am244   1.64E-24  2.84E-24  4.19E-24  6.01E-24  8.42E-24  7.38E-24
      am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux                2.71E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
0        1q array has        20 entries.
0        2q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
!library information...
```

```
          cross-section data taken from position number  1 of library on unit 15.

          pass   5
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ************************************************************************
          *                                                                      *
          *            prelim lwr origen-s binary working library--id = 1143     *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                      *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prepsas2" case updating all nuclides on the scale "burnup" library *
          *                                                                      *
          *                  fission product yields are from endf/b-v            *
          *                                                                      *
          *              photon libraries use an 18-energy-group structure       *
          *             the photon data are from the master photon data base,    *
          *              produced to include bremsstrahlung from uo2 matrix      *
          *                                                                      *
          *        see information above this box (if present) for later updates *
          *                                                                      *
          ************************************************************************
          *                                                                      *
0         ************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft15f001
0                8/28/1996    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7993    number of nonzero off-diagonal matrix elements
0         ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   39
       power=    .00mw, burnup=    146.mwd, flux= 2.70E+08n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      31046.6 d     32872.8 d     34699.1 d     36525.3 d
     productions  1.138556E+06  1.138592E+06  1.138629E+06  1.138666E+06  1.138703E+06
     absorptions  9.278101E+05  9.278671E+05  9.279241E+05  9.279809E+05  9.280372E+05
     k infinity   1.227143E+00  1.227107E+00  1.227072E+00  1.227036E+00  1.227001E+00
0                 initial      31046.6 d     32872.8 d     34699.1 d     36525.3 d
     actinide
     absorptions  9.240538E+05  9.240755E+05  9.240974E+05  9.241194E+05  9.241413E+05
     non-actinide
     abs. fracs.  4.048586E-03  4.086375E-03  4.123926E-03  4.161179E-03  4.198015E-03
```

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1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  40
0                                  fraction of total absorption rate
      power=      .00mw, burnup=     146.mwd, flux= 2.70E+08n/cm**2-sec
0           initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

     sm149    5.65E-04  5.98E-04  6.31E-04  6.64E-04  6.96E-04
     sm151    1.87E-05  1.95E-05  2.03E-05  2.10E-05  2.18E-05
     nd143    1.19E-05  1.26E-05  1.34E-05  1.41E-05  1.49E-05
     gd155    7.20E-06  7.69E-06  8.17E-06  8.66E-06  9.12E-06
     eu151    4.68E-06  5.22E-06  5.79E-06  6.37E-06  6.98E-06
     gd157    5.43E-06  5.95E-06  6.27E-06  6.59E-06  6.90E-06
     rh103    5.50E-06  5.84E-06  6.18E-06  6.53E-06  6.87E-06
     cd113    5.04E-06  5.34E-06  5.65E-06  5.95E-06  6.25E-06
     xe131    3.74E-06  3.97E-06  4.21E-06  4.44E-06  4.67E-06
     cs133    2.90E-06  3.08E-06  3.26E-06  3.45E-06  3.63E-06
     tc 99    2.13E-06  2.27E-06  2.40E-06  2.53E-06  2.67E-06
     sm147    2.05E-06  2.19E-06  2.32E-06  2.46E-06  2.59E-06
     xe135    2.29E-06  2.33E-06  2.33E-06  2.33E-06  2.33E-06
     nd145    1.66E-06  1.76E-06  1.87E-06  1.97E-06  2.08E-06
     mo 95    1.14E-06  1.22E-06  1.29E-06  1.36E-06  1.43E-06
     sm152    8.81E-07  9.36E-07  9.91E-07  1.05E-06  1.10E-06
     kr 83    7.23E-07  7.68E-07  8.13E-07  8.58E-07  9.04E-07
     cs135    6.55E-07  6.96E-07  7.37E-07  7.78E-07  8.18E-07
     ru101    5.06E-07  5.38E-07  5.69E-07  6.01E-07  6.32E-07
     pr141    4.91E-07  5.22E-07  5.52E-07  5.83E-07  6.14E-07
     eu153    4.44E-07  4.72E-07  5.00E-07  5.28E-07  5.55E-07
     la139    4.02E-07  4.27E-07  4.52E-07  4.77E-07  5.02E-07
     pm147    2.70E-07  2.70E-07  2.70E-07  2.70E-07  2.70E-07
     pd105    1.69E-07  1.80E-07  1.90E-07  2.01E-07  2.12E-07
     zr 93    1.62E-07  1.72E-07  1.82E-07  1.92E-07  2.03E-07
     eu155    1.58E-07  1.58E-07  1.58E-07  1.59E-07  1.59E-07
      i129    1.25E-07  1.33E-07  1.40E-07  1.48E-07  1.56E-07
     nd144    1.19E-07  1.27E-07  1.34E-07  1.42E-07  1.49E-07
     ba137    1.05E-07  1.15E-07  1.25E-07  1.36E-07  1.47E-07
     mo 97    9.10E-08  9.67E-08  1.02E-07  1.08E-07  1.14E-07
     as109    6.45E-08  6.66E-08  7.28E-08  7.49E-08  8.11E-08
     sm150    4.80E-08  5.41E-08  6.05E-08  6.72E-08  7.43E-08
     zr 91    4.29E-08  4.55E-08  4.82E-08  5.09E-08  5.36E-08
      y 89    4.12E-08  4.37E-08  4.63E-08  4.89E-08  5.15E-08
     ru102    3.71E-08  3.94E-08  4.17E-08  4.41E-08  4.64E-08
     ce142    3.35E-08  3.56E-08  3.77E-08  3.97E-08  4.18E-08
     nd148    3.21E-08  3.41E-08  3.61E-08  3.81E-08  4.01E-08
     nd146    2.70E-08  2.87E-08  3.03E-08  3.20E-08  3.37E-08
     ba138    2.31E-08  2.45E-08  2.60E-08  2.74E-08  2.88E-08
     in115    2.21E-08  2.35E-08  2.49E-08  2.63E-08  2.77E-08
     pd108    2.17E-08  2.31E-08  2.44E-08  2.58E-08  2.72E-08
     ce140    2.16E-08  2.29E-08  2.43E-08  2.56E-08  2.70E-08
     xe132    1.93E-08  2.05E-08  2.17E-08  2.29E-08  2.41E-08
     mo 98    1.33E-08  1.41E-08  1.49E-08  1.58E-08  1.66E-08
     pd107    1.29E-08  1.37E-08  1.45E-08  1.53E-08  1.61E-08
     mo100    1.29E-08  1.37E-08  1.45E-08  1.53E-08  1.61E-08
     xe134    1.27E-08  1.35E-08  1.43E-08  1.51E-08  1.59E-08
     sr 90    1.48E-08  1.51E-08  1.54E-08  1.56E-08  1.58E-08
     zr 92    1.03E-08  1.08E-08  1.16E-08  1.23E-08  1.29E-08
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  41
0                                  fraction of total absorption rate
      power=      .00mw, burnup=     146.mwd, flux= 2.70E+08n/cm**2-sec
0           initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

      i127    8.33E-09  8.85E-09  9.37E-09  9.89E-09  1.04E-08
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zr 96	8.83E-09	8.55E-09	9.05E-09	9.36E-09	1.01E-08
ru104	7.92E-09	8.41E-09	8.91E-09	9.40E-09	9.90E-09
nd150	7.10E-09	7.54E-09	7.99E-09	8.43E-09	8.87E-09
xe136	6.88E-09	7.31E-09	7.74E-09	8.17E-09	8.60E-09
rh105	8.36E-09	8.40E-09	8.40E-09	8.40E-09	8.40E-09
br 81	5.15E-09	5.47E-09	5.79E-09	6.11E-09	6.43E-09
rb 85	4.83E-09	5.14E-09	5.46E-09	5.77E-09	6.08E-09
zr 94	4.35E-09	4.62E-09	4.90E-09	5.17E-09	5.44E-09
cd111	3.36E-09	3.57E-09	3.78E-09	3.99E-09	4.20E-09
te130	3.13E-09	3.33E-09	3.52E-09	3.72E-09	3.91E-09
sm154	3.03E-09	3.22E-09	3.41E-09	3.60E-09	3.79E-09
rb 87	2.91E-09	3.09E-09	3.27E-09	3.45E-09	3.64E-09
cs137	3.18E-09	3.24E-09	3.30E-09	3.35E-09	3.40E-09
zr 90	2.29E-09	2.51E-09	2.73E-09	2.96E-09	3.19E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
se 77	2.08E-09	2.21E-09	2.34E-09	2.47E-09	2.60E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
pd106	1.44E-09	1.53E-09	1.62E-09	1.72E-09	1.81E-09
kr 84	1.37E-09	1.43E-09	1.54E-09	1.62E-09	1.71E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
se 79	1.06E-09	1.13E-09	1.20E-09	1.26E-09	1.33E-09
eu152	8.00E-10	9.15E-10	1.04E-09	1.16E-09	1.30E-09
sb121	1.00E-09	1.06E-09	1.13E-09	1.19E-09	1.25E-09
sb123	8.17E-10	8.68E-10	9.19E-10	9.70E-10	1.02E-09
pm149	9.74E-10	9.81E-10	9.81E-10	9.81E-10	9.81E-10
kr 86	7.69E-10	8.17E-10	8.65E-10	9.13E-10	9.61E-10
nd147	9.26E-10	9.30E-10	9.30E-10	9.30E-10	9.30E-10
te128	6.82E-10	7.25E-10	7.68E-10	8.10E-10	8.53E-10
gd156	5.42E-10	5.78E-10	6.14E-10	6.50E-10	6.86E-10
se 80	4.96E-10	5.27E-10	5.58E-10	5.89E-10	6.20E-10
ce144	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.03E-10
kr 83	5.73E-10	5.74E-10	5.75E-10	5.75E-10	5.76E-10
dy161	4.36E-10	4.64E-10	4.92E-10	5.20E-10	5.48E-10
te125	4.11E-10	4.39E-10	4.66E-10	4.93E-10	5.20E-10
tb159	2.92E-10	3.11E-10	3.29E-10	3.47E-10	3.66E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
li 6	2.82E-10	3.00E-10	3.17E-10	3.35E-10	3.53E-10
cd112	2.81E-10	2.98E-10	3.16E-10	3.34E-10	3.51E-10
sn117	2.22E-10	2.36E-10	2.50E-10	2.64E-10	2.78E-10
eu154	1.99E-10	2.13E-10	2.28E-10	2.42E-10	2.56E-10
gd152	1.24E-10	1.48E-10	1.76E-10	2.07E-10	2.41E-10
sn119	1.83E-10	1.95E-10	2.06E-10	2.18E-10	2.29E-10
sn115	1.68E-10	1.78E-10	1.89E-10	1.99E-10	2.10E-10
sr 88	1.41E-10	1.50E-10	1.59E-10	1.68E-10	1.76E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
gd158	1.06E-10	1.14E-10	1.21E-10	1.29E-10	1.37E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 42
0 fraction of total absorption rate
power= .80mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec
0 initial 31046.6 d 32872.8 d 34699.1 d 34525.3 d

cd114	9.98E-11	1.06E-10	1.13E-10	1.19E-10	1.26E-10
pd110	1.00E-10	1.07E-10	1.13E-10	1.19E-10	1.26E-10
se 82	9.58E-11	1.02E-10	1.08E-10	1.14E-10	1.20E-10
pm151	1.06E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
sn124	7.70E-11	8.18E-11	8.66E-11	9.15E-11	9.63E-11
se 78	7.24E-11	7.70E-11	8.15E-11	8.60E-11	9.06E-11
ru 99	5.51E-11	6.15E-11	6.82E-11	7.53E-11	8.27E-11

dy142	5.75E-11	4.12E-11	4.49E-11	4.86E-11	7.24E-11
sn124	5.79E-11	4.15E-11	4.51E-11	4.88E-11	7.24E-11
dy164	5.32E-11	5.67E-11	6.02E-11	6.37E-11	6.73E-11
se 75	4.32E-11	4.59E-11	4.86E-11	5.13E-11	5.40E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11
eu156	3.44E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11
in113	2.43E-11	2.62E-11	2.82E-11	3.02E-11	3.22E-11
gd154	1.91E-11	2.18E-11	2.47E-11	2.78E-11	3.11E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
sn118	2.36E-11	2.51E-11	2.65E-11	2.80E-11	2.95E-11
ba136	2.34E-11	2.49E-11	2.64E-11	2.79E-11	2.94E-11
cs134	2.13E-11	2.26E-11	2.40E-11	2.53E-11	2.67E-11
ru106	2.53E-11	2.53E-11	2.54E-11	2.54E-11	2.54E-11
sn122	2.01E-11	2.14E-11	2.26E-11	2.39E-11	2.52E-11
cd116	2.01E-11	2.13E-11	2.26E-11	2.38E-11	2.51E-11
kr 87	2.20E-12	2.31E-11	2.31E-11	2.31E-11	2.31E-11
sn120	1.50E-11	1.60E-11	1.69E-11	1.78E-11	1.88E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
kr 82	1.31E-11	1.40E-11	1.48E-11	1.57E-11	1.66E-11
dy163	1.28E-11	1.36E-11	1.45E-11	1.53E-11	1.62E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
y 90	1.41E-11	1.44E-11	1.46E-11	1.48E-11	1.50E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
ge 73	1.18E-11	1.25E-11	1.33E-11	1.40E-11	1.48E-11
ru103	8.76E-12	9.82E-12	1.09E-11	1.21E-11	1.33E-11
mo 99	1.29E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11
xe130	8.34E-12	8.90E-12	9.46E-12	1.00E-11	1.06E-11
pm148m	9.62E-12	9.62E-12	9.62E-12	9.62E-12	9.62E-12
mo 96	6.41E-12	7.10E-12	7.80E-12	8.11E-12	8.63E-12
nd142	5.43E-12	6.13E-12	6.87E-12	7.66E-12	8.48E-12
sm148	5.49E-12	6.15E-12	6.84E-12	7.58E-12	8.34E-12
ba134	5.03E-12	5.69E-12	6.38E-12	7.12E-12	7.89E-12
te127m	7.48E-12	7.48E-12	7.48E-12	7.48E-12	7.48E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12
ba133	4.28E-12	4.83E-12	5.41E-12	6.02E-12	6.67E-12
pd104	3.93E-12	3.98E-12	4.46E-12	4.97E-12	5.50E-12
ge 74	4.28E-12	4.55E-12	4.82E-12	5.08E-12	5.35E-12
gd160	2.72E-12	2.89E-12	3.04E-12	3.23E-12	3.41E-12
te124	2.20E-12	2.34E-12	2.49E-12	2.63E-12	2.78E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ho165	8.83E-13	9.40E-13	9.98E-13	1.06E-12	1.12E-12

1 cos2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 43

0 fraction of total absorption rate

power= .80mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec

0 initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

cd110	4.89E-13	5.50E-13	6.16E-13	6.85E-13	7.59E-13
nb 93	4.81E-13	4.65E-13	5.33E-13	6.10E-13	6.90E-13
te124	5.06E-13	5.46E-13	5.68E-13	6.00E-13	6.32E-13
sr 87	4.92E-13	5.23E-13	5.54E-13	5.85E-13	6.14E-13
kr 79	3.46E-13	3.91E-13	4.38E-13	4.88E-13	5.41E-13
pm148	3.63E-13	3.67E-13	3.67E-13	3.67E-13	3.67E-13
nb 94	2.78E-13	2.96E-13	3.13E-13	3.31E-13	3.48E-13
ag111	3.18E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13
xe129	1.96E-13	2.21E-13	2.48E-13	2.76E-13	3.06E-13
eu157	2.77E-13	2.80E-13	2.80E-13	2.80E-13	2.80E-13
ge 74	2.39E-13	2.54E-13	2.68E-13	2.83E-13	2.98E-13
ag107	1.84E-13	2.08E-13	2.33E-13	2.60E-13	2.88E-13
cd115m	2.37E-13	2.38E-13	2.38E-13	2.38E-13	2.38E-13

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     se 72      1.60E-13  1.70E-13  1.81E-13  1.91E-13  2.01E-13
     sr 86      1.48E-13  1.58E-13  1.68E-13  1.78E-13  1.89E-13
     se 76      9.52E-14  1.01E-13  1.07E-13  1.14E-13  1.20E-13
     dy160      4.26E-14  4.69E-14  5.14E-14  5.61E-14  6.09E-14
     cs136      5.74E-14  5.77E-14  5.79E-14  5.80E-14  5.81E-14
     xe128      4.11E-14  4.49E-14  4.89E-14  5.30E-14  5.72E-14
     er166      2.52E-14  2.69E-14  2.87E-14  3.06E-14  3.24E-14
     ru105      2.26E-14  2.95E-14  2.95E-14  2.96E-14  2.96E-14
     sn125      2.90E-14  2.92E-14  2.92E-14  2.92E-14  2.92E-14
     rb 88      8.88E-15  1.30E-14  1.30E-14  1.30E-14  1.30E-14
     sn116      7.67E-15  8.63E-15  9.64E-15  1.07E-14  1.19E-14
      1135      8.34E-15  1.02E-14  1.02E-14  1.02E-14  1.02E-14
     sn123      1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te132      9.44E-15  9.40E-15  9.40E-15  9.40E-15  9.40E-15
     kr 80      6.76E-15  7.18E-15  7.61E-15  8.04E-15  8.47E-15
     te134      8.73E-14  5.89E-15  5.89E-15  5.89E-15  5.89E-15
     te122      3.95E-15  4.40E-15  4.87E-15  5.37E-15  5.89E-15
     sb126      3.14E-15  3.16E-15  3.17E-15  3.18E-15  3.19E-15
     sb124      2.14E-15  2.15E-15  2.15E-15  2.15E-15  2.15E-15
     in117m     1.06E-15  2.11E-15  2.11E-15  2.11E-15  2.11E-15
     tb160      1.13E-15  1.18E-15  1.23E-15  1.28E-15  1.33E-15
      1130      7.37E-16  8.25E-16  8.31E-16  8.38E-16  8.44E-16
     pr142      5.20E-16  5.92E-16  6.27E-16  6.61E-16  6.96E-16
     be  9      5.31E-16  5.64E-16  5.97E-16  6.30E-16  6.64E-16
     in117      5.52E-16  6.21E-16  6.21E-16  6.21E-16  6.21E-16
     te123      4.90E-16  5.22E-16  5.53E-16  5.86E-16  6.18E-16
     rb 86      2.73E-16  2.76E-16  2.78E-16  2.80E-16  2.82E-16
     li  7      2.17E-16  2.31E-16  2.43E-16  2.58E-16  2.72E-16
     dy165      1.34E-16  2.33E-16  2.34E-16  2.36E-16  2.37E-16
     er167      1.32E-16  1.43E-16  1.55E-16  1.67E-16  1.80E-16
     cd118      2.48E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16
     ge 75      3.61E-17  3.71E-17  3.70E-17  3.70E-17  3.70E-17
     in119m     4.23E-19  3.03E-17  3.03E-17  3.03E-17  3.03E-17
     cd108      5.35E-18  5.76E-18  6.17E-18  6.59E-18  7.02E-18
     cs134m     2.58E-18  4.33E-18  4.58E-18  4.84E-18  5.09E-18
     in119      1.43E-21  2.37E-18  2.37E-18  2.37E-18  2.37E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  44
8                                  fraction of total absorption rate
        power=     .00mw, burnup=      146.mwd, flux= 2.70E+08n/cm**2-sec
0              initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

     sn114      1.21E-18  1.40E-18  1.60E-18  1.81E-18  2.04E-18
     cd109      3.24E-19  3.32E-19  3.41E-19  3.50E-19  3.58E-19
     ag110      6.39E-23  9.10E-20  9.44E-20  1.02E-19  1.07E-19
     in120      .00E+00   2.99E-22  2.99E-22  2.99E-22  2.99E-22
     in120m     .00E+00   4.33E-23  4.33E-23  4.33E-23  4.33E-23
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  45
       power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
8                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
              charge 31046.6 d 32872.8 d 34699.1 d 36525.3 d
      h  1   6.89E-06  7.31E-06  7.74E-06  8.17E-06  8.59E-06
      h  2   2.04E-08  2.17E-08  2.30E-08  2.42E-08  2.55E-08
      h  3   5.28E-11  5.28E-11  5.29E-11  5.30E-11  5.30E-11
      h  4    .00E+00  1.34E-34  1.34E-34  1.34E-34  1.34E-34
     he  3   1.17E-10  1.26E-10  1.35E-10  1.45E-10  1.54E-10
     he  4   1.14E-06  1.21E-06  1.28E-06  1.35E-06  1.42E-06
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   1.37E-07  1.45E-07  1.54E-07  1.62E-07  1.71E-07
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na 21	3.47E-13	3.89E-13	4.33E-13	4.79E-13	5.28E-13
na 22	8.50E-10	9.05E-10	9.60E-10	1.02E-09	1.07E-09
na 23	7.04E-30	7.04E-15	7.04E-15	7.04E-15	7.04E-15
na 22	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.53E-08	2.75E-08	2.75E-08	2.75E-08	2.75E-08
na 24m	4.35E-30	4.51E-15	4.51E-15	4.51E-15	4.51E-15
na 25	5.30E-42	5.65E-27	6.04E-27	6.43E-27	6.84E-27
mg 24	1.02E-03	1.08E-03	1.14E-03	1.19E-03	1.25E-03
mg 25	1.85E-10	1.98E-10	2.12E-10	2.26E-10	2.40E-10
mg 26	2.04E-08	2.17E-08	2.30E-08	2.42E-08	2.55E-08
mg 27	4.34E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.80E-25	2.04E-10	2.04E-10	2.04E-10	2.04E-10
al 29	4.34E-31	9.29E-25	1.04E-25	1.15E-25	1.26E-25
al 30	.00E+00	1.51E-37	1.78E-37	2.08E-37	2.42E-37
si 28	2.98E-03	3.14E-03	3.31E-03	3.47E-03	3.64E-03
si 29	3.25E-10	3.64E-10	4.06E-10	4.49E-10	4.95E-10
si 30	3.71E-17	4.43E-17	5.22E-17	6.11E-17	7.09E-17
si 31	1.41E-29	3.18E-29	3.73E-29	4.39E-29	5.10E-29
si 32	3.64E-36	4.59E-36	5.72E-36	7.04E-36	8.57E-36
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08

0
1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page .46
power= 4.000E-03mw, burnup=1.4410E+02mwd, flux= 2.79E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 31046.6 d	32872.8 d	34699.1 d	36525.3 d	
he 4	8.40E-03	9.16E-03	9.95E-03	1.07E-02	1.16E-02
pb206	3.48E-09	4.36E-09	5.33E-09	6.48E-09	7.78E-09
pb207	2.43E-08	2.84E-08	3.28E-08	3.76E-08	4.27E-08
pb208	7.38E-09	8.40E-09	9.47E-09	1.06E-08	1.18E-08
pb209	8.98E-15	1.01E-14	1.13E-14	1.26E-14	1.39E-14
pb210	5.10E-09	5.95E-09	6.88E-09	7.88E-09	8.96E-09
pb211	7.70E-14	8.41E-14	9.12E-14	9.83E-14	1.06E-13
pb212	3.44E-13	3.66E-13	3.88E-13	4.10E-13	4.32E-13
pb214	2.29E-14	2.67E-14	2.99E-14	3.33E-14	3.68E-14
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	4.44E-10	5.32E-10	6.32E-10	7.43E-10	8.66E-10
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.14E-12	3.67E-12	4.24E-12	4.83E-12	5.51E-12
bi211	4.60E-15	4.98E-15	5.40E-15	5.83E-15	6.26E-15
bi212	3.26E-14	3.67E-14	3.68E-14	3.89E-14	4.10E-14
bi213	2.02E-15	2.35E-15	2.64E-15	2.94E-15	3.25E-15
bi214	1.73E-14	1.98E-14	2.22E-14	2.47E-14	2.74E-14
po210	8.68E-11	1.01E-10	1.17E-10	1.34E-10	1.52E-10
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	5.08E-20	5.51E-20	5.97E-20	6.44E-20	6.91E-20
po212	1.71E-24	1.82E-24	1.93E-24	2.04E-24	2.15E-24
po213	3.04E-24	3.54E-24	3.96E-24	4.42E-24	4.89E-24
po214	2.38E-21	2.73E-21	3.03E-21	3.40E-21	3.76E-21
po215	6.33E-20	6.91E-20	7.49E-20	8.08E-20	8.67E-20
po216	1.30E-18	1.39E-18	1.47E-18	1.55E-18	1.64E-18
po218	2.74E-15	3.09E-15	3.46E-15	3.85E-15	4.26E-15
ra222	5.60E-27	5.94E-27	6.29E-27	6.64E-27	6.98E-27
ra223	5.52E-11	5.83E-11	6.14E-11	6.48E-11	6.81E-11
ra224	2.84E-12	3.02E-12	3.20E-12	3.39E-12	3.57E-12
ra225	9.74E-13	1.10E-12	1.23E-12	1.37E-12	1.52E-12

ra226	7.43E-07	8.38E-07	9.39E-07	1.05E-06	1.14E-06
ra228	1.51E-13	1.62E-13	1.73E-13	1.83E-13	1.94E-13
ac225	6.58E-13	7.43E-13	8.33E-13	9.28E-13	1.03E-12
ac227	2.44E-08	2.66E-08	2.89E-08	3.11E-08	3.34E-08
ac228	1.85E-17	1.98E-17	2.11E-17	2.24E-17	2.37E-17
th226	2.73E-25	2.90E-25	3.07E-25	3.24E-25	3.41E-25
th227	5.67E-11	6.19E-11	6.71E-11	7.24E-11	7.77E-11
th228	5.41E-10	5.76E-10	6.11E-10	6.46E-10	6.81E-10
th229	1.89E-07	2.14E-07	2.40E-07	2.67E-07	2.96E-07
th230	2.04E-03	2.17E-03	2.30E-03	2.43E-03	2.55E-03
th231	3.03E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09
th232	4.13E-04	4.39E-04	4.65E-04	4.91E-04	5.16E-04
th233	1.85E-16	4.02E-15	4.26E-15	4.50E-15	4.73E-15
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.76E-05	6.12E-05	6.48E-05	6.83E-05	7.19E-05
pa232	9.48E-13	1.05E-12	1.11E-12	1.17E-12	1.24E-12
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 47
power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge 31046.6 d 32872.8 d 34699.1 d 36525.3 d

u230	2.64E-22	2.81E-22	2.97E-22	3.14E-22	3.30E-22
u231	8.16E-19	8.78E-19	9.29E-19	9.81E-19	1.03E-18
u232	2.05E-08	2.17E-08	2.30E-08	2.43E-08	2.55E-08
u233	1.09E-03	1.16E-03	1.23E-03	1.29E-03	1.36E-03
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.07E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06
u238	3.44E+04	3.44E+04	3.44E+04	3.44E+04	3.44E+04
u239	1.06E-08	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.62E-12	8.61E-12	8.61E-12	8.61E-12	8.61E-12
np236m	1.03E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.59E-08	1.68E-08	1.78E-08	1.88E-08	1.97E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.53E-06	1.55E-06	1.53E-06	1.53E-06
np239	4.51E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.97E-15	9.32E-15	9.32E-15	9.32E-15	9.32E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	1.10E-13	1.15E-13	1.20E-13	1.24E-13	1.29E-13
pu238	1.11E-02	1.16E-02	1.20E-02	1.25E-02	1.29E-02
pu239	4.00E-01	4.24E-01	4.49E-01	4.73E-01	4.98E-01
pu240	1.57E-04	1.77E-04	1.99E-04	2.21E-04	2.43E-04
pu241	3.98E-08	4.61E-08	5.28E-08	5.99E-08	6.76E-08
pu242	8.89E-12	1.11E-11	1.37E-11	1.67E-11	2.02E-11
pu243	1.43E-20	2.34E-20	2.89E-20	3.52E-20	4.25E-20
pu244	4.20E-45	8.41E-45	1.54E-44	2.60E-44	4.00E-44
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.05E-23	1.45E-23	1.76E-23	2.11E-23	2.52E-23
am240	5.24E-21	6.62E-21	8.05E-21	9.68E-21	1.15E-20

```
     am241   4.30E-08  5.30E-08  6.44E-08  7.75E-08  9.22E-08
     am242m  1.61E-12  2.36E-12  3.04E-12  3.65E-12  4.62E-12
     am242   1.40E-15  1.87E-15  2.28E-15  2.74E-15  3.26E-15
     am243   1.11E-15  1.52E-15  2.05E-15  2.71E-15  3.54E-15
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   7.38E-24  1.15E-23  1.55E-23  2.06E-23  2.69E-23
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux              2.70E+08  2.70E+08  2.70E+08  2.70E+08
0  .results on logical unit no. 71, position  1, for time step  4, subcase 6. (run position 1, case position 1)
   title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
    sas2h: far-field crit based on b&w 15x15  3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page   48
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0                                                nuclide concentrations, grams
                                                 basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     h  1   8.59E-06  8.59E-06  8.59E-06  8.59E-06  8.59E-06  8.59E-06  8.59E-06
    he  4   5.68E-06  5.68E-06  5.68E-06  5.68E-06  5.68E-06  5.68E-06  5.68E-06
    ne 20   3.41E-06  3.41E-06  3.41E-06  3.41E-06  3.41E-06  3.41E-06  3.41E-06
    na 23   1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05
    mg 24   3.00E-02  3.00E-02  3.00E-02  3.00E-02  3.00E-02  3.00E-02  3.00E-02
    mg 26   6.63E-07  6.63E-07  6.63E-07  6.63E-07  6.63E-07  6.63E-07  6.63E-07
    al 27   1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06
    si 28   1.02E-01  1.02E-01  1.02E-01  1.02E-01  1.02E-01  1.02E-01  1.02E-01
   total    1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page   49
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0                                                element radioactivity, curies
                                                 basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
      h     9.58E-07  9.14E-07  8.72E-07  8.33E-07  7.96E-07  7.58E-07  7.23E-07
     na     8.40E+00  4.56E-06  3.65E-06  2.92E-06  2.34E-06  1.87E-06  1.50E-06
   totals   2.35E+01  5.47E-06  4.32E-06  3.75E-06  3.13E-06  2.63E-06  2.22E-06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page   50
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0                                                element thermal power, watts
                                                 basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     na     1.70E-01  6.45E-08  5.16E-08  4.13E-08  3.31E-08  2.65E-08  2.12E-08
   totals   4.76E-01  6.45E-08  5.17E-08  4.14E-08  3.31E-08  2.65E-08  2.13E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements          page   51
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0                                                nuclide gamma power, watts
                                                 basis =single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    na 22   7.39E-08  3.92E-08  4.74E-08  3.80E-08  3.04E-08  2.44E-08  1.95E-08
   total    3.31E-01  5.92E-08  4.74E-08  3.80E-08  3.04E-08  2.44E-08  1.95E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides               page   52
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    he  4   1.16E-02  1.17E-02  1.19E-02  1.20E-02  1.21E-02  1.23E-02  1.24E-02
   ra226    1.16E-06  1.18E-06  1.20E-06  1.22E-06  1.24E-06  1.25E-06  1.27E-06
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th230	2.55E-03	2.57E-03	2.60E-03	2.62E-03	2.64E-03	2.66E-03	2.68E-03
th232	5.16E-04	5.21E-04	5.25E-04	5.29E-04	5.34E-04	5.38E-04	5.42E-04
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.19E-05	7.25E-05	7.31E-05	7.37E-05	7.43E-05	7.49E-05	7.55E-05
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
u233	1.36E-03	1.38E-03	1.39E-03	1.40E-03	1.41E-03	1.43E-03	1.44E-03
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu238	1.29E-02	1.28E-02	1.27E-02	1.26E-02	1.26E-02	1.25E-02	1.24E-02
pu239	4.98E-01	4.98E-01	4.98E-01	4.98E-01	4.98E-01	4.98E-01	4.98E-01
pu240	2.45E-04	2.45E-04	2.44E-04	2.44E-04	2.44E-04	2.44E-04	2.44E-04
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 53
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	1.14E-02	1.17E-02	1.19E-02	1.20E-02	1.21E-02	1.23E-02	1.24E-02
ra	1.16E-06	1.18E-06	1.20E-06	1.22E-06	1.24E-06	1.26E-06	1.28E-06
th	3.07E-03	3.10E-03	3.12E-03	3.15E-03	3.17E-03	3.20E-03	3.22E-03
pa	7.34E-05	7.40E-05	7.46E-05	7.52E-05	7.58E-05	7.64E-05	7.70E-05
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.10E-01
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 54
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	4.63E-02	4.69E-02	4.74E-02	4.80E-02	4.85E-02	4.91E-02	4.96E-02
pb206	1.60E-06	1.65E-06	1.70E-06	1.75E-06	1.80E-06	1.85E-06	1.91E-06
pb207	8.84E-06	9.02E-06	9.21E-06	9.40E-06	9.59E-06	9.78E-06	9.98E-06
pb208	2.46E-06	2.50E-06	2.54E-06	2.59E-06	2.63E-06	2.68E-06	2.72E-06
pb210	1.88E-06	1.92E-06	1.96E-06	2.00E-06	2.04E-06	2.08E-06	2.12E-06
ra226	2.62E-04	2.66E-04	2.70E-04	2.75E-04	2.79E-04	2.84E-04	2.88E-04
ac227	7.58E-06	7.67E-06	7.76E-06	7.84E-06	7.93E-06	8.02E-06	8.11E-06
th229	6.78E-05	6.89E-05	7.00E-05	7.12E-05	7.24E-05	7.35E-05	7.47E-05
th230	5.87E-01	5.92E-01	5.97E-01	6.02E-01	6.07E-01	6.12E-01	6.17E-01
th231	7.00E-07	6.97E-07	6.97E-07	6.97E-07	6.97E-07	6.97E-07	6.97E-07
th232	1.20E-01	1.21E-01	1.22E-01	1.23E-01	1.24E-01	1.25E-01	1.26E-01
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.66E-02	1.68E-02	1.69E-02	1.70E-02	1.72E-02	1.73E-02	1.75E-02
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u232	5.93E-06	5.92E-06	5.91E-06	5.89E-06	5.87E-06	5.84E-06	5.81E-06
u233	3.18E-01	3.21E-01	3.24E-01	3.27E-01	3.30E-01	3.32E-01	3.35E-01
u234	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03
u235	1.71E+05	1.71E+05	1.71E+05	1.71E+05	1.71E+05	1.71E+05	1.71E+05
u236	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06
np236	4.66E-06	4.66E-06	4.66E-06	4.66E-06	4.66E-06	4.66E-06	4.66E-06
np237	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu238	3.07E+00	3.05E+00	3.03E+00	3.01E+00	2.99E+00	2.97E+00	2.95E+00
pu239	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02
pu240	5.87E-02	5.87E-02	5.87E-02	5.87E-02	5.87E-02	5.87E-02	5.87E-02

pu241	1.63E-05	1.57E-05	1.50E-05	1.44E-05	1.39E-05	1.33E-05	1.28E-05
am241	2.22E-05	2.28E-05	2.34E-05	2.40E-05	2.45E-05	2.50E-05	2.55E-05
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 55
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	4.63E-02	4.69E-02	4.74E-02	4.80E-02	4.85E-02	4.91E-02	4.96E-02
pb	1.48E-05	1.51E-05	1.54E-05	1.57E-05	1.61E-05	1.64E-05	1.67E-05
ra	2.62E-04	2.66E-04	2.70E-04	2.75E-04	2.79E-04	2.84E-04	2.88E-04
ac	7.58E-06	7.67E-06	7.76E-06	7.84E-06	7.93E-06	8.02E-06	8.11E-06
th	7.07E-01	7.13E-01	7.19E-01	7.25E-01	7.31E-01	7.37E-01	7.43E-01
pa	1.70E-02	1.71E-02	1.72E-02	1.74E-02	1.75E-02	1.77E-02	1.78E-02
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02
am	2.22E-05	2.28E-05	2.34E-05	2.40E-05	2.45E-05	2.50E-05	2.55E-05
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 56
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	5.48E-04	5.55E-04	5.61E-04	5.67E-04	5.74E-04	5.80E-04	5.86E-04
tl208	4.58E-05	4.63E-05	4.65E-05	4.66E-05	4.67E-05	4.67E-05	4.66E-05
pb209	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
pb210	1.44E-04	1.47E-04	1.50E-04	1.53E-04	1.56E-04	1.59E-04	1.62E-04
pb211	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
pb212	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
pb214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
bi210	1.44E-04	1.47E-04	1.50E-04	1.53E-04	1.56E-04	1.59E-04	1.62E-04
bi211	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
bi212	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
bi213	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
bi214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
po210	1.44E-04	1.44E-04	1.46E-04	1.49E-04	1.52E-04	1.55E-04	1.58E-04
po211	1.51E-06	1.53E-06	1.55E-06	1.56E-06	1.58E-06	1.60E-06	1.62E-06
po212	8.16E-05	8.24E-05	8.29E-05	8.31E-05	8.32E-05	8.32E-05	8.31E-05
po213	1.31E-05	1.34E-05	1.36E-05	1.38E-05	1.40E-05	1.43E-05	1.45E-05
po214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
po215	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
po216	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
po218	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
at217	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
rn219	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
rn220	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
rn222	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
fr221	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
fr223	7.57E-06	7.66E-06	7.75E-06	7.83E-06	7.92E-06	8.01E-06	8.10E-06
ra223	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
ra224	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
ra225	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
ra226	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
ac225	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
ac227	5.49E-04	5.55E-04	5.61E-04	5.68E-04	5.74E-04	5.80E-04	5.87E-04
th227	5.42E-04	5.49E-04	5.55E-04	5.61E-04	5.67E-04	5.74E-04	5.80E-04
th228	1.27E-04	1.28E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04

th229	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
th230	1.21E-02	1.22E-02	1.23E-02	1.24E-02	1.25E-02	1.26E-02	1.27E-02
th231	3.72E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	7.85E-04	7.92E-04	7.98E-04	8.05E-04	8.12E-04	8.18E-04	8.25E-04
pa233	7.04E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03
u232	1.31E-04	1.31E-04	1.31E-04	1.30E-04	1.30E-04	1.29E-04	1.28E-04
u233	3.06E-03	3.09E-03	3.12E-03	3.15E-03	3.18E-03	3.21E-03	3.23E-03
u234	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
u235	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
u236	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np237	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00
pu236	1.37E-04	1.12E-04	9.20E-05	7.54E-05	6.18E-05	5.06E-05	4.15E-05
pu238	5.25E+01	5.22E+01	5.19E+01	5.15E+01	5.12E+01	5.08E+01	5.05E+01
pu239	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu240	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02
pu241	1.69E-03	1.62E-03	1.56E-03	1.49E-03	1.43E-03	1.38E-03	1.32E-03
am241	7.62E-03	7.83E-05	8.03E-05	8.23E-05	8.41E-05	8.59E-05	8.75E-05
total	5.34E+03	9.90E+01	9.87E+01	9.84E+01	9.80E+01	9.77E+01	9.74E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 58
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	2.69E-06	2.72E-06	2.75E-06	2.77E-06	2.79E-06	2.81E-06	2.82E-06
pb	2.82E-06	2.86E-06	2.90E-06	2.93E-06	2.97E-06	3.00E-06	3.04E-06
bi	2.78E-05	2.81E-05	2.85E-05	2.88E-05	2.91E-05	2.94E-05	2.97E-05
po	4.08E-05	4.14E-05	4.23E-05	4.31E-05	4.39E-05	4.46E-05	4.54E-05
at	5.73E-07	5.83E-07	5.92E-07	6.02E-07	6.12E-07	6.22E-07	6.32E-07
rn	3.62E-05	3.67E-05	3.71E-05	3.75E-05	3.80E-05	3.84E-05	3.88E-05
fr	5.37E-07	5.46E-07	5.55E-07	5.64E-07	5.73E-07	5.82E-07	5.91E-07
ra	3.14E-05	3.18E-05	3.22E-05	3.25E-05	3.29E-05	3.33E-05	3.36E-05
ac	7.34E-07	7.45E-07	7.56E-07	7.67E-07	7.78E-07	7.90E-07	8.01E-07
th	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.99E-03	1.99E-03	1.99E-03
pa	3.22E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02
u	3.56E+00	3.56E-01	3.56E-01	3.56E-01	3.56E-01	3.56E-01	3.56E-01
np	7.11E+00	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01
pu	1.97E+00	1.96E+00	1.95E+00	1.94E+00	1.93E+00	1.92E+00	1.90E+00
am	2.54E-06	2.61E-06	2.68E-06	2.76E-06	2.81E-06	2.86E-06	2.92E-06
totals	1.67E+01	2.73E+00	2.72E+00	2.71E+00	2.70E+00	2.69E+00	2.68E+00

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 59
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	7.15E-09	7.24E-09	7.32E-09	7.40E-09	7.48E-09	7.57E-09	7.65E-09
tl208	9.12E-07	9.21E-07	9.26E-07	9.29E-07	9.30E-07	9.30E-07	9.29E-07
pb211	2.20E-07	2.23E-07	2.26E-07	2.28E-07	2.31E-07	2.33E-07	2.36E-07
pb212	1.09E-07	1.11E-07	1.11E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07

pb214	3.83E-07	3.90E-07	3.96E-07	4.03E-07	4.09E-07	4.16E-07	4.22E-07
bi211	1.53E-07	1.54E-07	1.56E-07	1.58E-07	1.60E-07	1.61E-07	1.63E-07
bi212	7.94E-08	8.03E-08	8.07E-08	8.09E-08	8.10E-08	8.10E-08	8.09E-08
bi213	1.01E-08	1.02E-08	1.04E-08	1.06E-08	1.07E-08	1.09E-08	1.11E-08
bi214	2.31E-06	2.35E-06	2.39E-06	2.43E-06	2.47E-06	2.51E-06	2.55E-06
rn219	1.83E-07	1.85E-07	1.87E-07	1.89E-07	1.91E-07	1.93E-07	1.95E-07
fr223	4.38E-07	4.43E-07	4.48E-07	4.53E-07	4.58E-07	4.63E-07	4.68E-07
ra224	7.60E-09	7.68E-09	7.72E-09	7.74E-09	7.75E-09	7.75E-09	7.74E-09
ra226	1.11E-08	1.13E-08	1.14E-08	1.16E-08	1.18E-08	1.20E-08	1.22E-08
th227	3.57E-07	3.61E-07	3.65E-07	3.69E-07	3.73E-07	3.77E-07	3.82E-07
th229	7.53E-09	7.66E-09	7.78E-09	7.91E-09	8.04E-09	8.17E-09	8.30E-09
th230	1.21E-07	1.22E-07	1.23E-07	1.24E-07	1.25E-07	1.26E-07	1.27E-07
th231	6.84E-05	6.81E-05	6.81E-05	6.81E-05	6.81E-05	6.81E-05	6.81E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	1.86E-07	1.88E-07	1.89E-07	1.91E-07	1.92E-07	1.94E-07	1.96E-07
pa233	9.33E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03	9.34E-03
pa234m	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04
pa234	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05
u233	2.25E-08	2.27E-08	2.29E-08	2.31E-08	2.34E-08	2.36E-08	2.38E-08
u234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
u235	3.65E-04	3.65E-04	3.65E-04	3.65E-04	3.65E-04	3.65E-04	3.65E-04
u236	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np237	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03
pu238	5.92E-04	5.88E-04	5.84E-04	5.80E-04	5.77E-04	5.73E-04	5.69E-04
pu239	3.55E-05	3.55E-05	3.55E-05	3.55E-05	3.55E-05	3.55E-05	3.55E-05
pu240	1.30E-07	1.30E-07	1.30E-07	1.30E-07	1.30E-07	1.30E-07	1.30E-07
am241	1.29E-08	1.33E-08	1.36E-08	1.39E-08	1.43E-08	1.46E-08	1.48E-08
total	3.97E+00	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02

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sas2h: for-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 60
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.82E-05	3.44E-05	3.48E-05	3.52E-05	3.17E-05	3.02E-05	2.88E-05
li 6	1.97E-06	1.97E-06	1.97E-06	1.97E-06	1.97E-06	1.97E-06	1.97E-06
be 10	5.90E-07	5.90E-07	5.90E-07	5.90E-07	5.90E-07	5.90E-07	5.90E-07
se 72	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05	1.26E-05
se 73	5.53E-05	5.53E-05	5.53E-05	5.53E-05	5.53E-05	5.53E-05	5.53E-05
se 74	4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.84E-05
se 75	5.64E-04	5.64E-04	5.64E-04	5.64E-04	5.64E-04	5.64E-04	5.64E-04
se 76	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03
se 77	4.17E-03	4.17E-03	4.17E-03	4.17E-03	4.17E-03	4.17E-03	4.17E-03
se 78	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
se 79	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02
br 79	2.39E-06	2.43E-06	2.47E-06	2.51E-06	2.55E-06	2.59E-06	2.63E-06
se 80	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02
br 81	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
se 82	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01
kr 82	3.39E-05	3.39E-05	3.39E-05	3.39E-05	3.39E-05	3.39E-05	3.39E-05
kr 83	2.91E-01	2.91E-01	2.91E-01	2.91E-01	2.91E-01	2.91E-01	2.91E-01
kr 84	5.86E-01	5.86E-01	5.86E-01	5.86E-01	5.86E-01	5.86E-01	5.86E-01
kr 85	2.25E-02	2.13E-02	2.02E-02	1.92E-02	1.81E-02	1.72E-02	1.63E-02
rb 85	4.56E-01	4.57E-01	4.58E-01	4.59E-01	6.60E-01	6.61E-01	6.62E-01
kr 86	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
sr 86	4.81E-06	4.81E-06	4.81E-06	4.81E-06	4.81E-06	4.81E-06	4.81E-06
rb 87	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
sr 87	2.45E-06	2.45E-06	2.45E-06	2.45E-06	2.45E-06	2.45E-06	2.45E-06
sr 88	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00

y 89	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00
sr 90	1.27E+00	1.25E+00	1.22E+00	1.20E+00	1.17E+00	1.15E+00	1.13E+00
y 90	3.31E-04	3.24E-04	3.18E-04	3.11E-04	3.05E-04	2.99E-04	2.93E-04
zr 90	2.16E+00	2.18E+00	2.21E+00	2.23E+00	2.26E+00	2.28E+00	2.30E+00
zr 91	3.50E+00	3.51E+00	3.51E+00	3.51E+00	3.51E+00	3.51E+00	3.51E+00
zr 92	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00	3.57E+00
zr 93	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00
nb 93	3.72E-05	3.79E-05	3.87E-05	3.94E-05	4.02E-05	4.10E-05	4.18E-05
nb 93m	2.08E-05	2.10E-05	2.12E-05	2.14E-05	2.16E-05	2.18E-05	2.20E-05
zr 94	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00
nb 94	1.81E-06	1.81E-06	1.81E-06	1.81E-06	1.81E-06	1.81E-06	1.81E-06
mo 95	4.00E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00
zr 96	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00
mo 96	4.33E-04	4.33E-04	4.33E-04	4.33E-04	4.33E-04	4.33E-04	4.33E-04
mo 97	3.58E+00	3.58E+00	3.58E+00	3.58E+00	3.58E+00	3.58E+00	3.58E+00
mo 98	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00
tc 99	3.96E+00	3.96E+00	3.96E+00	3.96E+00	3.96E+00	3.96E+00	3.96E+00
ru 99	7.79E-04	7.90E-04	8.00E-04	8.11E-04	8.22E-04	8.33E-04	8.44E-04
mo100	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00
ru100	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04
ru101	3.39E+00	3.39E+00	3.39E+00	3.39E+00	3.39E+00	3.39E+00	3.39E+00
ru102	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
rh103	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00
ru104	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
pd104	4.68E-04	4.68E-04	4.68E-04	4.68E-04	4.68E-04	4.68E-04	4.68E-04
pd105	7.35E-01	7.35E-01	7.35E-01	7.35E-01	7.35E-01	7.35E-01	7.35E-01
ru106	4.83E-03	2.74E-03	1.55E-03	8.79E-04	4.98E-04	2.82E-04	1.60E-04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 61
decay, following reactor irradiation identified by: powsr= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pd106	3.23E-01	3.25E-01	3.26E-01	3.27E-01	3.27E-01	3.27E-01	3.28E-01
pd107	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01
ag107	6.68E-07	6.80E-07	6.91E-07	7.02E-07	7.13E-07	7.24E-07	7.35E-07
pd108	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02	6.05E-02
ag109	3.08E-02	3.08E-02	3.08E-02	3.08E-02	3.08E-02	3.08E-02	3.08E-02
pd110	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02
cd110	5.89E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06	6.00E-06
cd111	1.63E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02
cd112	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
cd113	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02
cd113m	4.39E-05	4.32E-05	3.95E-05	3.60E-05	3.64E-05	3.50E-05	3.56E-05
in113	1.69E-04	1.71E-04	1.73E-04	1.74E-04	1.76E-04	1.77E-04	1.79E-04
cd114	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02
in115	8.54E-03	8.54E-03	8.54E-03	8.54E-03	8.54E-03	8.54E-03	8.54E-03
sn115	4.30E-04	4.30E-04	4.30E-04	4.30E-04	4.30E-04	4.30E-04	4.30E-04
cd116	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02
sn116	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06
sn117	8.95E-03	8.95E-03	8.95E-03	8.95E-03	8.95E-03	8.95E-03	8.95E-03
sn118	9.18E-03	9.18E-03	9.18E-03	9.18E-03	9.18E-03	9.18E-03	9.18E-03
sn119	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02
sn120	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02	1.01E-02
sn121m	3.02E-05	3.78E-05	3.74E-05	3.71E-05	3.67E-05	3.63E-05	3.59E-05
sb121	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
sn122	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
sb123	1.34E-02	1.34E-02	1.34E-02	1.34E-02	1.34E-02	1.34E-02	1.34E-02
sn124	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02
te124	9.89E-06	9.92E-06	9.92E-06	9.92E-06	9.92E-06	9.92E-06	9.92E-06

sb125	9.74E-04	7.91E-04	6.40E-04	5.18E-04	4.19E-04	3.39E-04	2.75E-04
te125	2.39E-02	2.41E-02	2.42E-02	2.43E-02	2.44E-02	2.45E-02	2.46E-02
te125m	1.33E-05	1.12E-05	9.09E-06	7.36E-06	5.95E-06	4.82E-06	3.90E-06
sn126	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02
te126	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.21E-04	2.21E-04	2.21E-04
i127	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01
te128	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
xe128	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06
i129	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01
xe129	1.42E-06	1.44E-06	1.47E-06	1.49E-06	1.51E-06	1.54E-06	1.56E-06
te130	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
xe130	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04
xe131	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00
xe132	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00
cs133	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00
xe134	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00
cs134	1.88E-05	1.42E-05	1.07E-05	8.09E-06	6.11E-06	4.62E-06	3.49E-06
ba134	3.12E-04	3.17E-04	3.20E-04	3.23E-04	3.25E-04	3.26E-04	3.28E-04
cs135	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00
ba135	8.81E-05	8.96E-05	9.10E-05	9.25E-05	9.40E-05	9.54E-05	9.69E-05
xe136	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00
ba136	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03
cs137	2.20E+00	2.16E+00	2.12E+00	2.08E+00	2.04E+00	2.00E+00	1.96E+00
ba137	3.44E+00	3.48E+00	3.52E+00	3.56E+00	3.60E+00	3.64E+00	3.68E+00
ba138	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
decay, following reactor irradiation identified by: power= 6.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
la138	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05
la139	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00
ce140	5.77E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00
pr141	5.34E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00
ce142	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00
nd142	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05
nd143	5.52E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00
ce144	5.78E-02	2.76E-02	1.32E-02	6.28E-03	2.99E-03	1.43E-03	6.81E-04
nd144	5.08E+00	5.11E+00	5.13E+00	5.13E+00	5.14E+00	5.14E+00	5.14E+00
nd145	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00
nd146	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00
pm147	8.22E-02	6.67E-02	5.55E-02	4.70E-02	4.45E-02	4.77E-02	5.22E-02
sm147	2.10E+00	2.11E+00	2.13E+00	2.14E+00	2.15E+00	2.15E+00	2.16E+00
nd148	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
sm148	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04
sm149	9.89E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01
nd150	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01
sm150	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02
sm151	2.93E-01	2.94E-01	2.92E-01	2.90E-01	2.88E-01	2.86E-01	2.84E-01
eu151	1.28E-01	1.30E-01	1.32E-01	1.34E-01	1.36E-01	1.37E-01	1.39E-01
sm152	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01
eu152	1.23E-04	1.18E-04	1.13E-04	1.08E-04	1.03E-04	9.90E-05	9.48E-05
gd152	1.80E-04	1.81E-04	1.82E-04	1.84E-04	1.85E-04	1.86E-04	1.87E-04
eu153	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
sm154	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02
eu154	1.25E-05	1.17E-05	1.09E-05	1.02E-05	9.56E-06	8.94E-06	8.36E-06
gd154	4.63E-05	4.72E-05	4.79E-05	4.86E-05	4.93E-05	4.99E-05	5.05E-05
eu155	2.42E-03	2.14E-03	1.89E-03	1.67E-03	1.48E-03	1.31E-03	1.16E-03
gd155	3.24E-02	3.28E-02	3.31E-02	3.33E-02	3.35E-02	3.37E-02	3.38E-02

gd156	1.62E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
gd157	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03
gd158	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03
tb159	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03
gd160	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04
dy161	1.33E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04
dy162	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05
dy163	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05
dy164	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06
ho165	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06
total	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02

1

sas2h: far-field crit based on b&w 15x15 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 43
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis: single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.69E-01	3.52E+01	3.36E-01	3.21E-01	3.06E-01	2.92E-01	2.79E-01
c 14	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07
se 79	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.12E-04
kr 85	8.84E+00	8.37E+00	7.93E+00	7.52E+00	7.12E+00	6.75E+00	6.40E+00
sr 90	1.80E+02	1.76E+02	1.73E+02	1.69E+02	1.66E+02	1.62E+02	1.59E+02
y 90	1.80E+02	1.76E+02	1.73E+02	1.69E+02	1.66E+02	1.62E+02	1.59E+02
y 91	1.99E+02	5.44E+00	1.48E-01	4.01E-03	1.09E-04	2.96E-06	8.04E-08
zr 93	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03
nb 93m	4.95E-03	5.00E-03	5.06E-03	5.10E-03	5.15E-03	5.19E-03	5.24E-03
zr 95	2.18E+02	8.09E+00	3.00E-01	1.11E-02	4.11E-04	1.52E-05	5.64E-07
nb 95	2.18E+02	1.72E+01	6.58E-01	2.44E-02	9.05E-04	3.35E-05	1.24E-06
tc 99	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02
rh102	8.00E-06	6.56E-06	5.37E-06	4.40E-06	3.61E-06	2.96E-06	2.42E-06
ru106	1.60E+01	9.07E+00	5.14E+00	2.92E+00	1.65E+00	9.37E-01	5.31E-01
rh106	1.60E+01	9.07E+00	5.14E+00	2.92E+00	1.65E+00	9.37E-01	5.31E-01
pd107	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05
cd113m	9.63E-03	9.25E-03	8.88E-03	8.52E-03	8.18E-03	7.85E-03	7.53E-03
sn119m	1.53E-03	7.46E-04	3.63E-04	1.77E-04	8.60E-05	4.19E-05	2.04E-05
sn121	4.70E-01	1.58E-03	1.56E-03	1.55E-03	1.53E-03	1.51E-03	1.50E-03
sn121m	2.05E-03	2.03E-03	2.01E-03	1.99E-03	1.97E-03	1.95E-03	1.93E-03
sn123	5.82E-02	1.14E-02	2.22E-03	4.33E-04	8.44E-05	1.65E-05	3.23E-06
sb125	1.02E+00	8.29E-01	6.71E-01	5.43E-01	4.39E-01	3.56E-01	2.88E-01
te125m	2.39E-01	2.02E-01	1.64E-01	1.33E-01	1.07E-01	8.68E-02	7.03E-02
sn126	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
sb126	4.87E-03	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04
sb126m	4.41E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
te127	4.21E+00	1.09E-01	1.37E-02	2.26E-03	3.26E-04	4.71E-05	6.80E-06
te127m	7.40E-01	1.11E-01	1.40E-02	2.31E-03	3.33E-04	4.81E-05	6.94E-06
i129	1.13E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04
xe134	2.43E-02	1.83E-02	1.39E-02	1.05E-02	7.92E-03	5.98E-03	4.52E-03
xe135	4.67E-03	4.67E-03	4.67E-03	4.67E-03	4.67E-03	4.67E-03	4.67E-03
xe137	1.91E+02	1.88E+02	1.84E+02	1.81E+02	1.77E+02	1.74E+02	1.70E+02
ba137m	1.81E+02	1.77E+02	1.74E+02	1.71E+02	1.67E+02	1.64E+02	1.61E+02
ce144	1.84E+02	8.78E+01	4.19E+01	2.00E+01	9.53E+00	4.54E+00	2.17E+00
pr144	1.84E+02	8.78E+01	4.19E+01	2.00E+01	9.53E+00	4.54E+00	2.17E+00
pr144m	2.58E+00	1.23E+00	5.86E-01	2.80E-01	1.33E-01	6.36E-02	3.03E-02
pm147	7.62E+01	6.19E+01	4.96E+01	3.98E+01	3.20E+01	2.56E+01	2.06E+01
sm151	7.78E+00	7.73E+00	7.68E+00	7.63E+00	7.58E+00	7.53E+00	7.48E+00
eu152	2.17E-02	2.08E-02	1.99E-02	1.91E-02	1.83E-02	1.75E-02	1.67E-02
eu154	3.38E-03	3.16E-03	2.96E-03	2.76E-03	2.59E-03	2.42E-03	2.26E-03
eu155	1.19E+00	1.06E+00	9.33E-01	8.25E-01	7.29E-01	6.45E-01	5.70E-01
total	2.07E+04	1.03E+03	8.67E+02	7.92E+02	7.47E+02	7.15E+02	6.91E+02

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sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 64
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4410E+02mwd, flux= 2.79E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.25E-05	1.19E-05	1.13E-05	1.08E-05	1.03E-05	9.85E-06	9.40E-06
se	3.33E+00	9.80E-08	9.80E-08	9.80E-08	9.80E-08	9.80E-08	9.80E-08
kr	1.29E+01	1.26E-02	1.19E-02	1.13E-02	1.07E-02	1.01E-02	9.59E-03
sr	2.01E+01	2.13E-01	2.01E-01	1.96E-01	1.92E-01	1.88E-01	1.85E-01
y	2.81E+01	9.95E-01	9.34E-01	9.37E-01	9.17E-01	8.99E-01	8.81E-01
zr	1.20E+01	4.08E-02	1.51E-03	5.67E-05	2.60E-06	8.01E-07	7.27E-07
nb	2.15E+01	8.25E-02	3.16E-03	1.18E-04	5.23E-06	1.06E-06	9.88E-07
tc	6.48E+00	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05
ru	7.12E-01	2.18E-03	3.13E-04	1.73E-04	9.82E-05	5.57E-05	3.16E-05
rh	3.83E-01	8.71E-02	4.93E-02	2.79E-02	1.58E-02	8.98E-03	5.09E-03
ag	7.61E-02	2.00E-07	8.59E-08	3.69E-08	1.59E-08	6.81E-09	2.93E-09
cd	6.86E-02	1.06E-05	9.64E-06	9.87E-06	8.89E-06	8.34E-06	8.19E-06
sn	1.87E+00	3.90E-05	1.02E-05	4.53E-06	3.38E-06	3.13E-06	3.06E-06
sb	7.51E+00	2.64E-03	2.14E-03	1.73E-03	1.40E-03	1.14E-03	9.25E-04
te	9.29E+00	4.13E-04	1.68E-04	1.16E-04	9.09E-05	7.32E-05	5.92E-05
i	2.08E+01	5.31E-08	5.31E-08	5.31E-08	5.31E-08	5.31E-08	5.31E-08
xe	1.83E+01	2.09E-01	2.05E-01	2.01E-01	1.97E-01	1.93E-01	1.89E-01
ba	1.19E+01	6.96E-01	4.03E-01	6.70E-01	6.57E-01	6.45E-01	6.32E-01
ce	6.40E+00	5.79E-02	2.74E-02	1.31E-02	6.24E-03	2.97E-03	1.42E-03
pr	6.24E+00	6.45E-01	5.08E-01	1.47E-01	7.00E-02	3.34E-02	1.59E-02
pm	3.40E-01	2.27E-02	1.82E-02	1.46E-02	1.17E-02	9.41E-03	7.55E-03
sm	2.10E-02	9.09E-04	9.03E-04	8.97E-04	8.91E-04	8.86E-04	8.80E-04
eu	9.31E-03	1.01E-03	9.04E-04	8.12E-04	7.30E-04	6.56E-04	5.91E-04
totals	2.61E+02	3.87E+00	2.47E+00	2.22E+00	2.08E+00	1.99E+00	1.93E+00

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sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 65
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4410E+02mwd, flux= 2.79E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.17E-04	1.11E-04	1.05E-04	9.94E-05	9.41E-05	8.92E-05	8.45E-05
y 90	1.81E-06	1.78E-06	1.74E-06	1.70E-06	1.67E-06	1.64E-06	1.60E-06
nb 93m	5.52E-08	5.58E-08	5.63E-08	5.69E-08	5.74E-08	5.79E-08	5.84E-08
sr 89	9.47E-01	3.51E-02	1.30E-03	4.81E-05	1.78E-06	6.61E-08	2.45E-09
nb 95	9.88E-01	7.78E-02	2.98E-03	1.11E-04	4.10E-06	1.52E-07	5.65E-09
rh102	1.02E-07	8.39E-08	6.88E-08	5.64E-08	4.62E-08	3.78E-08	3.10E-08
rh106	1.95E-02	1.11E-02	6.38E-03	3.56E-03	2.02E-03	1.14E-03	6.48E-04
ag110m	4.30E-07	1.93E-07	8.31E-08	3.57E-08	1.53E-08	6.59E-09	2.83E-09
sn121m	6.09E-08	6.03E-08	5.96E-08	5.90E-08	5.84E-08	5.78E-08	5.72E-08
sb125	2.63E-03	2.13E-03	1.73E-03	1.40E-03	1.13E-03	9.15E-04	7.40E-04
te125m	5.04E-05	4.27E-05	3.44E-05	2.80E-05	2.26E-05	1.83E-05	1.48E-05
sn126	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07
sb126	6.64E-05	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06
sb126m	5.90E-05	9.29E-06	9.29E-06	9.29E-06	9.29E-06	9.29E-06	9.29E-06
i129	1.65E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08
cs134	2.24E-04	1.69E-04	1.28E-04	9.65E-05	7.30E-05	5.51E-05	4.17E-05
ba137m	6.42E-01	6.29E-01	6.17E-01	6.05E-01	5.94E-01	5.83E-01	5.71E-01
ce144	2.07E-02	9.89E-03	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr144	3.16E-02	1.51E-02	7.18E-03	3.42E-03	1.63E-03	7.79E-04	3.71E-04
pr144m	1.91E-04	9.11E-05	4.35E-05	2.07E-05	9.88E-06	4.71E-06	2.25E-06
pm147	1.98E-06	1.61E-06	1.29E-06	1.03E-06	8.30E-07	6.66E-07	5.34E-07
sm151	6.54E-07	6.50E-07	6.46E-07	6.42E-07	6.38E-07	6.34E-07	6.30E-07
eu152	1.50E-04	1.43E-04	1.37E-04	1.31E-04	1.26E-04	1.20E-04	1.15E-04
eu154	2.51E-05	2.35E-05	2.20E-05	2.06E-05	1.92E-05	1.80E-05	1.68E-05
eu155	4.58E-04	4.05E-04	3.58E-04	3.16E-04	2.80E-04	2.47E-04	2.19E-04

total	1.29E+02	7.83E-01	6.42E-01	6.17E-01	6.00E-01	5.87E-01	5.74E-01

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 66
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0 element gamma power, watts
basis single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	1.11E-04	1.05E-04	9.94E-05	9.41E-05	8.92E-05	8.45E-05
y	9.80E+00	1.19E-04	4.91E-06	1.79E-06	1.67E-06	1.64E-06	1.60E-06
zr	4.61E+00	3.51E-02	1.30E-03	4.81E-05	1.74E-06	6.61E-08	2.45E-09
nb	9.13E+00	7.79E-02	2.98E-03	1.11E-04	4.16E-06	2.12E-07	4.58E-08
rh	1.07E-01	1.11E-02	6.28E-03	3.56E-03	2.02E-03	1.14E-03	6.43E-04
ag	3.07E-02	1.93E-07	2.31E-08	2.57E-08	1.54E-08	6.40E-09	2.84E-09
sn	1.23E+00	1.36E-06	9.56E-07	6.69E-07	6.48E-07	6.42E-07	6.39E-07
sb	5.16E+00	2.14E-03	1.74E-03	1.41E-03	1.14E-03	9.26E-04	7.52E-04
te	5.57E+00	5.71E-05	3.61E-05	2.82E-05	2.27E-05	1.83E-05	1.48E-05
i	1.36E+01	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08
cs	8.74E+00	1.69E-04	1.28E-04	9.65E-05	7.30E-05	5.51E-05	4.17E-05
ba	5.34E+00	6.29E-01	6.17E-01	6.05E-01	5.94E-01	5.83E-01	5.71E-01
ce	2.68E+00	1.00E-02	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr	1.80E+00	1.51E-02	7.22E-03	3.44E-03	1.64E-03	7.83E-04	3.74E-04
pm	8.55E-02	1.67E-06	1.29E-06	1.03E-06	8.30E-07	4.66E-07	5.34E-07
sm	4.47E-03	6.50E-07	6.46E-07	6.42E-07	6.38E-07	6.34E-07	6.30E-07
eu	5.77E-03	5.72E-04	5.17E-04	4.68E-04	4.23E-04	3.86E-04	3.51E-04
totals	1.29E+02	7.83E-01	6.42E-01	6.17E-01	6.00E-01	5.87E-01	5.74E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emesn (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	5.15E+11	5.55E+04	4.44E+04	3.56E+04	2.85E+04	2.28E+04	1.83E+04
3.00E-02	1.69E+11	1.77E+04	1.41E+04	1.13E+04	9.07E+03	7.26E+03	5.82E+03
5.50E-02	1.18E+11	1.19E+04	9.55E+03	7.65E+03	6.13E+03	4.91E+03	3.93E+03
8.50E-02	6.90E+10	6.71E+03	5.37E+03	4.30E+03	3.45E+03	2.76E+03	2.21E+03
1.20E-01	4.90E+10	4.39E+03	3.47E+03	2.94E+03	2.36E+03	1.89E+03	1.51E+03
1.70E-01	5.13E+10	4.50E+03	3.61E+03	2.89E+03	2.31E+03	1.85E+03	1.48E+03
3.00E-01	5.88E+10	4.48E+03	3.59E+03	2.88E+03	2.30E+03	1.84E+03	1.48E+03
6.50E-01	2.89E+10	2.39E+05	1.92E+05	1.54E+05	1.23E+05	9.85E+04	7.89E+04
1.13E+00	4.97E+09	1.91E+05	1.53E+05	1.22E+05	9.81E+04	7.85E+04	6.29E+04
1.58E+00	9.04E+11	4.78E-01	3.83E-01	3.07E-01	2.46E-01	1.97E-01	1.58E-01
2.00E+00	1.79E+08	4.25E-02	3.40E-02	2.73E-02	2.18E-02	1.75E-02	1.40E-02
2.40E+00	3.63E+07	9.53E-03	7.63E-03	6.11E-03	4.90E-03	3.92E-03	3.14E-03
2.80E+00	2.13E+11	1.49E-04	1.20E-04	9.57E-05	7.67E-05	6.14E-05	4.92E-05
3.25E+00	1.36E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.82E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.63E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.09E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.18E+12	5.36E+05	4.29E+05	3.44E+05	2.75E+05	2.20E+05	1.77E+05
0 mev/sec	2.10E+12	3.75E+05	3.01E+05	2.41E+05	1.93E+05	1.54E+05	1.24E+05

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emesn (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d

	1.00E-02	1.29E+06	1.39E-01	1.11E-01	8.90E-02	7.13E-02	5.71E-02	4.57E-02
	3.00E-02	1.27E+06	1.32E-01	1.06E-01	8.49E-02	6.80E-02	5.45E-02	4.36E-02
	5.50E-02	1.62E+06	1.44E-01	1.31E-01	1.05E-01	8.42E-02	6.75E-02	5.40E-02
	8.50E-02	1.47E+06	1.43E-01	1.14E-01	9.15E-02	7.33E-02	5.87E-02	4.70E-02
	1.20E-01	1.47E+06	1.38E-01	1.10E-01	8.83E-02	7.07E-02	5.66E-02	4.54E-02
	1.70E-01	2.18E+06	1.91E-01	1.53E-01	1.23E-01	9.84E-02	7.88E-02	6.31E-02
	3.00E-01	4.41E+06	3.36E-01	2.69E-01	2.16E-01	1.73E-01	1.38E-01	1.11E-01
	6.50E-01	4.70E+06	3.89E+01	3.12E+01	2.50E+01	2.00E+01	1.60E+01	1.28E+01
	1.13E+00	1.48E+06	5.37E+01	4.30E+01	3.44E+01	2.76E+01	2.21E+01	1.77E+01
	1.58E+00	3.56E+08	1.88E-04	1.51E-04	1.21E-04	9.67E-05	7.75E-05	6.20E-05
	2.00E+00	8.96E+04	2.13E-05	1.70E-05	1.36E-05	1.09E-05	8.75E-06	7.00E-06
	2.40E+00	7.18E+04	5.72E-06	4.58E-06	3.67E-06	2.94E-06	2.35E-06	1.88E-06
	2.80E+00	1.49E+08	1.04E-07	8.37E-08	6.70E-08	5.37E-08	4.30E-08	3.44E-08
	3.25E+00	1.10E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	7.87E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	1.50E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	5.25E+08	9.38E+01	7.52E+01	6.02E+01	4.82E+01	3.86E+01	3.09E+01
0	gamma watts	3.37E-01	6.02E-08	4.82E-08	3.86E-08	3.09E-08	2.48E-08	1.98E-08

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photon spectrum as a function of time for fission products

0 gas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

	emean (mev)	initial	304.4 d	time after discharge 608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	1.00E-02	2.41E+14	7.69E+12	6.25E+12	5.47E+12	5.04E+12	4.78E+12	4.60E+12
	3.00E-02	1.14E+14	3.41E+12	2.67E+12	2.32E+12	2.12E+12	2.01E+12	1.93E+12
	5.50E-02	6.07E+13	1.71E+12	1.33E+12	1.15E+12	1.05E+12	9.93E+11	9.54E+11
	8.50E-02	4.20E+13	1.02E+12	7.78E+11	6.59E+11	5.95E+11	5.58E+11	5.34E+11
	1.20E-01	3.44E+13	1.04E+12	6.94E+11	5.25E+11	4.40E+11	3.95E+11	3.70E+11
	1.70E-01	5.50E+13	6.34E+11	5.00E+11	4.27E+11	3.88E+11	3.65E+11	3.50E+11
	3.00E-01	1.10E+14	7.89E+11	5.35E+11	4.50E+11	4.05E+11	3.79E+11	3.63E+11
	6.50E-01	2.29E+14	7.58E+12	6.25E+12	6.02E+12	5.86E+12	5.73E+12	5.61E+12
	1.13E+00	7.81E+13	5.55E+10	3.75E+10	2.86E+10	2.40E+10	2.14E+10	1.99E+10
	1.58E+00	4.84E+13	1.94E+10	1.08E+10	6.62E+09	4.54E+09	3.49E+09	2.95E+09
	2.00E+00	1.23E+13	2.94E+10	1.41E+10	6.85E+09	3.36E+09	1.69E+09	8.83E+08
	2.40E+00	1.86E+13	6.19E+08	3.27E+08	1.76E+08	9.50E+07	5.01E+07	2.72E+07
	2.80E+00	4.23E+12	8.87E+07	4.38E+07	2.39E+07	1.31E+07	7.21E+06	3.99E+06
	3.25E+00	2.48E+12	1.01E+07	5.75E+06	3.46E+06	1.85E+06	1.05E+06	5.93E+05
	3.75E+00	1.26E+12	4.47E+03	2.53E+03	1.44E+03	8.14E+02	4.61E+02	2.61E+02
	4.25E+00	1.39E+12	2.00E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07
	4.75E+00	6.88E+11	1.00E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07
	5.50E+00	3.84E+11	7.45E-08	7.46E-08	7.47E-08	7.48E-08	7.49E-08	7.49E-08
0	total	1.86E+15	2.41E+13	1.91E+13	1.71E+13	1.59E+13	1.52E+13	1.47E+13
0	mev/sec	4.44E+14	5.89E+12	4.76E+12	4.44E+12	4.31E+12	4.19E+12	4.09E+12

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

	emean (mev)	initial	304.4 d	time after discharge 608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	1.00E-02	6.51E+08	1.97E+07	1.56E+07	1.37E+07	1.26E+07	1.19E+07	1.15E+07
	3.00E-02	8.54E+08	2.56E+07	2.01E+07	1.74E+07	1.59E+07	1.51E+07	1.45E+07
	5.50E-02	8.55E+08	2.55E+07	1.83E+07	1.58E+07	1.45E+07	1.36E+07	1.31E+07
	8.50E-02	8.92E+08	2.17E+07	1.65E+07	1.40E+07	1.26E+07	1.19E+07	1.14E+07
	1.20E-01	1.03E+09	3.13E+07	2.08E+07	1.58E+07	1.32E+07	1.19E+07	1.11E+07

1.70E-01	2.34E+09	2.79E+07	2.13E+07	1.81E+07	1.63E+07	1.35E+07	1.69E+07
3.00E-01	8.25E+09	5.92E+07	4.01E+07	2.38E+07	3.04E+07	2.85E+07	2.72E+07
6.50E-01	3.73E+10	1.83E+09	1.02E+09	9.78E+08	9.53E+08	9.31E+08	9.12E+08
1.13E+00	2.20E+10	1.56E+07	1.05E+07	8.03E+06	4.74E+06	4.03E+06	5.60E+06
1.58E+00	1.59E+10	7.65E+06	4.26E+06	2.41E+06	1.79E+06	1.38E+06	1.16E+06
2.00E+00	4.14E+09	1.47E+07	7.07E+06	5.63E+06	1.68E+06	8.44E+05	4.41E+05
2.40E+00	6.37E+09	3.72E+05	1.06E+05	1.04E+05	5.58E+04	3.01E+04	1.63E+04
2.80E+00	2.96E+09	5.65E+04	3.07E+04	1.67E+04	9.17E+03	5.05E+03	2.79E+03
3.25E+00	2.01E+09	8.24E+03	4.67E+03	2.65E+03	1.50E+03	8.50E+02	4.82E+02
3.75E+00	1.18E+09	4.19E+00	2.37E+00	1.35E+00	7.63E-01	4.32E-01	2.45E-01
4.25E+00	1.48E+09	2.13E-10	2.13E-10	2.13E-10	2.14E-10	2.14E-10	2.14E-10
4.75E+00	4.85E+08	1.19E-10	1.19E-10	1.20E-10	1.20E-10	1.20E-10	1.20E-10
5.50E+00	4.18E+08	1.02E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10
total	1.11E+11	1.47E+09	1.19E+09	1.12E+09	1.08E+09	1.05E+09	1.02E+09
gamma watts	7.12E+01	9.44E-01	7.63E-01	7.18E-01	6.92E-01	6.72E-01	6.54E-01

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principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (4.78E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	4.66E+10	4.42E+10	4.19E+10	3.97E+10	3.76E+10	3.56E+10	3.37E+10
sr 90	7.33E+11	7.18E+11	7.03E+11	6.89E+11	6.75E+11	6.61E+11	6.48E+11
y 90	3.40E+12	3.53E+12	3.46E+12	3.39E+12	3.32E+12	3.25E+12	3.18E+12
rh106	4.76E+11	2.70E+11	1.53E+11	8.68E+10	4.92E+10	2.79E+10	1.58E+10
cs137	6.75E+11	6.62E+11	6.50E+11	6.37E+11	6.25E+11	6.13E+11	6.01E+11
ba137m	3.17E+10	3.11E+10	3.05E+10	2.99E+10	2.93E+10	2.88E+10	2.82E+10
ce144	3.55E+11	1.69E+11	8.06E+10	3.85E+10	1.83E+10	8.75E+09	4.17E+09
pr144	4.70E+12	2.24E+12	1.07E+12	5.10E+11	2.43E+11	1.16E+11	5.53E+10
pm147	8.86E+10	7.19E+10	5.77E+10	4.63E+10	3.71E+10	2.98E+10	2.39E+10

principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (2.01E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	1.36E+10	1.29E+10	1.22E+10	1.16E+10	1.10E+10	1.04E+10	9.83E+09
sr 90	2.07E+11	2.03E+11	1.99E+11	1.95E+11	1.91E+11	1.87E+11	1.83E+11
y 90	1.17E+12	1.15E+12	1.13E+12	1.10E+12	1.08E+12	1.06E+12	1.04E+12
rh106	1.39E+11	9.02E+10	5.11E+10	2.90E+10	1.64E+10	9.31E+09	5.28E+09
sb125	1.87E+10	1.52E+10	1.23E+10	9.96E+09	8.06E+09	6.52E+09	5.28E+09
te125m	1.02E+10	8.65E+09	7.01E+09	5.67E+09	4.59E+09	3.72E+09	3.01E+09
cs137	1.85E+11	1.85E+11	1.81E+11	1.78E+11	1.74E+11	1.71E+11	1.68E+11
ba137m	5.44E+11	5.34E+11	5.23E+11	5.13E+11	5.04E+11	4.94E+11	4.85E+11
ce144	8.23E+11	3.93E+11	1.87E+11	8.93E+10	4.26E+10	2.03E+10	9.69E+09
pr144	1.35E+12	7.41E+11	3.54E+11	1.69E+11	8.04E+10	3.84E+10	1.83E+10
pm147	1.95E+10	1.58E+10	1.27E+10	1.02E+10	8.17E+09	6.55E+09	5.26E+09

principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (9.93E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	8.33E+09	7.90E+09	7.48E+09	7.09E+09	6.72E+09	6.36E+09	6.03E+09
sr 90	1.22E+11	1.20E+11	1.17E+11	1.15E+11	1.13E+11	1.10E+11	1.08E+11
y 90	8.11E+11	7.94E+11	7.78E+11	7.62E+11	7.47E+11	7.32E+11	7.17E+11
rh106	1.13E+11	6.39E+10	3.62E+10	2.05E+10	1.16E+10	6.59E+09	3.74E+09
cs137	1.09E+11	1.07E+11	1.05E+11	1.03E+11	1.01E+11	9.94E+10	9.75E+10
ce144	1.19E+11	5.68E+10	2.71E+10	1.29E+10	6.16E+09	2.94E+09	1.40E+09
pr144	1.09E+12	5.20E+11	2.48E+11	1.18E+11	5.63E+10	2.69E+10	1.28E+10
pm147	8.18E+09	6.64E+09	5.33E+09	4.28E+09	3.43E+09	2.75E+09	2.21E+09
eu155	9.21E+09	8.14E+09	7.20E+09	6.36E+09	5.62E+09	4.97E+09	4.39E+09

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principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (5.58E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	4.17E+09	3.95E+09	3.74E+09	3.55E+09	3.36E+09	3.19E+09	3.02E+09
sr 90	5.84E+10	5.72E+10	5.60E+10	5.49E+10	5.38E+10	5.27E+10	5.16E+10
y 90	4.69E+11	4.60E+11	4.50E+11	4.41E+11	4.32E+11	4.23E+11	4.15E+11
rh106	6.70E+10	3.80E+10	2.15E+10	1.22E+10	6.91E+09	3.92E+09	2.22E+09
cs137	5.13E+10	5.03E+10	4.93E+10	4.84E+10	4.75E+10	4.66E+10	4.57E+10
ce144	1.68E+11	8.02E+10	3.83E+10	1.82E+10	8.70E+09	4.15E+09	1.98E+09
pr144	6.62E+11	3.06E+11	1.46E+11	6.97E+10	3.32E+10	1.58E+10	7.56E+09
pm147	2.33E+09	1.89E+09	1.52E+09	1.22E+09	9.76E+08	7.83E+08	6.29E+08
eu155	1.40E+10	1.24E+10	1.09E+10	9.66E+09	8.54E+09	7.55E+09	6.67E+09

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (3.95E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	2.51E+09	2.38E+09	2.26E+09	2.14E+09	2.03E+09	1.92E+09	1.82E+09
sr 90	3.32E+10	3.25E+10	3.19E+10	3.12E+10	3.06E+10	3.00E+10	2.94E+10
y 90	3.30E+11	3.23E+11	3.17E+11	3.10E+11	3.04E+11	2.98E+11	2.92E+11
rh106	4.84E+10	2.74E+10	1.55E+10	8.81E+09	4.99E+09	2.83E+09	1.60E+09
cs137	2.87E+10	2.82E+10	2.76E+10	2.71E+10	2.66E+10	2.61E+10	2.56E+10
ce144	8.25E+11	3.93E+11	1.88E+11	8.95E+10	4.27E+10	2.03E+10	9.70E+09
pr144	4.60E+11	2.19E+11	1.05E+11	4.98E+10	2.38E+10	1.13E+10	5.41E+09
eu155	7.99E+09	7.06E+09	6.24E+09	5.51E+09	4.87E+09	4.31E+09	3.81E+09

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (3.65E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	2.00E+09	1.89E+09	1.79E+09	1.70E+09	1.61E+09	1.53E+09	1.45E+09
sr 90	2.37E+10	2.32E+10	2.27E+10	2.23E+10	2.18E+10	2.14E+10	2.09E+10
y 90	3.40E+11	3.33E+11	3.27E+11	3.20E+11	3.13E+11	3.07E+11	3.01E+11
rh106	5.19E+10	2.94E+10	1.67E+10	9.46E+09	5.35E+09	3.03E+09	1.72E+09
sb125	2.82E+09	2.29E+09	1.85E+09	1.50E+09	1.21E+09	9.82E+08	7.95E+08
cs137	2.03E+10	1.99E+10	1.95E+10	1.92E+10	1.88E+10	1.84E+10	1.81E+10
pr144	4.86E+11	2.32E+11	1.11E+11	5.27E+10	2.51E+10	1.20E+10	5.72E+09

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (3.79E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
kr 85	1.21E+09	1.14E+09	1.08E+09	1.03E+09	9.72E+08	9.21E+08	8.73E+08
sr 90	1.67E+10	1.65E+10	1.63E+10	1.61E+10	1.59E+09	9.69E+09	9.50E+09
y 90	3.78E+11	3.70E+11	3.63E+11	3.55E+11	3.48E+11	3.41E+11	3.34E+11
rh106	6.26E+10	3.55E+10	2.01E+10	1.14E+10	6.46E+09	3.66E+09	2.07E+09
cs137	1.03E+10	1.01E+10	9.88E+09	9.69E+09	9.51E+09	9.33E+09	9.15E+09
pr144	5.69E+11	2.71E+11	1.29E+11	6.17E+10	2.94E+10	1.40E+10	6.69E+09

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8 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (5.73E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
y 90	1.60E+11	1.56E+11	1.53E+11	1.50E+11	1.47E+11	1.44E+11	1.41E+11
rh106	1.93E+11	1.09E+11	6.21E+10	3.52E+10	1.99E+10	1.13E+10	6.41E+09
sb125	2.29E+10	1.86E+10	1.51E+10	1.22E+10	9.86E+09	7.98E+09	6.46E+09
ba137m	6.12E+12	6.00E+12	5.88E+12	5.77E+12	5.66E+12	5.55E+12	5.45E+12
pr144	3.88E+11	1.85E+11	8.83E+10	4.21E+10	2.01E+10	9.58E+09	4.57E+09

0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (2.14E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
y 90	2.08E+10	2.04E+10	2.00E+10	1.96E+10	1.92E+10	1.88E+10	1.84E+10
rh106	1.80E+10	1.02E+10	5.78E+09	3.28E+09	1.86E+09	1.05E+09	5.97E+08

```
  pr144   4.97E+10  2.37E+10  1.13E+10  5.39E+09  2.57E+09  1.23E+09  5.85E+08
  eu152   3.37E+08  3.23E+08  3.09E+08  2.96E+08  2.84E+08  2.72E+08  2.60E+08
  eu154   8.42E+07  7.87E+07  7.36E+07  6.88E+07  6.44E+07  6.02E+07  5.63E+07
0                principal photon sources in group 10, photons/sec
    mean energy = 1.5750 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.49E+09) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90   2.66E+09  2.63E+09  2.53E+09  2.50E+09  2.45E+09  2.40E+09  2.35E+09
 rh106    3.39E+09  1.92E+09  1.09E+09  6.18E+08  3.50E+08  1.99E+08  1.13E+08
 cs134    2.37E+07  1.79E+07  1.35E+07  1.02E+07  7.71E+06  5.83E+06  4.41E+06
 pr144    3.09E+10  1.47E+10  7.03E+09  3.35E+09  1.60E+09  7.63E+08  3.64E+08
 eu152    1.55E+08  1.48E+08  1.42E+08  1.36E+08  1.30E+08  1.25E+08  1.19E+08
0                principal photon sources in group 11, photons/sec
    mean energy = 2.0000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.69E+09) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90   1.59E+08  1.56E+08  1.53E+08  1.50E+08  1.47E+08  1.44E+08  1.41E+08
 rh106    1.10E+09  6.25E+08  3.54E+08  2.01E+08  1.14E+08  6.43E+07  3.66E+07
 pr144    5.99E+10  2.86E+10  1.36E+10  6.50E+09  3.10E+09  1.48E+09  7.05E+08
0                principal photon sources in group 12, photons/sec
    mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.01E+07) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90   9.28E+04  9.10E+04  8.91E+04  8.73E+04  8.55E+04  8.38E+04  8.21E+04
 rh106    4.16E+08  3.49E+08  1.98E+08  1.12E+08  6.36E+07  3.61E+07  2.04E+07
 pr144    5.66E+08  2.70E+08  1.29E+08  6.14E+07  2.93E+07  1.40E+07  6.67E+06
1                                                                                                          page  72
0                principal photon sources in group 13, photons/sec
    mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.21E+06) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106    1.04E+08  5.69E+07  3.34E+07  1.89E+07  1.07E+07  6.08E+06  3.45E+06
 pr144    4.56E+07  2.18E+07  1.04E+07  4.95E+06  2.36E+06  1.13E+06  5.37E+05
0                principal photon sources in group 14, photons/sec
    mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.05E+06) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106    1.79E+07  1.81E+07  3.75E+06  3.26E+06  1.85E+06  1.05E+06  5.93E+05
0                principal photon sources in group 15, photons/sec
    mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.61E+02) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 rh106    7.88E+03  4.47E+03  2.53E+03  1.46E+03  8.14E+02  4.61E+02  2.61E+02
0                principal photon sources in group 16, photons/sec
    mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.01E-07) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142    1.46E-07  1.46E-07  1.46E-07  1.46E-07  1.46E-07  1.46E-07  1.46E-07
 sm147    5.38E-08  5.42E-08  5.46E-08  5.49E-08  5.51E-08  5.52E-08  5.54E-08
0                principal photon sources in group 17, photons/sec
    mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.81E-07) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142    7.32E-08  7.32E-08  7.32E-08  7.32E-08  7.32E-08  7.32E-08  7.32E-08
 sm147    2.70E-08  2.72E-08  2.74E-08  2.75E-08  2.76E-08  2.77E-08  2.78E-08
0                principal photon sources in group 18, photons/sec
    mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.49E-08) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 ce142    5.43E-08  5.43E-08  5.43E-08  5.43E-08  5.43E-08  5.43E-08  5.43E-08
```

sm147 2.00E-08 2.02E-08 2.03E-08 2.04E-08 2.05E-08 2.06E-08 2.06E-08

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photon spectrum as a function of time for heavy metals and their daughters

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

0 powers= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec

0 actinide photon release rates, photons/sec

0 basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	1.34E+14	8.65E+11	8.63E+11	8.61E+11	8.59E+11	8.57E+11	8.55E+11
3.00E-02	8.46E+12	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10
5.50E-02	1.89E+13	2.08E+10	2.08E+10	2.08E+10	2.08E+10	2.08E+10	2.08E+10
8.50E-02	5.26E+13	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11
1.20E-01	5.43E+13	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10
1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
3.00E-01	2.87E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
6.50E-01	1.45E+12	6.31E+09	6.31E+09	6.31E+09	6.31E+09	6.31E+09	6.31E+09
1.13E+00	1.86E+12	9.19E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08
1.58E+00	1.10E+08	1.10E+08	1.10E+08	1.10E+08	1.11E+08	1.11E+08	1.11E+08
2.00E+00	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07
2.40E+00	4.43E+05	4.52E+05	4.59E+05	4.66E+05	4.73E+05	4.80E+05	4.87E+05
2.80E+00	1.61E+06	1.63E+06	1.63E+06	1.64E+06	1.64E+06	1.64E+06	1.64E+06
3.25E+00	1.44E+04	1.44E+04	1.45E+04	1.45E+04	1.46E+04	1.46E+04	1.47E+04
3.75E+00	6.40E+03	6.39E+03	6.39E+03	6.39E+03	6.38E+03	6.38E+03	6.38E+03
4.25E+00	3.69E+03	3.69E+03	3.69E+03	3.69E+03	3.69E+03	3.68E+03	3.68E+03
4.75E+00	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03
5.50E+00	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03
0 total	2.93E+14	1.27E+12	1.27E+12	1.26E+12	1.26E+12	1.26E+12	1.26E+12
0 mev/sec	2.51E+13	7.52E+10	7.52E+10	7.52E+10	7.52E+10	7.51E+10	7.51E+10

0 actinide energy release rates, mev/watt-sec

0 basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	3.34E+08	2.16E+06	2.15E+06	2.15E+06	2.15E+06	2.14E+06	2.14E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05
8.50E-02	1.12E+09	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06
1.20E-01	1.63E+09	8.72E+05	8.72E+05	8.72E+05	8.72E+05	8.72E+05	8.72E+05
1.70E-01	7.31E+07	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05
3.00E-01	2.15E+09	9.78E+06	9.78E+06	9.78E+06	9.78E+06	9.78E+06	9.78E+06
6.50E-01	2.36E+08	1.03E+06	1.03E+06	1.03E+06	1.03E+06	1.03E+06	1.03E+06
1.13E+00	3.23E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.59E+05	2.59E+05
1.58E+00	4.34E+04	4.35E+04	4.35E+04	4.35E+04	4.35E+04	4.35E+04	4.36E+04
2.00E+00	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04
2.40E+00	2.67E+02	2.71E+02	2.76E+02	2.80E+02	2.84E+02	2.88E+02	2.92E+02
2.80E+00	1.13E+03	1.14E+03	1.14E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03
3.25E+00	1.17E+01	1.17E+01	1.18E+01	1.18E+01	1.18E+01	1.19E+01	1.19E+01
3.75E+00	6.00E+00	5.99E+00	5.99E+00	5.99E+00	5.98E+00	5.98E+00	5.98E+00
4.25E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.91E+00	3.91E+00
4.75E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00
5.50E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00
0 total	6.28E+09	1.08E+07	1.08E+07	1.08E+07	1.08E+07	1.08E+07	1.08E+07
0 gamma watts	4.02E+00	1.21E-02	1.21E-02	1.21E-02	1.20E-02	1.20E-02	1.20E-02

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	3.48E-10	3.55E-10	3.62E-10	3.70E-10	3.77E-10	3.85E-10	3.92E-10
bi210	8.87E-08	9.04E-08	9.24E-08	9.43E-08	9.62E-08	9.82E-08	1.00E-07
bi211	8.72E-01	8.82E-01	8.92E-01	9.02E-01	9.12E-01	9.22E-01	9.32E-01
bi212	5.38E-02	5.44E-02	5.47E-02	5.49E-02	5.49E-02	5.49E-02	5.49E-02
bi213	5.11E-04	5.16E-04	5.21E-04	5.26E-04	5.32E-04	5.37E-04	5.43E-04
bi214	7.25E-05	7.37E-05	7.49E-05	7.61E-05	7.73E-05	7.86E-05	7.98E-05
po210	1.09E-01	1.09E-01	1.11E-01	1.13E-01	1.15E-01	1.18E-01	1.20E-01
po211	3.43E-03	3.49E-03	3.53E-03	3.57E-03	3.61E-03	3.65E-03	3.69E-03
po212	2.86E-01	2.89E-01	2.90E-01	2.91E-01	2.92E-01	2.92E-01	2.91E-01
po213	4.10E-02	4.17E-02	4.24E-02	4.31E-02	4.38E-02	4.45E-02	4.52E-02
po214	6.46E-01	6.56E-01	6.67E-01	6.78E-01	6.89E-01	7.00E-01	7.11E-01
po215	1.23E+00	1.25E+00	1.26E+00	1.28E+00	1.29E+00	1.30E+00	1.32E+00
po216	2.23E-01	2.25E-01	2.27E-01	2.27E-01	2.28E-01	2.27E-01	2.27E-01
po218	3.07E-01	3.12E-01	3.17E-01	3.23E-01	3.28E-01	3.33E-01	3.38E-01
at217	2.66E-02	2.70E-02	2.75E-02	2.79E-02	2.84E-02	2.88E-02	2.93E-02
rn218	4.21E-12	1.66E-16	6.51E-21	2.56E-25	.00E+00	.00E+00	.00E+00
rn219	9.80E-01	9.92E-01	1.00E+00	1.01E+00	1.03E+00	1.04E+00	1.05E+00
rn220	1.77E-01	1.79E-01	1.79E-01	1.80E-01	1.80E-01	1.80E-01	1.80E-01
rn222	2.24E-01	2.28E-01	2.32E-01	2.36E-01	2.39E-01	2.43E-01	2.47E-01
fr221	1.94E-02	1.97E-02	2.00E-02	2.04E-02	2.07E-02	2.10E-02	2.14E-02
fr223	3.71E-07	3.75E-07	3.79E-07	3.84E-07	3.88E-07	3.92E-07	3.96E-07
ra222	3.25E-12	1.28E-16	5.03E-21	1.98E-25	.00E+00	.00E+00	.00E+00
ra223	5.67E-01	5.74E-01	5.81E-01	5.87E-01	5.94E-01	6.00E-01	6.07E-01
ra224	1.25E-01	1.26E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
ra226	1.31E-01	1.33E-01	1.36E-01	1.38E-01	1.40E-01	1.42E-01	1.45E-01
ac225	1.39E-02	1.42E-02	1.44E-02	1.46E-02	1.49E-02	1.51E-02	1.54E-02
ac227	4.17E-03	4.22E-03	4.27E-03	4.32E-03	4.36E-03	4.41E-03	4.46E-03
ac228	2.11E-13	2.12E-13	2.14E-13	2.16E-13	2.18E-13	2.20E-13	2.22E-13
th226	2.94E-12	1.16E-16	4.54E-21	1.79E-25	.00E+00	.00E+00	.00E+00
th227	6.26E-01	6.33E-01	6.41E-01	6.48E-01	6.55E-01	6.62E-01	6.69E-01
th228	1.05E-01	1.06E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01
th229	8.15E-03	8.28E-03	8.42E-03	8.56E-03	8.70E-03	8.84E-03	8.98E-03
th230	5.67E+00	5.71E+00	5.76E+00	5.81E+00	5.85E+00	5.90E+00	5.95E+00
th232	2.93E-06	2.95E-06	2.97E-06	3.00E-06	3.02E-06	3.05E-06	3.07E-06
pa231	4.76E-01	4.80E-01	4.84E-01	4.88E-01	4.92E-01	4.96E-01	5.00E-01
u230	2.31E-12	9.09E-17	3.58E-21	1.41E-25	.00E+00	.00E+00	.00E+00
u231	1.49E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.01E-01	1.01E-01	1.01E-01	1.00E-01	1.00E-01	9.96E-02	9.90E-02
u233	1.62E+00	1.63E+00	1.65E+00	1.66E+00	1.68E+00	1.69E+00	1.71E+00
u234	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03
u235	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
u236	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.41E-08	1.42E-08	8.31E-09	4.88E-09	2.87E-09	1.68E-09	9.88E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	1.41E-01	1.16E-01	9.50E-02	7.78E-02	6.38E-02	5.23E-02	4.28E-02
pu237	1.26E-08	1.18E-10	1.10E-12	1.03E-14	9.68E-17	9.07E-19	8.49E-21
pu238	4.56E+04	4.53E+04	4.50E+04	4.47E+04	4.44E+04	4.41E+04	4.38E+04

1 neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	5.03E+03	5.03E+03	5.03E+03	5.03E+03	5.03E+03	5.03E+03	5.03E+03
pu240	9.14E+00	9.14E+00	9.14E+00	9.14E+00	9.14E+00	9.14E+00	9.13E+00
pu241	2.24E-05	2.15E-05	2.06E-05	1.98E-05	1.91E-05	1.83E-05	1.76E-05
pu242	1.08E-08	1.08E-08	1.08E-08	1.08E-08	1.08E-08	1.08E-08	1.08E-08
am239	6.85E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	1.08E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	6.56E-02	6.75E-02	6.92E-02	7.08E-02	7.24E-02	7.40E-02	7.56E-02
am242m	3.95E-08	3.93E-08	3.91E-08	3.90E-08	3.88E-08	3.87E-08	3.85E-08
am243	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10
am241	8.45E-18	1.36E-20	2.19E-23	3.52E-26	5.66E-29	.00E+00	.00E+00
am242	6.41E-04	1.85E-04	5.96E-05	2.51E-05	1.56E-05	1.30E-05	1.22E-05
am243	8.38E-12	8.21E-12	8.05E-12	7.88E-12	7.73E-12	7.57E-12	7.42E-12
am244	3.49E-12	3.38E-12	3.28E-12	3.18E-12	3.08E-12	2.98E-12	2.89E-12
am245	9.03E-20	9.03E-20	9.03E-20	9.03E-20	9.03E-20	9.03E-20	9.03E-20
am246	1.15E-23	1.15E-23	1.15E-23	1.15E-23	1.15E-23	1.15E-23	1.15E-23
total	6.26E+04	6.23E+04	6.20E+04	6.17E+04	6.14E+04	6.11E+04	6.08E+04

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neutron source intensity as a function of time

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.45E-04	1.47E-04	1.48E-04	1.49E-04	1.50E-04	1.51E-04	1.53E-04
pa231	5.97E-05	6.02E-05	6.07E-05	6.12E-05	6.17E-05	6.22E-05	6.27E-05
u232	6.20E-06	6.20E-06	6.19E-06	6.17E-06	6.16E-06	6.12E-06	6.08E-06
u234	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
u235	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00
u236	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
u237	1.22E-09	7.87E-19	7.56E-19	7.26E-19	6.98E-19	6.70E-19	6.44E-19
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.46E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.39E-10	7.39E-10	7.39E-10	7.39E-10	7.39E-10	7.39E-10	7.39E-10
np238	2.02E-08	1.05E-20	1.05E-20	1.04E-20	1.14E-20	1.13E-20	1.13E-20
np239	1.08E-05	1.33E-21	1.33E-21	1.33E-21	1.33E-21	1.33E-21	1.33E-21
pu236	9.56E-03	7.84E-03	6.43E-03	5.27E-03	4.32E-03	3.54E-03	2.90E-03
pu238	8.41E+03	8.36E+03	8.30E+03	8.25E+03	8.20E+03	8.14E+03	8.09E+03
pu239	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00
pu240	6.08E+01	6.08E+01	6.07E+01	6.07E+01	6.07E+01	6.07E+01	6.07E+01
pu241	8.85E-07	7.73E-07	7.43E-07	7.14E-07	6.85E-07	6.56E-07	6.32E-07
pu242	8.44E-06	8.44E-06	8.44E-06	8.44E-06	8.44E-06	8.44E-06	8.44E-06
pu243	6.03E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu244	2.24E-38	2.43E-38	2.62E-38	2.81E-38	3.00E-38	3.20E-38	3.39E-38
am241	2.53E-05	2.60E-05	2.66E-05	2.73E-05	2.79E-05	2.85E-05	2.90E-05
am242m	1.88E-07	1.87E-07	1.86E-07	1.85E-07	1.85E-07	1.84E-07	1.83E-07
am242	1.07E-08	2.03E-10	2.02E-10	2.01E-10	2.00E-10	2.00E-10	1.99E-10
am243	5.93E-13	5.93E-13	5.93E-13	5.93E-13	5.92E-13	5.92E-13	5.92E-13
am244	1.19E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am242	3.20E-03	9.75E-04	2.97E-04	1.25E-04	7.79E-05	6.48E-05	6.10E-05
am243	1.82E-13	1.78E-13	1.75E-13	1.71E-13	1.68E-13	1.64E-13	1.61E-13
am244	4.56E-10	6.41E-10	6.28E-10	6.16E-10	6.03E-10	5.89E-10	5.76E-10
am245	2.45E-20	2.45E-20	2.45E-20	2.45E-20	2.45E-20	2.45E-20	2.45E-20
am246	4.14E-19	4.14E-19	4.14E-19	4.14E-19	4.14E-19	4.14E-19	4.14E-19
am248	2.92E-29	2.92E-29	2.92E-29	2.92E-29	2.92E-29	2.92E-29	2.92E-29
cf249	1.92E-39	1.92E-39	1.92E-39	1.92E-39	1.92E-39	1.92E-39	1.92E-39
total	1.26E+05	1.26E+05	1.26E+05	1.26E+05	1.26E+05	1.26E+05	1.26E+05

```
0     total  1.89E+05  1.88E+05  1.88E+05  1.88E+05  1.87E+05  1.87E+05  1.87E+05
1                                                                                                                page  77

                          alpha-n neutron source spectrum as a function of time
                              (using reaction spectra for uranium dioxide)

0                         sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                             alpha-n neutron spectra, neutrons/sec/basis
                               basis = single reactor assembly

     boundaries, mev    initial   304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d

  1 6.43E+00 - 2.00E+01 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  2 3.00E+00 - 6.43E+00 1.212E+04 1.206E+04 1.201E+04 1.195E+04 1.189E+04 1.184E+04 1.178E+04
  3 1.85E+00 - 3.00E+00 3.434E+04 3.418E+04 3.401E+04 3.385E+04 3.369E+04 3.353E+04 3.337E+04
  4 1.40E+00 - 1.85E+00 9.222E+03 9.179E+03 9.135E+03 9.092E+03 9.049E+03 9.006E+03 8.963E+03
  5 9.00E-01 - 1.40E+00 5.187E+03 5.163E+03 5.139E+03 5.114E+03 5.090E+03 5.066E+03 5.042E+03
  6 4.00E-01 - 9.00E-01 1.507E+03 1.500E+03 1.493E+03 1.486E+03 1.478E+03 1.471E+03 1.464E+03
  7 1.00E-01 - 4.00E-01 2.355E+02 2.344E+02 2.333E+02 2.322E+02 2.311E+02 2.300E+02 2.289E+02
  8 1.70E-02 - 1.00E-01 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 11 1.00E-04 - 5.50E-04 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 12 3.00E-05 - 1.00E-04 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 13 1.00E-05 - 3.00E-05 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 14 3.05E-06 - 1.00E-05 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 15 1.77E-06 - 3.05E-06 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 16 1.30E-06 - 1.77E-06 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 17 1.13E-06 - 1.30E-06 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 18 1.00E-06 - 1.13E-06 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 19 8.00E-07 - 1.00E-06 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 20 4.00E-07 - 8.00E-07 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 21 3.25E-07 - 4.00E-07 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 22 2.25E-07 - 3.25E-07 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 23 1.00E-07 - 2.25E-07 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 24 5.00E-08 - 1.00E-07 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 25 3.00E-08 - 5.00E-08 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 26 1.00E-08 - 3.00E-08 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.00E-08 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                       6.261E+04 6.232E+04 6.202E+04 6.172E+04 6.143E+04 6.114E+04 6.085E+04
1                                                                                                                page  78

                          spontaneous fission neutron source spectrum as a function of time

0                         sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                             spontaneous fission neutron spectra, neutrons/sec/basis
                               basis = single reactor assembly

     boundaries, mev    initial   304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d

  1 6.43E+00 - 2.00E+01 2.406E+03 2.405E+03 2.404E+03 2.403E+03 2.402E+03 2.401E+03 2.400E+03
  2 3.00E+00 - 6.43E+00 2.637E+04 2.636E+04 2.635E+04 2.634E+04 2.633E+04 2.632E+04 2.631E+04
  3 1.85E+00 - 3.00E+00 2.874E+04 2.873E+04 2.872E+04 2.870E+04 2.869E+04 2.868E+04 2.867E+04
  4 1.40E+00 - 1.85E+00 1.629E+04 1.628E+04 1.627E+04 1.627E+04 1.626E+04 1.625E+04 1.625E+04
  5 9.00E-01 - 1.40E+00 2.235E+04 2.235E+04 2.234E+04 2.233E+04 2.232E+04 2.231E+04 2.230E+04
  6 4.00E-01 - 9.00E-01 2.491E+04 2.490E+04 2.489E+04 2.488E+04 2.487E+04 2.486E+04 2.485E+04
  7 1.00E-01 - 4.00E-01 4.918E+03 4.916E+03 4.914E+03 4.912E+03 4.910E+03 4.907E+03 4.905E+03
  8 1.70E-02 - 1.00E-01 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 11 1.00E-04 - 5.50E-04 .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
```

12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
0		1.260E+05	1.259E+05	1.259E+05	1.258E+05	1.258E+05	1.257E+05	1.257E+05	

1 page 79

total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on biw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.406E+03	2.405E+03	2.404E+03	2.403E+03	2.402E+03	2.401E+03	2.400E+03
2	3.00E+00 - 6.43E+00	3.850E+04	3.843E+04	3.836E+04	3.829E+04	3.822E+04	3.815E+04	3.809E+04
3	1.85E+00 - 3.00E+00	6.308E+04	6.290E+04	6.273E+04	6.256E+04	6.238E+04	6.221E+04	6.204E+04
4	1.40E+00 - 1.85E+00	2.551E+04	2.546E+04	2.541E+04	2.536E+04	2.531E+04	2.526E+04	2.521E+04
5	9.00E-01 - 1.40E+00	2.754E+04	2.751E+04	2.747E+04	2.744E+04	2.741E+04	2.737E+04	2.734E+04
6	4.00E-01 - 9.00E-01	2.642E+04	2.640E+04	2.638E+04	2.636E+04	2.633E+04	2.633E+04	2.631E+04
7	1.00E-01 - 4.00E-01	5.154E+03	5.150E+03	5.147E+03	5.144E+03	5.141E+03	5.137E+03	5.134E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.886E+05	1.883E+05	1.879E+05	1.876E+05	1.872E+05	1.869E+05	1.865E+05

1 * gamma sources determined *
0case applies the following photon data base
master photon library
in binary mode

```
0    the sources include photons of nuclides for...

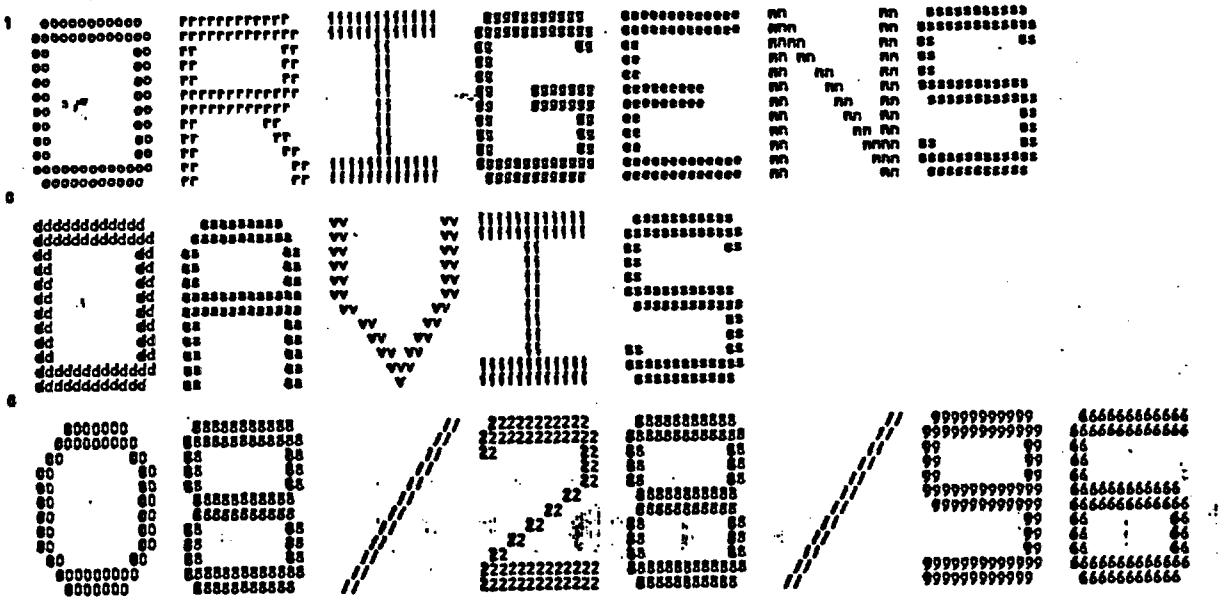
       light elements
       actinides
       fission products
1                      gamma source spectrum for gamma lines (sas2)
0                                  1826.25  day time of the requested nuclides
0                          energy interval in mev        photons / second      mev / second
0

                       1.0000E-02 to      5.0000E-02        3.8302E+12          1.1491E+11
                       5.0000E-02 to      1.0000E-01        1.2024E+12          9.0196E+10
                       1.0000E-01 to      2.0000E-01        7.3428E+11          1.1044E+11
                       2.0000E-01 to      3.0000E-01        2.3336E+11          5.8341E+10
                       3.0000E-01 to      4.0000E-01        2.5437E+11          8.9730E+10
                       4.0000E-01 to      6.0000E-01        1.2042E+11          6.0208E+10
                       6.0000E-01 to      8.0000E-01        5.1131E+12          3.5792E+12
                       8.0000E-01 to      1.0000E+00        2.1239E+10          1.9115E+10
                       1.0000E+00 to      1.3300E+00        1.2983E+10          1.5125E+10
                       1.3300E+00 to      1.4600E+00        2.8176E+09          4.2123E+09
                       1.4600E+00 to      2.0000E+00        5.5369E+08          1.0133E+09
                       2.0000E+00 to      2.5000E+00        6.7003E+08          1.5076E+09
                       2.5000E+00 to      3.0000E+00        6.4986E+06          1.7871E+07
                       3.0000E+00 to      4.0000E+00        5.6448E+05          1.9737E+06
                       4.0000E+00 to      5.0000E+00        5.7240E+03          2.5758E+04
                       5.0000E+00 to      6.5000E+00        2.2820E+03          1.3122E+04
                       6.5000E+00 to      8.0000E+00        4.4500E+02          3.2262E+03
                       8.0000E+00 to      1.0000E+01        9.4093E+01          8.4483E+02
0                      totals                               1.1531E+13          4.1440E+12
0
0                      total energy from nuclides with spectrum data     =   4.1440E+12
0                      total energy from nuclides with no spectrum data =   5.5050E+05
1
0  .results on logical unit no. 71, position  2, for time step  4, subcase 7, (run position 1, case position 2)
   title: sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
0    .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h    will be called
      SAS2H: Par-Field Crit based on 8X8 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      erbm-ftuff  2.6344 14 0 0 0 1001 1.855 8016 40.755 11023 0.570 12000 0.354
                                 13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                 26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                 92238 28.593 93237 0.033 1 1.0 538   end

      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-135     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      erbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 2 1.0 323.   end
      erbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 3 1.0 323.   end
```

```
!
! . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
! . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
!
!  fuel-pin-cell geometry:
!
symmslabcell  340.  280. 1 3 281. 2 end
! . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
!
!
!  assembly and cycle parameters:
!
npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=10 volfueltot=1.1494E7
printlevel=4 inplevel=0 end
power=0.004 burn=3.6525e5 down=1.82625e3
   end
```



```
0

      11        88888888888                 55555555555   99999999999                    0000000      666666666666
     111        888888888888                555555555555  9999999999999                 000000000    6666666666666
    1111        88        88        :::     55            99        99        :::      00        00   66
      11        88        88        :::     55            99        99        :::     00          00 66
      11        88        88        :::     55            99        99        :::     00          00 66
      11        888888888888                555555555555  9999999999999                00          00 666666666666
      11        888888888888                555555555555  9999999999999                00          00 6666666666666
      11        88        88        :::                 55            99        :::     00          00 66        66
      11        88        88        :::                 55            99        :::     00          00 66        66
      11        88        88        :::     55          55            99        :::      00        00  66        66
  11111111      888888888888                555555555555  9999999999999                 000000000    6666666666666
  11111111      888888888888                 55555555555  999999999999                   0000000      666666666666
1
0                          ssssssssss    eeeeeeeeeee    aaaaaaaa    ll            ooooooooooooo
                          ssssssssssss  eeeeeeeeeeee   aaaaaaaaaa  ll            ooooooooooooo
                          ss        ss  ee        ee   aa      aa  ll            oo
                          ss            ee             aa      aa  ll            oo
                          ss            ee             aa      aa  ll            oo
                          ssssssssssss  ee             aaaaaaaaaaaa ll           oooooooooo
                           ssssssssssss ee             aaaaaaaaaaaa ll           oooooooooo
                                     ss ee             aa      aa  ll            oo
                                     ss ee             aa      aa  ll            oo
                          ss         ss ee        ee   aa      aa  ll            oo
                          ssssssssssss  eeeeeeeeeeee  aa      aa  llllllllllll  ooooooooooooo
                           ssssssssssss  eeeeeeeeeee  aa      aa  llllllllllll  ooooooooooooo
```

program verification information

code system: scale version: 4.3

program: e0c004

creation date: 03/13/96

library: /usr1/ernl/Scale/bin

test code: origens

version: 3.0

jobname: davis

date of execution: 08/28/96

time of execution: 18:59:06

```
                        *****                                                                  *****
                        *****                                                                  *****
                        ***********************************************************************
                        ***********************************************************************
                        ***********************************************************************

1
0       -1q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0        dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0            short-lived split test fraction, qxn =    9.1188E-04
0            half-norm of matrix used, axn =    7.0000E+00
0            4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

         cross-section data taken from position number  1 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ***********************************************************************
         *                                                                     *
         *            prelim lwr origen-s binary working library--id = 1143    *
         *         made from modified card-image origen-s libraries of scale 4.2 *
         *      data from the light element, actinide, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                     *
         *      neutron flux spectrum factors and cross sections were produced from *
         *    the "prepas2" case updating all nuclides on the scale "burnup" library *
         *                                                                     *
         *                  fission product yields are from endf/b-v           *
         *                                                                     *
         *              photon libraries use an 18-energy-group structure      *
         *             the photon data are from the master photon data base,   *
         *              produced to include bremsstrahlung from uo2 matrix     *
         *                                                                     *
         *      see information above this box (if present) for later updates  *
         ***********************************************************************
         *                                                                     *
```

```
0          ****************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  ft33f001
0                   8/28/1996     date library was produced
0                        1697     total number of nuclides in library
                          689     number of light-element nuclides
                          129     number of actinide nuclides
                          879     number of fission product nuclides
0                        7993     number of nonzero off-diagonal matrix elements
0          ****************************************************************************
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page   1
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
    na 23   1.73E+05  1.73E+05
    al 27   1.35E+06  1.35E+06
  total     1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   2
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
     u234   2.12E+03  2.12E+03
     u235   1.72E+05  1.72E+05
     u236   4.12E+04  4.12E+04
     u238   8.66E+06  8.66E+06
    np237   9.99E+03  9.99E+03
  total     8.88E+06  8.88E+06
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                page   3
        power=    .00mw, burnup=    146.mwd, flux= 3.00E+08n/cm**2-sec
0                                          basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial       9131.3 d      18262.5 d      27393.8 d      36525.0 d      36525.1 d
    productions   1.023114E+06  1.023298E+06  1.023481E+06  1.023664E+06  1.023847E+06  1.023847E+06
    absorptions   8.461686E+05  8.445511E+05  8.487263E+05  8.449958E+05  8.472601E+05  8.472601E+05
    k infinity    1.209113E+00  1.208927E+00  1.208751E+00  1.208582E+00  1.208421E+00  1.208421E+00
0                 initial       9131.3 d      18262.5 d      27393.8 d      36525.0 d      36525.1 d
    actinide
    absorptions   8.424028E+05  8.425110E+05  8.426190E+05  8.427266E+05  8.428336E+05  8.428336E+05
    non-actinide
    abs. fracs.   4.650440E-03  4.654825E-03  4.850743E-03  5.040407E-03  5.224466E-03  5.224407E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products      page   4
0                                          fraction of total absorption rate
        power=    .00mw, burnup=    146.mwd, flux= 3.00E+08n/cm**2-sec
0                initial  9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d

    sm149       .00E+00  1.79E-04  3.52E-04  5.20E-04  6.81E-04  6.81E-04
    sm151       .00E+00  6.99E-06  1.27E-05  1.73E-05  2.13E-05  2.13E-05
    nd143       .00E+00  3.65E-06  7.30E-06  1.09E-05  1.46E-05  1.46E-05
    gd155       .00E+00  1.00E-06  4.20E-06  6.58E-06  8.93E-06  8.93E-06
    rh103       .00E+00  1.72E-06  3.45E-06  5.18E-06  6.91E-06  6.91E-06
    eu151       .00E+00  5.14E-07  1.93E-06  4.09E-06  6.04E-06  6.04E-06
    gd157       .00E+00  1.03E-06  3.56E-06  5.22E-06  6.79E-06  6.79E-06
    cd113       .00E+00  1.58E-06  3.12E-06  4.64E-06  6.13E-06  6.13E-06
    xe131       .00E+00  1.18E-06  2.37E-06  3.55E-06  4.73E-06  4.73E-06
    cs133       .00E+00  9.18E-07  1.84E-06  2.76E-06  3.67E-06  3.67E-06
    tc 99       .00E+00  6.79E-07  1.36E-06  2.04E-06  2.71E-06  2.71E-06
    sm147       .00E+00  5.79E-07  1.26E-06  1.95E-06  2.63E-06  2.63E-06
    xe135       .00E+00  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.24E-06
```

nd145	.00E+00	5.21E-07	1.04E-06	1.36E-06	2.08E-06	2.08E-06
mo 95	.00E+00	3.57E-07	7.19E-07	1.88E-06	1.44E-06	1.44E-06
sm152	.00E+00	2.78E-07	5.57E-07	8.37E-07	1.12E-06	1.12E-06
kr 83	.00E+00	2.23E-07	4.43E-07	6.67E-07	8.89E-07	8.89E-07
cs135	.00E+00	2.06E-07	4.12E-07	6.18E-07	8.24E-07	8.24E-07
ru101	.00E+00	1.62E-07	3.25E-07	4.87E-07	6.49E-07	6.49E-07
pr141	.00E+00	1.51E-07	3.03E-07	4.55E-07	6.07E-07	6.07E-07
eu153	.00E+00	1.39E-07	2.79E-07	4.18E-07	5.57E-07	5.57E-07
la139	.00E+00	1.24E-07	2.48E-07	3.72E-07	4.96E-07	4.96E-07
pm147	.00E+00	2.74E-07	2.75E-07	2.74E-07	2.74E-07	2.74E-07
pd105	.00E+00	5.33E-08	1.07E-07	1.60E-07	2.13E-07	2.13E-07
zr 93	.00E+00	5.14E-08	1.03E-07	1.54E-07	2.05E-07	2.05E-07
eu155	.00E+00	1.55E-07	1.59E-07	1.60E-07	1.60E-07	1.60E-07
i129	.00E+00	3.83E-08	7.66E-08	1.15E-07	1.53E-07	1.53E-07
nd144	.00E+00	3.56E-08	7.25E-08	1.10E-07	1.47E-07	1.47E-07
ba137	.00E+00	1.42E-08	4.80E-08	9.28E-08	1.44E-07	1.44E-07
mo 97	.00E+00	2.82E-08	5.64E-08	8.46E-08	1.13E-07	1.13E-07
ag109	.00E+00	2.03E-08	4.08E-08	6.17E-08	8.29E-08	8.29E-08
sm150	.00E+00	4.77E-09	1.88E-08	4.19E-08	7.36E-08	7.36E-08
zr 91	.00E+00	1.32E-08	2.64E-08	3.97E-08	5.29E-08	5.29E-08
y 89	.00E+00	1.26E-08	2.53E-08	3.80E-08	5.06E-08	5.06E-08
ru102	.00E+00	1.14E-08	2.29E-08	3.43E-08	4.57E-08	4.57E-08
ce142	.00E+00	1.03E-08	2.05E-08	3.08E-08	4.10E-08	4.10E-08
nd148	.00E+00	9.97E-09	1.99E-08	2.99E-08	3.98E-08	3.98E-08
nd146	.00E+00	8.31E-09	1.66E-08	2.49E-08	3.32E-08	3.32E-08
ba138	.00E+00	7.87E-09	1.41E-08	2.12E-08	2.83E-08	2.83E-08
pd108	.00E+00	6.90E-09	1.39E-08	2.09E-08	2.79E-08	2.79E-08
in115	.00E+00	6.91E-09	1.38E-08	2.07E-08	2.77E-08	2.77E-08
ce140	.00E+00	6.61E-09	1.32E-08	1.98E-08	2.65E-08	2.65E-08
xe132	.00E+00	6.04E-09	1.21E-08	1.81E-08	2.42E-08	2.42E-08
mo 98	.00E+00	4.23E-09	8.44E-09	1.27E-08	1.69E-08	1.69E-08
mo100	.00E+00	4.04E-09	8.09E-09	1.21E-08	1.62E-08	1.62E-08
pd107	.00E+00	3.99E-09	8.01E-09	1.20E-08	1.61E-08	1.61E-08
xe134	.00E+00	3.92E-09	7.84E-09	1.18E-08	1.57E-08	1.57E-08
sr 90	.00E+00	7.80E-09	1.20E-08	1.43E-08	1.55E-08	1.55E-08
zr 92	.00E+00	3.19E-09	6.38E-09	9.56E-09	1.27E-08	1.27E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5
0 fraction of total absorption rate
power= .00mw, burnup= 146.mwd, flux= 3.00E+08n/cm**2-sec
0 initial 9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d

i127	.00E+00	2.61E-09	5.23E-09	7.84E-09	1.05E-08	1.05E-08
zr 96	.00E+00	2.60E-09	5.21E-09	7.81E-09	1.04E-08	1.04E-08
ru104	.00E+00	2.48E-09	4.96E-09	7.45E-09	9.93E-09	9.93E-09
nd150	.00E+00	2.22E-09	4.44E-09	6.66E-09	8.87E-09	8.87E-09
xe136	.00E+00	2.12E-09	4.24E-09	6.36E-09	8.48E-09	8.48E-09
rh105	.00E+00	2.08E-09	4.29E-09	6.30E-09	8.31E-09	8.28E-09
br 81	.00E+00	1.61E-09	3.23E-09	4.84E-09	6.45E-09	6.45E-09
rb 85	.00E+00	1.41E-09	2.95E-09	4.51E-09	6.08E-09	6.08E-09
zr 94	.00E+00	1.38E-09	2.75E-09	4.13E-09	5.50E-09	5.50E-09
cd111	.00E+00	1.03E-09	2.06E-09	3.10E-09	4.14E-09	4.14E-09
te130	.00E+00	9.61E-10	1.92E-09	2.88E-09	3.84E-09	3.84E-09
sm154	.00E+00	9.38E-10	1.88E-09	2.81E-09	3.75E-09	3.75E-09
rb 87	.00E+00	9.12E-10	1.82E-09	2.73E-09	3.64E-09	3.64E-09
cs137	.00E+00	1.66E-09	2.59E-09	3.11E-09	3.41E-09	3.41E-09
zr 90	.00E+00	3.18E-10	1.07E-09	2.05E-09	3.15E-09	3.15E-09
pr143	.00E+00	2.66E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09
se 77	.00E+00	6.36E-10	1.27E-09	1.91E-09	2.54E-09	2.54E-09
xe133	.00E+00	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
pd106	.00E+00	4.38E-10	9.04E-10	1.37E-09	1.84E-09	1.84E-09

```
     kr 84        .00E+00  4.35E-10  8.69E-10  1.30E-09  1.74E-09  1.74E-09
     ce141        .00E+00  1.58E-09  1.58E-09  1.57E-09  1.57E-09  1.57E-09
     se 79        .00E+00  3.26E-10  6.52E-10  9.77E-10  1.30E-09  1.30E-09
     eu152        .00E+00  4.41E-11  2.41E-10  6.77E-10  1.27E-09  1.27E-09
     sb121        .00E+00  3.16E-10  6.32E-10  9.48E-10  1.27E-09  1.27E-09
     sb123        .00E+00  2.57E-10  5.15E-10  7.73E-10  1.03E-09  1.03E-09
     pm149        .00E+00  9.62E-10  9.62E-10  9.61E-10  9.61E-10  9.35E-10
     kr 86        .00E+00  2.37E-10  4.73E-10  7.09E-10  9.45E-10  9.45E-10
     nd147        .00E+00  9.44E-10  9.44E-10  9.43E-10  9.43E-10  9.39E-10
     te128        .00E+00  2.13E-10  4.26E-10  6.40E-10  8.53E-10  8.53E-10
     pd156        .00E+00  1.67E-10  3.41E-10  5.19E-10  7.04E-10  7.04E-10
     se 80        .00E+00  1.52E-10  3.05E-10  4.57E-10  6.09E-10  6.09E-10
     ce144        .00E+00  4.00E-10  2.99E-10  2.99E-10  2.99E-10  2.99E-10
     kr 85        .00E+00  4.56E-10  5.46E-10  5.64E-10  5.67E-10  5.67E-10
     dy161        .00E+00  1.33E-10  2.68E-10  4.05E-10  5.43E-10  5.43E-10
     te125        .00E+00  1.14E-10  2.49E-10  3.84E-10  5.19E-10  5.19E-10
     tb159        .00E+00  9.14E-11  1.83E-10  2.76E-10  3.68E-10  3.68E-10
     ru103        .00E+00  3.56E-10  3.56E-10  3.56E-10  3.56E-10  3.56E-10
     cd112        .00E+00  8.70E-11  1.74E-10  2.61E-10  3.49E-10  3.49E-10
     li  6        .00E+00  8.64E-11  1.73E-10  2.59E-10  3.45E-10  3.45E-10
     sn117        .00E+00  6.89E-11  1.38E-10  2.07E-10  2.76E-10  2.76E-10
     eu154        .00E+00  4.64E-11  1.14E-10  1.85E-10  2.56E-10  2.56E-10
     gd152        .00E+00  3.47E-12  2.91E-11  9.94E-11  2.34E-10  2.34E-10
     sn119        .00E+00  5.64E-11  1.13E-10  1.69E-10  2.26E-10  2.26E-10
     sn115        .00E+00  5.15E-11  1.03E-10  1.55E-10  2.06E-10  2.06E-10
     sr 88        .00E+00  4.36E-11  8.71E-11  1.31E-10  1.74E-10  1.74E-10
     zr 95        .00E+00  1.68E-10  1.68E-10  1.68E-10  1.67E-10  1.67E-10
     nb 95        .00E+00  1.53E-10  1.53E-10  1.53E-10  1.53E-10  1.53E-10
      y 91        .00E+00  1.42E-10  1.42E-10  1.42E-10  1.42E-10  1.42E-10
     gd158        .00E+00  3.01E-11  6.33E-11  9.95E-11  1.39E-10  1.39E-10
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page    6
0                          fraction of total absorption rate
         powerw     .00mw, burnup=    146.mwd, flux= 3.00E+08n/cm**2-sec
0                initial  9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d

     cd114        .00E+00  3.12E-11  6.30E-11  9.53E-11  1.29E-10  1.29E-10
     pd110        .00E+00  2.17E-11  6.35E-11  9.55E-11  1.28E-10  1.28E-10
     se 82        .00E+00  2.05E-11  5.00E-11  8.05E-11  1.18E-10  1.18E-10
     pm151        .00E+00  1.09E-10  1.09E-10  1.09E-10  1.09E-10  1.05E-10
     sn126        .00E+00  2.35E-11  4.71E-11  7.07E-11  9.43E-11  9.43E-11
     se 78        .00E+00  2.26E-11  4.51E-11  6.77E-11  9.02E-11  9.02E-11
     ru 99        .00E+00  7.79E-12  2.45E-11  4.94E-11  8.32E-11  8.32E-11
     sn124        .00E+00  1.84E-11  3.69E-11  5.53E-11  7.37E-11  7.37E-11
     dy162        .00E+00  1.76E-11  3.57E-11  5.42E-11  7.32E-11  7.32E-11
     dy164        .00E+00  1.59E-11  3.23E-11  4.92E-11  6.67E-11  6.67E-11
     as 75        .00E+00  1.35E-11  2.69E-11  4.04E-11  5.38E-11  5.38E-11
     ba140        .00E+00  4.72E-11  4.71E-11  4.71E-11  4.69E-11  4.69E-11
     sm153        .00E+00  3.80E-11  3.80E-11  3.80E-11  3.71E-11  3.71E-11
     eu156        .00E+00  3.39E-11  3.40E-11  3.41E-11  3.41E-11  3.41E-11
     in113        .00E+00  4.30E-12  1.27E-11  2.24E-11  3.24E-11  3.24E-11
     gd154        .00E+00  1.27E-12  6.56E-12  1.65E-11  3.11E-11  3.11E-11
     sr 89        .00E+00  2.04E-11  3.03E-11  3.03E-11  3.03E-11  3.03E-11
     sn118        .00E+00  7.57E-12  1.51E-11  2.27E-11  3.03E-11  3.03E-11
     ba136        .00E+00  7.22E-12  1.45E-11  2.20E-11  2.95E-11  2.95E-11
     xe134        .00E+00  7.13E-12  1.42E-11  2.13E-11  2.79E-11  2.79E-11
     ru106        .00E+00  2.59E-11  2.59E-11  2.60E-11  2.61E-11  2.61E-11
     cd116        .00E+00  6.38E-12  1.28E-11  1.91E-11  2.55E-11  2.55E-11
     sn122        .00E+00  6.23E-12  1.25E-11  1.87E-11  2.49E-11  2.49E-11
     sn120        .00E+00  6.09E-12  1.22E-11  1.83E-11  2.44E-11  2.44E-11
     ce143        .00E+00  1.74E-11  1.74E-11  1.74E-11  1.74E-11  1.68E-11
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kr 82	.00E+00	3.95E-12	7.99E-12	1.21E-11	1.44E-11	1.44E-11
dy163	.00E+00	3.89E-12	7.90E-12	1.20E-11	1.43E-11	1.43E-11
la140	.00E+00	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
sb125	.00E+00	1.50E-11	1.50E-11	1.50E-11	1.50E-11	1.50E-11
y 90	.00E+00	7.40E-12	1.14E-11	1.36E-11	1.47E-11	1.47E-11
ge 73	.00E+00	3.44E-12	7.28E-12	1.09E-11	1.46E-11	1.46E-11
ru100	.00E+00	1.03E-12	3.69E-12	7.80E-12	1.34E-11	1.34E-11
mo 99	.00E+00	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
xe130	.00E+00	2.43E-12	4.97E-12	7.62E-12	1.04E-11	1.04E-11
pm148m	.00E+00	9.61E-12	9.62E-12	9.62E-12	9.61E-12	9.60E-12
mo 96	.00E+00	1.82E-12	3.88E-12	6.16E-12	8.69E-12	8.69E-12
sm148	.00E+00	6.76E-13	2.34E-12	4.95E-12	8.51E-12	8.51E-12
nd142	.00E+00	5.22E-13	2.09E-12	4.69E-12	8.34E-12	8.34E-12
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	8.33E-12
ba134	.00E+00	5.15E-13	2.07E-12	4.66E-12	8.28E-12	8.28E-12
te127m	.00E+00	7.36E-12	7.37E-12	7.38E-12	7.38E-12	7.38E-12
i131	.00E+00	6.77E-12	6.76E-12	6.76E-12	6.76E-12	6.74E-12
ba135	.00E+00	4.30E-13	1.69E-12	3.77E-12	6.67E-12	6.67E-12
pd104	.00E+00	3.53E-13	1.42E-12	3.21E-12	5.70E-12	5.70E-12
se 76	.00E+00	1.33E-12	2.66E-12	3.99E-12	5.32E-12	5.32E-12
gd160	.00E+00	8.47E-13	1.70E-12	2.56E-12	3.43E-12	3.43E-12
te126	.00E+00	6.57E-13	1.34E-12	2.04E-12	2.77E-12	2.77E-12
te129m	.00E+00	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
ho165	.00E+00	2.67E-13	5.43E-13	8.28E-13	1.12E-12	1.12E-12

1 sas2h: far-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7

0 fraction of total absorption rate

0 power= .00mw, burnup= 146.mwd, flux= 3.00E+08n/cm**2-sec

	initial	9131.3 d	18262.9 d	27393.8 d	36525.0 d	36525.1 d
cd110	.00E+00	5.15E-14	1.96E-13	4.36E-13	7.71E-13	7.71E-13
nb 93	.00E+00	1.08E-14	1.21E-13	3.39E-13	6.05E-13	6.05E-13
te124	.00E+00	1.32E-13	3.07E-13	4.63E-13	6.19E-13	6.19E-13
sr 87	.00E+00	1.32E-13	3.04E-13	4.56E-13	6.08E-13	6.08E-13
br 79	.00E+00	3.38E-14	1.35E-13	3.03E-13	5.38E-13	5.38E-13
pm148	.00E+00	3.84E-13	3.84E-13	3.84E-13	3.81E-13	3.81E-13
nb 94	.00E+00	8.77E-14	1.75E-13	2.63E-13	3.51E-13	3.51E-13
ag111	.00E+00	3.22E-13	3.23E-13	3.24E-13	3.26E-13	3.24E-13
xe129	.00E+00	1.91E-14	7.62E-14	1.71E-13	3.05E-13	3.05E-13
se 74	.00E+00	7.33E-14	1.46E-13	2.20E-13	2.93E-13	2.93E-13
ag107	.00E+00	1.77E-14	7.10E-14	1.60E-13	2.85E-13	2.85E-13
eu157	.00E+00	2.96E-13	2.97E-13	2.98E-13	2.99E-13	2.77E-13
cd115m	.00E+00	2.36E-13	2.36E-13	2.36E-13	2.36E-13	2.36E-13
ge 72	.00E+00	4.91E-14	9.83E-14	1.48E-13	1.97E-13	1.97E-13
sr 86	.00E+00	4.35E-14	8.89E-14	1.36E-13	1.85E-13	1.85E-13
se 74	.00E+00	2.86E-14	5.77E-14	8.72E-14	1.17E-13	1.17E-13
dy160	.00E+00	8.02E-15	2.10E-14	3.90E-14	6.20E-14	6.20E-14
xe136	.00E+00	5.66E-14	5.73E-14	5.80E-14	5.87E-14	5.85E-14
xe128	.00E+00	8.66E-15	2.10E-14	3.71E-14	5.69E-14	5.69E-14
er166	.00E+00	7.11E-15	1.48E-14	2.32E-14	3.20E-14	3.20E-14
sm125	.00E+00	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.93E-14
ru105	.00E+00	5.01E-14	5.01E-14	5.01E-14	5.02E-14	2.33E-14
sn116	.00E+00	8.29E-16	3.16E-15	7.01E-15	1.24E-14	1.24E-14
sn123	.00E+00	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
te132	.00E+00	9.49E-15	9.49E-15	9.49E-15	9.48E-15	9.33E-15
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	8.83E-15
kr 85	.00E+00	2.07E-15	4.15E-15	6.24E-15	8.35E-15	8.35E-15
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	8.83E-15
te122	.00E+00	3.79E-16	1.78E-15	3.59E-15	6.03E-15	6.03E-15
sb126	.00E+00	3.03E-15	3.07E-15	3.11E-15	3.14E-15	3.14E-15
sb124	.00E+00	2.11E-15	2.13E-15	2.14E-15	2.15E-15	2.15E-15

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     in117m      .00E+00  2.07E-15  2.07E-15  2.07E-15  2.07E-15  1.84E-15
     tb160       .00E+00  5.53E-16  8.12E-16  1.07E-15  1.33E-15  1.53E-15
     te134       .00E+00  5.77E-15  5.77E-15  5.77E-15  5.76E-15  9.16E-16
      i130       .00E+00  7.42E-16  7.76E-16  8.06E-16  8.38E-16  7.58E-16
     br  9       .00E+00  1.71E-16  3.42E-16  5.12E-16  6.83E-16  6.83E-16
     pr142       .00E+00  1.73E-16  3.46E-16  5.19E-16  6.92E-16  6.47E-16
     te123       .00E+00  1.47E-16  3.00E-16  4.56E-16  6.15E-16  6.15E-16
     in117       .00E+00  6.08E-16  6.08E-16  6.09E-16  6.10E-16  5.46E-16
     rb 86       .00E+00  2.48E-16  2.59E-16  2.69E-16  2.79E-16  2.78E-16
     li  7       .00E+00  6.66E-17  1.33E-16  2.00E-16  2.66E-16  2.66E-16
     er167       .00E+00  3.10E-17  7.07E-17  1.20E-16  1.78E-16  1.78E-16
     dy165       .00E+00  2.15E-16  2.22E-16  2.29E-16  2.35E-16  1.39E-16
     ge 75       .00E+00  8.51E-17  8.51E-17  8.50E-17  8.50E-17  3.45E-17
     cd118       .00E+00  1.19E-16  1.19E-16  1.19E-16  1.19E-16  2.59E-17
     cd108       .00E+00  1.44E-18  3.07E-18  4.91E-18  6.96E-18  6.96E-18
     cs134m      .00E+00  1.28E-18  2.56E-18  3.84E-18  5.12E-18  5.10E-18
     sn114       .00E+00  7.45E-20  3.72E-19  1.03E-18  2.02E-18  2.02E-18
     in119m      .00E+00  2.97E-17  2.97E-17  2.97E-17  2.97E-17  4.69E-19
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page   8
0                                  fraction of total absorption rate
         power=      .00mw, burnup=      146.mwd, flux= 3.00E+08n/cm**2-sec
0                initial  9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d

     cd109       .00E+00  2.26E-19  2.49E-19  3.12E-19  3.59E-19  3.59E-19
     in119       .00E+00  2.32E-18  2.32E-18  2.33E-18  2.33E-18  3.32E-21
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page   9
       power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 3.00E+08n/cm**2-sec
0                                      nuclide concentrations, gram atoms
                                       basis = single reactor assembly
               charge  9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d
      h  1     .00E+00  2.20E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06
      h  2     .00E+00  6.33E-09  1.31E-08  1.96E-08  2.61E-08  2.61E-08
      h  3     .00E+00  2.57E-11  3.21E-11  3.37E-11  3.41E-11  3.41E-11
      h  4     .00E+00  1.04E-34  1.30E-34  1.36E-34  1.38E-34   .00E+00
     he  3     .00E+00  2.22E-11  6.57E-11  1.10E-10  1.58E-10  1.58E-10
     he  4     .00E+00  3.64E-07  7.28E-07  1.09E-06  1.46E-06  1.46E-06
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20     .00E+00  4.37E-08  6.75E-08  1.31E-07  1.75E-07  1.75E-07
     ne 21     .00E+00  3.95E-14  1.58E-13  3.55E-13  6.32E-13  6.32E-13
     ne 22     .00E+00  2.42E-10  5.27E-10  8.12E-10  1.10E-09  1.10E-09
     na 23     .00E+00  7.29E-15  7.29E-15  7.29E-15  7.29E-15  7.29E-30
     na 22     .00E+00  4.27E-11  4.28E-11  4.28E-11  4.28E-11  4.28E-11
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24     .00E+00  3.64E-08  3.64E-08  3.64E-08  3.64E-08  3.64E-08
     na 24m    .00E+00  5.99E-15  5.99E-15  5.99E-15  5.99E-15  5.99E-30
     na 25     .00E+00  1.36E-27  5.34E-27  5.35E-27  7.58E-27  7.59E-42
     mg 24     .00E+00  2.78E-04  7.55E-04  1.13E-03  1.51E-03  1.51E-03
     mg 25     .00E+00  5.17E-11  1.11E-10  1.78E-10  2.32E-10  2.32E-10
     mg 26     .00E+00  6.53E-09  1.31E-08  1.96E-08  2.61E-08  2.61E-08
     mg 27     .00E+00  2.18E-12  2.18E-12  2.18E-12  2.18E-12  6.43E-16
     mg 28     .00E+00  4.42E-24  4.41E-24  4.41E-24  4.41E-24  4.15E-24
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28     .00E+00  2.70E-10  2.70E-10  2.70E-10  2.70E-10  6.11E-25
     al 29     .00E+00  9.50E-27  3.80E-26  8.55E-26  1.52E-25  1.25E-30
     al 30     .00E+00  4.37E-39  3.49E-38  1.18E-37  2.79E-37   .00E+00
     si 28     .00E+00  1.18E-03  2.20E-03  3.30E-03  4.40E-03  4.40E-03
     si 29     .00E+00  3.53E-11  1.41E-10  3.17E-10  5.64E-10  5.64E-10
     si 30     .00E+00  1.21E-18  9.70E-18  3.27E-17  7.76E-17  7.76E-17
     si 31     .00E+00  6.68E-31  6.05E-30  2.34E-29  5.55E-29  5.41E-29
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si 32	.00E+00	3.76E-38	5.00E-37	2.93E-36	9.08E-36	9.08E-36
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E-07

ses2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10
power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 3.00E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	9131.3 d	18262.5 d	27393.8 d	36525.0 d	36525.1 d
he 4	.00E+00	1.75E-03	4.36E-03	7.69E-03	1.16E-02	1.16E-02
pb206	.00E+00	4.36E-11	6.13E-10	2.75E-09	7.80E-09	7.80E-09
pb207	.00E+00	1.04E-09	7.07E-09	5.06E-08	4.27E-08	4.27E-08
pb208	.00E+00	5.82E-10	2.86E-09	6.86E-09	1.25E-08	1.25E-08
pb209	.00E+00	8.70E-16	5.48E-15	7.04E-15	1.39E-14	1.40E-14
pb210	.00E+00	2.20E-10	1.49E-09	4.32E-09	8.96E-09	8.96E-09
pb211	.00E+00	1.17E-14	5.77E-14	7.01E-14	1.05E-13	1.05E-13
pb212	.00E+00	1.04E-13	2.27E-13	3.47E-13	4.43E-13	4.43E-13
pb214	.00E+00	2.33E-15	9.28E-15	2.08E-14	3.68E-14	3.57E-14
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	.00E+00	1.35E-11	1.08E-10	3.66E-10	8.67E-10	8.67E-10
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	.00E+00	1.35E-13	9.16E-13	2.66E-12	5.51E-12	5.51E-12
bi211	.00E+00	6.93E-16	2.23E-15	4.15E-15	6.25E-15	6.29E-15
bi212	.00E+00	9.86E-15	2.15E-14	3.29E-14	4.40E-14	4.40E-14
bi213	.00E+00	2.03E-16	8.14E-16	1.03E-15	3.25E-15	3.16E-15
bi214	.00E+00	1.73E-15	6.89E-15	1.54E-14	2.74E-14	2.69E-14
po210	.00E+00	3.73E-12	2.53E-11	7.35E-11	1.52E-10	1.52E-10
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	.00E+00	7.66E-21	2.47E-20	4.59E-20	6.91E-20	6.95E-20
po212	.00E+00	5.18E-25	1.13E-24	1.73E-24	2.31E-24	2.31E-24
po213	.00E+00	3.06E-25	1.22E-24	2.75E-24	4.89E-24	4.75E-24
po214	.00E+00	2.38E-22	9.48E-22	2.13E-21	3.76E-21	3.71E-21
po215	.00E+00	9.61E-21	3.10E-20	5.76E-20	8.66E-20	8.66E-20
po216	.00E+00	3.04E-19	8.39E-19	1.31E-18	1.75E-18	1.76E-18
po218	.00E+00	2.69E-16	1.07E-15	2.41E-15	4.26E-15	4.27E-15
ra222	.00E+00	1.72E-27	3.73E-27	5.67E-27	7.56E-27	7.56E-27
ra223	.00E+00	5.33E-12	1.72E-11	3.20E-11	4.81E-11	4.81E-11
ra224	.00E+00	8.58E-13	1.07E-12	2.66E-12	3.83E-12	3.83E-12
ra225	.00E+00	9.50E-14	3.81E-13	8.56E-13	1.52E-12	1.52E-12
ra226	.00E+00	7.31E-08	2.91E-07	6.53E-07	1.16E-06	1.16E-06
ra228	.00E+00	3.62E-14	8.81E-14	1.41E-13	1.94E-13	1.94E-13
ac225	.00E+00	6.42E-14	2.57E-13	5.79E-13	1.03E-12	1.03E-12
ac227	.00E+00	5.71E-09	1.19E-08	2.22E-08	3.34E-08	3.34E-08
ac228	.00E+00	4.41E-18	1.08E-17	1.72E-17	2.36E-17	2.36E-17
th226	.00E+00	8.41E-26	1.82E-25	2.77E-25	3.69E-25	3.68E-25
th227	.00E+00	6.61E-12	2.77E-11	5.46E-11	7.76E-11	7.76E-11
th228	.00E+00	1.64E-10	5.38E-10	1.46E-10	2.31E-10	2.31E-10
th229	.00E+00	1.85E-08	1.40E-08	1.67E-07	2.96E-07	2.96E-07
th230	.00E+00	6.39E-04	1.28E-03	1.92E-03	2.55E-03	2.55E-03
th231	.00E+00	1.02E-09	2.03E-09	3.03E-09	4.03E-09	4.03E-09
th232	.00E+00	1.29E-04	2.58E-04	3.87E-04	5.16E-04	5.16E-04
th233	.00E+00	1.20E-15	2.39E-15	3.59E-15	4.78E-15	1.02E-16
th234	.00E+00	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	1.80E-05	3.60E-05	5.40E-05	7.19E-05	7.19E-05
pa232	.00E+00	3.09E-13	6.18E-13	9.27E-13	1.24E-12	1.19E-12
pa233	.00E+00	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	.00E+00	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
      power= 6.000E-03mw, burnup=1.4610E+02mwd, flux= 3.00E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
                 charge  9131.3 d 18262.5 d 27393.8 d 36525.0 d 36525.1 d
      u230       .00E+00  8.16E-23  1.76E-22  2.68E-22  3.58E-22  3.57E-22
      u231       .00E+00  2.72E-19  5.45E-19  8.17E-19  1.09E-18  1.08E-18
      u232       .00E+00  5.98E-09  1.29E-08  1.96E-08  2.62E-08  2.62E-08
      u233       .00E+00  3.40E-04  6.81E-04  1.02E-03  1.36E-03  1.36E-03
      u234      9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00  9.06E+00
      u235      7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02  7.30E+02
      u236      1.74E+02  1.74E+02  1.75E+02  1.75E+02  1.75E+02  1.75E+02
      u237       .00E+00  3.24E-06  3.24E-06  3.24E-06  3.24E-06  3.21E-06
      u238      3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04  3.64E+04
      u239       .00E+00  3.29E-07  3.29E-07  3.29E-07  3.29E-07  1.24E-08
      u240       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      u241       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235       .00E+00  9.08E-12  9.08E-12  9.08E-12  9.08E-12  9.08E-12
     np236m      .00E+00  2.16E-12  2.16E-12  2.16E-12  2.16E-12  2.04E-12
     np236       .00E+00  1.12E-09  1.02E-08  1.54E-08  2.05E-08  2.05E-08
     np237      4.22E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
     np238       .00E+00  1.58E-06  1.58E-06  1.58E-06  1.58E-06  1.54E-06
     np239       .00E+00  4.75E-05  4.75E-05  4.75E-05  4.75E-05  4.67E-05
     np240m      .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240       .00E+00  9.74E-15  9.74E-15  9.74E-15  9.73E-15  2.81E-15
     np241       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236       .00E+00  1.17E-09  1.17E-09  1.17E-09  1.17E-09  1.17E-09
     pu237       .00E+00  4.46E-14  8.15E-14  1.12E-13  1.37E-13  1.37E-13
     pu238       .00E+00  4.28E-03  7.80E-03  1.07E-02  1.30E-02  1.30E-02
     pu239       .00E+00  1.28E-01  2.35E-01  3.82E-01  5.09E-01  5.09E-01
     pu240       .00E+00  1.97E-05  4.24E-05  1.41E-04  2.50E-04  2.50E-04
     pu241       .00E+00  2.84E-09  1.29E-08  3.57E-08  7.14E-08  7.14E-08
     pu242       .00E+00  1.13E-13  1.39E-12  7.29E-12  2.12E-11  2.12E-11
     pu243       .00E+00  2.47E-22  3.50E-21  1.60E-20  4.65E-20  5.59E-20
     pu244       .00E+00   .00E+00   .00E+00  2.00E-45  5.75E-44  5.75E-44
     pu245       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239       .00E+00  1.85E-25  2.42E-24  1.03E-23  2.78E-23  2.49E-23
     am240       .00E+00  8.49E-23  1.11E-21  4.71E-21  1.27E-20  1.24E-20
     am241       .00E+00  6.44E-10  8.43E-09  3.57E-08  9.66E-08  9.66E-08
     am242m      .00E+00  8.43E-15  2.22E-13  1.41E-12  5.08E-12  5.08E-12
     am242       .00E+00  2.27E-17  2.99E-16  1.27E-15  3.46E-15  3.70E-15
     am243       .00E+00  2.54E-18  9.78E-17  8.28E-16  3.74E-15  3.74E-15
     am244m      .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244       .00E+00  2.00E-24  7.70E-23  6.52E-24  2.94E-23  2.59E-23
     am245       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246       .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals       3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux                3.00E+08  3.00E+08  3.00E+08  3.00E+08  3.00E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        5q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
```

```
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *              prelim lwr origen-s binary working library--id = 1143  *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *             photon libraries use an 18-energy-group structure       *
          *            the photon data are from the master photon data base,    *
          *             produced to include bremsstrahlung from uo2 matrix      *
          *                                                                     *
          *       see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  fc33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   12
         power=    .00mw, burnup=    292.mwd, flux= 2.81E+08n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      45656.3 d      54787.6 d      63918.8 d      73050.1 d      73050.2 d
     productions  1.091229E+06  1.091412E+06  1.091594E+06  1.091776E+06  1.091958E+06  1.091958E+06
     absorptions  8.948173E+05  8.950878E+05  8.953530E+05  8.956128E+05  8.958677E+05  8.958677E+05
     k infinity   1.219499E+00  1.219333E+00  1.219177E+00  1.219027E+00  1.218883E+00  1.218883E+00
0                   initial      45656.3 d      54787.6 d      63918.8 d      73050.1 d      73050.2 d
     actinide
     absorptions  8.907244E+05  8.908325E+05  8.909400E+05  8.910474E+05  8.911544E+05  8.911544E+05
     non-actinide
     abs. fracs.  4.573882E-03  4.734007E-03  4.928768E-03  5.097308E-03  5.261123E-03  5.261123E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   13
0                                          fraction of total absorption rate
         power=    .00mw, burnup=    292.mwd, flux= 2.81E+08n/cm**2-sec
0                initial 45656.3 d 54787.6 d 63918.8 d 73050.1 d 73050.2 d
```

sm149	6.90E-04	8.48E-04	1.00E-03	1.15E-03	1.29E-03	1.29E-03
sm151	2.16E-05	2.48E-05	2.75E-05	2.97E-05	3.14E-05	3.14E-05
nd143	1.47E-05	1.84E-05	2.21E-05	2.58E-05	2.95E-05	2.95E-05
eu151	6.92E-06	1.02E-05	1.39E-05	1.79E-05	2.22E-05	2.22E-05
gd155	9.06E-06	1.14E-05	1.37E-05	1.60E-05	1.83E-05	1.83E-05
rh103	6.89E-06	8.41E-06	1.03E-05	1.21E-05	1.38E-05	1.38E-05
gd157	6.88E-06	8.39E-06	9.82E-06	1.12E-05	1.25E-05	1.25E-05
cd113	6.21E-06	7.69E-06	9.15E-06	1.06E-05	1.20E-05	1.20E-05
xe131	4.70E-06	5.87E-06	7.04E-06	8.21E-06	9.38E-06	9.38E-06
cs133	3.66E-06	4.53E-06	5.46E-06	6.37E-06	7.28E-06	7.28E-06
tc 99	2.69E-06	3.36E-06	4.03E-06	4.70E-06	5.36E-06	5.36E-06
sm147	2.61E-06	3.28E-06	3.94E-06	4.63E-06	5.31E-06	5.31E-06
nd145	2.08E-06	2.59E-06	3.11E-06	3.63E-06	4.15E-06	4.15E-06
mo 95	1.44E-06	1.80E-06	2.15E-06	2.51E-06	2.87E-06	2.87E-06
xe135	2.27E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.27E-06
sm152	1.11E-06	1.39E-06	1.67E-06	1.95E-06	2.23E-06	2.23E-06
kr 83	8.97E-07	1.12E-06	1.34E-06	1.57E-06	1.79E-06	1.79E-06
cs135	8.20E-07	1.03E-06	1.23E-06	1.43E-06	1.64E-06	1.64E-06
ru101	6.39E-07	7.99E-07	9.58E-07	1.12E-06	1.28E-06	1.28E-06
pr141	6.10E-07	7.63E-07	9.15E-07	1.07E-06	1.22E-06	1.22E-06
eu153	5.56E-07	6.95E-07	8.34E-07	9.73E-07	1.11E-06	1.11E-06
in139	4.99E-07	6.24E-07	7.49E-07	8.73E-07	9.98E-07	9.98E-07
pd105	2.13E-07	2.66E-07	3.19E-07	3.72E-07	4.26E-07	4.26E-07
zr 93	2.04E-07	2.54E-07	3.05E-07	3.56E-07	4.07E-07	4.07E-07
ba137	1.45E-07	2.01E-07	2.58E-07	3.16E-07	3.74E-07	3.74E-07
i129	1.55E-07	1.94E-07	2.32E-07	2.71E-07	3.10E-07	3.10E-07
nd144	1.48E-07	1.86E-07	2.23E-07	2.60E-07	2.98E-07	2.98E-07
sm150	7.38E-08	1.14E-07	1.63E-07	2.19E-07	2.83E-07	2.83E-07
pm147	2.72E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07
mo 97	1.13E-07	1.42E-07	1.70E-07	1.98E-07	2.26E-07	2.26E-07
ag109	8.21E-08	1.03E-07	1.25E-07	1.46E-07	1.69E-07	1.69E-07
eu155	1.59E-07	1.59E-07	1.59E-07	1.60E-07	1.60E-07	1.60E-07
zr 91	5.33E-08	6.66E-08	7.99E-08	9.32E-08	1.07E-07	1.07E-07
y 89	5.11E-08	6.38E-08	7.66E-08	8.94E-08	1.02E-07	1.02E-07
ru102	4.61E-08	5.76E-08	6.91E-08	8.07E-08	9.22E-08	9.22E-08
ce142	4.15E-08	5.18E-08	6.22E-08	7.25E-08	8.29E-08	8.29E-08
nd148	4.00E-08	5.00E-08	6.00E-08	6.99E-08	7.99E-08	7.99E-08
nd146	3.35E-08	4.19E-08	5.02E-08	5.86E-08	6.69E-08	6.69E-08
ba138	2.86E-08	3.57E-08	4.29E-08	5.00E-08	5.71E-08	5.71E-08
pd108	2.76E-08	3.46E-08	4.17E-08	4.88E-08	5.60E-08	5.60E-08
in115	2.77E-08	3.46E-08	4.15E-08	4.84E-08	5.54E-08	5.54E-08
ce140	2.68E-08	3.35E-08	4.01E-08	4.68E-08	5.35E-08	5.35E-08
xe132	2.41E-08	3.01E-08	3.62E-08	4.22E-08	4.82E-08	4.82E-08
mo 98	1.87E-08	2.09E-08	2.50E-08	2.92E-08	3.34E-08	3.34E-08
pd107	1.62E-08	2.03E-08	2.44E-08	2.85E-08	3.27E-08	3.27E-08
mo100	1.61E-08	2.01E-08	2.42E-08	2.82E-08	3.22E-08	3.22E-08
xe134	1.58E-08	1.98E-08	2.37E-08	2.77E-08	3.16E-08	3.16E-08
zr 92	1.28E-08	1.61E-08	1.93E-08	2.25E-08	2.57E-08	2.57E-08
i127	1.04E-08	1.31E-08	1.57E-08	1.83E-08	2.09E-08	2.09E-08

1 ass2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 14
0 fraction of total absorption rate
power .00mw burnup 292.mwd, flux= 2.01E+08n/cm**2-sec
0 initial 45636.3 d 54787.4 d 63918.8 d 73050.1 d 73050.2 d

zr 96	1.02E-08	1.27E-08	1.53E-08	1.78E-08	2.04E-08	2.04E-08
ru104	9.92E-09	1.24E-08	1.49E-08	1.74E-08	1.98E-08	1.98E-08
nd150	8.88E-09	1.11E-08	1.33E-08	1.55E-08	1.77E-08	1.77E-08
xe136	8.53E-09	1.07E-08	1.28E-08	1.50E-08	1.71E-08	1.71E-08
sr 90	1.57E-08	1.63E-08	1.67E-08	1.69E-08	1.70E-08	1.70E-08

br 81	6.44E-09	8.04E-09	9.65E-09	1.13E-08	1.29E-08	1.29E-08
rb 85	6.08E-09	7.65E-09	9.22E-09	1.08E-08	1.24E-08	1.24E-08
zr 94	5.46E-09	6.83E-09	8.19E-09	9.55E-09	1.09E-08	1.09E-08
cd111	4.18E-09	5.24E-09	6.29E-09	7.36E-09	8.42E-09	8.42E-09
rh105	8.35E-09	8.38E-09	8.38E-09	8.39E-09	8.40E-09	8.37E-09
zr 90	3.17E-09	4.35E-09	5.57E-09	6.81E-09	8.05E-09	8.05E-09
te130	3.88E-09	4.85E-09	5.82E-09	6.79E-09	7.76E-09	7.76E-09
sm154	3.78E-09	4.72E-09	5.66E-09	6.61E-09	7.55E-09	7.55E-09
rb 87	3.64E-09	4.54E-09	5.45E-09	6.36E-09	7.26E-09	7.26E-09
se 77	2.57E-09	3.21E-09	3.86E-09	4.50E-09	5.14E-09	5.14E-09
eu152	1.29E-09	2.04E-09	2.92E-09	3.91E-09	4.98E-09	4.98E-09
cs137	3.40E-09	3.56E-09	3.68E-09	3.71E-09	3.74E-09	3.74E-09
pd106	1.83E-09	2.29E-09	2.76E-09	3.22E-09	3.69E-09	3.69E-09
kr 84	1.72E-09	2.15E-09	2.58E-09	3.01E-09	3.44E-09	3.44E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.66E-09	2.66E-09	2.66E-09
se 79	1.32E-09	1.65E-09	1.98E-09	2.31E-09	2.63E-09	2.63E-09
sb121	1.26E-09	1.57E-09	1.89E-09	2.20E-09	2.52E-09	2.52E-09
sb123	1.03E-09	1.28E-09	1.54E-09	1.79E-09	2.05E-09	2.05E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
kr 86	9.54E-10	1.19E-09	1.43E-09	1.67E-09	1.90E-09	1.90E-09
gd152	2.37E-10	4.37E-10	7.73E-10	1.20E-09	1.74E-09	1.74E-09
te128	8.53E-10	1.07E-09	1.28E-09	1.49E-09	1.70E-09	1.70E-09
ce141	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
gd156	8.94E-10	8.81E-10	1.07E-09	1.27E-09	1.47E-09	1.47E-09
se 80	6.15E-10	7.68E-10	9.22E-10	1.08E-09	1.23E-09	1.23E-09
dy161	5.49E-10	6.89E-10	8.31E-10	9.75E-10	1.12E-09	1.12E-09
te125	5.19E-10	6.54E-10	7.89E-10	9.24E-10	1.06E-09	1.06E-09
pm149	9.66E-10	9.73E-10	9.72E-10	9.72E-10	9.72E-10	9.65E-10
nd147	9.31E-10	9.35E-10	9.35E-10	9.34E-10	9.34E-10	9.30E-10
tb159	3.68E-10	4.61E-10	5.54E-10	6.48E-10	7.42E-10	7.42E-10
cd112	3.51E-10	4.39E-10	5.27E-10	6.15E-10	7.03E-10	7.03E-10
li 6	3.49E-10	4.37E-10	5.24E-10	6.11E-10	6.98E-10	6.98E-10
ce144	6.01E-10	6.01E-10	6.01E-10	6.01E-10	6.01E-10	6.00E-10
kr 85	5.72E-10	5.72E-10	5.72E-10	5.72E-10	5.72E-10	5.72E-10
sn117	2.78E-10	3.47E-10	4.16E-10	4.86E-10	5.55E-10	5.55E-10
eu154	2.59E-10	3.28E-10	3.99E-10	4.70E-10	5.41E-10	5.41E-10
sn119	2.28E-10	2.85E-10	3.42E-10	3.99E-10	4.56E-10	4.56E-10
sn115	2.09E-10	2.61E-10	3.13E-10	3.65E-10	4.17E-10	4.17E-10
ru103	1.57E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.57E-10
sr 88	1.75E-10	2.19E-10	2.63E-10	3.07E-10	3.50E-10	3.50E-10
gd158	1.38E-10	1.80E-10	2.24E-10	2.70E-10	3.19E-10	3.19E-10
ru 99	6.29E-11	1.25E-10	1.76E-10	2.36E-10	3.04E-10	3.04E-10
cd114	1.27E-10	1.60E-10	1.94E-10	2.29E-10	2.64E-10	2.64E-10
pd110	1.27E-10	1.59E-10	1.91E-10	2.23E-10	2.56E-10	2.56E-10

1 ass2h: far-field crit based on k∞ 15x15 - 3.80wt%, 20gud/mtu 40% h2o/ 8% uo2 fission products page 15

0 fraction of total absorption rate

0 power= .80mw burnup= 292.mwd flux= 2.81E+04n/cm**2-sec
initial 45656.5 d 54787.6 d 63918.8 d 73050.1 d 73050.2 d

se 82	1.19E-10	1.49E-10	1.78E-10	2.08E-10	2.38E-10	2.38E-10
sn124	9.54E-11	1.19E-10	1.43E-10	1.67E-10	1.91E-10	1.91E-10
sr 78	9.04E-11	1.13E-10	1.36E-10	1.58E-10	1.81E-10	1.81E-10
zr 95	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
dy162	7.34E-11	9.26E-11	1.12E-10	1.32E-10	1.53E-10	1.53E-10
sn124	7.29E-11	9.12E-11	1.09E-10	1.28E-10	1.46E-10	1.46E-10
dy164	6.73E-11	8.56E-11	1.04E-10	1.23E-10	1.43E-10	1.43E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
gd154	3.14E-11	5.07E-11	7.48E-11	1.03E-10	1.37E-10	1.37E-10
as 75	5.39E-11	6.73E-11	8.08E-11	9.42E-11	1.08E-10	1.08E-10

pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
in113	3.23E-11	4.24E-11	5.25E-11	6.26E-11	7.28E-11	7.28E-11
ba136	2.94E-11	3.70E-11	4.46E-11	5.24E-11	6.02E-11	6.02E-11
sn118	2.98E-11	3.73E-11	4.47E-11	5.22E-11	5.97E-11	5.97E-11
cs134	2.81E-11	3.45E-11	4.12E-11	4.80E-11	5.48E-11	5.48E-11
ru100	1.36E-11	2.07E-11	2.93E-11	3.94E-11	5.09E-11	5.09E-11
cd116	2.93E-11	3.16E-11	3.79E-11	4.42E-11	5.05E-11	5.05E-11
sn122	2.51E-11	3.13E-11	3.76E-11	4.39E-11	5.01E-11	5.01E-11
ba140	4.71E-11	4.73E-11	4.73E-11	4.73E-11	4.73E-11	4.71E-11
sn120	1.88E-11	2.35E-11	2.82E-11	3.29E-11	3.76E-11	3.76E-11
sm153	2.73E-11	2.82E-11	2.82E-11	2.82E-11	2.83E-11	2.73E-11
eu156	3.45E-11	3.44E-11	3.45E-11	3.46E-11	3.46E-11	3.46E-11
kr 82	1.65E-11	2.08E-11	2.53E-11	3.08E-11	3.45E-11	3.45E-11
dy163	1.63E-11	2.07E-11	2.51E-11	2.97E-11	3.43E-11	3.43E-11
nd142	8.44E-12	1.32E-11	1.69E-11	2.58E-11	3.36E-11	3.36E-11
ba134	8.30E-12	1.29E-11	1.85E-11	2.51E-11	3.27E-11	3.27E-11
sm148	8.53E-12	1.30E-11	1.83E-11	2.46E-11	3.09E-11	3.09E-11
sr 89	3.06E-11	3.06E-11	3.06E-11	3.06E-11	3.06E-11	3.06E-11
ge 73	1.47E-11	1.83E-11	2.20E-11	2.57E-11	2.93E-11	2.93E-11
ba135	4.67E-12	1.04E-11	1.49E-11	2.03E-11	2.65E-11	2.65E-11
ru106	2.58E-11	2.37E-11	2.58E-11	2.39E-11	2.39E-11	2.39E-11
xe130	1.05E-11	1.34E-11	1.64E-11	1.95E-11	2.28E-11	2.28E-11
pd104	5.64E-12	8.78E-12	1.26E-11	1.71E-11	2.24E-11	2.24E-11
mo 96	8.66E-12	1.14E-11	1.44E-11	1.76E-11	2.10E-11	2.10E-11
ce143	1.69E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.69E-11
y 90	1.49E-11	1.55E-11	1.58E-11	1.60E-11	1.61E-11	1.61E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sb125	1.50E-11	1.50E-11	1.50E-11	1.50E-11	1.50E-11	1.50E-11
mo 99	1.29E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.29E-11
se 76	5.33E-12	6.66E-12	8.00E-12	9.33E-12	1.07E-11	1.07E-11
pm148m	9.71E-12	9.56E-12	9.56E-12	9.56E-12	9.56E-12	9.55E-12
kr 87	8.44E-12	2.29E-11	2.29E-11	2.29E-11	2.29E-11	8.43E-12
te127m	7.44E-12	7.45E-12	7.45E-12	7.46E-12	7.46E-12	7.46E-12
gd160	3.43E-12	4.30E-12	5.17E-12	6.05E-12	6.94E-12	6.94E-12
i131	6.75E-12	6.77E-12	6.77E-12	6.77E-12	6.77E-12	6.75E-12
te126	2.77E-12	3.52E-12	4.30E-12	5.09E-12	5.91E-12	5.91E-12
nb 93	6.88E-13	1.17E-12	1.78E-12	2.52E-12	3.40E-12	3.40E-12
cd110	7.78E-13	1.21E-12	1.73E-12	2.34E-12	3.08E-12	3.08E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16
8 fraction of total absorption rate
0 power= .80mw, burnup= 292.mwd, flux= 2.81E+08n/cm**2-sec
Initial 45656.3 d 54787.6 d 63918.8 d 73050.1 d 73050.2 d

ho165	1.12E-12	1.42E-12	1.73E-12	2.05E-12	2.37E-12	2.37E-12
br 79	2.40E-13	8.43E-13	1.21E-12	1.63E-12	2.16E-12	2.16E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
te124	6.26E-13	7.85E-13	9.43E-13	1.11E-12	1.27E-12	1.27E-12
sr 87	6.12E-13	7.65E-13	9.19E-13	1.07E-12	1.23E-12	1.23E-12
xe129	3.05E-13	4.77E-13	6.87E-13	9.35E-13	1.22E-12	1.22E-12
ag107	2.88E-13	4.50E-13	6.49E-13	8.85E-13	1.16E-12	1.16E-12
nb 94	3.49E-13	4.36E-13	5.24E-13	6.13E-13	6.98E-13	6.98E-13
ge 74	2.96E-13	3.70E-13	4.44E-13	5.18E-13	5.92E-13	5.92E-13
sr 86	1.87E-13	2.38E-13	2.91E-13	3.46E-13	4.03E-13	4.03E-13
ge 72	1.99E-13	2.49E-13	2.99E-13	3.48E-13	3.98E-13	3.98E-13
pm148	2.74E-13	2.74E-13	2.74E-13	2.73E-13	2.73E-13	2.70E-13
as111	2.22E-13	2.24E-13	2.25E-13	2.27E-13	2.28E-13	2.26E-13
eu157	2.79E-13	3.01E-13	3.01E-13	3.02E-13	3.03E-13	3.01E-13
se 76	1.19E-13	1.49E-13	1.80E-13	2.12E-13	2.44E-13	2.44E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
dy160	8.18E-14	8.95E-14	1.22E-13	1.60E-13	2.02E-13	2.02E-13

xe128	5.74E-14	8.09E-14	1.08E-13	1.39E-13	1.74E-13	1.74E-13
er166	3.23E-14	4.19E-14	5.20E-14	6.27E-14	7.41E-14	7.41E-14
ce136	5.81E-14	5.91E-14	5.98E-14	6.05E-14	6.11E-14	6.09E-14
sn116	1.22E-14	1.89E-14	2.70E-14	3.66E-14	4.77E-14	4.77E-14
sn125	2.91E-14	2.93E-14	2.93E-14	2.93E-14	2.93E-14	2.92E-14
ru105	2.31E-14	2.98E-14	2.99E-14	2.99E-14	2.99E-14	2.91E-14
te122	6.00E-15	9.01E-15	1.26E-14	1.68E-14	2.17E-14	2.17E-14
kr 80	8.41E-15	1.06E-14	1.27E-14	1.49E-14	1.71E-14	1.71E-14
sn123	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14
te132	9.40E-15	9.55E-15	9.55E-15	9.54E-15	9.54E-15	9.39E-15
rb 88	8.94E-15	1.29E-14	1.29E-14	1.29E-14	1.29E-14	8.93E-15
i135	8.33E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	8.32E-15
sb126	3.16E-15	3.22E-15	3.26E-15	3.30E-15	3.33E-15	3.33E-15
tb160	1.35E-15	1.60E-15	1.86E-15	2.12E-15	2.39E-15	2.38E-15
sb124	2.13E-15	2.17E-15	2.18E-15	2.19E-15	2.21E-15	2.20E-15
in117m	1.86E-15	2.10E-15	2.10E-15	2.10E-15	2.11E-15	1.87E-15
be 9	6.71E-16	8.39E-16	1.01E-15	1.17E-15	1.34E-15	1.34E-15
pr142	6.51E-16	8.67E-16	1.06E-15	1.21E-15	1.39E-15	1.30E-15
te123	6.17E-16	7.80E-16	9.46E-16	1.12E-15	1.29E-15	1.29E-15
te134	9.28E-16	5.84E-15	5.83E-15	5.83E-15	5.83E-15	9.26E-16
i130	7.60E-16	8.76E-16	9.05E-16	9.37E-16	9.69E-16	8.77E-16
in117	5.53E-16	6.17E-16	6.18E-16	6.19E-16	6.19E-16	5.55E-16
li 7	2.69E-16	3.37E-16	4.06E-16	4.71E-16	5.28E-16	5.38E-16
er167	1.79E-16	2.47E-16	3.25E-16	4.13E-16	5.12E-16	5.12E-16
rb 86	2.80E-16	2.91E-16	3.02E-16	3.12E-16	3.22E-16	3.21E-16
dy165	1.41E-16	2.43E-16	2.50E-16	2.57E-16	2.64E-16	1.54E-16
ge 73	3.50E-17	8.62E-17	8.62E-17	8.61E-17	8.61E-17	3.50E-17
cd118	2.62E-17	1.20E-16	1.21E-16	1.21E-16	1.21E-16	2.62E-17
cd108	7.01E-18	9.31E-18	1.19E-17	1.47E-17	1.78E-17	1.78E-17
sn114	2.85E-18	3.40E-18	3.12E-18	7.19E-18	9.62E-18	9.62E-18
ce134m	3.34E-18	6.38E-18	7.65E-18	8.92E-18	1.02E-17	6.34E-18
cd109	3.62E-19	4.86E-19	4.49E-19	4.93E-19	5.36E-19	5.36E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 17
0 fraction of total absorption rate
power= .00mw, burnup= 292.mwd, flux= 2.81E+08n/cm**2-sec
8 initial 45656.3 d 54787.6 d 63918.8 d 73050.1 d 73050.2 d

in119m	4.96E-19	3.01E-17	3.01E-17	3.01E-17	3.01E-17	4.96E-19
in119	3.35E-21	2.36E-18	2.36E-18	2.36E-18	2.36E-18	3.35E-21

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 18
power= 4.000E-03mw, burnup=2.9220E+02mwd, flux= 2.81E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly
8 charge 45656.3 d 54787.6 d 63918.8 d 73050.1 d 73050.2 d

h 1	8.81E-06	1.10E-05	1.31E-05	1.53E-05	1.74E-05	1.74E-05
h 2	2.41E-08	2.25E-08	2.09E-08	6.53E-08	5.16E-08	5.16E-08
h 3	3.41E-11	3.37E-11	3.34E-11	3.37E-11	3.37E-11	3.37E-11
h 4	.00E+00	1.37E-34	1.36E-34	1.37E-34	1.37E-34	.00E+00
he 3	1.58E-10	2.05E-10	2.52E-10	2.98E-10	3.45E-10	3.45E-10
he 4	1.44E-06	1.81E-06	2.17E-06	2.52E-06	2.88E-06	2.88E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.75E-07	2.18E-07	2.60E-07	3.03E-07	3.46E-07	3.46E-07
ne 21	6.32E-13	9.70E-13	1.37E-12	1.84E-12	2.37E-12	2.37E-12
ne 22	1.10E-09	1.38E-09	1.65E-09	1.93E-09	2.21E-09	2.21E-09
na 23	7.29E-30	7.11E-15	7.11E-15	7.11E-15	7.11E-15	7.11E-30
ne 22	4.28E-11	4.18E-11	4.18E-11	4.18E-11	4.18E-11	4.18E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.34E-08	3.07E-08	2.07E-08	3.07E-08	3.07E-08	2.82E-08
na 24m	5.99E-30	5.05E-15	5.05E-15	5.05E-15	5.05E-15	5.05E-30

na 25	7.59E-42	9.49E-27	1.22E-26	1.49E-26	1.78E-26	1.78E-41
mg 24	1.51E-03	1.83E-03	2.15E-03	2.47E-03	2.78E-03	2.78E-03
mg 25	2.52E-10	3.32E-10	4.19E-10	5.12E-10	6.12E-10	6.12E-10
mg 26	2.61E-08	3.25E-08	3.89E-08	4.53E-08	5.16E-08	5.16E-08
mg 27	6.43E-16	2.12E-12	2.12E-12	2.12E-12	2.12E-12	6.27E-16
mg 28	4.15E-24	4.32E-24	4.32E-24	4.32E-24	4.32E-24	4.06E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	6.11E-23	2.28E-10	2.28E-10	2.28E-10	2.28E-10	5.14E-23
al 29	1.25E-30	2.39E-25	2.26E-25	4.28E-25	2.66E-25	4.63E-30
al 30	.00E+00	5.88E-37	9.10E-37	1.44E-36	2.13E-36	.00E+00
al 28	6.40E-03	5.32E-03	6.25E-03	7.18E-03	8.10E-03	8.10E-03
si 29	5.64E-10	8.77E-10	1.25E-09	1.68E-09	2.17E-09	2.17E-09
si 30	7.76E-17	1.32E-16	2.61E-16	4.12E-16	6.11E-16	6.11E-16
si 31	3.41E-29	1.09E-28	1.87E-28	2.96E-28	4.38E-28	2.69E-28
si 32	9.88E-36	2.18E-35	4.43E-35	8.06E-35	1.35E-34	1.35E-34
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

0
1

sas2h: fsr-field crit based on h2o 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 19
power= 4.000E-03mw, burnup=2.9220E+02mwd, flux= 2.81E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 45656.3 d	54787.6 d	63918.8 d	73050.1 d	73050.2 d	
he 4	1.16E-02	1.61E-02	2.10E-02	2.62E-02	3.18E-02	3.18E-02
pb206	7.80E-09	1.72E-08	3.24E-08	5.50E-08	8.64E-08	8.64E-08
pb207	4.27E-08	7.39E-08	1.15E-07	1.65E-07	2.24E-07	2.24E-07
pb208	1.25E-08	1.98E-08	2.87E-08	3.91E-08	5.11E-08	5.11E-08
pb209	1.40E-14	2.18E-14	3.13E-14	4.26E-14	5.56E-14	5.59E-14
pb210	6.96E-09	1.55E-08	2.39E-08	3.43E-08	4.65E-08	4.65E-08
pb211	1.05E-13	1.42E-13	1.79E-13	2.17E-13	2.54E-13	2.54E-13
pb212	4.63E-13	5.75E-13	6.86E-13	7.95E-13	9.04E-13	9.04E-13
pb214	3.57E-14	5.74E-14	8.23E-14	1.12E-13	1.43E-13	1.41E-13
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	8.67E-10	1.69E-09	2.92E-09	4.44E-09	6.92E-09	6.92E-09
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	5.31E-12	9.52E-12	1.47E-11	2.11E-11	2.86E-11	2.86E-11
bi211	4.29E-15	8.42E-15	1.06E-14	1.29E-14	1.51E-14	1.32E-14
bi212	6.40E-14	5.46E-14	6.50E-14	7.64E-14	8.57E-14	8.38E-14
bi213	3.16E-15	5.08E-15	7.31E-15	9.94E-15	1.30E-14	1.26E-14
bi214	2.69E-14	4.26E-14	6.11E-14	8.29E-14	1.08E-13	1.06E-13
po210	1.52E-10	2.63E-10	4.06E-10	5.83E-10	7.91E-10	7.91E-10
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	6.95E-20	9.31E-20	1.17E-19	1.42E-19	1.67E-19	1.68E-19
po212	2.31E-24	2.87E-24	3.42E-24	3.96E-24	4.51E-24	4.51E-24
po213	4.75E-24	7.64E-24	1.10E-23	1.49E-23	1.95E-23	1.89E-23
po214	5.71E-21	5.86E-21	8.41E-21	1.14E-20	1.48E-20	1.46E-20
po215	8.66E-20	1.17E-19	1.47E-19	1.78E-19	2.09E-19	2.09E-19
po216	1.76E-18	2.18E-18	2.60E-18	3.01E-18	3.42E-18	3.42E-18
po218	4.27E-15	6.64E-15	9.52E-15	1.29E-14	1.68E-14	1.68E-14
rn222	7.56E-27	9.09E-27	1.08E-26	1.25E-26	1.42E-26	1.42E-26
rn223	4.81E-11	6.48E-11	8.18E-11	9.89E-11	1.16E-10	1.16E-10
rn224	3.83E-12	4.73E-12	5.66E-12	6.56E-12	7.46E-12	7.46E-12
rn225	1.32E-12	2.38E-12	3.42E-12	4.65E-12	6.07E-12	6.07E-12
rn226	1.16E-06	1.80E-06	2.58E-06	3.51E-06	4.56E-06	4.56E-06
rn228	1.94E-13	2.47E-13	2.99E-13	3.52E-13	4.05E-13	4.05E-13
ac225	1.03E-12	1.61E-12	2.31E-12	3.14E-12	4.10E-12	4.10E-12
ac227	3.34E-08	4.50E-08	5.68E-08	6.87E-08	8.06E-08	8.06E-08
ac228	2.36E-17	3.01E-17	3.65E-17	4.30E-17	4.95E-17	4.95E-17
th226	3.68E-25	4.43E-25	5.28E-25	6.12E-25	6.95E-25	6.94E-25
th227	7.76E-11	1.05E-10	1.32E-10	1.60E-10	1.87E-10	1.87E-10

th228	7.31E-10	9.07E-10	1.08E-09	1.23E-09	1.42E-09	1.42E-09
th229	2.96E-07	4.42E-07	4.45E-07	9.04E-07	1.16E-06	1.16E-06
th230	2.55E-03	3.19E-03	3.43E-03	4.47E-03	5.11E-03	5.11E-03
th231	3.03E-09	3.03E-09	3.03E-09	3.04E-09	3.04E-09	3.04E-09
th232	5.16E-04	6.46E-04	7.75E-04	9.04E-04	1.03E-03	1.03E-03
th233	1.32E-16	5.94E-15	7.15E-15	8.32E-15	9.50E-15	3.02E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.19E-05	8.99E-05	1.08E-04	1.26E-04	1.44E-04	1.44E-04
pa232	1.19E-12	1.35E-12	1.45E-12	2.16E-12	2.47E-12	2.37E-12
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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sas2h: fer-field crit based on btu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 20
power= 4.000E-03mw, burnup=2.9220E+02mwd, flux= 2.81E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 45636.3 d	54787.6 d	63918.8 d	73050.1 d	73050.2 d	
u230	3.57E-22	4.30E-22	5.12E-22	5.93E-22	6.74E-22	6.72E-22
u231	1.08E-18	1.32E-18	1.58E-18	1.83E-18	2.11E-18	2.08E-18
u232	2.62E-08	3.15E-08	3.87E-08	4.49E-08	5.10E-08	5.10E-08
u233	1.36E-03	1.70E-03	2.04E-03	2.38E-03	2.73E-03	2.73E-03
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.07E+00	9.07E+00
u235	7.30E+02	7.29E+02	7.29E+02	7.29E+02	7.29E+02	7.29E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.21E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.24E-08	3.22E-07	3.22E-07	3.22E-07	3.22E-07	1.21E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	9.08E-12	8.80E-12	8.80E-12	8.80E-12	8.80E-12	8.80E-12
np236m	2.04E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	1.98E-12
np236	2.05E-08	2.54E-08	3.04E-08	3.54E-08	4.03E-08	4.03E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.54E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.52E-06
np239	4.67E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05	4.58E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.01E-15	9.48E-15	9.48E-15	9.48E-15	9.48E-15	2.74E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.17E-09	1.14E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	1.37E-13	1.53E-13	1.69E-13	1.83E-13	1.94E-13	1.94E-13
pu238	1.30E-02	1.49E-02	1.65E-02	1.78E-02	1.88E-02	1.88E-02
pu239	5.09E-01	6.33E-01	7.57E-01	8.81E-01	1.00E+00	1.00E+00
pu240	2.50E-04	3.09E-04	3.58E-04	7.56E-04	9.85E-04	9.85E-04
pu241	7.14E-08	1.18E-07	1.78E-07	2.50E-07	3.35E-07	3.35E-07
pu242	2.12E-11	4.79E-11	9.30E-11	1.63E-10	2.64E-10	2.64E-10
pu243	3.59E-20	1.03E-19	1.99E-19	3.48E-19	5.66E-19	4.37E-19
pu244	5.75E-44	6.57E-43	4.73E-42	2.69E-41	1.05E-40	1.05E-40
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	2.49E-23	5.68E-23	1.03E-22	1.69E-22	2.49E-22	2.32E-22
am240	1.24E-20	2.60E-20	4.72E-20	7.73E-20	1.18E-19	1.16E-19
am241	9.66E-08	2.04E-07	3.69E-07	6.07E-07	9.28E-07	9.28E-07
am242m	5.08E-12	2.33E-11	2.87E-11	3.43E-11	9.37E-11	9.37E-11
am242	2.20E-15	7.27E-15	1.32E-14	2.19E-14	3.36E-14	1.11E-14
am243	3.74E-15	1.18E-14	3.01E-14	6.39E-14	1.29E-13	1.29E-13
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.59E-23	9.12E-23	2.32E-22	5.07E-22	9.93E-22	8.73E-22
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
     am246     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0     flux              2.81E+08  2.81E+08  2.81E+08  2.81E+08  2.81E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

         cross-section data taken from position number  3 of library on unit 33.

         pass   1
         pass   0
         'scale-system control module sas2 library'
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         'scale-system control module sas2 library'
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ***********************************************************************
         *                                                                     *
         *            prelim lwr origen-s binary working library--id = 1143    *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *      data from the light element, actinide, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                     *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                     *
         *                  fission product yields are from endf/b-v           *
         *                                                                     *
         *             photon libraries use an 18-energy-group structure       *
         *            the photon data are from the master photon data base,    *
         *             produced to include bremsstrahlung from uo2 matrix      *
         *                                                                     *
         *       see information above this box (if present) for later updates *
         *                                                                     *
         ***********************************************************************
         *                                                                     *
0        ***********************************************************************
0                 .other identification and sizes of library.
0                  date set name:  fc33f001
0               8/28/1996     date library was produced
0                    1697     total number of nuclides in library
                      689     number of light-element nuclides
                      129     number of actinide nuclides
                      879     number of fission product nuclides
0                    7993     number of nonzero off-diagonal matrix elements
0        ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   21
       power=    .00mw, burnup=    438.mwd, flux= 2.73E+08n/cm**2-sec
0                                          basis =
```

```
0    (note, k-infinities, clad and moderater absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        82181. d        91313. d        100444. d       109575. d       109575. d
     productions  1.123583E+06   1.123684E+06   1.123866E+06    1.124046E+06    1.124226E+06    1.124226E+06
     absorptions  9.183541E+05   9.186095E+05   9.188597E+05    9.191057E+05    9.193471E+05    9.193471E+05
     k infinity   1.223387E+00   1.223245E+00   1.223109E+00    1.222978E+00    1.222853E+00    1.222853E+00
0                 initial        82181. d        91313. d        100444. d       109575. d       109575. d
     actinide
     absorptions  9.137518E+05   9.138591E+05   9.139662E+05    9.140729E+05    9.141796E+05    9.141796E+05
     non-actinide
     abs. fracs.  5.011499E-03   5.171339E-03   5.325615E-03    5.475700E-03    5.620897E-03    5.620897E-03
1    sps2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products        page   22
0                                fraction of total absorption rate
0        powers     .00mw, burnup=    438.mwd, flux= 2.73E+08n/cm**2-sec
                 initial  82181. d  91313. d 100444. d 109575. d 109575. d

     sm149       1.30E-03  1.44E-03  1.57E-03  1.70E-03  1.82E-03  1.82E-03
     nd143       2.96E-05  3.33E-05  3.70E-05  4.07E-05  4.43E-05  4.43E-05
     eu151       2.23E-05  2.69E-05  3.16E-05  3.64E-05  4.14E-05  4.14E-05
     sm151       3.16E-05  3.31E-05  3.43E-05  3.53E-05  3.61E-05  3.61E-05
     gd155       1.84E-05  2.06E-05  2.28E-05  2.50E-05  2.71E-05  2.71E-05
     rh103       1.38E-05  1.55E-05  1.72E-05  1.89E-05  2.06E-05  2.06E-05
     cd113       1.20E-05  1.34E-05  1.48E-05  1.61E-05  1.74E-05  1.74E-05
     gd157       1.26E-05  1.38E-05  1.50E-05  1.61E-05  1.72E-05  1.72E-05
     xe131       9.36E-06  1.05E-05  1.17E-05  1.29E-05  1.40E-05  1.40E-05
     cs133       7.26E-06  8.16E-06  9.07E-06  9.97E-06  1.09E-05  1.09E-05
     tc 99       5.34E-06  6.01E-06  6.67E-06  7.34E-06  8.00E-06  8.00E-06
     sm147       5.29E-06  5.96E-06  6.63E-06  7.30E-06  7.98E-06  7.98E-06
     nd145       4.15E-06  4.66E-06  5.18E-06  5.69E-06  6.21E-06  6.21E-06
     mo 95       2.87E-06  3.23E-06  3.58E-06  3.94E-06  4.30E-06  4.30E-06
     sm152       2.23E-06  2.51E-06  2.79E-06  3.07E-06  3.36E-06  3.36E-06
     kr 83       1.80E-06  2.02E-06  2.25E-06  2.47E-06  2.49E-06  2.49E-06
     cs135       1.44E-06  1.64E-06  2.04E-06  2.25E-06  2.45E-06  2.45E-06
     xe135       2.29E-06  2.32E-06  2.32E-06  2.32E-06  2.32E-06  2.29E-06
     ru101       1.27E-06  1.43E-06  1.59E-06  1.74E-06  1.90E-06  1.90E-06
     pr141       1.22E-06  1.38E-06  1.53E-06  1.68E-06  1.83E-06  1.83E-06
     eu153       1.11E-06  1.25E-06  1.39E-06  1.53E-06  1.67E-06  1.67E-06
     la139       1.00E-06  1.13E-06  1.25E-06  1.37E-06  1.50E-06  1.50E-06
     pd105       4.25E-07  4.78E-07  5.31E-07  5.85E-07  6.38E-07  6.38E-07
     ba137       3.76E-07  4.23E-07  4.93E-07  5.44E-07  6.14E-07  6.14E-07
     sm150       2.83E-07  3.44E-07  4.33E-07  5.18E-07  6.10E-07  6.10E-07
     zr 93       4.05E-07  4.56E-07  5.06E-07  5.57E-07  6.07E-07  6.07E-07
      i129       3.11E-07  3.80E-07  4.89E-07  4.27E-07  4.66E-07  4.66E-07
     nd144       2.99E-07  3.36E-07  3.74E-07  4.11E-07  4.49E-07  4.49E-07
     mo 97       2.27E-07  2.55E-07  2.83E-07  3.12E-07  3.40E-07  3.40E-07
     pm147       2.71E-07  2.71E-07  2.71E-07  2.71E-07  2.71E-07  2.71E-07
     ag109       1.68E-07  1.90E-07  2.13E-07  2.35E-07  2.58E-07  2.58E-07
     eu155       1.60E-07  1.60E-07  1.60E-07  1.60E-07  1.60E-07  1.60E-07
     zr 91       1.07E-07  1.20E-07  1.33E-07  1.47E-07  1.60E-07  1.60E-07
      y 89       1.02E-07  1.15E-07  1.28E-07  1.41E-07  1.54E-07  1.54E-07
     ru102       9.25E-08  1.04E-07  1.16E-07  1.27E-07  1.39E-07  1.39E-07
     ce142       8.33E-08  9.37E-08  1.04E-07  1.14E-07  1.25E-07  1.25E-07
     nd148       8.00E-08  9.00E-08  1.00E-07  1.10E-07  1.20E-07  1.20E-07
     nd146       6.72E-08  7.55E-08  8.39E-08  9.23E-08  1.01E-07  1.01E-07
     ba138       5.74E-08  6.45E-08  7.17E-08  7.89E-08  8.60E-08  8.60E-08
     pd108       5.57E-08  6.28E-08  7.01E-08  7.74E-08  8.47E-08  8.47E-08
     in115       5.54E-08  6.23E-08  6.92E-08  7.61E-08  8.30E-08  8.30E-08
     ce140       5.37E-08  6.04E-08  6.71E-08  7.38E-08  8.05E-08  8.05E-08
     xe132       4.82E-08  5.42E-08  6.02E-08  6.62E-08  7.22E-08  7.22E-08
     mo 98       3.32E-08  3.74E-08  4.15E-08  4.56E-08  4.98E-08  4.98E-08
     pd107       3.27E-08  3.69E-08  4.11E-08  4.53E-08  4.96E-08  4.96E-08
```

mo100	3.21E-08	3.62E-08	4.02E-08	4.42E-08	4.82E-08	4.82E-08
xe134	3.17E-08	3.57E-08	3.96E-08	4.36E-08	4.75E-08	4.75E-08
zr 92	2.57E-08	2.90E-08	3.22E-08	3.54E-08	3.86E-08	3.86E-08
i127	2.09E-08	2.35E-08	2.61E-08	2.87E-08	3.14E-08	3.14E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 23
0 fraction of total absorption rate

power= .00mw, burnup= 438.mwd, flux= 2.73E+08n/cm**2-sec
0 initial 82181. d 91313. d 100444. d 109575. d 109575. d

zr 96	2.02E-08	2.27E-08	2.52E-08	2.77E-08	3.03E-08	3.03E-08
ru104	1.98E-08	2.23E-08	2.48E-08	2.73E-08	2.97E-08	2.97E-08
nd150	1.77E-08	1.99E-08	2.22E-08	2.44E-08	2.66E-08	2.66E-08
xe136	1.71E-08	1.93E-08	2.14E-08	2.36E-08	2.57E-08	2.57E-08
br 81	1.28E-08	1.65E-08	1.61E-08	1.77E-08	1.93E-08	1.93E-08
rb 85	1.23E-08	1.39E-08	1.55E-08	1.70E-08	1.86E-08	1.86E-08
sr 90	1.70E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08
zr 94	1.09E-08	1.22E-08	1.36E-08	1.49E-08	1.63E-08	1.63E-08
zr 90	8.07E-09	9.53E-09	1.06E-08	1.18E-08	1.31E-08	1.31E-08
cd111	8.46E-09	9.93E-09	1.06E-08	1.17E-08	1.28E-08	1.28E-08
te130	7.79E-09	8.76E-09	9.74E-09	1.07E-08	1.17E-08	1.17E-08
sm154	7.37E-09	8.32E-09	9.46E-09	1.06E-08	1.16E-08	1.16E-08
rb 87	7.26E-09	8.16E-09	9.07E-09	9.97E-09	1.09E-08	1.09E-08
eu152	5.80E-09	6.14E-09	7.34E-09	8.38E-09	9.85E-09	9.85E-09
rh105	8.60E-09	8.43E-09	8.44E-09	8.45E-09	8.44E-09	8.44E-09
se 77	5.14E-09	5.81E-09	6.45E-09	7.09E-09	7.74E-09	7.74E-09
pd106	3.68E-09	4.14E-09	4.61E-09	5.08E-09	5.55E-09	5.55E-09
gd152	1.75E-09	2.42E-09	3.22E-09	4.16E-09	5.34E-09	5.34E-09
kr 84	3.42E-09	3.85E-09	4.28E-09	4.70E-09	5.13E-09	5.13E-09
se 79	2.65E-09	2.98E-09	3.31E-09	3.64E-09	3.97E-09	3.97E-09
sb121	2.51E-09	2.83E-09	3.14E-09	3.44E-09	3.77E-09	3.77E-09
cs137	2.73E-09	2.73E-09	2.74E-09	2.74E-09	2.74E-09	2.74E-09
sb123	2.05E-09	2.30E-09	2.56E-09	2.81E-09	3.07E-09	3.07E-09
kr 86	1.91E-09	2.15E-09	2.39E-09	2.63E-09	2.86E-09	2.86E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09
te128	1.70E-09	1.92E-09	2.15E-09	2.34E-09	2.56E-09	2.56E-09
gd156	1.47E-09	1.67E-09	1.88E-09	2.10E-09	2.32E-09	2.32E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09
se 80	1.23E-09	1.39E-09	1.54E-09	1.69E-09	1.85E-09	1.85E-09
dy161	1.12E-09	1.27E-09	1.42E-09	1.57E-09	1.72E-09	1.72E-09
te125	1.04E-09	1.19E-09	1.33E-09	1.46E-09	1.60E-09	1.60E-09
ce141	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09
tb159	7.42E-10	8.36E-10	9.31E-10	1.03E-09	1.12E-09	1.12E-09
cd112	7.85E-10	7.83E-10	8.82E-10	9.71E-10	1.06E-09	1.06E-09
li 6	7.81E-10	7.89E-10	8.74E-10	9.63E-10	1.05E-09	1.05E-09
pm149	9.70E-10	9.76E-10	9.76E-10	9.76E-10	9.76E-10	9.70E-10
nd147	9.27E-10	9.30E-10	9.30E-10	9.30E-10	9.30E-10	9.26E-10
sn117	5.57E-10	6.26E-10	6.96E-10	7.66E-10	8.36E-10	8.36E-10
eu154	5.43E-10	6.12E-10	6.82E-10	7.53E-10	8.24E-10	8.24E-10
sn119	4.58E-10	5.15E-10	5.72E-10	6.29E-10	6.87E-10	6.87E-10
ru 99	3.03E-10	3.80E-10	4.65E-10	5.59E-10	6.61E-10	6.61E-10
sn115	4.19E-10	4.71E-10	5.24E-10	5.76E-10	6.29E-10	6.29E-10
ce144	4.81E-10	6.01E-10	6.01E-10	6.01E-10	6.01E-10	6.01E-10
kr 85	5.74E-10	5.74E-10	5.73E-10	5.73E-10	5.73E-10	5.73E-10
gd158	5.19E-10	5.70E-10	6.23E-10	6.78E-10	7.35E-10	7.35E-10
sr 88	5.51E-10	5.95E-10	6.39E-10	6.83E-10	7.26E-10	7.26E-10
cd114	2.63E-10	2.98E-10	3.34E-10	3.71E-10	4.08E-10	4.08E-10
pd110	2.55E-10	2.87E-10	3.20E-10	3.53E-10	3.86E-10	3.86E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 24
0 fraction of total absorption rate

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0          powerm     .00mw, burnup=    438.mwd, flux= 2.73E+08n/cm**2-sec
                initial  82181. d  91313. d 100444. d 109575. d 109575. d

     se 82     2.38E-10  2.68E-10  2.98E-10  3.28E-10  3.57E-10  3.57E-10
     gd154     1.37E-10  1.76E-10  2.18E-10  2.66E-10  3.18E-10  3.18E-10
     sn126     1.92E-10  2.16E-10  2.40E-10  2.65E-10  2.89E-10  2.89E-10
     se 78     1.81E-10  2.03E-10  2.26E-10  2.48E-10  2.71E-10  2.71E-10
     dy162     1.33E-10  1.74E-10  1.95E-10  2.17E-10  2.39E-10  2.39E-10
     dy164     1.44E-10  1.64E-10  1.85E-10  2.06E-10  2.28E-10  2.28E-10
     sn124     1.45E-10  1.63E-10  1.82E-10  2.00E-10  2.18E-10  2.18E-10
     zr 93     1.65E-10  1.65E-10  1.65E-10  1.65E-10  1.65E-10  1.65E-10
     se 75     1.08E-10  1.21E-10  1.35E-10  1.48E-10  1.61E-10  1.61E-10
     nb 93     1.53E-10  1.53E-10  1.53E-10  1.53E-10  1.53E-10  1.53E-10
      y 91     1.44E-10  1.44E-10  1.43E-10  1.43E-10  1.43E-10  1.43E-10
     in113     7.27E-11  8.28E-11  9.30E-11  1.03E-10  1.13E-10  1.13E-10
     ru100     5.12E-11  6.42E-11  7.87E-11  9.47E-11  1.12E-10  1.12E-10
     pm151     1.06E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10  1.06E-10
     ba136     6.02E-11  6.81E-11  7.61E-11  8.42E-11  9.24E-11  9.24E-11
     sn118     5.93E-11  6.67E-11  7.41E-11  8.15E-11  8.89E-11  8.89E-11
     ce134     5.49E-11  6.13E-11  6.81E-11  7.48E-11  8.15E-11  8.15E-11
     nd142     3.38E-11  4.27E-11  5.27E-11  6.38E-11  7.58E-11  7.58E-11
     cd116     5.03E-11  5.66E-11  6.29E-11  6.92E-11  7.55E-11  7.55E-11
     sn122     5.03E-11  5.66E-11  6.29E-11  6.91E-11  7.54E-11  7.54E-11
     ba134     3.27E-11  4.13E-11  5.09E-11  6.15E-11  7.31E-11  7.31E-11
     sm148     3.19E-11  4.00E-11  4.90E-11  5.89E-11  6.98E-11  6.98E-11
     ba135     2.65E-11  3.35E-11  4.13E-11  5.00E-11  5.95E-11  5.95E-11
     sn120     3.76E-11  4.23E-11  4.70E-11  5.17E-11  5.64E-11  5.64E-11
     dy163     3.44E-11  3.91E-11  4.40E-11  4.90E-11  5.41E-11  5.41E-11
     kr 82     3.46E-11  3.93E-11  4.41E-11  4.91E-11  5.41E-11  5.41E-11
     pd104     2.23E-11  2.81E-11  3.47E-11  4.19E-11  4.98E-11  4.98E-11
     ba140     4.72E-11  4.73E-11  4.73E-11  4.73E-11  4.73E-11  4.71E-11
     ge 73     2.94E-11  3.31E-11  3.68E-11  4.04E-11  4.41E-11  4.41E-11
     sm153     3.74E-11  3.83E-11  3.84E-11  3.84E-11  3.84E-11  3.73E-11
     xe130     2.29E-11  2.42E-11  2.97E-11  3.33E-11  3.70E-11  3.70E-11
     mo 96     2.10E-11  2.46E-11  2.85E-11  3.25E-11  3.69E-11  3.69E-11
     eu156     3.48E-11  3.48E-11  3.49E-11  3.50E-11  3.50E-11  3.50E-11
     sr 89     3.07E-11  3.07E-11  3.07E-11  3.07E-11  3.07E-11  3.07E-11
     ru106     2.58E-11  2.58E-11  2.59E-11  2.60E-11  2.60E-11  2.60E-11
     ce143     1.69E-11  1.75E-11  1.75E-11  1.75E-11  1.75E-11  1.70E-11
      y 90     1.62E-11  1.62E-11  1.63E-11  1.63E-11  1.63E-11  1.63E-11
     ge 76     1.07E-11  1.20E-11  1.33E-11  1.47E-11  1.60E-11  1.60E-11
     la140     1.53E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11
     sb125     1.30E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11
     mo 99     1.29E-11  1.31E-11  1.31E-11  1.31E-11  1.31E-11  1.29E-11
     gd160     6.94E-12  7.63E-12  8.73E-12  9.63E-12  1.05E-11  1.05E-11
     pm148m    9.89E-12  9.54E-12  9.54E-12  9.54E-12  9.53E-12  9.52E-12
     te126     5.92E-12  6.76E-12  7.63E-12  8.51E-12  9.42E-12  9.42E-12
     kr 87     8.47E-12  2.30E-11  2.30E-11  2.29E-11  2.29E-11  9.14E-12
     nb 93     3.41E-12  4.42E-12  5.37E-12  6.05E-12  6.26E-12  6.26E-12
     te127m    7.48E-12  7.49E-12  7.50E-12  7.50E-12  7.51E-12  7.51E-12
     cd110     3.89E-12  3.91E-12  4.83E-12  5.86E-12  6.99E-12  6.99E-12
      i131     6.75E-12  6.77E-12  6.77E-12  6.77E-12  6.77E-12  6.75E-12
1    sas2h: far-field crit based on bbu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   25
0                                   fraction of total absorption rate
0          powerm     .00mw, burnup=    438.mwd, flux= 2.73E+08n/cm**2-sec
                initial  82181. d  91313. d 100444. d 109575. d 109575. d

     br 79     2.16E-12  2.73E-12  3.37E-12  4.07E-12  4.85E-12  4.85E-12
     ho165     2.38E-12  2.71E-12  3.05E-12  3.40E-12  3.76E-12  3.76E-12
     xe129     1.22E-12  1.53E-12  1.91E-12  2.31E-12  2.75E-12  2.75E-12
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    as107     1.16E-12  1.47E-12  1.82E-12  2.21E-12  2.63E-12  2.63E-12
    te124     1.27E-12  1.44E-12  1.60E-12  1.77E-12  1.93E-12  1.93E-12
    sr 87     1.23E-12  1.38E-12  1.54E-12  1.69E-12  1.84E-12  1.84E-12
    te129m    1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12
    nb 94     6.97E-13  7.84E-13  8.71E-13  9.59E-13  1.05E-12  1.05E-12
    ge 74     5.94E-13  6.68E-13  7.42E-13  8.17E-13  8.91E-13  8.91E-13
    sr 86     4.05E-13  4.44E-13  5.24E-13  5.67E-13  6.51E-13  6.51E-13
    ge 72     4.00E-13  4.50E-13  5.00E-13  5.50E-13  6.01E-13  6.01E-13
    dy160     2.02E-13  2.49E-13  3.01E-13  3.58E-13  4.20E-13  4.20E-13
    se 76     2.45E-13  2.78E-13  3.11E-13  3.44E-13  3.78E-13  3.78E-13
    pm148     3.48E-13  3.69E-13  3.69E-13  3.69E-13  3.69E-13  3.65E-13
    sb128     1.74E-13  2.13E-13  2.35E-13  2.00E-13  1.49E-13  1.49E-13
    ag111     2.25E-13  2.28E-13  2.29E-13  2.31E-13  2.32E-13  2.30E-13
    au197     2.82E-13  3.04E-13  3.05E-13  3.06E-13  3.07E-13  2.87E-13
    cd115m    2.38E-13  2.38E-13  2.38E-13  2.38E-13  2.38E-13  2.38E-13
    er166     7.43E-14  8.63E-14  9.83E-14  1.12E-13  1.26E-13  1.26E-13
    sn116     4.74E-14  5.99E-14  7.38E-14  8.91E-14  1.06E-13  1.06E-13
    xe136     6.07E-14  6.17E-14  6.24E-14  6.30E-14  6.37E-14  6.35E-14
    te122     2.16E-14  2.70E-14  3.30E-14  3.96E-14  4.68E-14  4.68E-14
    sn125     2.91E-14  2.93E-14  2.93E-14  2.93E-14  2.93E-14  2.92E-14
    kr 80     1.71E-14  1.94E-14  2.16E-14  2.38E-14  2.61E-14  2.61E-14
    ru105     2.30E-14  2.98E-14  2.99E-14  2.99E-14  2.99E-14  2.36E-14
    sn123     1.81E-14  1.81E-14  1.81E-14  1.01E-14  1.01E-14  1.01E-14
    te132     9.42E-15  9.37E-15  9.36E-15  9.36E-15  9.36E-15  9.42E-15
    rb 88     8.98E-15  1.29E-14  1.29E-14  1.29E-14  1.29E-14  9.27E-15
     I135     8.36E-15  1.02E-14  1.02E-14  1.02E-14  1.01E-14  8.48E-15
    sb126     3.34E-15  3.40E-15  3.44E-15  3.48E-15  3.53E-15  3.51E-15
    tb160     2.39E-15  2.65E-15  2.92E-15  3.18E-15  3.45E-15  3.45E-15
    sb124     2.20E-15  2.22E-15  2.23E-15  2.24E-15  2.26E-15  2.25E-15
    te123     1.29E-15  1.47E-15  1.65E-15  1.84E-15  2.03E-15  2.03E-15
    be  9     1.33E-15  1.50E-15  1.66E-15  1.83E-15  2.00E-15  2.00E-15
    pr142     1.30E-15  1.56E-15  1.73E-15  1.91E-15  2.08E-15  1.95E-15
    in117m    1.88E-15  2.12E-15  2.12E-15  2.12E-15  2.12E-15  1.91E-15
    te134     9.31E-16  5.66E-15  5.86E-15  5.85E-15  5.85E-15  1.07E-15
    er167     5.13E-16  6.23E-16  7.43E-16  8.74E-16  1.02E-15  1.02E-15
     I130     8.78E-16  1.00E-15  1.03E-15  1.07E-15  1.10E-15  1.00E-15
    li  7     5.41E-16  6.08E-16  6.76E-16  7.43E-16  8.10E-16  8.10E-16
    in117     5.37E-16  6.23E-16  6.23E-16  6.24E-16  6.25E-16  5.48E-16
    rb 86     3.72E-16  3.33E-16  3.43E-16  3.53E-16  3.64E-16  3.63E-16
    dy165     1.37E-16  2.71E-16  2.78E-16  2.84E-16  2.91E-16  1.80E-16
    ge 75     3.32E-17  8.66E-17  8.66E-17  8.65E-17  8.65E-17  3.77E-17
    cd108     1.78E-17  2.13E-17  2.50E-17  2.91E-17  3.35E-17  3.33E-17
    cd118     2.43E-17  1.21E-16  1.21E-16  1.21E-16  1.21E-16  2.96E-17
    sn114     9.67E-18  1.55E-17  1.56E-17  1.91E-17  2.30E-17  2.30E-17
    xe134m    6.60E-18  1.34E-17  1.37E-17  1.40E-17  1.32E-17  1.02E-17
    cd109     5.38E-19  5.82E-19  6.22E-19  6.66E-19  7.09E-19  7.09E-19
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page  26
0                                   fraction of total absorption rate
0        powers=      .00mw, burnup=     438.mwd, flux= 2.73E+08n/cm**2-sec
0              initial  82181. d  91313. d 100444. d 109575. d 109575. d

    in119m    4.98E-19  3.03E-17  3.03E-17  3.03E-17  3.03E-17  4.92E-19
    in119     3.34E-21  2.37E-18  2.37E-18  2.38E-18  2.38E-18  3.34E-21
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements            page  27
     powers 4.000E-01mw, burnup=4.3810E+02mwd, flux= 2.73E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
          charge  82181. d  91313. d 100444. d 109575. d 109575. d
     h  1  1.74E-05  1.95E-05  2.17E-05  2.38E-05  2.60E-05  2.60E-05
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h 2	5.16E-08	5.80E-08	6.43E-08	7.06E-08	7.70E-08	7.70E-08
h 3	3.37E-11	3.36E-11	3.36E-11	3.37E-11	3.38E-11	3.38E-11
h 4	.00E+00	1.37E-34	1.37E-34	1.37E-34	1.37E-34	.00E+00
he 3	3.45E-10	3.92E-10	4.38E-10	4.84E-10	5.31E-10	5.31E-10
he 4	2.88E-06	3.23E-06	3.58E-06	3.94E-06	4.29E-06	4.29E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.46E-07	3.88E-07	4.30E-07	4.73E-07	5.15E-07	5.15E-07
ne 21	2.37E-12	2.96E-12	3.60E-12	4.31E-12	5.07E-12	5.07E-12
ne 22	2.21E-09	2.69E-09	2.76E-09	3.04E-09	3.32E-09	3.32E-09
ne 23	7.11E-30	7.06E-15	7.06E-15	7.06E-15	7.06E-15	7.06E-30
na 22	4.18E-11	4.15E-11	4.15E-11	4.15E-11	4.15E-11	4.15E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.82E-08	2.83E-08	2.85E-08	2.85E-08	2.85E-08	2.63E-08
na 24m	5.05E-30	4.69E-15	4.69E-15	4.69E-15	4.69E-15	4.69E-30
na 25	1.78E-41	2.06E-26	2.38E-26	2.72E-26	3.07E-26	3.07E-41
mg 24	2.78E-03	3.08E-03	3.38E-03	3.67E-03	3.97E-03	3.97E-03
mg 25	6.12E-10	7.17E-10	8.28E-10	9.46E-10	1.07E-09	1.07E-09
mg 26	5.16E-08	5.80E-08	6.43E-08	7.06E-08	7.70E-08	7.70E-08
mg 27	6.27E-16	2.11E-12	2.11E-12	2.11E-12	2.11E-12	1.16E-15
mg 28	4.06E-24	4.30E-24	4.30E-24	4.30E-24	4.29E-24	4.06E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	5.16E-25	2.11E-10	2.11E-10	2.11E-10	2.11E-10	5.88E-24
al 29	4.65E-30	7.00E-25	8.56E-25	1.03E-24	1.21E-24	2.45E-29
al 30	.00E+00	2.97E-36	4.05E-36	5.35E-36	6.89E-36	.00E+00
si 28	8.10E-03	8.96E-03	9.82E-03	1.07E-02	1.15E-02	1.15E-02
si 29	2.17E-09	2.72E-09	3.33E-09	3.99E-09	4.70E-09	4.70E-09
si 30	6.11E-16	8.64E-16	1.18E-15	1.56E-15	2.00E-15	2.00E-15
si 31	2.69E-28	4.20E-28	8.45E-28	1.12E-27	1.44E-27	9.16E-28
si 32	1.35E-34	2.11E-34	5.14E-34	4.49E-34	6.22E-34	6.22E-34
totele	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.73E+08	2.73E+08	2.73E+08	2.73E+08	2.73E-07

0
1 sas2h: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 28
power= 4.800E-03mw, burnup=4.3830E+02mwd, flux= 2.73E+08n/cm**2-sec
nuclide concentrations, gram atoms
0 basis = single reactor assembly

	charge	82181. d	91313. d	100444. d	109573. d	109575. d
he 4	3.18E-02	3.76E-02	4.37E-02	5.00E-02	5.65E-02	5.65E-02
pb206	8.44E-08	1.28E-07	1.82E-07	2.48E-07	3.30E-07	3.30E-07
pb207	2.24E-07	2.83E-07	3.72E-07	4.60E-07	5.57E-07	5.57E-07
pb208	5.11E-08	6.66E-08	7.86E-08	9.03E-08	1.14E-07	1.14E-07
pb209	5.39E-14	7.03E-14	8.67E-14	1.05E-13	1.25E-13	1.25E-13
pb210	4.65E-08	6.07E-08	7.67E-08	9.46E-08	1.14E-07	1.14E-07
pb211	2.54E-13	2.92E-13	3.30E-13	3.68E-13	4.05E-13	4.05E-13
pb212	9.04E-13	1.01E-12	1.12E-12	1.22E-12	1.33E-12	1.33E-12
pb214	1.41E-13	1.83E-13	2.25E-13	2.72E-13	3.22E-13	3.12E-13
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.92E-09	9.85E-09	1.35E-08	1.80E-08	2.33E-08	2.33E-08
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.86E-11	3.74E-11	4.72E-11	5.83E-11	7.04E-11	7.04E-11
bi211	1.32E-14	1.73E-14	1.96E-14	2.18E-14	2.40E-14	2.42E-14
bi212	8.38E-14	9.59E-14	1.06E-13	1.16E-13	1.26E-13	1.26E-13
bi213	1.26E-14	1.64E-14	2.02E-14	2.45E-14	2.91E-14	2.83E-14
bi214	1.06E-13	1.36E-13	1.67E-13	2.02E-13	2.39E-13	2.36E-13
po210	7.91E-10	1.03E-09	1.30E-09	1.61E-09	1.94E-09	1.94E-09
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.68E-19	1.91E-19	2.16E-19	2.41E-19	2.66E-19	2.68E-19
po212	4.51E-24	5.04E-24	5.57E-24	6.11E-24	6.64E-24	6.64E-24
po213	1.89E-23	2.47E-23	3.04E-23	3.68E-23	4.38E-23	4.25E-23
po214	1.46E-20	1.87E-20	2.30E-20	2.78E-20	3.29E-20	3.25E-20

po215	2.09E-19	2.40E-19	2.71E-19	3.02E-19	3.33E-19	3.33E-19
po216	3.42E-18	3.83E-18	4.23E-18	4.64E-18	5.04E-18	5.04E-18
po218	1.68E-14	2.12E-14	2.61E-14	3.14E-14	3.73E-14	3.73E-14
rn218	1.31E-29	1.45E-29	1.60E-29	1.75E-29	1.91E-29	1.91E-29
rn219	4.65E-16	5.34E-16	6.03E-16	6.72E-16	7.41E-16	7.41E-16
rn220	1.31E-15	1.47E-15	1.62E-15	1.78E-15	1.93E-15	1.93E-15
rn222	2.99E-11	3.77E-11	4.63E-11	5.58E-11	6.62E-11	6.62E-11
ra222	1.42E-26	1.57E-26	1.74E-26	1.90E-26	2.07E-26	2.07E-26
ra223	1.16E-10	1.33E-10	1.50E-10	1.68E-10	1.85E-10	1.85E-10
ra224	7.46E-12	8.35E-12	9.23E-12	1.01E-11	1.10E-11	1.10E-11
ra225	6.07E-12	7.68E-12	9.47E-12	1.16E-11	1.36E-11	1.36E-11
ra226	4.56E-06	5.75E-06	7.08E-06	8.53E-06	1.01E-05	1.01E-05
ra228	4.05E-13	4.88E-13	5.11E-13	5.64E-13	6.17E-13	6.17E-13
ac225	4.10E-12	5.18E-12	6.40E-12	7.73E-12	9.19E-12	9.19E-12
ac227	8.06E-08	9.86E-08	1.05E-07	1.16E-07	1.28E-07	1.28E-07
ac228	4.95E-17	5.59E-17	6.24E-17	6.88E-17	7.53E-17	7.53E-17
th226	6.94E-25	7.67E-25	8.48E-25	9.28E-25	1.01E-24	1.01E-24
th227	1.87E-10	2.15E-10	2.43E-10	2.71E-10	2.98E-10	2.98E-10
th228	1.42E-09	1.59E-09	1.76E-09	1.93E-09	2.10E-09	2.10E-09
th229	1.18E-06	1.49E-06	1.84E-06	2.23E-06	2.65E-06	2.65E-06
th230	5.11E-03	5.74E-03	6.38E-03	7.02E-03	7.66E-03	7.66E-03
th231	3.84E-09	3.84E-09	3.84E-09	3.84E-09	3.85E-09	3.85E-09
th232	1.03E-03	1.16E-03	1.29E-03	1.42E-03	1.55E-03	1.55E-03
th233	3.82E-14	1.07E-14	1.18E-14	1.30E-14	1.42E-14	5.89E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.44E-04	1.62E-04	1.80E-04	1.98E-04	2.16E-04	2.16E-04
pa232	2.37E-12	2.78E-12	3.09E-12	3.40E-12	3.71E-12	3.57E-12

1

sas2h: fer-field crit based on biu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 29
power= 4.000E-03mw, burnup=4.3830E+02mwd, flux= 2.73E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	82181. d	91313. d	100444. d	109575. d	109575. d
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.72E-22	7.43E-22	8.22E-22	9.00E-22	9.78E-22	9.76E-22
u231	2.08E-18	2.34E-18	2.60E-18	2.86E-18	3.12E-18	3.08E-18
u232	5.10E-08	5.70E-08	6.30E-08	6.91E-08	7.51E-08	7.51E-08
u233	2.73E-03	3.07E-03	3.41E-03	3.75E-03	4.09E-03	4.09E-03
u234	9.07E+00	9.07E+00	9.07E+00	9.07E+00	9.08E+00	9.08E+00
u235	7.29E+02	7.29E+02	7.29E+02	7.28E+02	7.28E+02	7.28E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	2.13E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.10E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.21E-08	3.19E-07	3.19E-07	3.19E-07	3.19E-07	1.55E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.80E-12	8.69E-12	8.68E-12	8.68E-12	8.68E-12	8.68E-12
np236m	1.98E-12	2.07E-12	2.07E-12	2.06E-12	2.06E-12	1.96E-12
np236	4.03E-08	4.92E-08	5.01E-08	5.10E-08	5.99E-08	5.99E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.52E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.52E-06
np239	4.58E-05	4.61E-05	4.61E-05	4.61E-05	4.61E-05	4.54E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.74E-15	9.37E-15	9.37E-15	9.37E-15	9.37E-15	2.98E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.12E-09	1.12E-09	1.12E-09	1.12E-09	1.12E-09
pu237	1.94E-13	2.01E-13	2.09E-13	2.15E-13	2.21E-13	2.21E-13

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      pu238   1.88E-02  1.97E-02  2.04E-02  2.09E-02  2.14E-02  2.14E-02
      pu239   1.00E+00  1.13E+00  1.25E+00  1.37E+00  1.49E+00  1.49E+00
      pu240   9.85E-04  1.24E-03  1.53E-03  1.84E-03  2.19E-03  2.19E-03
      pu241   3.35E-07  4.29E-07  5.36E-07  6.56E-07  7.88E-07  7.88E-07
      pu242   2.44E-10  4.05E-10  5.94E-10  8.59E-10  1.15E-09  1.15E-09
      pu243   4.37E-19  8.58E-19  1.26E-18  1.78E-18  2.43E-18  1.92E-18
      pu244   1.05E-40  3.48E-40  1.13E-39  3.08E-39  7.71E-39  7.71E-39
      pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am239   2.32E-22  3.70E-22  5.12E-22  6.86E-22  8.46E-22  8.09E-22
      am240   1.16E-19  1.69E-19  2.34E-19  3.14E-19  4.09E-19  4.00E-19
      am241   9.28E-07  1.34E-06  1.86E-06  2.49E-06  3.25E-06  3.25E-06
      am242m  9.37E-11  1.50E-10  2.28E-10  3.31E-10  4.63E-10  4.63E-10
      am242   3.11E-14  4.86E-14  6.76E-14  9.08E-14  1.19E-13  1.11E-13
      am243   1.29E-13  2.32E-13  3.91E-13  6.25E-13  9.56E-13  9.56E-13
      am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am244   8.75E-22  1.77E-21  2.99E-21  4.77E-21  7.29E-21  6.49E-21
      am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0     flux                2.73E+08  2.73E+08  2.73E+08  2.73E+08  2.73E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
!library information...

         cross-section data taken from position number  4 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module cas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module cas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ****************************************************************************
         *                                                                          *
         *              prelim lwr origen-s binary working library--id = 1143       *
         *          made from modified card-image origen-s libraries of scale 4.2   *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                          *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "prepas2" case updating all nuclides on the scale "burnup" library *
         *                                                                          *
         *                  fission product yields are from endf/b-v                *
         *                                                                          *
         *                  photon libraries use an 18-energy-group structure       *
         *                 the photon data are from the master photon data base,    *
         *                  produced to include bremsstrahlung from uo2 matrix      *
```

```
         *                                                                      *
         *        see information above this box (if present) for later updates *
         *                                                                      *
         ************************************************************************
         *                                                                      *
         ************************************************************************
0                .other identification and sizes of library.
0                 data set name:  fz33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   30
         power=    .00mw, burnup=     584.mwd, flux= 2.70E+08n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      118706. d      127838. d      136969. d      146100. d      146100. d
     productions  1.136002E+06   1.136182E+06   1.136361E+06   1.136540E+06   1.136719E+06   1.136719E+06
     absorptions  9.278001E+05   9.280391E+05   9.282760E+05   9.285046E+05   9.287318E+05   9.287318E+05
     k infinity   1.224404E+00   1.224282E+00   1.224166E+00   1.224054E+00   1.223947E+00   1.223947E+00
8                 initial      118706. d      127838. d      136969. d      146100. d      146100. d
     actinide
     absorptions  9.226709E+05   9.227775E+05   9.228838E+05   9.229898E+05   9.230958E+05   9.230958E+05
     non-actinide
     abs. fracs.  5.528271E-03   5.669594E-03   5.806684E-03   5.939364E-03   6.068587E-03   6.068587E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   31
0                                   fraction of total absorption rate
         power=    .00mw, burnup=     584.mwd, flux= 2.70E+08n/cm**2-sec
0                initial 118706. d 127838. d 136969. d 146100. d 146100. d

     sm149     1.83E-03  1.95E-03  2.06E-03  2.17E-03  2.28E-03  2.28E-03
     eu151     4.15E-05  4.65E-05  5.17E-05  5.69E-05  6.21E-05  6.21E-05
     nd143     4.44E-05  4.81E-05  5.18E-05  5.55E-05  5.91E-05  5.91E-05
     sm151     3.62E-05  3.68E-05  3.74E-05  3.79E-05  3.82E-05  3.82E-05
     gd155     2.72E-05  2.93E-05  3.14E-05  3.35E-05  3.55E-05  3.55E-05
     rh103     2.06E-05  2.23E-05  2.41E-05  2.58E-05  2.75E-05  2.75E-05
     cd113     1.74E-05  1.87E-05  2.00E-05  2.12E-05  2.25E-05  2.25E-05
     gd157     1.72E-05  1.82E-05  1.92E-05  2.02E-05  2.11E-05  2.11E-05
     xe131     1.40E-05  1.52E-05  1.63E-05  1.75E-05  1.87E-05  1.87E-05
     cs133     1.09E-05  1.18E-05  1.27E-05  1.36E-05  1.45E-05  1.45E-05
     tc 99     7.99E-06  8.66E-06  9.32E-06  9.98E-06  1.06E-05  1.06E-05
     sm147     7.97E-06  8.64E-06  9.31E-06  9.97E-06  1.06E-05  1.06E-05
     nd145     6.21E-06  6.72E-06  7.24E-06  7.76E-06  8.27E-06  8.27E-06
     mo 95     4.30E-06  4.65E-06  5.01E-06  5.37E-06  5.72E-06  5.72E-06
     sm152     3.35E-06  3.64E-06  3.92E-06  4.21E-06  4.49E-06  4.49E-06
     kr 83     2.70E-06  2.92E-06  3.14E-06  3.37E-06  3.59E-06  3.59E-06
     cs135     2.45E-06  2.65E-06  2.86E-06  3.06E-06  3.27E-06  3.27E-06
     ru101     1.90E-06  2.05E-06  2.21E-06  2.37E-06  2.53E-06  2.53E-06
     pr141     1.83E-06  1.99E-06  2.14E-06  2.29E-06  2.44E-06  2.44E-06
     xe135     2.29E-06  2.32E-06  2.32E-06  2.32E-06  2.32E-06  2.32E-06
     eu153     1.67E-06  1.81E-06  1.94E-06  2.08E-06  2.22E-06  2.22E-06
     la139     1.50E-06  1.63E-06  1.75E-06  1.87E-06  2.00E-06  2.00E-06
     sm150     6.30E-07  7.08E-07  8.15E-07  9.23E-07  1.04E-06  1.04E-06
     ba137     4.35E-07  4.75E-07  5.34E-07  5.94E-07  6.53E-07  6.53E-07
     pd105     6.38E-07  6.91E-07  7.44E-07  7.98E-07  8.51E-07  8.51E-07
     zr 93     6.06E-07  6.57E-07  7.07E-07  7.57E-07  8.07E-07  8.07E-07
      I129     4.67E-07  5.06E-07  5.45E-07  5.83E-07  6.22E-07  6.22E-07
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nd144	4.50E-07	4.87E-07	5.25E-07	5.62E-07	5.99E-07	5.99E-07
mo 97	3.40E-07	3.68E-07	3.97E-07	4.25E-07	4.53E-07	4.53E-07
ag109	2.58E-07	2.81E-07	3.05E-07	3.29E-07	3.53E-07	3.53E-07
pm147	2.71E-07	2.71E-07	2.70E-07	2.70E-07	2.70E-07	2.70E-07
zr 91	1.60E-07	1.73E-07	1.87E-07	2.00E-07	2.13E-07	2.13E-07
y 89	1.54E-07	1.67E-07	1.79E-07	1.92E-07	2.05E-07	2.05E-07
ru102	1.39E-07	1.50E-07	1.62E-07	1.73E-07	1.85E-07	1.85E-07
ce142	1.25E-07	1.35E-07	1.46E-07	1.56E-07	1.66E-07	1.66E-07
eu155	1.60E-07	1.60E-07	1.60E-07	1.60E-07	1.61E-07	1.61E-07
nd148	1.20E-07	1.30E-07	1.40E-07	1.50E-07	1.60E-07	1.60E-07
nd146	1.01E-07	1.09E-07	1.17E-07	1.26E-07	1.34E-07	1.34E-07
ba138	8.61E-08	9.33E-08	1.00E-07	1.08E-07	1.15E-07	1.15E-07
pd108	8.45E-08	9.19E-08	9.93E-08	1.07E-07	1.14E-07	1.14E-07
in115	8.31E-08	9.00E-08	9.69E-08	1.04E-07	1.11E-07	1.11E-07
ce140	8.07E-08	8.74E-08	9.41E-08	1.01E-07	1.07E-07	1.07E-07
xe132	7.22E-08	7.82E-08	8.42E-08	9.02E-08	9.62E-08	9.62E-08
pd107	4.96E-08	5.39E-08	5.82E-08	6.25E-08	6.68E-08	6.68E-08
mo 98	4.97E-08	5.38E-08	5.80E-08	6.21E-08	6.62E-08	6.62E-08
mo100	4.82E-08	5.22E-08	5.62E-08	6.02E-08	6.42E-08	6.42E-08
xe134	4.76E-08	5.15E-08	5.55E-08	5.94E-08	6.34E-08	6.34E-08
zr 92	3.86E-08	4.18E-08	4.50E-08	4.82E-08	5.14E-08	5.14E-08
i127	3.13E-08	3.40E-08	3.66E-08	3.92E-08	4.18E-08	4.18E-08

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 32

0 fraction of total absorption rate

0 powerm .00mw, burnup= 584.mwd, flux= 2.70E+08n/cm**2-sec

	initial 118706. d	127838. d	136969. d	146100. d	146100. d
zr 96	3.02E-08	3.27E-08	3.52E-08	3.77E-08	4.02E-08	4.02E-08
ru104	2.97E-08	3.22E-08	3.47E-08	3.72E-08	3.96E-08	3.96E-08
nd150	2.66E-08	2.88E-08	3.10E-08	3.32E-08	3.54E-08	3.54E-08
xe136	2.57E-08	2.79E-08	3.00E-08	3.21E-08	3.43E-08	3.43E-08
br 81	1.92E-08	2.08E-08	2.24E-08	2.40E-08	2.56E-08	2.56E-08
rb 85	1.86E-08	2.02E-08	2.17E-08	2.33E-08	2.48E-08	2.48E-08
zr 94	1.63E-08	1.76E-08	1.90E-08	2.03E-08	2.17E-08	2.17E-08
zr 90	1.31E-08	1.44E-08	1.56E-08	1.69E-08	1.81E-08	1.81E-08
cd111	1.28E-08	1.39E-08	1.50E-08	1.61E-08	1.72E-08	1.72E-08
sr 90	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08
te130	1.17E-08	1.27E-08	1.36E-08	1.46E-08	1.56E-08	1.56E-08
eu152	9.87E-09	1.12E-08	1.25E-08	1.39E-08	1.52E-08	1.52E-08
sm154	1.14E-08	1.23E-08	1.33E-08	1.42E-08	1.52E-08	1.52E-08
rb 87	1.09E-08	1.18E-08	1.27E-08	1.36E-08	1.45E-08	1.45E-08
gd152	5.25E-09	6.47E-09	7.64E-09	8.86E-09	1.10E-08	1.10E-08
se 77	7.75E-09	8.39E-09	9.04E-09	9.68E-09	1.03E-08	1.03E-08
rh103	8.45E-09	8.48E-09	8.49E-09	8.50E-09	8.51E-09	8.47E-09
pd106	5.54E-09	6.01E-09	6.48E-09	6.96E-09	7.43E-09	7.43E-09
kr 84	5.12E-09	5.53E-09	5.97E-09	6.39E-09	6.82E-09	6.82E-09
se 79	5.07E-09	4.30E-09	4.63E-09	4.96E-09	5.29E-09	5.29E-09
sb121	3.77E-09	4.08E-09	4.40E-09	4.71E-09	5.03E-09	5.03E-09
sb123	3.07E-09	3.32E-09	3.58E-09	3.83E-09	4.09E-09	4.09E-09
kr 86	2.07E-09	2.11E-09	2.34E-09	2.58E-09	2.82E-09	2.82E-09
cs137	2.76E-09	2.76E-09	2.76E-09	2.76E-09	2.76E-09	2.76E-09
te128	2.56E-09	2.77E-09	2.98E-09	3.19E-09	3.41E-09	3.41E-09
gd156	2.32E-09	2.53E-09	2.78E-09	3.01E-09	3.25E-09	3.25E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.66E-09	2.66E-09	2.66E-09
se 80	1.85E-09	2.00E-09	2.16E-09	2.31E-09	2.47E-09	2.47E-09
dy161	1.73E-09	1.88E-09	2.04E-09	2.19E-09	2.35E-09	2.35E-09
te125	1.60E-09	1.74E-09	1.87E-09	2.01E-09	2.14E-09	2.14E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09
ce141	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
tb159	1.12E-09	1.22E-09	1.31E-09	1.41E-09	1.51E-09	1.51E-09

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     cd112     1.04E-09  1.15E-09  1.24E-09  1.33E-09  1.42E-09  1.42E-09
     ti  6     1.05E-09  1.14E-09  1.23E-09  1.31E-09  1.40E-09  1.40E-09
     ru 99     6.61E-10  7.72E-10  8.91E-10  1.02E-09  1.16E-09  1.16E-09
     sn117     8.36E-10  9.06E-10  9.76E-10  1.05E-09  1.12E-09  1.12E-09
     eu154     8.25E-10  8.95E-10  9.66E-10  1.04E-09  1.11E-09  1.11E-09
     pm149     9.72E-10  9.77E-10  9.77E-10  9.77E-10  9.76E-10  9.69E-10
     nd147     9.25E-10  9.28E-10  9.28E-10  9.28E-10  9.27E-10  9.23E-10
     sn119     6.88E-10  7.45E-10  8.02E-10  8.59E-10  9.17E-10  9.17E-10
     sn115     6.30E-10  6.82E-10  7.35E-10  7.87E-10  8.40E-10  8.40E-10
     gd158     5.35E-10  5.64E-10  6.54E-10  7.17E-10  7.80E-10  7.80E-10
     sr 88     5.27E-10  5.71E-10  6.14E-10  6.58E-10  7.02E-10  7.02E-10
     ce144     6.01E-10  6.01E-10  6.01E-10  6.00E-10  6.00E-10  6.00E-10
     pd154     3.18E-10  3.75E-10  4.37E-10  5.03E-10  5.74E-10  5.74E-10
     kr 85     5.74E-10  5.73E-10  5.73E-10  5.73E-10  5.73E-10  5.73E-10
     cd114     4.07E-10  4.45E-10  4.83E-10  5.22E-10  5.61E-10  5.61E-10
     pd110     3.86E-10  4.19E-10  4.52E-10  4.86E-10  5.19E-10  5.19E-10
1    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   33
0                                  fraction of total absorption rate
          powers     .00mw, burnup=     584.gwd, flux= 2.70E+08n/cm**2-sec
0                 initial 118704. d 127838. d 136969. d 146100. d 146100. d

     se 82     3.58E-10  3.87E-10  4.17E-10  4.47E-10  4.76E-10  4.76E-10
     sn126     2.89E-10  3.14E-10  3.38E-10  3.62E-10  3.87E-10  3.87E-10
     se 78     2.71E-10  2.94E-10  3.16E-10  3.39E-10  3.61E-10  3.61E-10
     ru103     3.38E-10  3.39E-10  3.39E-10  3.39E-10  3.39E-10  3.38E-10
     dy162     2.39E-10  2.61E-10  2.84E-10  3.07E-10  3.31E-10  3.31E-10
     dy164     2.29E-10  2.51E-10  2.74E-10  2.97E-10  3.21E-10  3.21E-10
     sn124     2.18E-10  2.36E-10  2.54E-10  2.72E-10  2.90E-10  2.90E-10
     as 75     1.61E-10  1.75E-10  1.88E-10  2.02E-10  2.15E-10  2.15E-10
     ru100     1.12E-10  1.31E-10  1.52E-10  1.74E-10  1.97E-10  1.97E-10
     zr 95     1.65E-10  1.65E-10  1.65E-10  1.65E-10  1.65E-10  1.64E-10
     in113     1.13E-10  1.23E-10  1.33E-10  1.44E-10  1.54E-10  1.54E-10
     nb 95     1.53E-10  1.53E-10  1.53E-10  1.52E-10  1.52E-10  1.52E-10
      y 91     1.44E-10  1.44E-10  1.43E-10  1.43E-10  1.43E-10  1.43E-10
     nd142     7.60E-11  8.91E-11  1.03E-10  1.19E-10  1.35E-10  1.35E-10
     ba134     7.31E-11  8.57E-11  9.93E-11  1.14E-10  1.29E-10  1.29E-10
     ba136     9.23E-11  1.01E-10  1.09E-10  1.17E-10  1.26E-10  1.26E-10
     sm148     6.08E-11  8.16E-11  9.43E-11  1.08E-10  1.22E-10  1.22E-10
     sn116     8.88E-11  9.61E-11  1.04E-10  1.11E-10  1.18E-10  1.18E-10
     cs134     8.16E-11  8.81E-11  9.48E-11  1.02E-10  1.08E-10  1.08E-10
     pm151     1.07E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10  1.06E-10
     ba135     5.95E-11  6.98E-11  8.09E-11  9.28E-11  1.06E-10  1.06E-10
     sn122     7.55E-11  8.18E-11  8.81E-11  9.44E-11  1.03E-10  1.01E-10
     cd116     7.54E-11  8.17E-11  8.80E-11  9.43E-11  1.01E-10  1.01E-10
     pd106     4.98E-11  5.64E-11  6.76E-11  7.76E-11  8.82E-11  8.82E-11
     dy163     5.41E-11  5.94E-11  6.47E-11  7.01E-11  7.57E-11  7.57E-11
     kr 82     5.41E-11  5.93E-11  6.45E-11  6.98E-11  7.52E-11  7.52E-11
     sn120     5.44E-11  6.11E-11  6.58E-11  7.05E-11  7.52E-11  7.52E-11
     ge 73     4.42E-11  4.78E-11  5.15E-11  5.52E-11  5.89E-11  5.89E-11
     mo 96     3.69E-11  4.14E-11  4.67E-11  5.11E-11  5.63E-11  5.63E-11
     xe130     3.70E-11  4.08E-11  4.67E-11  4.88E-11  5.29E-11  5.29E-11
     ba140     2.71E-11  4.73E-11  4.73E-11  4.73E-11  4.73E-11  4.71E-11
     sm153     3.75E-11  3.84E-11  3.85E-11  3.85E-11  3.85E-11  3.74E-11
     eu156     3.31E-11  3.51E-11  3.52E-11  3.53E-11  3.54E-11  3.53E-11
     cr 89     3.07E-11  3.07E-11  3.07E-11  3.07E-11  3.07E-11  3.06E-11
     ru104     2.60E-11  2.60E-11  2.61E-11  2.62E-11  2.62E-11  2.62E-11
     ge 76     1.60E-11  1.73E-11  1.86E-11  2.00E-11  2.13E-11  2.13E-11
     ce143     1.70E-11  1.75E-11  1.75E-11  1.75E-11  1.75E-11  1.69E-11
      y 90     1.63E-11  1.63E-11  1.63E-11  1.63E-11  1.63E-11  1.63E-11
     la140     1.53E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11
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nb 93	8.26E-12	9.81E-12	1.15E-11	1.33E-11	1.52E-11	1.52E-11
sb125	1.30E-11	1.50E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11
gd160	1.05E-11	1.15E-11	1.24E-11	1.33E-11	1.42E-11	1.42E-11
te126	9.43E-12	1.04E-11	1.13E-11	1.23E-11	1.33E-11	1.33E-11
mo 99	1.29E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.28E-11
cd110	7.00E-12	8.23E-12	9.37E-12	1.10E-11	1.26E-11	1.26E-11
pm148m	9.34E-12	9.53E-12	9.53E-12	9.52E-12	9.52E-12	9.51E-12
kr 79	4.85E-12	5.69E-12	6.60E-12	7.37E-12	8.61E-12	8.61E-12
kr 87	9.16E-12	2.30E-11	2.30E-11	2.29E-11	2.29E-11	7.83E-12
te127m	7.31E-12	7.52E-12	7.53E-12	7.53E-12	7.54E-12	7.54E-12

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 34
0 fraction of total absorption rate
0 powers= .00mw, burnup= 384.mwd, flux= 2.70E+08n/cm**2-sec
Initial 118706. d 127838. d 136969. d 146100. d 146100. d

i131	6.75E-12	6.77E-12	6.77E-12	6.77E-12	6.77E-12	6.75E-12
he165	3.76E-12	4.12E-12	4.50E-12	4.88E-12	5.27E-12	5.27E-12
xe129	2.75E-12	3.22E-12	3.74E-12	4.29E-12	4.88E-12	4.88E-12
ag107	2.63E-12	3.09E-12	3.59E-12	4.13E-12	4.71E-12	4.71E-12
te124	1.94E-12	2.10E-12	2.27E-12	2.44E-12	2.61E-12	2.61E-12
sr 87	1.85E-12	2.00E-12	2.15E-12	2.31E-12	2.46E-12	2.46E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
nb 94	1.05E-12	1.13E-12	1.22E-12	1.31E-12	1.39E-12	1.39E-12
ge 74	8.92E-13	9.66E-13	1.04E-12	1.11E-12	1.19E-12	1.19E-12
sr 86	6.92E-13	7.18E-13	7.86E-13	8.56E-13	9.27E-13	9.27E-13
ge 72	6.02E-13	6.52E-13	7.02E-13	7.52E-13	8.03E-13	8.03E-13
dy160	4.20E-13	4.87E-13	5.59E-13	6.36E-13	7.18E-13	7.18E-13
xe128	3.50E-13	4.03E-13	4.60E-13	5.20E-13	5.84E-13	5.84E-13
se 76	3.79E-13	4.13E-13	4.48E-13	4.84E-13	5.19E-13	5.19E-13
pm148	3.65E-13	3.67E-13	3.67E-13	3.67E-13	3.67E-13	3.63E-13
ag111	3.30E-13	3.33E-13	3.34E-13	3.35E-13	3.37E-13	3.35E-13
eu157	2.87E-13	3.08E-13	3.09E-13	3.10E-13	3.11E-13	2.86E-13
cd115m	2.38E-13	2.39E-13	2.39E-13	2.39E-13	2.39E-13	2.39E-13
sn116	1.06E-13	1.24E-13	1.43E-13	1.65E-13	1.87E-13	1.87E-13
er166	1.26E-13	1.40E-13	1.55E-13	1.70E-13	1.86E-13	1.86E-13
te122	4.68E-14	5.45E-14	6.29E-14	7.19E-14	8.15E-14	8.15E-14
cs136	6.34E-14	6.43E-14	6.50E-14	6.57E-14	6.64E-14	6.61E-14
kr 80	2.61E-14	2.84E-14	3.07E-14	3.30E-14	3.54E-14	3.54E-14
sn125	2.91E-14	2.93E-14	2.93E-14	2.93E-14	2.93E-14	2.91E-14
ru105	2.56E-14	2.99E-14	2.99E-14	3.00E-14	3.00E-14	2.27E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.43E-15	9.57E-15	9.57E-15	9.56E-15	9.56E-15	9.40E-15
rb 88	9.89E-15	1.29E-14	1.29E-14	1.29E-14	1.29E-14	8.66E-15
i135	8.49E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.23E-15
tb160	3.45E-15	3.73E-15	3.98E-15	4.25E-15	4.52E-15	4.52E-15
sb126	3.32E-15	3.57E-15	3.62E-15	3.66E-15	3.70E-15	3.69E-15
te123	2.03E-15	2.23E-15	2.43E-15	2.63E-15	2.84E-15	2.84E-15
be 9	1.99E-15	2.16E-15	2.32E-15	2.49E-15	2.65E-15	2.65E-15
pr142	1.96E-15	2.25E-15	2.42E-15	2.60E-15	2.77E-15	2.58E-15
sb124	2.25E-15	2.27E-15	2.28E-15	2.29E-15	2.31E-15	2.31E-15
in117m	1.91E-15	2.13E-15	2.13E-15	2.13E-15	2.14E-15	1.86E-15
er167	1.02E-15	1.17E-15	1.34E-15	1.52E-15	1.71E-15	1.71E-15
i130	1.00E-15	1.13E-15	1.16E-15	1.19E-15	1.22E-15	1.10E-15
li 7	8.12E-16	8.79E-16	9.47E-16	1.01E-15	1.08E-15	1.08E-15
te134	1.07E-15	5.86E-15	5.86E-15	5.85E-15	5.83E-15	8.07E-16
in117	5.69E-16	6.26E-16	6.27E-16	6.28E-16	6.28E-16	5.54E-16
rb 86	3.63E-16	3.74E-16	3.84E-16	3.94E-16	4.04E-16	4.03E-16
dy165	1.80E-16	2.98E-16	3.05E-16	3.11E-16	3.18E-16	1.80E-16
cd108	3.35E-17	3.83E-17	4.35E-17	4.91E-17	5.51E-17	5.51E-17
sn114	2.31E-17	2.73E-17	3.19E-17	3.69E-17	4.22E-17	4.22E-17

```
     ge 75      3.78E-17  8.47E-17  8.46E-17  8.46E-17  8.46E-17  3.28E-17
     cd118      2.97E-17  1.22E-16  1.22E-16  1.22E-16  1.22E-16  2.35E-17
     cs134m     1.02E-17  1.45E-17  1.78E-17  1.90E-17  2.03E-17  1.26E-17
     cd109      7.10E-19  7.54E-19  7.94E-19  8.38E-19  8.81E-19  8.81E-19
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  35
0                                  fraction of total absorption rate
         power=     .00mw, burnup=      384.mwd, flux= 2.70E+08n/cm**2-sec
0              initial 118706. d 127838. d 136969. d 146100. d 146100. d

     in119m     6.93E-19  3.84E-17  3.84E-17  3.84E-17  3.84E-17  3.60E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  36
       power= 4.000E-03mw, burnup=5.8440E+02mwd, flux= 2.70E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
            charge 118706. d 127838. d 136969. d 146100. d 146100. d
      h  1  2.60E-05  2.81E-05  3.02E-05  3.24E-05  3.45E-05  3.45E-05
      h  2  7.70E-08  8.33E-08  8.96E-08  9.60E-08  1.02E-07  1.02E-07
      h  3  3.38E-11  3.38E-11  3.39E-11  3.39E-11  3.40E-11  3.40E-11
      h  4   .00E+00  1.37E-34  1.38E-34  1.38E-34  1.38E-34   .00E+00
     he  3  5.31E-10  5.77E-10  6.24E-10  6.70E-10  7.16E-10  7.16E-10
     he  4  4.29E-06  4.64E-06  4.99E-06  5.35E-06  5.70E-06  5.70E-06
     he  6   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20  5.15E-07  5.58E-07  6.00E-07  6.42E-07  6.85E-07  6.85E-07
     ne 21  5.07E-12  5.89E-12  6.77E-12  7.70E-12  8.69E-12  8.69E-12
     ne 22  3.32E-09  3.59E-09  3.87E-09  4.15E-09  4.42E-09  4.42E-09
     ne 23  7.06E-30  7.06E-15  7.05E-15  7.05E-15  7.05E-15  7.05E-30
     na 22  4.15E-11  4.15E-11  4.15E-11  4.15E-11  4.15E-11  4.15E-11
     na 23  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24  2.63E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08  2.52E-08
     na 24m 4.49E-30  4.55E-15  4.55E-15  4.55E-15  4.55E-15  4.55E-30
     na 25  3.07E-41  3.43E-26  3.81E-26  4.21E-26  4.63E-26  4.63E-41
     mg 24  3.97E-03  4.25E-03  4.54E-03  4.83E-03  5.12E-03  5.12E-03
     mg 25  1.07E-09  1.20E-09  1.33E-09  1.47E-09  1.62E-09  1.62E-09
     mg 26  7.70E-08  8.33E-08  8.96E-08  9.60E-08  1.02E-07  1.02E-07
     mg 27  1.16E-15  2.11E-12  2.11E-12  2.11E-12  2.11E-12  3.33E-16
     mg 28  4.86E-24  4.30E-24  4.29E-24  4.29E-24  4.29E-24  4.82E-24
     al 27  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28  3.88E-24  2.05E-10  2.05E-10  2.05E-10  2.05E-10  2.31E-25
     al 29  2.45E-29  1.40E-24  1.61E-24  1.84E-24  2.07E-24  4.92E-30
     al 30   .00E+00  8.66E-36  1.07E-35  1.31E-35  1.58E-35   .00E+00
     al 28  1.15E-02  1.24E-02  1.32E-02  1.41E-02  1.49E-02  1.49E-02
     al 29  4.70E-09  5.47E-09  6.30E-09  7.17E-09  8.10E-09  8.10E-09
     al 30  2.00E-15  2.53E-15  3.14E-15  3.84E-15  4.63E-15  4.63E-15
     al 31  3.16E-26  1.92E-27  2.25E-27  2.73E-27  3.32E-27  1.96E-27
     al 32  6.22E-34  8.37E-34  1.10E-33  1.42E-33  1.79E-33  1.79E-33
   totals   5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
8  flux               2.70E+08  2.70E+08  2.70E+08  2.70E+08  2.70E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  37
       power= 4.000E-03mw, burnup=5.8440E+02mwd, flux= 2.70E+08n/cm**2-sec
8                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
            charge 118706. d 127838. d 136969. d 146100. d 146100. d
     he  4  5.65E-02  6.32E-02  7.00E-02  7.69E-02  8.40E-02  8.40E-02
     pb206  5.30E-07  5.88E-07  6.43E-07  6.77E-07  6.32E-07  6.32E-07
     pb207  5.57E-07  6.64E-07  7.81E-07  9.07E-07  1.04E-06  1.04E-06
     pb208  .14E-07  1.34E-07  .55E-07  1.77E-07  2.01E-07  2.01E-07
     pb209  .25E-13  1.46E-13  1.69E-13  1.94E-13  2.21E-13  2.22E-13
     pb210  1.14E-07  1.36E-07  1.59E-07  1.84E-07  2.11E-07  2.11E-07
```

pb211	4.05E-13	4.43E-13	4.81E-13	5.19E-13	5.56E-13	5.56E-13
pb212	1.33E-12	1.44E-12	1.54E-12	1.65E-12	1.76E-12	1.76E-12
pb214	3.12E-13	3.77E-13	4.36E-13	4.98E-13	5.65E-13	5.68E-13
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.33E-08	2.96E-08	3.70E-08	4.53E-08	5.52E-08	5.52E-08
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	7.04E-11	8.37E-11	9.81E-11	1.14E-10	1.30E-10	1.30E-10
bi211	2.42E-14	2.63E-14	2.85E-14	3.07E-14	3.30E-14	3.32E-14
bi212	1.26E-13	1.36E-13	1.47E-13	1.57E-13	1.67E-13	1.67E-13
bi213	2.83E-14	3.41E-14	3.95E-14	4.54E-14	5.16E-14	5.00E-14
bi214	2.36E-13	2.80E-13	3.23E-13	3.70E-13	4.19E-13	4.12E-13
po210	1.94E-09	2.31E-09	2.71E-09	3.14E-09	3.59E-09	3.59E-09
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.68E-19	2.90E-19	3.15E-19	3.40E-19	3.66E-19	3.67E-19
po212	6.64E-24	7.17E-24	7.70E-24	8.23E-24	8.76E-24	8.76E-24
po213	4.25E-23	5.13E-23	5.95E-23	6.82E-23	7.75E-23	7.52E-23
po214	2.25E-20	3.85E-20	4.49E-20	5.09E-20	5.77E-20	5.67E-20
po215	3.33E-19	3.64E-19	3.95E-19	4.26E-19	4.57E-19	4.57E-19
po216	5.04E-18	5.44E-18	5.85E-18	6.25E-18	6.65E-18	6.65E-18
po218	3.73E-14	4.36E-14	5.04E-14	5.76E-14	6.53E-14	6.54E-14
rn218	1.91E-29	2.05E-29	2.20E-29	2.35E-29	2.50E-29	2.50E-29
rn219	7.41E-16	8.10E-16	8.79E-16	9.48E-16	1.02E-15	1.02E-15
rn220	1.93E-15	2.09E-15	2.24E-15	2.40E-15	2.55E-15	2.55E-15
rn222	6.62E-11	7.74E-11	8.95E-11	1.02E-10	1.16E-10	1.16E-10
ra222	2.07E-26	2.22E-26	2.39E-26	2.55E-26	2.72E-26	2.71E-26
ra223	1.85E-10	2.02E-10	2.19E-10	2.37E-10	2.54E-10	2.54E-10
ra224	1.10E-11	1.19E-11	1.28E-11	1.36E-11	1.45E-11	1.43E-11
ra225	1.36E-11	1.60E-11	1.85E-11	2.12E-11	2.41E-11	2.41E-11
ra226	1.01E-05	1.18E-05	1.37E-05	1.54E-05	1.77E-05	1.77E-05
ra228	6.17E-13	6.70E-13	7.23E-13	7.75E-13	8.28E-13	8.28E-13
ac225	9.19E-12	1.08E-11	1.25E-11	1.43E-11	1.63E-11	1.63E-11
ac227	1.28E-07	1.40E-07	1.52E-07	1.64E-07	1.76E-07	1.76E-07
ac228	7.53E-17	8.17E-17	8.82E-17	9.46E-17	1.01E-16	1.01E-16
th226	1.01E-24	1.08E-24	1.16E-24	1.24E-24	1.33E-24	1.32E-24
th227	2.98E-10	3.26E-10	3.54E-10	3.82E-10	4.10E-10	4.10E-10
th228	2.10E-09	2.27E-09	2.43E-09	2.60E-09	2.77E-09	2.77E-09
th229	2.65E-06	3.10E-06	3.60E-06	4.12E-06	4.69E-06	4.69E-06
th230	7.66E-03	8.30E-03	8.93E-03	9.57E-03	1.02E-02	1.02E-02
th231	3.85E-09	3.85E-09	3.85E-09	3.85E-09	3.06E-09	3.05E-09
th232	1.55E-03	1.68E-03	1.81E-03	1.94E-03	2.07E-03	2.07E-03
th233	5.89E-16	1.34E-14	1.46E-14	1.78E-14	1.89E-14	4.62E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.16E-04	2.34E-04	2.52E-04	2.70E-04	2.88E-04	2.88E-04
pa232	3.57E-12	4.02E-12	4.32E-12	4.63E-12	4.94E-12	4.73E-12

1 sas2h: fer-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 38

power= 4.000E-03mw, burnup=5.8440E+02mwd, flux= 2.70E+08n/cm^2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge 118706. d	127838. d	136969. d	146100. d	146100. d	
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	9.76E-22	1.05E-21	1.13E-21	1.21E-21	1.28E-21	1.28E-21
u231	3.08E-18	3.36E-18	3.62E-18	3.88E-18	4.14E-18	4.08E-18
u232	7.51E-08	8.11E-08	8.70E-08	9.30E-08	9.90E-08	9.90E-08
u233	4.09E-03	4.42E-03	4.76E-03	5.10E-03	5.44E-03	5.44E-03
u234	9.08E+00	9.08E+00	9.08E+00	9.09E+00	9.09E+00	9.09E+00
u235	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.27E+02	7.27E+02

u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.10E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.08E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.55E-08	3.18E-07	3.18E-07	3.18E-07	3.18E-07	9.32E-09
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.68E-12	8.65E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12
np236m	1.96E-12	2.06E-12	2.06E-12	2.06E-12	2.05E-12	1.93E-12
np236	5.99E-08	6.47E-08	6.96E-08	7.45E-08	7.93E-08	7.93E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.52E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.51E-06
np239	4.54E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.51E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.98E-15	9.33E-15	9.33E-15	9.33E-15	9.32E-15	2.45E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.12E-09	1.12E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	2.21E-13	2.25E-13	2.29E-13	2.32E-13	2.35E-13	2.35E-13
pu238	2.14E-02	2.18E-02	2.21E-02	2.23E-02	2.25E-02	2.25E-02
pu239	1.49E+00	1.61E+00	1.74E+00	1.86E+00	1.98E+00	1.98E+00
pu240	2.19E-03	2.56E-03	2.96E-03	3.39E-03	3.85E-03	3.85E-03
pu241	7.88E-07	9.50E-07	1.08E-06	1.25E-06	1.43E-06	1.43E-06
pu242	1.15E-09	1.54E-09	2.01E-09	2.59E-09	3.27E-09	3.27E-09
pu243	1.92E-18	3.74E-18	4.24E-18	5.45E-18	4.89E-18	5.22E-18
pu244	7.71E-39	1.79E-38	3.87E-38	7.94E-38	1.55E-37	1.55E-37
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	8.09E-22	1.13E-21	1.41E-21	1.74E-21	2.10E-21	1.87E-21
am240	6.00E-19	5.19E-19	6.48E-19	7.96E-19	9.63E-19	9.37E-19
am241	3.25E-06	4.13E-06	5.16E-06	6.34E-06	7.67E-06	7.67E-06
am242m	4.63E-10	6.28E-10	8.31E-10	1.08E-09	1.37E-09	1.37E-09
am242	1.11E-13	1.52E-13	1.90E-13	2.34E-13	2.84E-13	2.42E-13
am243	9.56E-13	1.41E-12	2.01E-12	2.80E-12	3.81E-12	3.81E-12
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	6.49E-21	1.07E-20	1.53E-20	2.13E-20	2.90E-20	2.53E-20
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	6.93E-24	8.82E-24	1.10E-23	1.36E-23	1.65E-23	1.65E-23
cm242	2.40E-11	3.06E-11	3.83E-11	4.72E-11	5.73E-11	5.73E-11
cm243	5.99E-18	7.98E-18	1.04E-17	1.32E-17	1.63E-17	1.45E-17
cm244	7.88E-17	1.19E-16	1.74E-16	2.48E-16	3.43E-16	3.43E-16

1 ssa2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 39
power= 4.000E-03mw, burnup=5.8440E+02mwd, flux= 2.70E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 118706. d	127838. d	136969. d	146100. d	146100. d	
cm245	3.99E-21	4.57E-21	1.04E-20	1.59E-20	2.37E-20	2.37E-20
cm246	9.35E-25	1.48E-24	2.08E-24	4.75E-24	7.37E-24	7.37E-24
cm247	3.42E-30	7.07E-30	1.31E-29	2.35E-29	3.07E-29	3.07E-29
cm248	1.44E-34	3.07E-34	4.17E-34	1.18E-33	2.15E-33	2.15E-33
cm249	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08	2.70E-07

0 1q array has 20 entries.
0 2q array has 1 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 4q array has 1 entries.

```
0       54q array has     12 entries.
library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi  *
          *                                                                          *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prepas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                    fission product yields are from endf/b-v              *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
          *        see information above this box (if present) for later updates     *
          *                                                                          *
          ****************************************************************************
0         *                                                                          *
0         ****************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        489    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ****************************************************************************
1    sas2h: for-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 0% uo2                                    page   40
       power=    .00mw, burnup=    730.mwd, flux= 2.69E+08n/cm**2-sec
0                                                   basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      155232. d     164363. d     173494. d     182625. d     182625. d
     productions  1.140054E+06  1.140232E+06  1.140410E+06  1.140588E+06  1.140765E+06  1.140765E+06
     absorptions  9.312772E+05  9.315008E+05  9.317208E+05  9.319371E+05  9.321501E+05  9.321501E+05
     k infinity   1.224183E+00  1.224081E+00  1.223983E+00  1.223889E+00  1.223799E+00  1.223799E+00
0                   initial      155232. d     164363. d     173494. d     182625. d     182625. d
     actinide
     absorptions  9.256458E+05  9.257515E+05  9.258570E+05  9.259623E+05  9.260674E+05  9.260674E+05
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     non-actinide
     abs. fracs.   6.047010E-03   6.172001E-03   6.293535E-03   6.411195E-03   6.525517E-03   6.525457E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page  41
0                                   fraction of total absorption rate
        power=     .00mw, burnup=     730.mwd, flux= 2.69E+08n/cm**2-sec
0             initial 155232. d 164363. d 173494. d 182625. d 182625. d

     sm149     2.28E-03  2.39E-03  2.49E-03  2.59E-03  2.68E-03  2.68E-03
     eu151     6.21E-05  6.74E-05  7.27E-05  7.80E-05  8.34E-05  8.34E-05
     nd143     5.91E-05  6.28E-05  6.65E-05  7.02E-05  7.38E-05  7.38E-05
     gd155     3.55E-05  3.75E-05  3.95E-05  4.15E-05  4.34E-05  4.34E-05
     sm151     3.82E-05  3.86E-05  3.88E-05  3.90E-05  3.92E-05  3.92E-05
     rh103     2.75E-05  2.92E-05  3.09E-05  3.26E-05  3.44E-05  3.44E-05
     cd113     2.25E-05  2.37E-05  2.48E-05  2.60E-05  2.71E-05  2.71E-05
     gd157     2.11E-05  2.19E-05  2.27E-05  2.35E-05  2.42E-05  2.42E-05
     xe131     1.87E-05  1.98E-05  2.10E-05  2.21E-05  2.33E-05  2.33E-05
     cs133     1.45E-05  1.54E-05  1.63E-05  1.72E-05  1.81E-05  1.81E-05
     sm147     1.06E-05  1.13E-05  1.20E-05  1.26E-05  1.33E-05  1.33E-05
     tc 99     1.06E-05  1.13E-05  1.20E-05  1.26E-05  1.33E-05  1.33E-05
     nd145     8.27E-06  8.78E-06  9.30E-06  9.81E-06  1.03E-05  1.03E-05
     mo 95     5.72E-06  6.08E-06  6.43E-06  6.79E-06  7.15E-06  7.15E-06
     sm152     4.49E-06  4.78E-06  5.06E-06  5.35E-06  5.64E-06  5.64E-06
     kr 83     3.59E-06  3.82E-06  4.06E-06  4.26E-06  4.48E-06  4.48E-06
     cs135     3.27E-06  3.47E-06  3.67E-06  3.87E-06  4.08E-06  4.08E-06
     ru101     2.53E-06  2.68E-06  2.84E-06  3.00E-06  3.16E-06  3.16E-06
     pr141     2.44E-06  2.60E-06  2.75E-06  2.90E-06  3.05E-06  3.05E-06
     eu153     2.22E-06  2.36E-06  2.50E-06  2.64E-06  2.78E-06  2.78E-06
     la139     2.00E-06  2.12E-06  2.25E-06  2.37E-06  2.50E-06  2.50E-06
     xe135     2.28E-06  2.32E-06  2.32E-06  2.32E-06  2.32E-06  2.29E-06
     sm150     1.04E-06  1.16E-06  1.29E-06  1.42E-06  1.56E-06  1.56E-06
     ba137     8.54E-07  9.13E-07  9.73E-07  1.03E-06  1.09E-06  1.09E-06
     pd105     8.51E-07  9.05E-07  9.58E-07  1.01E-06  1.07E-06  1.07E-06
     zr 93     8.07E-07  8.58E-07  9.08E-07  9.58E-07  1.01E-06  1.01E-06
      i129     6.22E-07  6.61E-07  7.00E-07  7.39E-07  7.78E-07  7.78E-07
     nd144     6.80E-07  6.37E-07  6.74E-07  7.12E-07  7.49E-07  7.49E-07
     mo 97     4.53E-07  4.81E-07  5.09E-07  5.38E-07  5.66E-07  5.66E-07
     ag109     3.53E-07  3.77E-07  4.02E-07  4.27E-07  4.52E-07  4.52E-07
     pm147     2.70E-07  2.70E-07  2.70E-07  2.70E-07  2.70E-07  2.70E-07
     zr 91     2.13E-07  2.27E-07  2.40E-07  2.53E-07  2.66E-07  2.66E-07
      y 89     2.05E-07  2.18E-07  2.30E-07  2.43E-07  2.56E-07  2.56E-07
     ru102     1.85E-07  1.96E-07  2.08E-07  2.19E-07  2.31E-07  2.31E-07
     ce142     1.67E-07  1.77E-07  1.87E-07  1.98E-07  2.08E-07  2.08E-07
     nd148     1.60E-07  1.70E-07  1.80E-07  1.90E-07  2.00E-07  2.00E-07
     nd146     1.54E-07  1.43E-07  1.51E-07  1.59E-07  1.68E-07  1.68E-07
     eu155     1.61E-07  1.61E-07  1.61E-07  1.61E-07  1.61E-07  1.61E-07
     pd108     1.14E-07  1.22E-07  1.30E-07  1.37E-07  1.45E-07  1.45E-07
     ba138     1.15E-07  1.22E-07  1.29E-07  1.36E-07  1.43E-07  1.43E-07
     in115     1.11E-07  1.18E-07  1.25E-07  1.32E-07  1.38E-07  1.38E-07
     ce140     1.07E-07  1.14E-07  1.21E-07  1.28E-07  1.34E-07  1.34E-07
     xe132     9.62E-08  1.02E-07  1.08E-07  1.14E-07  1.20E-07  1.20E-07
     pd107     6.68E-08  7.12E-08  7.56E-08  8.00E-08  8.44E-08  8.44E-08
     mo 98     6.62E-08  7.03E-08  7.44E-08  7.86E-08  8.27E-08  8.27E-08
     mo100     6.41E-08  6.81E-08  7.21E-08  7.61E-08  8.01E-08  8.01E-08
     xe134     6.34E-08  6.73E-08  7.13E-08  7.52E-08  7.91E-08  7.91E-08
     zr 92     5.14E-08  5.46E-08  5.78E-08  6.10E-08  6.42E-08  6.42E-08
      i127     4.18E-08  4.45E-08  4.71E-08  4.97E-08  5.23E-08  5.23E-08
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page  42
0                                   fraction of total absorption rate
        power=     .00mw, burnup=     730.mwd, flux= 2.69E+08n/cm**2-sec
0             initial 155232. d 164363. d 173494. d 182625. d 182625. d
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zr 96	4.02E-08	4.27E-08	4.52E-08	4.77E-08	5.02E-08	5.02E-08
ru104	3.96E-08	4.21E-08	4.46E-08	4.71E-08	4.96E-08	4.96E-08
nd150	3.54E-08	3.76E-08	3.98E-08	4.20E-08	4.42E-08	4.42E-08
xe136	3.43E-08	3.64E-08	3.85E-08	4.07E-08	4.28E-08	4.28E-08
br 81	2.36E-08	2.72E-08	2.88E-08	3.04E-08	3.20E-08	3.20E-08
rb 85	2.48E-08	2.64E-08	2.80E-08	2.95E-08	3.11E-08	3.11E-08
zr 94	2.17E-08	2.30E-08	2.44E-08	2.57E-08	2.71E-08	2.71E-08
zr 90	1.81E-08	1.96E-08	2.07E-08	2.19E-08	2.32E-08	2.32E-08
cd111	1.72E-08	1.83E-08	1.94E-08	2.05E-08	2.16E-08	2.16E-08
eu152	1.82E-08	1.68E-08	1.80E-08	1.94E-08	2.08E-08	2.08E-08
te130	1.36E-08	1.46E-08	1.75E-08	1.85E-08	1.95E-08	1.95E-08
gd152	1.10E-08	1.29E-08	1.48E-08	1.70E-08	1.92E-08	1.92E-08
sm154	1.32E-08	1.61E-08	1.71E-08	1.80E-08	1.90E-08	1.90E-08
rb 87	1.45E-08	1.54E-08	1.63E-08	1.72E-08	1.81E-08	1.81E-08
sr 90	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08
se 77	1.03E-08	1.10E-08	1.16E-08	1.23E-08	1.29E-08	1.29E-08
pd106	7.43E-09	7.90E-09	8.38E-09	8.85E-09	9.33E-09	9.33E-09
rh105	8.47E-09	8.52E-09	8.53E-09	8.54E-09	8.55E-09	8.52E-09
kr 84	6.82E-09	7.24E-09	7.66E-09	8.09E-09	8.51E-09	8.51E-09
se 79	5.29E-09	5.62E-09	5.95E-09	6.28E-09	6.61E-09	6.61E-09
sb121	5.03E-09	5.34E-09	5.66E-09	5.97E-09	6.29E-09	6.29E-09
sb123	4.09E-09	4.34E-09	4.60E-09	4.86E-09	5.11E-09	5.11E-09
kr 86	3.82E-09	4.06E-09	4.29E-09	4.53E-09	4.77E-09	4.77E-09
gd156	3.25E-09	3.50E-09	3.75E-09	4.00E-09	4.26E-09	4.26E-09
te128	3.41E-09	3.62E-09	3.83E-09	4.05E-09	4.26E-09	4.26E-09
cs137	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09
se 80	2.47E-09	2.62E-09	2.77E-09	2.93E-09	3.08E-09	3.08E-09
dy161	2.35E-09	2.51E-09	2.67E-09	2.84E-09	3.00E-09	3.00E-09
te125	2.14E-09	2.28E-09	2.41E-09	2.55E-09	2.69E-09	2.69E-09
pr143	2.46E-09	2.46E-09	2.46E-09	2.46E-09	2.46E-09	2.46E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.01E-09
tb159	1.51E-09	1.61E-09	1.70E-09	1.80E-09	1.90E-09	1.90E-09
ru 99	1.16E-09	1.30E-09	1.45E-09	1.62E-09	1.79E-09	1.79E-09
cd112	1.42E-09	1.51E-09	1.60E-09	1.69E-09	1.78E-09	1.78E-09
li 6	1.40E-09	1.49E-09	1.57E-09	1.66E-09	1.75E-09	1.75E-09
ce141	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09
sn117	1.12E-09	1.19E-09	1.26E-09	1.33E-09	1.40E-09	1.40E-09
eu154	1.11E-09	1.18E-09	1.25E-09	1.32E-09	1.39E-09	1.39E-09
sn119	9.17E-10	9.74E-10	1.03E-09	1.09E-09	1.15E-09	1.15E-09
gd158	7.00E-10	8.46E-10	9.13E-10	9.81E-10	1.05E-09	1.05E-09
sn115	8.40E-10	8.92E-10	9.45E-10	9.97E-10	1.05E-09	1.05E-09
pm149	9.69E-10	9.76E-10	9.76E-10	9.76E-10	9.76E-10	9.70E-10
nd147	9.23E-10	9.27E-10	9.27E-10	9.26E-10	9.26E-10	9.23E-10
gd154	5.74E-10	6.50E-10	7.30E-10	8.15E-10	9.04E-10	9.04E-10
sr 88	7.02E-10	7.45E-10	7.89E-10	8.32E-10	8.76E-10	8.76E-10
cd114	5.61E-10	6.01E-10	6.41E-10	6.82E-10	7.23E-10	7.23E-10
pd110	5.19E-10	5.53E-10	5.87E-10	6.21E-10	6.55E-10	6.55E-10
ce144	6.00E-10	6.00E-10	6.00E-10	6.00E-10	5.99E-10	5.99E-10
se 82	4.77E-10	5.06E-10	5.36E-10	5.65E-10	5.95E-10	5.95E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 43
6 fraction of total absorption rate
6 powers .00mw, burnups 730.mwd, flux= 2.69E+08n/cm**2-sec
6 initial 155232. d 164363. d 173494. d 182625. d 182625. d

kr 85	5.73E-10	5.72E-10	5.72E-10	5.72E-10	5.72E-10	5.72E-10
sn126	3.87E-10	4.11E-10	4.35E-10	4.60E-10	4.84E-10	4.84E-10
se 78	3.61E-10	3.84E-10	4.06E-10	4.29E-10	4.51E-10	4.51E-10
dy162	3.31E-10	3.55E-10	3.80E-10	4.04E-10	4.30E-10	4.30E-10
dy164	3.21E-10	3.46E-10	3.71E-10	3.96E-10	4.22E-10	4.22E-10

sn124	2.90E-10	3.09E-10	3.27E-10	3.43E-10	3.63E-10	3.63E-10
ru103	3.58E-10	3.59E-10	3.59E-10	3.59E-10	3.59E-10	3.59E-10
ru100	1.97E-10	2.22E-10	2.48E-10	2.76E-10	3.05E-10	3.05E-10
se 75	2.15E-10	2.28E-10	2.42E-10	2.55E-10	2.69E-10	2.69E-10
nd142	1.33E-10	1.52E-10	1.70E-10	1.90E-10	2.10E-10	2.10E-10
ba134	1.29E-10	1.46E-10	1.63E-10	1.82E-10	2.02E-10	2.02E-10
in113	1.54E-10	1.64E-10	1.74E-10	1.84E-10	1.94E-10	1.94E-10
sm148	1.22E-10	1.38E-10	1.54E-10	1.71E-10	1.89E-10	1.89E-10
ba135	1.06E-10	1.19E-10	1.33E-10	1.49E-10	1.65E-10	1.65E-10
zr 95	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
ba136	1.26E-10	1.34E-10	1.43E-10	1.52E-10	1.61E-10	1.61E-10
nb 95	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10
sn118	1.18E-10	1.26E-10	1.33E-10	1.41E-10	1.48E-10	1.48E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
pd104	8.82E-11	9.95E-11	1.22E-10	1.24E-10	1.38E-10	1.38E-10
xe134	1.08E-10	1.18E-10	1.22E-10	1.28E-10	1.35E-10	1.35E-10
sn122	1.01E-10	1.07E-10	1.13E-10	1.20E-10	1.26E-10	1.26E-10
cd116	1.01E-10	1.07E-10	1.13E-10	1.19E-10	1.26E-10	1.26E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.07E-10
dy163	7.57E-11	8.13E-11	8.71E-11	9.29E-11	9.89E-11	9.89E-11
kr 82	7.52E-11	8.07E-11	8.62E-11	9.18E-11	9.77E-11	9.77E-11
sn120	7.52E-11	7.99E-11	8.46E-11	8.93E-11	9.40E-11	9.40E-11
mo 96	5.63E-11	6.18E-11	6.74E-11	7.33E-11	7.94E-11	7.94E-11
ge 73	5.89E-11	6.25E-11	6.62E-11	6.99E-11	7.36E-11	7.36E-11
xe130	5.29E-11	5.71E-11	6.15E-11	6.59E-11	7.05E-11	7.05E-11
ba140	4.71E-11	4.73E-11	4.72E-11	4.72E-11	4.72E-11	4.70E-11
sm153	3.75E-11	3.85E-11	3.85E-11	3.86E-11	3.86E-11	3.77E-11
eu156	3.53E-11	3.54E-11	3.55E-11	3.56E-11	3.56E-11	3.56E-11
sr 89	3.06E-11	3.07E-11	3.06E-11	3.06E-11	3.06E-11	3.06E-11
ge 76	2.13E-11	2.26E-11	2.40E-11	2.53E-11	2.66E-11	2.66E-11
ru106	2.62E-11	2.63E-11	2.63E-11	2.64E-11	2.65E-11	2.65E-11
nb 93	1.52E-11	1.73E-11	1.95E-11	2.19E-11	2.44E-11	2.44E-11
cd110	1.26E-11	1.42E-11	1.60E-11	1.79E-11	1.99E-11	1.99E-11
gd160	1.42E-11	1.52E-11	1.61E-11	1.71E-11	1.80E-11	1.80E-11
te126	1.33E-11	1.43E-11	1.54E-11	1.64E-11	1.75E-11	1.75E-11
ce143	1.49E-11	1.75E-11	1.75E-11	1.74E-11	1.74E-11	1.69E-11
y 90	1.63E-11	1.63E-11	1.63E-11	1.63E-11	1.63E-11	1.63E-11
la140	1.53E-11	1.53E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
sb125	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11
br 79	8.61E-12	9.72E-12	1.09E-11	1.21E-11	1.34E-11	1.34E-11
mo 99	1.28E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.29E-11
pm148m	9.51E-12	9.52E-12	9.52E-12	9.52E-12	9.52E-12	9.51E-12
kr 87	7.83E-12	2.29E-11	2.29E-11	2.29E-11	2.29E-11	9.13E-12
xe129	4.88E-12	5.51E-12	6.18E-12	6.88E-12	7.62E-12	7.62E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 44
0 fraction of total absorption rate
0 powers= .00mw burnup= 730.mwd/t flux= 2.69E+08n/cm**2-sec
initial 155232. d 164363. d 173494. d 182625. d 182625. d

te127m	7.54E-12	7.54E-12	7.53E-12	7.53E-12	7.56E-12	7.56E-12
ag107	4.71E-12	5.32E-12	5.98E-12	6.67E-12	7.40E-12	7.40E-12
ho165	5.27E-12	5.67E-12	6.08E-12	6.49E-12	6.91E-12	6.91E-12
i131	6.73E-12	6.76E-12	6.76E-12	6.76E-12	6.76E-12	6.75E-12
te124	2.61E-12	2.78E-12	2.96E-12	3.13E-12	3.30E-12	3.30E-12
sr 87	2.46E-12	2.62E-12	2.77E-12	2.93E-12	3.08E-12	3.08E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
nb 94	1.39E-12	1.48E-12	1.57E-12	1.66E-12	1.74E-12	1.74E-12
ge 74	1.19E-12	1.26E-12	1.34E-12	1.41E-12	1.49E-12	1.49E-12
sr 86	9.88E-13	1.00E-12	1.08E-12	1.15E-12	1.23E-12	1.23E-12
dy160	7.18E-13	8.06E-13	8.96E-13	9.93E-13	1.10E-12	1.10E-12

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     ge 72      8.03E-13  8.53E-13  9.04E-13  9.54E-13  1.00E-12  1.00E-12
     xe128      5.84E-13  6.32E-13  7.23E-13  7.98E-13  8.77E-13  8.77E-13
     se 76      5.19E-13  5.56E-13  5.92E-13  6.29E-13  6.67E-13  6.67E-13
     pm148      3.63E-13  3.87E-13  3.66E-13  3.46E-13  3.46E-13  3.43E-13
     ag111      3.35E-13  3.38E-13  3.39E-13  3.40E-13  3.42E-13  3.40E-13
     eu157      2.86E-13  3.11E-13  3.12E-13  3.13E-13  3.14E-13  3.03E-13
     sn116      1.87E-13  2.11E-13  2.36E-13  2.63E-13  2.91E-13  2.81E-13
     er166      1.86E-13  2.03E-13  2.20E-13  2.37E-13  2.56E-13  2.56E-13
     cd115m     2.39E-13  2.39E-13  2.39E-13  2.39E-13  2.39E-13  2.39E-13
     te122      8.15E-14  9.16E-14  1.02E-13  1.14E-13  1.26E-13  1.26E-13
     cs136      6.61E-14  6.70E-14  6.77E-14  6.84E-14  6.90E-14  6.88E-14
     kr 80      3.54E-14  3.78E-14  4.01E-14  4.25E-14  4.50E-14  4.50E-14
     sn125      2.91E-14  2.93E-14  2.93E-14  2.94E-14  2.94E-14  2.92E-14
     ru105      2.27E-14  3.00E-14  3.01E-14  3.01E-14  3.01E-14  2.38E-14
     sn123      1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te132      9.40E-15  9.54E-15  9.56E-15  9.56E-15  9.56E-15  9.42E-15
     rb 88      8.66E-15  1.29E-14  1.29E-14  1.29E-14  1.29E-14  9.26E-15
      i135      8.24E-15  1.02E-14  1.02E-14  1.01E-14  1.01E-14  8.48E-15
     tb160      4.52E-15  4.79E-15  5.06E-15  5.34E-15  5.61E-15  5.61E-15
     sb126      3.69E-15  3.74E-15  3.79E-15  3.83E-15  3.87E-15  3.86E-15
     te123      3.84E-15  3.05E-15  3.27E-15  3.50E-15  3.73E-15  3.73E-15
     he  9      2.65E-15  2.82E-15  2.98E-15  3.15E-15  3.31E-15  3.31E-15
     pr142      2.58E-15  2.94E-15  3.11E-15  3.28E-15  3.46E-15  3.25E-15
     er167      1.71E-15  1.91E-15  2.13E-15  2.36E-15  2.60E-15  2.60E-15
     sb124      2.31E-15  2.32E-15  2.33E-15  2.35E-15  2.36E-15  2.36E-15
     in117m     1.86E-15  2.14E-15  2.14E-15  2.14E-15  2.14E-15  1.93E-15
     li  7      1.08E-15  1.15E-15  1.22E-15  1.28E-15  1.35E-15  1.35E-15
      i130      1.10E-15  1.24E-15  1.29E-15  1.32E-15  1.35E-15  1.23E-15
     te134      8.02E-16  5.05E-15  5.05E-15  5.05E-15  5.05E-15  1.07E-15
     in117      5.34E-16  6.29E-16  6.30E-16  6.31E-16  6.31E-16  5.74E-16
     rb 86      4.03E-16  4.35E-16  4.25E-16  4.35E-16  4.45E-16  4.44E-16
     dy165      1.80E-16  2.25E-16  2.51E-16  2.46E-16  2.65E-16  2.13E-16
     cd108      5.51E-17  6.15E-17  6.86E-17  7.58E-17  8.36E-17  8.36E-17
     sn114      4.22E-17  4.79E-17  5.39E-17  6.03E-17  6.71E-17  6.71E-17
     ge 73      3.28E-17  8.66E-17  8.66E-17  8.66E-17  8.65E-17  3.78E-17
     cd118      2.35E-17  1.22E-16  1.22E-16  1.22E-16  1.22E-16  2.98E-17
     cs134m     1.26E-17  2.15E-17  2.28E-17  2.41E-17  2.53E-17  1.69E-17
     cd189      5.78E-19  9.22E-19  9.65E-19  1.01E-18  1.05E-18  1.05E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   45
0                                   fraction of total absorption rate
        power=      .00mw, burnup=     730.mwd, flux= 2.69E+08n/cm**2-sec
0             initial 155232. d 164363. d 173494. d 182625. d 182625. d

     in119m     3.60E-19  3.04E-17  3.04E-17  3.04E-17  3.04E-17  6.96E-19
     in119      .00E+00   2.39E-18  2.39E-18  2.39E-18  2.39E-18  3.36E-21
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page   46
       power= 4.000E-03mw, burnup=7.3050E+02mwd, flux= 2.69E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
             charge 155232. d 164363. d 173494. d 182625. d 182625. d
      h  1   3.45E-05  3.66E-05  3.88E-05  4.09E-05  4.30E-05  4.30E-05
      h  2   1.02E-07  1.09E-07  1.15E-07  1.21E-07  1.28E-07  1.28E-07
      h  3   3.40E-11  3.41E-11  3.42E-11  3.43E-11  3.43E-11  3.43E-11
      h  4    .00E+00  1.39E-34  1.39E-34  1.39E-34  1.39E-34   .00E+00
     he  3   7.16E-10  7.63E-10  8.09E-10  8.55E-10  9.02E-10  9.02E-10
     he  4   5.70E-06  6.05E-06  6.41E-06  6.76E-06  7.11E-06  7.11E-06
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   6.85E-07  7.27E-07  7.70E-07  8.12E-07  8.54E-07  8.54E-07
     ne 21   8.69E-12  9.74E-12  1.08E-11  1.20E-11  1.32E-11  1.32E-11
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ne 22	4.42E-09	4.70E-09	4.97E-09	5.25E-09	5.53E-09	5.53E-09
ne 23	7.05E-30	7.06E-15	7.06E-15	7.06E-15	7.06E-15	7.06E-30
na 22	4.15E-11	4.15E-11	4.15E-11	4.15E-11	4.15E-11	4.15E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.52E-08	2.75E-08	2.75E-08	2.75E-08	2.75E-08	2.54E-08
na 24m	4.55E-30	4.52E-15	4.52E-15	4.52E-15	4.52E-15	4.52E-30
na 25	4.63E-41	5.06E-26	5.51E-26	5.98E-26	6.46E-26	6.46E-41
mg 24	5.12E-03	5.40E-03	5.69E-03	5.97E-03	6.26E-03	6.26E-03
mg 25	1.62E-09	1.77E-09	1.93E-09	2.09E-09	2.26E-09	2.26E-09
mg 26	1.02E-07	1.09E-07	1.15E-07	1.21E-07	1.28E-07	1.28E-07
mg 27	3.33E-14	2.11E-12	2.11E-12	2.11E-12	2.11E-12	1.16E-15
mg 28	4.02E-24	4.30E-24	4.30E-24	4.30E-24	4.30E-24	4.06E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.31E-25	2.04E-10	2.04E-10	2.04E-10	2.04E-10	3.74E-24
al 29	6.92E-30	2.33E-24	2.59E-24	2.87E-24	3.16E-24	6.39E-29
al 30	.00E+00	1.89E-35	2.23E-35	2.60E-35	3.02E-35	.00E+00
si 28	1.49E-02	1.57E-02	1.65E-02	1.74E-02	1.82E-02	1.82E-02
si 29	6.10E-09	9.09E-09	1.01E-08	1.12E-08	1.24E-08	1.24E-08
si 30	4.63E-15	5.52E-15	6.51E-15	7.62E-15	8.84E-15	8.84E-15
si 31	1.96E-27	3.96E-27	4.67E-27	5.44E-27	6.34E-27	4.04E-27
si 32	1.79E-33	2.24E-33	2.75E-33	3.34E-33	4.02E-33	4.02E-33
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.70E+08	2.69E+08	2.69E+08	2.69E+08	2.69E-07

0
1 ass2h: far-field crit based on h2u 19x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 47
power= 4.000E-03mw, burnup=7.3050E+02mwd, flux= 2.69E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 153232. d	164363. d	173494. d	182625. d	182625. d	d
he 4	8.40E-02	9.13E-02	9.86E-02	1.06E-01	1.14E-01	1.14E-01
pb206	8.32E-07	1.01E-06	1.21E-06	1.43E-06	1.68E-06	1.68E-06
pb207	1.04E-06	1.19E-06	1.34E-06	1.51E-06	1.68E-06	1.68E-06
pb208	2.01E-07	2.27E-07	2.54E-07	2.83E-07	3.13E-07	3.13E-07
pb209	2.22E-13	2.49E-13	2.79E-13	3.11E-13	3.46E-13	3.46E-13
pb210	2.11E-07	2.40E-07	2.70E-07	3.02E-07	3.36E-07	3.36E-07
pb211	5.54E-13	5.94E-13	6.32E-13	6.70E-13	7.07E-13	7.07E-13
pb212	1.76E-12	1.86E-12	1.97E-12	2.08E-12	2.18E-12	2.18E-12
pb214	5.48E-13	6.35E-13	7.30E-13	7.88E-13	8.70E-13	8.43E-13
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.52E-08	6.41E-08	7.44E-08	9.22E-08	1.07E-07	1.07E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.30E-10	1.48E-10	1.46E-10	1.06E-10	2.07E-10	2.07E-10
bi211	3.32E-14	3.62E-14	3.75E-14	3.97E-14	4.19E-14	4.23E-14
bi212	1.67E-13	1.77E-13	1.87E-13	1.97E-13	2.07E-13	2.07E-13
bi213	5.80E-14	6.82E-14	6.52E-14	7.25E-14	8.03E-14	7.80E-14
bi214	4.12E-13	4.72E-13	5.27E-13	5.85E-13	6.46E-13	6.18E-13
po210	3.59E-09	4.08E-09	4.60E-09	5.14E-09	5.72E-09	5.72E-09
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.47E-19	3.89E-19	4.14E-19	4.39E-19	4.63E-19	4.67E-19
po212	8.76E-24	9.79E-24	9.82E-24	1.04E-23	1.09E-23	1.09E-23
po213	7.32E-23	8.74E-23	9.79E-23	1.09E-22	1.21E-22	1.17E-22
po214	5.67E-20	6.49E-20	7.25E-20	8.05E-20	8.89E-20	8.77E-20
po215	4.37E-19	4.88E-19	5.19E-19	5.50E-19	5.81E-19	5.91E-19
po216	6.05E-18	7.06E-18	7.46E-18	7.86E-18	8.27E-18	8.27E-18
po218	6.54E-14	7.35E-14	8.21E-14	9.12E-14	1.01E-13	1.01E-13
rn218	2.30E-29	2.65E-29	2.80E-29	2.95E-29	3.10E-29	3.11E-29
rn219	1.02E-15	1.09E-15	1.16E-15	1.22E-15	1.29E-15	1.29E-15
rn220	2.55E-15	2.71E-15	2.86E-15	3.02E-15	3.17E-15	3.17E-15
rn222	1.16E-10	1.31E-10	1.46E-10	1.62E-10	1.79E-10	1.79E-10
ra222	2.71E-26	2.88E-26	3.04E-26	3.21E-26	3.37E-26	3.37E-26

ra223	2.54E-10	2.71E-10	2.88E-10	3.05E-10	3.23E-10	3.23E-10
ra224	1.45E-11	1.54E-11	1.63E-11	1.71E-11	1.80E-11	1.80E-11
ra225	2.41E-11	2.72E-11	3.05E-11	3.39E-11	3.76E-11	3.76E-11
ra226	1.77E-05	2.00E-05	2.23E-05	2.48E-05	2.73E-05	2.73E-05
ra228	8.28E-13	8.81E-13	9.34E-13	9.87E-13	1.04E-12	1.04E-12
ac225	1.43E-11	1.84E-11	2.06E-11	2.29E-11	2.54E-11	2.54E-11
ac227	1.76E-07	1.88E-07	2.00E-07	2.12E-07	2.24E-07	2.24E-07
ac228	1.01E-16	1.08E-16	1.14E-16	1.20E-16	1.27E-16	1.27E-16
th226	1.32E-24	1.40E-24	1.48E-24	1.56E-24	1.64E-24	1.64E-24
th227	4.10E-10	4.37E-10	4.65E-10	4.93E-10	5.21E-10	5.21E-10
th228	2.77E-09	2.94E-09	3.11E-09	3.27E-09	3.44E-09	3.44E-09
th229	4.69E-06	5.29E-06	5.92E-06	6.60E-06	7.30E-06	7.30E-06
th230	1.02E-02	1.09E-02	1.15E-02	1.21E-02	1.28E-02	1.28E-02
th231	3.05E-09	3.06E-09	3.06E-09	3.06E-09	3.06E-09	3.06E-09
th232	2.07E-03	2.20E-03	2.33E-03	2.46E-03	2.59E-03	2.59E-03
th233	4.62E-16	2.01E-14	2.13E-14	2.25E-14	2.37E-14	9.01E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.88E-04	3.06E-04	3.24E-04	3.42E-04	3.60E-04	3.60E-04
pa232	4.73E-12	5.25E-12	5.56E-12	5.87E-12	6.18E-12	5.95E-12

1 sas2h: for-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 48
power= 4.000E-03mw, burnup=7.3050E+02mwd, flux= 2.69E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 155232. d	164363. d	173494. d	182625. d	182625. d	
pa233	1.46E-06	1.46E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.28E-21	1.36E-21	1.44E-21	1.52E-21	1.59E-21	1.59E-21
u231	4.08E-18	4.39E-18	4.65E-18	4.90E-18	5.16E-18	5.10E-18
u232	9.90E-08	1.05E-07	1.11E-07	1.17E-07	1.23E-07	1.23E-07
u233	5.44E-03	5.78E-03	6.12E-03	6.46E-03	6.80E-03	6.80E-03
u234	9.09E+00	9.09E+00	9.10E+00	9.10E+00	9.10E+00	9.10E+00
u235	7.27E+02	7.27E+02	7.27E+02	7.27E+02	7.27E+02	7.27E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.08E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.08E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	9.32E-09	5.18E-07	5.18E-07	5.18E-07	5.18E-07	1.54E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.64E-12	8.64E-12	8.64E-12	8.63E-12	8.63E-12	8.63E-12
np236m	1.93E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.95E-12
np236	7.93E-08	8.42E-08	8.91E-08	9.39E-08	9.88E-08	9.88E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.51E-06
np239	4.51E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.52E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.45E-15	9.32E-15	9.32E-15	9.31E-15	9.31E-15	2.06E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	2.35E-13	2.38E-13	2.40E-13	2.42E-13	2.44E-13	2.44E-13
pu238	2.25E-02	2.27E-02	2.28E-02	2.29E-02	2.30E-02	2.30E-02
pu239	1.98E+00	2.10E+00	2.22E+00	2.34E+00	2.46E+00	2.46E+00
pu240	3.85E-03	4.33E-03	4.84E-03	5.38E-03	5.95E-03	5.85E-03
pu241	1.43E-06	1.82E-06	1.82E-06	2.03E-06	2.25E-06	2.25E-06
pu242	3.27E-09	4.08E-09	5.02E-09	6.11E-09	7.36E-09	7.36E-09
pu243	5.22E-18	8.59E-18	1.06E-17	1.29E-17	1.55E-17	1.22E-17
pu244	1.35E-37	2.90E-37	5.23E-37	9.12E-37	1.24E-36	1.44E-36
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.87E-21  2.51E-21  2.97E-21  3.48E-21  4.03E-21  3.65E-21
     am240   9.37E-19  1.15E-18  1.36E-18  1.59E-18  1.83E-18  1.80E-18
     am241   7.67E-06  9.17E-06  1.08E-05  1.27E-05  1.47E-05  1.47E-05
     am242m  1.37E-09  1.71E-09  2.10E-09  2.55E-09  3.07E-09  3.07E-09
     am242   2.62E-13  3.40E-13  4.03E-13  4.73E-13  5.50E-13  5.14E-13
     am243   3.81E-12  5.08E-12  6.66E-12  8.58E-12  1.09E-11  1.09E-11
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   2.53E-20  3.86E-20  5.06E-20  6.52E-20  8.28E-20  7.37E-20
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.65E-23  1.98E-23  2.34E-23  2.73E-23  3.20E-23  3.19E-23
     cm242   5.73E-11  6.87E-11  8.14E-11  9.55E-11  1.11E-10  1.11E-10
     cm243   1.65E-17  2.02E-17  2.45E-17  2.94E-17  3.48E-17  3.48E-17
     cm244   3.43E-16  4.45E-16  6.17E-16  8.06E-16  1.04E-15  1.04E-15
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   49
       power= 4.000E-03mw, burnup=7.3050E+02mwd, flux= 2.69E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge 155232. d 164363. d 173494. d 182625. d 182625. d
     cm245   2.37E-20  3.43E-20  4.84E-20  6.71E-20  9.12E-20  9.12E-20
     cm246   1.57E-24  1.17E-23  1.76E-23  2.58E-23  3.70E-23  3.70E-23
     cm247   3.97E-29  6.53E-29  1.04E-28  1.42E-28  2.46E-28  2.46E-28
     cm248   2.15E-33  3.77E-33  6.40E-33  1.05E-32  1.69E-32  1.69E-32
     cm249    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.70E+08  2.69E+08  2.69E+08  2.69E+08  2.69E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

         cross-section data taken from position number  6 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ****************************************************************************
         *                                                                          *
         *            prelim lwr origen-s binary working library--id = 1143         *
         *          made from modified card-image origen-s libraries of scale 4.2   *
         *      data from the light element, actinide, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi  *
```

```
         *                                                                      *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "prepaz" case updating all nuclides on the scale "burnup" library *
         *                                                                      *
         *                  fission product yields are from endf/b-v            *
         *                                                                      *
         *            photon libraries use an 18-energy-group structure         *
         *           the photon data are from the master photon data base,      *
         *            produced to include bremsstrahlung from uo2 matrix        *
         *                                                                      *
         *       see information above this box (if present) for later updates  *
         *                                                                      *
         ************************************************************************
         *                                                                      *
0        ************************************************************************
0                 .other identification and sizes of library.
0                   data set name:  ft33f001
0               8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   50
       power=    .00mw, burnup=    877.mwd, flux= 2.69E+08n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      191757. d      200888. d      210019. d      219150. d      219150. d
     productions   1.141551E+06  1.141728E+06  1.141904E+06  1.142080E+06  1.142256E+06  1.142256E+06
     absorptions   9.329141E+05  9.331241E+05  9.333314E+05  9.335349E+05  9.337341E+05  9.337341E+05
     k infinity    1.223640E+00  1.223554E+00  1.223472E+00  1.223393E+00  1.223318E+00  1.223318E+00
0                   initial      191757. d      200888. d      210019. d      219150. d      219150. d
     actinide
     absorptions   9.268260E+05  9.269309E+05  9.270358E+05  9.271403E+05  9.272448E+05  9.272448E+05
     non-actinide
     abs. fracs.   6.525874E-03  6.637037E-03  6.743279E-03  6.849885E-03  6.951988E-03  6.951988E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   51
0                                                fraction of total absorption rate
       power=    .00mw, burnup=    877.mwd, flux= 2.69E+08n/cm**2-sec
0                initial 191757. d 200888. d 210019. d 219150. d 219150. d

     sm149      2.63E-03  2.77E-03  2.86E-03  2.95E-03  3.03E-03  3.03E-03
     eu151      8.34E-05  8.87E-05  9.40E-05  9.94E-05  1.05E-04  1.05E-04
     nd143      7.38E-05  7.75E-05  8.12E-05  8.48E-05  8.85E-05  8.85E-05
     gd155      4.34E-05  4.53E-05  4.72E-05  4.91E-05  5.09E-05  5.09E-05
     rh103      3.44E-05  3.61E-05  3.78E-05  3.95E-05  4.12E-05  4.12E-05
     sm151      3.92E-05  3.93E-05  3.95E-05  3.95E-05  3.96E-05  3.96E-05
     cd113      2.71E-05  2.82E-05  2.93E-05  3.04E-05  3.15E-05  3.15E-05
     xe131      2.33E-05  2.45E-05  2.56E-05  2.68E-05  2.79E-05  2.79E-05
     gd157      2.42E-05  2.49E-05  2.56E-05  2.63E-05  2.69E-05  2.69E-05
     cs133      1.81E-05  1.90E-05  1.99E-05  2.08E-05  2.17E-05  2.17E-05
     sm147      1.33E-05  1.40E-05  1.46E-05  1.53E-05  1.60E-05  1.60E-05
     tc 99      1.33E-05  1.39E-05  1.46E-05  1.53E-05  1.59E-05  1.59E-05
     nd145      1.03E-05  1.08E-05  1.14E-05  1.19E-05  1.24E-05  1.24E-05
     mo 95      7.15E-06  7.50E-06  7.86E-06  8.21E-06  8.57E-06  8.57E-06
     sm152      5.64E-06  5.93E-06  6.22E-06  6.51E-06  6.80E-06  6.80E-06
     kr 83      4.48E-06  4.71E-06  4.95E-06  5.15E-06  5.37E-06  5.37E-06
     cs135      4.08E-06  4.28E-06  4.48E-06  4.69E-06  4.89E-06  4.89E-06
     ru101      3.46E-06  3.31E-06  3.47E-06  3.63E-06  3.78E-06  3.78E-06
```

pr141	3.05E-06	3.20E-06	3.36E-06	3.51E-06	3.46E-06	3.46E-06
eu153	2.78E-06	2.92E-06	3.06E-06	3.20E-06	3.34E-06	3.34E-06
la139	2.50E-06	2.62E-06	2.74E-06	2.87E-06	2.99E-06	2.99E-06
xe135	2.29E-06	2.32E-06	2.32E-06	2.32E-06	2.32E-06	2.29E-06
sm150	1.56E-06	1.70E-06	1.84E-06	1.80E-06	2.15E-06	2.15E-06
ba137	1.09E-06	1.15E-06	1.21E-06	1.27E-06	1.33E-06	1.33E-06
pd105	1.07E-06	1.12E-06	1.17E-06	1.23E-06	1.28E-06	1.28E-06
zr 93	1.01E-06	1.06E-06	1.11E-06	1.16E-06	1.21E-06	1.21E-06
i129	7.78E-07	8.17E-07	8.55E-07	8.94E-07	9.33E-07	9.33E-07
nd144	7.49E-07	7.87E-07	8.24E-07	8.61E-07	8.99E-07	8.99E-07
mo 97	5.66E-07	5.94E-07	6.22E-07	6.50E-07	6.78E-07	6.78E-07
ag109	4.52E-07	4.78E-07	5.04E-07	5.30E-07	5.56E-07	5.56E-07
zr 91	2.66E-07	2.80E-07	2.93E-07	3.06E-07	3.19E-07	3.19E-07
y 89	2.56E-07	2.68E-07	2.81E-07	2.94E-07	3.06E-07	3.06E-07
ru102	2.31E-07	2.42E-07	2.54E-07	2.65E-07	2.77E-07	2.77E-07
pm147	2.70E-07	2.70E-07	2.70E-07	2.70E-07	2.70E-07	2.70E-07
ce142	2.08E-07	2.18E-07	2.29E-07	2.39E-07	2.49E-07	2.49E-07
nd148	2.00E-07	2.10E-07	2.19E-07	2.29E-07	2.39E-07	2.39E-07
nd146	1.68E-07	1.76E-07	1.84E-07	1.93E-07	2.01E-07	2.01E-07
pd108	1.45E-07	1.53E-07	1.61E-07	1.69E-07	1.76E-07	1.76E-07
ba138	1.43E-07	1.50E-07	1.58E-07	1.65E-07	1.72E-07	1.72E-07
in115	1.38E-07	1.45E-07	1.52E-07	1.59E-07	1.66E-07	1.66E-07
eu155	1.41E-07	1.41E-07	1.42E-07	1.42E-07	1.42E-07	1.42E-07
ce140	1.34E-07	1.41E-07	1.48E-07	1.54E-07	1.61E-07	1.61E-07
xe132	1.20E-07	1.26E-07	1.32E-07	1.38E-07	1.44E-07	1.44E-07
pd107	8.44E-08	8.88E-08	9.33E-08	9.78E-08	1.02E-07	1.02E-07
mo 98	8.27E-08	8.68E-08	9.09E-08	9.50E-08	9.91E-08	9.91E-08
mo100	8.01E-08	8.41E-08	8.81E-08	9.21E-08	9.61E-08	9.61E-08
xe134	7.91E-08	8.31E-08	8.70E-08	9.09E-08	9.49E-08	9.49E-08
zr 92	6.42E-08	6.74E-08	7.06E-08	7.38E-08	7.69E-08	7.69E-08
i127	5.23E-08	5.50E-08	5.76E-08	6.02E-08	6.29E-08	6.29E-08

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 52
0 fraction of total absorption rate
0 power= .00mw, burnup= 877.mwd, flux= 2.49E+08n/cm**2-sec
0 initial 191757. d 200888. d 210019. d 219150. d 219150. d

zr 96	5.02E-08	5.27E-08	5.52E-08	5.77E-08	6.02E-08	6.02E-08
ru104	4.86E-08	5.21E-08	5.43E-08	5.70E-08	5.95E-08	5.95E-08
nd150	4.42E-08	4.66E-08	4.86E-08	5.08E-08	5.30E-08	5.30E-08
xe136	4.28E-08	4.49E-08	4.70E-08	4.92E-08	5.13E-08	5.13E-08
br 81	3.20E-08	3.34E-08	3.52E-08	3.68E-08	3.84E-08	3.84E-08
rb 85	3.11E-08	3.26E-08	3.42E-08	3.57E-08	3.73E-08	3.73E-08
zr 94	2.71E-08	2.84E-08	2.98E-08	3.11E-08	3.25E-08	3.25E-08
gd152	1.02E-08	2.17E-08	2.42E-08	2.70E-08	2.99E-08	2.99E-08
zr 90	2.32E-08	2.44E-08	2.57E-08	2.69E-08	2.82E-08	2.82E-08
eu152	2.08E-08	2.21E-08	2.35E-08	2.49E-08	2.63E-08	2.63E-08
cd111	2.16E-08	2.28E-08	2.39E-08	2.50E-08	2.62E-08	2.62E-08
te130	1.95E-08	2.04E-08	2.14E-08	2.24E-08	2.33E-08	2.33E-08
sm154	1.90E-08	1.99E-08	2.09E-08	2.18E-08	2.28E-08	2.28E-08
rb 87	1.81E-08	1.90E-08	1.99E-08	2.08E-08	2.17E-08	2.17E-08
sr 90	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08	1.71E-08
se 77	1.29E-08	1.35E-08	1.42E-08	1.48E-08	1.55E-08	1.55E-08
pd106	9.33E-09	9.81E-09	1.03E-08	1.08E-08	1.13E-08	1.13E-08
kr 84	8.51E-09	8.94E-09	9.36E-09	9.78E-09	1.02E-08	1.02E-08
rh105	8.52E-09	8.56E-09	8.57E-09	8.57E-09	8.58E-09	8.56E-09
se 79	6.61E-09	6.94E-09	7.27E-09	7.59E-09	7.92E-09	7.92E-09
sb121	6.29E-09	6.60E-09	6.92E-09	7.23E-09	7.55E-09	7.55E-09
sb123	5.11E-09	5.37E-09	5.62E-09	5.88E-09	6.13E-09	6.13E-09
kr 86	4.77E-09	5.00E-09	5.24E-09	5.48E-09	5.71E-09	5.71E-09
gd156	4.26E-09	4.53E-09	4.79E-09	5.07E-09	5.34E-09	5.34E-09

te128	4.26E-09	4.47E-09	4.68E-09	4.90E-09	5.11E-09	5.11E-09
cs137	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09
se 80	3.08E-09	3.23E-09	3.39E-09	3.54E-09	3.69E-09	3.69E-09
dy161	3.08E-09	3.17E-09	3.34E-09	3.51E-09	3.68E-09	3.68E-09
te125	2.49E-09	2.82E-09	2.96E-09	3.09E-09	3.23E-09	3.23E-09
pr143	2.46E-09	2.46E-09	2.46E-09	2.46E-09	2.46E-09	2.46E-09
ru 99	1.79E-09	1.97E-09	2.15E-09	2.35E-09	2.55E-09	2.55E-09
tb159	1.90E-09	2.00E-09	2.10E-09	2.20E-09	2.30E-09	2.30E-09
cd112	1.78E-09	1.87E-09	1.96E-09	2.05E-09	2.14E-09	2.14E-09
li 6	1.75E-09	1.83E-09	1.92E-09	2.01E-09	2.09E-09	2.09E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
sn117	1.40E-09	1.47E-09	1.54E-09	1.61E-09	1.68E-09	1.68E-09
eu154	1.39E-09	1.46E-09	1.53E-09	1.60E-09	1.67E-09	1.67E-09
ce141	1.60E-09	1.60E-09	1.60E-09	1.59E-09	1.59E-09	1.59E-09
sn119	1.15E-09	1.20E-09	1.26E-09	1.32E-09	1.38E-09	1.38E-09
gd158	1.05E-09	1.12E-09	1.19E-09	1.27E-09	1.34E-09	1.34E-09
gd154	9.04E-10	9.98E-10	1.10E-09	1.20E-09	1.31E-09	1.31E-09
sn115	1.05E-09	1.10E-09	1.15E-09	1.21E-09	1.26E-09	1.26E-09
sr 88	8.76E-10	9.19E-10	9.63E-10	1.01E-09	1.05E-09	1.05E-09
pm149	9.70E-10	9.76E-10	9.75E-10	9.75E-10	9.75E-10	9.69E-10
nd147	9.23E-10	9.26E-10	9.26E-10	9.26E-10	9.25E-10	9.22E-10
cd114	7.23E-10	7.65E-10	8.07E-10	8.50E-10	8.93E-10	8.93E-10
pd110	6.55E-10	6.90E-10	7.24E-10	7.59E-10	7.94E-10	7.94E-10
se 82	5.95E-10	6.24E-10	6.54E-10	6.84E-10	7.13E-10	7.13E-10
ce144	5.99E-10	5.99E-10	5.99E-10	5.99E-10	5.99E-10	5.98E-10

1 sas2h: far-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 53
0 fraction of total absorption rate
0 power= .80mw, burnup= 877.0wd, flux= 2.69E+08n/cm**2-sec
initial 191757. d 200888. d 210019. d 219150. d 219150. d

sn126	4.84E-10	5.09E-10	5.33E-10	5.58E-10	5.82E-10	5.82E-10
kr 85	5.72E-10	5.71E-10	5.71E-10	5.71E-10	5.71E-10	5.71E-10
se 78	4.51E-10	4.74E-10	4.96E-10	5.19E-10	5.41E-10	5.41E-10
dy162	4.30E-10	4.55E-10	4.82E-10	5.08E-10	5.35E-10	5.35E-10
dy164	4.22E-10	4.49E-10	4.76E-10	5.03E-10	5.31E-10	5.31E-10
ru100	3.85E-10	3.56E-10	3.68E-10	4.02E-10	4.37E-10	4.37E-10
sn124	3.63E-10	3.81E-10	4.00E-10	4.18E-10	4.36E-10	4.36E-10
ru103	3.59E-10	3.59E-10	3.59E-10	3.59E-10	3.59E-10	3.59E-10
as 75	2.69E-10	2.82E-10	2.95E-10	3.09E-10	3.22E-10	3.22E-10
nd142	2.10E-10	2.32E-10	2.54E-10	2.78E-10	3.02E-10	3.02E-10
ba134	2.02E-10	2.22E-10	2.44E-10	2.66E-10	2.90E-10	2.90E-10
sm148	1.89E-10	2.09E-10	2.28E-10	2.49E-10	2.71E-10	2.71E-10
ba135	1.65E-10	1.82E-10	1.99E-10	2.18E-10	2.37E-10	2.37E-10
in113	1.94E-10	2.05E-10	2.15E-10	2.25E-10	2.35E-10	2.35E-10
pd104	1.38E-10	1.52E-10	1.66E-10	1.82E-10	1.98E-10	1.98E-10
ba136	1.61E-10	1.70E-10	1.79E-10	1.88E-10	1.97E-10	1.97E-10
sn118	1.48E-10	1.55E-10	1.63E-10	1.70E-10	1.78E-10	1.78E-10
zr 95	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10
cs134	1.35E-10	1.42E-10	1.48E-10	1.55E-10	1.62E-10	1.62E-10
nb 95	1.32E-10	1.32E-10	1.32E-10	1.32E-10	1.32E-10	1.32E-10
sn122	1.26E-10	1.32E-10	1.39E-10	1.45E-10	1.51E-10	1.51E-10
cd116	1.26E-10	1.32E-10	1.38E-10	1.45E-10	1.51E-10	1.51E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
dy163	9.09E-11	1.05E-10	1.11E-10	1.17E-10	1.24E-10	1.24E-10
kr 82	9.77E-11	1.04E-10	1.09E-10	1.15E-10	1.22E-10	1.22E-10
sn120	9.40E-11	9.87E-11	1.03E-10	1.08E-10	1.13E-10	1.13E-10
pm151	1.07E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.07E-10
mo 96	7.94E-11	8.58E-11	9.23E-11	9.91E-11	1.06E-10	1.06E-10
xe130	7.83E-11	7.52E-11	7.99E-11	8.48E-11	8.98E-11	8.98E-11
ge 73	7.36E-11	7.72E-11	8.09E-11	8.46E-11	8.83E-11	8.83E-11

ba140	4.70E-11	4.72E-11	4.72E-11	4.72E-11	4.72E-11	4.70E-11
sm153	3.77E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.78E-11
eu156	3.56E-11	3.57E-11	3.58E-11	3.59E-11	3.59E-11	3.59E-11
nb 93	3.44E-11	3.70E-11	3.97E-11	3.26E-11	3.56E-11	3.56E-11
se 76	2.66E-11	2.79E-11	2.92E-11	3.06E-11	3.19E-11	3.19E-11
sr 89	3.06E-11	3.06E-11	3.06E-11	3.06E-11	3.06E-11	3.05E-11
cd110	1.99E-11	2.20E-11	2.43E-11	2.66E-11	2.91E-11	2.91E-11
ru106	2.65E-11	2.45E-11	2.46E-11	2.67E-11	2.67E-11	2.67E-11
te126	1.75E-11	1.87E-11	1.98E-11	2.10E-11	2.21E-11	2.21E-11
gd160	1.80E-11	1.90E-11	2.00E-11	2.09E-11	2.19E-11	2.19E-11
br 79	1.34E-11	1.48E-11	1.63E-11	1.78E-11	1.93E-11	1.93E-11
ce143	1.69E-11	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.69E-11
y 90	1.63E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
la140	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
sb125	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.52E-11	1.52E-11
mo 99	1.29E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.28E-11
xe129	7.62E-12	8.40E-12	9.22E-12	1.01E-11	1.10E-11	1.10E-11
ag107	7.40E-12	8.18E-12	8.99E-12	9.84E-12	1.07E-11	1.07E-11
pm148m	9.51E-12	9.52E-12	9.52E-12	9.52E-12	9.52E-12	9.51E-12

1 sss2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 54
0 fraction of total absorption rate
power= .00mw, burnup= 877.mwd, flux= 2.69E+08n/cm**2-sec
0 initial 191757. d 200888. d 210019. d 219150. d

kr 87	9.12E-12	2.29E-11	2.29E-11	2.29E-11	2.29E-11	9.11E-12
ho165	6.91E-12	7.35E-12	7.79E-12	8.23E-12	8.69E-12	8.69E-12
te127m	7.56E-12	7.56E-12	7.57E-12	7.58E-12	7.58E-12	7.58E-12
i131	6.73E-12	6.76E-12	6.76E-12	6.76E-12	6.76E-12	6.74E-12
te124	3.30E-12	3.48E-12	3.65E-12	3.83E-12	4.01E-12	4.01E-12
sr 87	3.08E-12	3.23E-12	3.39E-12	3.54E-12	3.70E-12	3.70E-12
nb 94	1.74E-12	1.83E-12	1.92E-12	2.01E-12	2.10E-12	2.10E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ge 74	1.49E-12	1.56E-12	1.63E-12	1.71E-12	1.78E-12	1.78E-12
sr 86	1.23E-12	1.31E-12	1.39E-12	1.48E-12	1.56E-12	1.56E-12
dy160	1.10E-12	1.20E-12	1.32E-12	1.43E-12	1.56E-12	1.56E-12
xe128	8.77E-13	9.60E-13	1.05E-12	1.14E-12	1.23E-12	1.23E-12
ge 72	1.00E-12	1.06E-12	1.11E-12	1.16E-12	1.21E-12	1.21E-12
se 76	6.67E-13	7.04E-13	7.43E-13	7.81E-13	8.21E-13	8.21E-13
sn116	2.91E-13	3.21E-13	3.52E-13	3.85E-13	4.19E-13	4.19E-13
pm148	3.63E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.63E-13
ag111	3.40E-13	3.43E-13	3.44E-13	3.46E-13	3.47E-13	3.45E-13
er166	3.56E-13	3.74E-13	3.94E-13	3.14E-13	3.34E-13	3.34E-13
eu157	2.93E-13	3.15E-13	3.16E-13	3.17E-13	3.18E-13	3.96E-13
cd115m	3.39E-13	3.40E-13	3.40E-13	3.40E-13	3.40E-13	3.40E-13
te122	1.26E-13	1.38E-13	1.51E-13	1.65E-13	1.80E-13	1.80E-13
as136	6.80E-14	6.97E-14	7.04E-14	7.11E-14	7.17E-14	7.15E-14
kr 80	4.50E-14	4.74E-14	4.99E-14	5.24E-14	5.49E-14	5.49E-14
sn125	2.92E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.93E-14
ru105	3.38E-14	3.02E-14	3.02E-14	3.02E-14	3.03E-14	3.39E-14
sn123	1.81E-14	1.81E-14	1.81E-14	1.81E-14	1.81E-14	1.81E-14
te132	9.42E-15	9.55E-15	9.55E-15	9.55E-15	9.55E-15	9.41E-15
rb 88	9.26E-15	1.29E-14	1.29E-14	1.29E-14	1.29E-14	9.26E-15
i135	8.48E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	8.47E-15
tb160	5.60E-15	5.88E-15	6.16E-15	6.43E-15	6.71E-15	6.70E-15
te123	3.73E-15	3.96E-15	4.20E-15	4.43E-15	4.70E-15	4.70E-15
sb126	3.86E-15	3.92E-15	3.96E-15	4.00E-15	4.04E-15	4.03E-15
be 9	3.31E-15	3.48E-15	3.64E-15	3.81E-15	3.97E-15	3.97E-15
pr142	3.23E-15	3.43E-15	3.80E-15	3.97E-15	4.14E-15	3.89E-15
er167	2.60E-15	2.86E-15	3.13E-15	3.41E-15	3.71E-15	3.71E-15
sb124	2.36E-15	2.37E-15	2.38E-15	2.40E-15	2.41E-15	2.41E-15

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     in117m    1.93E-15  2.15E-15  2.15E-15  2.15E-15  2.15E-15  1.94E-15
     li  7     1.55E-15  1.42E-15  1.48E-15  1.55E-15  1.42E-15  1.42E-15
      i130     1.23E-15  1.38E-15  1.41E-15  1.44E-15  1.48E-15  1.35E-15
     te134     1.07E-15  5.84E-15  5.84E-15  5.84E-15  5.84E-15  1.07E-15
     in117     5.73E-16  6.32E-16  6.33E-16  6.33E-16  6.34E-16  5.76E-16
     rb 86     4.44E-16  4.55E-16  4.65E-16  4.75E-16  4.85E-16  4.84E-16
     dy165     2.13E-16  3.52E-16  3.58E-16  3.65E-16  3.72E-16  2.29E-16
     cd108     8.36E-17  9.20E-17  1.01E-16  1.10E-16  1.20E-16  1.20E-16
     sn114     6.71E-17  7.42E-17  8.17E-17  8.96E-17  9.78E-17  9.78E-17
     ga 75     3.77E-17  8.65E-17  8.65E-17  8.65E-17  8.65E-17  3.77E-17
     cd118     2.98E-17  1.22E-16  1.22E-16  1.22E-16  1.22E-16  2.99E-17
     cs134m    1.69E-17  2.46E-17  2.78E-17  2.91E-17  3.03E-17  2.02E-17
     cd109     1.05E-18  1.09E-18  1.13E-18  1.17E-18  1.22E-18  1.21E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  55
0                                  fraction of total absorption rate
          power=    .00mw, burnup=     877.mwd, flux= 2.69E+08n/cm**2-sec
0                 initial 191757. d 200888. d 210019. d 219150. d

     in119m    6.96E-19  3.06E-17  3.05E-17  3.05E-17  3.05E-17  6.95E-19
     in119     3.36E-21  2.39E-18  2.39E-18  2.40E-18  2.40E-18  3.36E-21
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  56
       power= 4.000E-03mw, burnup=8.7659E+02mwd, flux= 2.69E+08n/cm**2-sec
0                                      nuclide concentrations, gram atoms
                                       basis = single reactor assembly
                 charge 191757. d 200888. d 210019. d 219150. d
      h  1   4.30E-05  4.52E-05  4.73E-05  4.94E-05  5.16E-05  5.16E-05
      h  2   1.28E-07  1.34E-07  1.40E-07  1.47E-07  1.53E-07  1.53E-07
      h  3   3.43E-11  3.44E-11  3.43E-11  3.46E-11  3.44E-11  3.44E-11
      h  4    .00E+00  1.40E-34  1.40E-34  1.40E-34  1.41E-34   .00E+00
     he  3   9.02E-10  9.48E-10  9.95E-10  1.04E-09  1.09E-09  1.09E-09
     he  4   7.11E-06  7.47E-06  7.82E-06  8.17E-06  8.53E-06  8.53E-06
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   8.54E-07  8.97E-07  9.39E-07  9.82E-07  1.02E-06  1.02E-06
     ne 21   1.32E-11  1.43E-11  1.58E-11  1.72E-11  1.86E-11  1.86E-11
     ne 22   5.53E-09  5.80E-09  6.08E-09  6.36E-09  6.64E-09  6.64E-09
     na 23   7.06E-30  7.07E-15  7.07E-15  7.07E-15  7.07E-15  7.07E-30
     na 22   4.15E-11  4.16E-11  4.16E-11  4.16E-11  4.16E-11  4.16E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   2.54E-08  2.75E-08  2.75E-08  2.75E-08  2.75E-08  2.54E-08
     na 24m  4.52E-30  4.52E-15  4.52E-15  4.52E-15  4.52E-15  4.52E-30
     na 25   6.44E-41  6.96E-26  7.48E-26  8.01E-26  8.56E-26  8.55E-41
     mg 24   6.24E-03  6.54E-03  6.83E-03  7.11E-03  7.40E-03  7.40E-03
     mg 25   2.26E-09  2.44E-09  2.62E-09  2.80E-09  3.00E-09  3.00E-09
     mg 26   1.28E-07  1.34E-07  1.40E-07  1.47E-07  1.53E-07  1.53E-07
     mg 27   1.16E-15  2.11E-12  2.11E-12  2.11E-12  2.11E-12  1.17E-15
     mg 28   4.86E-24  4.30E-24  4.30E-24  4.30E-24  4.30E-24  4.86E-24
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   3.74E-24  2.04E-10  2.04E-10  2.04E-10  2.04E-10  3.74E-24
     al 29   6.39E-29  3.47E-24  3.79E-24  4.12E-24  4.47E-24  9.03E-29
     al 30    .00E+00  3.48E-35  3.98E-35  4.53E-35  5.12E-35   .00E+00
     si 28   1.82E-02  1.90E-02  1.99E-02  2.07E-02  2.15E-02  2.15E-02
     si 29   1.26E-08  1.36E-08  1.48E-08  1.61E-08  1.75E-08  1.75E-08
     si 30   8.84E-15  1.02E-14  1.16E-14  1.32E-14  1.50E-14  1.50E-14
     si 31   4.84E-27  7.30E-27  8.35E-27  9.50E-27  1.07E-26  4.84E-27
     si 32   4.02E-33  4.79E-33  5.65E-33  6.61E-33  7.69E-33  7.69E-33
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                2.69E+08  2.69E+08  2.69E+08  2.69E+08  2.69E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides                 page  57
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0 power= 4.000E-03mw, burnup=8.7659E+02mwd, flux= 2.69E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 191757. d	200888. d	210019. d	219150. d	219150. d	
he 4	1.14E-01	1.21E-01	1.29E-01	1.37E-01	1.43E-01	1.43E-01
pb206	1.68E-06	1.96E-06	2.26E-06	2.60E-06	2.96E-06	2.96E-06
pb207	1.68E-06	1.87E-06	2.06E-06	2.26E-06	2.47E-06	2.47E-06
pb208	3.13E-07	3.44E-07	3.77E-07	4.12E-07	4.48E-07	4.48E-07
pb209	3.46E-13	3.79E-13	4.15E-13	4.54E-13	4.93E-13	4.97E-13
pb210	3.36E-07	3.72E-07	4.09E-07	4.47E-07	4.88E-07	4.88E-07
pb211	7.07E-13	7.45E-13	7.83E-13	8.21E-13	8.59E-13	8.58E-13
pb212	2.18E-12	2.29E-12	2.40E-12	2.50E-12	2.61E-12	2.61E-12
pb214	8.43E-13	9.56E-13	1.05E-12	1.14E-12	1.24E-12	1.20E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.07E-07	1.24E-07	1.43E-07	1.63E-07	1.85E-07	1.85E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.07E-10	2.29E-10	2.52E-10	2.75E-10	3.00E-10	3.00E-10
bi211	4.23E-14	4.42E-14	4.64E-14	4.87E-14	5.09E-14	5.13E-14
bi212	2.07E-13	2.17E-13	2.27E-13	2.37E-13	2.48E-13	2.48E-13
bi213	7.80E-14	8.85E-14	9.70E-14	1.06E-13	1.15E-13	1.12E-13
bi214	6.38E-13	7.10E-13	7.77E-13	8.46E-13	9.18E-13	9.06E-13
po210	5.72E-09	6.32E-09	6.95E-09	7.61E-09	8.29E-09	8.29E-09
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.67E-19	4.88E-19	5.13E-19	5.38E-19	5.62E-19	5.67E-19
po212	1.09E-23	1.14E-23	1.19E-23	1.25E-23	1.30E-23	1.30E-23
po213	1.17E-22	1.33E-22	1.46E-22	1.59E-22	1.73E-22	1.68E-22
po214	8.77E-20	9.77E-20	1.07E-19	1.16E-19	1.26E-19	1.25E-19
po215	5.61E-19	6.12E-19	6.43E-19	6.75E-19	7.06E-19	7.06E-19
po216	8.27E-18	8.67E-18	9.07E-18	9.48E-18	9.88E-18	9.88E-18
po218	1.01E-13	1.11E-13	1.21E-13	1.32E-13	1.43E-13	1.43E-13
rn218	3.11E-29	3.26E-29	3.41E-29	3.56E-29	3.71E-29	3.71E-29
rn219	1.29E-15	1.36E-15	1.43E-15	1.50E-15	1.57E-15	1.57E-15
rn220	3.17E-15	3.32E-15	3.48E-15	3.63E-15	3.79E-15	3.79E-15
rn222	1.79E-10	1.97E-10	2.15E-10	2.34E-10	2.54E-10	2.54E-10
ra222	3.37E-26	3.56E-26	3.70E-26	3.86E-26	4.03E-26	4.03E-26
ra223	3.23E-10	3.40E-10	3.57E-10	3.74E-10	3.92E-10	3.92E-10
ra224	1.80E-11	1.89E-11	1.98E-11	2.07E-11	2.15E-11	2.15E-11
ra225	3.76E-11	4.14E-11	4.54E-11	4.95E-11	5.39E-11	5.39E-11
ra226	2.73E-05	2.80E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05
ra228	1.04E-12	1.09E-12	1.15E-12	1.20E-12	1.25E-12	1.25E-12
ac225	2.54E-11	2.79E-11	3.06E-11	3.35E-11	3.64E-11	3.64E-11
ac227	2.24E-07	2.36E-07	2.48E-07	2.60E-07	2.72E-07	2.72E-07
ac228	1.27E-16	1.33E-16	1.40E-16	1.46E-16	1.53E-16	1.53E-16
th226	1.64E-24	1.73E-24	1.81E-24	1.89E-24	1.96E-24	1.96E-24
th227	5.21E-10	5.49E-10	5.76E-10	6.04E-10	6.32E-10	6.32E-10
th228	3.44E-09	3.61E-09	3.78E-09	3.95E-09	4.11E-09	4.11E-09
th229	7.30E-06	8.04E-06	8.82E-06	9.63E-06	1.05E-05	1.05E-05
th230	1.28E-02	1.34E-02	1.40E-02	1.47E-02	1.53E-02	1.53E-02
th231	3.06E-09	3.07E-09	3.07E-09	3.07E-09	3.07E-09	3.07E-09
th232	2.59E-03	2.71E-03	2.84E-03	2.97E-03	3.10E-03	3.10E-03
th233	9.81E-16	2.48E-16	2.60E-16	2.72E-16	2.84E-16	1.18E-15
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	3.60E-06	3.78E-06	3.96E-06	4.14E-06	4.32E-06	4.32E-06
pa232	5.95E-12	6.48E-12	6.79E-12	7.10E-12	7.41E-12	7.13E-12

1 ssb2h: far-field crit based on b2w 13x15, 3.80wt%, 20gwd/mtu 40% b2o/ 8% uo2 actinides page 58

0 power= 4.000E-03mw, burnup=8.7659E+02mwd, flux= 2.69E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

charge 191757. d 200888. d 210019. d 219150. d 219150. d

pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.59E-21	1.67E-21	1.75E-21	1.83E-21	1.90E-21	1.98E-21
u231	5.10E-18	5.42E-18	5.68E-18	5.93E-18	6.19E-18	6.12E-18
u232	1.23E-07	1.29E-07	1.35E-07	1.41E-07	1.47E-07	1.47E-07
u233	6.80E-03	7.14E-03	7.48E-03	7.81E-03	8.15E-03	8.15E-03
u234	9.10E+00	9.11E+00	9.11E+00	9.11E+00	9.12E+00	9.12E+00
u235	7.27E+02	7.26E+02	7.26E+02	7.26E+02	7.26E+02	7.26E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.08E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.54E-08	3.18E-07	3.18E-07	3.18E-07	3.17E-07	1.54E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.43E-12	8.44E-12	8.44E-12	8.44E-12	8.43E-12	8.43E-12
np236m	1.95E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.95E-12
np236	9.08E-08	1.04E-07	1.08E-07	1.13E-07	1.18E-07	1.18E-07
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.53E-06	1.55E-06	1.55E-06	1.53E-06	1.51E-06
np239	4.52E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.52E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.96E-15	9.31E-15	9.31E-15	9.31E-15	9.31E-15	2.96E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	2.44E-13	2.46E-13	2.47E-13	2.49E-13	2.50E-13	2.50E-13
pu238	2.30E-02	2.31E-02	2.32E-02	2.32E-02	2.33E-02	2.33E-02
pu239	2.46E+00	2.58E+00	2.70E+00	2.82E+00	2.94E+00	2.94E+00
pu240	5.95E-03	6.54E-03	7.17E-03	7.82E-03	8.49E-03	8.49E-03
pu241	2.25E-06	2.49E-06	2.74E-06	2.99E-06	3.26E-06	3.26E-06
pu242	7.54E-09	8.79E-09	1.04E-08	1.22E-08	1.43E-08	1.43E-08
pu243	1.22E-17	1.85E-17	2.19E-17	2.58E-17	3.01E-17	2.37E-17
pu244	1.54E-36	2.54E-36	4.08E-36	6.41E-36	9.87E-36	9.87E-36
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	3.65E-21	4.64E-21	5.31E-21	6.03E-21	6.80E-21	6.16E-21
am240	1.80E-18	2.13E-18	2.43E-18	2.76E-18	3.11E-18	3.04E-18
am241	1.47E-05	1.69E-05	1.94E-05	2.20E-05	2.48E-05	2.48E-05
am242m	3.07E-09	3.65E-09	4.30E-09	5.02E-09	5.82E-09	5.82E-09
am242	5.14E-13	6.35E-13	7.67E-13	9.27E-13	9.35E-13	9.76E-13
am243	1.09E-11	1.37E-11	1.70E-11	2.08E-11	2.53E-11	2.53E-11
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	7.37E-20	1.04E-19	1.29E-19	1.58E-19	1.92E-19	1.71E-19
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	3.19E-23	3.69E-23	4.23E-23	4.81E-23	5.44E-23	5.43E-23
am242	1.11E-10	1.28E-10	1.47E-10	1.67E-10	1.89E-10	1.89E-10
am243	3.48E-17	4.08E-17	4.74E-17	5.47E-17	6.26E-17	6.26E-17
am244	1.04E-15	1.31E-15	1.65E-15	2.04E-15	2.50E-15	2.50E-15

1

sas2h: fer-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2 actinides page 59
power= 4.600E-03mw, burnup=8.7659E+02mwd, flux= 2.69E+08n/cm**2-sec

6

nuclide concentrations, gram atoms
basis = single reactor assembly

charge 191757. d 200888. d 210019. d 219150. d 219150. d

am243	9.12E-20	1.22E-19	1.61E-19	2.09E-19	2.68E-19	2.68E-19
am244	5.70E-23	5.22E-23	7.23E-23	9.06E-23	1.33E-22	1.33E-22
am247	2.46E-28	3.66E-28	5.53E-28	7.62E-28	1.07E-27	1.07E-27
am248	1.69E-32	2.64E-32	4.04E-32	6.06E-32	8.91E-32	8.91E-32

```
     cm249    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.69E+08  2.69E+08  2.69E+08  2.69E+08  2.69E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
ilibrary information...

          cross-section data taken from position number  7 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi  *
          *                                                                          *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prosas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                   fission product yields are from endf/b-v               *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
          *        see information above this box (if present) for later updates     *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
0         ****************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/28/1996    date library was produced
0                    1697     total number of nuclides in library
                      689     number of light-element nuclides
                      129     number of actinide nuclides
                      879     number of fission product nuclides
0                    7993     number of nonzero off-diagonal matrix elements
0         ****************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   60
```

```
        power=    .00mw, burnup=   1023.mwd, flux= 2.69E+08n/cm**2-sec.
0                                                 basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial     228282. d     237413. d     246544. d     255675. d     255676. d
     productions  1.142991E+06  1.143166E+06  1.143341E+06  1.143515E+06  1.143689E+06  1.143689E+06
     absorptions  9.344589E+05  9.346578E+05  9.348529E+05  9.350436E+05  9.352355E+05  9.352354E+05
     k infinity   1.223158E+00  1.223085E+00  1.223017E+00  1.222951E+00  1.222888E+00  1.222889E+00
0                   initial     228282. d     237413. d     246544. d     255675. d     255676. d
     actinide
     absorptions  9.279626E+05  9.280671E+05  9.281709E+05  9.282748E+05  9.283785E+05  9.283785E+05
     non-actinide
     abs. frees.  6.951928E-03  7.051468E-03  7.147670E-03  7.241130E-03  7.331848E-03  7.331789E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   61
0                                   fraction of total absorption rate
     power=    .00mw, burnup=   1023.mwd, flux= 2.69E+08n/cm**2-sec
0              initial 228282. d 237413. d 246544. d 255675. d 255676. d

     sm149     3.03E-03  3.11E-03  3.18E-03  3.26E-03  3.33E-03  3.33E-03
     eu151     1.05E-04  1.10E-04  1.15E-04  1.21E-04  1.26E-04  1.26E-04
     nd143     8.85E-05  9.21E-05  9.58E-05  9.94E-05  1.03E-04  1.03E-04
     gd155     5.09E-05  5.27E-05  5.45E-05  5.63E-05  5.80E-05  5.80E-05
     rh103     4.12E-05  4.29E-05  4.46E-05  4.64E-05  4.81E-05  4.81E-05
     sm151     3.96E-05  3.97E-05  3.98E-05  3.98E-05  3.98E-05  3.98E-05
     cd113     3.14E-05  3.25E-05  3.35E-05  3.45E-05  3.55E-05  3.55E-05
     xe131     2.79E-05  2.91E-05  3.03E-05  3.14E-05  3.26E-05  3.26E-05
     gd157     2.69E-05  2.75E-05  2.80E-05  2.86E-05  2.91E-05  2.91E-05
     cs133     2.17E-05  2.26E-05  2.35E-05  2.44E-05  2.53E-05  2.53E-05
     sm147     1.60E-05  1.66E-05  1.73E-05  1.80E-05  1.86E-05  1.86E-05
     tc 99     1.59E-05  1.66E-05  1.73E-05  1.79E-05  1.86E-05  1.86E-05
     nd145     1.24E-05  1.29E-05  1.34E-05  1.39E-05  1.44E-05  1.44E-05
     mo 95     8.57E-06  8.92E-06  9.28E-06  9.63E-06  9.99E-06  9.99E-06
     sm152     6.80E-06  7.09E-06  7.38E-06  7.67E-06  7.97E-06  7.97E-06
     kr 83     5.37E-06  5.59E-06  5.82E-06  6.04E-06  6.26E-06  6.26E-06
     cs135     4.89E-06  5.09E-06  5.30E-06  5.50E-06  5.70E-06  5.70E-06
     ru101     3.79E-06  3.94E-06  4.10E-06  4.26E-06  4.41E-06  4.41E-06
     pr141     3.66E-06  3.81E-06  3.96E-06  4.11E-06  4.27E-06  4.27E-06
     eu153     3.34E-06  3.47E-06  3.61E-06  3.75E-06  3.89E-06  3.89E-06
     la139     2.99E-06  3.12E-06  3.24E-06  3.36E-06  3.49E-06  3.49E-06
     sm150     2.15E-06  2.31E-06  2.47E-06  2.64E-06  2.81E-06  2.81E-06
     xe135     2.29E-06  2.32E-06  2.32E-06  2.32E-06  2.32E-06  2.29E-06
     ba137     1.33E-06  1.39E-06  1.45E-06  1.51E-06  1.57E-06  1.57E-06
     pd105     1.28E-06  1.33E-06  1.39E-06  1.44E-06  1.50E-06  1.50E-06
     zr 93     1.21E-06  1.26E-06  1.31E-06  1.36E-06  1.41E-06  1.41E-06
      i129     9.33E-07  9.72E-07  1.01E-06  1.05E-06  1.09E-06  1.09E-06
     nd146     8.98E-07  9.36E-07  9.73E-07  1.01E-06  1.05E-06  1.05E-06
     mo 97     6.78E-07  7.06E-07  7.34E-07  7.63E-07  7.91E-07  7.91E-07
     ag109     5.56E-07  5.83E-07  6.10E-07  6.37E-07  6.65E-07  6.65E-07
     zr 91     3.19E-07  3.32E-07  3.46E-07  3.59E-07  3.72E-07  3.72E-07
      y 89     2.06E-07  2.19E-07  2.32E-07  2.44E-07  2.57E-07  2.57E-07
     ru102     2.77E-07  2.88E-07  3.00E-07  3.11E-07  3.23E-07  3.23E-07
     ce142     2.49E-07  2.59E-07  2.70E-07  2.80E-07  2.90E-07  2.90E-07
     nd148     2.39E-07  2.49E-07  2.59E-07  2.69E-07  2.79E-07  2.79E-07
     pm147     2.70E-07  2.70E-07  2.70E-07  2.70E-07  2.69E-07  2.69E-07
     nd144     2.01E-07  2.09E-07  2.18E-07  2.26E-07  2.34E-07  2.34E-07
     pd108     1.77E-07  1.85E-07  1.93E-07  2.01E-07  2.09E-07  2.09E-07
     ba138     1.72E-07  1.79E-07  1.86E-07  1.93E-07  2.00E-07  2.00E-07
     in115     1.66E-07  1.73E-07  1.80E-07  1.87E-07  1.94E-07  1.94E-07
     ce140     1.61E-07  1.67E-07  1.74E-07  1.81E-07  1.87E-07  1.87E-07
     xe132     1.44E-07  1.50E-07  1.56E-07  1.62E-07  1.68E-07  1.68E-07
     eu155     1.62E-07  1.62E-07  1.62E-07  1.62E-07  1.63E-07  1.63E-07
```

pd107	1.02E-07	1.07E-07	1.11E-07	1.16E-07	1.21E-07	1.21E-07
mo 98	9.91E-08	1.03E-07	1.07E-07	1.11E-07	1.16E-07	1.16E-07
mo100	9.61E-08	1.00E-07	1.04E-07	1.08E-07	1.12E-07	1.12E-07
xe134	9.49E-08	9.88E-08	1.03E-07	1.07E-07	1.11E-07	1.11E-07
sr 92	7.69E-08	8.01E-08	8.33E-08	8.65E-08	8.96E-08	8.96E-08
i127	6.29E-08	6.55E-08	6.82E-08	7.08E-08	7.34E-08	7.34E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
0 fraction of total absorption rate
0 powers .00mw, burnup= 1023.mwd, flux= 2.69E+08n/cm**2-sec
initial 228282. d 237413. d 246544. d 255675. d 255676. d

zr 96	6.02E-08	6.27E-08	6.52E-08	6.76E-08	7.01E-08	7.01E-08
ru104	5.95E-08	6.20E-08	6.45E-08	6.70E-08	6.95E-08	6.95E-08
nd150	5.30E-08	5.52E-08	5.74E-08	5.96E-08	6.18E-08	6.18E-08
xe136	5.13E-08	5.34E-08	5.55E-08	5.77E-08	5.98E-08	5.98E-08
br 81	3.84E-08	4.00E-08	4.16E-08	4.32E-08	4.47E-08	4.47E-08
rb 85	3.73E-08	3.88E-08	4.04E-08	4.19E-08	4.35E-08	4.35E-08
gd152	2.99E-08	3.29E-08	3.61E-08	3.95E-08	4.30E-08	4.30E-08
zr 94	3.25E-08	3.38E-08	3.52E-08	3.65E-08	3.78E-08	3.78E-08
zr 90	2.82E-08	2.94E-08	3.07E-08	3.19E-08	3.32E-08	3.32E-08
eu152	2.63E-08	2.77E-08	2.91E-08	3.05E-08	3.19E-08	3.19E-08
cd111	2.62E-08	2.73E-08	2.84E-08	2.96E-08	3.07E-08	3.07E-08
te130	2.33E-08	2.43E-08	2.53E-08	2.62E-08	2.72E-08	2.72E-08
sm154	2.28E-08	2.37E-08	2.47E-08	2.56E-08	2.66E-08	2.66E-08
rb 87	2.17E-08	2.25E-08	2.34E-08	2.43E-08	2.52E-08	2.52E-08
se 77	1.55E-08	1.61E-08	1.67E-08	1.74E-08	1.80E-08	1.80E-08
sr 90	1.71E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08
pd106	1.13E-08	1.17E-08	1.22E-08	1.27E-08	1.32E-08	1.32E-08
kr 84	1.02E-08	1.06E-08	1.10E-08	1.15E-08	1.19E-08	1.19E-08
se 79	7.92E-09	8.23E-09	8.58E-09	8.91E-09	9.23E-09	9.23E-09
sb121	7.55E-09	7.66E-09	8.18E-09	8.49E-09	8.81E-09	8.81E-09
rh105	8.36E-09	8.59E-09	8.60E-09	8.61E-09	8.62E-09	8.59E-09
sb123	6.13E-09	6.39E-09	6.65E-09	6.90E-09	7.16E-09	7.16E-09
kr 86	5.71E-09	5.95E-09	6.19E-09	6.42E-09	6.66E-09	6.66E-09
gd156	5.34E-09	5.63E-09	5.91E-09	6.20E-09	6.49E-09	6.49E-09
te128	5.11E-09	5.32E-09	5.53E-09	5.75E-09	5.96E-09	5.96E-09
dy161	3.48E-09	3.85E-09	4.03E-09	4.20E-09	4.38E-09	4.38E-09
se 80	3.69E-09	3.84E-09	4.00E-09	4.15E-09	4.30E-09	4.30E-09
te125	2.73E-09	2.77E-09	2.90E-09	2.64E-09	2.78E-09	2.78E-09
ba137	3.74E-09	3.76E-09	3.75E-09	3.75E-09	3.75E-09	3.75E-09
ru 99	2.35E-09	2.77E-09	2.99E-09	3.22E-09	3.46E-09	3.46E-09
tb159	2.30E-09	2.48E-09	2.51E-09	2.61E-09	2.71E-09	2.71E-09
pr143	2.46E-09	2.46E-09	2.46E-09	2.45E-09	2.45E-09	2.45E-09
cd112	2.14E-09	2.23E-09	2.33E-09	2.42E-09	2.51E-09	2.51E-09
li 6	2.09E-09	2.18E-09	2.27E-09	2.35E-09	2.44E-09	2.44E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
sn117	1.68E-09	1.73E-09	1.82E-09	1.89E-09	1.96E-09	1.96E-09
eu154	1.67E-09	1.75E-09	1.82E-09	1.89E-09	1.96E-09	1.96E-09
gd154	1.31E-09	1.42E-09	1.54E-09	1.66E-09	1.79E-09	1.79E-09
gd158	1.34E-09	1.42E-09	1.49E-09	1.57E-09	1.65E-09	1.65E-09
sn119	1.38E-09	1.43E-09	1.49E-09	1.55E-09	1.61E-09	1.61E-09
ba141	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
sn115	1.26E-09	1.31E-09	1.37E-09	1.42E-09	1.47E-09	1.47E-09
sr 88	1.05E-09	1.09E-09	1.14E-09	1.18E-09	1.22E-09	1.22E-09
cd114	8.93E-10	9.37E-10	9.83E-10	1.03E-09	1.07E-09	1.07E-09
pm149	9.69E-10	9.73E-10	9.74E-10	9.74E-10	9.74E-10	9.69E-10
pd110	7.94E-10	8.29E-10	8.64E-10	9.00E-10	9.35E-10	9.35E-10
nd147	9.22E-10	9.25E-10	9.25E-10	9.23E-10	9.24E-10	9.21E-10
se 82	7.13E-10	7.42E-10	7.72E-10	8.01E-10	8.31E-10	8.31E-10
sn126	5.82E-10	6.07E-10	6.31E-10	6.56E-10	6.81E-10	6.81E-10

1 sas2h: far-field crit based on h2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 63
0 fraction of total absorption rate
power= .00mw, burnup= 1023.mwd, flux= 2.69E+08n/cm**2-sec
0 initial 228282. d 237413. d 246544. d 255675. d 255676. d

dy164	5.31E-10	5.60E-10	5.89E-10	6.19E-10	6.49E-10	6.49E-10
dy162	5.35E-10	5.62E-10	5.90E-10	6.18E-10	6.47E-10	6.47E-10
se 78	5.41E-10	5.63E-10	5.86E-10	6.08E-10	6.31E-10	6.31E-10
ce144	5.98E-10	5.98E-10	5.98E-10	5.98E-10	5.98E-10	5.98E-10
ru100	4.37E-10	4.74E-10	5.12E-10	5.51E-10	5.92E-10	5.92E-10
kr 85	5.71E-10	5.70E-10	5.70E-10	5.70E-10	5.70E-10	5.70E-10
sn124	4.36E-10	4.54E-10	4.73E-10	4.91E-10	5.09E-10	5.09E-10
nd142	3.82E-10	3.88E-10	3.95E-10	3.82E-10	4.11E-10	4.11E-10
ba134	2.90E-10	3.14E-10	3.40E-10	3.66E-10	3.94E-10	3.94E-10
se 75	3.22E-10	3.35E-10	3.49E-10	3.62E-10	3.75E-10	3.75E-10
sm148	2.71E-10	2.94E-10	3.17E-10	3.42E-10	3.67E-10	3.67E-10
ru103	3.39E-10	3.39E-10	3.39E-10	3.39E-10	3.40E-10	3.39E-10
ba135	2.37E-10	2.57E-10	2.78E-10	3.00E-10	3.22E-10	3.22E-10
in113	2.35E-10	2.45E-10	2.56E-10	2.66E-10	2.76E-10	2.76E-10
pd104	1.98E-10	2.15E-10	2.32E-10	2.50E-10	2.69E-10	2.69E-10
ba136	1.97E-10	2.06E-10	2.16E-10	2.25E-10	2.35E-10	2.35E-10
sn118	1.78E-10	1.85E-10	1.92E-10	2.00E-10	2.07E-10	2.07E-10
cs134	1.62E-10	1.68E-10	1.75E-10	1.82E-10	1.88E-10	1.88E-10
sn122	1.51E-10	1.57E-10	1.64E-10	1.70E-10	1.76E-10	1.76E-10
cd116	1.51E-10	1.57E-10	1.64E-10	1.70E-10	1.76E-10	1.76E-10
zr 95	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
nb 93	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10
dy163	1.24E-10	1.30E-10	1.37E-10	1.44E-10	1.51E-10	1.51E-10
kr 82	1.22E-10	1.28E-10	1.34E-10	1.40E-10	1.47E-10	1.47E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
mo 96	1.06E-10	1.13E-10	1.21E-10	1.28E-10	1.36E-10	1.36E-10
sn120	1.13E-10	1.18E-10	1.22E-10	1.27E-10	1.32E-10	1.32E-10
xe130	8.98E-11	9.49E-11	1.00E-10	1.05E-10	1.11E-10	1.11E-10
pm151	1.07E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.07E-10
ge 73	8.83E-11	9.19E-11	9.56E-11	9.93E-11	1.03E-10	1.03E-10
nb 93	3.56E-11	3.87E-11	4.20E-11	4.54E-11	4.89E-11	4.89E-11
ba140	4.70E-11	4.71E-11	4.71E-11	4.71E-11	4.71E-11	4.69E-11
cd110	2.91E-11	3.17E-11	3.44E-11	3.72E-11	4.02E-11	4.02E-11
sm153	2.78E-11	2.87E-11	2.87E-11	2.87E-11	2.87E-11	2.78E-11
ge 76	2.19E-11	2.32E-11	2.45E-11	2.58E-11	2.72E-11	2.72E-11
eu154	2.59E-11	2.60E-11	2.61E-11	2.61E-11	2.62E-11	2.62E-11
sr 89	2.05E-11	2.05E-11	2.05E-11	2.05E-11	2.05E-11	2.05E-11
te126	2.21E-11	2.34E-11	2.46E-11	2.58E-11	2.71E-11	2.71E-11
ru106	2.67E-11	2.68E-11	2.69E-11	2.69E-11	2.70E-11	2.70E-11
br 79	1.93E-11	2.10E-11	2.27E-11	2.45E-11	2.63E-11	2.63E-11
gd160	2.19E-11	2.29E-11	2.39E-11	2.49E-11	2.59E-11	2.59E-11
ce143	1.49E-11	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.69E-11
y 90	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
la140	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
sb125	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
xe129	1.10E-11	1.19E-11	1.29E-11	1.39E-11	1.49E-11	1.49E-11
ag107	1.07E-11	1.17E-11	1.26E-11	1.36E-11	1.47E-11	1.47E-11
mo 99	1.28E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.28E-11
ho165	8.49E-12	9.15E-12	9.83E-12	1.01E-11	1.06E-11	1.06E-11

1 sas2h: far-field crit based on h2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 64
0 fraction of total absorption rate
power= .00mw, burnup= 1023.mwd, flux= 2.69E+08n/cm**2-sec
0 initial 228282. d 237413. d 246544. d 255675. d 255676. d

pm148m	9.50E-12	9.52E-12	9.52E-12	9.52E-12	9.52E-12	9.50E-12

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     kr 87     9.11E-12  2.28E-11  2.28E-11  2.28E-11  2.28E-11  9.09E-12
     te127m    7.38E-12  7.39E-12  7.39E-12  7.40E-12  7.40E-12  7.40E-12
      i131     4.74E-12  6.76E-12  6.76E-12  6.76E-12  6.75E-12  4.74E-12
     te124     4.00E-12  4.18E-12  4.36E-12  4.44E-12  4.72E-12  4.72E-12
     sr 87     3.70E-12  3.85E-12  4.01E-12  4.16E-12  4.32E-12  4.32E-12
     nb 94     2.10E-12  2.18E-12  2.27E-12  2.36E-12  2.45E-12  2.45E-12
     dy160     1.96E-12  1.68E-12  1.82E-12  1.95E-12  2.10E-12  2.10E-12
     ge 74     1.78E-12  1.86E-12  1.93E-12  2.00E-12  2.08E-12  2.08E-12
     sr 86     1.84E-12  1.65E-12  1.74E-12  1.83E-12  1.93E-12  1.93E-12
     te129m    1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12
     xe128     1.23E-12  1.33E-12  1.43E-12  1.53E-12  1.64E-12  1.64E-12
     ge 72     1.21E-12  1.26E-12  1.31E-12  1.36E-12  1.41E-12  1.41E-12
     se 76     8.20E-13  8.60E-13  9.00E-13  9.41E-13  9.81E-13  9.81E-13
     sn116     4.19E-13  4.54E-13  4.91E-13  5.30E-13  5.70E-13  5.70E-13
     er166     3.34E-13  3.55E-13  3.77E-13  3.99E-13  4.22E-13  4.22E-13
     pm148     3.63E-13  3.66E-13  3.66E-13  3.66E-13  3.66E-13  3.63E-13
     ag111     3.45E-13  3.48E-13  3.50E-13  3.51E-13  3.52E-13  3.51E-13
     eu157     2.96E-13  3.18E-13  3.19E-13  3.20E-13  3.21E-13  3.00E-13
     te122     1.80E-13  1.95E-13  2.10E-13  2.26E-13  2.43E-13  2.43E-13
     cd115m    2.40E-13  2.40E-13  2.40E-13  2.40E-13  2.40E-13  2.40E-13
     cs136     7.15E-14  7.24E-14  7.31E-14  7.37E-14  7.44E-14  7.41E-14
     kr 80     5.49E-14  5.74E-14  5.99E-14  6.25E-14  6.51E-14  6.51E-14
     sn125     2.93E-14  2.94E-14  2.94E-14  2.94E-14  2.94E-14  2.93E-14
     ru105     2.39E-14  3.03E-14  3.03E-14  3.04E-14  3.04E-14  2.40E-14
     sn123     1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te132     9.41E-15  9.55E-15  9.55E-15  9.54E-15  9.54E-15  9.40E-15
     rb 88     9.24E-15  1.28E-14  1.28E-14  1.28E-14  1.28E-14  9.22E-15
      i135     8.47E-15  1.01E-14  1.01E-14  1.01E-14  1.01E-14  8.46E-15
     tb160     6.70E-15  6.99E-15  7.26E-15  7.54E-15  7.82E-15  7.82E-15
     te123     4.70E-15  4.96E-15  5.22E-15  5.49E-15  5.77E-15  5.77E-15
     er167     3.71E-15  4.03E-15  4.35E-15  4.70E-15  5.06E-15  5.06E-15
     be  9     3.97E-15  4.14E-15  4.30E-15  4.47E-15  4.63E-15  4.63E-15
     pr142     3.89E-15  4.31E-15  4.48E-15  4.65E-15  4.82E-15  4.83E-15
     sb126     4.03E-15  4.09E-15  4.13E-15  4.17E-15  4.22E-15  4.20E-15
     sb124     2.41E-15  2.42E-15  2.43E-15  2.45E-15  2.46E-15  2.46E-15
     in117m    1.04E-15  2.15E-15  2.16E-15  2.16E-15  2.16E-15  1.04E-15
     li  7     1.62E-15  1.69E-15  1.75E-15  1.82E-15  1.89E-15  1.89E-15
      i130     1.35E-15  1.51E-15  1.54E-15  1.57E-15  1.60E-15  1.46E-15
     te134     1.07E-15  3.03E-15  3.03E-15  3.03E-15  3.03E-15  1.07E-15
     in117     5.76E-16  6.35E-16  6.35E-16  6.36E-16  6.37E-16  5.78E-16
     rb 86     4.84E-16  4.95E-16  5.05E-16  5.16E-16  5.26E-16  5.26E-16
     dy165     2.29E-16  3.78E-16  3.85E-16  3.92E-16  3.98E-16  2.46E-16
     cd108     1.20E-16  1.31E-16  1.42E-16  1.54E-16  1.66E-16  1.66E-16
     sn114     9.77E-17  1.06E-16  1.15E-16  1.25E-16  1.34E-16  1.34E-16
     ge 75     3.77E-17  8.64E-17  8.64E-17  8.64E-17  8.64E-17  3.77E-17
     cd118     2.99E-17  1.22E-16  1.22E-16  1.22E-16  1.22E-16  2.99E-17
     cs134m    2.02E-17  3.16E-17  3.28E-17  3.41E-17  3.53E-17  2.35E-17
     cd109     1.21E-18  1.26E-18  1.30E-18  1.34E-18  1.38E-18  1.38E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  65
0                                  fraction of total absorption rate
          power=     .00mw, burnup=    1023.mwd, flux= 2.69E+08n/cm**2-sec
0               initial 228282. d 237413. d 246544. d 255675. d 255676. d

     in119m    6.96E-19  3.05E-17  3.05E-17  3.05E-17  3.05E-17  6.95E-19
     in119     3.34E-21  2.40E-18  2.40E-18  2.40E-18  2.40E-18  3.34E-21
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  66
       power= 4.000E-03mw, burnup=1.0227E+03mwd, flux= 2.69E+08n/cm**2-sec
0                                     nuclide concentrations, gram atoms
                                      basis = single reactor assembly
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	charge 228282. d	237413. d	246544. d	255675. d	255676. d	
h 1	5.16E-05	5.57E-05	5.59E-05	5.80E-05	6.01E-05	6.01E-05
h 2	1.53E-07	1.59E-07	1.66E-07	1.72E-07	1.79E-07	1.79E-07
h 3	3.46E-11	3.48E-11	3.48E-11	3.49E-11	3.50E-11	3.50E-11
h 4	.00E+00	1.41E-34	1.41E-34	1.41E-34	1.42E-34	.00E+00
he 3	1.09E-09	1.13E-09	1.18E-09	1.23E-09	1.27E-09	1.27E-09
he 4	8.53E-06	8.88E-06	9.24E-06	9.59E-06	9.94E-06	9.94E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.02E-06	1.07E-06	1.11E-06	1.15E-06	1.19E-06	1.19E-06
ne 21	1.86E-11	2.01E-11	2.17E-11	2.33E-11	2.50E-11	2.50E-11
ne 22	6.64E-09	6.91E-09	7.19E-09	7.47E-09	7.75E-09	7.75E-09
ne 23	7.07E-30	7.08E-15	7.08E-15	7.08E-15	7.08E-15	7.08E-30
ne 22	4.16E-11	4.17E-11	4.17E-11	4.17E-11	4.16E-11	4.16E-11
ne 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
ne 24	2.54E-08	2.75E-08	2.73E-08	2.73E-08	2.73E-08	2.54E-08
ne 24m	4.52E-30	4.52E-15	4.52E-15	4.52E-15	4.52E-15	4.52E-30
ne 25	8.55E-41	9.13E-26	9.71E-26	1.03E-25	1.09E-25	1.09E-40
mg 24	7.40E-03	7.48E-03	7.97E-03	8.25E-03	8.54E-03	8.54E-03
mg 25	3.00E-09	3.19E-09	3.40E-09	3.61E-09	3.82E-09	3.82E-09
mg 26	1.53E-07	1.59E-07	1.66E-07	1.72E-07	1.78E-07	1.78E-07
mg 27	1.17E-15	2.12E-12	2.12E-12	2.11E-12	2.11E-12	1.17E-15
mg 28	4.06E-24	4.31E-24	4.30E-24	4.30E-24	4.30E-24	4.07E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	3.74E-24	2.04E-10	2.04E-10	2.04E-10	2.04E-10	3.74E-24
al 29	9.03E-29	4.83E-24	5.21E-24	5.59E-24	5.99E-24	1.21E-28
al 30	.00E+00	5.77E-35	6.46E-35	7.21E-35	8.01E-35	.00E+00
si 28	2.15E-02	2.24E-02	2.32E-02	2.40E-02	2.48E-02	2.48E-02
si 29	1.75E-08	1.89E-08	2.03E-08	2.19E-08	2.34E-08	2.34E-08
si 30	1.50E-14	1.69E-14	1.89E-14	2.11E-14	2.34E-14	2.34E-14
si 31	6.84E-27	1.21E-26	1.35E-26	1.51E-26	1.68E-26	1.07E-26
si 32	7.49E-33	8.08E-33	1.02E-32	1.16E-32	1.32E-32	1.32E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.69E+08	2.69E+08	2.69E+08	2.69E+08	2.69E-07

sas2h: far-field grit based on b1w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 67

power= 4.800E-03mw, burnup=1.8227E+03mwd, flux= 2.69E+08n/cm**2-sec

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 228282. d	237413. d	246544. d	255675. d	255676. d	
he 4	1.65E-01	1.53E-01	1.61E-01	1.69E-01	1.78E-01	1.78E-01
pb206	2.96E-06	3.36E-06	3.79E-06	4.26E-06	4.76E-06	4.76E-06
pb207	2.47E-06	2.69E-06	2.93E-06	3.17E-06	3.42E-06	3.42E-06
pb208	4.48E-07	4.84E-07	5.25E-07	5.65E-07	6.08E-07	6.08E-07
pb209	4.97E-13	5.35E-13	5.78E-13	6.23E-13	6.69E-13	6.74E-13
pb210	4.88E-07	5.30E-07	5.73E-07	6.18E-07	6.65E-07	6.65E-07
pb211	8.58E-13	8.96E-13	9.34E-13	9.72E-13	1.01E-12	1.01E-12
pb212	2.61E-12	2.72E-12	2.82E-12	2.93E-12	3.04E-12	3.04E-12
pb214	1.20E-12	1.34E-12	1.44E-12	1.55E-12	1.66E-12	1.61E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.85E-07	2.09E-07	2.35E-07	2.63E-07	2.93E-07	2.93E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.00E-10	3.26E-10	3.53E-10	3.81E-10	4.09E-10	4.09E-10
bi211	5.13E-14	5.31E-14	5.54E-14	5.76E-14	5.99E-14	6.04E-14
bi212	2.48E-13	2.58E-13	2.68E-13	2.78E-13	2.88E-13	2.88E-13
bi213	1.12E-13	1.25E-13	1.35E-13	1.45E-13	1.56E-13	1.52E-13
bi214	8.06E-13	9.03E-13	1.07E-12	1.15E-12	1.23E-12	1.22E-12
po210	8.29E-09	9.01E-09	9.75E-09	1.05E-08	1.13E-08	1.13E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	5.67E-19	5.87E-19	6.12E-19	6.37E-19	6.62E-19	6.67E-19
po212	1.30E-23	1.35E-23	1.41E-23	1.46E-23	1.51E-23	1.51E-23

po213	1.68E-22	1.88E-22	2.03E-22	2.19E-22	2.35E-22	2.28E-22
po214	1.25E-19	1.37E-19	1.47E-19	1.58E-19	1.70E-19	1.67E-19
po215	7.06E-19	7.37E-19	7.68E-19	7.99E-19	8.30E-19	8.30E-19
po216	9.88E-18	1.03E-17	1.07E-17	1.11E-17	1.15E-17	1.15E-17
po218	1.43E-13	1.53E-13	1.67E-13	1.79E-13	1.92E-13	1.92E-13
rn218	3.71E-29	3.86E-29	4.01E-29	4.16E-29	4.32E-29	4.32E-29
rn219	1.37E-15	1.44E-15	1.71E-15	1.78E-15	1.85E-15	1.85E-15
rn220	3.79E-15	3.94E-15	4.10E-15	4.25E-15	4.41E-15	4.41E-15
rn222	2.54E-10	2.75E-10	2.96E-10	3.18E-10	3.41E-10	3.41E-10
ra222	4.03E-26	4.19E-26	4.36E-26	4.52E-26	4.69E-26	4.69E-26
ra223	3.92E-10	4.09E-10	4.26E-10	4.43E-10	4.61E-10	4.61E-10
ra224	2.15E-11	2.24E-11	2.33E-11	2.42E-11	2.51E-11	2.51E-11
ra225	5.39E-11	5.84E-11	6.31E-11	6.80E-11	7.31E-11	7.31E-11
ra226	3.88E-05	4.20E-05	4.52E-05	4.86E-05	5.21E-05	5.21E-05
ra228	1.25E-12	1.31E-12	1.36E-12	1.41E-12	1.46E-12	1.46E-12
ac225	3.64E-11	3.95E-11	4.27E-11	4.60E-11	4.94E-11	4.94E-11
ac227	2.72E-07	2.84E-07	2.96E-07	3.08E-07	3.20E-07	3.20E-07
ac228	1.53E-16	1.59E-16	1.66E-16	1.72E-16	1.79E-16	1.79E-16
th226	1.96E-24	2.05E-24	2.13E-24	2.21E-24	2.29E-24	2.28E-24
th227	6.32E-10	6.60E-10	6.88E-10	7.16E-10	7.43E-10	7.43E-10
th228	4.11E-09	4.28E-09	4.45E-09	4.62E-09	4.79E-09	4.79E-09
th229	1.05E-05	1.14E-05	1.23E-05	1.32E-05	1.42E-05	1.42E-05
th230	1.53E-02	1.60E-02	1.66E-02	1.72E-02	1.79E-02	1.79E-02
th231	3.07E-09	3.07E-09	3.08E-09	3.08E-09	3.08E-09	3.08E-09
th232	3.10E-03	3.23E-03	3.36E-03	3.49E-03	3.62E-03	3.62E-03
th233	1.18E-15	2.96E-14	5.08E-14	5.19E-14	5.31E-14	1.37E-15
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	4.32E-04	4.50E-04	4.68E-04	4.86E-04	5.04E-04	5.04E-04
pa232	7.13E-12	7.72E-12	8.02E-12	8.33E-12	8.64E-12	8.32E-12

1

sas2h: for-field crit based on b2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 68
power= 4.000E-03mw, burnup=1.6227E+03mwd, flux= 2.69E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

0

	charge 228282. d	237613. d	246544. d	255673. d	255676. d	
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.98E-21	1.98E-21	2.06E-21	2.14E-21	2.22E-21	2.21E-21
u231	6.12E-18	6.45E-18	6.70E-18	6.96E-18	7.22E-18	7.13E-18
u232	1.47E-07	1.53E-07	1.59E-07	1.65E-07	1.71E-07	1.71E-07
u233	8.15E-03	8.49E-03	8.83E-03	9.17E-03	9.51E-03	9.51E-03
u234	9.12E+00	9.12E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00
u235	7.26E+02	7.26E+02	7.26E+02	7.25E+02	7.25E+02	7.25E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.09E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.54E-08	3.18E-07	3.18E-07	3.17E-07	3.17E-07	1.54E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.63E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12
np236m	1.05E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.05E-12
np236	1.38E-07	1.23E-07	1.28E-07	1.33E-07	1.38E-07	1.38E-07
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.51E-06
np239	4.52E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.52E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.96E-15	9.31E-15	9.31E-15	9.30E-15	9.30E-15	2.96E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
     pu236   1.11E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09
     pu237   2.50E-13  2.52E-13  2.53E-13  2.54E-13  2.55E-13  2.55E-13
     pu238   2.33E-02  2.33E-02  2.33E-02  2.33E-02  2.33E-02  2.33E-02
     pu239   2.04E+00  3.05E+00  3.17E+00  3.29E+00  3.41E+00  3.41E+00
     pu240   8.49E-03  9.19E-03  9.92E-03  1.07E-02  1.15E-02  1.15E-02
     pu241   3.26E-06  3.54E-06  3.83E-06  4.13E-06  4.45E-06  4.45E-06
     pu242   1.43E-08  1.46E-08  1.81E-08  2.18E-08  2.50E-08  2.50E-08
     pu243   2.37E-17  3.49E-17  4.83E-17  4.62E-17  5.27E-17  4.15E-17
     pu244   9.87E-36  1.49E-35  2.22E-35  3.34E-35  4.67E-35  4.67E-35
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   6.16E-21  7.64E-21  8.53E-21  9.48E-21  1.05E-20  9.50E-21
     am240   3.04E-18  3.50E-18  3.91E-18  4.34E-18  4.81E-18  4.70E-18
     am241   2.48E-05  2.79E-05  3.11E-05  3.46E-05  3.83E-05  3.83E-05
     am242m  5.82E-09  6.70E-09  7.66E-09  8.71E-09  9.84E-09  9.84E-09
     am242   8.74E-13  1.05E-12  1.18E-12  1.31E-12  1.45E-12  1.36E-12
     am243   2.53E-11  3.05E-11  3.44E-11  4.32E-11  5.09E-11  5.09E-11
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.71E-19  2.32E-19  2.77E-19  3.28E-19  3.87E-19  3.46E-19
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.43E-23  6.12E-23  6.85E-23  7.63E-23  8.46E-23  8.45E-23
     cm242   1.89E-10  2.12E-10  2.38E-10  2.65E-10  2.94E-10  2.94E-10
     cm243   6.26E-17  7.12E-17  8.05E-17  9.06E-17  1.01E-16  1.01E-16
     cm244   2.50E-15  3.04E-15  3.66E-15  4.37E-15  5.18E-15  5.18E-15
1
     sas2h: for-field crit based on b1w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page   69
       power= 4.000E-03mw, burnup=1.0227E+03mwd, flux= 2.69E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge 228282. d 237413. d 246544. d 255675. d 255676. d
     cm245   2.68E-19  3.41E-19  4.28E-19  5.33E-19  6.58E-19  6.58E-19
     cm246   1.33E-22  1.76E-22  2.31E-22  2.99E-22  3.83E-22  3.83E-22
     cm247   1.07E-27  1.49E-27  2.03E-27  2.74E-27  3.66E-27  3.66E-27
     cm248   6.91E-32  1.29E-31  1.84E-31  2.59E-31  3.59E-31  3.59E-31
     cm249    .00E+00  7.78E-42  7.78E-42  7.78E-42  7.78E-42  2.57E-42
     cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.69E+08  2.69E+08  2.69E+08  2.69E+08  2.69E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  8 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
```

```
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "pressx2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
          ***********************************************************************
0
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/28/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0        ***********************************************************************
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   70
       power=    .00mw, burnup=   1169.mwd, flux= 2.69E+08n/cm**2-sec
0                                                basis m
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial     264807. d     273938. d     283069. d     292201. d     292201. d
     productions  1.144583E+06  1.146756E+06  1.146929E+06  1.145102E+06  1.145274E+06  1.145274E+06
     absorptions  9.360666E+05  9.362543E+05  9.364396E+05  9.366226E+05  9.368034E+05  9.368033E+05
     k infinity   1.222758E+00  1.222698E+00  1.222641E+00  1.222586E+00  1.222534E+00  1.222534E+00
0                 initial     264807. d     273938. d     283069. d     292201. d     292201. d
     actinide
     absorptions  9.292053E+05  9.293088E+05  9.294123E+05  9.295153E+05  9.296181E+05  9.296181E+05
     non-actinide
     abs. fracs.  7.329941E-03  7.418396E-03  7.506284E-03  7.588327E-03  7.670045E-03  7.669985E-03
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   71
0                                  fraction of total absorption rate
       power=    .00mw, burnup=   1169.mwd, flux= 2.69E+08n/cm**2-sec
0              initial 264807. d 273938. d 283069. d 292201. d 292201. d

     sm149     3.33E-03  3.40E-03  3.46E-03  3.53E-03  3.59E-03  3.59E-03
     eu151     1.24E-04  1.31E-04  1.37E-04  1.42E-04  1.47E-04  1.47E-04
     nd143     1.03E-04  1.07E-04  1.10E-04  1.14E-04  1.18E-04  1.18E-04
     gd155     5.80E-05  5.98E-05  6.15E-05  6.31E-05  6.48E-05  6.48E-05
     rh103     4.81E-05  4.98E-05  5.15E-05  5.32E-05  5.49E-05  5.49E-05
     sm151     3.98E-05  3.99E-05  3.99E-05  3.99E-05  3.99E-05  3.99E-05
     cd113     3.55E-05  3.65E-05  3.74E-05  3.83E-05  3.93E-05  3.93E-05
     xe131     3.26E-05  3.37E-05  3.49E-05  3.60E-05  3.72E-05  3.72E-05
```

gd157	2.91E-05	2.96E-05	3.01E-05	3.06E-05	3.10E-05	3.10E-05
cs133	2.53E-05	2.62E-05	2.71E-05	2.80E-05	2.89E-05	2.89E-05
sm147	1.86E-05	1.93E-05	2.00E-05	2.06E-05	2.13E-05	2.13E-05
tc 99	1.86E-05	1.92E-05	1.99E-05	2.05E-05	2.12E-05	2.12E-05
nd145	1.44E-05	1.49E-05	1.54E-05	1.60E-05	1.65E-05	1.65E-05
mo 95	9.99E-06	1.03E-05	1.07E-05	1.11E-05	1.14E-05	1.14E-05
sm152	7.97E-06	8.26E-06	8.55E-06	8.85E-06	9.14E-06	9.14E-06
kr 83	6.26E-06	6.48E-06	6.70E-06	6.92E-06	7.14E-06	7.14E-06
cs135	5.70E-06	5.90E-06	6.11E-06	6.31E-06	6.51E-06	6.51E-06
ru101	4.41E-06	4.57E-06	4.73E-06	4.88E-06	5.04E-06	5.04E-06
pr141	4.37E-06	4.42E-06	4.57E-06	4.72E-06	4.87E-06	4.87E-06
eu153	3.89E-06	4.03E-06	4.17E-06	4.31E-06	4.45E-06	4.45E-06
la139	3.49E-06	3.61E-06	3.74E-06	3.86E-06	3.98E-06	3.98E-06
sm150	2.81E-06	2.99E-06	3.16E-06	3.35E-06	3.53E-06	3.53E-06
xe135	2.28E-06	2.32E-06	2.32E-06	2.31E-06	2.31E-06	2.26E-06
ba137	1.57E-06	1.63E-06	1.69E-06	1.74E-06	1.80E-06	1.80E-06
pd105	1.50E-06	1.55E-06	1.61E-06	1.66E-06	1.71E-06	1.71E-06
zr 93	1.41E-06	1.46E-06	1.51E-06	1.56E-06	1.61E-06	1.61E-06
i129	1.09E-06	1.13E-06	1.17E-06	1.20E-06	1.24E-06	1.24E-06
nd144	1.05E-06	1.08E-06	1.12E-06	1.16E-06	1.20E-06	1.20E-06
mo 97	7.91E-07	8.19E-07	8.47E-07	8.75E-07	9.03E-07	9.03E-07
ag109	6.65E-07	6.93E-07	7.21E-07	7.49E-07	7.78E-07	7.78E-07
zr 91	3.72E-07	3.85E-07	3.98E-07	4.11E-07	4.25E-07	4.25E-07
y 89	3.57E-07	3.70E-07	3.82E-07	3.95E-07	4.07E-07	4.07E-07
ru102	3.23E-07	3.34E-07	3.46E-07	3.57E-07	3.69E-07	3.69E-07
ce142	2.90E-07	3.01E-07	3.11E-07	3.21E-07	3.32E-07	3.32E-07
nd148	2.79E-07	2.89E-07	2.99E-07	3.09E-07	3.18E-07	3.18E-07
pm147	2.69E-07	2.69E-07	2.69E-07	2.69E-07	2.69E-07	2.69E-07
nd146	2.34E-07	2.42E-07	2.51E-07	2.59E-07	2.67E-07	2.67E-07
pd108	2.09E-07	2.17E-07	2.25E-07	2.34E-07	2.42E-07	2.42E-07
ba138	2.00E-07	2.07E-07	2.14E-07	2.21E-07	2.29E-07	2.29E-07
in115	1.94E-07	2.01E-07	2.08E-07	2.15E-07	2.22E-07	2.22E-07
ce140	1.87E-07	1.94E-07	2.01E-07	2.07E-07	2.14E-07	2.14E-07
xe132	1.68E-07	1.74E-07	1.80E-07	1.86E-07	1.92E-07	1.92E-07
eu155	1.63E-07	1.63E-07	1.63E-07	1.63E-07	1.63E-07	1.63E-07
pd107	1.21E-07	1.25E-07	1.30E-07	1.35E-07	1.39E-07	1.39E-07
mo 98	1.16E-07	1.20E-07	1.24E-07	1.28E-07	1.32E-07	1.32E-07
mo100	1.12E-07	1.16E-07	1.20E-07	1.24E-07	1.28E-07	1.28E-07
xe134	1.11E-07	1.14E-07	1.18E-07	1.22E-07	1.26E-07	1.26E-07
zr 92	8.96E-08	9.28E-08	9.60E-08	9.92E-08	1.02E-07	1.02E-07
i127	7.35E-08	7.61E-08	7.87E-08	8.14E-08	8.40E-08	8.40E-08

1 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% wo2 fission products page 72

0 fraction of total absorption rate

power= .00mw, burnup= 1169.mwd, flux= 2.69E+08n/cm**2-sec

0 initial 264807. d 273938. d 283069. d 292201. d 292201. d

zr 96	7.02E-08	7.26E-08	7.51E-08	7.76E-08	8.01E-08	8.01E-08
ru104	6.95E-08	7.20E-08	7.44E-08	7.69E-08	7.94E-08	7.94E-08
nd150	6.18E-08	6.40E-08	6.62E-08	6.84E-08	7.06E-08	7.06E-08
xe136	5.98E-08	6.19E-08	6.40E-08	6.62E-08	6.83E-08	6.83E-08
gd152	4.30E-08	4.66E-08	5.04E-08	5.44E-08	5.85E-08	5.85E-08
br 81	4.47E-08	4.63E-08	4.79E-08	4.95E-08	5.11E-08	5.11E-08
rb 85	4.35E-08	4.50E-08	4.66E-08	4.81E-08	4.97E-08	4.97E-08
zr 94	3.78E-08	3.92E-08	4.05E-08	4.19E-08	4.32E-08	4.32E-08
zr 90	3.32E-08	3.44E-08	3.56E-08	3.69E-08	3.81E-08	3.81E-08
eu152	3.19E-08	3.33E-08	3.46E-08	3.60E-08	3.74E-08	3.74E-08
cd111	3.07E-08	3.19E-08	3.30E-08	3.42E-08	3.54E-08	3.54E-08
te130	2.72E-08	2.82E-08	2.91E-08	3.01E-08	3.11E-08	3.11E-08
sm154	2.66E-08	2.75E-08	2.85E-08	2.95E-08	3.04E-08	3.04E-08
rb 87	2.52E-08	2.61E-08	2.70E-08	2.79E-08	2.88E-08	2.88E-08

se 77	1.80E-08	1.84E-08	1.93E-08	1.99E-08	2.06E-08	2.06E-08
sr 90	1.70E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08
pd106	1.32E-08	1.37E-08	1.42E-08	1.47E-08	1.51E-08	1.51E-08
kr 84	1.19E-08	1.23E-08	1.27E-08	1.32E-08	1.36E-08	1.36E-08
se 79	9.23E-09	9.56E-09	9.89E-09	1.02E-08	1.05E-08	1.05E-08
sb121	8.81E-09	9.12E-09	9.44E-09	9.75E-09	1.01E-08	1.01E-08
rh105	8.59E-09	8.43E-09	8.44E-09	8.45E-09	8.46E-09	8.61E-09
sb123	7.16E-09	7.42E-09	7.67E-09	7.93E-09	8.18E-09	8.18E-09
gd154	6.49E-09	6.79E-09	7.09E-09	7.40E-09	7.71E-09	7.71E-09
kr 86	6.66E-09	6.89E-09	7.13E-09	7.36E-09	7.60E-09	7.60E-09
te128	5.96E-09	6.17E-09	6.39E-09	6.60E-09	6.81E-09	6.81E-09
dy161	4.38E-09	4.56E-09	4.74E-09	4.93E-09	5.11E-09	5.11E-09
se 80	4.30E-09	4.45E-09	4.61E-09	4.76E-09	4.91E-09	4.91E-09
ru 99	3.46E-09	3.70E-09	3.96E-09	4.22E-09	4.49E-09	4.49E-09
te125	3.78E-09	3.91E-09	4.05E-09	4.18E-09	4.32E-09	4.32E-09
cs137	3.75E-09	3.75E-09	3.75E-09	3.75E-09	3.75E-09	3.75E-09
tb159	2.71E-09	2.81E-09	2.92E-09	3.02E-09	3.13E-09	3.13E-09
cd112	2.51E-09	2.60E-09	2.69E-09	2.78E-09	2.88E-09	2.88E-09
li 6	2.44E-09	2.52E-09	2.61E-09	2.70E-09	2.78E-09	2.78E-09
pr143	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09
gd154	1.79E-09	1.92E-09	2.06E-09	2.20E-09	2.34E-09	2.34E-09
sn117	1.96E-09	2.03E-09	2.10E-09	2.18E-09	2.25E-09	2.25E-09
eu154	1.96E-09	2.03E-09	2.10E-09	2.17E-09	2.24E-09	2.24E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
gd158	1.65E-09	1.73E-09	1.81E-09	1.89E-09	1.97E-09	1.97E-09
sn119	1.61E-09	1.66E-09	1.72E-09	1.78E-09	1.84E-09	1.84E-09
sn115	1.47E-09	1.52E-09	1.58E-09	1.63E-09	1.68E-09	1.68E-09
ce141	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
sr 88	1.22E-09	1.27E-09	1.31E-09	1.35E-09	1.40E-09	1.40E-09
cd114	1.07E-09	1.12E-09	1.16E-09	1.21E-09	1.25E-09	1.25E-09
pd110	9.35E-10	9.71E-10	1.01E-09	1.04E-09	1.08E-09	1.08E-09
pm149	9.68E-10	9.74E-10	9.74E-10	9.74E-10	9.73E-10	9.64E-10
se 82	8.31E-10	8.60E-10	8.90E-10	9.19E-10	9.48E-10	9.48E-10
nd147	9.21E-10	9.24E-10	9.24E-10	9.24E-10	9.24E-10	9.19E-10
sn126	6.80E-10	7.05E-10	7.30E-10	7.54E-10	7.79E-10	7.79E-10

1 sas2h: fer-field crit based on 6kw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 73
0 fraction of total absorption rate
0 powers .80mw, burnup= 1169.mwd, flux= 2.69E+08n/cm**2-sec
initial 264807. d 273938. d 283069. d 292201. d

dy164	6.48E-10	6.79E-10	7.10E-10	7.42E-10	7.74E-10	7.74E-10
ru100	5.92E-10	6.35E-10	6.79E-10	7.24E-10	7.71E-10	7.71E-10
dy162	6.47E-10	6.76E-10	7.05E-10	7.35E-10	7.65E-10	7.65E-10
se 78	6.31E-10	6.53E-10	6.76E-10	6.98E-10	7.20E-10	7.20E-10
ce144	5.98E-10	5.97E-10	5.97E-10	5.97E-10	5.97E-10	5.97E-10
sn124	5.09E-10	5.28E-10	5.46E-10	5.64E-10	5.82E-10	5.82E-10
kr 85	5.70E-10	5.69E-10	5.69E-10	5.69E-10	5.69E-10	5.69E-10
nd142	4.11E-10	4.41E-10	4.71E-10	5.03E-10	5.36E-10	5.36E-10
ba134	3.96E-10	4.22E-10	4.51E-10	4.82E-10	5.13E-10	5.13E-10
sm148	3.67E-10	3.94E-10	4.21E-10	4.49E-10	4.78E-10	4.78E-10
se 75	3.75E-10	3.89E-10	4.02E-10	4.15E-10	4.29E-10	4.29E-10
ba135	3.22E-10	3.45E-10	3.70E-10	3.95E-10	4.20E-10	4.20E-10
ru103	3.59E-10	3.60E-10	3.60E-10	3.60E-10	3.60E-10	3.59E-10
pd104	2.69E-10	2.89E-10	3.09E-10	3.30E-10	3.51E-10	3.51E-10
in113	2.74E-10	2.86E-10	2.96E-10	3.07E-10	3.17E-10	3.17E-10
ba136	2.35E-10	2.44E-10	2.54E-10	2.64E-10	2.74E-10	2.74E-10
sn118	2.07E-10	2.15E-10	2.22E-10	2.30E-10	2.37E-10	2.37E-10
cs134	1.88E-10	1.95E-10	2.02E-10	2.08E-10	2.15E-10	2.15E-10
sn122	1.76E-10	1.83E-10	1.89E-10	1.95E-10	2.02E-10	2.02E-10
cd116	1.76E-10	1.82E-10	1.89E-10	1.95E-10	2.01E-10	2.01E-10

dy163	1.51E-10	1.58E-10	1.65E-10	1.72E-10	1.79E-10	1.79E-10
kr 82	1.47E-10	1.53E-10	1.60E-10	1.67E-10	1.74E-10	1.74E-10
mo 96	1.36E-10	1.44E-10	1.53E-10	1.61E-10	1.70E-10	1.70E-10
zr 95	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10
nb 95	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10	1.52E-10
sn120	1.32E-10	1.36E-10	1.41E-10	1.46E-10	1.51E-10	1.51E-10
y 91	1.43E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10
xe130	1.11E-10	1.16E-10	1.22E-10	1.28E-10	1.34E-10	1.34E-10
ge 73	1.03E-10	1.07E-10	1.10E-10	1.14E-10	1.18E-10	1.18E-10
pm151	1.07E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.05E-10
nb 93	4.89E-11	5.26E-11	5.64E-11	6.03E-11	6.44E-11	6.44E-11
cd110	4.02E-11	4.33E-11	4.65E-11	4.98E-11	5.33E-11	5.33E-11
ba140	4.69E-11	4.71E-11	4.71E-11	4.71E-11	4.71E-11	4.68E-11
ge 76	3.72E-11	3.85E-11	3.98E-11	4.11E-11	4.24E-11	4.24E-11
sm153	3.79E-11	3.87E-11	3.88E-11	3.88E-11	3.88E-11	3.76E-11
eu156	3.62E-11	3.63E-11	3.64E-11	3.64E-11	3.65E-11	3.65E-11
br 79	2.63E-11	2.82E-11	3.02E-11	3.22E-11	3.43E-11	3.43E-11
te126	2.71E-11	2.84E-11	2.97E-11	3.11E-11	3.25E-11	3.25E-11
sr 89	3.05E-11	3.05E-11	3.05E-11	3.05E-11	3.04E-11	3.04E-11
gd160	2.59E-11	2.69E-11	2.79E-11	2.90E-11	3.00E-11	3.00E-11
ru106	2.70E-11	2.71E-11	2.71E-11	2.72E-11	2.72E-11	2.72E-11
xe129	1.49E-11	1.60E-11	1.71E-11	1.83E-11	1.95E-11	1.95E-11
ag107	1.47E-11	1.58E-11	1.69E-11	1.81E-11	1.93E-11	1.93E-11
se143	1.69E-11	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.67E-11
y 90	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
sb125	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
la140	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
mo 99	1.28E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11	1.27E-11
ho165	1.06E-11	1.11E-11	1.16E-11	1.21E-11	1.26E-11	1.26E-11

1 sas2h: fer-field crit based on 6&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 74
0 fraction of total absorption rate
power= .60mw, burnup= 1169.mwd, flux= 2.49e+08n/cm**2-sec
0 initial 264807, d 273938. d 283069. d 292201. d

pm148m	9.50E-12	9.52E-12	9.52E-12	9.51E-12	9.51E-12	9.50E-12
te127m	7.60E-12	7.61E-12	7.61E-12	7.62E-12	7.62E-12	7.62E-12
i131	6.74E-12	6.75E-12	6.75E-12	6.75E-12	6.75E-12	6.73E-12
kr 87	9.09E-12	2.28E-11	2.28E-11	2.28E-11	2.28E-11	6.65E-12
te126	4.72E-12	4.90E-12	5.09E-12	5.27E-12	5.45E-12	5.45E-12
sr 87	4.32E-12	4.47E-12	4.63E-12	4.78E-12	4.94E-12	4.94E-12
nb 94	2.45E-12	2.54E-12	2.62E-12	2.71E-12	2.80E-12	2.80E-12
dy160	2.10E-12	2.25E-12	2.40E-12	2.56E-12	2.72E-12	2.72E-12
ge 74	2.08E-12	2.15E-12	2.23E-12	2.30E-12	2.37E-12	2.37E-12
sr 86	1.93E-12	2.02E-12	2.12E-12	2.22E-12	2.32E-12	2.32E-12
xe128	1.64E-12	1.75E-12	1.87E-12	1.99E-12	2.11E-12	2.11E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ge 72	1.41E-12	1.46E-12	1.51E-12	1.56E-12	1.61E-12	1.61E-12
se 76	0.81E-13	1.02E-12	1.06E-12	1.11E-12	1.15E-12	1.15E-12
sn116	5.70E-13	6.11E-13	6.54E-13	6.98E-13	7.43E-13	7.43E-13
er166	4.22E-13	4.45E-13	4.69E-13	4.93E-13	5.18E-13	5.18E-13
pm148	3.63E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.61E-13
ag111	3.51E-13	3.53E-13	3.55E-13	3.56E-13	3.57E-13	3.55E-13
te122	2.43E-13	2.60E-13	2.78E-13	2.97E-13	3.16E-13	3.16E-13
eu157	3.00E-13	3.22E-13	3.23E-13	3.23E-13	3.24E-13	3.05E-13
cd115m	2.40E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13
cs136	7.41E-14	7.51E-14	7.57E-14	7.64E-14	7.71E-14	7.67E-14
kr 88	6.51E-14	6.77E-14	7.04E-14	7.30E-14	7.57E-14	7.57E-14
sn125	2.93E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.93E-14
ru105	2.40E-14	2.05E-14	2.05E-14	2.05E-14	2.06E-14	2.21E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14

te132	9.40E-15	9.54E-15	9.54E-15	9.54E-15	9.54E-15	9.35E-15
tb160	7.82E-15	8.10E-15	8.39E-15	8.67E-15	8.95E-15	8.94E-15
rb 88	9.22E-15	1.28E-14	1.28E-14	1.28E-14	1.28E-14	8.02E-15
i135	8.46E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	7.96E-15
te123	5.77E-15	6.05E-15	6.34E-15	6.44E-15	6.04E-15	6.04E-15
er167	5.06E-15	5.43E-15	5.82E-15	6.23E-15	6.65E-15	6.65E-15
be 9	4.63E-15	4.80E-15	4.96E-15	5.12E-15	5.29E-15	5.29E-15
pr142	4.53E-15	4.99E-15	5.17E-15	5.34E-15	5.51E-15	5.07E-15
sb126	4.20E-15	4.26E-15	4.30E-15	4.34E-15	4.39E-15	4.37E-15
sb124	2.46E-15	2.47E-15	2.48E-15	2.50E-15	2.51E-15	2.51E-15
li 7	1.89E-15	1.95E-15	2.02E-15	2.09E-15	2.15E-15	2.15E-15
in117m	1.94E-15	2.16E-15	2.16E-15	2.17E-15	2.17E-15	1.82E-15
i130	1.44E-15	1.63E-15	1.66E-15	1.70E-15	1.73E-15	1.53E-15
te134	1.07E-15	5.82E-15	5.82E-15	5.82E-15	5.82E-15	6.05E-16
rb 86	5.24E-16	5.36E-16	5.46E-16	5.56E-16	5.66E-16	5.44E-16
in117	5.78E-16	6.37E-16	6.38E-16	6.39E-16	6.39E-16	5.65E-16
cd108	1.46E-16	1.80E-16	1.93E-16	2.08E-16	2.23E-16	2.23E-16
dy165	2.46E-16	4.05E-16	4.12E-16	4.18E-16	4.25E-16	2.21E-16
sn114	1.34E-16	1.44E-16	1.55E-16	1.65E-16	1.76E-16	1.76E-16
ge 75	3.77E-17	8.63E-17	8.63E-17	8.63E-17	8.63E-17	2.83E-17
cs134m	2.35E-17	3.66E-17	3.78E-17	3.91E-17	4.03E-17	2.35E-17
cd118	2.99E-17	1.23E-16	1.23E-16	1.23E-16	1.23E-16	1.07E-17
cd109	1.38E-18	1.42E-18	1.46E-18	1.50E-18	1.54E-18	1.54E-18

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 75
0 fraction of total absorption rate
power= .00mw, burnup= 1169.mwd, flux= 2.69E+08n/cm**2-sec
0 initial 264807. d 273938. d 283069. d 292201. d 292201. d

in119m	6.95E-19	3.05E-17	3.05E-17	3.05E-17	3.06E-17	1.88E-19

1
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 76
power= 4.000E-03mw, burnup=1.1688E+03mwd, flux= 2.69E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 264807. d	273938. d	283069. d	292201. d	292201. d	
h 1	6.01E-05	6.23E-05	6.44E-05	6.66E-05	6.87E-05	6.87E-05
h 2	1.79E-07	1.85E-07	1.91E-07	1.98E-07	2.04E-07	2.04E-07
h 3	3.50E-11	3.51E-11	3.51E-11	3.52E-11	3.53E-11	3.53E-11
h 4	.00E+00	1.42E-34	1.42E-34	1.43E-34	1.43E-34	.00E+00
he 3	1.27E-09	1.32E-09	1.37E-09	1.41E-09	1.46E-09	1.46E-09
he 4	9.94E-06	1.03E-05	1.07E-05	1.10E-05	1.14E-05	1.14E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.19E-06	1.24E-06	1.28E-06	1.32E-06	1.36E-06	1.36E-06
ne 21	2.50E-11	2.67E-11	2.85E-11	3.03E-11	3.22E-11	3.22E-11
ne 22	7.75E-09	8.02E-09	8.30E-09	8.58E-09	8.86E-09	8.86E-09
na 23	7.88E-30	7.89E-15	7.89E-15	7.89E-15	7.89E-15	7.89E-30
na 22	4.16E-11	4.17E-11	4.17E-11	4.17E-11	4.17E-11	4.17E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.34E-08	2.75E-08	2.75E-08	2.75E-08	2.75E-08	2.47E-08
na 24m	4.32E-30	4.32E-15	4.31E-15	4.31E-15	4.31E-15	4.31E-30
na 25	1.09E-40	1.15E-25	1.22E-25	1.29E-25	1.35E-25	1.35E-40
mg 24	8.54E-03	8.82E-03	9.10E-03	9.39E-03	9.67E-03	9.67E-03
mg 25	3.82E-09	4.04E-09	4.27E-09	4.50E-09	4.74E-09	4.74E-09
mg 26	1.78E-07	1.85E-07	1.91E-07	1.98E-07	2.04E-07	2.04E-07
mg 27	1.17E-15	2.12E-12	2.12E-12	2.12E-12	2.12E-12	9.59E-17
mg 28	4.07E-24	4.31E-24	4.31E-24	4.31E-24	4.30E-24	5.99E-24
si 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
si 28	3.74E-24	2.04E-10	2.04E-10	2.04E-10	2.04E-10	2.11E-25
si 29	1.21E-28	4.41E-24	4.84E-24	7.28E-24	7.73E-24	4.26E-30
si 30	.00E+00	8.66E-35	9.78E-35	1.08E-34	1.18E-34	.00E+00

si 28	2.48E-02	2.57E-02	2.65E-02	2.73E-02	2.82E-02	2.82E-02
si 29	2.34E-08	2.51E-08	2.67E-08	2.85E-08	3.02E-08	3.02E-08
si 30	2.34E-14	2.59E-14	2.86E-14	3.15E-14	3.45E-14	3.45E-14
si 31	1.07E-26	1.86E-26	2.05E-26	2.25E-26	2.47E-26	1.35E-26
si 32	1.32E-32	1.49E-32	1.68E-32	1.88E-32	2.10E-32	2.10E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.69E+08	2.69E+08	2.69E+08	2.69E+08	2.68E-07

sas2h: far-field crit based on b&u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 77
power= 4.000E-03mw, burnup=1.1688E+03mwd, flux= 2.69E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 264807. d 273938. d 283069. d 292201. d 292201. d					
he 4	1.78E-01	1.86E-01	1.95E-01	2.03E-01	2.12E-01	2.12E-01
pb206	4.76E-06	5.30E-06	5.88E-06	6.49E-06	7.15E-06	7.15E-06
pb207	3.42E-06	3.68E-06	3.95E-06	4.23E-06	4.51E-06	4.51E-06
pb208	6.08E-07	6.51E-07	6.96E-07	7.43E-07	7.91E-07	7.91E-07
pb209	6.74E-13	7.17E-13	7.67E-13	8.18E-13	8.71E-13	8.76E-13
pb210	6.65E-07	7.13E-07	7.63E-07	8.16E-07	8.67E-07	8.67E-07
pb211	1.01E-12	1.05E-12	1.09E-12	1.12E-12	1.16E-12	1.16E-12
pb212	3.04E-12	3.14E-12	3.25E-12	3.36E-12	3.46E-12	3.46E-12
pb214	1.61E-12	1.77E-12	1.89E-12	2.01E-12	2.14E-12	2.08E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.93E-07	3.26E-07	3.60E-07	3.97E-07	4.37E-07	4.37E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	4.09E-10	4.39E-10	4.70E-10	5.01E-10	5.34E-10	5.34E-10
bi211	6.04E-14	6.21E-14	6.43E-14	6.66E-14	6.88E-14	6.91E-14
bi212	2.88E-13	2.98E-13	3.08E-13	3.18E-13	3.28E-13	3.29E-13
bi213	1.52E-13	1.68E-13	1.79E-13	1.91E-13	2.03E-13	1.97E-13
bi214	1.22E-12	1.32E-12	1.41E-12	1.50E-12	1.59E-12	1.56E-12
po210	1.13E-08	1.21E-08	1.30E-08	1.38E-08	1.47E-08	1.47E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	6.67E-19	6.86E-19	7.11E-19	7.36E-19	7.61E-19	7.64E-19
po212	1.51E-23	1.57E-23	1.62E-23	1.67E-23	1.73E-23	1.73E-23
po213	2.28E-22	2.52E-22	2.69E-22	2.87E-22	3.06E-22	2.97E-22
po214	1.67E-19	1.81E-19	1.93E-19	2.06E-19	2.18E-19	2.14E-19
po215	8.30E-19	8.61E-19	8.92E-19	9.23E-19	9.54E-19	9.54E-19
po216	1.15E-17	1.19E-17	1.23E-17	1.27E-17	1.31E-17	1.31E-17
po218	1.92E-13	2.05E-13	2.19E-13	2.33E-13	2.47E-13	2.48E-13
rn218	4.32E-29	4.47E-29	4.62E-29	4.77E-29	4.92E-29	4.91E-29
rn219	1.85E-15	1.92E-15	1.98E-15	2.05E-15	2.12E-15	2.12E-15
rn220	6.41E-15	6.56E-15	6.72E-15	6.87E-15	5.03E-15	5.03E-15
rn222	3.41E-10	3.65E-10	3.89E-10	4.14E-10	4.39E-10	4.39E-10
ra222	4.69E-26	4.85E-26	5.01E-26	5.18E-26	5.34E-26	5.34E-26
ra223	4.61E-10	4.78E-10	4.95E-10	5.12E-10	5.30E-10	5.30E-10
ra224	2.51E-11	2.59E-11	2.68E-11	2.77E-11	2.86E-11	2.86E-11
ra225	7.31E-11	7.85E-11	8.38E-11	8.94E-11	9.52E-11	9.52E-11
ra226	5.21E-05	5.57E-05	5.94E-05	6.32E-05	6.72E-05	6.72E-05
ra228	1.46E-12	1.52E-12	1.57E-12	1.62E-12	1.68E-12	1.68E-12
ac225	4.94E-11	5.29E-11	5.66E-11	6.04E-11	6.43E-11	6.43E-11
ac227	3.20E-07	3.52E-07	3.44E-07	3.56E-07	3.68E-07	3.68E-07
ac228	1.79E-16	1.85E-16	1.92E-16	1.98E-16	2.05E-16	2.05E-16
th226	2.28E-24	2.37E-24	2.45E-24	2.53E-24	2.61E-24	2.60E-24
th227	7.43E-10	7.71E-10	7.99E-10	8.27E-10	8.55E-10	8.55E-10
th228	4.79E-09	4.95E-09	5.12E-09	5.29E-09	5.46E-09	5.46E-09
th229	1.42E-05	1.52E-05	1.63E-05	1.74E-05	1.85E-05	1.85E-05
th230	1.79E-02	1.85E-02	1.92E-02	1.98E-02	2.04E-02	2.04E-02
th231	3.08E-09	3.08E-09	3.08E-09	3.09E-09	3.09E-09	3.08E-09
th232	3.62E-03	3.75E-03	3.88E-03	4.01E-03	4.14E-03	4.14E-03
th233	1.37E-15	3.43E-14	3.55E-14	3.67E-14	3.79E-14	3.43E-14

th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.04E-04	5.22E-04	5.40E-04	5.58E-04	5.76E-04	5.76E-04
pa232	8.32E-12	8.95E-12	9.26E-12	9.58E-12	9.87E-12	9.39E-12

1

ass2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 78
power= 4.000E-03mw, burnup=1.1688E+03mwd, flux= 2.49E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 264807. d	273938. d	283069. d	292201. d	292201. d	
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.21E-21	2.29E-21	2.37E-21	2.45E-21	2.53E-21	2.52E-21
u231	7.13E-18	7.47E-18	7.73E-18	7.99E-18	8.24E-18	8.11E-18
u232	1.71E-07	1.77E-07	1.83E-07	1.89E-07	1.95E-07	1.95E-07
u233	9.51E-03	9.84E-03	1.02E-02	1.05E-02	1.09E-02	1.09E-02
u234	9.13E+00	9.14E+00	9.14E+00	9.14E+00	9.15E+00	9.15E+00
u235	7.25E+02	7.25E+02	7.25E+02	7.25E+02	7.24E+02	7.24E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.09E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.08E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.54E-08	3.17E-07	3.17E-07	3.17E-07	3.17E-07	5.63E-09
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12
np236m	1.95E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.91E-12
np236	1.38E-07	1.42E-07	1.47E-07	1.52E-07	1.57E-07	1.57E-07
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.50E-06
np239	4.52E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.49E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.96E-15	9.30E-15	9.30E-15	9.30E-15	9.30E-15	2.02E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	2.55E-13	2.57E-13	2.58E-13	2.59E-13	2.60E-13	2.59E-13
pu238	2.33E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
pu239	5.41E+00	5.53E+00	5.65E+00	5.77E+00	5.88E+00	5.88E+00
pu240	1.15E-02	1.23E-02	1.31E-02	1.40E-02	1.49E-02	1.49E-02
pu241	4.45E-06	4.77E-06	5.10E-06	5.45E-06	5.80E-06	5.80E-06
pu242	2.50E-08	2.86E-08	3.22E-08	3.62E-08	4.06E-08	4.06E-08
pu243	4.15E-17	5.99E-17	6.77E-17	7.63E-17	8.55E-17	4.22E-17
pu244	4.67E-35	6.65E-35	9.35E-35	1.29E-34	1.78E-34	1.78E-34
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	9.50E-21	1.16E-20	1.27E-20	1.39E-20	1.52E-20	1.33E-20
am240	4.70E-18	5.30E-18	5.83E-18	6.38E-18	6.96E-18	6.75E-18
am241	3.83E-05	4.22E-05	4.64E-05	5.08E-05	5.55E-05	5.55E-05
am242m	9.64E-09	1.11E-08	1.24E-08	1.38E-08	1.53E-08	1.53E-08
am242	1.36E-12	1.61E-12	1.77E-12	1.94E-12	2.12E-12	1.94E-12
am243	5.09E-11	5.97E-11	6.94E-11	8.04E-11	9.26E-11	9.26E-11
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	3.46E-19	4.53E-19	5.27E-19	6.11E-19	7.03E-19	6.01E-19
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	8.45E-23	9.35E-23	1.03E-22	1.13E-22	1.23E-22	1.23E-22
cm242	2.96E-10	3.24E-10	3.57E-10	3.91E-10	4.28E-10	4.28E-10
cm243	1.01E-16	1.13E-16	1.25E-16	1.38E-16	1.52E-16	1.52E-16
cm244	5.18E-15	6.10E-15	7.14E-15	8.30E-15	9.61E-15	9.61E-15

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     sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   79
       power= 4.000E-03mw, burnup=1.1688E+03mwd, flux= 2.69E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge 264807. d 273938. d 283069. d 292201. d 292201. d
     cm245   6.58E-19  8.05E-19  9.78E-19  1.18E-18  1.41E-18  1.41E-18
     cm246   5.83E-22  4.87E-22  4.14E-22  7.67E-22  9.50E-22  9.50E-22
     cm247   3.66E-27  4.83E-27  4.31E-27  8.17E-27  1.05E-26  1.05E-26
     cm248   3.59E-31  4.01E-31  4.05E-31  8.92E-31  1.18E-30  1.18E-30
     cm249   2.57E-42  1.56E-41  2.33E-41  3.11E-41  3.89E-41  8.90E-42
     cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.69E+08  2.69E+08  2.69E+08  2.69E+08  2.68E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

          cross-section data taken from position number  9 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the *process2* case updating all nuclides on the scale *burnup* library *
          *                                                                          *
          *                   fission product yields are from endf/b-v               *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
          *        see information above this box (if present) for later updates     *
          *                                                                          *
          ****************************************************************************
0         ****************************************************************************
0                   .other identification and sizes of library.
```

```
0                 data set name:  ft33f001
0               8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0      ****************************************************************************
1   sas2h: far-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page  80
       powerr    .00mw, burnup=   1315.mwd, flux= 2.68E+08n/cm**2-sec
0                                                basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial        301332. d      310463. d      319594. d      328726. d      328726. d
    productions  1.145846E+06   1.146018E+06   1.146189E+06   1.146360E+06   1.146531E+06   1.146531E+06
    absorptions  9.373998E+05   9.375783E+05   9.377566E+05   9.379288E+05   9.381009E+05   9.381009E+05
    k infinity   1.222366E+00   1.222317E+00   1.222270E+00   1.222225E+00   1.222183E+00   1.222183E+00
0                  initial        301332. d      310463. d      319594. d      328726. d      328726. d
    actinide
    absorptions  9.302094E+05   9.303122E+05   9.304148E+05   9.305171E+05   9.306193E+05   9.306193E+05
    non-actinide
    abs. fracs.  7.670581E-03   7.749796E-03   7.829984E-03   7.902205E-03   7.975280E-03   7.975221E-03
1   sas2h: far-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products  page  81
0                                  fraction of total absorption rate
       powerr    .00mw, burnup=   1315.mwd, flux= 2.68E+08n/cm**2-sec
0                 initial 301332. d 310463. d 319594. d 328726. d 328726. d

    sm149     3.59E-03  3.65E-03  3.71E-03  3.76E-03  3.82E-03  3.82E-03
    eu151     1.47E-04  1.52E-04  1.58E-04  1.63E-04  1.68E-04  1.68E-04
    nd143     1.18E-04  1.21E-04  1.25E-04  1.29E-04  1.32E-04  1.32E-04
    gd155     6.48E-05  6.64E-05  6.81E-05  6.97E-05  7.12E-05  7.12E-05
    rh103     5.49E-05  5.67E-05  5.84E-05  6.01E-05  6.18E-05  6.18E-05
    cd113     3.92E-05  4.01E-05  4.10E-05  4.19E-05  4.28E-05  4.28E-05
    xe131     3.72E-05  3.84E-05  3.95E-05  4.07E-05  4.18E-05  4.18E-05
    sm151     3.99E-05  4.00E-05  4.00E-05  4.00E-05  4.00E-05  4.00E-05
    gd157     3.10E-05  3.16E-05  3.18E-05  3.22E-05  3.26E-05  3.26E-05
    cs133     2.89E-05  2.97E-05  3.06E-05  3.15E-05  3.24E-05  3.24E-05
    sm147     2.13E-05  2.20E-05  2.26E-05  2.33E-05  2.40E-05  2.40E-05
    tc 99     2.12E-05  2.19E-05  2.25E-05  2.32E-05  2.38E-05  2.38E-05
    nd145     1.65E-05  1.70E-05  1.75E-05  1.80E-05  1.85E-05  1.85E-05
    mo 95     1.14E-05  1.18E-05  1.21E-05  1.25E-05  1.28E-05  1.28E-05
    sm152     9.14E-06  9.44E-06  9.74E-06  1.00E-05  1.03E-05  1.03E-05
    kr 83     7.14E-06  7.36E-06  7.58E-06  7.81E-06  8.03E-06  8.03E-06
    cs135     6.51E-06  6.71E-06  6.92E-06  7.12E-06  7.32E-06  7.32E-06
    ru101     5.04E-06  5.20E-06  5.36E-06  5.51E-06  5.67E-06  5.67E-06
    pr141     4.87E-06  5.02E-06  5.17E-06  5.32E-06  5.47E-06  5.47E-06
    eu153     4.45E-06  4.59E-06  4.73E-06  4.87E-06  5.01E-06  5.01E-06
    la139     3.98E-06  4.11E-06  4.23E-06  4.35E-06  4.48E-06  4.48E-06
    sm150     3.53E-06  3.72E-06  3.91E-06  4.10E-06  4.30E-06  4.30E-06
    xe133     2.26E-06  2.31E-06  2.31E-06  2.31E-06  2.31E-06  2.26E-06
    ba137     1.80E-06  1.86E-06  1.92E-06  1.98E-06  2.04E-06  2.04E-06
    pd105     1.71E-06  1.77E-06  1.82E-06  1.88E-06  1.93E-06  1.93E-06
    zr 93     1.61E-06  1.66E-06  1.71E-06  1.76E-06  1.81E-06  1.81E-06
     i129     1.24E-06  1.28E-06  1.32E-06  1.36E-06  1.40E-06  1.40E-06
    nd144     1.20E-06  1.23E-06  1.27E-06  1.31E-06  1.35E-06  1.35E-06
    mo 97     9.03E-07  9.31E-07  9.59E-07  9.87E-07  1.01E-06  1.01E-06
    ag109     7.78E-07  8.07E-07  8.36E-07  8.65E-07  8.95E-07  8.95E-07
    zr 91     4.25E-07  4.38E-07  4.51E-07  4.64E-07  4.77E-07  4.77E-07
     y 89     4.07E-07  4.20E-07  4.33E-07  4.43E-07  4.58E-07  4.58E-07
    ru102     3.69E-07  3.80E-07  3.92E-07  4.03E-07  4.15E-07  4.15E-07
    ce142     3.32E-07  3.42E-07  3.52E-07  3.62E-07  3.73E-07  3.73E-07
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nd148	3.18E-07	3.28E-07	3.38E-07	3.48E-07	3.58E-07	3.58E-07
nd146	2.67E-07	2.76E-07	2.84E-07	2.92E-07	3.00E-07	3.00E-07
pd108	2.42E-07	2.31E-07	2.39E-07	2.68E-07	2.76E-07	2.76E-07
pm147	2.69E-07	2.69E-07	2.69E-07	2.69E-07	2.69E-07	2.69E-07
ba138	2.29E-07	2.36E-07	2.43E-07	2.50E-07	2.57E-07	2.57E-07
in115	2.22E-07	2.29E-07	2.36E-07	2.42E-07	2.49E-07	2.49E-07
ce140	2.14E-07	2.21E-07	2.27E-07	2.34E-07	2.41E-07	2.41E-07
xe132	1.92E-07	1.98E-07	2.04E-07	2.10E-07	2.16E-07	2.16E-07
eu155	1.63E-07	1.63E-07	1.64E-07	1.64E-07	1.64E-07	1.64E-07
pd107	1.39E-07	1.44E-07	1.49E-07	1.53E-07	1.58E-07	1.58E-07
mo 98	1.32E-07	1.36E-07	1.40E-07	1.44E-07	1.48E-07	1.48E-07
mo100	1.28E-07	1.32E-07	1.36E-07	1.40E-07	1.44E-07	1.44E-07
xe134	1.26E-07	1.30E-07	1.34E-07	1.38E-07	1.42E-07	1.42E-07
zr 92	1.02E-07	1.05E-07	1.09E-07	1.12E-07	1.15E-07	1.15E-07
i127	8.40E-08	8.67E-08	8.93E-08	9.20E-08	9.47E-08	9.47E-08

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 82

0 fraction of total absorption rate

0 powers .00mw, burnup= 1315.mwd, flux= 2.68E+08n/cm**2-sec

0 initial $01332. d $10463. d $19594. d $28726. d $28726. d

zr 96	8.81E-08	8.26E-08	8.51E-08	8.76E-08	9.01E-08	9.01E-08
ru104	7.94E-08	8.19E-08	8.44E-08	8.69E-08	8.94E-08	8.94E-08
nd150	7.06E-08	7.28E-08	7.50E-08	7.72E-08	7.94E-08	7.94E-08
xe136	6.83E-08	7.04E-08	7.25E-08	7.46E-08	7.67E-08	7.67E-08
gd152	5.85E-08	6.27E-08	6.71E-08	7.17E-08	7.64E-08	7.64E-08
br 81	5.11E-08	5.27E-08	5.43E-08	5.58E-08	5.74E-08	5.74E-08
rb 85	4.97E-08	5.12E-08	5.27E-08	5.43E-08	5.58E-08	5.58E-08
zr 94	4.32E-08	4.46E-08	4.59E-08	4.72E-08	4.86E-08	4.86E-08
zr 90	3.81E-08	3.94E-08	4.06E-08	4.19E-08	4.31E-08	4.31E-08
eu152	3.74E-08	3.88E-08	4.01E-08	4.15E-08	4.29E-08	4.29E-08
cd111	3.54E-08	3.65E-08	3.77E-08	3.89E-08	4.01E-08	4.01E-08
te130	3.11E-08	3.20E-08	3.30E-08	3.40E-08	3.49E-08	3.49E-08
sm154	3.06E-08	3.14E-08	3.23E-08	3.33E-08	3.42E-08	3.42E-08
rb 87	2.88E-08	2.97E-08	3.06E-08	3.15E-08	3.24E-08	3.24E-08
se 77	2.06E-08	2.12E-08	2.18E-08	2.25E-08	2.31E-08	2.31E-08
pd106	1.51E-08	1.56E-08	1.61E-08	1.66E-08	1.71E-08	1.71E-08
sr 90	1.70E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08	1.70E-08
kr 84	1.36E-08	1.40E-08	1.44E-08	1.48E-08	1.53E-08	1.53E-08
se 79	1.05E-08	1.09E-08	1.12E-08	1.15E-08	1.18E-08	1.18E-08
sb121	1.01E-08	1.04E-08	1.07E-08	1.10E-08	1.13E-08	1.13E-08
sb123	8.18E-09	8.44E-09	8.70E-09	8.95E-09	9.21E-09	9.21E-09
gd156	7.71E-09	8.02E-09	8.34E-09	8.66E-09	8.98E-09	8.98E-09
rh105	8.41E-09	8.67E-09	8.68E-09	8.69E-09	8.70E-09	8.65E-09
kr 86	7.40E-09	7.83E-09	8.07E-09	8.30E-09	8.54E-09	8.54E-09
te128	6.81E-09	7.02E-09	7.24E-09	7.45E-09	7.66E-09	7.66E-09
dy161	5.11E-09	5.30E-09	5.48E-09	5.67E-09	5.87E-09	5.87E-09
ru 99	4.49E-09	4.78E-09	5.06E-09	5.36E-09	5.67E-09	5.67E-09
se 80	4.91E-09	5.06E-09	5.22E-09	5.37E-09	5.52E-09	5.52E-09
te125	4.32E-09	4.46E-09	4.60E-09	4.73E-09	4.87E-09	4.87E-09
ba137	3.75E-09	3.75E-09	3.75E-09	3.75E-09	3.75E-09	3.75E-09
tb159	3.13E-09	3.23E-09	3.34E-09	3.44E-09	3.55E-09	3.55E-09
cd112	2.88E-09	2.97E-09	3.06E-09	3.15E-09	3.25E-09	3.25E-09
li 6	2.78E-09	2.87E-09	2.95E-09	3.04E-09	3.12E-09	3.12E-09
gd154	2.34E-09	2.49E-09	2.65E-09	2.81E-09	2.97E-09	2.97E-09
pr143	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09
sn117	2.25E-09	2.32E-09	2.39E-09	2.46E-09	2.53E-09	2.53E-09
eu154	2.24E-09	2.31E-09	2.38E-09	2.45E-09	2.53E-09	2.53E-09
gd158	1.97E-09	2.06E-09	2.14E-09	2.23E-09	2.31E-09	2.31E-09
sn119	1.86E-09	1.89E-09	1.95E-09	2.01E-09	2.07E-09	2.07E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09

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     sn115     1.68E-09  1.73E-09  1.79E-09  1.84E-09  1.89E-09  1.89E-09
     ce141     1.59E-09  1.59E-09  1.59E-09  1.59E-09  1.59E-09  1.59E-09
     sr 88     1.40E-09  1.44E-09  1.48E-09  1.53E-09  1.57E-09  1.57E-09
     cd114     1.25E-09  1.30E-09  1.35E-09  1.39E-09  1.44E-09  1.44E-09
     pd110     1.08E-09  1.12E-09  1.15E-09  1.19E-09  1.23E-09  1.23E-09
     se 82     9.48E-10  9.78E-10  1.01E-09  1.04E-09  1.07E-09  1.07E-09
     ru100     7.71E-10  8.19E-10  8.69E-10  9.20E-10  9.73E-10  9.73E-10
     pm149     9.44E-10  9.73E-10  9.73E-10  9.73E-10  9.73E-10  9.63E-10
     nd147     9.19E-10  9.24E-10  9.23E-10  9.23E-10  9.23E-10  9.18E-10
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   83
0                                  fraction of total absorption rate
          powers     .00mw, burnup=   1315.mwd, flux= 2.68E+08n/cm**2-sec
0                 initial 301332. d 310463. d 319594. d 328726. d 328726. d

     dy164     7.74E-10  8.06E-10  8.39E-10  8.73E-10  9.07E-10  9.07E-10
     dy162     7.65E-10  7.95E-10  8.26E-10  8.58E-10  8.89E-10  8.89E-10
     sn126     7.79E-10  8.06E-10  8.29E-10  8.53E-10  8.78E-10  8.78E-10
     se 78     7.20E-10  7.43E-10  7.65E-10  7.88E-10  8.10E-10  8.10E-10
     nd142     5.36E-10  5.70E-10  6.05E-10  6.41E-10  6.78E-10  6.78E-10
     sn124     5.83E-10  6.01E-10  6.19E-10  6.38E-10  6.56E-10  6.56E-10
     ba134     5.13E-10  5.46E-10  5.79E-10  6.13E-10  6.49E-10  6.49E-10
     sm148     4.78E-10  5.08E-10  5.39E-10  5.70E-10  6.03E-10  6.03E-10
     ce144     5.07E-10  5.07E-10  5.07E-10  5.06E-10  5.06E-10. 5.06E-10
     kr 85     5.69E-10  5.68E-10  5.68E-10  5.68E-10  5.68E-10  5.68E-10
     ba135     4.20E-10  4.47E-10  4.76E-10  5.03E-10  5.32E-10  5.32E-10
     as 75     4.29E-10  4.42E-10  4.55E-10  4.69E-10  4.82E-10  4.82E-10
     pd104     3.51E-10  3.73E-10  3.96E-10  4.20E-10  4.44E-10  4.44E-10
     ru103     3.59E-10  3.60E-10  3.60E-10  3.60E-10  3.60E-10  3.59E-10
     in113     3.17E-10  3.27E-10  3.37E-10  3.48E-10  3.58E-10  3.58E-10
     ba136     2.74E-10  2.84E-10  2.94E-10  3.04E-10  3.14E-10  3.14E-10
     sn118     2.37E-10  2.45E-10  2.52E-10  2.60E-10  2.67E-10  2.67E-10
     cs134     2.15E-10  2.22E-10  2.28E-10  2.35E-10  2.42E-10  2.41E-10
     sn122     2.02E-10  2.08E-10  2.14E-10  2.21E-10  2.27E-10  2.27E-10
     cd116     2.01E-10  2.08E-10  2.14E-10  2.20E-10  2.27E-10  2.27E-10
     dy163     1.79E-10  1.86E-10  1.94E-10  2.02E-10  2.09E-10  2.09E-10
     mo 96     1.70E-10  1.79E-10  1.88E-10  1.98E-10  2.08E-10  2.08E-10
     kr 82     1.74E-10  1.87E-10  1.88E-10  1.95E-10  2.02E-10  2.02E-10
     sn120     1.51E-10  1.55E-10  1.60E-10  1.65E-10  1.69E-10  1.69E-10
     zr 95     1.44E-10  1.44E-10  1.44E-10  1.44E-10  1.44E-10  1.43E-10
     xe130     1.34E-10  1.40E-10  1.46E-10  1.52E-10  1.58E-10  1.58E-10
     nb 95     1.52E-10  1.52E-10  1.52E-10  1.52E-10  1.51E-10  1.51E-10
      y 91     1.42E-10  1.42E-10  1.42E-10  1.42E-10  1.42E-10  1.42E-10
     se 73     1.18E-10  1.21E-10  1.25E-10  1.29E-10  1.32E-10  1.32E-10
     pm151     1.05E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10  1.05E-10
     nb 93     6.44E-11  6.85E-11  7.09E-11  7.73E-11  8.19E-11  8.19E-11
     cd110     5.33E-11  5.69E-11  6.06E-11  6.45E-11  6.85E-11  6.85E-11
     ge 74     4.24E-11  4.37E-11  4.51E-11  4.64E-11  4.77E-11  4.77E-11
     ba140     4.68E-11  4.70E-11  4.70E-11  4.70E-11  4.70E-11  4.68E-11
     br 79     3.43E-11  3.65E-11  3.87E-11  4.10E-11  4.34E-11  4.34E-11
     te126     3.25E-11  3.38E-11  3.53E-11  3.67E-11  3.82E-11  3.82E-11
     sm153     2.76E-11  2.88E-11  2.88E-11  2.89E-11  2.89E-11  2.77E-11
     eu154     2.45E-11  2.66E-11  2.66E-11  2.47E-11  2.68E-11  2.68E-11
     gd160     2.80E-11  3.10E-11  3.21E-11  3.31E-11  3.42E-11  3.42E-11
     sr 89     3.04E-11  3.04E-11  3.04E-11  3.04E-11  3.04E-11  3.04E-11
     ru106     2.72E-11  2.73E-11  2.74E-11  2.74E-11  2.75E-11  2.75E-11
     xe129     1.95E-11  2.07E-11  2.20E-11  2.33E-11  2.47E-11  2.47E-11
     ag107     1.93E-11  2.06E-11  2.19E-11  2.32E-11  2.46E-11  2.46E-11
     ce143     1.67E-11  1.74E-11  1.74E-11  1.74E-11  1.73E-11  1.67E-11
      y 90     1.62E-11  1.61E-11  1.61E-11  1.61E-11  1.61E-11  1.61E-11
     sb125     1.52E-11  1.52E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11
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     te140     1.52E-11  1.52E-11  1.52E-11  1.52E-11  1.52E-11  1.52E-11
     ho165     1.26E-11  1.32E-11  1.37E-11  1.43E-11  1.48E-11  1.48E-11
     mo 99     1.27E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11  1.27E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  84
0                                   fraction of total absorption rate
        powers    .00mw, burnup=   1315.mwd, flux= 2.68E+08n/cm**2-sec
0            initial 301332. d 310463. d 319594. d 328726. d 328726. d

     pm148m    9.50E-12  9.51E-12  9.51E-12  9.51E-12  9.51E-12  9.50E-12
     te127m    7.62E-12  7.63E-12  7.63E-12  7.64E-12  7.65E-12  7.65E-12
      i131     6.73E-12  6.73E-12  6.73E-12  6.73E-12  6.73E-12  6.72E-12
     kr 87     6.45E-12  2.28E-11  2.27E-11  2.27E-11  2.27E-11  6.44E-12
     te126     5.45E-12  5.64E-12  5.83E-12  6.01E-12  6.20E-12  6.20E-12
     sr 87     4.93E-12  5.09E-12  5.24E-12  5.40E-12  5.55E-12  5.55E-12
     dy160     2.72E-12  2.89E-12  3.07E-12  3.25E-12  3.43E-12  3.43E-12
     nb 94     2.80E-12  2.89E-12  2.98E-12  3.06E-12  3.15E-12  3.15E-12
     sr 86     2.32E-12  2.42E-12  2.52E-12  2.63E-12  2.73E-12  2.73E-12
     ge 76     2.37E-12  2.43E-12  2.52E-12  2.60E-12  2.67E-12  2.67E-12
     xe128     2.11E-12  2.24E-12  2.37E-12  2.50E-12  2.64E-12  2.64E-12
     ge 72     1.61E-12  1.66E-12  1.71E-12  1.76E-12  1.81E-12  1.81E-12
     te129m    1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12
     se 76     1.15E-12  1.19E-12  1.24E-12  1.28E-12  1.32E-12  1.32E-12
     sn116     7.44E-13  7.91E-13  8.39E-13  8.89E-13  9.40E-13  9.40E-13
     er166     5.18E-13  5.43E-13  5.69E-13  5.96E-13  6.23E-13  6.23E-13
     te122     3.16E-13  3.36E-13  3.56E-13  3.77E-13  3.99E-13  3.99E-13
     pm148     3.61E-13  3.66E-13  3.66E-13  3.66E-13  3.65E-13  3.61E-13
     ag111     3.55E-13  3.59E-13  3.60E-13  3.61E-13  3.62E-13  3.60E-13
     eu157     2.05E-13  2.25E-13  2.26E-13  2.27E-13  2.28E-13  2.08E-13
     cd115m    2.41E-13  2.41E-13  2.41E-13  2.41E-13  2.41E-13  2.41E-13
     kr 85     7.57E-14  7.84E-14  8.12E-14  8.40E-14  8.68E-14  8.68E-14
     cs136     7.67E-14  7.78E-14  7.84E-14  7.91E-14  7.97E-14  7.93E-14
     sn125     2.93E-14  2.95E-14  2.95E-14  2.95E-14  2.95E-14  2.93E-14
     ru105     2.21E-14  3.06E-14  3.06E-14  3.07E-14  3.07E-14  2.22E-14
     sn123     1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     tb160     8.94E-15  9.23E-15  9.52E-15  9.83E-15  1.01E-14  1.01E-14
     te132     9.35E-15  9.53E-15  9.53E-15  9.53E-15  9.53E-15  9.34E-15
     er167     6.65E-15  7.09E-15  7.55E-15  8.03E-15  8.52E-15  8.52E-15
     te123     6.94E-15  7.25E-15  7.57E-15  7.90E-15  8.23E-15  8.23E-15
     rb 88     8.02E-15  1.28E-14  1.28E-14  1.28E-14  1.28E-14  8.01E-15
      i135     7.96E-15  1.01E-14  1.01E-14  1.01E-14  1.01E-14  7.95E-15
     be  9     5.29E-15  5.45E-15  5.62E-15  5.78E-15  5.95E-15  5.95E-15
     pr142     5.07E-15  5.48E-15  5.85E-15  6.02E-15  6.19E-15  5.70E-15
     sb126     4.37E-15  4.43E-15  4.47E-15  4.51E-15  4.56E-15  4.54E-15
     sb124     2.51E-15  2.52E-15  2.54E-15  2.55E-15  2.56E-15  2.54E-15
     li  7     2.15E-15  2.22E-15  2.29E-15  2.35E-15  2.42E-15  2.42E-15
     in117m    1.82E-15  1.97E-15  2.17E-15  2.17E-15  2.18E-15  1.83E-15
      i130     1.53E-15  1.76E-15  1.79E-15  1.82E-15  1.85E-15  1.64E-15
     te134     8.05E-16  8.82E-15  9.01E-15  9.01E-15  9.01E-15  8.64E-16
     rb 86     2.44E-16  2.76E-16  2.86E-16  2.96E-16  3.06E-16  2.86E-16
     in117     1.45E-16  1.40E-16  1.41E-16  1.41E-16  1.42E-16  1.47E-16
     cd108     2.23E-16  2.39E-16  2.56E-16  2.73E-16  2.91E-16  2.91E-16
     dy165     2.21E-16  2.32E-16  2.39E-16  2.45E-16  2.52E-16  2.35E-16
     sn114     1.76E-16  1.88E-16  2.00E-16  2.12E-16  2.24E-16  2.24E-16
     ge 75     2.03E-17  2.02E-17  2.02E-17  2.02E-17  2.02E-17  2.03E-17
     cs134m    2.35E-17  4.16E-17  4.28E-17  4.41E-17  4.53E-17  2.44E-17
     cd118     1.87E-17  1.23E-16  1.23E-16  1.23E-16  1.23E-16  1.88E-17
     cd109     1.54E-18  1.58E-18  1.63E-18  1.67E-18  1.71E-18  1.71E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  85
0                                   fraction of total absorption rate
        powers    .00mw, burnup=   1315.mwd, flux= 2.68E+08n/cm**2-sec
```

```
0              initial 301332. d 310463. d 319594. d 328726. d 328726. d

    in119m    1.88E-19  3.86E-17  3.86E-17  3.86E-17  3.86E-17  1.88E-19
1
    ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   86
      power= 4.000E-03mw, burnup=1.3149E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge 301332. d 310463. d 319594. d 328726. d 328726. d
     h  1    4.87E-05  7.89E-05  7.30E-05  7.32E-05  7.73E-05  7.73E-05
     h  2    2.04E-07  2.10E-07  2.17E-07  2.23E-07  2.29E-07  2.29E-07
     h  3    5.53E-11  5.54E-11  5.54E-11  5.55E-11  5.56E-11  5.56E-11
     h  4     .00E+00  1.43E-34  1.44E-34  1.44E-34  1.44E-34   .00E+00
    he  3    1.46E-09  1.51E-09  1.55E-09  1.60E-09  1.65E-09  1.65E-09
    he  4    1.14E-05  1.17E-05  1.21E-05  1.24E-05  1.28E-05  1.28E-05
    he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20    1.36E-06  1.41E-06  1.45E-06  1.49E-06  1.54E-06  1.54E-06
    ne 21    3.22E-11  3.42E-11  3.62E-11  3.83E-11  4.04E-11  4.04E-11
    ne 22    8.86E-09  9.13E-09  9.41E-09  9.69E-09  9.97E-09  9.97E-09
    ne 23    7.09E-30  7.10E-15  7.09E-15  7.09E-15  7.09E-15  7.09E-30
    na 22    4.17E-11  4.17E-11  4.17E-11  4.17E-11  4.17E-11  4.17E-11
    na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24    2.47E-08  2.75E-08  2.75E-08  2.75E-08  2.75E-08  2.47E-08
    na 24m   4.51E-30  4.52E-15  4.52E-15  4.51E-15  4.51E-15  4.51E-30
    na 25    1.35E-40  1.42E-25  1.49E-25  1.57E-25  1.64E-25  1.64E-40
    mg 24    9.67E-03  9.96E-03  1.02E-02  1.05E-02  1.08E-02  1.08E-02
    mg 25    4.74E-09  4.98E-09  5.23E-09  5.49E-09  5.75E-09  5.75E-09
    mg 26    2.04E-07  2.10E-07  2.17E-07  2.23E-07  2.29E-07  2.29E-07
    mg 27    9.59E-17  9.12E-12  9.12E-12  9.12E-12  9.12E-12  9.40E-17
    mg 28    3.99E-24  4.31E-24  4.31E-24  4.31E-24  4.31E-24  3.99E-24
    al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
    al 28    2.11E-25  2.04E-10  2.04E-10  2.04E-10  2.04E-10  2.11E-25
    al 29    4.26E-30  8.21E-24  8.69E-24  9.19E-24  9.69E-24  5.34E-30
    al 30     .00E+00  1.29E-34  1.41E-34  1.53E-34  1.66E-34   .00E+00
    si 28    2.82E-02  2.90E-02  2.98E-02  3.06E-02  3.15E-02  3.15E-02
    si 29    3.02E-08  3.21E-08  3.40E-08  3.59E-08  3.79E-08  3.79E-08
    si 30    3.45E-14  3.77E-14  4.11E-14  4.47E-14  4.86E-14  4.86E-14
    si 31    1.35E-26  2.70E-26  2.94E-26  3.20E-26  3.47E-26  1.90E-26
    si 32    2.10E-32  2.33E-32  2.59E-32  2.86E-32  3.15E-32  3.15E-32
  totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0 flux                2.68E+08  2.68E+08  2.68E+08  2.68E+08  2.68E-07
1
    ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page   87
      power= 4.000E-03mw, burnup=1.3149E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge 301332. d 310463. d 319594. d 328726. d 328726. d
    he  4    2.12E-01  2.21E-01  2.30E-01  2.38E-01  2.48E-01  2.48E-01
    pb206    7.15E-06  7.85E-06  8.59E-06  9.38E-06  1.02E-05  1.02E-05
    pb207    4.51E-06  4.81E-06  5.12E-06  5.44E-06  5.76E-06  5.76E-06
    pb208    7.91E-07  8.41E-07  8.92E-07  9.45E-07  9.99E-07  9.99E-07
    pb209    8.76E-13  9.26E-13  9.82E-13  1.04E-12  1.10E-12  1.11E-12
    pb210    8.67E-07  9.21E-07  9.76E-07  1.03E-06  1.09E-06  1.09E-06
    pb211    1.16E-12  1.20E-12  1.24E-12  1.27E-12  1.31E-12  1.31E-12
    pb212    3.46E-12  3.57E-12  3.68E-12  3.78E-12  3.89E-12  3.89E-12
    pb214    2.08E-12  2.27E-12  2.40E-12  2.53E-12  2.67E-12  2.60E-12
    bi208     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    bi209    4.37E-07  4.79E-07  5.23E-07  5.71E-07  6.20E-07  6.20E-07
    bi210m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    bi210    5.34E-10  5.67E-10  6.01E-10  6.36E-10  6.72E-10  6.72E-10
```

bi211	6.91E-14	7.11E-14	7.33E-14	7.55E-14	7.78E-14	7.81E-14
bi212	3.29E-13	3.39E-13	3.49E-13	3.59E-13	3.69E-13	3.69E-13
bi213	1.97E-13	2.16E-13	2.29E-13	2.43E-13	2.57E-13	2.49E-13
bi214	1.56E-12	1.68E-12	1.78E-12	1.88E-12	1.98E-12	1.94E-12
po210	1.47E-08	1.57E-08	1.66E-08	1.76E-08	1.86E-08	1.86E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	7.64E-19	7.85E-19	8.10E-19	8.35E-19	8.60E-19	8.63E-19
po212	1.73E-23	1.78E-23	1.83E-23	1.88E-23	1.94E-23	1.94E-23
po213	2.97E-22	3.25E-22	3.45E-22	3.65E-22	3.86E-22	3.74E-22
po214	3.14E-19	2.32E-19	2.45E-19	2.59E-19	2.73E-19	2.68E-19
po215	9.54E-19	9.85E-19	1.02E-18	1.05E-18	1.08E-18	1.08E-18
po216	1.31E-17	1.35E-17	1.39E-17	1.43E-17	1.47E-17	1.47E-17
po218	2.48E-13	2.62E-13	2.77E-13	2.93E-13	3.09E-13	3.09E-13
rn218	4.91E-29	5.07E-29	5.22E-29	5.38E-29	5.53E-29	5.52E-29
rn219	2.12E-15	2.19E-15	2.26E-15	2.33E-15	2.40E-15	2.40E-15
rn220	5.03E-15	5.18E-15	5.34E-15	5.49E-15	5.64E-15	5.65E-15
rn222	4.39E-10	4.66E-10	4.93E-10	5.20E-10	5.49E-10	5.49E-10
ra222	5.34E-26	5.51E-26	5.67E-26	5.84E-26	6.00E-26	5.99E-26
ra223	5.30E-10	5.47E-10	5.64E-10	5.81E-10	5.99E-10	5.99E-10
ra224	2.86E-11	2.95E-11	3.03E-11	3.12E-11	3.21E-11	3.21E-11
ra225	9.52E-11	1.01E-10	1.07E-10	1.14E-10	1.20E-10	1.20E-10
ra226	6.72E-05	7.12E-05	7.53E-05	7.95E-05	8.39E-05	8.39E-05
ra228	1.68E-12	1.73E-12	1.78E-12	1.84E-12	1.89E-12	1.89E-12
ac225	6.43E-11	6.83E-11	7.24E-11	7.67E-11	8.11E-11	8.11E-11
ac227	3.68E-07	3.80E-07	3.92E-07	4.04E-07	4.16E-07	4.16E-07
ac228	2.05E-16	2.11E-16	2.18E-16	2.24E-16	2.31E-16	2.31E-16
th226	2.60E-24	2.69E-24	2.77E-24	2.85E-24	2.93E-24	2.92E-24
th227	8.53E-10	8.83E-10	9.10E-10	9.38E-10	9.66E-10	9.66E-10
th228	5.46E-09	5.63E-09	5.79E-09	5.96E-09	6.13E-09	6.13E-09
th229	1.85E-05	1.97E-05	2.09E-05	2.21E-05	2.33E-05	2.33E-05
th230	2.04E-02	2.11E-02	2.17E-02	2.24E-02	2.30E-02	2.30E-02
th231	3.08E-09	3.09E-09	3.09E-09	3.10E-09	3.10E-09	3.09E-09
th232	4.14E-03	4.27E-03	4.40E-03	4.53E-03	4.66E-03	4.66E-03
th233	5.43E-16	3.90E-14	4.02E-14	4.14E-14	4.26E-14	6.11E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.76E-04	5.94E-04	6.12E-04	6.30E-04	6.48E-04	6.48E-04
pa232	9.39E-12	1.02E-11	1.05E-11	1.08E-11	1.11E-11	1.06E-11

1 sas2h: for-field crit based on b4w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 88
power= 4.000E-03mw, burnup=1.3149E+03mwd, flux= 2.66E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 301332. d	310443. d	319594. d	328726. d	328726. d	
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.68E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.52E-21	2.60E-21	2.68E-21	2.76E-21	2.84E-21	2.83E-21
u231	8.11E-18	8.50E-18	8.76E-18	9.01E-18	9.26E-18	9.12E-18
u232	1.95E-07	2.01E-07	2.07E-07	2.13E-07	2.19E-07	2.19E-07
u233	1.09E-02	1.12E-02	1.15E-02	1.19E-02	1.22E-02	1.22E-02
u234	9.15E+00	9.15E+00	9.15E+00	9.16E+00	9.16E+00	9.16E+00
u235	7.24E+02	7.24E+02	7.24E+02	7.24E+02	7.24E+02	7.24E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.08E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.08E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	5.63E-09	3.17E-07	3.17E-07	3.17E-07	3.17E-07	5.62E-09
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	1.40E-45
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12

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    np236m  1.91E-12  2.05E-12  2.05E-12  2.05E-12  2.05E-12  1.91E-12
    np236   1.57E-07  1.62E-07  1.67E-07  1.72E-07  1.76E-07  1.76E-07
    np237   4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
    np238   1.50E-06  1.55E-06  1.55E-06  1.55E-06  1.55E-06  1.50E-06
    np239   4.49E-05  4.59E-05  4.59E-05  4.59E-05  4.59E-05  4.49E-05
    np248m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    np240   2.82E-15  9.30E-15  9.30E-15  9.29E-15  9.29E-15  2.81E-15
    np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    pu236   1.11E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09  1.11E-09
    pu237   2.59E-13  2.61E-13  2.62E-13  2.63E-13  2.64E-13  2.64E-13
    pu238   2.34E-02  2.34E-02  2.34E-02  2.34E-02  2.34E-02  2.34E-02
    pu239   3.85E+00  4.00E+00  4.12E+00  4.24E+00  4.35E+00  4.35E+00
    pu240   1.49E-02  1.58E-02  1.67E-02  1.77E-02  1.87E-02  1.87E-02
    pu241   5.80E-06  6.17E-06  6.55E-06  6.93E-06  7.33E-06  7.33E-06
    pu242   4.06E-08  4.34E-08  5.06E-08  5.42E-08  6.22E-08  6.22E-08
    pu243   6.22E-17  9.56E-17  1.07E-16  1.18E-16  1.31E-16  9.32E-17
    pu244   1.78E-34  2.41E-34  3.23E-34  4.33E-34  5.72E-34  5.72E-34
    pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    am239   1.33E-20  1.66E-20  1.80E-20  1.94E-20  2.10E-20  1.84E-20
    am240   6.75E-18  7.58E-18  8.22E-18  8.90E-18  9.41E-18  9.31E-18
    am241   5.55E-05  6.03E-05  6.55E-05  7.09E-05  7.65E-05  7.65E-05
    am242m  1.53E-08  1.70E-08  1.87E-08  2.05E-08  2.25E-08  2.25E-08
    am242   1.94E-12  2.31E-12  2.51E-12  2.72E-12  2.94E-12  2.69E-12
    am243   9.26E-11  1.06E-10  1.21E-10  1.38E-10  1.56E-10  1.56E-10
    am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    am244   6.81E-19  8.04E-19  9.19E-19  1.04E-18  1.18E-18  1.81E-18
    am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00  1.40E-45
    am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    cm241   1.23E-22  1.34E-22  1.46E-22  1.58E-22  1.71E-22  1.71E-22
    cm242   4.28E-10  4.46E-10  5.06E-10  5.49E-10  5.93E-10  5.93E-10
    cm243   1.52E-16  1.67E-16  1.83E-16  1.99E-16  2.16E-16  2.16E-16
    cm244   9.61E-15  1.11E-14  1.27E-14  1.45E-14  1.64E-14  1.64E-14
1
    ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   89
      power= 4.000E-03mw, burnup=1.3149E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                     basis a single reactor assembly
              charge 301332. d 310463. d 319594. d 328726. d 328726. d
    cm245   1.41E-18  1.68E-18  1.99E-18  2.35E-18  2.75E-18  2.75E-18
    cm246   9.50E-22  1.17E-21  1.43E-21  1.74E-21  2.10E-21  2.10E-21
    cm247   1.05E-24  1.33E-24  1.68E-24  2.11E-24  2.63E-24  2.03E-24
    cm248   1.18E-30  1.56E-30  2.03E-30  2.62E-30  3.36E-30  3.36E-30
    cm249   8.90E-42  4.47E-41  6.22E-41  8.56E-41  1.09E-40  2.49E-41
    cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
  totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0   flux               2.68E+08  2.68E+08  2.68E+08  2.68E+08  2.68E-07
0        1q array has      20 entries.
0        2q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0        5q array has      12 entries.
11library information...

    cross-section data taken from position number  1 of library on unit 15.

    pass  10
    pass   1
```

```
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   6
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
0         *                                                                     *
          ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  fc15f001
0                8/28/1996    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   90
         power=    .00mw, burnup=   1461.mwd, flux= 2.68E+08n/cm**2-sec
8                                                  basis =
0    (note, k-infinities, eind and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial      337857. d      346988. d      356120. d      365251. d
     productions   1.147285E+06   1.147456E+06   1.147625E+06   1.147795E+06   1.147964E+06
     absorptions   9.388229E+05   9.389935E+05   9.391619E+05   9.393289E+05   9.394933E+05
     k infinity    1.222046E+00   1.222006E+00   1.221968E+00   1.221931E+00   1.221897E+00
0                  initial      337857. d      346988. d      356120. d      365251. d
     actinide
     absorptions   9.313372E+05   9.314392E+05   9.315411E+05   9.316427E+05   9.317441E+05
     non-actinide
     abs. fracs.   7.973492E-03   8.045137E-03   8.114398E-03   8.182645E-03   8.248210E-03
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   91
8                                  fraction of total absorption rate
         power=    .00mw, burnup=   1461.mwd, flux= 2.68E+08n/cm**2-sec
8              initial 337857. d 346988. d 356120. d 365251. d
```

```
     sm149     3.82E-03  3.87E-03  3.92E-03  3.97E-03  4.02E-03
     eu151     1.68E-04  1.73E-04  1.78E-04  1.84E-04  1.89E-04
     nd143     1.32E-04  1.36E-04  1.39E-04  1.43E-04  1.47E-04
     gd155     7.12E-05  7.28E-05  7.43E-05  7.58E-05  7.73E-05
     rh103     4.18E-05  4.35E-05  4.52E-05  4.69E-05  4.87E-05
     xe131     4.18E-05  4.30E-05  4.41E-05  4.53E-05  4.64E-05
     cd113     4.27E-05  4.36E-05  4.44E-05  4.52E-05  4.60E-05
     sm151     4.00E-05  4.00E-05  4.00E-05  4.00E-05  4.00E-05
     cs133     3.24E-05  3.33E-05  3.42E-05  3.51E-05  3.60E-05
     gd157     3.26E-05  3.30E-05  3.33E-05  3.37E-05  3.40E-05
     sm147     2.40E-05  2.46E-05  2.53E-05  2.60E-05  2.66E-05
     tc 99     2.38E-05  2.43E-05  2.51E-05  2.58E-05  2.65E-05
     nd145     1.85E-05  1.90E-05  1.95E-05  2.00E-05  2.05E-05
     mo 95     1.28E-05  1.32E-05  1.35E-05  1.39E-05  1.42E-05
     sm152     1.03E-05  1.06E-05  1.09E-05  1.12E-05  1.15E-05
     kr 83     8.03E-06  8.25E-06  8.47E-06  8.69E-06  8.91E-06
     cs135     7.32E-06  7.52E-06  7.73E-06  7.93E-06  8.13E-06
     ru101     5.47E-06  5.83E-06  5.98E-06  6.14E-06  6.30E-06
     pr141     5.47E-06  5.62E-06  5.78E-06  5.93E-06  6.08E-06
     eu153     5.01E-06  5.15E-06  5.29E-06  5.43E-06  5.57E-06
     sm150     4.30E-06  4.30E-06  4.70E-06  4.90E-06  5.11E-06
     la139     4.68E-06  4.80E-06  4.72E-06  4.85E-06  4.97E-06
     xe135     2.26E-06  2.31E-06  2.31E-06  2.31E-06  2.31E-06
     ba137     2.04E-06  2.10E-06  2.16E-06  2.22E-06  2.28E-06
     pd105     1.93E-06  1.99E-06  2.04E-06  2.10E-06  2.15E-06
     zr 93     1.81E-06  1.86E-06  1.91E-06  1.96E-06  2.01E-06
      I129     1.40E-06  1.44E-06  1.48E-06  1.51E-06  1.55E-06
     nd144     1.34E-06  1.38E-06  1.42E-06  1.46E-06  1.49E-06
     mo 97     1.01E-06  1.04E-06  1.07E-06  1.10E-06  1.13E-06
     ag109     8.95E-07  9.25E-07  9.55E-07  9.86E-07  1.02E-06
     zr 91     4.77E-07  4.90E-07  5.03E-07  5.16E-07  5.29E-07
      y 89     4.58E-07  4.70E-07  4.83E-07  4.95E-07  5.08E-07
     ru102     4.14E-07  4.26E-07  4.37E-07  4.49E-07  4.60E-07
     ce142     3.73E-07  3.83E-07  3.93E-07  4.03E-07  4.14E-07
     nd148     3.58E-07  3.68E-07  3.78E-07  3.88E-07  3.97E-07
     nd146     3.00E-07  3.09E-07  3.17E-07  3.25E-07  3.34E-07
     pd108     2.76E-07  2.85E-07  2.94E-07  3.02E-07  3.11E-07
     ba138     2.57E-07  2.64E-07  2.71E-07  2.78E-07  2.85E-07
     in115     2.49E-07  2.56E-07  2.63E-07  2.70E-07  2.77E-07
     pm147     2.69E-07  2.69E-07  2.69E-07  2.69E-07  2.69E-07
     ce140     2.41E-07  2.47E-07  2.54E-07  2.60E-07  2.67E-07
     xe132     2.16E-07  2.22E-07  2.28E-07  2.34E-07  2.40E-07
     pd107     1.58E-07  1.63E-07  1.68E-07  1.73E-07  1.78E-07
     mo 98     1.48E-07  1.53E-07  1.57E-07  1.61E-07  1.65E-07
     eu155     1.64E-07  1.64E-07  1.64E-07  1.64E-07  1.65E-07
     mo100     1.44E-07  1.48E-07  1.52E-07  1.56E-07  1.60E-07
     xe134     1.42E-07  1.46E-07  1.50E-07  1.54E-07  1.58E-07
     zr 92     1.15E-07  1.18E-07  1.21E-07  1.24E-07  1.28E-07
      I127     9.47E-08  9.73E-08  1.00E-07  1.03E-07  1.05E-07
1    sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   92
0                                  fraction of total absorption rate
       power=     .80mw, burnup=    1461.mwd, flux= 2.68E+08n/cm**2-sec
0                 initial 337857. d 346988. d 356120. d 365251. d

     zr 96     9.01E-08  9.26E-08  9.50E-08  9.75E-08  1.00E-07
     ru104     8.94E-08  9.19E-08  9.44E-08  9.69E-08  9.94E-08
     gd152     7.44E-08  8.12E-08  8.62E-08  9.14E-08  9.67E-08
     nd150     7.94E-08  8.16E-08  8.38E-08  8.60E-08  8.82E-08
     xe136     7.67E-08  7.89E-08  8.10E-08  8.31E-08  8.52E-08
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     br 81     5.74E-08  5.90E-08  6.06E-08  6.22E-08  6.38E-08
     rb 85     5.58E-08  5.74E-08  5.89E-08  6.04E-08  6.20E-08
     zr 94     4.86E-08  4.99E-08  5.12E-08  5.26E-08  5.39E-08
     eu152     4.29E-08  4.42E-08  4.56E-08  4.69E-08  4.83E-08
     zr 90     4.31E-08  4.43E-08  4.56E-08  4.68E-08  4.81E-08
     cd111     4.01E-08  4.13E-08  4.25E-08  4.37E-08  4.49E-08
     te130     3.49E-08  3.59E-08  3.69E-08  3.78E-08  3.88E-08
     sm154     3.42E-08  3.52E-08  3.62E-08  3.71E-08  3.81E-08
     rb 87     3.24E-08  3.33E-08  3.41E-08  3.50E-08  3.59E-08
     se 77     2.31E-08  2.37E-08  2.44E-08  2.50E-08  2.57E-08
     pd106     1.71E-08  1.76E-08  1.81E-08  1.86E-08  1.91E-08
     kr 84     1.53E-08  1.57E-08  1.61E-08  1.65E-08  1.69E-08
     sr 90     1.70E-08  1.70E-08  1.69E-08  1.69E-08  1.69E-08
     se 79     1.18E-08  1.22E-08  1.25E-08  1.28E-08  1.32E-08
     sb121     1.13E-08  1.17E-08  1.20E-08  1.23E-08  1.26E-08
     gd156     8.99E-09  9.31E-09  9.65E-09  9.98E-09  1.03E-08
     sb123     9.21E-09  9.47E-09  9.72E-09  9.98E-09  1.02E-08
     kr 86     8.54E-09  8.77E-09  9.00E-09  9.24E-09  9.47E-09
     rh105     8.44E-09  8.70E-09  8.71E-09  8.72E-09  8.73E-09
     te128     7.66E-09  7.87E-09  8.09E-09  8.30E-09  8.51E-09
     ru 99     5.67E-09  5.98E-09  6.31E-09  6.64E-09  6.98E-09
     dy161     5.06E-09  5.06E-09  5.25E-09  5.45E-09  5.64E-09
     se 80     5.52E-09  5.67E-09  5.82E-09  5.98E-09  6.13E-09
     te125     4.87E-09  5.01E-09  5.14E-09  5.28E-09  5.42E-09
     tb159     3.55E-09  3.65E-09  3.76E-09  3.87E-09  3.98E-09
     cs137     3.75E-09  3.75E-09  3.75E-09  3.75E-09  3.75E-09
     gd154     2.97E-09  3.14E-09  3.31E-09  3.49E-09  3.68E-09
     cd112     3.25E-09  3.34E-09  3.43E-09  3.53E-09  3.62E-09
     li  6     3.12E-09  3.21E-09  3.30E-09  3.38E-09  3.47E-09
     sn117     2.53E-09  2.60E-09  2.68E-09  2.75E-09  2.82E-09
     eu154     2.52E-09  2.60E-09  2.67E-09  2.74E-09  2.81E-09
     gd158     2.31E-09  2.40E-09  2.48E-09  2.57E-09  2.66E-09
     pr143     2.65E-09  2.65E-09  2.65E-09  2.64E-09  2.64E-09
     sn119     2.07E-09  2.12E-09  2.18E-09  2.24E-09  2.30E-09
     sn115     1.89E-09  1.94E-09  2.00E-09  2.05E-09  2.10E-09
     xe133     2.01E-09  2.01E-09  2.01E-09  2.01E-09  2.01E-09
     sr 88     1.57E-09  1.61E-09  1.65E-09  1.70E-09  1.74E-09
     cd114     1.44E-09  1.49E-09  1.54E-09  1.59E-09  1.64E-09
     ce141     1.59E-09  1.59E-09  1.59E-09  1.59E-09  1.59E-09
     pd110     1.23E-09  1.26E-09  1.30E-09  1.34E-09  1.38E-09
     ru100     9.73E-10  1.03E-09  1.08E-09  1.14E-09  1.20E-09
     se 82     1.07E-09  1.09E-09  1.12E-09  1.15E-09  1.18E-09
     dy164     9.07E-10  9.41E-10  9.76E-10  1.01E-09  1.05E-09
     dy162     8.09E-10  8.22E-10  8.34E-10  8.47E-10  8.62E-09
1    sas2h: far-field grit based on h&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   93
6                                  fraction of total absorption rate
         powers      .80mw, burnup=      1461.mwd, flux= 2.48E+08n/cm**2-sec
6              initial 337857. d 346988. d 356120. d 365251. d

     sn126     8.78E-10  9.03E-10  9.28E-10  9.53E-10  9.78E-10
     pm149     9.63E-10  9.72E-10  9.72E-10  9.72E-10  9.72E-10
     nd147     9.18E-10  9.23E-10  9.23E-10  9.22E-10  9.22E-10
     se 78     8.10E-10  8.32E-10  8.55E-10  8.77E-10  9.00E-10
     nd142     6.78E-10  7.15E-10  7.54E-10  7.95E-10  8.36E-10
     ba134     6.49E-10  6.85E-10  7.22E-10  7.61E-10  8.00E-10
     sm148     6.03E-10  6.37E-10  6.71E-10  7.06E-10  7.43E-10
     sn124     6.56E-10  6.74E-10  6.93E-10  7.11E-10  7.29E-10
     ba135     5.32E-10  5.61E-10  5.92E-10  6.23E-10  6.56E-10
     ce144     5.96E-10  5.96E-10  5.96E-10  5.96E-10  5.95E-10
     kr 83     5.68E-10  5.67E-10  5.67E-10  5.67E-10  5.67E-10
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    pd104     4.44E-10  4.69E-10  4.95E-10  5.21E-10  5.48E-10
    as 75     4.82E-10  4.95E-10  5.09E-10  5.22E-10  5.35E-10
    in113     3.58E-10  3.68E-10  3.79E-10  3.89E-10  3.99E-10
    ru103     3.59E-10  3.60E-10  3.60E-10  3.60E-10  3.60E-10
    ba136     3.16E-10  3.25E-10  3.35E-10  3.45E-10  3.56E-10
    sn118     2.67E-10  2.74E-10  2.82E-10  2.89E-10  2.97E-10
    ce134     2.41E-10  2.48E-10  2.55E-10  2.61E-10  2.68E-10
    sn122     2.27E-10  2.33E-10  2.40E-10  2.46E-10  2.52E-10
    cd116     2.27E-10  2.33E-10  2.39E-10  2.46E-10  2.52E-10
    mo 96     2.08E-10  2.17E-10  2.28E-10  2.38E-10  2.48E-10
    dy163     2.09E-10  2.17E-10  2.25E-10  2.33E-10  2.41E-10
    kr 82     2.02E-10  2.09E-10  2.17E-10  2.24E-10  2.32E-10
    sn120     1.69E-10  1.74E-10  1.79E-10  1.84E-10  1.88E-10
    xe130     1.58E-10  1.65E-10  1.71E-10  1.78E-10  1.84E-10
    zr 95     1.63E-10  1.64E-10  1.64E-10  1.63E-10  1.63E-10
    nb 95     1.51E-10  1.51E-10  1.51E-10  1.51E-10  1.51E-10
    ge 73     1.32E-10  1.36E-10  1.40E-10  1.43E-10  1.47E-10
     y 91     1.42E-10  1.42E-10  1.42E-10  1.42E-10  1.42E-10
    pm151     1.05E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10
    nb 93     8.19E-11  8.66E-11  9.14E-11  9.64E-11  1.02E-10
    cd110     6.85E-11  7.26E-11  7.69E-11  8.13E-11  8.58E-11
    br 79     4.34E-11  4.58E-11  4.83E-11  5.09E-11  5.35E-11
    ge 76     4.77E-11  4.90E-11  5.03E-11  5.16E-11  5.29E-11
    ba140     4.68E-11  4.70E-11  4.70E-11  4.70E-11  4.70E-11
    te126     3.82E-11  3.96E-11  4.12E-11  4.27E-11  4.42E-11
    sm153     3.77E-11  3.89E-11  3.89E-11  3.89E-11  3.90E-11
    gd160     3.42E-11  3.52E-11  3.63E-11  3.74E-11  3.85E-11
    eu154     3.48E-11  3.68E-11  3.69E-11  3.70E-11  3.71E-11
    ag107     2.46E-11  2.60E-11  2.75E-11  2.90E-11  3.06E-11
    xe129     2.47E-11  2.60E-11  2.75E-11  2.89E-11  3.04E-11
    sr 89     3.03E-11  3.04E-11  3.04E-11  3.03E-11  3.03E-11
    ru106     2.75E-11  2.76E-11  2.76E-11  2.77E-11  2.78E-11
    kr 87     6.44E-12  2.27E-11  2.27E-11  2.27E-11  2.27E-11
    ce143     1.67E-11  1.73E-11  1.73E-11  1.73E-11  1.73E-11
    he143     1.48E-11  1.54E-11  1.59E-11  1.65E-11  1.71E-11
     y 90     1.61E-11  1.61E-11  1.61E-11  1.61E-11  1.61E-11
    sb125     1.53E-11  1.53E-11  1.53E-11  1.53E-11  1.53E-11
    la140     1.52E-11  1.52E-11  1.52E-11  1.52E-11  1.52E-11
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  94
0                                  fraction of total absorption rate
0        power=     .80mw, burnup=   1661.mwd, flux= 3.68E+08n/cm**2-sec
            initial 337857. d 346988. d 356120. d 365251. d

    mo 99     1.27E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11
    pm148m    9.30E-12  9.51E-12  9.51E-12  9.51E-12  9.51E-12
    te127m    7.64E-12  7.65E-12  7.66E-12  7.66E-12  7.67E-12
    te134     4.20E-12  4.39E-12  4.58E-12  4.77E-12  4.96E-12
     i131     4.72E-12  4.75E-12  4.75E-12  4.75E-12  4.75E-12
    sr 87     3.95E-12  3.71E-12  3.84E-12  4.02E-12  4.17E-12
    dy160     3.43E-12  3.62E-12  3.82E-12  4.02E-12  4.23E-12
    nb 94     3.15E-12  3.24E-12  3.33E-12  3.42E-12  3.51E-12
    xe128     2.64E-12  2.78E-12  2.93E-12  3.07E-12  3.23E-12
    sr 86     2.73E-12  2.84E-12  2.95E-12  3.07E-12  3.18E-12
    ge 74     2.67E-12  2.74E-12  2.82E-12  2.89E-12  2.97E-12
    ge 72     1.81E-12  1.86E-12  1.92E-12  1.97E-12  2.02E-12
    te129m    1.80E-12  1.80E-12  1.80E-12  1.80E-12  1.80E-12
    se 76     1.32E-12  1.37E-12  1.41E-12  1.46E-12  1.50E-12
    sn116     9.40E-13  9.93E-13  1.05E-12  1.10E-12  1.16E-12
    er166     6.23E-13  6.51E-13  6.79E-13  7.08E-13  7.37E-13
    te122     3.99E-13  4.21E-13  4.44E-13  4.67E-13  4.91E-13
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     ag111      3.40E-13  3.44E-13  3.45E-13  3.46E-13  3.47E-13
     pm148      3.61E-13  3.66E-13  3.65E-13  3.65E-13  3.65E-13
     eu157      2.98E-13  3.29E-13  3.29E-13  3.30E-13  3.31E-13
     cd115m     2.41E-13  2.41E-13  2.42E-13  2.42E-13  2.42E-13
     kr 80      8.67E-14  8.96E-14  9.24E-14  9.53E-14  9.82E-14
     cs134      7.93E-14  8.04E-14  8.11E-14  8.17E-14  8.24E-14
     ru105      2.22E-14  3.07E-14  3.08E-14  3.08E-14  3.08E-14
     sn125      2.93E-14  2.95E-14  2.96E-14  2.96E-14  2.96E-14
     rb 88      8.01E-15  1.28E-14  1.28E-14  1.28E-14  1.28E-14
     tb160      1.01E-14  1.04E-14  1.07E-14  1.10E-14  1.12E-14
     er167      8.52E-15  9.03E-15  9.55E-15  1.01E-14  1.07E-14
     sn123      1.01E-14  1.01E-14  1.01E-14  1.01E-14  1.01E-14
      1135      7.95E-15  1.01E-14  1.01E-14  1.01E-14  1.01E-14
     te123      8.23E-15  8.57E-15  8.92E-15  9.27E-15  9.63E-15
     te132      9.34E-15  9.53E-15  9.53E-15  9.53E-15  9.52E-15
     pr142      5.70E-15  6.36E-15  6.53E-15  6.70E-15  6.87E-15
     be  9      5.95E-15  6.11E-15  6.28E-15  6.44E-15  6.60E-15
     te134      6.04E-16  5.81E-15  5.81E-15  5.80E-15  5.80E-15
     sb126      4.54E-15  4.60E-15  4.64E-15  4.69E-15  4.73E-15
     li  7      2.42E-15  2.49E-15  2.55E-15  2.62E-15  2.69E-15
     sb124      2.56E-15  2.57E-15  2.59E-15  2.60E-15  2.61E-15
     in117m     1.83E-15  2.18E-15  2.18E-15  2.18E-15  2.18E-15
      1130      1.64E-15  1.88E-15  1.91E-15  1.94E-15  1.98E-15
     rb 86      6.03E-16  6.16E-16  6.26E-16  6.36E-16  6.45E-16
     in117      5.47E-16  6.42E-16  6.43E-16  6.44E-16  6.45E-16
     dy165      2.35E-16  4.59E-16  4.65E-16  4.72E-16  4.79E-16
     cd108      3.91E-16  3.10E-16  3.30E-16  3.51E-16  3.72E-16
     sn114      2.24E-16  2.37E-16  2.51E-16  2.64E-16  2.78E-16
     cd118      1.07E-17  1.23E-16  1.23E-16  1.23E-16  1.23E-16
     ge 75      2.83E-17  8.62E-17  8.62E-17  8.61E-17  8.61E-17
     cs134m     2.64E-17  4.66E-17  4.78E-17  4.91E-17  5.03E-17
     in119m     1.85E-19  3.06E-17  3.06E-17  3.06E-17  3.06E-17
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  95
0                                  fraction of total absorption rate
         power=      .00mw, burnup=     1461.mwd, flux= 2.68E+08n/cm**2-sec
0              initial 337857. d 346988. d 356120. d 365251. d

     in119      7.22E-22  2.41E-18  2.42E-18  2.42E-18  2.42E-18
     cd109      1.71E-18  1.75E-18  1.79E-18  1.83E-18  1.87E-18
     ag110      6.76E-22  1.21E-18  1.25E-18  1.29E-18  1.33E-18
     in120       .00E+00  4.06E-22  4.06E-22  4.06E-22  4.06E-22
     in120m      .00E+00  4.76E-23  4.77E-23  4.78E-23  4.79E-23
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  96
       power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
              charge 337857. d 346988. d 356120. d 365251. d
     h  1    7.73E-05  7.94E-05  8.16E-05  8.37E-05  8.59E-05
     h  2    2.29E-07  2.36E-07  2.42E-07  2.49E-07  2.55E-07
     h  3    3.56E-11  3.56E-11  3.57E-11  3.58E-11  3.58E-11
     h  4     .00E+00  1.46E-34  1.45E-34  1.45E-34  1.45E-34
    he  3    1.65E-09  1.69E-09  1.74E-09  1.79E-09  1.83E-09
    he  4    1.28E-05  1.31E-05  1.35E-05  1.38E-05  1.42E-05
    he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20    1.54E-06  1.58E-06  1.62E-06  1.66E-06  1.71E-06
    ne 21    4.06E-11  4.26E-11  4.48E-11  4.71E-11  4.95E-11
    ne 22    9.97E-09  1.02E-08  1.05E-08  1.08E-08  1.11E-08
    na 23    7.09E-30  7.10E-15  7.10E-15  7.10E-15  7.10E-15
    na 22    4.17E-11  4.18E-11  4.18E-11  4.18E-11  4.18E-11
```

na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.47E-08	2.75E-08	2.75E-08	2.75E-08	2.75E-08
na 24m	4.51E-30	4.51E-15	4.51E-15	4.51E-15	4.51E-15
na 25	1.64E-40	1.72E-25	1.80E-25	1.87E-25	1.06E-25
mg 24	1.08E-02	1.11E-02	1.14E-02	1.17E-02	1.20E-02
mg 25	5.75E-09	6.01E-09	6.28E-09	6.56E-09	6.85E-09
mg 26	2.29E-07	2.36E-07	2.42E-07	2.49E-07	2.55E-07
mg 27	9.60E-07	2.12E-12	2.12E-12	2.12E-12	2.12E-12
mg 28	3.99E-24	4.31E-24	4.31E-24	4.31E-24	4.31E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.11E-25	2.04E-10	2.04E-10	2.04E-10	2.04E-10
al 29	5.34E-30	1.02E-23	1.08E-23	1.13E-23	1.19E-23
al 30	.00E+00	1.80E-34	1.94E-34	2.09E-34	2.25E-34
si 28	5.15E-02	5.23E-02	5.31E-02	5.40E-02	5.48E-02
si 29	3.79E-08	3.99E-08	4.20E-08	4.42E-08	4.64E-08
si 30	4.86E-14	5.26E-14	5.68E-14	6.13E-14	6.59E-14
si 31	1.90E-26	3.76E-26	4.06E-26	4.38E-26	4.72E-26
si 32	3.15E-32	3.45E-32	3.78E-32	4.13E-32	4.50E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.68E+08	2.68E+08	2.68E+08	2.68E+08

0
1 sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 97
power= 4.000E-03mw, burnup=1.4410E+03mwd, flux= 2.74E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge 337857. d 346988. d 356120. d 365251. d

he 4	2.48E-01	2.57E-01	2.66E-01	2.75E-01	2.85E-01
pb206	1.02E-05	1.11E-05	1.20E-05	1.30E-05	1.40E-05
pb207	5.76E-06	6.10E-06	6.43E-06	6.80E-06	7.17E-06
pb208	9.99E-07	1.05E-06	1.11E-06	1.17E-06	1.23E-06
pb209	1.11E-12	1.16E-12	1.22E-12	1.29E-12	1.35E-12
pb210	1.09E-06	1.15E-06	1.21E-06	1.28E-06	1.34E-06
pb211	1.31E-12	1.35E-12	1.39E-12	1.43E-12	1.46E-12
pb212	3.89E-12	3.99E-12	4.10E-12	4.21E-12	4.31E-12
pb214	2.60E-12	2.81E-12	2.96E-12	3.10E-12	3.25E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.20E-07	6.73E-07	7.29E-07	7.87E-07	8.49E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	6.72E-10	7.09E-10	7.47E-10	7.85E-10	8.25E-10
bi211	7.81E-14	8.00E-14	8.23E-14	8.45E-14	8.68E-14
bi212	3.69E-13	3.79E-13	3.89E-13	3.99E-13	4.09E-13
bi213	2.49E-13	2.71E-13	2.85E-13	3.00E-13	3.16E-13
bi214	1.94E-12	2.09E-12	2.19E-12	2.30E-12	2.42E-12
po210	1.86E-08	1.96E-08	2.06E-08	2.17E-08	2.28E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	8.63E-19	8.84E-19	9.09E-19	9.34E-19	9.59E-19
po212	1.96E-23	1.99E-23	2.04E-23	2.10E-23	2.15E-23
po213	3.74E-22	4.07E-22	4.29E-22	4.52E-22	4.75E-22
po214	2.68E-19	2.87E-19	3.02E-19	3.17E-19	3.32E-19
po215	1.08E-18	1.11E-18	1.14E-18	1.17E-18	1.20E-18
po216	1.47E-17	1.51E-17	1.55E-17	1.59E-17	1.63E-17
po218	3.09E-13	3.25E-13	3.42E-13	3.59E-13	3.76E-13
rn218	5.32E-29	5.68E-29	5.83E-29	5.98E-29	6.13E-29
rn219	2.40E-15	2.47E-15	2.54E-15	2.61E-15	2.68E-15
rn220	5.63E-15	5.80E-15	5.95E-15	6.11E-15	6.26E-15
rn222	5.49E-10	5.78E-10	6.07E-10	6.38E-10	6.69E-10
ra222	5.99E-26	6.17E-26	6.33E-26	6.49E-26	6.66E-26
ra223	5.99E-10	6.16E-10	6.33E-10	6.50E-10	6.68E-10
ra224	3.21E-11	3.30E-11	3.39E-11	3.47E-11	3.56E-11
ra225	1.20E-10	1.27E-10	1.34E-10	1.41E-10	1.48E-10

ra226	8.39E-05	8.83E-05	9.28E-05	9.74E-05	1.02E-04
ra228	1.89E-12	1.94E-12	1.99E-12	2.05E-12	2.10E-12
ac225	8.11E-11	8.56E-11	9.02E-11	9.49E-11	9.98E-11
ac227	4.16E-07	4.28E-07	4.40E-07	4.52E-07	4.64E-07
ac228	2.31E-16	2.37E-16	2.43E-16	2.50E-16	2.56E-16
th226	2.92E-24	3.01E-24	3.09E-24	3.17E-24	3.25E-24
th227	9.66E-10	9.96E-10	1.02E-09	1.05E-09	1.08E-09
th228	6.13E-09	6.30E-09	6.46E-09	6.63E-09	6.80E-09
th229	2.33E-05	2.46E-05	2.60E-05	2.73E-05	2.87E-05
th230	2.30E-02	2.36E-02	2.43E-02	2.49E-02	2.56E-02
th231	3.09E-09	3.10E-09	3.10E-09	3.10E-09	3.11E-09
th232	4.66E-03	4.79E-03	4.92E-03	5.05E-03	5.18E-03
th233	4.11E-14	4.38E-14	4.49E-14	4.61E-14	4.73E-14
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	6.48E-04	6.67E-04	6.85E-04	7.03E-04	7.21E-04
pa232	1.06E-11	1.14E-11	1.17E-11	1.20E-11	1.23E-11

1

power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge 337857. d 346988. d 356120. d 365251. d

pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.83E-21	2.92E-21	2.99E-21	3.07E-21	3.15E-21
u231	9.12E-18	9.52E-18	9.78E-18	1.00E-17	1.03E-17
u232	2.19E-07	2.25E-07	2.31E-07	2.37E-07	2.43E-07
u233	1.22E-02	1.25E-02	1.29E-02	1.32E-02	1.35E-02
u234	9.16E+00	9.16E+00	9.17E+00	9.17E+00	9.17E+00
u235	7.24E+02	7.24E+02	7.23E+02	7.23E+02	7.23E+02
u236	1.75E+02	1.75E+02	1.76E+02	1.76E+02	1.76E+02
u237	3.88E-06	3.12E-06	3.12E-06	3.12E-06	3.12E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	5.62E-09	5.17E-07	5.17E-07	5.17E-07	5.17E-07
u240	1.40E-43	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np233	8.64E-12	8.64E-12	8.64E-12	8.64E-12	8.64E-12
np236m	1.91E-12	2.06E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.76E-07	1.81E-07	1.86E-07	1.91E-07	1.96E-07
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.50E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.49E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.01E-15	9.29E-15	9.29E-15	9.29E-15	9.29E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	2.64E-13	2.63E-13	2.66E-13	2.67E-13	2.68E-13
pu238	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
pu239	4.35E+00	4.47E+00	4.59E+00	4.70E+00	4.82E+00
pu240	1.87E-02	1.97E-02	2.07E-02	2.18E-02	2.29E-02
pu241	7.33E-06	7.74E-06	8.16E-06	8.58E-06	9.02E-06
pu242	6.22E-08	6.84E-08	7.54E-08	8.30E-08	9.09E-08
pu243	9.52E-17	1.45E-16	1.59E-16	1.73E-16	1.81E-16
pu244	5.72E-34	7.50E-34	9.76E-34	1.26E-33	1.62E-33
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.84E-20	2.26E-20	2.43E-20	2.60E-20	2.79E-20
am240	9.31E-18	1.04E-17	1.11E-17	1.19E-17	1.28E-17

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    am241   7.65E-05  8.24E-05  8.85E-05  9.49E-05  1.02E-04
    am242m  2.25E-08  2.43E-08  2.67E-08  2.90E-08  3.14E-08
    am242   2.69E-12  3.17E-12  3.41E-12  3.66E-12  3.92E-12
    am243   1.56E-10  1.75E-10  1.97E-10  2.21E-10  2.46E-10
    am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    am244   1.01E-18  1.33E-18  1.50E-18  1.67E-18  1.87E-18
    am245   1.40E-45   .00E+00   .00E+00   .00E+00   .00E+00
    am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    cm241   1.71E-22  1.85E-22  1.99E-22  2.13E-22  2.28E-22
    cm242   5.93E-10  6.40E-10  6.88E-10  7.39E-10  7.91E-10
    cm243   2.16E-16  2.34E-16  2.53E-16  2.73E-16  2.94E-16
    cm244   1.64E-14  1.86E-14  2.09E-14  2.35E-14  2.63E-14
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  99
      power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge 337837. d 346988. d 356120. d 365251. d
    cm245   2.75E-18  3.20E-18  3.72E-18  4.29E-18  4.94E-18
    cm246   2.10E-21  2.52E-21  3.00E-21  3.57E-21  4.22E-21
    cm247   2.63E-26  3.25E-26  3.99E-26  4.88E-26  5.92E-26
    cm248   5.36E-30  6.28E-30  5.41E-30  6.80E-30  8.49E-30
    cm249   2.49E-41  1.32E-40  1.71E-40  2.10E-40  2.65E-40
    cm250    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
  totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0  flux               2.68E+08  2.68E+08  2.68E+08  2.68E+08
0  .results on logical unit no. 71, position  1, for time step  4, subcase11. (run position 1, case position 1)
  title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements       page 100
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0                                                nuclide concentrations, grams
                                                 basis =single reactor assembly
              initial  306.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     h  1    8.59E-05  8.59E-05  8.59E-05  8.59E-05  8.59E-05  8.59E-05  8.59E-05
     h  2    5.10E-07  5.10E-07  5.10E-07  5.10E-07  5.10E-07  5.10E-07  5.10E-07
    he  4    5.68E-05  5.68E-05  5.68E-05  5.68E-05  5.68E-05  5.68E-05  5.68E-05
    ne 20    5.41E-05  5.41E-05  5.41E-05  5.41E-05  5.41E-05  5.41E-05  5.41E-05
    na 23    1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05
    mg 24    2.87E-01  2.87E-01  2.87E-01  2.87E-01  2.87E-01  2.87E-01  2.87E-01
    mg 26    6.63E-06  6.63E-06  6.63E-06  6.63E-06  6.63E-06  6.63E-06  6.63E-06
    al 27    1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06
    si 28    9.74E-01  9.74E-01  9.74E-01  9.74E-01  9.74E-01  9.74E-01  9.74E-01
    si 29    1.35E-06  1.35E-06  1.35E-06  1.35E-06  1.35E-06  1.35E-06  1.35E-06
  total      1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements       page 101
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0                                                element radioactivity, curies
                                                 basis =single reactor assembly
              initial  306.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     h  3    1.04E-06  9.02E-07  8.47E-07  8.03E-07  8.23E-07  7.85E-07
    na 22    9.40E-00  6.60E-06  5.68E-06  5.95E-06  5.46E-06  5.69E-06  5.52E-06
  totals     2.55E+01  5.59E-06  4.63E-06  4.83E-06  5.22E-06  2.71E-06  2.30E-06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements       page 102
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0                                                element thermal power, watts
                                                 basis =single reactor assembly
```

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na	1.70E-01	6.51E-08	5.21E-08	4.17E-08	3.34E-08	2.68E-08	2.14E-08
totals	4.76E-01	6.51E-08	5.21E-08	4.18E-08	3.34E-08	2.68E-08	2.15E-08

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 103
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 22	7.46E-08	5.98E-08	4.79E-08	3.83E-08	3.07E-08	2.46E-08	1.97E-08
total	3.31E-01	5.98E-08	4.79E-08	3.83E-08	3.07E-08	2.46E-08	1.97E-08

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 104
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.85E-01	2.85E-01	2.85E-01	2.86E-01	2.86E-01	2.86E-01	2.86E-01
pb206	1.40E-05	1.40E-05	1.41E-05	1.41E-05	1.42E-05	1.42E-05	1.42E-05
pb207	7.17E-06	7.18E-06	7.19E-06	7.20E-06	7.22E-06	7.23E-06	7.24E-06
pb208	1.23E-06	1.23E-06	1.24E-06	1.24E-06	1.24E-06	1.24E-06	1.24E-06
pb210	1.34E-06	1.34E-06	1.34E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06
bi209	8.49E-07	8.51E-07	8.53E-07	8.55E-07	8.57E-07	8.59E-07	8.62E-07
ra226	1.02E-04	1.02E-04	1.02E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
th229	2.87E-05	2.88E-05	2.88E-05	2.89E-05	2.89E-05	2.90E-05	2.90E-05
th230	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.57E-02	2.57E-02
th232	5.18E-03	5.18E-03	5.19E-03	5.19E-03	5.20E-03	5.20E-03	5.20E-03
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.21E-04	7.21E-04	7.22E-04	7.22E-04	7.23E-04	7.24E-04	7.24E-04
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
u233	1.35E-02	1.36E-02	1.36E-02	1.36E-02	1.36E-02	1.36E-02	1.36E-02
u234	9.17E+00	9.17E+00	9.17E+00	9.18E+00	9.18E+00	9.18E+00	9.18E+00
u235	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02
u236	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02
u238	3.44E+04	3.44E+04	3.44E+04	3.44E+04	3.44E+04	3.44E+04	3.44E+04
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu238	2.34E-02	2.32E-02	2.31E-02	2.29E-02	2.28E-02	2.26E-02	2.25E-02
pu239	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00
pu240	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
pu241	9.02E-06	8.67E-06	8.32E-06	8.00E-06	7.68E-06	7.38E-06	7.09E-06
am241	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.03E-04	1.03E-04
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 105
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.85E-01	2.85E-01	2.85E-01	2.86E-01	2.86E-01	2.86E-01	2.86E-01
pb	2.37E-05	2.38E-05	2.39E-05	2.39E-05	2.40E-05	2.40E-05	2.41E-05
bi	8.50E-07	8.52E-07	8.54E-07	8.56E-07	8.58E-07	8.60E-07	8.62E-07
ra	1.02E-04	1.02E-04	1.02E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
th	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.09E-02	5.09E-02	5.09E-02
pa	7.22E-04	7.23E-04	7.23E-04	7.24E-04	7.24E-04	7.25E-04	7.26E-04
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.86E+00	4.86E+00	4.86E+00
am	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.03E-04	1.03E-04
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 106
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.15E+00
pb206	2.89E-03	2.89E-03	2.90E-03	2.91E-03	2.92E-03	2.92E-03	2.93E-03
pb207	1.48E-03	1.49E-03	1.49E-03	1.49E-03	1.49E-03	1.50E-03	1.50E-03
pb208	2.56E-04	2.56E-04	2.57E-04	2.57E-04	2.58E-04	2.58E-04	2.59E-04
pb210	2.81E-04	2.82E-04	2.82E-04	2.83E-04	2.83E-04	2.84E-04	2.84E-04
bi209	1.77E-04	1.78E-04	1.78E-04	1.79E-04	1.79E-04	1.80E-04	1.80E-04
po210	4.78E-06	4.74E-06	4.73E-06	4.74E-06	4.75E-06	4.75E-06	4.76E-06
ra226	2.31E-02	2.31E-02	2.32E-02	2.32E-02	2.32E-02	2.33E-02	2.33E-02
ac227	1.05E-04	1.05E-04	1.05E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
th228	1.55E-06	1.54E-06	1.53E-06	1.52E-06	1.51E-06	1.50E-06	1.49E-06
th229	6.58E-03	6.59E-03	6.60E-03	6.61E-03	6.62E-03	6.63E-03	6.64E-03
th230	5.88E+00	5.88E+00	5.89E+00	5.89E+00	5.90E+00	5.90E+00	5.91E+00
th231	7.18E-07	6.91E-07	6.91E-07	6.91E-07	6.91E-07	6.91E-07	6.91E-07
th232	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.66E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u232	5.63E-05	5.59E-05	5.55E-05	5.51E-05	5.47E-05	5.42E-05	5.38E-05
u233	3.16E+00	3.16E+00	3.16E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00
u234	2.15E+03	2.15E+03	2.15E+03	2.15E+03	2.15E+03	2.15E+03	2.15E+03
u235	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05	1.70E+05
u236	4.14E+04	4.14E+04	4.14E+04	4.14E+04	4.14E+04	4.14E+04	4.14E+04
u238	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06
np236	4.62E-05	4.62E-05	4.62E-05	4.62E-05	4.62E-05	4.62E-05	4.62E-05
np237	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03
pu238	5.57E+00	5.53E+00	5.50E+00	5.46E+00	5.42E+00	5.39E+00	5.35E+00
pu239	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03
pu240	5.49E+00	5.69E+00	5.49E+00	5.49E+00	5.49E+00	5.49E+00	5.49E+00
pu241	2.17E-03	2.09E-03	2.01E-03	1.93E-03	1.85E-03	1.78E-03	1.71E-03
pu242	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
am241	2.45E-02	2.45E-02	2.44E-02	2.44E-02	2.47E-02	2.47E-02	2.47E-02
am242m	7.60E-06	7.57E-06	7.53E-06	7.50E-06	7.47E-06	7.44E-06	7.41E-06
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 107
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.14E+00	1.15E+00
pb	4.91E-03	4.92E-03	4.93E-03	4.94E-03	4.95E-03	4.96E-03	4.97E-03
bi	1.78E-04	1.78E-04	1.78E-04	1.79E-04	1.79E-04	1.80E-04	1.80E-04
po	4.78E-06	4.74E-06	4.73E-06	4.74E-06	4.75E-06	4.75E-06	4.76E-06
ra	2.31E-02	2.31E-02	2.32E-02	2.32E-02	2.32E-02	2.33E-02	2.33E-02
ac	1.05E-04	1.05E-04	1.05E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
th	7.09E+00	7.09E+00	7.10E+00	7.10E+00	7.11E+00	7.12E+00	7.12E+00
pa	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.68E-01
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03	9.97E+03
pu	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03
am	2.45E-02	2.45E-02	2.46E-02	2.46E-02	2.47E-02	2.47E-02	2.48E-02
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 108
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	7.61E-03	7.62E-03	7.63E-03	7.64E-03	7.64E-03	7.65E-03	7.66E-03
tl208	4.57E-04	4.56E-04	4.53E-04	4.49E-04	4.46E-04	4.43E-04	4.40E-04
tl209	2.74E-05	2.74E-05	2.75E-05	2.75E-05	2.75E-05	2.76E-05	2.76E-05
pb209	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
pb210	2.15E-02	2.15E-02	2.16E-02	2.16E-02	2.16E-02	2.17E-02	2.17E-02
pb211	7.63E-03	7.64E-03	7.65E-03	7.66E-03	7.66E-03	7.67E-03	7.68E-03
pb212	1.27E-03	1.27E-03	1.26E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
pb214	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.30E-02
bi210	2.15E-02	2.15E-02	2.16E-02	2.16E-02	2.16E-02	2.17E-02	2.17E-02
bi211	7.63E-03	7.64E-03	7.65E-03	7.66E-03	7.66E-03	7.67E-03	7.68E-03
bi212	1.27E-03	1.27E-03	1.26E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
bi213	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
bi214	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.30E-02
po210	2.15E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.14E-02	2.14E-02
po211	2.10E-05	2.10E-05	2.10E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05
po212	8.34E-04	8.32E-04	8.07E-04	8.01E-04	7.95E-04	7.90E-04	7.84E-04
po213	1.28E-03	1.28E-03	1.28E-03	1.28E-03	1.28E-03	1.29E-03	1.29E-03
po214	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.30E-02
po215	7.63E-03	7.64E-03	7.65E-03	7.66E-03	7.66E-03	7.67E-03	7.68E-03
po216	1.27E-03	1.27E-03	1.26E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
po218	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.31E-02
at217	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
rn219	7.63E-03	7.64E-03	7.65E-03	7.66E-03	7.66E-03	7.67E-03	7.68E-03
rn220	1.27E-03	1.27E-03	1.26E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
rn222	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.31E-02
fr221	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
fr223	1.05E-04	1.05E-04	1.05E-04	1.05E-04	1.06E-04	1.06E-04	1.06E-04
ra223	7.63E-03	7.64E-03	7.65E-03	7.66E-03	7.66E-03	7.67E-03	7.68E-03
ra224	1.27E-03	1.27E-03	1.26E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
ra225	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
ra226	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.30E-02	2.30E-02	2.31E-02
ac225	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
ac227	7.62E-03	7.63E-03	7.63E-03	7.64E-03	7.65E-03	7.65E-03	7.66E-03
th227	7.52E-03	7.54E-03	7.54E-03	7.55E-03	7.56E-03	7.56E-03	7.57E-03
th228	1.27E-03	1.26E-03	1.25E-03	1.25E-03	1.24E-03	1.23E-03	1.22E-03
th229	1.30E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.31E-03	1.32E-03
th230	1.21E-01	1.21E-01	1.21E-01	1.22E-01	1.22E-01	1.22E-01	1.22E-01
th231	3.82E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	7.07E-03	7.07E-03	7.08E-03	7.09E-03	7.09E-03	7.90E-03	7.90E-03
pa233	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03
u232	1.24E-03	1.24E-03	1.23E-03	1.22E-03	1.21E-03	1.20E-03	1.19E-03
u233	3.94E-02	3.05E-02	3.05E-02	3.05E-02	3.06E-02	3.06E-02	3.06E-02
u234	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01
u235	3.67E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01	3.67E-01
u236	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00
u237	6.03E+01	5.17E-06	4.97E-06	4.77E-06	4.58E-06	4.40E-06	4.23E-06
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np236	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
np237	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00	7.03E+00

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bas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% u02 actinides page 109
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.461OE+03mwd, flux= 2.74E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu236	1.37E-04	1.13E-04	9.24E-05	7.57E-05	6.20E-05	5.08E-05	4.17E-05
pu238	9.54E+01	9.48E+01	9.41E+01	9.35E+01	9.29E+01	9.23E+01	9.17E+01
pu239	7.15E+01	7.15E+01	7.15E+01	7.15E+01	7.15E+01	7.15E+01	7.15E+01
pu240	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00
pu241	2.25E+01	2.16E+01	2.08E+01	1.99E+01	1.91E+01	1.84E+01	1.77E+01
am241	8.40E-02	8.42E-02	8.43E-02	8.45E-02	8.46E-02	8.48E-02	8.49E-02
am242m	7.96E-05	7.93E-05	7.90E-05	7.86E-05	7.83E-05	7.80E-05	7.77E-05
am242	7.67E-04	7.89E-05	7.86E-05	7.83E-05	7.80E-05	7.77E-05	7.73E-05
cm242	6.34E-04	2.22E-04	1.08E-04	7.44E-05	6.78E-05	6.52E-05	6.43E-05
total	5.45E+03	2.08E+02	2.07E+02	2.07E+02	2.06E+02	2.05E+02	2.05E+02

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 110
decay, following reactor irradiation identified by: power= 4.800E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec

0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	3.36E-05	3.36E-05	3.33E-05	3.35E-05	3.34E-05	3.34E-05	3.33E-05
pb	1.06E-04	1.06E-04	1.06E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04
bi	6.74E-04	6.75E-04	6.75E-04	6.76E-04	6.77E-04	6.77E-04	6.78E-04
po	3.08E-03	3.07E-03	3.08E-03	3.08E-03	3.08E-03	3.09E-03	3.09E-03
at	5.56E-05	5.57E-05	5.58E-05	5.59E-05	5.60E-05	5.61E-05	5.62E-05
rn	1.12E-03	1.12E-03	1.12E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03
fr	5.06E-05	5.06E-05	5.07E-05	5.08E-05	5.09E-05	5.10E-05	5.11E-05
ra	9.75E-04	9.77E-04	9.78E-04	9.79E-04	9.80E-04	9.81E-04	9.82E-04
ac	4.92E-05	4.93E-05	4.93E-05	4.94E-05	4.95E-05	4.96E-05	4.97E-05
th	5.40E-03	5.39E-03	5.39E-03	5.39E-03	5.40E-03	5.40E-03	5.40E-03
pa	3.24E-02	3.24E-02	3.24E-02	3.24E-02	3.24E-02	3.24E-02	3.24E-02
u	7.54E+00	5.42E-01	5.42E-01	5.42E-01	5.42E-01	5.42E-01	5.42E-01
np	7.11E+00	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01
pu	5.42E+00	5.40E+00	5.38E+00	5.36E+00	5.34E+00	5.32E+00	5.30E+00
am	2.80E-03	2.81E-03	2.81E-03	2.82E-03	2.82E-03	2.83E-03	2.83E-03
cm	2.31E-05	8.09E-06	3.94E-06	2.79E-06	2.47E-06	2.38E-06	2.35E-06
totals	2.01E+01	6.19E+00	6.17E+00	6.15E+00	6.13E+00	6.11E+00	6.09E+00

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 111
decay, following reactor irradiation identified by: power= 4.800E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec

0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	9.92E-08	9.94E-08	9.95E-08	9.96E-08	9.97E-08	9.97E-08	9.98E-08
tl208	9.10E-06	9.08E-06	9.02E-06	8.95E-06	8.89E-06	8.82E-06	8.76E-06
tl209	3.44E-07	3.45E-07	3.45E-07	3.46E-07	3.46E-07	3.47E-07	3.47E-07
pb210	6.42E-07	6.43E-07	6.44E-07	6.45E-07	6.46E-07	6.47E-07	6.48E-07
pb211	3.06E-06	3.06E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.08E-06
pb212	1.09E-06	1.09E-06	1.08E-06	1.08E-06	1.07E-06	1.06E-06	1.05E-06
pb214	3.38E-05	3.39E-05	3.39E-05	3.40E-05	3.40E-05	3.41E-05	3.42E-05
bi211	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.13E-06	2.13E-06	2.13E-06
bi212	7.93E-07	7.91E-07	7.85E-07	7.80E-07	7.74E-07	7.69E-07	7.63E-07
bi213	9.75E-07	9.77E-07	9.79E-07	9.80E-07	9.82E-07	9.83E-07	9.85E-07
bi214	2.04E-04	2.04E-04	2.05E-04	2.05E-04	2.05E-04	2.06E-04	2.06E-04
po214	1.12E-08	1.13E-08	1.13E-08	1.13E-08	1.13E-08	1.13E-08	1.13E-08
po215	7.93E-09	7.95E-09	7.96E-09	7.96E-09	7.97E-09	7.98E-09	7.99E-09
rn219	2.33E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.35E-06	2.35E-06
rn222	5.27E-08	5.27E-08	5.28E-08	5.29E-08	5.30E-08	5.31E-08	5.32E-08
fr221	2.29E-07	2.29E-07	2.29E-07	2.30E-07	2.30E-07	2.31E-07	2.31E-07
fr223	3.58E-08	3.58E-08	3.58E-08	3.59E-08	3.59E-08	3.59E-08	3.60E-08
ra223	6.07E-06	6.09E-06	6.09E-06	6.10E-06	6.10E-06	6.11E-06	6.11E-06
ra224	7.59E-08	7.57E-08	7.52E-08	7.46E-08	7.41E-08	7.36E-08	7.30E-08
ra225	1.11E-07	1.11E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07

ra226	9.77E-07	9.79E-07	9.80E-07	9.82E-07	9.84E-07	9.85E-07	9.87E-07
ac225	1.30E-07	1.30E-07	1.30E-07	1.30E-07	1.31E-07	1.31E-07	1.31E-07
ac227	8.71E-09	8.72E-09	8.73E-09	8.74E-09	8.74E-09	8.75E-09	8.76E-09
th227	4.95E-06	4.96E-06	4.96E-06	4.97E-06	4.97E-06	4.98E-06	4.98E-06
th228	2.65E-08	2.44E-08	2.62E-08	2.60E-08	2.58E-08	2.56E-08	2.54E-08
th229	7.31E-07	7.32E-07	7.33E-07	7.34E-07	7.36E-07	7.37E-07	7.38E-07
th230	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06
th231	7.81E-05	6.75E-05	6.75E-05	6.75E-05	6.75E-05	6.75E-05	6.75E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	1.87E-06	1.87E-06	1.87E-06	1.87E-06	1.87E-06	1.87E-06	1.87E-06
pa233	9.32E-03	9.32E-03	9.32E-03	9.32E-03	9.32E-03	9.32E-03	9.32E-03
pa234m	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04
pa234	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05
u232	1.60E-08	1.59E-08	1.58E-08	1.56E-08	1.55E-08	1.54E-08	1.53E-08
u233	2.24E-07	2.24E-07	2.24E-07	2.24E-07	2.25E-07	2.25E-07	2.25E-07
u234	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04
u235	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04
u236	2.70E-05	2.70E-05	2.70E-05	2.70E-05	2.70E-05	2.70E-05	2.70E-05
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np237	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03
pu238	1.07E-03	1.07E-03	1.06E-03	1.05E-03	1.05E-03	1.04E-03	1.03E-03
pu239	3.43E-04	3.43E-04	3.43E-04	3.43E-04	3.43E-04	3.43E-04	3.43E-04
pu240	1.22E-05	1.22E-05	1.22E-05	1.22E-05	1.22E-05	1.22E-05	1.22E-05
am241	1.42E-05	1.43E-05	1.43E-05	1.43E-05	1.44E-05	1.44E-05	1.44E-05
am242	8.83E-08	9.09E-09	9.05E-09	9.02E-09	8.98E-09	8.94E-09	8.91E-09
total	3.97E+00	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 112
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.84E-05	3.67E-05	3.50E-05	3.34E-05	3.19E-05	3.04E-05	2.90E-05
li 6	1.95E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05
be 9	8.85E-07	8.85E-07	8.85E-07	8.85E-07	8.85E-07	8.85E-07	8.85E-07
be 10	5.90E-06	5.90E-06	5.90E-06	5.90E-06	5.90E-06	5.90E-06	5.90E-06
c 14	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06
ga 71	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06
ge 72	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04
ge 73	5.57E-04	5.57E-04	5.57E-04	5.57E-04	5.57E-04	5.57E-04	5.57E-04
ge 74	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04
as 75	5.65E-03	5.65E-03	5.65E-03	5.65E-03	5.65E-03	5.65E-03	5.65E-03
ge 76	1.87E-02	1.87E-02	1.87E-02	1.87E-02	1.87E-02	1.87E-02	1.87E-02
se 76	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06
se 77	4.17E-02	4.17E-02	4.17E-02	4.17E-02	4.17E-02	4.17E-02	4.17E-02
se 78	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
se 79	2.28E-01	2.28E-01	2.28E-01	2.28E-01	2.28E-01	2.28E-01	2.28E-01
br 79	2.39E-04	2.39E-04	2.40E-04	2.40E-04	2.41E-04	2.41E-04	2.41E-04
se 80	6.78E-01	6.78E-01	6.78E-01	6.78E-01	6.78E-01	6.78E-01	6.78E-01
br 81	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00
se 82	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00
kr 82	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04
kr 83	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00
kr 84	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00
kr 85	2.24E-02	2.12E-02	2.01E-02	1.90E-02	1.80E-02	1.71E-02	1.62E-02
rb 85	6.73E+00	6.73E+00	6.74E+00	6.74E+00	6.74E+00	6.74E+00	6.74E+00
kr 86	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
sr 86	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05	8.20E-05
rb 87	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
sr 87	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05

sr 88	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01
y 89	2.80E+01	2.80E+01	2.80E+01	2.80E+01	2.80E+01	2.80E+01	2.80E+01
sr 90	1.38E+00	1.35E+00	1.33E+00	1.30E+00	1.27E+00	1.25E+00	1.22E+00
y 90	3.59E-04	3.52E-04	3.44E-04	3.37E-04	3.31E-04	3.24E-04	3.17E-04
zr 90	3.28E+01	3.28E+01	3.28E+01	3.28E+01	3.29E+01	3.29E+01	3.29E+01
zr 91	3.49E+01	3.49E+01	3.49E+01	3.49E+01	3.49E+01	3.49E+01	3.49E+01
zr 92	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01
zr 93	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01
nb 93	5.52E-03	5.53E-03	5.54E-03	5.55E-03	5.56E-03	5.57E-03	5.58E-03
nb 93m	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.64E-04	2.64E-04
zr 94	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01
nb 94	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05
mo 95	4.01E+01	4.01E+01	4.01E+01	4.01E+01	4.01E+01	4.01E+01	4.01E+01
zr 96	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.93E+01
mo 96	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
mo 97	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01
mo 98	3.72E+01	3.72E+01	3.72E+01	3.72E+01	3.72E+01	3.72E+01	3.72E+01
tc 98	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06
tc 99	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01
ru 99	6.62E-02	6.63E-02	6.64E-02	6.65E-02	6.66E-02	6.67E-02	6.68E-02
mo100	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01
ru100	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02
ru101	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01
ru102	2.88E+01	2.88E+01	2.88E+01	2.88E+01	2.88E+01	2.88E+01	2.88E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 113
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
rh103	2.13E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01
ru104	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01
pd104	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
pd105	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00
ru106	5.31E-03	3.01E-03	1.71E-03	9.47E-04	5.48E-04	3.16E-04	1.76E-04
pd106	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00
pd107	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00
ag107	7.17E-05	7.18E-05	7.20E-05	7.21E-05	7.22E-05	7.23E-05	7.25E-05
pd108	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01	6.96E-01
ag109	3.89E-01	3.89E-01	3.89E-01	3.89E-01	3.89E-01	3.89E-01	3.89E-01
pd110	2.71E-01	2.71E-01	2.71E-01	2.71E-01	2.71E-01	2.71E-01	2.71E-01
ad110	8.84E-04	8.84E-04	8.85E-04	8.85E-04	8.85E-04	8.85E-04	8.85E-04
cd111	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01	1.74E-01
cd112	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01
cd113	9.15E-02	9.15E-02	9.15E-02	9.15E-02	9.15E-02	9.15E-02	9.15E-02
cd113m	4.47E-05	4.29E-05	4.12E-05	3.95E-05	3.80E-05	3.64E-05	3.50E-05
in113	2.11E-03	2.11E-03	2.12E-03	2.12E-03	2.12E-03	2.12E-03	2.12E-03
cd114	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01	1.52E-01
in115	8.63E-02	8.63E-02	8.63E-02	8.63E-02	8.63E-02	8.63E-02	8.63E-02
sn115	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03
cd116	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
sn116	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04
sn117	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
sn118	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02
sn119	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
sn120	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
sn121m	5.73E-05	5.67E-05	5.61E-05	5.55E-05	5.49E-05	5.43E-05	5.38E-05
sb121	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01
sn122	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01
te122	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05

sb123	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
sn124	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
te124	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
sb125	1.01E-03	6.17E-04	6.61E-04	5.35E-04	4.53E-04	3.90E-04	2.84E-04
te125	2.51E-01	2.51E-01	2.51E-01	2.51E-01	2.51E-01	2.51E-01	2.52E-01
te125m	1.35E-05	1.16E-05	9.39E-06	7.60E-06	6.15E-06	4.98E-06	4.03E-06
sn126	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.65E-01
te126	3.53E-03	3.53E-03	3.53E-03	3.53E-03	3.53E-03	3.54E-03	3.54E-03
i127	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
te128	3.01E+00	3.01E+00	3.01E+00	3.01E+00	3.01E+00	3.01E+00	3.01E+00
xe128	9.55E-05	9.55E-05	9.55E-05	9.55E-05	9.55E-05	9.55E-05	9.55E-05
i129	6.46E+00	6.46E+00	6.46E+00	6.46E+00	6.46E+00	6.46E+00	6.46E+00
xe129	1.42E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.44E-04	1.44E-04
te130	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01	1.50E+01
xe130	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03
xe131	2.49E+01	2.49E+01	2.49E+01	2.49E+01	2.49E+01	2.49E+01	2.49E+01
xe132	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01
cs133	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01
xe134	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01
cs134	1.90E-04	1.44E-04	1.09E-04	8.20E-05	6.20E-05	4.68E-05	3.54E-05
ba134	3.19E-02	3.20E-02	3.20E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02
cs135	5.79E+01	5.79E+01	5.79E+01	5.79E+01	5.79E+01	5.79E+01	5.79E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 114
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
ba135	8.74E-03	8.75E-03	8.77E-03	8.78E-03	8.80E-03	8.81E-03	8.83E-03
xe136	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01
ba136	5.96E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02	5.96E-02
cs137	2.44E+00	2.39E+00	2.35E+00	2.30E+00	2.26E+00	2.22E+00	2.18E+00
ba137	5.40E+01	5.40E+01	5.41E+01	5.41E+01	5.41E+01	5.42E+01	5.42E+01
ba138	6.03E+01	6.03E+01	6.03E+01	6.03E+01	6.03E+01	6.03E+01	6.03E+01
la138	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04
la139	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01
ce140	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01
pr141	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01
ce142	5.43E+01	5.43E+01	5.43E+01	5.43E+01	5.43E+01	5.43E+01	5.43E+01
nd142	5.71E-03	5.71E-03	5.71E-03	5.71E-03	5.71E-03	5.71E-03	5.71E-03
nd143	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01
ce144	5.76E-02	2.75E-02	1.31E-02	6.25E-03	2.98E-03	1.42E-03	6.78E-04
nd144	5.14E+01	5.14E+01	5.14E+01	5.14E+01	5.14E+01	5.14E+01	5.14E+01
nd145	3.71E+01	3.71E+01	3.71E+01	3.71E+01	3.71E+01	3.71E+01	3.71E+01
nd146	2.86E+01	2.86E+01	2.86E+01	2.86E+01	2.86E+01	2.86E+01	2.86E+01
sm146	2.51E-06	2.51E-06	2.51E-06	2.51E-06	2.51E-06	2.51E-06	2.51E-06
pm147	8.22E-02	6.68E-02	5.36E-02	4.30E-02	3.45E-02	2.77E-02	2.22E-02
sm147	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01
nd148	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
sm148	2.65E-02	2.65E-02	2.65E-02	2.65E-02	2.65E-02	2.65E-02	2.65E-02
sm149	5.77E+00	5.77E+00	5.77E+00	5.77E+00	5.77E+00	5.77E+00	5.77E+00
nd150	6.59E+00	6.59E+00	6.59E+00	6.59E+00	6.59E+00	6.59E+00	6.59E+00
sm150	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00
sm151	5.49E-01	5.45E-01	5.42E-01	5.38E-01	5.35E-01	5.31E-01	5.28E-01
eu151	5.50E+00	5.50E+00	5.51E+00	5.51E+00	5.51E+00	5.52E+00	5.52E+00
sm152	2.92E+00	2.92E+00	2.92E+00	2.92E+00	2.92E+00	2.92E+00	2.92E+00
eu152	4.61E-03	4.42E-03	4.23E-03	4.05E-03	3.88E-03	3.71E-03	3.56E-03
gd152	7.30E-02	7.30E-02	7.31E-02	7.31E-02	7.32E-02	7.32E-02	7.32E-02
eu153	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00
sm154	7.99E-01	7.99E-01	7.99E-01	7.99E-01	7.99E-01	7.99E-01	7.99E-01

eu154	1.39E-04	1.30E-04	1.21E-04	1.13E-04	1.06E-04	9.91E-05	9.27E-05
gd154	5.53E-03	5.54E-03	5.54E-03	5.55E-03	5.56E-03	5.57E-03	5.57E-03
eu155	2.53E-03	2.24E-03	1.98E-03	1.75E-03	1.55E-03	1.37E-03	1.21E-03
gd155	2.79E-01	2.79E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01	2.80E-01
gd156	2.46E-01	2.46E-01	2.46E-01	2.46E-01	2.46E-01	2.46E-01	2.46E-01
gd157	5.34E-02	5.34E-02	5.34E-02	5.34E-02	5.34E-02	5.34E-02	5.34E-02
gd158	8.32E-02	8.32E-02	8.32E-02	8.32E-02	8.32E-02	8.32E-02	8.32E-02
tb159	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02
gd160	4.96E-03	4.96E-03	4.96E-03	4.96E-03	4.96E-03	4.96E-03	4.96E-03
dy160	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06
dy161	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03	1.64E-03
dy162	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04
dy163	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04
dy164	6.45E-05	6.45E-05	6.45E-05	6.45E-05	6.45E-05	6.45E-05	6.45E-05
ho165	2.86E-05	2.86E-05	2.86E-05	2.86E-05	2.86E-05	2.86E-05	2.86E-05
er166	2.82E-06	2.82E-06	2.82E-06	2.82E-06	2.82E-06	2.82E-06	2.82E-06
total	1.52E+03	1.52E+03	1.52E+03	1.52E+03	1.52E+03	1.52E+03	1.52E+03

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sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 115
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.76E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.72E-01	3.55E-01	3.38E-01	3.23E-01	3.08E-01	2.94E-01	2.81E-01
c 14	5.01E-06	5.01E-06	5.01E-06	5.01E-06	5.01E-06	5.01E-06	5.01E-06
se 79	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03	3.12E-03
kr 85	8.79E+00	8.32E+00	7.89E+00	7.47E+00	7.08E+00	6.71E+00	6.36E+00
rb 87	1.23E-06	1.23E-06	1.23E-06	1.23E-06	1.23E-06	1.23E-06	1.23E-06
sr 90	1.95E+02	1.91E+02	1.87E+02	1.83E+02	1.80E+02	1.76E+02	1.72E+02
y 90	1.95E+02	1.91E+02	1.87E+02	1.83E+02	1.80E+02	1.76E+02	1.72E+02
y 91	1.97E+02	5.39E+00	1.47E-01	3.98E-03	1.08E-04	2.94E-06	7.97E-08
zr 93	6.41E-02	6.41E-02	6.41E-02	6.41E-02	6.41E-02	6.41E-02	6.41E-02
nb 93m	6.26E-02	6.27E-02	6.27E-02	6.28E-02	6.28E-02	6.29E-02	6.29E-02
nb 94	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06
zr 95	2.17E+02	8.96E+00	2.98E-01	1.11E-02	4.09E-04	1.52E-05	5.62E-07
nb 95	2.17E+02	1.71E+01	6.56E-01	2.43E-02	9.02E-04	3.34E-05	1.24E-06
tc 99	6.76E-01	6.76E-01	6.76E-01	6.76E-01	6.76E-01	6.76E-01	6.76E-01
rh102	8.66E-06	7.09E-06	5.81E-06	4.76E-06	3.90E-06	3.20E-06	2.62E-06
ru106	1.76E+01	9.98E+00	5.66E+00	3.21E+00	1.82E+00	1.03E+00	5.84E-01
rh106	1.76E+01	9.98E+00	5.66E+00	3.21E+00	1.82E+00	1.03E+00	5.84E-01
pd107	7.17E-04	7.17E-04	7.17E-04	7.17E-04	7.17E-04	7.17E-04	7.17E-04
ag110m	2.81E-04	1.21E-04	5.19E-05	2.23E-05	9.58E-06	4.12E-06	1.77E-06
cd113m	1.80E-02	8.63E-03	4.25E-03	2.07E-03	8.52E-03	8.18E-03	7.85E-03
sn119m	1.58E-03	7.70E-04	3.75E-04	1.82E-04	8.88E-05	4.32E-05	2.10E-05
sn121	6.81E-01	2.36E-03	2.34E-03	2.31E-03	2.29E-03	2.27E-03	2.24E-03
sn121m	3.08E-03	3.04E-03	3.01E-03	2.98E-03	2.95E-03	2.92E-03	2.89E-03
sn123	5.88E-02	1.15E-02	2.24E-03	4.37E-04	8.54E-05	1.67E-05	3.26E-06
sb125	1.05E+00	8.36E-01	6.93E-01	5.61E-01	4.54E-01	3.67E-01	2.97E-01
te125m	2.43E-01	2.09E-01	1.69E-01	1.37E-01	1.11E-01	8.97E-02	7.26E-02
sn126	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02
sb126	6.09E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03
sb126m	1.67E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02
te127	4.36E+00	1.12E-01	1.42E-02	2.34E-03	3.38E-04	4.88E-05	7.04E-06
te127m	2.66E-01	1.15E-01	4.66E-02	2.39E-03	3.45E-04	4.98E-05	7.19E-06
i129	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03
cs134	2.46E-01	1.86E-01	1.40E-01	1.06E-01	8.02E-02	6.06E-02	4.58E-02
cs135	6.67E-02	6.67E-02	6.67E-02	6.67E-02	6.67E-02	6.67E-02	6.67E-02
cs137	2.12E+02	2.08E+02	2.04E+02	2.01E+02	1.97E+02	1.93E+02	1.89E+02
ba137m	2.01E+02	1.97E+02	1.93E+02	1.89E+02	1.86E+02	1.82E+02	1.79E+02
ce142	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06

ce144	1.83E+02	8.74E+01	4.17E+01	1.99E+01	9.48E+00	4.52E+00	2.16E+00
pr144	1.83E+02	8.74E+01	4.17E+01	1.99E+01	9.48E+00	4.52E+00	2.16E+00
pr144m	2.57E+00	1.22E+00	5.84E-01	2.78E-01	1.33E-01	6.33E-02	3.02E-02
pm147	7.63E+01	6.19E+01	4.97E+01	3.99E+01	3.20E+01	2.57E+01	2.06E+01
sm151	1.44E+01	1.44E+01	1.43E+01	1.42E+01	1.41E+01	1.40E+01	1.39E+01
eu152	8.14E-01	7.80E-01	7.47E-01	7.15E-01	6.85E-01	6.56E-01	6.28E-01
gd153	6.58E-04	2.75E-04	1.15E-04	4.79E-05	2.00E-05	8.35E-06	3.49E-06
eu154	3.75E-02	3.51E-02	3.28E-02	3.07E-02	2.87E-02	2.68E-02	2.51E-02
eu155	1.25E+00	1.10E+00	9.76E-01	8.63E-01	7.63E-01	6.74E-01	5.96E-01
total	2.07E+04	1.11E+03	9.44E+02	8.68E+02	8.21E+02	7.88E+02	7.62E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 116
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

element thermal power, watts
basis maingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.25E-05	1.20E-05	1.14E-05	1.09E-05	1.04E-05	9.92E-06	9.47E-06
se	3.30E+00	9.79E-07	9.79E-07	9.79E-07	9.79E-07	9.79E-07	9.79E-07
kr	1.28E+01	1.23E-02	1.18E-02	1.12E-02	1.06E-02	1.01E-02	9.54E-03
sr	2.00E+01	2.30E-01	2.17E-01	2.13E-01	2.09E-01	2.04E-01	2.00E-01
y	2.81E+01	1.08E+00	1.04E+00	1.02E+00	9.94E-01	9.74E-01	9.54E-01
zr	1.20E+01	4.06E-02	1.51E-03	6.29E-05	9.28E-06	7.30E-06	7.22E-06
nb	2.15E+01	8.22E-02	3.16E-03	1.28E-04	1.51E-05	1.10E-05	1.08E-05
tc	6.63E+00	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
ru	7.56E-01	2.26E-03	3.44E-04	1.91E-04	1.08E-04	6.13E-05	3.47E-05
rh	4.36E-01	9.58E-02	3.42E-02	3.07E-02	1.74E-02	9.88E-03	5.60E-03
pd	3.77E-02	3.95E-08	3.95E-08	3.95E-08	3.95E-08	3.95E-08	3.95E-08
ag	7.68E-02	2.03E-06	8.70E-07	3.74E-07	1.61E-07	6.91E-08	2.98E-08
cd	4.95E-02	1.10E-05	1.01E-05	9.65E-06	9.27E-06	8.89E-06	8.54E-06
sn	1.87E+00	5.47E-05	2.56E-05	1.99E-05	1.87E-05	1.84E-05	1.84E-05
sb	7.31E+00	2.87E-03	7.35E-03	1.03E-03	1.60E-03	1.32E-03	1.10E-03
te	9.26E+00	4.27E-04	1.73E-04	1.20E-04	9.39E-05	7.36E-05	6.11E-05
i	2.08E+01	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07
cs	1.82E+01	2.34E-01	2.29E-01	2.24E-01	2.19E-01	2.15E-01	2.11E-01
ba	1.19E+01	7.73E-01	7.58E-01	7.44E-01	7.30E-01	7.16E-01	7.02E-01
ce	4.39E+00	5.76E-02	2.73E-02	1.30E-02	6.21E-03	2.96E-03	1.41E-03
pr	6.23E+00	6.42E-01	3.06E-01	1.46E-01	6.96E-02	3.32E-02	1.58E-02
pm	3.44E-01	3.27E-02	1.82E-02	1.46E-02	1.17E-02	9.42E-03	7.56E-03
sm	2.27E-02	1.69E-03	1.68E-03	1.67E-03	1.66E-03	1.66E-03	1.65E-03
eu	1.87E-02	7.13E-03	6.76E-03	6.41E-03	6.08E-03	5.77E-03	5.48E-03
gd	1.66E-04	2.41E-07	1.01E-07	4.21E-08	1.76E-08	7.34E-09	3.06E-09
totals	2.61E+02	5.28E+00	2.48E+00	2.42E+00	2.28E+00	2.18E+00	2.12E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 117
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0

nuclide gamma power, watts
basis maingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.16E-04	1.10E-04	1.04E-04	9.88E-05	9.36E-05	8.87E-05	8.40E-05
y 90	1.96E-06	1.92E-06	1.89E-06	1.85E-06	1.81E-06	1.77E-06	1.74E-06
nb 93m	6.98E-07	6.98E-07	6.99E-07	6.99E-07	7.00E-07	7.00E-07	7.01E-07
nb 94	1.78E-08	1.78E-08	1.78E-08	1.78E-08	1.78E-08	1.78E-08	1.78E-08
zr 95	9.44E-01	3.50E-02	1.29E-03	4.80E-05	1.78E-06	6.58E-08	2.44E-09
nb 95	9.85E-01	7.75E-02	2.97E-03	1.10E-04	4.09E-06	1.51E-07	5.61E-09
rh102	1.11E-07	9.88E-08	7.44E-08	6.10E-08	5.00E-08	4.09E-08	3.35E-08
rh106	2.15E-02	1.22E-02	6.91E-03	3.92E-03	2.22E-03	1.26E-03	7.13E-04
ag110m	4.36E-06	1.96E-06	8.42E-07	3.62E-07	1.56E-07	6.68E-08	2.87E-08
sn121m	9.12E-08	9.02E-08	8.93E-08	8.83E-08	8.74E-08	8.65E-08	8.56E-08
sb125	2.71E-03	2.20E-03	1.78E-03	1.44E-03	1.17E-03	9.45E-04	7.65E-04
te125m	5.12E-05	4.40E-05	3.57E-05	2.89E-05	2.36E-05	1.89E-05	1.53E-05

sn126	8.01E-06	8.01E-06	8.01E-06	8.01E-06	8.01E-06	8.01E-06	8.01E-06
sb126	9.94E-05	2.36E-05	2.36E-05	2.36E-05	2.36E-05	2.36E-05	2.36E-05
sb126m	1.54E-04	9.53E-05	9.53E-05	9.53E-05	9.53E-05	9.53E-05	9.53E-05
i129	1.66E-07	1.66E-07	1.66E-07	1.66E-07	1.66E-07	1.66E-07	1.66E-07
cs134	2.27E-03	1.71E-03	1.29E-03	9.78E-04	7.39E-04	5.59E-04	4.22E-04
ba137m	7.12E-01	6.99E-01	6.85E-01	6.72E-01	6.60E-01	6.47E-01	6.35E-01
ce144	2.06E-02	9.85E-03	4.70E-03	2.24E-03	1.07E-03	5.09E-04	2.43E-04
pr144	3.14E-02	1.50E-02	7.14E-03	3.41E-03	1.63E-03	7.75E-04	3.70E-04
pr144m	1.90E-04	9.07E-05	4.33E-05	2.06E-05	9.84E-06	4.69E-06	2.24E-06
pm147	1.98E-06	1.61E-06	1.29E-06	1.03E-06	8.30E-07	6.66E-07	5.35E-07
sm151	1.22E-06	1.21E-06	1.20E-06	1.19E-06	1.18E-06	1.18E-06	1.17E-06
eu152	5.61E-03	5.37E-03	5.14E-03	4.92E-03	4.72E-03	4.52E-03	4.32E-03
gd153	4.20E-07	1.75E-07	7.32E-08	3.05E-08	1.28E-08	5.32E-09	2.22E-09
eu154	2.79E-04	2.61E-04	2.44E-04	2.28E-04	2.13E-04	1.99E-04	1.86E-04
eu155	4.79E-04	4.24E-04	3.74E-04	3.31E-04	2.93E-04	2.59E-04	2.29E-04
total	1.29E+02	8.60E-01	7.18E-01	6.90E-01	6.72E-01	6.56E-01	6.42E-01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 118
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.74E+08n/cm**2-sec
0 element gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.67E+00	1.10E-04	1.04E-04	9.88E-05	8.36E-05	8.07E-05	8.40E-05
y	9.75E+00	1.18E-04	5.03E-06	1.93E-06	1.61E-06	1.77E-06	1.74E-06
zr	4.79E+00	3.50E-02	1.29E-03	4.80E-05	1.78E-06	6.58E-08	2.44E-09
nb	9.14E+00	7.76E-02	2.97E-03	1.11E-04	4.81E-06	8.70E-07	7.24E-07
rh	1.24E-01	1.22E-02	6.91E-03	3.92E-03	2.22E-03	1.26E-03	7.13E-04
ag	3.16E-02	1.96E-06	8.63E-07	3.62E-07	1.56E-07	6.69E-08	2.88E-08
sn	1.22E+00	8.62E-06	8.21E-06	8.13E-06	8.10E-06	8.10E-06	8.09E-06
sb	5.15E+00	2.32E-03	1.90E-03	1.56E-03	1.29E-03	1.06E-03	8.84E-04
te	5.53E+00	5.89E-05	3.73E-05	2.91E-05	2.54E-05	1.89E-05	1.53E-05
i	1.56E+01	1.66E-07	1.66E-07	1.66E-07	1.66E-07	1.66E-07	1.66E-07
cs	8.72E+00	1.71E-03	1.29E-03	9.78E-04	7.39E-04	5.59E-04	4.22E-04
ba	5.39E+00	6.99E-01	6.85E-01	6.72E-01	6.60E-01	6.47E-01	6.35E-01
ce	2.08E+00	9.98E-03	4.70E-03	2.24E-03	1.07E-03	5.09E-04	2.43E-04
pr	1.80E+00	1.51E-02	7.99E-03	3.43E-03	1.64E-03	7.80E-04	3.72E-04
pm	8.73E-02	1.67E-06	1.29E-06	1.04E-06	8.30E-07	6.66E-07	5.35E-07
sm	4.73E-03	1.21E-06	1.20E-06	1.19E-06	1.18E-06	1.18E-06	1.17E-06
eu	1.28E-02	6.05E-03	5.74E-03	5.48E-03	5.22E-03	4.97E-03	4.74E-03
gd	4.27E-05	1.75E-07	7.32E-08	3.05E-08	1.28E-08	5.32E-09	2.22E-09
totals	1.29E+02	8.60E-01	7.18E-01	6.90E-01	6.72E-01	6.56E-01	6.42E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 1461.mwd, flux= 2.74E+08 n**2-sec
0 spectrum of photon release rates, photons/sec
0 basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	5.15E+11	5.60E+04	4.48E+04	3.59E+04	2.88E+04	2.30E+04	1.85E+04
3.00E-02	1.69E+11	1.78E+04	1.43E+04	1.14E+04	9.15E+03	7.33E+03	5.87E+03
5.50E-02	1.18E+11	1.20E+04	9.64E+03	7.72E+03	6.18E+03	4.95E+03	3.97E+03
8.50E-02	6.89E+10	6.77E+03	5.42E+03	4.34E+03	3.48E+03	2.79E+03	2.23E+03
1.20E-01	4.90E+10	4.63E+03	3.71E+03	2.97E+03	2.38E+03	1.90E+03	1.53E+03
1.70E-01	5.13E+10	4.55E+03	3.64E+03	2.92E+03	2.34E+03	1.87E+03	1.50E+03
3.00E-01	5.88E+10	4.52E+03	3.62E+03	2.90E+03	2.32E+03	1.86E+03	1.49E+03
6.50E-01	2.89E+10	2.42E+03	1.94E+03	1.55E+03	1.24E+03	9.94E+04	7.96E+04
1.13E+00	4.97E+09	1.93E+03	1.54E+03	1.24E+03	9.89E+04	7.92E+04	6.35E+04

1.58E+00	9.04E+11	4.82E-01	3.66E-01	3.09E-01	2.48E-01	1.99E-01	1.59E-01
2.00E+00	1.79E+08	4.29E-02	3.44E-02	2.75E-02	2.20E-02	1.77E-02	1.41E-02
2.40E+00	3.63E+07	9.62E-03	7.70E-03	6.17E-03	4.94E-03	3.96E-03	3.17E-03
2.80E+00	2.13E+11	1.51E-04	1.21E-04	9.66E-05	7.74E-05	6.20E-05	4.96E-05
3.25E+00	1.37E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.82E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.17E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.01E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.18E+12	5.41E+05	4.33E+05	3.47E+05	2.78E+05	2.22E+05	1.78E+05
mev/sec	2.10E+12	3.79E+05	3.03E+05	2.43E+05	1.95E+05	1.56E+05	1.25E+05

spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

gmean (mev)	initial	304.4 d	408.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.29E+06	1.40E-01	1.12E-01	8.98E-02	7.19E-02	5.76E-02	4.61E-02
3.00E-02	1.27E+06	1.34E-01	1.07E-01	8.57E-02	6.86E-02	5.50E-02	4.40E-02
5.50E-02	1.62E+06	1.45E-01	1.33E-01	1.06E-01	8.50E-02	6.81E-02	5.45E-02
8.50E-02	1.46E+06	1.44E-01	1.15E-01	9.23E-02	7.39E-02	5.92E-02	4.74E-02
1.20E-01	1.47E+06	1.39E-01	1.11E-01	8.91E-02	7.13E-02	5.71E-02	4.58E-02
1.70E-01	2.18E+06	1.93E-01	1.53E-01	1.24E-01	9.93E-02	7.95E-02	6.37E-02
3.00E-01	4.41E+06	2.39E-01	2.72E-01	2.18E-01	1.74E-01	1.40E-01	1.12E-01
6.50E-01	4.70E+06	5.93E+01	3.15E+01	2.52E+01	2.02E+01	1.62E+01	1.29E+01
1.13E+00	1.48E+06	5.42E+01	4.34E+01	3.47E+01	2.78E+01	2.23E+01	1.79E+01
1.58E+00	3.56E+02	1.90E-04	1.52E-04	1.22E-04	9.76E-05	7.82E-05	6.26E-05
2.00E+00	8.95E+04	2.14E-05	1.72E-05	1.38E-05	1.10E-05	8.83E-06	7.07E-06
2.40E+00	2.18E+04	5.77E-06	4.62E-06	3.70E-06	2.96E-06	2.37E-06	1.90E-06
2.80E+00	1.49E+02	1.05E-07	8.44E-08	6.76E-08	5.42E-08	4.34E-08	3.47E-08
3.25E+00	1.11E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	7.33E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.39E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	5.25E+02	9.47E+01	7.58E+01	6.07E+01	4.87E+01	3.90E+01	3.12E+01
gamma watts	3.37E-01	6.07E-08	4.86E-08	3.89E-08	3.12E-08	2.50E-08	2.00E-08

photon spectrum as a function of time for fission products

sas2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 1461.mwd, flux= 2.74E+08 n**2-sec
spectrum of photon release rates, photons/sec
basis = single reactor assembly

gmean (mev)	initial	304.4 d	408.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	2.60E+14	1.34E+12	6.69E+12	5.90E+12	5.46E+12	5.18E+12	5.00E+12
3.00E-02	1.14E+14	5.62E+12	2.88E+12	2.52E+12	2.32E+12	2.20E+12	2.11E+12
5.50E-02	6.06E+13	2.82E+12	1.43E+12	1.25E+12	1.14E+12	1.08E+12	1.04E+12
8.50E-02	4.19E+13	1.87E+12	8.28E+11	7.08E+11	6.42E+11	6.04E+11	5.79E+11
1.20E-01	2.63E+13	1.09E+12	7.35E+11	5.65E+11	4.79E+11	4.33E+11	4.07E+11
1.70E-01	5.49E+13	6.90E+11	5.33E+11	4.59E+11	4.08E+11	3.94E+11	3.79E+11
3.00E-01	1.30E+14	2.56E+11	5.00E+11	4.93E+11	4.67E+11	4.20E+11	4.02E+11
6.50E-01	2.30E+14	6.28E+12	6.94E+12	6.69E+12	6.52E+12	6.37E+12	6.23E+12
1.13E+00	7.79E+13	1.09E+10	5.19E+10	4.22E+10	3.69E+10	3.37E+10	3.17E+10
1.58E+00	4.03E+13	2.34E+10	1.65E+10	1.20E+10	9.63E+09	8.34E+09	7.59E+09
2.00E+00	1.22E+13	2.93E+10	1.41E+10	6.86E+09	3.37E+09	1.70E+09	8.95E+08
2.40E+00	1.06E+13	6.33E+08	3.46E+08	1.85E+08	9.92E+07	5.37E+07	2.92E+07
2.80E+00	4.22E+12	8.65E+07	4.71E+07	2.58E+07	1.42E+07	7.81E+06	4.33E+06
3.25E+00	2.46E+12	1.11E+07	6.32E+06	3.58E+06	2.03E+06	1.15E+06	6.52E+05

3.75E+00	1.25E+12	4.92E+03	2.79E+03	1.58E+03	8.95E+02	5.07E+02	2.88E+02
4.25E+00	1.38E+12	2.01E-06	2.01E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06
4.75E+00	4.04E+11	1.01E-06	1.01E-06	1.01E-06	1.01E-06	1.01E-06	1.01E-06
5.50E+00	3.01E+11	7.50E-07	7.50E-07	7.50E-07	7.50E-07	7.50E-07	7.50E-07
total	1.06E+15	2.58E+13	2.07E+13	1.66E+13	1.75E+13	1.67E+13	1.62E+13
mev/sec	4.44E+14	8.42E+12	5.28E+12	4.98E+12	4.80E+12	4.67E+12	4.56E+12

spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

emean (mev)	time after discharge initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	6.51E+08	2.09E+07	1.67E+07	1.47E+07	1.56E+07	1.30E+07	1.25E+07
3.00E-02	8.56E+08	2.71E+07	2.16E+07	1.89E+07	1.74E+07	1.65E+07	1.59E+07
5.50E-02	8.34E+08	2.30E+07	1.97E+07	1.71E+07	1.57E+07	1.49E+07	1.43E+07
8.50E-02	8.90E+08	2.28E+07	1.76E+07	1.50E+07	1.37E+07	1.28E+07	1.23E+07
1.20E-01	1.03E+09	2.26E+07	2.20E+07	1.70E+07	1.64E+07	1.50E+07	1.22E+07
1.70E-01	2.33E+09	2.93E+07	2.27E+07	1.95E+07	1.78E+07	1.68E+07	1.61E+07
3.00E-01	8.25E+09	5.67E+07	4.35E+07	3.70E+07	3.35E+07	3.15E+07	3.02E+07
6.50E-01	3.73E+10	1.35E+09	1.13E+09	1.09E+09	1.06E+09	1.04E+09	1.01E+09
1.13E+00	2.19E+10	1.99E+07	1.46E+07	1.19E+07	1.04E+07	9.48E+06	8.90E+06
1.58E+00	1.59E+10	1.00E+07	4.48E+06	4.71E+06	3.79E+06	3.29E+06	2.99E+06
2.00E+00	6.12E+09	1.67E+07	7.06E+06	3.43E+06	1.69E+06	8.49E+05	4.67E+05
2.40E+00	6.34E+09	3.92E+05	2.08E+05	1.11E+05	5.95E+04	3.22E+04	1.75E+04
2.80E+00	2.95E+09	4.05E+04	2.30E+04	1.80E+04	9.81E+03	5.47E+03	3.03E+03
3.25E+00	2.00E+09	9.06E+03	5.13E+03	2.91E+03	1.65E+03	9.35E+02	5.30E+02
3.75E+00	1.17E+09	4.61E+00	2.61E+00	1.48E+00	8.39E-01	4.76E-01	2.70E-01
4.25E+00	1.47E+09	2.14E-09	2.14E-09	2.14E-09	2.14E-09	2.14E-09	2.14E-09
4.75E+00	4.80E+08	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09
5.50E+00	4.14E+08	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09
total	1.11E+11	1.61E+09	1.32E+09	1.25E+09	1.20E+09	1.17E+09	1.14E+09
gamma watts	7.11E+01	1.03E+00	8.46E-01	7.99E-01	7.70E-01	7.48E-01	7.30E-01

principal photon sources in group 1, photons/sec
mean energy = .0160 mev. nuclides exceeding 1.0E-03 of total group release rate (5.18E+12) at 1521.9 d

nuclide	time after discharge initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	4.44E+10	4.39E+10	4.16E+10	3.94E+10	3.74E+10	3.54E+10	3.36E+10
sr 90	7.94E+11	7.78E+11	7.62E+11	7.47E+11	7.32E+11	7.17E+11	7.02E+11
y 90	3.90E+12	3.82E+12	3.75E+12	3.67E+12	3.60E+12	3.52E+12	3.45E+12
rh106	5.24E+11	2.97E+11	1.68E+11	9.54E+10	5.41E+10	3.07E+10	1.74E+10
cs137	7.50E+11	7.35E+11	7.21E+11	7.08E+11	6.94E+11	6.81E+11	6.68E+11
ba137m	3.52E+10	3.45E+10	3.38E+10	3.32E+10	3.26E+10	3.19E+10	3.13E+10
ce144	3.53E+11	1.48E+11	8.03E+10	5.83E+10	1.83E+10	8.71E+09	4.15E+09
pr144	4.68E+12	2.23E+12	1.06E+12	5.07E+11	2.42E+11	1.15E+11	5.50E+10
pm147	8.86E+10	7.19E+10	5.77E+10	4.63E+10	3.72E+10	2.98E+10	2.39E+10

principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (2.20E+12) at 1521.9 d

nuclide	time after discharge initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.35E+10	1.28E+10	1.21E+10	1.15E+10	1.09E+10	1.03E+10	9.78E+09
sr 90	2.26E+11	2.20E+11	2.15E+11	2.19E+11	2.07E+11	2.03E+11	1.98E+11
y 90	1.27E+12	1.25E+12	1.22E+12	1.20E+12	1.17E+12	1.15E+12	1.12E+12
rh106	1.75E+11	9.92E+10	5.62E+10	3.19E+10	1.81E+10	1.02E+10	5.80E+09
sb125	1.96E+10	1.57E+10	1.27E+10	1.03E+10	8.33E+09	6.74E+09	5.45E+09
te125m	1.06E+10	8.93E+09	7.26E+09	5.86E+09	4.74E+09	3.84E+09	3.11E+09
cs137	2.09E+11	2.05E+11	2.01E+11	1.97E+11	1.93E+11	1.90E+11	1.86E+11
ba137m	6.06E+11	5.93E+11	5.81E+11	5.70E+11	5.59E+11	5.49E+11	5.38E+11
ce144	8.19E+11	3.91E+11	1.86E+11	8.89E+10	4.24E+10	2.02E+10	9.64E+09
pr144	1.55E+12	7.38E+11	3.52E+11	1.68E+11	8.00E+10	3.82E+10	1.82E+10
pm147	1.95E+10	1.58E+10	1.27E+10	1.02E+10	8.17E+09	6.56E+09	5.26E+09

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    eu152   1.19E+10  1.14E+10  1.09E+10  1.04E+10  1.00E+10  9.58E+09  9.17E+09
0                 principal photon sources in group  3, photons/sec
    mean energy =  .0550 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.08E+12) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   8.28E+09  7.85E+09  7.44E+09  7.05E+09  6.68E+09  6.33E+09  6.00E+09
 sr 90   1.33E+11  1.30E+11  1.27E+11  1.25E+11  1.22E+11  1.20E+11  1.17E+11
  y 90   8.79E+11  8.61E+11  8.44E+11  8.26E+11  8.10E+11  7.93E+11  7.77E+11
 rh106   1.24E+11  7.03E+10  3.98E+10  2.26E+10  1.28E+10  7.25E+09  4.11E+09
 cs137   1.22E+11  1.19E+11  1.17E+11  1.15E+11  1.13E+11  1.10E+11  1.08E+11
 ce144   1.19E+11  5.65E+10  2.70E+10  1.29E+10  6.13E+09  2.93E+09  1.40E+09
 pr144   1.09E+12  5.18E+11  2.47E+11  1.18E+11  5.62E+10  2.68E+10  1.28E+10
 pm147   8.19E+09  6.65E+09  5.33E+09  4.28E+09  3.43E+09  2.75E+09  2.21E+09
 eu152   1.03E+10  9.90E+09  9.48E+09  9.08E+09  8.69E+09  8.32E+09  7.97E+09
 eu155   9.64E+09  8.32E+09  7.53E+09  6.65E+09  5.88E+09  5.20E+09  4.59E+09
1                                                                                                          page 122
0                 principal photon sources in group  4, photons/sec
    mean energy =  .0850 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.84E+11) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   4.15E+09  3.93E+09  3.72E+09  3.53E+09  3.34E+09  3.17E+09  3.00E+09
 sr 90   6.32E+10  6.20E+10  6.07E+10  5.95E+10  5.83E+10  5.71E+10  5.59E+10
  y 90   5.09E+11  4.98E+11  4.88E+11  4.78E+11  4.68E+11  4.59E+11  4.50E+11
 rh106   7.37E+10  4.17E+10  2.37E+10  1.34E+10  7.60E+09  4.31E+09  2.44E+09
 cs137   5.49E+10  5.38E+10  5.28E+10  5.17E+10  5.27E+10  5.17E+10  5.07E+10
 ce144   1.67E+11  7.98E+10  3.81E+10  1.82E+10  8.66E+09  4.13E+09  1.97E+09
 pr144   6.39E+11  3.05E+11  1.45E+11  6.93E+10  3.31E+10  1.58E+10  7.52E+09
 pm147   2.53E+09  1.89E+09  1.52E+09  1.22E+09  9.77E+08  7.84E+08  6.29E+08
 eu155   1.46E+10  1.29E+10  1.14E+10  1.01E+10  8.93E+09  7.89E+09  6.98E+09
0                 principal photon sources in group  5, photons/sec
    mean energy =  .1200 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.33E+11) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   2.50E+09  2.37E+09  2.24E+09  2.13E+09  2.02E+09  1.91E+09  1.81E+09
 sr 90   3.60E+10  3.53E+10  3.46E+10  3.39E+10  3.32E+10  3.25E+10  3.18E+10
  y 90   5.58E+11  5.51E+11  5.43E+11  5.36E+11  5.30E+11  5.23E+11  5.16E+11
 rh106   5.32E+10  3.02E+10  1.71E+10  9.69E+09  5.49E+09  3.11E+09  1.76E+09
 cs137   3.19E+10  3.13E+10  3.07E+10  3.01E+10  2.95E+10  2.90E+10  2.84E+10
 ce144   8.21E+11  3.91E+11  1.87E+11  8.90E+10  4.25E+10  2.03E+10  9.66E+09
 pr144   4.57E+11  2.18E+11  1.04E+11  4.96E+10  2.37E+10  1.13E+10  5.38E+09
 eu152   8.71E+09  8.34E+09  7.98E+09  7.64E+09  7.32E+09  7.01E+09  6.71E+09
 eu155   6.35E+09  7.38E+09  6.52E+09  5.77E+09  5.10E+09  4.51E+09  3.98E+09
0                 principal photon sources in group  6, photons/sec
    mean energy =  .1700 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.94E+11) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   1.99E+09  1.88E+09  1.78E+09  1.69E+09  1.60E+09  1.52E+09  1.44E+09
 sr 90   2.57E+10  2.52E+10  2.46E+10  2.41E+10  2.37E+10  2.32E+10  2.27E+10
  y 90   3.69E+11  3.61E+11  3.54E+11  3.47E+11  3.40E+11  3.33E+11  3.26E+11
 rh106   5.70E+10  3.23E+10  1.83E+10  1.04E+10  5.89E+09  3.34E+09  1.89E+09
 sb125   2.91E+09  2.36E+09  1.91E+09  1.55E+09  1.25E+09  1.01E+09  8.21E+08
 cs137   2.25E+10  2.21E+10  2.17E+10  2.13E+10  2.09E+10  2.05E+10  2.01E+10
 pr144   4.84E+11  2.31E+11  1.10E+11  5.25E+10  2.50E+10  1.19E+10  5.69E+09
0                 principal photon sources in group  7, photons/sec
    mean energy =  .3000 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.20E+11) at  1521.9 d
nuclide                                          time after discharge
          initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   1.20E+09  1.14E+09  1.08E+09  1.02E+09  9.67E+08  9.16E+08  8.68E+08
 sr 90   1.16E+10  1.14E+10  1.12E+10  1.09E+10  1.07E+10  1.05E+10  1.03E+10
  y 90   4.10E+11  4.01E+11  3.93E+11  3.85E+11  3.77E+11  3.70E+11  3.62E+11
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rh106	4.88E+10	3.90E+10	2.21E+10	1.25E+10	7.10E+09	4.03E+09	2.28E+09
cs137	1.14E+10	1.12E+10	1.10E+10	1.08E+10	1.06E+10	1.04E+10	1.02E+10
pr144	5.66E+11	2.70E+11	1.29E+11	6.14E+10	2.93E+10	1.40E+10	6.66E+09
eu152	1.21E+10	1.16E+10	1.11E+10	1.06E+10	1.02E+10	9.72E+09	9.31E+09

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0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (6.37E+12) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	1.73E+11	1.70E+11	1.66E+11	1.63E+11	1.59E+11	1.56E+11	1.53E+11
rh106	2.12E+11	1.20E+11	6.83E+10	3.87E+10	2.19E+10	1.24E+10	7.05E+09
sb125	2.37E+10	1.92E+10	1.56E+10	1.26E+10	1.02E+10	8.25E+09	6.67E+09
ba137m	6.79E+12	6.66E+12	6.53E+12	6.41E+12	6.29E+12	6.17E+12	6.05E+12
pr144	3.86E+11	1.84E+11	8.79E+10	4.19E+10	2.00E+10	9.54E+09	4.55E+09
eu152	8.52E+09	8.16E+09	7.81E+09	7.48E+09	7.16E+09	6.86E+09	6.57E+09

0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (3.37E+10) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	2.26E+10	2.21E+10	2.17E+10	2.12E+10	2.08E+10	2.04E+10	2.00E+10
rh106	1.98E+10	1.12E+10	6.36E+09	3.60E+09	2.04E+09	1.16E+09	6.56E+08
cs134	2.54E+08	1.92E+08	1.45E+08	1.10E+08	8.28E+07	6.24E+07	4.73E+07
pr144	4.94E+10	2.36E+10	1.12E+10	5.36E+09	2.56E+09	1.22E+09	5.82E+08
eu152	1.27E+10	1.21E+10	1.16E+10	1.11E+10	1.06E+10	1.02E+10	9.75E+09
eu154	9.34E+08	8.73E+08	8.16E+08	7.63E+08	7.14E+08	6.67E+08	6.24E+08

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 1.0E-03 of total group release rate (8.34E+09) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	2.88E+09	2.82E+09	2.77E+09	2.71E+09	2.66E+09	2.60E+09	2.55E+09
rh106	3.73E+09	2.12E+09	1.20E+09	6.80E+08	3.85E+08	2.18E+08	1.24E+08
cs134	2.40E+08	1.81E+08	1.37E+08	1.03E+08	7.82E+07	5.91E+07	4.46E+07
pr144	3.08E+10	1.47E+10	7.00E+09	3.34E+09	1.59E+09	7.59E+08	3.62E+08
eu152	5.81E+09	5.37E+09	5.33E+09	5.10E+09	4.89E+09	4.68E+09	4.48E+09
eu154	3.38E+07	3.16E+07	2.95E+07	2.76E+07	2.58E+07	2.41E+07	2.26E+07

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.70E+09) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	1.72E+08	1.69E+08	1.65E+08	1.62E+08	1.59E+08	1.56E+08	1.52E+08
rh106	1.21E+09	6.88E+08	3.90E+08	2.21E+08	1.25E+08	7.10E+07	4.02E+07
pr144	5.97E+10	2.85E+10	1.36E+10	6.47E+09	3.09E+09	1.47E+09	7.02E+08

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0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 1.0E-03 of total group release rate (5.37E+07) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	1.01E+05	9.86E+04	9.64E+04	9.44E+04	9.27E+04	9.08E+04	8.90E+04
rh106	6.78E+08	3.84E+08	2.18E+08	1.23E+08	7.00E+07	3.97E+07	2.25E+07
pr144	3.44E+08	2.69E+08	1.28E+08	6.12E+07	2.92E+07	1.39E+07	6.63E+06

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 1.0E-03 of total group release rate (7.81E+06) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
rh106	1.14E+08	6.48E+07	3.68E+07	2.08E+07	1.18E+07	6.69E+06	3.79E+06
pr144	4.54E+07	3.17E+07	1.83E+07	6.93E+06	2.35E+06	1.12E+06	5.34E+05

0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.15E+06) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d

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     rh106   1.97E+07  1.11E+07  6.32E+06  3.58E+06  2.03E+06  1.15E+06  6.52E+05
0                principal photon sources in group 15, photons/sec
       mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.07E+02) at  1521.9 d
    nuclide                                   time after discharge
              initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     rh106   8.67E+03  4.92E+03  2.79E+03  1.58E+03  8.95E+02  5.07E+02  2.88E+02
0                principal photon sources in group 16, photons/sec
       mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.02E-06) at  1521.9 d
    nuclide                                   time after discharge
              initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     ce142   1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06  1.46E-06
     sm147   5.56E-07  5.57E-07  5.57E-07  5.57E-07  5.57E-07  5.58E-07  5.58E-07
0                principal photon sources in group 17, photons/sec
       mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.01E-06) at  1521.9 d
    nuclide                                   time after discharge
              initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     ce142   7.31E-07  7.31E-07  7.31E-07  7.31E-07  7.31E-07  7.31E-07  7.31E-07
     sm147   2.79E-07  2.79E-07  2.79E-07  2.79E-07  2.80E-07  2.80E-07  2.80E-07
1                                                                                                          page 125
0                principal photon sources in group 18, photons/sec
       mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.50E-07) at  1521.9 d
    nuclide                                   time after discharge
              initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     ce142   5.42E-07  5.42E-07  5.42E-07  5.42E-07  5.42E-07  5.42E-07  5.42E-07
     sm147   2.07E-07  2.07E-07  2.07E-07  2.07E-07  2.07E-07  2.07E-07  2.07E-07
1                                                                                                          page 126
            photon spectrum as a function of time for heavy metals and their daughters

0                     sas2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                          power=    .00 mw, burnup=   1461.mwd, flux= 2.74E+08 n**2-sec
0                              actinide photon release rates, photons/sec
                            basis = single reactor assembly
0
          gmean                                time after discharge
          (mev)      initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
        1.00E-02  1.34E+14  1.26E+12  1.25E+12  1.25E+12  1.25E+12  1.24E+12  1.24E+12
        3.00E-02  8.46E+12  4.66E+10  4.66E+10  4.66E+10  4.66E+10  4.66E+10  4.66E+10
        5.50E-02  1.09E+13  2.33E+10  2.33E+10  2.33E+10  2.33E+10  2.33E+10  2.33E+10
        8.50E-02  3.26E+13  1.51E+11  1.51E+11  1.51E+11  1.51E+11  1.51E+11  1.51E+11
        1.20E-01  5.43E+13  2.93E+10  2.93E+10  2.93E+10  2.93E+10  2.93E+10  2.93E+10
        1.70E-01  1.72E+12  1.91E+10  1.91E+10  1.91E+10  1.91E+10  1.91E+10  1.91E+10
        3.00E-01  2.87E+13  1.31E+11  1.31E+11  1.31E+11  1.31E+11  1.31E+11  1.31E+11
        6.50E-01  1.45E+12  6.89E+09  6.89E+09  6.89E+09  6.90E+09  6.90E+09  6.90E+09
        1.13E+00  1.85E+12  1.17E+09  1.17E+09  1.17E+09  1.18E+09  1.18E+09  1.18E+09
        1.58E+00  4.03E+08  4.03E+08  4.04E+08  4.04E+08  4.05E+08  4.05E+08  4.06E+08
        2.00E+00  9.82E+07  9.83E+07  9.84E+07  9.85E+07  9.86E+07  9.87E+07  9.88E+07
        2.40E+00  3.66E+07  3.66E+07  3.67E+07  3.67E+07  3.68E+07  3.68E+07  3.69E+07
        2.80E+00  1.69E+07  1.69E+07  1.68E+07  1.66E+07  1.65E+07  1.64E+07  1.63E+07
        3.25E+00  3.04E+05  3.04E+05  3.05E+05  3.05E+05  3.06E+05  3.06E+05  3.07E+05
        3.75E+00  7.19E+03  7.18E+03  7.18E+03  7.17E+03  7.16E+03  7.16E+03  7.15E+03
        4.25E+00  4.13E+03  4.13E+03  4.13E+03  4.12E+03  4.12E+03  4.12E+03  4.11E+03
        4.75E+00  2.38E+03  2.38E+03  2.38E+03  2.37E+03  2.37E+03  2.37E+03  2.37E+03
        5.50E+00  2.14E+03  2.13E+03  2.13E+03  2.13E+03  2.13E+03  2.13E+03  2.13E+03
0         total   2.94E+14  1.67E+12  1.66E+12  1.66E+12  1.66E+12  1.65E+12  1.65E+12
0        mev/sec  2.51E+13  8.10E+10  8.10E+10  8.09E+10  8.09E+10  8.09E+10  8.08E+10
0                              actinide energy release rates, mev/watt-sec
                            basis = single reactor assembly
0
          gmean                                time after discharge
          (mev)      initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
```

	1.00E-02	3.35E+08	3.14E+06	3.14E+06	3.13E+06	3.12E+06	3.11E+06	3.10E+06
	3.00E-02	6.34E+07	3.50E+05	3.50E+05	3.50E+05	3.50E+05	3.50E+05	3.50E+05
	5.50E-02	1.50E+08	3.20E+05	3.20E+05	3.20E+05	3.20E+05	3.20E+05	3.20E+05
	8.50E-02	1.12E+09	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06
	1.20E-01	1.63E+09	8.80E+05	8.80E+05	8.80E+05	8.80E+05	8.80E+05	8.80E+05
	1.70E-01	7.31E+07	8.10E+05	8.10E+05	8.10E+05	8.10E+05	8.10E+05	8.10E+05
	3.00E-01	2.15E+09	9.84E+06	9.84E+06	9.84E+06	9.84E+06	9.84E+06	9.84E+06
	6.50E-01	2.36E+08	1.12E+06	1.12E+06	1.12E+06	1.12E+06	1.12E+06	1.12E+06
	1.13E+00	5.22E+08	3.30E+05	3.30E+05	3.30E+05	3.30E+05	3.31E+05	3.31E+05
	1.58E+00	1.59E+05	1.59E+05	1.59E+05	1.59E+05	1.59E+05	1.60E+05	1.60E+05
	2.00E+00	4.91E+04	4.91E+04	4.92E+04	4.92E+04	4.93E+04	4.03E+04	4.94E+04
	2.40E+00	2.19E+04	2.20E+04	2.20E+04	2.20E+04	2.21E+04	2.21E+04	2.21E+04
	2.80E+00	1.18E+04	1.18E+04	1.17E+04	1.17E+04	1.16E+04	1.15E+04	1.14E+04
	3.25E+00	2.47E+02	2.47E+02	2.48E+02	2.48E+02	2.48E+02	2.49E+02	2.49E+02
	3.75E+00	6.74E+00	6.73E+00	6.73E+00	6.72E+00	6.72E+00	6.71E+00	6.71E+00
	4.25E+00	4.39E+00	4.39E+00	4.38E+00	4.38E+00	4.38E+00	4.37E+00	4.37E+00
	4.75E+00	2.83E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.81E+00	2.81E+00
	5.50E+00	2.94E+00	2.93E+00	2.93E+00	2.93E+00	2.93E+00	2.93E+00	2.92E+00
0	total	6.28E+09	2.02E+07	2.02E+07	2.02E+07	2.02E+07	2.02E+07	2.02E+07
0	gamma watts	4.02E+00	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	5.20E-08	5.21E-08	5.22E-08	5.23E-08	5.23E-08	5.24E-08	5.25E-08
bi210	1.33E-05	1.33E-05	1.33E-05	1.33E-05	1.34E-05	1.34E-05	1.34E-05
bi211	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.22E+01	1.22E+01	1.22E+01
bi212	5.57E-01	5.56E-01	5.52E-01	5.48E-01	5.44E-01	5.40E-01	5.36E-01
bi213	3.02E-02	3.02E-02	3.03E-02	3.03E-02	3.04E-02	3.04E-02	3.05E-02
bi214	6.40E-03	6.41E-03	6.42E-03	6.43E-03	6.44E-03	6.45E-03	6.46E-03
po210	1.63E+01	1.62E+01	1.62E+01	1.62E+01	1.62E+01	1.62E+01	1.63E+01
po211	6.79E-02	6.80E-02	6.80E-02	6.81E-02	6.81E-02	6.82E-02	6.82E-02
po212	2.85E+00	2.85E+00	2.83E+00	2.81E+00	2.79E+00	2.77E+00	2.75E+00
po213	3.98E+00	3.99E+00	3.99E+00	4.00E+00	4.01E+00	4.01E+00	4.02E+00
po214	5.70E+01	5.71E+01	5.72E+01	5.73E+01	5.74E+01	5.74E+01	5.75E+01
po215	1.71E+01	1.71E+01	1.71E+01	1.72E+01	1.72E+01	1.72E+01	1.72E+01
po216	2.23E+00	2.22E+00	2.21E+00	2.19E+00	2.17E+00	2.16E+00	2.14E+00
po218	2.71E+01	2.72E+01	2.72E+01	2.72E+01	2.73E+01	2.73E+01	2.74E+01
at217	2.58E+00	2.58E+00	2.59E+00	2.59E+00	2.60E+00	2.60E+00	2.60E+00
rn218	4.01E-11	1.58E-15	6.20E-20	2.44E-24	.00E+00	.00E+00	.00E+00
rn219	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.37E+01	1.37E+01	1.37E+01
rn220	1.76E+00	1.76E+00	1.75E+00	1.73E+00	1.72E+00	1.71E+00	1.70E+00
rn222	1.98E+01	1.98E+01	1.99E+01	1.99E+01	1.99E+01	2.00E+01	2.00E+01
fr221	1.88E+00	1.89E+00	1.89E+00	1.89E+00	1.89E+00	1.90E+00	1.90E+00
fr223	5.15E-06	5.15E-06	5.16E-06	5.16E-06	5.16E-06	5.17E-06	5.17E-06
ra222	3.10E-11	1.22E-15	4.80E-20	1.89E-24	7.16E-29	.00E+00	.00E+00
ra223	7.87E+00	7.89E+00	7.89E+00	7.90E+00	7.91E+00	7.91E+00	7.92E+00
ra224	1.25E+00	1.24E+00	1.24E+00	1.23E+00	1.22E+00	1.21E+00	1.20E+00
ra226	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.17E+01	1.17E+01	1.17E+01
ac225	1.35E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.37E+00
ac227	5.79E-02	5.80E-02	5.80E-02	5.81E-02	5.81E-02	5.82E-02	5.82E-02
ac228	2.28E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12
th226	2.80E-11	1.10E-15	4.33E-20	1.70E-24	6.66E-29	.00E+00	.00E+00
th227	8.68E+00	8.70E+00	8.71E+00	8.72E+00	8.72E+00	8.73E+00	8.74E+00
th228	1.05E+00	1.04E+00	1.04E+00	1.03E+00	1.02E+00	1.02E+00	1.01E+00

th229	7.91E-01	7.92E-01	7.93E-01	7.94E-01	7.96E-01	7.97E-01	7.98E-01
th230	5.67E+01	5.68E+01	5.68E+01	5.69E+01	5.69E+01	5.70E+01	5.70E+01
th232	2.93E-05	2.94E-05	2.94E-05	2.94E-05	2.94E-05	2.95E-05	2.95E-05
pa231	4.77E+00	4.78E+00	4.78E+00	4.78E+00	4.79E+00	4.79E+00	4.80E+00
u230	2.20E-11	8.67E-16	3.41E-20	1.34E-24	5.09E-29	.00E+00	.00E+00
u231	1.48E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	9.40E-01	9.53E-01	9.46E-01	9.39E-01	9.31E-01	9.24E-01	9.17E-01
u233	1.61E+01	1.61E+01	1.61E+01	1.61E+01	1.62E+01	1.62E+01	1.62E+01
u234	6.71E+03	6.71E+03	6.71E+03	6.71E+03	6.71E+03	6.71E+03	6.71E+03
u235	1.36E+02	1.36E+02	1.36E+02	1.36E+02	1.36E+02	1.36E+02	1.36E+02
u236	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.42E-08	1.42E-08	8.34E-09	4.90E-09	2.87E-09	1.69E-09	9.91E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	1.42E-01	1.46E-01	9.53E-02	7.01E-02	6.40E-02	5.35E-02	4.30E-02
pu237	2.62E-08	2.45E-10	2.30E-12	2.15E-14	2.02E-16	1.89E-18	1.77E-20
pu238	8.27E+04	8.22E+04	8.16E+04	8.11E+04	8.06E+04	8.00E+04	7.95E+04

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neutron source intensity as a function of time

0 sas2h; far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	4.87E+04	4.87E+04	4.87E+04	4.87E+04	4.87E+04	4.87E+04	4.87E+04
pu240	8.55E+02	8.55E+02	8.55E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02
pu241	2.99E-03	2.87E-03	2.75E-03	2.65E-03	2.54E-03	2.44E-03	2.35E-03
pu242	4.87E-05	4.87E-05	4.88E-05	4.88E-05	4.88E-05	4.88E-05	4.88E-05
am239	7.58E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	1.19E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	7.23E+01	7.25E+01	7.26E+01	7.28E+01	7.29E+01	7.30E+01	7.31E+01
am242m	2.57E-04	2.56E-04	2.55E-04	2.54E-04	2.53E-04	2.52E-04	2.51E-04
am243	8.95E-06	8.95E-06	8.95E-06	8.95E-06	8.95E-06	8.95E-06	8.95E-06
cm241	1.02E-14	1.64E-17	2.64E-20	4.25E-23	6.84E-26	1.10E-28	2.56E-31
cm242	7.70E-01	2.69E-01	1.31E-01	9.30E-02	8.23E-02	7.02E-02	7.81E-02
cm243	4.01E-09	3.93E-09	3.85E-09	3.77E-09	3.70E-09	3.62E-09	3.55E-09
cm244	5.50E-07	5.32E-07	5.16E-07	4.99E-07	4.84E-07	4.68E-07	4.54E-07
cm245	1.73E-13	1.73E-13	1.73E-13	1.73E-13	1.73E-13	1.73E-13	1.73E-13
cm246	2.57E-16	2.57E-16	2.57E-16	2.57E-16	2.57E-16	2.57E-16	2.57E-16
cm247	7.78E-25	7.78E-25	7.78E-25	7.78E-25	7.78E-25	7.78E-25	7.78E-25
cm248	5.24E-27	5.24E-27	5.24E-27	5.24E-27	5.24E-27	5.24E-27	5.24E-27
bk249	8.03E-33	4.73E-33	5.46E-33	1.31E-33	4.25E-34	2.53E-34	2.63E-34
cf249	1.51E-28	1.51E-28	1.51E-28	1.51E-28	1.51E-28	1.51E-28	1.51E-28
total	1.45E+05	1.44E+05	1.44E+05	1.43E+05	1.43E+05	1.42E+05	1.41E+05

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neutron source intensity as a function of time

0 sas2h; far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.46E-03
pa231	3.98E-04	3.99E-04	3.99E-04	4.00E-04	4.00E-04	4.01E-04	4.01E-04
u232	5.90E-05	5.85E-05	5.81E-05	5.77E-05	5.72E-05	5.68E-05	5.63E-05
u234	1.44E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01
u235	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.66E+00

u236	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02
u237	1.22E-09	1.05E-16	1.01E-16	9.69E-17	9.31E-17	8.94E-17	8.59E-17
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.33E-09	7.33E-09	7.33E-09	7.33E-09	7.33E-09	7.33E-09	7.33E-09
np238	2.01E-08	7.51E-17	7.48E-17	7.45E-17	7.42E-17	7.39E-17	7.36E-17
np239	1.98E-05	9.28E-17	9.28E-17	9.28E-17	9.28E-17	9.28E-17	9.28E-17
pu236	9.60E-03	7.87E-03	6.45E-03	5.29E-03	4.33E-03	3.55E-03	2.91E-03
pu238	1.53E+04	1.52E+04	1.51E+04	1.50E+04	1.49E+04	1.48E+04	1.47E+04
pu239	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01
pu240	5.68E+03	5.68E+03	5.68E+03	5.68E+03	5.68E+03	5.68E+03	5.68E+03
pu241	1.07E-04	1.03E-04	9.91E-05	9.52E-05	9.15E-05	8.78E-05	8.44E-05
pu242	3.80E-02	3.80E-02	3.80E-02	3.80E-02	3.80E-02	3.80E-02	3.80E-02
pu243	3.08E-15	3.36E-35	3.36E-35	3.36E-35	3.36E-35	3.36E-35	3.36E-35
pu244	7.37E-28	7.43E-28	7.49E-28	7.55E-28	7.61E-28	7.67E-28	7.73E-28
am241	2.78E-02	2.79E-02	2.80E-02	2.80E-02	2.81E-02	2.81E-02	2.81E-02
am242m	1.22E-03	1.22E-03	1.21E-03	1.21E-03	1.20E-03	1.20E-03	1.19E-03
am242	1.28E-05	1.32E-06	1.31E-06	1.31E-06	1.30E-06	1.30E-06	1.29E-06
am243	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08
am244	8.31E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	3.85E+00	1.35E+00	4.55E-01	4.44E-01	4.11E-01	3.95E-01	3.90E-01
cm243	8.71E-11	8.53E-11	8.36E-11	8.19E-11	8.03E-11	7.87E-11	7.71E-11
cm244	7.17E-05	6.04E-05	4.73E-05	4.51E-05	4.31E-05	4.11E-05	3.92E-05
cm245	4.69E-14	4.69E-14	4.69E-14	4.69E-14	4.69E-14	4.69E-14	4.69E-14
cm246	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12
cm248	8.59E-20	8.59E-20	8.59E-20	8.59E-20	8.59E-20	8.59E-20	8.59E-20
bk249	4.92E-29	2.53E-29	1.32E-29	6.81E-30	3.52E-30	1.82E-30	9.42E-31
cf249	8.82E-29	8.87E-29	8.89E-29	8.89E-29	8.88E-29	8.87E-29	8.86E-29
cf250	3.95E-26	3.78E-26	3.62E-26	3.46E-26	3.31E-26	3.17E-26	3.03E-26
cf252	4.08E-30	3.26E-30	2.45E-30	1.63E-30	1.63E-30	1.63E-30	1.63E-30
0 total	1.38E+05	1.38E+05	1.38E+05	1.38E+05	1.38E+05	1.38E+05	1.38E+05
0 total	2.83E+05	2.83E+05	2.82E+05	2.81E+05	2.81E+05	2.80E+05	2.79E+05

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	2.801E+04	2.791E+04	2.780E+04	2.770E+04	2.759E+04	2.749E+04	2.739E+04
3	1.85E+00 - 3.00E+00	7.935E+04	7.905E+04	7.875E+04	7.846E+04	7.817E+04	7.788E+04	7.759E+04
4	1.40E+00 - 1.85E+00	2.131E+04	2.123E+04	2.115E+04	2.107E+04	2.099E+04	2.092E+04	2.084E+04
5	9.00E-01 - 1.40E+00	1.199E+04	1.194E+04	1.190E+04	1.185E+04	1.181E+04	1.177E+04	1.172E+04
6	4.00E-01 - 9.00E-01	3.482E+03	3.469E+03	3.456E+03	3.443E+03	3.430E+03	3.418E+03	3.405E+03
7	1.00E-01 - 4.00E-01	5.442E+02	5.422E+02	5.401E+02	5.381E+02	5.361E+02	5.341E+02	5.321E+02
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.30E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.30E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.447E+05	1.441E+05	1.436E+05	1.431E+05	1.425E+05	1.420E+05	1.415E+05

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spontaneous fission neutron source spectrum as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.643E+03	2.643E+03	2.641E+03	2.639E+03	2.637E+03	2.635E+03	2.634E+03
2	3.00E+00 - 6.43E+00	2.899E+04	2.897E+04	2.895E+04	2.893E+04	2.891E+04	2.889E+04	2.887E+04
3	1.85E+00 - 3.00E+00	3.159E+04	3.157E+04	3.155E+04	3.152E+04	3.150E+04	3.148E+04	3.146E+04
4	1.40E+00 - 1.85E+00	1.790E+04	1.789E+04	1.788E+04	1.786E+04	1.785E+04	1.784E+04	1.783E+04
5	9.00E-01 - 1.40E+00	2.457E+04	2.455E+04	2.454E+04	2.452E+04	2.450E+04	2.448E+04	2.447E+04
6	4.00E-01 - 9.00E-01	2.738E+04	2.736E+04	2.734E+04	2.732E+04	2.730E+04	2.728E+04	2.726E+04
7	1.00E-01 - 4.00E-01	5.406E+03	5.402E+03	5.398E+03	5.394E+03	5.390E+03	5.386E+03	5.382E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.385E+05	1.384E+05	1.383E+05	1.382E+05	1.381E+05	1.380E+05	1.379E+05

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.643E+03	2.643E+03	2.641E+03	2.639E+03	2.637E+03	2.635E+03	2.634E+03
2	3.00E+00 - 6.43E+00	5.700E+04	5.687E+04	5.675E+04	5.662E+04	5.650E+04	5.638E+04	5.625E+04

```
 3 1.85E+00 - 3.00E+00 1.109E+05 1.106E+05 1.103E+05 1.100E+05 1.097E+05 1.094E+05 1.090E+05
 4 1.40E+00 - 1.85E+00 3.921E+04 3.912E+04 3.903E+04 3.894E+04 3.885E+04 3.875E+04 3.866E+04
 5 9.00E-01 - 1.40E+00 3.656E+04 3.650E+04 3.643E+04 3.637E+04 3.631E+04 3.625E+04 3.619E+04
 6 4.00E-01 - 9.00E-01 3.086E+04 3.083E+04 3.080E+04 3.076E+04 3.073E+04 3.070E+04 3.067E+04
 7 1.00E-01 - 4.00E-01 5.950E+03 5.944E+03 5.938E+03 5.932E+03 5.926E+03 5.920E+03 5.915E+03
 8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
10 5.50E-04 - 3.00E-03  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
11 1.00E-04 - 5.50E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
12 3.00E-05 - 1.00E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
13 1.00E-05 - 3.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
14 3.05E-06 - 1.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
15 1.77E-06 - 3.05E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
16 1.30E-06 - 1.77E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
17 1.13E-06 - 1.30E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
18 1.00E-06 - 1.13E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
19 8.00E-07 - 1.00E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
20 4.00E-07 - 8.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
21 3.25E-07 - 4.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
22 2.25E-07 - 3.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
23 1.00E-07 - 2.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
24 5.00E-08 - 1.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
25 3.00E-08 - 5.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
26 1.00E-08 - 3.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
27 1.00E-11 - 1.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                      2.832E+05 2.825E+05 2.819E+05 2.812E+05 2.806E+05 2.800E+05 2.794E+05
1
1                      * gamma sources determined *
0case applies the following photon data base
                       master photon library
                       in binary mode
0    the sources include photons of nuclides for...

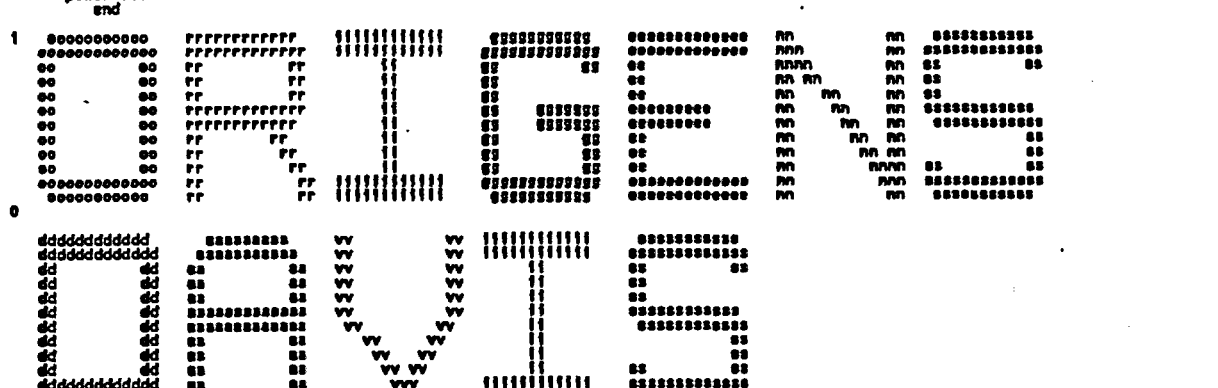
       light elements
       actinides
       fission products
1                      gamma source spectrum for gamma lines (sas2)
0                                  1826.25  day time of the requested nuclides
0                          energy interval in mev      photons / second      mev / second
0
                       1.0000E-02 to      5.0000E-02       4.2926E+12        1.2878E+11
                       5.0000E-02 to      1.0000E-01       1.2905E+12        9.4789E+10
                       1.0000E-01 to      2.0000E-01       7.0924E+11        1.1989E+11
                       2.0000E-01 to      3.0000E-01       2.5376E+11        6.3439E+10
                       3.0000E-01 to      4.0000E-01       2.7379E+11        9.6525E+10
                       4.0000E-01 to      6.0000E-01       1.3287E+11        6.6435E+10
                       6.0000E-01 to      8.0000E-01       2.6825E+12        1.9777E+12
                       8.0000E-01 to      1.0000E+00       2.8643E+10        2.5779E+10
                       1.0000E+00 to      1.3300E+00       2.0943E+10        2.4399E+10
                       1.3300E+00 to      1.4600E+00       7.7815E+09        1.1633E+10
                       1.4600E+00 to      2.0000E+00       7.0011E+08        1.4276E+09
                       2.0000E+00 to      2.5000E+00       7.4349E+08        1.6733E+09
                       2.5000E+00 to      3.0000E+00       2.1896E+07        6.0214E+07
                       3.0000E+00 to      4.0000E+00       8.9081E+05        3.1178E+06
                       4.0000E+00 to      5.0000E+00       4.3857E+03        2.6736E+04
                       5.0000E+00 to      6.5000E+00       2.5277E+03        1.4534E+04
                       6.5000E+00 to      8.0000E+00       4.8968E+02        3.5502E+03
                       8.0000E+00 to      1.0000E+01       1.0307E+02        9.2764E+02
0                      totals                              1.2784E+13        4.8146E+12
0
```

```
0                    total energy from nuclides with spectrum data    =   4.6146E+12
0                    total energy from nuclides with no spectrum data =   7.5490E+05
1
0  .results on logical unit no. 71, position  2, for time step  4, subcase12, (run position 1, case position 2)
   title: sas2h: far-field crit based on bkw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
0    .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h      will be called
      SAS2H: Far-Field Crit based on BZW 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ttuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
                                 13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                 26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                 92238 38.593 93237 0.833 1 1.0 538    end    ,

      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-135     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 2 1.0 323.    end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 3 1.0 323.    end
```

```
'
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
'
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'  fuel-pin-cell geometry:
'
symmslabcell  340.  280. 1 3 281. 2 end
'
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'
'  assembly and cycle parameters:
'
npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
printlevel=4 inplevel=0 end
power=0.004 burn=3.6525e4 down=1.82625e3
   end
```



```
00       00     88         88     //          22            88         88     //          99        66         66
000000000       88888888888       //          2222222222222 88888888888       //          9999999999999 6666666666666
0000000          88888888888     //          2222222222222  88888888888     //          999999999999   66666666666
0

11               88888888888                 333333333333    666666666666                555555555555   88888888888
111             88888888888                  333333333333   6666666666666               555555555555  88888888888
1111            88         88       :::      33         33  66                   :::   55           88         88
11              88         88       :::                33  66                   :::   55           88         88
11              88         88       :::                33  66                   :::   55           88         88
11               88888888888                        333    666666666666               555555555555   88888888888
11               88888888888                        333    6666666666666              555555555555   88888888888
11              88         88       :::                33  66         66         :::            55  88         88
11              88         88       :::                33  66         66         :::            55  88         88
11              88         88       :::      33         33  66         66         :::  55         55  88         88
11111111        88888888888888                333333333333  6666666666666              555555555555  888888888888
11111111         88888888888                   333333333333   66666666666               555555555555   88888888888
1
0
                                   ssssssssss    eeeeeeeeeee     aaaaaaaa    ll            ooooooooooooo
                                  ssssssssssss  eeeeeeeeeeeee   aaaaaaaaaa  ll            ooooooooooooo
                                  ss        ss  ee         ee   aa      aa  ll            oo
                                  ss            ee              aa      aa  ll            oo
                                  ss            ee              aa      aa  ll            oo
                                  ssssssssssss  ee              aaaaaaaaaaa ll            ooooooooo
                                   ssssssssssss ee              aaaaaaaaaaa ll            ooooooooo
                                            ss  ee              aa      aa  ll            oo
                                            ss  ee              aa      aa  ll            oo
                                  ss        ss  ee         ee   aa      aa  ll            oo
                                  ssssssssssss  eeeeeeeeeeeee   aa      aa  llllllllllll  ooooooooooooo
                                   ssssssssssss  eeeeeeeeeeeee  aa      aa  llllllllllll  ooooooooooooo
```

program verification information

code system: scale version: 4.3

program: s0s004

creation date: 03/13/96

library: /usrl/ornl/$cale/bin

test code: origens

version: 3.0

jobname: davis

```
                    *****   date of execution:  08/28/96                    *****
                    *****                                                   *****
                    *****   time of execution:  18:36:58                    *****
                    *****                                                   *****
                    *****                                                   *****
                    ***********************************************************
                    ***********************************************************
                    ***********************************************************

1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =     9.1158E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       54q array has     12 entries.
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the *presas2* case updating all nuclides on the scale *burnup* library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
```

```
          *                                                                    *
          ************************************************************************
          *                                                                    *
          ************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/28/1996    date library was produced
0                    1697    total number of nuclides in library
                      489    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7993    number of nonzero off-diagonal matrix elements
0         ************************************************************************
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page   1
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly

              initial  1E-18 d
    na 23   1.73E+05  1.73E+05
    al 27   1.35E+06  1.35E+06
  total     1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides         page   2
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly

              initial  1E-18 d
     u234   2.12E+03  2.12E+03
     u235   1.72E+05  1.72E+05
     u236   4.12E+04  4.12E+04
     u238   8.66E+06  8.66E+06
    np237   9.99E+03  9.99E+03
  total     8.88E+06  8.88E+06
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   3
        power=     .00mw, burnup=    1461.mwd, flux= 2.99E+08n/cm**2-sec
0                                          basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                    initial       91313. d      182625. d      273938. d      365250. d      365250. d
    productions   1.022622E+06   1.024453E+06   1.026237E+06   1.027977E+06   1.029673E+06   1.029673E+06
    absorptions   8.448353E+05   8.494152E+05   8.515743E+05   8.534369E+05   8.550839E+05   8.550839E+05
    k infinity    1.207580E+00   1.206068E+00   1.205106E+00   1.204514E+00   1.204177E+00   1.204177E+00
0                    initial       91313. d      182625. d      273938. d      365250. d      365250. d
    actinide
    absorptions   8.430638E+05   8.441381E+05   8.451858E+05   8.462119E+05   8.472176E+05   8.472176E+05
    non-actinide
    abs. fracs.   4.453659E-03   4.212592E-03   7.302079E-03   8.465767E-03   9.199560E-03   9.199560E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                   fission products      page   4
0                                          fraction of total absorption rate
        power=     .00mw, burnup=    1461.mwd, flux= 2.99E+08n/cm**2-sec
0               initial  91313. d 182625. d 273938. d 365250. d 365250. d

    sm149       .00E+00  1.54E-03  2.43E-03  3.40E-03  3.95E-03  3.95E-03
    eu151       .00E+00  3.10E-05  8.18E-05  1.34E-04  1.85E-04  1.85E-04
    nd143       .00E+00  3.63E-05  7.24E-05  1.08E-04  1.44E-04  1.44E-04
    gd155       .00E+00  2.23E-05  4.25E-05  6.03E-05  7.59E-05  7.59E-05
    rh103       .00E+00  1.73E-05  3.45E-05  5.18E-05  6.90E-05  6.90E-05
    xe131       .00E+00  1.18E-05  2.36E-05  3.53E-05  4.70E-05  4.70E-05
    cd113       .00E+00  1.45E-05  2.64E-05  3.68E-05  4.53E-05  4.53E-05
    sm151       .00E+00  3.37E-05  5.64E-05  5.91E-05  5.03E-05  5.03E-05
    cs133       .00E+00  9.18E-06  1.83E-05  2.74E-05  3.44E-05  3.44E-05
    gd157       .00E+00  1.48E-05  2.39E-05  2.98E-05  3.37E-05  3.37E-05
```

sm147	.00E+00	6.72E-06	1.33E-05	2.02E-05	2.70E-05	2.70E-05
tc 99	.00E+00	6.78E-06	1.35E-05	2.02E-05	2.69E-05	2.69E-05
nd145	.00E+00	5.19E-06	1.03E-05	1.55E-05	2.06E-05	2.06E-05
mo 95	.00E+00	3.61E-06	7.21E-06	1.08E-05	1.43E-05	1.43E-05
sm152	.00E+00	2.83E-06	5.73E-06	8.68E-06	1.17E-05	1.17E-05
kr 83	.00E+00	2.21E-06	4.41E-06	6.59E-06	8.76E-06	8.76E-06
cs135	.00E+00	2.06E-06	4.11E-06	6.15E-06	8.18E-06	8.18E-06
ru101	.00E+00	1.62E-06	3.24E-06	4.85E-06	6.45E-06	6.45E-06
pr141	.00E+00	1.51E-06	3.02E-06	4.52E-06	6.01E-06	6.01E-06
eu153	.00E+00	1.39E-06	2.79E-06	4.18E-06	5.58E-06	5.58E-06
sm150	.00E+00	4.29E-07	1.54E-06	3.13E-06	5.07E-06	5.07E-06
la139	.00E+00	1.24E-06	2.46E-06	3.69E-06	4.91E-06	4.91E-06
xe135	.00E+00	2.27E-06	2.27E-06	2.26E-06	2.26E-06	2.26E-06
ba137	.00E+00	4.86E-07	1.07E-06	1.65E-06	2.23E-06	2.23E-06
pd105	.00E+00	5.36E-07	1.08E-06	1.62E-06	2.17E-06	2.17E-06
zr 93	.00E+00	5.13E-07	1.02E-06	1.53E-06	2.03E-06	2.03E-06
i129	.00E+00	3.82E-07	7.63E-07	1.14E-06	1.53E-06	1.53E-06
nd144	.00E+00	3.68E-07	7.35E-07	1.10E-06	1.47E-06	1.47E-06
mo 97	.00E+00	2.81E-07	5.61E-07	8.39E-07	1.12E-06	1.12E-06
ag109	.00E+00	2.17E-07	4.44E-07	7.40E-07	1.05E-06	1.05E-06
zr 91	.00E+00	1.32E-07	2.63E-07	3.94E-07	5.23E-07	5.23E-07
y 89	.00E+00	1.26E-07	2.52E-07	3.76E-07	5.00E-07	5.00E-07
ru102	.00E+00	1.14E-07	2.28E-07	3.41E-07	4.54E-07	4.54E-07
ce142	.00E+00	1.02E-07	2.04E-07	3.05E-07	4.06E-07	4.06E-07
nd148	.00E+00	9.94E-08	1.98E-07	2.97E-07	3.95E-07	3.95E-07
nd146	.00E+00	8.27E-08	1.65E-07	2.47E-07	3.28E-07	3.28E-07
pd108	.00E+00	7.18E-08	1.49E-07	2.32E-07	3.21E-07	3.21E-07
ba138	.00E+00	7.04E-08	1.40E-07	2.10E-07	2.80E-07	2.80E-07
in115	.00E+00	6.92E-08	1.38E-07	2.08E-07	2.77E-07	2.77E-07
pm147	.00E+00	2.75E-07	2.74E-07	2.73E-07	2.72E-07	2.72E-07
ce140	.00E+00	6.59E-08	1.32E-07	1.97E-07	2.62E-07	2.62E-07
xe132	.00E+00	6.04E-08	1.20E-07	1.80E-07	2.40E-07	2.40E-07
pd107	.00E+00	4.10E-08	8.43E-08	1.30E-07	1.78E-07	1.78E-07
mo 98	.00E+00	4.22E-08	8.43E-08	1.26E-07	1.68E-07	1.68E-07
eu155	.00E+00	1.61E-07	1.63E-07	1.64E-07	1.66E-07	1.66E-07
mo100	.00E+00	4.04E-08	8.05E-08	1.21E-07	1.60E-07	1.60E-07
xe134	.00E+00	3.91E-08	7.79E-08	1.17E-07	1.55E-07	1.55E-07
zr 92	.00E+00	3.18E-08	6.33E-08	9.46E-08	1.26E-07	1.26E-07
i127	.00E+00	2.63E-08	5.27E-08	7.92E-08	1.06E-07	1.06E-07

1 sas2h: far-field crit based on 8x8 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5
0 fraction of total absorption rate
0 power= .00mw, burnup= 1461.mwd, flux= 2.99E+08n/cm**2-sec
initial 91313. d 182625. d 273938. d 365250. d 365250. d

zr 96	.00E+00	2.60E-08	5.19E-08	7.77E-08	1.03E-07	1.03E-07
ru104	.00E+00	2.48E-08	4.97E-08	7.47E-08	9.98E-08	9.98E-08
gd152	.00E+00	3.29E-09	1.01E-08	4.08E-08	9.52E-08	9.52E-08
nd150	.00E+00	2.22E-08	4.42E-08	6.63E-08	8.82E-08	8.82E-08
xe136	.00E+00	2.11E-08	4.22E-08	6.31E-08	8.40E-08	8.40E-08
br 81	.00E+00	1.61E-08	3.21E-08	4.80E-08	6.39E-08	6.39E-08
rb 85	.00E+00	1.55E-08	3.10E-08	4.63E-08	6.19E-08	6.19E-08
zr 94	.00E+00	1.37E-08	2.74E-08	4.10E-08	5.45E-08	5.45E-08
eu152	.00E+00	8.12E-09	2.14E-08	3.50E-08	4.84E-08	4.84E-08
zr 90	.00E+00	1.05E-08	2.09E-08	3.12E-08	4.15E-08	4.15E-08
cd111	.00E+00	1.05E-08	2.13E-08	3.26E-08	4.43E-08	4.43E-08
te130	.00E+00	9.57E-09	1.91E-08	2.86E-08	3.81E-08	3.81E-08
sm154	.00E+00	9.39E-09	1.88E-08	2.83E-08	3.78E-08	3.78E-08
rb 87	.00E+00	9.08E-09	1.81E-08	2.71E-08	3.60E-08	3.60E-08
se 77	.00E+00	4.33E-09	1.26E-08	1.89E-08	2.51E-08	2.51E-08
pd106	.00E+00	4.68E-09	9.50E-09	1.44E-08	1.95E-08	1.95E-08

kr 84	.00E+00	4.34E-09	8.65E-09	1.29E-08	1.72E-08	1.72E-08
sr 90	.00E+00	1.68E-08	1.68E-08	1.67E-08	1.66E-08	1.66E-08
se 79	.00E+00	3.24E-09	6.47E-09	9.68E-09	1.29E-08	1.29E-08
sb121	.00E+00	3.17E-09	6.35E-09	9.54E-09	1.27E-08	1.27E-08
gd156	.00E+00	1.94E-09	4.39E-09	7.30E-09	1.06E-08	1.06E-08
sb125	.00E+00	2.98E-09	5.16E-09	7.75E-09	1.03E-08	1.03E-08
kr 86	.00E+00	2.35E-09	4.69E-09	7.01E-09	9.32E-09	9.32E-09
rh105	.00E+00	8.37E-09	8.47E-09	8.36E-09	8.66E-09	8.66E-09
te128	.00E+00	2.13E-09	4.26E-09	6.38E-09	8.51E-09	8.51E-09
ru 99	.00E+00	4.68E-10	1.80E-09	3.98E-09	7.02E-09	7.02E-09
dy161	.00E+00	1.41E-09	2.99E-09	4.73E-09	6.64E-09	6.64E-09
se 80	.00E+00	1.52E-09	3.02E-09	4.53E-09	6.02E-09	6.02E-09
te125	.00E+00	1.33E-09	2.68E-09	4.05E-09	5.42E-09	5.42E-09
tb159	.00E+00	9.36E-10	1.92E-09	2.95E-09	4.02E-09	4.02E-09
cs137	.00E+00	3.77E-09	3.77E-09	3.76E-09	3.75E-09	3.75E-09
gd154	.00E+00	2.28E-10	9.26E-10	2.09E-09	3.73E-09	3.73E-09
cd112	.00E+00	8.77E-10	1.77E-09	2.68E-09	3.60E-09	3.60E-09
li 6	.00E+00	8.59E-10	1.71E-09	2.56E-09	3.39E-09	3.39E-09
eu154	.00E+00	7.20E-10	1.43E-09	2.14E-09	2.85E-09	2.85E-09
sn117	.00E+00	6.92E-10	1.39E-09	2.09E-09	2.80E-09	2.80E-09
gd158	.00E+00	4.26E-10	1.06E-09	1.83E-09	2.69E-09	2.69E-09
pr143	.00E+00	2.65E-09	2.64E-09	2.63E-09	2.62E-09	2.62E-09
sn119	.00E+00	5.64E-10	1.13E-09	1.69E-09	2.26E-09	2.26E-09
sn115	.00E+00	5.15E-10	1.03E-09	1.55E-09	2.07E-09	2.07E-09
xe133	.00E+00	1.98E-09	1.98E-09	1.97E-09	1.97E-09	1.97E-09
sr 88	.00E+00	4.34E-10	8.64E-10	1.29E-09	1.72E-09	1.72E-09
cd114	.00E+00	3.41E-10	7.39E-10	1.19E-09	1.67E-09	1.67E-09
ce141	.00E+00	1.57E-09	1.56E-09	1.56E-09	1.56E-09	1.56E-09
pd110	.00E+00	3.25E-10	6.67E-10	1.03E-09	1.40E-09	1.40E-09
ru100	.00E+00	7.91E-11	3.09E-10	6.07E-10	1.21E-09	1.21E-09
se 82	.00E+00	2.94E-10	5.86E-10	8.76E-10	1.16E-09	1.16E-09
dy164	.00E+00	1.83E-10	4.20E-10	7.08E-10	1.05E-09	1.05E-09
dy162	.00E+00	1.96E-10	4.55E-10	7.16E-10	1.04E-09	1.04E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 6

0 fraction of total absorption rate

power= .00mw, burnup= 3461.mwd, flux= 2.99E+08n/cm**2-sec

0 initial 91313. d 182625. d 273938. d 365250. d 365250. d

sn126	.00E+00	2.36E-10	4.74E-10	7.15E-10	9.58E-10	9.58E-10
pm149	.00E+00	9.59E-10	9.57E-10	9.55E-10	9.53E-10	9.53E-10
nd147	.00E+00	9.43E-10	9.40E-10	9.38E-10	9.35E-10	9.35E-10
se 78	.00E+00	2.25E-10	4.49E-10	6.73E-10	8.96E-10	8.96E-10
nd142	.00E+00	5.19E-11	2.07E-10	4.64E-10	8.22E-10	8.22E-10
ba134	.00E+00	5.17E-11	2.06E-10	4.62E-10	8.19E-10	8.19E-10
sm148	.00E+00	5.04E-11	1.95E-10	4.33E-10	7.63E-10	7.63E-10
sn124	.00E+00	1.85E-10	3.70E-10	5.56E-10	7.43E-10	7.43E-10
ba135	.00E+00	4.14E-11	1.65E-10	3.70E-10	6.56E-10	6.56E-10
ce144	.00E+00	5.07E-10	5.05E-10	5.03E-10	5.01E-10	5.01E-10
pd104	.00E+00	3.57E-11	1.43E-10	3.20E-10	5.69E-10	5.69E-10
kr 85	.00E+00	5.66E-10	5.63E-10	5.61E-10	5.59E-10	5.59E-10
se 75	.00E+00	1.34E-10	2.68E-10	4.01E-10	5.34E-10	5.34E-10
in113	.00E+00	9.33E-11	1.95E-10	2.98E-10	4.01E-10	4.01E-10
ru103	.00E+00	3.37E-10	3.57E-10	3.58E-10	3.59E-10	3.59E-10
ba136	.00E+00	7.64E-11	1.62E-10	2.56E-10	3.59E-10	3.59E-10
sn118	.00E+00	7.59E-11	1.52E-10	2.28E-10	3.05E-10	3.05E-10
se134	.00E+00	6.91E-11	1.37E-10	2.05E-10	2.72E-10	2.72E-10
cd116	.00E+00	6.39E-11	1.28E-10	1.92E-10	2.56E-10	2.56E-10
mo 96	.00E+00	2.87E-11	8.87E-11	1.66E-10	2.53E-10	2.53E-10
sn122	.00E+00	6.22E-11	1.25E-10	1.87E-10	2.50E-10	2.50E-10
dy163	.00E+00	4.42E-11	9.98E-11	1.67E-10	2.45E-10	2.45E-10

kr 82	.00E+00	4.37E-11	9.68E-11	1.59E-10	2.31E-10	2.31E-10
sn120	.00E+00	4.69E-11	9.39E-11	1.41E-10	1.88E-10	1.88E-10
xe130	.00E+00	2.91E-11	6.90E-11	1.20E-10	1.81E-10	1.81E-10
zr 95	.00E+00	1.68E-10	1.67E-10	1.66E-10	1.66E-10	1.66E-10
nb 95	.00E+00	1.53E-10	1.52E-10	1.52E-10	1.51E-10	1.51E-10
ge 73	.00E+00	3.63E-11	7.26E-11	1.09E-10	1.45E-10	1.45E-10
y 91	.00E+00	1.41E-10	1.40E-10	1.40E-10	1.39E-10	1.39E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10
nb 93	.00E+00	6.03E-12	2.53E-11	5.77E-11	1.03E-10	1.03E-10
cd110	.00E+00	4.89E-12	2.83E-11	4.76E-11	8.80E-11	8.80E-11
br 79	.00E+00	1.36E-12	1.34E-11	3.00E-11	5.33E-11	5.33E-11
ge 76	.00E+00	1.33E-11	2.64E-11	3.95E-11	5.26E-11	5.26E-11
ba140	.00E+00	4.70E-11	4.68E-11	4.67E-11	4.66E-11	4.66E-11
te126	.00E+00	7.59E-12	1.75E-11	2.96E-11	4.41E-11	4.41E-11
gd160	.00E+00	8.77E-12	1.02E-11	2.82E-11	3.89E-11	3.89E-11
sm153	.00E+00	1.81E-11	3.03E-11	3.85E-11	3.87E-11	3.87E-11
eu156	.00E+00	3.46E-11	3.53E-11	3.60E-11	3.68E-11	3.68E-11
ag107	.00E+00	1.80E-12	7.33E-12	1.68E-11	3.04E-11	3.04E-11
xe129	.00E+00	1.90E-12	7.39E-12	1.71E-11	3.03E-11	3.03E-11
sr 89	.00E+00	3.02E-11	3.00E-11	2.99E-11	2.98E-11	2.98E-11
ru106	.00E+00	2.66E-11	2.72E-11	2.79E-11	2.86E-11	2.86E-11
kr 87	.00E+00	2.25E-11	2.24E-11	2.23E-11	2.22E-11	2.22E-11
ho165	.00E+00	3.06E-12	6.96E-12	1.17E-11	1.73E-11	1.73E-11
ce143	.00E+00	1.73E-11	1.73E-11	1.72E-11	1.72E-11	1.72E-11
y 90	.00E+00	1.60E-11	1.59E-11	1.59E-11	1.58E-11	1.58E-11
sb125	.00E+00	1.51E-11	1.52E-11	1.53E-11	1.54E-11	1.54E-11
la140	.00E+00	1.54E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11

1 sas2h: far-field crit based on b2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7
0 fraction of total absorption rate
0 powers .00mw, burnup= 1461.mwd, flux= 2.99E+08n/cm**2-sec
initial 91313. d 182625. d 273938. d 365250. d 365250. d

mo 99	.00E+00	1.31E-11	1.31E-11	1.31E-11	1.30E-11	1.30E-11
pm148m	.00E+00	9.44E-12	9.43E-12	9.42E-12	9.42E-12	9.42E-12
te127m	.00E+00	7.41E-12	7.47E-12	7.52E-12	7.58E-12	7.58E-12
te124	.00E+00	1.57E-12	3.24E-12	5.00E-12	6.84E-12	6.84E-12
i131	.00E+00	4.76E-12	4.75E-12	4.74E-12	4.73E-12	4.73E-12
sr 87	.00E+00	1.52E-12	3.04E-12	4.56E-12	6.09E-12	6.09E-12
dy160	.00E+00	3.06E-13	1.12E-12	2.47E-12	4.36E-12	4.36E-12
nb 94	.00E+00	8.78E-13	1.76E-12	2.64E-12	3.54E-12	3.54E-12
xe128	.00E+00	7.54E-13	8.79E-13	1.07E-12	3.24E-12	3.24E-12
sr 86	.00E+00	5.17E-13	1.21E-12	2.09E-12	3.14E-12	3.14E-12
ge 74	.00E+00	7.30E-13	1.46E-12	2.19E-12	2.91E-12	2.91E-12
ge 72	.00E+00	4.92E-13	9.85E-13	1.48E-12	1.98E-12	1.98E-12
te129m	.00E+00	1.78E-12	1.78E-12	1.79E-12	1.79E-12	1.79E-12
se 76	.00E+00	1.05E-13	6.53E-13	1.04E-12	1.48E-12	1.48E-12
sn116	.00E+00	7.43E-14	3.03E-13	6.80E-13	1.21E-12	1.21E-12
er166	.00E+00	9.78E-14	2.46E-13	4.69E-13	7.40E-13	7.40E-13
te122	.00E+00	2.37E-14	1.30E-13	2.87E-13	5.07E-13	5.07E-13
pm148	.00E+00	3.84E-13	3.85E-13	3.84E-13	3.83E-13	3.83E-13
ag111	.00E+00	1.35E-13	2.48E-13	3.62E-13	3.75E-13	3.75E-13
eu157	.00E+00	3.84E-13	3.13E-13	3.22E-13	3.31E-13	3.31E-13
cd115m	.00E+00	2.37E-13	2.38E-13	2.39E-13	2.40E-13	2.40E-13
kr 80	.00E+00	2.13E-14	4.44E-14	6.95E-14	9.71E-14	9.71E-14
cs136	.00E+00	6.30E-14	7.00E-14	7.70E-14	8.39E-14	8.39E-14
ru105	.00E+00	3.04E-14	3.08E-14	3.11E-14	3.15E-14	3.15E-14
sn125	.00E+00	2.93E-14	2.96E-14	2.98E-14	2.99E-14	2.99E-14
rb 88	.00E+00	1.26E-14	1.26E-14	1.25E-14	1.25E-14	1.25E-14
tb160	.00E+00	2.02E-15	5.44E-15	8.45E-15	1.13E-14	1.13E-14
er167	.00E+00	7.34E-16	2.59E-15	5.83E-15	1.07E-14	1.07E-14

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     sn123       .00E+00  1.04E-14  1.04E-14  1.04E-14  1.04E-14  1.04E-14
      i135       .00E+00  9.97E-15  9.95E-15  9.92E-15  9.90E-15  9.90E-15
     te123       .00E+00  1.65E-15  3.73E-15  4.38E-15  9.73E-15  9.73E-15
     te132       .00E+00  9.47E-15  9.45E-15  9.43E-15  9.42E-15  9.42E-15
     pr142       .00E+00  1.73E-15  3.44E-15  5.14E-15  6.83E-15  6.83E-15
     be  9       .00E+00  1.71E-15  5.41E-15  5.10E-15  6.79E-15  6.79E-15
     te134       .00E+00  5.74E-15  5.72E-15  5.70E-15  5.68E-15  5.68E-15
     sb126       .00E+00  5.41E-15  5.85E-15  4.28E-15  4.71E-15  4.71E-15
     li  7       .00E+00  6.63E-16  1.32E-15  1.98E-15  2.63E-15  2.63E-15
     sb124       .00E+00  2.23E-15  2.36E-15  2.49E-15  2.62E-15  2.62E-15
     in117m      .00E+00  2.09E-15  2.11E-15  2.13E-15  2.15E-15  2.15E-15
      i130       .00E+00  1.03E-15  1.34E-15  1.66E-15  1.97E-15  1.97E-15
     rb 86       .00E+00  3.41E-16  4.42E-16  5.43E-16  6.43E-16  6.43E-16
     in117       .00E+00  6.13E-16  6.20E-16  6.27E-16  6.34E-16  6.34E-16
     dy165       .00E+00  2.76E-16  3.44E-16  4.12E-16  4.80E-16  4.80E-16
     cd108       .00E+00  2.48E-17  8.36E-17  1.04E-16  3.74E-16  3.74E-16
     sn114       .00E+00  1.67E-17  6.95E-17  1.58E-16  2.83E-16  2.83E-16
     cd118       .00E+00  1.19E-16  1.20E-16  1.20E-16  1.21E-16  1.21E-16
     ge 75       .00E+00  8.47E-17  8.45E-17  8.43E-17  8.42E-17  8.42E-17
     cs134m      .00E+00  1.28E-17  3.35E-17  5.01E-17  5.06E-17  5.06E-17
     in119m      .00E+00  2.98E-17  2.99E-17  3.00E-17  3.01E-17  3.01E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   8
0                                  fraction of total absorption rate
         power=     .00mw, burnup=    1461.mwd, flux= 2.99E+08n/cm**2-sec
0                initial  91313. d 182625. d 273938. d 365250. d 365250. d

     in119       .00E+00  2.33E-18  2.35E-18  2.36E-18  2.38E-18  2.38E-18
     cd109       .00E+00  6.19E-19  1.05E-18  1.47E-18  1.89E-18  1.89E-18
     sg110       .00E+00  2.03E-19  6.08E-19  9.67E-19  1.36E-18  1.36E-18
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page   9
       power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
                charge  91313. d 182625. d 273938. d 365250. d 365250. d
      h  1      .00E+00  2.22E-05  4.43E-05  6.64E-05  8.84E-05  8.84E-05
      h  2      .00E+00  8.57E-08  1.31E-07  1.97E-07  2.62E-07  2.62E-07
      h  3      .00E+00  3.50E-11  3.56E-11  3.63E-11  3.69E-11  3.69E-11
      h  4      .00E+00  1.41E-34  1.44E-34  1.46E-34  1.49E-34  1.49E-34
     he  3      .00E+00  4.77E-10  9.79E-10  1.47E-09  1.95E-09  1.95E-09
     he  4      .00E+00  3.66E-06  7.32E-06  1.10E-05  1.46E-05  1.46E-05
     he  6      .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     na 20      .00E+00  4.40E-07  8.79E-07  1.32E-06  1.76E-06  1.76E-06
     na 21      .00E+00  3.97E-12  1.59E-11  3.57E-11  6.33E-11  6.33E-11
     na 22      .00E+00  5.87E-09  5.77E-09  5.68E-09  1.16E-08  1.16E-08
     na 23      .00E+00  7.33E-15  7.32E-15  7.31E-15  7.30E-15  7.30E-15
     na 22      .00E+00  4.31E-11  4.30E-11  4.29E-11  4.29E-11  4.29E-11
     na 23     7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24      .00E+00  3.65E-08  3.64E-08  3.64E-08  3.64E-08  3.64E-08
     na 24m     .00E+00  6.00E-15  5.99E-15  5.98E-15  5.97E-15  5.97E-15
     na 25      .00E+00  2.60E-26  7.67E-26  1.46E-25  2.40E-25  2.40E-25
     mg 24      .00E+00  5.78E-03  7.56E-03  1.13E-02  1.51E-02  1.51E-02
     mg 25      .00E+00  8.61E-10  2.68E-09  4.84E-09  7.06E-09  7.06E-09
     mg 26      .00E+00  6.57E-08  1.31E-07  1.97E-07  2.62E-07  2.62E-07
     mg 27      .00E+00  2.19E-12  2.18E-12  2.18E-12  2.18E-12  2.18E-12
     mg 28      .00E+00  4.43E-24  4.42E-24  4.41E-24  4.40E-24  4.40E-24
     al 27     4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28      .00E+00  2.71E-10  2.70E-10  2.70E-10  2.70E-10  2.70E-10
     al 29      .00E+00  9.55E-25  1.61E-24  8.55E-24  1.52E-23  1.52E-23
     al 30      .00E+00  4.58E-36  3.49E-35  1.18E-34  2.78E-34  2.78E-34
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si 28	.00E+00	1.10E-02	2.20E-02	3.30E-02	4.40E-02	4.40E-02
si 29	.00E+00	3.53E-09	1.41E-08	3.17E-08	5.62E-08	5.62E-08
si 30	.00E+00	1.21E-15	9.68E-15	3.26E-14	7.71E-14	7.71E-14
si 31	.00E+00	8.67E-28	6.91E-27	2.33E-26	5.50E-26	5.50E-26
si 32	.00E+00	3.17E-34	4.28E-33	1.86E-32	5.14E-32	5.14E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		3.00E+08	3.00E+08	2.99E+08	2.99E+08	2.99E-07

ess2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10
power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91313. d	182625. d	273938. d	365250. d	
he 4	.00E+00	4.39E-02	1.15E-01	1.97E-01	2.89E-01	2.89E-01
pb206	.00E+00	2.25E-07	1.86E-06	4.26E-06	1.47E-05	1.47E-05
pb207	.00E+00	4.16E-07	1.78E-06	4.11E-06	7.38E-06	7.38E-06
pb208	.00E+00	8.05E-08	3.16E-07	7.02E-07	1.24E-06	1.24E-06
pb209	.00E+00	8.67E-14	3.44E-13	7.67E-13	1.35E-12	1.35E-12
pb210	.00E+00	9.86E-08	3.81E-07	8.28E-07	1.42E-06	1.42E-06
pb211	.00E+00	3.77E-13	7.35E-13	1.13E-12	1.51E-12	1.51E-12
pb212	.00E+00	1.11E-12	2.16E-12	3.21E-12	4.25E-12	4.25E-12
pb214	.00E+00	2.25E-13	8.70E-13	1.89E-12	3.25E-12	3.25E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	.00E+00	1.35E-08	1.07E-07	3.40E-07	8.49E-07	8.49E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	.00E+00	6.07E-11	2.34E-10	5.10E-10	8.76E-10	8.76E-10
bi211	.00E+00	2.23E-14	4.47E-14	6.72E-14	8.96E-14	8.96E-14
bi212	.00E+00	1.05E-13	2.05E-13	3.04E-13	4.03E-13	4.03E-13
bi213	.00E+00	2.02E-14	8.03E-14	1.79E-13	3.16E-13	3.16E-13
bi214	.00E+00	1.67E-13	6.46E-13	1.41E-12	2.42E-12	2.42E-12
po210	.00E+00	1.48E-09	6.47E-09	1.41E-08	2.42E-08	2.42E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	.00E+00	2.67E-19	4.94E-19	7.42E-19	9.90E-19	9.90E-19
po212	.00E+00	5.52E-24	1.08E-23	1.60E-23	2.12E-23	2.12E-23
po213	.00E+00	3.04E-23	1.21E-22	2.69E-22	4.75E-22	4.75E-22
po214	.00E+00	2.30E-20	8.89E-20	1.93E-19	3.32E-19	3.32E-19
po215	.00E+00	5.10E-19	6.20E-19	9.31E-19	1.24E-18	1.24E-18
po216	.00E+00	4.99E-18	8.18E-18	1.24E-17	1.61E-17	1.61E-17
po218	.00E+00	2.61E-14	1.01E-13	2.19E-13	3.76E-13	3.76E-13
rn218	.00E+00	1.70E-29	3.31E-29	4.90E-29	6.49E-29	6.49E-29
rn219	.00E+00	6.89E-16	1.38E-15	2.07E-15	2.76E-15	2.76E-15
rn220	.00E+00	1.61E-15	3.14E-15	4.65E-15	6.17E-15	6.17E-15
rn222	.00E+00	4.63E-11	1.79E-10	3.89E-10	6.69E-10	6.69E-10
ra222	.00E+00	1.84E-26	3.59E-26	5.32E-26	7.04E-26	7.04E-26
ra223	.00E+00	1.72E-10	3.44E-10	5.17E-10	6.90E-10	6.90E-10
ra224	.00E+00	9.14E-12	1.78E-11	2.65E-11	3.51E-11	3.51E-11
ra225	.00E+00	9.47E-12	3.76E-11	8.38E-11	1.48E-10	1.48E-10
ra226	.00E+00	7.08E-06	2.73E-05	5.94E-05	1.02E-04	1.02E-04
ra228	.00E+00	5.28E-13	1.06E-12	1.59E-12	2.12E-12	2.12E-12
ac225	.00E+00	6.40E-12	2.54E-11	5.66E-11	9.98E-11	9.98E-11
ac227	.00E+00	1.20E-07	2.39E-07	3.59E-07	4.80E-07	4.80E-07
ac228	.00E+00	6.45E-17	1.29E-16	1.94E-16	2.59E-16	2.59E-16
th226	.00E+00	9.00E-25	1.75E-24	2.60E-24	3.44E-24	3.44E-24
th227	.00E+00	2.78E-10	5.56E-10	8.34E-10	1.11E-09	1.11E-09
th228	.00E+00	1.75E-09	3.41E-09	5.05E-09	6.70E-09	6.70E-09
th229	.00E+00	1.04E-06	7.30E-06	1.43E-05	2.07E-05	2.07E-05
th230	.00E+00	6.38E-03	1.28E-02	1.92E-02	2.56E-02	2.56E-02
th231	.00E+00	3.04E-09	3.07E-09	3.09E-09	3.11E-09	3.11E-09
th232	.00E+00	1.79E-03	2.59E-03	2.88E-03	3.18E-03	3.18E-03
th233	.00E+00	1.20E-14	2.39E-14	3.59E-14	4.78E-14	4.78E-14

th234	.00E+00	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	1.80E-04	3.60E-04	5.41E-04	7.21E-04	7.21E-04
pa232	.00E+00	3.09E-12	4.18E-12	9.26E-12	1.23E-11	1.23E-11

1 ss2hr: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 11
power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91313. d	182625. d	273938. d	365250. d	365250. d
pa233	.00E+00	1.46E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	.00E+00	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	8.72E-22	1.70E-21	2.52E-21	3.33E-21	3.33E-21
u231	.00E+00	2.74E-18	5.45E-18	8.16E-18	1.08E-17	1.08E-17
u232	.00E+00	6.37E-08	1.24E-07	1.84E-07	2.44E-07	2.44E-07
u233	.00E+00	3.41E-03	6.80E-03	1.02E-02	1.35E-02	1.35E-02
u234	9.86E+00	9.07E+00	9.10E+00	9.14E+00	9.18E+00	9.18E+00
u235	7.30E+02	7.29E+02	7.27E+02	7.25E+02	7.23E+02	7.23E+02
u236	1.74E+02	1.75E+02	1.75E+02	1.75E+02	1.76E+02	1.76E+02
u237	.00E+00	3.25E-06	3.25E-06	3.25E-06	3.26E-06	3.26E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.28E-07	3.28E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	9.13E-12	9.11E-12	9.10E-12	9.08E-12	9.08E-12
np236m	.00E+00	2.17E-12	2.17E-12	2.16E-12	2.16E-12	2.16E-12
np236	.00E+00	3.15E-08	1.03E-07	1.94E-07	2.85E-07	2.85E-07
np237	4.22E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	.00E+00	1.58E-06	1.58E-06	1.57E-06	1.57E-06	1.57E-06
np239	.00E+00	4.76E-05	4.76E-05	4.75E-05	4.74E-05	4.74E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.77E-15	9.74E-15	9.72E-15	9.69E-15	9.69E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.18E-09	1.18E-09	1.17E-09	1.17E-09	1.17E-09
pu237	.00E+00	2.22E-13	2.61E-13	2.76E-13	2.87E-13	2.87E-13
pu238	.00E+00	2.06E-02	2.34E-02	2.37E-02	2.38E-02	2.38E-02
pu239	.00E+00	1.37E+00	2.32E+00	3.73E+00	4.97E+00	4.97E+00
pu240	.00E+00	1.55E-03	6.10E-03	1.35E-02	2.36E-02	2.36E-02
pu241	.00E+00	6.62E-07	2.60E-06	5.76E-06	1.01E-05	1.01E-05
pu242	.00E+00	7.37E-10	8.71E-09	3.72E-08	1.04E-07	1.04E-07
pu243	.00E+00	1.62E-18	1.92E-17	6.18E-17	2.28E-16	2.28E-16
pu244	.00E+00	4.00E-39	3.81E-36	1.89E-34	2.93E-33	2.93E-33
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	.00E+00	6.45E-22	4.76E-21	1.47E-20	3.18E-20	3.18E-20
am240	.00E+00	2.93E-19	2.18E-18	6.73E-18	1.44E-17	1.44E-17
am241	.00E+00	5.23E-06	1.65E-05	5.09E-05	1.10E-04	1.10E-04
am242m	.00E+00	2.89E-10	3.44E-09	1.43E-08	3.57E-08	3.57E-08
am242	.00E+00	6.20E-14	4.25E-13	1.97E-12	4.32E-12	4.32E-12
am243	.00E+00	5.26E-13	1.38E-11	8.38E-11	2.90E-10	2.90E-10
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	.00E+00	4.35E-21	1.08E-19	6.60E-19	2.28E-18	2.28E-18
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	.00E+00	1.04E-24	3.83E-23	1.21E-22	2.65E-22	2.65E-22
cm242	.00E+00	1.63E-11	1.26E-10	3.98E-10	8.73E-10	8.73E-10
cm243	.00E+00	.00E+00	1.40E-20	1.07E-19	3.36E-19	3.36E-19
cm244	.00E+00	6.52E-17	1.70E-15	1.04E-14	3.58E-14	3.58E-14

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     sas2h: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   12
       power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = single reactor assembly
              charge  91313. d 182625. d 273938. d 365250. d 365250. d
     cm245    .00E+00  2.85E-21  1.54E-19  1.46E-18  6.91E-18  6.91E-18
     cm246    .00E+00  6.19E-25  6.80E-23  9.06E-22  6.36E-21  6.36E-21
     cm247    .00E+00  2.25E-30  1.17E-25  1.15E-26  9.86E-26  9.86E-26
     cm248    .00E+00  8.27E-35  3.89E-32  1.29E-30  1.49E-29  1.49E-29
     cm249    .00E+00   .00E+00   .00E+00  3.09E-41  4.82E-40  4.82E-40
     cm250    .00E+00   .00E+00   .00E+00   .00E+00  1.40E-45  1.40E-45
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               3.00E+08  3.00E+08  2.99E+08  2.99E+08  2.99E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

         cross-section data taken from position number  2 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ****************************************************************************
         *                                                                          *
         *            prelim lwr origen-s binary working library--id = 1143         *
         *          made from modified card-image origen-s libraries of scale 4.2   *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                          *
         *       neutron flux spectrum factors and cross sections were produced from *
         *      the "presas2" sass updating all nuclides on the scale "burnup" library *
         *                                                                          *
         *                   fission product yields are from endf/b-v               *
         *                                                                          *
         *              photon libraries use an 18-energy-group structure           *
         *             the photon data are from the master photon data base,        *
         *              produced to include bremsstrahlung from uo2 matrix          *
         *                                                                          *
         *        see information above this box (if present) for later updates     *
         *                                                                          *
         ****************************************************************************
         *                                                                          *
0        ****************************************************************************
0                 .other identification and sizes of library.
```

```
0                 date set name:  ft33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     489    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ****************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   13
       powers    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec  ,
0                                                  basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial      456563. d      947875. d      639188. d      730500. d      730500. d
    productions  1.096527E+06  1.098196E+06  1.099821E+06  1.101403E+06  1.102943E+06  1.102943E+06
    absorptions  9.037613E+05  9.052724E+05  9.066773E+05  9.079868E+05  9.092220E+05  9.092220E+05
    k infinity   1.213320E+00  1.213111E+00  1.213024E+00  1.213017E+00  1.213062E+00  1.213062E+00
0                  initial      456563. d      947875. d      639188. d      730500. d      730500. d
    actinide
    absorptions  8.959688E+05  8.969688E+05  8.979482E+05  8.989073E+05  8.998463E+05  8.998463E+05
    non-actinide
    abs. fracs.  8.600354E-03  9.172499E-03  9.627581E-03  9.999692E-03  1.031184E-02  1.031184E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   14
0                                  fraction of total absorption rate
       powers    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
0            initial 456563. d 947875. d 639188. d 730500. d 730500. d

    sm149     3.99E-03  4.38E-03  4.66E-03  4.83E-03  4.99E-03  4.99E-03
    eu151     1.87E-04  2.38E-04  2.87E-04  3.35E-04  3.82E-04  3.82E-04
    nd143     1.43E-04  1.81E-04  2.17E-04  2.52E-04  2.87E-04  2.87E-04
    rh103     6.89E-05  8.61E-05  1.03E-04  1.20E-04  1.38E-04  1.38E-04
    gd155     7.68E-05  9.85E-05  1.03E-04  1.14E-04  1.24E-04  1.24E-04
    xe131     4.67E-05  5.83E-05  6.98E-05  8.14E-05  9.29E-05  9.29E-05
    cs133     3.62E-05  4.52E-05  5.41E-05  6.31E-05  7.20E-05  7.20E-05
    cd113     4.58E-05  5.30E-05  5.91E-05  6.43E-05  6.87E-05  6.87E-05
    sm147     2.68E-05  3.34E-05  4.01E-05  4.67E-05  5.32E-05  5.32E-05
    tc 99     2.67E-05  3.33E-05  3.98E-05  4.64E-05  5.29E-05  5.29E-05
    gd157     3.41E-05  3.45E-05  3.88E-05  4.04E-05  4.18E-05  4.18E-05
    nd145     2.86E-05  3.56E-05  3.87E-05  3.57E-05  4.08E-05  4.08E-05
    sm151     3.97E-05  3.97E-05  3.98E-05  3.99E-05  4.00E-05  4.00E-05
    mo 95     1.43E-05  1.78E-05  2.13E-05  2.48E-05  2.83E-05  2.83E-05
    sm152     1.16E-05  1.47E-05  1.78E-05  2.09E-05  2.41E-05  2.41E-05
    kr 83     8.83E-06  1.10E-05  1.32E-05  1.53E-05  1.75E-05  1.75E-05
    cs135     8.15E-06  1.02E-05  1.22E-05  1.42E-05  1.62E-05  1.62E-05
    sm150     5.08E-06  7.26E-06  9.40E-06  1.21E-05  1.46E-05  1.46E-05
    ru101     6.37E-06  7.96E-06  9.53E-06  1.11E-05  1.27E-05  1.27E-05
    pr141     6.84E-06  7.54E-06  9.03E-06  1.05E-05  1.20E-05  1.20E-05
    eu153     5.58E-06  6.98E-06  8.39E-06  9.80E-06  1.12E-05  1.12E-05
    la139     4.94E-06  6.16E-06  7.38E-06  8.59E-06  9.80E-06  9.80E-06
    ba137     2.25E-06  2.84E-06  3.42E-06  4.00E-06  4.58E-06  4.58E-06
    pd105     2.17E-06  2.72E-06  3.28E-06  3.85E-06  4.42E-06  4.42E-06
    zr 93     2.02E-06  2.52E-06  3.01E-06  3.51E-06  4.00E-06  4.00E-06
     i129     1.54E-06  1.92E-06  2.31E-06  2.69E-06  3.08E-06  3.08E-06
    nd144     1.48E-06  1.85E-06  2.21E-06  2.58E-06  2.94E-06  2.94E-06
    ag109     1.04E-06  1.37E-06  1.72E-06  2.11E-06  2.52E-06  2.52E-06
    xe135     2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06
    mo 97     1.12E-06  1.40E-06  1.68E-06  1.95E-06  2.23E-06  2.23E-06
    zr 91     5.26E-07  6.56E-07  7.85E-07  9.14E-07  1.04E-06  1.04E-06
     y 89     5.84E-07  6.28E-07  7.51E-07  8.74E-07  9.97E-07  9.97E-07
    ru102     4.57E-07  5.71E-07  6.85E-07  7.98E-07  9.11E-07  9.11E-07
    ce142     4.89E-07  5.11E-07  6.12E-07  7.12E-07  8.13E-07  8.13E-07
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     nd148    3.96E-07  4.94E-07  5.92E-07  6.89E-07  7.87E-07  7.87E-07
     pd108    3.18E-07  4.11E-07  5.09E-07  6.12E-07  7.20E-07  7.20E-07
     nd146    3.31E-07  4.13E-07  4.95E-07  5.76E-07  6.57E-07  6.57E-07
     ba138    2.82E-07  3.52E-07  4.22E-07  4.91E-07  5.61E-07  5.61E-07
     in115    2.78E-07  3.47E-07  4.17E-07  4.88E-07  5.58E-07  5.58E-07
     ce140    2.64E-07  3.30E-07  3.95E-07  4.60E-07  5.25E-07  5.25E-07
     xe132    2.48E-07  3.00E-07  3.59E-07  4.19E-07  4.78E-07  4.78E-07
     gd152    9.42E-08  1.57E-07  2.31E-07  3.20E-07  4.21E-07  4.21E-07
     pd107    1.79E-07  2.29E-07  2.81E-07  3.36E-07  3.92E-07  3.92E-07
     mo 98    1.66E-07  2.07E-07  2.49E-07  2.90E-07  3.30E-07  3.30E-07
     mo100    1.60E-07  2.00E-07  2.39E-07  2.79E-07  3.18E-07  3.18E-07
     xe134    1.56E-07  1.95E-07  2.34E-07  2.72E-07  3.11E-07  3.11E-07
     pm147    2.71E-07  2.70E-07  2.70E-07  2.69E-07  2.69E-07  2.69E-07
     zr 92    1.27E-07  1.58E-07  1.89E-07  2.20E-07  2.51E-07  2.51E-07
      i127    1.06E-07  1.32E-07  1.59E-07  1.87E-07  2.14E-07  2.14E-07
1    ssz2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  15
0                                  fraction of total absorption rate
0          powers     .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
                 initial 454563. d 547875. d 639188. d 730500. d 730500. d

     zr 96    1.82E-07  1.27E-07  1.52E-07  1.77E-07  2.02E-07  2.02E-07
     ru104    9.97E-08  1.25E-07  1.50E-07  1.75E-07  2.01E-07  2.01E-07
     nd150    8.82E-08  1.10E-07  1.32E-07  1.54E-07  1.76E-07  1.76E-07
     eu155    1.66E-07  1.67E-07  1.69E-07  1.70E-07  1.72E-07  1.72E-07
     xe136    8.46E-08  1.06E-07  1.26E-07  1.47E-07  1.68E-07  1.68E-07
     br 81    6.38E-08  7.96E-08  9.53E-08  1.11E-07  1.27E-07  1.27E-07
     rb 85    6.19E-08  7.72E-08  9.25E-08  1.08E-07  1.23E-07  1.23E-07
     zr 94    5.42E-08  6.76E-08  8.09E-08  9.42E-08  1.07E-07  1.07E-07
     eu152    4.88E-08  6.21E-08  7.48E-08  8.73E-08  9.94E-08  9.94E-08
     zr 90    4.77E-08  6.00E-08  7.22E-08  8.44E-08  9.65E-08  9.65E-08
     cd111    4.47E-08  5.69E-08  6.95E-08  8.23E-08  9.58E-08  9.58E-08
     sm154    3.80E-08  4.76E-08  5.72E-08  6.69E-08  7.67E-08  7.67E-08
     te130    3.84E-08  4.80E-08  5.75E-08  6.70E-08  7.66E-08  7.66E-08
     rb 87    3.59E-08  4.48E-08  5.36E-08  6.24E-08  7.11E-08  7.11E-08
     se 77    2.54E-08  3.16E-08  3.79E-08  4.42E-08  5.04E-08  5.04E-08
     pd106    1.94E-08  2.45E-08  2.97E-08  3.50E-08  4.05E-08  4.05E-08
     kr 84    1.71E-08  2.13E-08  2.55E-08  2.96E-08  3.38E-08  3.38E-08
     ru 99    7.00E-09  1.09E-08  1.46E-08  2.11E-08  2.75E-08  2.75E-08
     gd156    1.05E-08  1.41E-08  1.81E-08  2.23E-08  2.68E-08  2.68E-08
     se 79    1.30E-08  1.62E-08  1.94E-08  2.26E-08  2.58E-08  2.58E-08
     sb121    1.27E-08  1.59E-08  1.91E-08  2.23E-08  2.55E-08  2.55E-08
     sb123    1.03E-08  1.29E-08  1.55E-08  1.81E-08  2.07E-08  2.07E-08
     kr 86    9.39E-09  1.17E-08  1.40E-08  1.63E-08  1.86E-08  1.86E-08
     te128    8.51E-09  1.06E-08  1.28E-08  1.49E-08  1.70E-08  1.70E-08
     sr 90    1.68E-08  1.67E-08  1.67E-08  1.66E-08  1.65E-08  1.65E-08
     dy161    6.70E-09  8.77E-09  1.10E-08  1.34E-08  1.59E-08  1.59E-08
     gd154    5.76E-09  8.06E-09  8.43E-09  1.15E-08  1.50E-08  1.50E-08
     se 80    6.07E-09  7.57E-09  9.07E-09  1.06E-08  1.21E-08  1.21E-08
     te125    5.42E-09  6.79E-09  8.18E-09  9.57E-09  1.10E-08  1.10E-08
     rh103    8.72E-09  8.80E-09  8.89E-09  8.99E-09  9.08E-09  9.08E-09
     tb159    4.02E-09  5.13E-09  6.29E-09  7.49E-09  8.73E-09  8.73E-09
     cd112    3.42E-09  4.56E-09  5.53E-09  6.50E-09  7.49E-09  7.49E-09
     li  6    3.43E-09  4.27E-09  5.11E-09  5.94E-09  6.77E-09  6.77E-09
     gd158    2.68E-09  3.60E-09  4.57E-09  5.58E-09  6.61E-09  6.61E-09
     sn117    2.02E-09  3.33E-09  4.26E-09  4.99E-09  5.73E-09  5.73E-09
     eu154    2.07E-09  3.56E-09  4.27E-09  4.99E-09  5.70E-09  5.70E-09
     ru100    1.22E-09  1.89E-09  2.71E-09  3.66E-09  4.76E-09  4.76E-09
     sn119    2.28E-09  2.66E-09  3.43E-09  4.01E-09  4.60E-09  4.60E-09
     sn115    2.09E-09  2.61E-09  3.14E-09  3.67E-09  4.20E-09  4.20E-09
     cd114    1.66E-09  2.17E-09  2.72E-09  3.29E-09  3.86E-09  3.86E-09
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     cs137     3.73E-09  3.74E-09  3.74E-09  3.73E-09  3.73E-09  3.73E-09
     sr 88     1.73E-09  2.15E-09  2.58E-09  3.00E-09  3.42E-09  3.42E-09
     nd142     8.30E-10  1.29E-09  1.66E-09  2.52E-09  3.28E-09  3.28E-09
     ba134     8.20E-10  1.27E-09  1.62E-09  2.47E-09  3.22E-09  3.22E-09
     pd110     1.39E-09  1.78E-09  2.19E-09  2.61E-09  3.04E-09  3.04E-09
     sm148     7.64E-10  1.18E-09  1.49E-09  2.28E-09  2.97E-09  2.97E-09
     dy164     1.06E-09  1.45E-09  1.89E-09  2.37E-09  2.90E-09  2.90E-09
     dy162     1.04E-09  1.40E-09  1.80E-09  2.24E-09  2.72E-09  2.72E-09
     ba135     6.56E-10  1.02E-09  1.47E-09  2.00E-09  2.61E-09  2.61E-09
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page   16
0                                  fraction of total absorption rate
       power=     .00mw, burnup=    2022.mwd, flux= 2.80E+08n/cm**2-sec
0                 initial 456563. d 547875. d 639188. d 730500. d 730500. d

     pr143     2.63E-09  2.63E-09  2.62E-09  2.61E-09  2.61E-09  2.61E-09
     se 82     1.17E-09  1.46E-09  1.75E-09  2.04E-09  2.33E-09  2.33E-09
     pd104     5.64E-10  8.77E-10  1.26E-09  1.71E-09  2.23E-09  2.23E-09
     sn126     9.68E-10  1.22E-09  1.47E-09  1.72E-09  1.98E-09  1.98E-09
     xe133     1.99E-09  1.98E-09  1.98E-09  1.98E-09  1.98E-09  1.98E-09
     se 78     8.97E-10  1.12E-09  1.34E-09  1.57E-09  1.79E-09  1.79E-09
     ce141     1.57E-09  1.57E-09  1.57E-09  1.56E-09  1.56E-09  1.56E-09
     sn124     7.36E-10  9.22E-10  1.11E-09  1.30E-09  1.49E-09  1.49E-09
     as 75     5.34E-10  6.66E-10  7.99E-10  9.30E-10  1.06E-09  1.06E-09
     pm149     9.63E-10  9.62E-10  9.60E-10  9.59E-10  9.58E-10  9.58E-10
     nd147     9.29E-10  9.27E-10  9.25E-10  9.23E-10  9.22E-10  9.22E-10
     mo 96     2.53E-10  3.72E-10  5.13E-10  6.77E-10  8.62E-10  8.62E-10
     ba136     3.58E-10  4.49E-10  5.08E-10  7.16E-10  8.53E-10  8.53E-10
     in113     4.01E-10  5.04E-10  6.09E-10  7.14E-10  8.19E-10  8.19E-10
     dy163     2.45E-10  3.34E-10  4.32E-10  5.42E-10  6.61E-10  6.61E-10
     sn118     3.01E-10  3.77E-10  4.54E-10  5.30E-10  6.07E-10  6.07E-10
     kr 82     2.32E-10  3.13E-10  4.02E-10  5.00E-10  6.06E-10  6.06E-10
     ce144     5.93E-10  5.92E-10  5.90E-10  5.88E-10  5.87E-10  5.87E-10
     kr 83     5.62E-10  5.61E-10  5.59E-10  5.57E-10  5.55E-10  5.55E-10
     xe130     1.83E-10  2.35E-10  2.88E-10  4.32E-10  5.36E-10  5.36E-10
     cs134     2.74E-10  3.36E-10  4.02E-10  4.68E-10  5.34E-10  5.34E-10
     cd116     2.54E-10  3.18E-10  3.82E-10  4.47E-10  5.11E-10  5.11E-10
     sn122     2.52E-10  3.15E-10  3.79E-10  4.43E-10  5.07E-10  5.07E-10
     nb 93     1.83E-10  1.82E-10  2.34E-10  3.18E-10  4.15E-10  4.15E-10
     cd110     8.86E-11  1.43E-10  2.13E-10  2.99E-10  4.03E-10  4.03E-10
     sn120     1.88E-10  2.36E-10  2.83E-10  3.31E-10  3.79E-10  3.79E-10
     ru103     3.40E-10  3.60E-10  3.81E-10  3.62E-10  3.63E-10  3.63E-10
     ge 73     1.46E-10  1.82E-10  2.19E-10  2.55E-10  2.92E-10  2.92E-10
     sr 79     5.34E-11  8.33E-11  1.20E-10  1.63E-10  2.12E-10  2.12E-10
     zr 93     1.65E-10  1.64E-10  1.64E-10  1.63E-10  1.63E-10  1.63E-10
     nb 95     1.51E-10  1.51E-10  1.51E-10  1.50E-10  1.50E-10  1.50E-10
      y 91     1.40E-10  1.40E-10  1.39E-10  1.39E-10  1.38E-10  1.38E-10
     ag107     3.06E-11  4.87E-11  7.13E-11  9.86E-11  1.31E-10  1.31E-10
     te126     4.42E-11  6.10E-11  8.01E-11  1.02E-10  1.26E-10  1.26E-10
     xe129     3.84E-11  4.74E-11  6.82E-11  9.28E-11  1.21E-10  1.21E-10
     pm151     1.10E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10  1.10E-10
     ge 76     3.27E-11  6.57E-11  7.87E-11  9.17E-11  1.05E-10  1.05E-10
     gd160     3.89E-11  5.01E-11  6.19E-11  7.43E-11  8.73E-11  8.73E-11
     ho165     1.74E-11  2.38E-11  3.11E-11  3.92E-11  4.82E-11  4.82E-11
     ba140     4.68E-11  4.67E-11  4.66E-11  4.65E-11  4.64E-11  4.64E-11
     eu156     3.71E-11  3.77E-11  3.84E-11  3.91E-11  3.97E-11  3.97E-11
     sm153     3.89E-11  3.91E-11  3.93E-11  3.95E-11  3.97E-11  3.97E-11
     ru106     2.83E-11  2.88E-11  2.95E-11  3.01E-11  3.07E-11  3.07E-11
     sr 89     2.80E-11  2.99E-11  2.98E-11  2.97E-11  2.96E-11  2.96E-11
     kr 87     2.24E-11  2.23E-11  2.23E-11  2.22E-11  2.21E-11  2.21E-11
     dy160     4.34E-12  6.76E-12  9.75E-12  1.33E-11  1.75E-11  1.75E-11
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     ce143     1.72E-11  1.72E-11  1.72E-11  1.71E-11  1.71E-11  1.71E-11
     sb125     1.54E-11  1.55E-11  1.56E-11  1.57E-11  1.58E-11  1.58E-11
      y 90     1.59E-11  1.59E-11  1.58E-11  1.58E-11  1.57E-11  1.57E-11
!    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page   17
0                                   fraction of total absorption rate
          power=    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
0                 initial 456563. d 547875. d 639188. d 730500. d

     te126     4.90E-12  8.86E-12  1.09E-11  1.30E-11  1.53E-11  1.53E-11
     la140     1.52E-11  1.52E-11  1.52E-11  1.51E-11  1.51E-11  1.51E-11
     mo 99     1.30E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11  1.30E-11
     xe128     3.27E-12  5.80E-12  7.11E-12  9.59E-12  1.24E-11  1.24E-11
     sr 87     6.13E-12  7.67E-12  9.23E-12  1.08E-11  1.23E-11  1.23E-11
     pm148m    9.70E-12  9.57E-12  9.57E-12  9.57E-12  9.57E-12  9.57E-12
     sr 86     3.17E-12  4.41E-12  5.81E-12  7.40E-12  9.15E-12  9.15E-12
     te127m    7.63E-12  7.69E-12  7.74E-12  7.80E-12  7.85E-12  7.85E-12
     nb 94     3.52E-12  4.42E-12  5.32E-12  6.24E-12  7.17E-12  7.17E-12
      i131     6.74E-12  6.73E-12  6.73E-12  6.73E-12  6.72E-12  6.72E-12
     se 74     2.94E-12  3.67E-12  4.40E-12  5.13E-12  5.86E-12  5.86E-12
     sn116     1.19E-12  1.86E-12  2.67E-12  3.63E-12  4.73E-12  4.73E-12
     se 72     2.00E-12  2.30E-12  3.01E-12  3.53E-12  4.04E-12  4.04E-12
     se 76     1.49E-12  1.97E-12  2.69E-12  3.06E-12  3.66E-12  3.66E-12
     er166     7.43E-13  1.07E-12  1.43E-12  1.89E-12  2.38E-12  2.38E-12
     te122     5.05E-13  7.82E-13  1.12E-12  1.52E-12  1.98E-12  1.98E-12
     te129m    1.80E-12  1.80E-12  1.80E-12  1.81E-12  1.81E-12  1.81E-12
     ag111     3.73E-13  3.85E-13  3.97E-13  4.09E-13  4.22E-13  4.22E-13
     pm148     3.79E-13  3.74E-13  3.73E-13  3.72E-13  3.72E-13  3.72E-13
     eu157     3.33E-13  3.40E-13  3.48E-13  3.57E-13  3.65E-13  3.65E-13
     cd115m    2.42E-13  2.43E-13  2.44E-13  2.45E-13  2.46E-13  2.46E-13
     kr 80     9.78E-14  1.28E-13  1.62E-13  1.99E-13  2.40E-13  2.40E-13
     cs136     8.34E-14  9.00E-14  9.66E-14  1.03E-13  1.10E-13  1.10E-13
     er167     1.08E-14  1.76E-14  2.63E-14  3.78E-14  5.17E-14  5.17E-14
     te123     9.76E-15  1.39E-14  1.90E-14  2.52E-14  3.26E-14  3.26E-14
     ru105     3.12E-14  3.15E-14  3.19E-14  3.22E-14  3.25E-14  3.25E-14
     sn125     2.97E-14  2.98E-14  3.00E-14  3.01E-14  3.02E-14  3.02E-14
     tb160     1.16E-14  1.43E-14  1.76E-14  2.06E-14  2.38E-14  2.38E-14
     pr142     4.86E-15  8.33E-15  1.02E-14  1.19E-14  1.35E-14  1.35E-14
     be  9     4.70E-15  8.36E-15  1.00E-14  1.17E-14  1.33E-14  1.33E-14
     rb 88     1.26E-14  1.26E-14  1.25E-14  1.25E-14  1.24E-14  1.24E-14
     sn123     1.02E-14  1.03E-14  1.03E-14  1.03E-14  1.03E-14  1.03E-14
      i135     1.00E-14  9.88E-15  9.77E-15  9.55E-15  9.44E-15  9.44E-15
     te132     9.47E-15  9.46E-15  9.45E-15  9.44E-15  9.44E-15  9.44E-15
     sb126     4.73E-15  5.16E-15  5.59E-15  6.02E-15  6.45E-15  6.45E-15
     te134     3.74E-15  3.72E-15  3.71E-15  3.69E-15  3.68E-15  3.68E-15
     li  7     2.66E-15  3.32E-15  3.98E-15  4.63E-15  5.29E-15  5.29E-15
      i130     1.97E-15  2.29E-15  2.59E-15  2.90E-15  3.21E-15  3.21E-15
     sb124     2.62E-15  2.75E-15  2.88E-15  3.00E-15  3.13E-15  3.13E-15
     in117m    2.17E-15  2.19E-15  2.21E-15  2.23E-15  2.25E-15  2.25E-15
     cd108     3.76E-16  6.46E-16  1.03E-15  1.54E-15  2.20E-15  2.20E-15
     sn114     2.86E-16  4.48E-16  6.46E-16  8.81E-16  1.15E-15  1.15E-15
     rb 86     6.47E-16  7.44E-16  8.42E-16  9.40E-16  1.04E-15  1.04E-15
     dy165     4.85E-16  5.51E-16  6.19E-16  6.87E-16  7.54E-16  7.54E-16
     in117     6.41E-16  6.47E-16  6.54E-16  6.60E-16  6.67E-16  6.67E-16
     cd118     1.22E-16  1.23E-16  1.23E-16  1.24E-16  1.25E-16  1.25E-16
     cs134m    5.11E-17  6.29E-17  7.52E-17  8.76E-17  9.98E-17  9.98E-17
     se 75     8.51E-17  8.50E-17  8.49E-17  8.48E-17  8.47E-17  8.47E-17
     in119m    3.04E-17  3.05E-17  3.06E-17  3.08E-17  3.09E-17  3.09E-17
!    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page   18
0                                   fraction of total absorption rate
          power=    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
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0              initial 456563. d 547875. d 639188. d 730500. d 730500. d

    cd109     1.91E-18  2.31E-18  2.72E-18  3.12E-18  3.52E-18  3.52E-18
    ag110     1.38E-18  1.79E-18  2.25E-18  2.75E-18  3.27E-18  3.27E-18
    in119     2.40E-18  2.41E-18  2.43E-18  2.44E-18  2.46E-18  2.46E-18
1
    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page   19
      power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = simple reactor assembly
              charge 456563. d 547875. d 639188. d 730500. d 730500. d
      h  1   8.84E-05  1.10E-04  1.32E-04  1.53E-04  1.75E-04  1.75E-04
      h  2   2.62E-07  3.27E-07  3.91E-07  4.56E-07  5.20E-07  5.20E-07
      h  3   3.69E-11  3.71E-11  3.77E-11  3.83E-11  3.89E-11  3.89E-11
      h  4   1.49E-34  1.49E-34  1.52E-34  1.54E-34  1.56E-34  1.56E-34
     he  3   1.95E-09  2.42E-09  2.87E-09  3.32E-09  3.76E-09  3.76E-09
     he  4   1.46E-05  1.82E-05  2.18E-05  2.54E-05  2.90E-05  2.90E-05
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   1.76E-06  2.19E-06  2.62E-06  3.05E-06  3.48E-06  3.48E-06
     ne 21   6.33E-11  9.74E-11  1.38E-10  1.85E-10  2.38E-10  2.38E-10
     ne 22   1.16E-08  1.44E-08  1.73E-08  2.01E-08  2.30E-08  2.30E-08
     ne 23   7.30E-15  7.17E-15  7.17E-15  7.16E-15  7.15E-15  7.15E-15
     na 22   4.29E-11  4.22E-11  4.22E-11  4.21E-11  4.21E-11  4.21E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   3.64E-08  3.08E-08  3.07E-08  3.07E-08  3.07E-08  3.07E-08
     na 24m  5.97E-15  5.05E-15  5.05E-15  5.04E-15  5.04E-15  5.04E-15
     na 25   2.40E-25  3.45E-25  4.74E-25  6.22E-25  7.88E-25  7.88E-25
     mg 24   1.51E-02  1.83E-02  2.15E-02  2.47E-02  2.78E-02  2.78E-02
     mg 25   7.96E-09  1.18E-08  1.62E-08  2.13E-08  2.70E-08  2.70E-08
     mg 26   2.62E-07  3.27E-07  3.91E-07  4.56E-07  5.20E-07  5.20E-07
     mg 27   2.18E-12  2.14E-12  2.14E-12  2.14E-12  2.13E-12  2.13E-12
     mg 28   4.40E-24  4.33E-24  4.32E-24  4.31E-24  4.31E-24  4.31E-24
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.70E-10  2.28E-10  2.28E-10  2.28E-10  2.27E-10  2.27E-10
     al 29   1.52E-23  2.29E-23  3.26E-23  4.38E-23  5.45E-23  5.45E-23
     al 30   2.78E-34  5.28E-34  9.06E-34  1.43E-33  2.11E-33  2.11E-33
     si 28   4.40E-02  5.32E-02  6.25E-02  7.18E-02  8.10E-02  8.10E-02
     si 29   5.62E-08  8.73E-08  1.24E-07  1.67E-07  2.14E-07  2.14E-07
     si 30   7.71E-14  1.50E-13  2.59E-13  4.08E-13  6.04E-13  6.04E-13
     si 31   8.50E-24  1.07E-23  1.84E-23  2.90E-23  4.29E-23  4.29E-23
     si 32   3.14E-32  1.12E-31  2.07E-31  3.44E-31  5.14E-31  5.14E-31
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0    flux              2.80E+08  2.80E+08  2.80E+08  2.80E+08  2.79E+07
1
    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides             page   20
      power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = simple reactor assembly
              charge 456563. d 547875. d 639188. d 730500. d 730500. d
     he  4   2.89E-01  3.89E-01  4.98E-01  6.16E-01  7.42E-01  7.42E-01
    pb206    1.47E-05  2.82E-05  4.78E-05  7.45E-05  1.09E-04  1.09E-04
    pb207    7.38E-06  1.36E-05  1.68E-05  2.30E-05  3.01E-05  3.01E-05
    pb208    1.24E-06  1.92E-06  2.76E-06  3.74E-06  4.87E-06  4.87E-06
    pb209    1.35E-12  2.09E-12  2.09E-12  4.04E-12  5.23E-12  5.23E-12
    pb210    1.42E-06  2.15E-06  3.00E-06  3.96E-06  5.01E-06  5.01E-06
    pb211    1.51E-12  1.89E-12  2.27E-12  2.65E-12  3.03E-12  3.03E-12
    pb212    4.25E-12  5.28E-12  6.32E-12  7.36E-12  8.40E-12  8.40E-12
    pb214    3.25E-12  4.92E-12  6.66E-12  9.04E-12  1.15E-11  1.15E-11
    bi208     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    bi209    8.49E-07  1.65E-06  2.83E-06  4.46E-06  6.62E-06  6.62E-06
```

bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	8.76E-10	1.32E-09	1.85E-09	2.44E-09	3.08E-09	3.08E-09
bi211	8.96E-14	1.12E-13	1.33E-13	1.57E-13	1.80E-13	1.80E-13
bi212	4.03E-13	5.81E-13	6.00E-13	6.99E-13	7.97E-13	7.97E-13
bi213	3.16E-13	4.89E-13	6.99E-13	9.43E-13	1.22E-12	1.22E-12
bi214	2.42E-12	3.65E-12	5.09E-12	6.72E-12	8.50E-12	8.50E-12
po210	2.42E-08	3.64E-08	5.10E-08	6.73E-08	8.52E-08	8.52E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	9.90E-19	1.24E-18	1.49E-18	1.74E-18	1.99E-18	1.99E-18
po212	2.12E-23	2.63E-23	3.15E-23	3.67E-23	4.19E-23	4.19E-23
po213	4.75E-22	7.33E-22	1.03E-21	1.62E-21	1.04E-21	1.04E-21
po214	3.32E-19	5.02E-19	7.01E-19	9.24E-19	1.17E-18	1.17E-18
po215	1.24E-18	1.55E-18	1.87E-18	2.18E-18	2.49E-18	2.49E-18
po216	1.41E-17	2.00E-17	2.39E-17	2.79E-17	3.18E-17	3.18E-17
po218	3.76E-13	5.69E-13	7.93E-13	1.05E-12	1.32E-12	1.32E-12
rn218	6.49E-29	7.85E-29	9.39E-29	1.09E-28	1.24E-28	1.24E-28
rn219	2.76E-15	3.46E-15	4.15E-15	4.84E-15	5.54E-15	5.54E-15
rn220	6.17E-15	7.67E-15	9.18E-15	1.07E-14	1.22E-14	1.22E-14
rn222	6.69E-10	1.01E-09	1.41E-09	1.86E-09	2.35E-09	2.35E-09
ra222	7.04E-26	8.52E-26	1.02E-25	1.19E-25	1.35E-25	1.35E-25
ra223	6.90E-10	8.62E-10	1.04E-09	1.21E-09	1.38E-09	1.38E-09
ra224	3.51E-11	4.36E-11	5.22E-11	6.08E-11	6.94E-11	6.94E-11
ra225	1.48E-10	2.29E-10	3.27E-10	4.61E-10	5.71E-10	5.71E-10
ra226	1.02E-04	1.54E-04	2.15E-04	2.84E-04	3.60E-04	3.60E-04
ra228	2.12E-12	2.65E-12	3.18E-12	3.72E-12	4.25E-12	4.25E-12
ac225	9.98E-11	1.93E-10	2.21E-10	2.98E-10	3.86E-10	3.86E-10
ac227	4.80E-07	6.80E-07	7.20E-07	8.41E-07	9.61E-07	9.61E-07
ac228	2.59E-16	3.23E-16	3.88E-16	4.54E-16	5.19E-16	5.19E-16
th226	3.44E-24	4.16E-24	4.97E-24	5.78E-24	6.59E-24	6.59E-24
th227	1.11E-09	1.39E-09	1.67E-09	1.95E-09	2.23E-09	2.23E-09
th228	6.70E-09	8.53E-09	9.97E-09	1.16E-08	1.32E-08	1.32E-08
th229	2.87E-05	4.45E-05	6.35E-05	8.57E-05	1.11E-04	1.11E-04
th230	2.56E-02	3.20E-02	3.84E-02	4.48E-02	5.13E-02	5.13E-02
th231	3.11E-09	3.13E-09	3.15E-09	3.17E-09	3.20E-09	3.20E-09
th232	5.18E-03	6.48E-03	7.78E-03	9.08E-03	1.04E-02	1.04E-02
th233	4.78E-14	5.94E-14	7.13E-14	8.32E-14	9.50E-14	9.50E-14
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.21E-04	9.02E-04	1.08E-03	1.26E-03	1.45E-03	1.45E-03
pa232	1.23E-11	1.54E-11	1.85E-11	2.16E-11	2.46E-11	2.46E-11

1

ass2h: fer-field crit based on h2v 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 21

power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 436363. d	547875. d	639188. d	730500. d		730500. d
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	3.33E-21	4.03E-21	4.82E-21	5.61E-21	6.39E-21	6.39E-21
u231	1.08E-17	1.32E-17	1.58E-17	1.83E-17	2.09E-17	2.09E-17
u232	2.44E-07	3.03E-07	3.63E-07	4.23E-07	4.82E-07	4.82E-07
u233	1.35E-02	1.49E-02	2.02E-02	2.36E-02	2.69E-02	2.69E-02
u234	9.18E+00	9.21E+00	9.25E+00	9.28E+00	9.32E+00	9.32E+00
u235	7.23E+02	7.21E+02	7.19E+02	7.18E+02	7.16E+02	7.16E+02
u236	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.77E+02	1.77E+02
u237	3.26E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	3.28E-07	3.22E-07	3.22E-07	3.22E-07	3.21E-07	3.21E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	9.08E-12	8.87E-12	8.86E-12	8.84E-12	8.83E-12	8.83E-12
np236m	2.16E-12	2.11E-12	2.11E-12	2.10E-12	2.10E-12	2.10E-12
np236	2.05E-07	2.55E-07	3.04E-07	3.53E-07	4.03E-07	4.03E-07
np237	4.21E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01
np238	1.57E-06	1.56E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.74E-05	4.66E-05	4.65E-05	4.65E-05	4.44E-05	4.44E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	9.69E-15	9.47E-15	9.45E-15	9.43E-15	9.41E-15	9.41E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.17E-09	1.14E-09	1.14E-09	1.14E-09	1.14E-09	1.14E-09
pu237	2.87E-13	2.89E-13	2.98E-13	3.07E-13	3.16E-13	3.16E-13
pu238	2.30E-02	2.36E-02	2.35E-02	2.35E-02	2.34E-02	2.34E-02
pu239	6.07E+00	6.14E+00	7.29E+00	8.43E+00	9.55E+00	9.55E+00
pu240	2.36E-02	3.02E-02	5.12E-02	6.85E-02	8.79E-02	8.79E-02
pu241	1.01E-05	1.31E-05	2.14E-05	2.86E-05	3.67E-05	3.67E-05
pu242	1.04E-07	2.27E-07	4.27E-07	7.35E-07	1.14E-06	1.14E-06
pu243	2.28E-16	4.88E-16	9.17E-16	1.56E-15	2.45E-15	2.45E-15
pu244	2.93E-33	2.38E-32	1.29E-31	5.32E-31	1.80E-30	1.80E-30
pu245	.00E+00	.00E+00	.00E+00	.00E+00	7.64E-41	7.64E-41
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	3.18E-20	5.30E-20	8.65E-20	1.26E-19	1.74E-19	1.74E-19
am240	1.46E-17	2.52E-17	3.97E-17	5.78E-17	7.95E-17	7.95E-17
am241	1.10E-04	1.95E-04	3.08E-04	4.49E-04	6.18E-04	6.18E-04
am242m	3.37E-08	6.90E-08	1.16E-07	1.76E-07	2.51E-07	2.51E-07
am242	4.32E-12	7.68E-12	1.22E-11	1.79E-11	2.47E-11	2.47E-11
am243	2.90E-10	7.36E-10	1.54E-09	2.86E-09	4.82E-09	4.82E-09
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.28E-18	5.68E-18	1.19E-17	2.20E-17	3.71E-17	3.71E-17
am245	.00E+00	.00E+00	.00E+00	.00E+00	1.49E-41	1.49E-41
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	2.65E-22	4.59E-22	7.28E-22	1.07E-21	1.47E-21	1.47E-21
cm242	8.73E-10	1.55E-09	2.44E-09	3.41E-09	4.98E-09	4.98E-09
cm243	3.36E-19	7.28E-19	1.29E-18	2.05E-18	3.00E-18	3.00E-18
cm244	3.58E-14	8.92E-14	1.87E-13	3.45E-13	5.83E-13	5.83E-13

1

ass2h: fer-field crit based on b1w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 22
power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 456543. d 947875. d	639188. d	730500. d	730500. d		
cm245	4.91E-18	2.19E-17	3.57E-17	1.22E-16	2.36E-16	2.36E-16
cm246	4.36E-21	2.57E-20	7.88E-20	2.00E-19	4.46E-19	4.46E-19
cm247	9.86E-24	4.97E-23	1.84E-24	3.48E-24	1.40E-23	1.40E-23
cm248	1.49E-29	9.49E-29	4.24E-28	1.69E-27	4.38E-27	4.38E-27
cm249	4.82E-40	3.03E-39	1.35E-38	4.74E-38	1.39E-37	1.39E-37
cm250	1.40E-45	1.54E-44	8.03E-44	3.69E-43	1.23E-42	1.23E-42
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.80E+08	2.80E+08	2.80E+08	2.80E+08	2.79E-07

0 1q array has 20 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 4q array has 1 entries.
0 54q array has 12 entries.
library information....

cross-section data taken from position number 3 of library on unit 33.

```
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ************************************************************************
          *                                                                      *
          *            preliminary origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries . *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                      *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                      *
          *                    fission product yields are from endf/b-v          *
          *                                                                      *
          *                photon libraries use an 18-energy-group structure     *
          *               the photon data are from the master photon data base,  *
          *                produced to include bremsstrahlung from uo2 matrix    *
          *                                                                      *
          *         see information above this box (if present) for later updates *
          *                                                                      *
          ************************************************************************
          *                                                                      *
0         ************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ************************************************************************
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   23
         power=    .00mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
0                                                  basic =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial      821813. d      913125. d      ******* d      ******* d      ******* d
     productions  1.133886E+06  1.135393E+06  1.136859E+06  1.138285E+06  1.139671E+06  1.139671E+06
     absorptions  9.323096E+05  9.334989E+05  9.346394E+05  9.357402E+05  9.368058E+05  9.368058E+05
     k infinity   1.216212E+00  1.216277E+00  1.216341E+00  1.216455E+00  1.216550E+00  1.216550E+00
0                  initial      821813. d      913125. d      ******* d      ******* d      ******* d
     actinide
     absorptions  9.229046E+05  9.238316E+05  9.247386E+05  9.256261E+05  9.264941E+05  9.264941E+05
     non-actinide
     abs. fracs.  1.008779E-02  1.033595E-02  1.059318E-02  1.080871E-02  1.100731E-02  1.100731E-02
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   24
0                                 fraction of total absorption rate
         power=    .00mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
```

```
0              initial 821813. d 913125. d ******* d ******* d ******* d

     sm149     5.01E-03  5.11E-03  5.18E-03  5.23E-03  5.27E-03  5.27E-03
     eu151     3.83E-04  4.29E-04  4.74E-04  5.17E-04  5.60E-04  5.60E-04
     nd143     2.88E-04  3.24E-04  3.59E-04  3.94E-04  4.29E-04  4.29E-04
     rh103     1.38E-04  1.55E-04  1.72E-04  1.89E-04  2.06E-04  2.06E-04
     gd155     1.24E-04  1.33E-04  1.41E-04  1.48E-04  1.54E-04  1.54E-04
     xe131     9.27E-05  1.04E-04  1.14E-04  1.27E-04  1.38E-04  1.38E-04
     cs133     7.18E-05  8.07E-05  8.95E-05  9.83E-05  1.07E-04  1.07E-04
     cd113     6.09E-05  7.27E-05  7.59E-05  7.87E-05  8.11E-05  8.11E-05
     sm147     5.31E-05  5.96E-05  6.62E-05  7.27E-05  7.92E-05  7.92E-05
     tc 99     5.27E-05  5.92E-05  6.57E-05  7.21E-05  7.85E-05  7.85E-05
     nd145     4.08E-05  4.58E-05  5.08E-05  5.57E-05  6.07E-05  6.07E-05
     gd157     4.20E-05  4.32E-05  4.43E-05  4.53E-05  4.64E-05  4.64E-05
     mo 95     2.83E-05  3.18E-05  3.52E-05  3.87E-05  4.22E-05  4.22E-05
     sm151     4.02E-05  4.02E-05  4.03E-05  4.04E-05  4.05E-05  4.05E-05
     sm152     2.40E-05  2.73E-05  3.06E-05  3.39E-05  3.73E-05  3.73E-05
     kr 83     1.75E-05  1.97E-05  2.18E-05  2.39E-05  2.60E-05  2.60E-05
     sm150     1.44E-05  1.72E-05  1.99E-05  2.25E-05  2.52E-05  2.52E-05
     cs135     1.42E-05  1.82E-05  2.02E-05  2.22E-05  2.42E-05  2.42E-05
     ru101     1.26E-05  1.42E-05  1.57E-05  1.73E-05  1.89E-05  1.89E-05
     pr141     1.20E-05  1.35E-05  1.50E-05  1.65E-05  1.79E-05  1.79E-05
     eu153     1.12E-05  1.26E-05  1.41E-05  1.55E-05  1.69E-05  1.69E-05
     la139     9.82E-06  1.10E-05  1.22E-05  1.34E-05  1.46E-05  1.46E-05
     ba137     4.60E-06  5.18E-06  5.76E-06  6.34E-06  6.92E-06  6.92E-06
     pd105     4.41E-06  4.99E-06  5.57E-06  6.15E-06  6.74E-06  6.74E-06
     zr 93     3.89E-06  4.48E-06  4.97E-06  5.46E-06  5.94E-06  5.94E-06
      i129     3.09E-06  3.47E-06  3.86E-06  4.25E-06  4.63E-06  4.63E-06
     nd144     2.95E-06  3.32E-06  3.68E-06  4.05E-06  4.41E-06  4.41E-06
     ag109     2.51E-06  2.94E-06  3.40E-06  3.88E-06  4.39E-06  4.39E-06
     mo 97     2.23E-06  2.51E-06  2.78E-06  3.05E-06  3.33E-06  3.33E-06
     xe135     2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06
     sr 91     1.04E-06  1.17E-06  1.30E-06  1.43E-06  1.55E-06  1.55E-06
      y 89     9.99E-07  1.12E-06  1.24E-06  1.36E-06  1.49E-06  1.49E-06
     ru102     9.13E-07  1.03E-06  1.14E-06  1.25E-06  1.37E-06  1.37E-06
     ce142     8.16E-07  9.16E-07  1.02E-06  1.12E-06  1.22E-06  1.22E-06
     pd108     7.18E-07  8.30E-07  9.48E-07  1.07E-06  1.20E-06  1.20E-06
     nd148     7.85E-07  8.55E-07  9.82E-07  1.08E-06  1.18E-06  1.18E-06
     nd146     6.59E-07  7.40E-07  8.21E-07  9.02E-07  9.83E-07  9.83E-07
     gd152     4.23E-07  5.36E-07  6.66E-07  8.06E-07  9.58E-07  9.58E-07
     in115     5.58E-07  6.59E-07  7.00E-07  7.71E-07  8.42E-07  8.42E-07
     ba138     5.62E-07  6.32E-07  7.01E-07  7.70E-07  8.39E-07  8.39E-07
     ce140     5.27E-07  5.92E-07  6.56E-07  7.21E-07  7.86E-07  7.86E-07
     xe132     4.78E-07  5.37E-07  5.97E-07  6.56E-07  7.15E-07  7.15E-07
     pd107     3.93E-07  4.32E-07  5.12E-07  5.75E-07  6.40E-07  6.40E-07
     mo 98     3.29E-07  3.70E-07  4.11E-07  4.51E-07  4.92E-07  4.92E-07
     mo100     3.18E-07  3.57E-07  3.96E-07  4.36E-07  4.75E-07  4.75E-07
     xe134     3.11E-07  3.50E-07  3.88E-07  4.26E-07  4.65E-07  4.65E-07
     zr 92     2.57E-07  2.82E-07  3.13E-07  3.44E-07  3.74E-07  3.74E-07
      i127     2.14E-07  2.41E-07  2.69E-07  2.97E-07  3.25E-07  3.25E-07
     ru104     2.01E-07  2.26E-07  2.52E-07  2.78E-07  3.03E-07  3.03E-07
1    sas2h: far-field crit based on bbu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  25
0                                fraction of total absorption rate
       power=    .00mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
0              initial 821813. d 913125. d ******* d ******* d ******* d

     zr 96     2.01E-07  2.25E-07  2.50E-07  2.74E-07  2.99E-07  2.99E-07
     pm147     2.68E-07  2.68E-07  2.67E-07  2.67E-07  2.66E-07  2.66E-07
     nd150     1.76E-07  1.98E-07  2.20E-07  2.41E-07  2.63E-07  2.63E-07
     xe136     1.69E-07  1.89E-07  2.10E-07  2.31E-07  2.52E-07  2.52E-07
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br 81	1.27E-07	1.42E-07	1.58E-07	1.73E-07	1.89E-07	1.89E-07
rb 85	1.23E-07	1.38E-07	1.53E-07	1.68E-07	1.83E-07	1.83E-07
eu155	1.72E-07	1.73E-07	1.75E-07	1.76E-07	1.78E-07	1.78E-07
zr 94	1.07E-07	1.20E-07	1.34E-07	1.47E-07	1.60E-07	1.60E-07
cd111	9.61E-08	1.10E-07	1.24E-07	1.38E-07	1.53E-07	1.53E-07
eu152	9.97E-08	1.12E-07	1.23E-07	1.34E-07	1.45E-07	1.45E-07
zr 90	9.66E-08	1.09E-07	1.21E-07	1.33E-07	1.45E-07	1.45E-07
sm154	7.68E-08	8.66E-08	9.65E-08	1.06E-07	1.16E-07	1.16E-07
te130	7.68E-08	8.63E-08	9.58E-08	1.05E-07	1.15E-07	1.15E-07
rb 87	7.11E-08	7.98E-08	8.84E-08	9.71E-08	1.06E-07	1.06E-07
se 77	5.05E-08	5.68E-08	6.30E-08	6.92E-08	7.54E-08	7.54E-08
pd106	4.04E-08	4.59E-08	5.15E-08	5.73E-08	6.31E-08	6.31E-08
ru 99	2.75E-08	3.47E-08	4.27E-08	5.15E-08	6.12E-08	6.12E-08
kr 84	3.37E-08	3.79E-08	4.20E-08	4.61E-08	5.02E-08	5.02E-08
gd156	2.67E-08	3.14E-08	3.63E-08	4.14E-08	4.66E-08	4.66E-08
se 79	2.59E-08	2.91E-08	3.23E-08	3.55E-08	3.87E-08	3.87E-08
sb121	2.55E-08	2.87E-08	3.19E-08	3.52E-08	3.84E-08	3.84E-08
gd154	1.50E-08	1.90E-08	2.34E-08	2.83E-08	3.37E-08	3.37E-08
sb123	2.06E-08	2.33E-08	2.59E-08	2.85E-08	3.11E-08	3.11E-08
kr 86	1.86E-08	2.09E-08	2.32E-08	2.55E-08	2.77E-08	2.77E-08
dy161	1.59E-08	1.86E-08	2.14E-08	2.44E-08	2.75E-08	2.75E-08
te128	1.70E-08	1.92E-08	2.13E-08	2.35E-08	2.56E-08	2.56E-08
se 80	1.21E-08	1.36E-08	1.51E-08	1.66E-08	1.80E-08	1.80E-08
te125	1.10E-08	1.24E-08	1.38E-08	1.52E-08	1.67E-08	1.67E-08
sr 90	1.66E-08	1.65E-08	1.65E-08	1.64E-08	1.64E-08	1.64E-08
tb159	8.73E-09	1.00E-08	1.13E-08	1.27E-08	1.41E-08	1.41E-08
cd112	7.51E-09	8.32E-09	9.14E-09	1.06E-08	1.16E-08	1.16E-08
gd158	6.61E-09	7.67E-09	8.77E-09	9.89E-09	1.10E-08	1.10E-08
ru100	4.78E-09	6.02E-09	7.40E-09	8.92E-09	1.06E-08	1.06E-08
li 6	6.79E-09	7.62E-09	8.44E-09	9.26E-09	1.01E-08	1.01E-08
rh103	9.10E-09	9.19E-09	9.27E-09	9.36E-09	9.45E-09	9.45E-09
sn117	5.74E-09	6.49E-09	7.24E-09	8.00E-09	8.77E-09	8.77E-09
eu154	5.71E-09	6.41E-09	7.13E-09	7.85E-09	8.57E-09	8.57E-09
nd142	3.29E-09	4.16E-09	5.12E-09	6.19E-09	7.35E-09	7.35E-09
ba134	3.22E-09	4.06E-09	4.99E-09	6.02E-09	7.15E-09	7.15E-09
sn119	4.61E-09	5.20E-09	5.78E-09	6.37E-09	6.97E-09	6.97E-09
sm148	2.97E-09	3.76E-09	4.60E-09	5.55E-09	6.58E-09	6.58E-09
cd114	3.87E-09	4.48E-09	5.10E-09	5.74E-09	6.39E-09	6.39E-09
sn115	4.22E-09	4.75E-09	5.29E-09	5.83E-09	6.38E-09	6.38E-09
ba135	2.61E-09	3.29E-09	4.06E-09	4.91E-09	5.84E-09	5.84E-09
dy164	2.91E-09	3.48E-09	4.10E-09	4.73E-09	5.45E-09	5.45E-09
sr 88	3.43E-09	3.85E-09	4.24E-09	4.68E-09	5.09E-09	5.09E-09
dy162	2.72E-09	3.24E-09	3.79E-09	4.37E-09	5.00E-09	5.00E-09
pd104	2.22E-09	2.80E-09	3.46E-09	4.18E-09	4.96E-09	4.96E-09
pd110	3.44E-09	3.49E-09	3.95E-09	4.43E-09	4.92E-09	4.92E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% b2o/ 8% uo2 fission products page 26
0 fraction of total absorption rate
0 power= .00mw, burnup= 4383.mwd, flux= 2.71E+08n/cm**2-sec
0 initial 821813. d 913125. d ******* d ******* d ******* d

cs137	3.73E-09	3.72E-09	3.72E-09	3.71E-09	3.71E-09	3.71E-09
se 82	2.33E-09	2.62E-09	2.90E-09	3.19E-09	3.47E-09	3.47E-09
sn126	1.98E-09	2.24E-09	2.50E-09	2.77E-09	3.03E-09	3.03E-09
se 78	1.79E-09	2.01E-09	2.23E-09	2.45E-09	2.68E-09	2.68E-09
pr143	2.61E-09	2.60E-09	2.60E-09	2.59E-09	2.59E-09	2.59E-09
sn124	1.48E-09	1.67E-09	1.86E-09	2.05E-09	2.24E-09	2.24E-09
xe133	1.98E-09	1.98E-09	1.98E-09	1.97E-09	1.97E-09	1.97E-09
mo 96	6.61E-10	1.07E-09	1.50E-09	1.54E-09	1.62E-09	1.62E-09
se 76	1.06E-09	1.19E-09	1.32E-09	1.46E-09	1.59E-09	1.59E-09
ce141	1.56E-09	1.56E-09	1.56E-09	1.56E-09	1.55E-09	1.55E-09

ba136	8.52E-10	9.96E-10	1.15E-09	1.31E-09	1.48E-09	1.48E-09
in113	8.19E-10	9.25E-10	1.03E-09	1.14E-09	1.25E-09	1.25E-09
dy163	6.61E-10	7.90E-10	9.29E-10	1.08E-09	1.23E-09	1.23E-09
kr 82	6.07E-10	7.22E-10	8.45E-10	9.76E-10	1.11E-09	1.11E-09
xe130	5.38E-10	6.53E-10	7.78E-10	9.14E-10	1.06E-09	1.06E-09
cd110	4.04E-10	5.27E-10	6.69E-10	8.33E-10	1.02E-09	1.02E-09
pm149	9.62E-10	9.61E-10	9.60E-10	9.59E-10	9.58E-10	9.58E-10
nb 93	4.16E-10	5.26E-10	6.49E-10	7.85E-10	9.33E-10	9.33E-10
nd147	9.19E-10	9.18E-10	9.16E-10	9.15E-10	9.14E-10	9.14E-10
sn118	6.84E-10	6.81E-10	7.58E-10	8.36E-10	9.14E-10	9.14E-10
cs134	5.35E-10	5.97E-10	6.62E-10	7.27E-10	7.91E-10	7.91E-10
cd116	5.10E-10	5.75E-10	6.39E-10	7.04E-10	7.70E-10	7.70E-10
sn122	5.08E-10	5.72E-10	6.37E-10	7.02E-10	7.68E-10	7.68E-10
ce144	5.88E-10	5.86E-10	5.85E-10	5.84E-10	5.82E-10	5.82E-10
sn120	3.79E-10	4.27E-10	4.75E-10	5.24E-10	5.72E-10	5.72E-10
kr 83	5.56E-10	5.55E-10	5.53E-10	5.52E-10	5.50E-10	5.50E-10
br 79	2.12E-10	2.68E-10	3.31E-10	4.00E-10	4.75E-10	4.75E-10
ge 73	2.93E-10	3.29E-10	3.66E-10	4.03E-10	4.39E-10	4.39E-10
ru103	3.63E-10	3.64E-10	3.65E-10	3.66E-10	3.66E-10	3.66E-10
ag107	1.31E-10	1.69E-10	2.11E-10	2.59E-10	3.13E-10	3.13E-10
xe129	1.21E-10	1.53E-10	1.89E-10	2.29E-10	2.73E-10	2.73E-10
te126	1.26E-10	1.52E-10	1.81E-10	2.12E-10	2.45E-10	2.45E-10
zr 95	1.63E-10	1.62E-10	1.62E-10	1.62E-10	1.61E-10	1.61E-10
ge 76	1.05E-10	1.18E-10	1.30E-10	1.43E-10	1.56E-10	1.56E-10
nb 95	1.50E-10	1.50E-10	1.49E-10	1.49E-10	1.49E-10	1.49E-10
gd160	8.73E-11	1.01E-10	1.15E-10	1.29E-10	1.45E-10	1.45E-10
y 91	1.39E-10	1.38E-10	1.38E-10	1.38E-10	1.37E-10	1.37E-10
pm151	1.10E-10	1.10E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
ho165	4.82E-11	5.80E-11	6.86E-11	8.01E-11	9.24E-11	9.24E-11
ba140	4.65E-11	4.64E-11	4.63E-11	4.62E-11	4.62E-11	4.62E-11
eu154	3.98E-11	4.05E-11	4.11E-11	4.18E-11	4.24E-11	4.24E-11
sm153	3.98E-11	4.00E-11	4.02E-11	4.04E-11	4.07E-11	4.07E-11
dy160	1.75E-11	2.22E-11	2.76E-11	3.37E-11	4.03E-11	4.03E-11
ru106	3.06E-11	3.11E-11	3.17E-11	3.23E-11	3.28E-11	3.28E-11
sr 89	2.97E-11	2.96E-11	2.95E-11	2.94E-11	2.93E-11	2.93E-11
xe128	1.25E-11	1.57E-11	1.93E-11	2.33E-11	2.77E-11	2.77E-11
te124	1.33E-11	1.76E-11	2.00E-11	2.25E-11	2.51E-11	2.51E-11
kr 87	2.22E-11	2.21E-11	2.20E-11	2.20E-11	2.19E-11	2.19E-11
sr 87	1.24E-11	1.39E-11	1.55E-11	1.71E-11	1.87E-11	1.87E-11

1 ass2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 27
0 fraction of total absorption rate
powers .00mw, burnup= 4383.mwd, flux= 2.71E+08n/cm**2-sec
8 initial 821813. d 913125. d ******* d ******* d ******* d

sr 86	9.18E-12	1.11E-11	1.32E-11	1.35E-11	1.79E-11	1.79E-11
ce143	1.71E-11	1.71E-11	1.70E-11	1.70E-11	1.70E-11	1.70E-11
sb125	1.58E-11	1.59E-11	1.60E-11	1.61E-11	1.62E-11	1.62E-11
y 90	1.58E-11	1.57E-11	1.56E-11	1.56E-11	1.55E-11	1.55E-11
la140	1.51E-11	1.51E-11	1.50E-11	1.50E-11	1.50E-11	1.50E-11
mo 99	1.30E-11	1.29E-11	1.29E-11	1.29E-11	1.29E-11	1.29E-11
nb 94	7.16E-12	8.89E-12	9.85E-12	1.00E-11	1.10E-11	1.10E-11
sn114	4.71E-12	5.96E-12	7.35E-12	8.89E-12	1.06E-11	1.06E-11
pm148m	9.60E-12	9.56E-12	9.56E-12	9.56E-12	9.57E-12	9.57E-12
ge 74	5.88E-12	6.61E-12	7.35E-12	8.08E-12	8.82E-12	8.82E-12
te127m	7.87E-12	7.93E-12	7.98E-12	8.03E-12	8.08E-12	8.08E-12
i131	6.73E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12
se 76	3.68E-12	4.73E-12	5.02E-12	5.75E-12	6.52E-12	6.52E-12
ge 72	4.05E-12	4.57E-12	5.09E-12	5.62E-12	6.15E-12	6.15E-12
er166	2.38E-12	3.92E-12	3.91E-12	4.15E-12	4.04E-12	4.04E-12
te122	1.98E-12	2.49E-12	3.07E-12	3.71E-12	4.41E-12	4.41E-12

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     te129m    1.81E-12  1.82E-12  1.82E-12  1.82E-12  1.83E-12  1.83E-12
     ag111     4.21E-13  4.32E-13  4.44E-13  4.55E-13  4.66E-13  4.66E-13
     kr 80     2.40E-13  2.45E-13  2.35E-13  2.89E-13  4.48E-13  4.48E-13
     eu157     3.05E-13  3.73E-13  3.80E-13  3.88E-13  3.96E-13  3.96E-13
     pm148     3.71E-13  3.68E-13  3.68E-13  3.67E-13  3.67E-13  3.67E-13
     cd115m    2.67E-13  2.48E-13  2.49E-13  2.51E-13  2.52E-13  2.52E-13
     er167     5.18E-14  6.86E-14  8.84E-14  1.11E-13  1.38E-13  1.38E-13
     cs136     1.09E-13  1.16E-13  1.22E-13  1.28E-13  1.35E-13  1.35E-13
     te123     3.26E-14  4.03E-14  5.14E-14  6.22E-14  7.66E-14  7.66E-14
     tb160     2.39E-14  2.71E-14  3.05E-14  3.39E-14  3.75E-14  3.75E-14
     ru105     3.24E-14  3.27E-14  3.31E-14  3.34E-14  3.37E-14  3.37E-14
     sb125     3.01E-14  3.02E-14  3.04E-14  3.05E-14  3.06E-14  3.06E-14
     pr142     1.36E-14  1.52E-14  1.49E-14  1.85E-14  2.01E-14  2.01E-14
     be  9     1.33E-14  1.49E-14  1.65E-14  1.82E-14  1.98E-14  1.98E-14
     rb 88     1.25E-14  1.24E-14  1.24E-14  1.24E-14  1.23E-14  1.23E-14
     sn123     1.02E-14  1.03E-14  1.03E-14  1.03E-14  1.03E-14  1.03E-14
      1135     9.97E-15  9.96E-15  9.95E-15  9.93E-15  9.92E-15  9.92E-15
     te132     9.45E-15  9.45E-15  9.44E-15  9.43E-15  9.43E-15  9.43E-15
     sb126     6.46E-15  6.89E-15  7.33E-15  7.76E-15  8.19E-15  8.19E-15
     li  7     5.30E-15  5.96E-15  6.61E-15  7.27E-15  7.92E-15  7.92E-15
     cd108     2.20E-15  3.04E-15  4.07E-15  5.33E-15  6.83E-15  6.83E-15
     te134     5.70E-15  5.69E-15  5.67E-15  5.66E-15  5.65E-15  5.65E-15
      1130     3.21E-15  3.52E-15  3.82E-15  4.12E-15  4.42E-15  4.42E-15
     sb124     3.13E-15  3.25E-15  3.38E-15  3.50E-15  3.63E-15  3.63E-15
     sn114     1.16E-15  1.46E-15  1.81E-15  2.19E-15  2.61E-15  2.61E-15
     in117m    2.26E-15  2.28E-15  2.30E-15  2.32E-15  2.34E-15  2.34E-15
     rb 86     1.04E-15  1.13E-15  1.23E-15  1.33E-15  1.42E-15  1.42E-15
     dy165     7.37E-16  8.24E-16  8.92E-16  9.60E-16  1.03E-15  1.03E-15
     in117     6.69E-16  6.75E-16  6.82E-16  6.88E-16  6.94E-16  6.94E-16
     cs134m    1.00E-16  1.12E-16  1.24E-16  1.36E-16  1.48E-16  1.48E-16
     cd118     1.25E-16  1.26E-16  1.26E-16  1.27E-16  1.27E-16  1.27E-16
     gr 75     8.90E-17  8.49E-17  8.48E-17  8.47E-17  8.46E-17  8.46E-17
     in119m    3.10E-17  3.11E-17  3.12E-17  3.13E-17  3.14E-17  3.14E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  28
0                                  fraction of total absorption rate
         power=      .00mw, burnup=      4383.mwd, flux= 2.71E+08n/cm**2-sec
0              initial 821813. d 913125. d ******* d ******* d ******* d

     ag110     3.29E-18  3.83E-18  4.42E-18  5.04E-18  5.70E-18  5.70E-18
     cd109     3.53E-18  3.92E-18  4.32E-18  4.72E-18  5.12E-18  5.12E-18
     in119     2.47E-18  2.48E-18  2.49E-18  2.51E-18  2.52E-18  2.52E-18
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  29
       power= 4.000E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
              charge 821813. d 913125. d ******* d ******* d ******* d
      h  1   1.75E-04  1.97E-04  2.18E-04  2.40E-04  2.61E-04  2.61E-04
      h  2   5.20E-07  5.84E-07  6.48E-07  7.13E-07  7.77E-07  7.77E-07
      h  3   3.89E-11  3.95E-11  4.00E-11  4.06E-11  4.11E-11  4.11E-11
      h  4   1.56E-34  1.59E-34  1.61E-34  1.63E-34  1.65E-34  1.65E-34
     he  3   3.76E-09  4.19E-09  4.61E-09  5.02E-09  5.43E-09  5.43E-09
     he  4   2.90E-05  3.25E-05  3.61E-05  3.97E-05  4.32E-05  4.32E-05
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   3.48E-06  3.91E-06  4.34E-06  4.76E-06  5.19E-06  5.19E-06
     ne 21   3.38E-10  3.87E-10  3.62E-10  4.33E-10  5.10E-10  5.10E-10
     ne 22   3.30E-08  3.88E-08  3.87E-08  3.15E-08  3.43E-08  3.43E-08
     ne 23   7.15E-15  7.14E-15  7.13E-15  7.13E-15  7.12E-15  7.12E-15
     na 22   4.21E-11  4.21E-11  4.20E-11  4.20E-11  4.20E-11  4.20E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
```

na 24	3.07E-08	2.86E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08
na 24m	5.04E-15	4.69E-15	4.69E-15	4.68E-15	4.68E-15	4.68E-15
na 25	7.88E-25	9.63E-25	1.16E-24	1.38E-24	1.61E-24	1.61E-24
mg 24	2.78E-02	3.08E-02	3.37E-02	3.67E-02	3.97E-02	3.97E-02
mg 25	2.70E-08	3.33E-08	4.02E-08	4.76E-08	5.57E-08	5.57E-08
mg 26	5.20E-07	5.84E-07	6.48E-07	7.12E-07	7.76E-07	7.76E-07
mg 27	2.13E-12	2.13E-12	2.13E-12	2.13E-12	2.13E-12	2.13E-12
mg 28	4.31E-24	4.30E-24	4.29E-24	4.28E-24	4.28E-24	4.28E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.27E-10	2.12E-10	2.11E-10	2.11E-10	2.11E-10	2.11E-10
al 29	5.65E-23	7.00E-23	8.55E-23	1.02E-22	1.20E-22	1.20E-22
al 30	2.11E-33	2.95E-33	4.01E-33	5.29E-33	6.81E-33	6.81E-33
si 28	8.10E-02	8.96E-02	9.82E-02	1.07E-01	1.15E-01	1.15E-01
si 29	2.16E-07	2.70E-07	3.30E-07	3.95E-07	4.66E-07	4.66E-07
si 30	6.04E-13	8.52E-13	1.16E-12	1.53E-12	1.97E-12	1.97E-12
si 31	4.29E-25	6.06E-25	8.23E-25	1.09E-24	1.40E-24	1.40E-24
si 32	3.34E-31	7.81E-31	1.09E-30	1.47E-30	1.93E-30	1.93E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.72E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

0
1

sas2h: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 30
power= 4.000E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge 821813. d 913125. d ******* d ******* d ******* d

he 4	7.42E-01	8.77E-01	1.02E+00	1.17E+00	1.33E+00	1.33E+00
pb206	1.09E-04	1.32E-04	2.04E-04	2.66E-04	3.38E-04	3.38E-04
pb207	3.01E-05	3.81E-05	4.72E-05	5.71E-05	6.81E-05	6.81E-05
pb208	4.87E-06	6.16E-06	7.59E-06	9.17E-06	1.09E-05	1.09E-05
pb209	5.23E-12	6.56E-12	8.03E-12	9.64E-12	1.16E-11	1.16E-11
pb210	5.01E-06	6.15E-06	7.37E-06	8.66E-06	1.00E-05	1.00E-05
pb211	3.03E-12	3.41E-12	3.79E-12	4.17E-12	4.55E-12	4.55E-12
pb212	8.40E-12	9.44E-12	1.05E-11	1.15E-11	1.26E-11	1.26E-11
pb214	1.15E-11	1.41E-11	1.68E-11	1.98E-11	2.29E-11	2.29E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.62E-06	9.37E-06	1.28E-05	1.69E-05	2.18E-05	2.18E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.05E-09	3.79E-09	4.54E-09	5.33E-09	6.17E-09	6.17E-09
bi211	1.80E-13	2.02E-13	2.25E-13	2.47E-13	2.70E-13	2.70E-13
bi212	7.97E-13	8.96E-13	9.94E-13	1.09E-12	1.19E-12	1.19E-12
bi213	1.22E-12	1.53E-12	1.88E-12	2.25E-12	2.66E-12	2.66E-12
bi214	8.50E-12	1.04E-11	1.23E-11	1.47E-11	1.70E-11	1.70E-11
po210	8.52E-08	1.05E-07	1.23E-07	1.47E-07	1.70E-07	1.70E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.99E-18	2.73E-18	2.48E-18	2.73E-18	2.98E-18	2.98E-18
po212	4.19E-23	4.71E-23	5.22E-23	5.74E-23	6.26E-23	6.26E-23
po213	1.86E-21	2.00E-21	2.02E-21	2.33E-21	2.09E-21	2.09E-21
po214	1.17E-18	1.44E-18	1.72E-18	2.02E-18	2.34E-18	2.34E-18
po215	2.49E-18	2.80E-18	3.12E-18	3.43E-18	3.74E-18	3.74E-18
po216	3.18E-17	3.37E-17	3.97E-17	4.36E-17	4.75E-17	4.75E-17
po218	1.32E-12	1.63E-12	1.95E-12	2.29E-12	2.65E-12	2.65E-12
rn218	1.24E-28	1.39E-28	1.54E-28	1.69E-28	1.84E-28	1.84E-28
rn219	3.34E-15	4.24E-15	5.03E-15	7.63E-15	8.33E-15	8.33E-15
rn220	1.22E-14	1.37E-14	1.52E-14	1.67E-14	1.82E-14	1.82E-14
rn222	2.35E-09	2.89E-09	3.46E-09	4.07E-09	4.70E-09	4.70E-09
ra222	1.35E-25	1.50E-25	1.67E-25	1.83E-25	2.00E-25	2.00E-25
ra223	1.38E-09	1.56E-09	1.73E-09	1.90E-09	2.08E-09	2.08E-09
ra224	6.94E-11	7.79E-11	8.65E-11	9.51E-11	1.04E-10	1.04E-10
ra225	5.71E-10	7.17E-10	8.77E-10	1.05E-09	1.24E-09	1.24E-09
ra226	3.60E-04	4.42E-04	5.29E-04	6.22E-04	7.19E-04	7.19E-04

pa228	4.25E-12	4.79E-12	5.32E-12	5.86E-12	6.40E-12	6.40E-12
ac225	3.86E-10	4.84E-10	5.83E-10	7.11E-10	8.39E-10	8.39E-10
ac227	9.61E-07	1.08E-06	1.20E-06	1.32E-06	1.44E-06	1.44E-06
ac228	5.19E-14	5.84E-14	6.49E-14	7.15E-14	7.81E-14	7.81E-14
th226	6.59E-24	7.34E-24	8.14E-24	8.94E-24	9.73E-24	9.73E-24
th227	2.23E-09	2.31E-09	2.79E-09	3.07E-09	3.35E-09	3.35E-09
th228	1.32E-08	1.49E-08	1.65E-08	1.82E-08	1.98E-08	1.98E-08
th229	1.11E-04	1.59E-04	1.71E-04	2.05E-04	2.42E-04	2.42E-04
th230	5.13E-02	5.77E-02	6.41E-02	7.06E-02	7.71E-02	7.71E-02
th231	3.20E-09	3.22E-09	3.24E-09	3.26E-09	3.28E-09	3.28E-09
th232	1.04E-02	1.17E-02	1.30E-02	1.43E-02	1.56E-02	1.56E-02
th233	9.50E-14	1.07E-13	1.19E-13	1.30E-13	1.42E-13	1.42E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.45E-03	1.63E-03	1.81E-03	1.99E-03	2.17E-03	2.17E-03
pa232	2.46E-11	2.77E-11	3.08E-11	3.38E-11	3.69E-11	3.69E-11

1

ass2h: far-field crit based on btw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 31
power= 4.000E-03aw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 821813. d	913125. d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.39E-21	7.11E-21	7.89E-21	8.66E-21	9.43E-21	9.43E-21
u231	2.09E-17	2.32E-17	2.57E-17	2.82E-17	3.07E-17	3.07E-17
u232	4.82E-07	5.42E-07	6.01E-07	6.61E-07	7.21E-07	7.21E-07
u233	2.69E-02	3.02E-02	3.35E-02	3.68E-02	4.00E-02	4.00E-02
u234	9.32E+00	9.35E+00	9.39E+00	9.42E+00	9.46E+00	9.46E+00
u235	7.16E+02	7.16E+02	7.12E+02	7.11E+02	7.09E+02	7.09E+02
u236	1.77E+02	1.77E+02	1.77E+02	1.77E+02	1.78E+02	1.78E+02
u237	3.19E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	3.21E-07	3.19E-07	3.19E-07	3.19E-07	3.18E-07	3.18E-07
u240	.00E+00	1.03E-40	3.08E-40	6.16E-40	1.23E-39	1.23E-39
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.83E-12	8.77E-12	8.74E-12	8.73E-12	8.73E-12	8.73E-12
np236m	2.10E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12
np236	4.03E-07	4.52E-07	5.00E-07	5.49E-07	5.97E-07	5.97E-07
np237	4.20E+01	4.20E+01	4.19E+01	4.19E+01	4.19E+01	4.19E+01
np238	1.55E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06
np239	4.44E-05	4.61E-05	4.61E-05	4.61E-05	4.60E-05	4.60E-05
np240m	.00E+00	8.76E-43	2.63E-42	5.25E-42	1.14E-41	1.14E-41
np240	9.41E-15	9.32E-15	9.31E-15	9.29E-15	9.27E-15	9.27E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.14E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	3.16E-13	3.23E-13	3.32E-13	3.41E-13	3.49E-13	3.49E-13
pu238	2.34E-02	2.34E-02	2.33E-02	2.33E-02	2.33E-02	2.33E-02
pu239	9.55E+00	1.06E+01	1.17E+01	1.28E+01	1.38E+01	1.38E+01
pu240	8.79E-02	1.09E-01	1.33E-01	1.58E-01	1.83E-01	1.83E-01
pu241	3.67E-05	4.52E-05	5.48E-05	6.52E-05	7.62E-05	7.62E-05
pu242	1.14E-06	1.49E-06	2.40E-06	3.28E-06	4.36E-06	4.36E-06
pu243	2.43E-15	3.60E-15	5.10E-15	6.97E-15	9.24E-15	9.24E-15
pu244	1.80E-30	5.23E-30	1.35E-29	3.17E-29	6.88E-29	6.88E-29
pu245	7.64E-41	2.29E-40	5.35E-40	1.30E-39	2.75E-39	2.75E-39
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.74E-19	2.26E-19	2.87E-19	3.53E-19	4.29E-19	4.29E-19
am240	7.05E-17	1.04E-16	1.31E-16	1.62E-16	1.96E-16	1.96E-16
am241	6.18E-04	8.11E-04	1.03E-03	1.27E-03	1.54E-03	1.54E-03

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     am242m  2.51E-07  3.38E-07  4.39E-07  5.52E-07  6.77E-07  6.77E-07
     am242   2.67E-11  3.24E-11  4.12E-11  5.10E-11  6.18E-11  6.18E-11
     am243   4.82E-09  7.58E-09  1.13E-08  1.62E-08  2.23E-08  2.23E-08
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   3.71E-17  5.80E-17  8.66E-17  1.23E-16  1.70E-16  1.70E-16
     am245   1.49E-41  5.97E-41  1.34E-40  2.98E-40  6.27E-40  6.27E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.47E-21  1.92E-21  2.44E-21  3.02E-21  3.65E-21  3.65E-21
     cm242   4.98E-09  6.54E-09  8.32E-09  1.03E-08  1.25E-08  1.25E-08
     cm243   3.00E-18  4.12E-18  5.40E-18  6.87E-18  8.50E-18  8.50E-18
     cm244   5.83E-13  9.11E-13  1.36E-12  1.94E-12  2.67E-12  2.67E-12
1
     sas2h: fer-field crit based on btu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   32
       power= 4.000E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge 821813. d 913125. d ******* d ******* d ******* d
     cm245   2.36E-16  4.20E-16  6.98E-16  1.10E-15  1.66E-15  1.66E-15
     cm246   4.46E-19  8.95E-19  1.66E-18  2.87E-18  4.73E-18  4.73E-18
     cm247   1.40E-23  3.18E-23  6.37E-23  1.26E-22  2.28E-22  2.28E-22
     cm248   4.38E-27  1.12E-26  2.39E-26  5.51E-26  1.09E-25  1.09E-25
     cm249   1.39E-37  3.55E-37  8.19E-37  1.74E-36  3.43E-36  3.43E-36
     cm250   1.25E-42  3.60E-42  9.87E-42  2.17E-41  4.70E-41  4.70E-41
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.72E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       34q array has       12 entries.
library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
```

```
*                 fission product yields are from endf/b-v                 *
*                                                                          *
*            photon libraries use an 18-energy-group structure             *
*           the photon data are from the master photon data base,          *
*            produced to include bremsstrahlung from uo2 matrix            *
*                                                                          *
*       see information above this box (if present) for later updates      *
*                                                                          *
****************************************************************************
*                                                                          *
****************************************************************************
0          .other identification and sizes of library.
0           date set name:  fe33f001
0         6/28/1996    date library was produced
0              1697    total number of nuclides in library
                689    number of light-element nuclides
                129    number of actinide nuclides
                879    number of fission product nuclides
0              7993    number of nonzero off-diagonal matrix elements
0     ****************************************************************
0
1   sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  33
      powers    .00mw, burnup=   5844.mwd, flux= 2.68E+08n/cm**2-sec
0                                   basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
    productions  1.150207E+06  1.151651E+06  1.152966E+06  1.154243E+06  1.155483E+06  1.155483E+06
    absorptions  9.452068E+05  9.462478E+05  9.472621E+05  9.482513E+05  9.492169E+05  9.492169E+05
    k infinity   1.216979E+00  1.217071E+00  1.217156E+00  1.217234E+00  1.217302E+00  1.217302E+00
                  initial      ******* d      ******* d      ******* d      ******* d      ******* d
0
    actinide
    absorptions  9.348808E+05  9.357344E+05  9.365491E+05  9.373851E+05  9.381828E+05  9.381828E+05
    non-actinide
    abs. frace.  1.092452E-02  1.111060E-02  1.128829E-02  1.145917E-02  1.162446E-02  1.162446E-02
1   sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    fission products   page  34
0                                  fraction of total absorption rate
      powers    .00mw, burnup=   5844.mwd, flux= 2.68E+08n/cm**2-sec
0          initial ******* d ******* d ******* d ******* d ******* d
```

sm149	5.27E-03	5.29E-03	5.31E-03	5.32E-03	5.33E-03	5.33E-03
eu151	5.40E-04	6.02E-04	6.63E-04	6.82E-04	7.21E-04	7.21E-04
nd143	4.29E-04	4.44E-04	4.98E-04	5.23E-04	5.67E-04	5.67E-04
rh103	2.06E-04	2.24E-04	2.41E-04	2.58E-04	2.75E-04	2.75E-04
xe131	1.38E-04	1.50E-04	1.61E-04	1.72E-04	1.84E-04	1.84E-04
gd155	1.54E-04	1.60E-04	1.65E-04	1.70E-04	1.74E-04	1.74E-04
cs133	1.07E-04	1.16E-04	1.25E-04	1.33E-04	1.42E-04	1.42E-04
sm147	7.91E-05	8.56E-05	9.21E-05	9.65E-05	1.05E-04	1.05E-04
tc 99	7.05E-05	8.49E-05	9.13E-05	9.76E-05	1.04E-04	1.04E-04
cd113	8.12E-05	8.33E-05	8.52E-05	8.68E-05	8.83E-05	8.83E-05
nd145	6.07E-05	6.57E-05	7.06E-05	7.55E-05	8.04E-05	8.04E-05
mo 95	4.21E-05	4.56E-05	4.90E-05	5.24E-05	5.59E-05	5.59E-05
sm152	3.73E-05	4.07E-05	4.42E-05	4.77E-05	5.12E-05	5.12E-05
gd157	4.44E-05	4.74E-05	4.83E-05	4.93E-05	5.02E-05	5.02E-05
sm151	4.05E-05	4.06E-05	4.07E-05	4.08E-05	4.09E-05	4.09E-05
sm150	2.52E-05	2.79E-05	3.06E-05	3.33E-05	3.60E-05	3.60E-05
kr 83	2.60E-05	2.81E-05	3.02E-05	3.23E-05	3.44E-05	3.44E-05
cs135	2.42E-05	2.62E-05	2.82E-05	3.02E-05	3.21E-05	3.21E-05
ru101	1.89E-05	2.04E-05	2.20E-05	2.35E-05	2.50E-05	2.50E-05
pr141	1.79E-05	1.94E-05	2.09E-05	2.23E-05	2.38E-05	2.38E-05
eu153	1.69E-05	1.84E-05	1.98E-05	2.13E-05	2.27E-05	2.27E-05
la139	1.47E-05	1.59E-05	1.70E-05	1.82E-05	1.94E-05	1.94E-05

ba137	6.92E-06	7.50E-06	8.07E-06	8.65E-06	9.22E-06	9.22E-06
pd105	6.74E-06	7.34E-06	7.94E-06	8.54E-06	9.15E-06	9.15E-06
zr 93	5.94E-06	6.42E-06	6.91E-06	7.39E-06	7.86E-06	7.86E-06
ag109	4.39E-06	4.92E-06	5.47E-06	6.06E-06	6.63E-06	6.63E-06
i129	4.64E-06	5.02E-06	5.41E-06	5.00E-06	6.19E-06	6.19E-06
nd144	4.41E-06	4.77E-06	5.14E-06	5.50E-06	5.86E-06	5.86E-06
mo 97	3.33E-06	3.60E-06	3.87E-06	4.15E-06	4.42E-06	4.42E-06
xe135	2.28E-06	2.28E-06	2.27E-06	2.27E-06	2.27E-06	2.27E-06
zr 91	1.55E-06	1.68E-06	1.80E-06	1.93E-06	2.05E-06	2.05E-06
y 89	1.49E-06	1.61E-06	1.73E-06	1.85E-06	1.96E-06	1.96E-06
ru102	1.37E-06	1.48E-06	1.59E-06	1.71E-06	1.82E-06	1.82E-06
pd108	1.20E-06	1.33E-06	1.46E-06	1.60E-06	1.75E-06	1.75E-06
gd152	9.59E-07	1.12E-06	1.30E-06	1.48E-06	1.68E-06	1.68E-06
ce142	1.22E-06	1.32E-06	1.42E-06	1.51E-06	1.61E-06	1.61E-06
nd148	1.18E-06	1.27E-06	1.37E-06	1.46E-06	1.56E-06	1.56E-06
nd146	9.84E-07	1.06E-06	1.14E-06	1.22E-06	1.31E-06	1.31E-06
in115	8.42E-07	9.13E-07	9.85E-07	1.06E-06	1.13E-06	1.13E-06
ba138	8.39E-07	9.08E-07	9.77E-07	1.05E-06	1.11E-06	1.11E-06
ce140	7.86E-07	8.50E-07	9.15E-07	9.79E-07	1.04E-06	1.04E-06
xe132	7.15E-07	7.74E-07	8.34E-07	8.93E-07	9.52E-07	9.52E-07
pd107	6.40E-07	7.06E-07	7.73E-07	8.45E-07	9.17E-07	9.17E-07
mo 98	4.81E-07	5.32E-07	5.72E-07	6.12E-07	6.52E-07	6.52E-07
mo100	4.75E-07	5.14E-07	5.53E-07	5.92E-07	6.30E-07	6.30E-07
xe134	4.65E-07	5.03E-07	5.41E-07	5.79E-07	6.17E-07	6.17E-07
zr 92	3.74E-07	4.05E-07	4.35E-07	4.65E-07	4.95E-07	4.95E-07
i127	3.25E-07	3.53E-07	3.81E-07	4.10E-07	4.38E-07	4.38E-07
ru104	3.03E-07	3.29E-07	3.55E-07	3.81E-07	4.08E-07	4.08E-07

1 sas2h: far-field crit based on b4w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35

0 fraction of total absorption rate

0 powers .80mw, burnups 5844.mwd, flux= 2.68E+08n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
zr 96	2.99E-07	3.23E-07	3.48E-07	3.72E-07	3.96E-07	3.96E-07
nd150	2.63E-07	2.85E-07	3.07E-07	3.29E-07	3.50E-07	3.50E-07
xe136	2.32E-07	2.72E-07	2.93E-07	3.14E-07	3.34E-07	3.34E-07
pm147	2.44E-07	2.64E-07	2.44E-07	2.65E-07	2.65E-07	2.65E-07
br 81	1.89E-07	2.04E-07	2.20E-07	2.35E-07	2.51E-07	2.51E-07
rb 85	1.83E-07	1.98E-07	2.12E-07	2.27E-07	2.42E-07	2.42E-07
cd111	1.53E-07	1.69E-07	1.84E-07	2.00E-07	2.16E-07	2.16E-07
zr 94	1.60E-07	1.73E-07	1.86E-07	1.99E-07	2.12E-07	2.12E-07
zr 90	1.45E-07	1.57E-07	1.68E-07	1.80E-07	1.92E-07	1.92E-07
eu152	1.45E-07	1.56E-07	1.67E-07	1.77E-07	1.87E-07	1.87E-07
eu155	1.78E-07	1.79E-07	1.81E-07	1.82E-07	1.83E-07	1.83E-07
sm154	1.16E-07	1.26E-07	1.36E-07	1.47E-07	1.57E-07	1.57E-07
te130	1.15E-07	1.24E-07	1.34E-07	1.43E-07	1.53E-07	1.53E-07
rb 87	1.06E-07	1.14E-07	1.23E-07	1.31E-07	1.40E-07	1.40E-07
ru 99	6.12E-08	7.17E-08	8.30E-08	9.51E-08	1.08E-07	1.08E-07
se 77	7.54E-08	8.16E-08	8.77E-08	9.39E-08	1.00E-07	1.00E-07
pd106	6.31E-08	6.90E-08	7.50E-08	8.11E-08	8.73E-08	8.73E-08
gd156	4.64E-08	5.20E-08	5.76E-08	6.32E-08	6.90E-08	6.90E-08
kr 84	3.82E-08	5.43E-08	5.03E-08	6.24E-08	6.64E-08	6.64E-08
gd154	3.37E-08	3.96E-08	4.59E-08	5.27E-08	5.99E-08	5.99E-08
sb121	3.84E-08	4.17E-08	4.49E-08	4.82E-08	5.15E-08	5.15E-08
se 79	3.87E-08	4.19E-08	4.50E-08	4.82E-08	5.13E-08	5.13E-08
sb123	3.11E-08	3.38E-08	3.64E-08	3.90E-08	4.17E-08	4.17E-08
dy161	2.75E-08	3.07E-08	3.40E-08	3.75E-08	4.11E-08	4.11E-08
kr 86	2.77E-08	3.00E-08	3.22E-08	3.44E-08	3.67E-08	3.67E-08
te128	2.64E-08	2.78E-08	2.99E-08	3.21E-08	3.42E-08	3.42E-08
se 80	1.80E-08	1.95E-08	2.10E-08	2.25E-08	2.39E-08	2.39E-08
te125	1.67E-08	1.81E-08	1.95E-08	2.10E-08	2.25E-08	2.25E-08

tb159	1.41E-08	1.55E-08	1.70E-08	1.85E-08	2.01E-08	2.01E-08
ru100	1.06E-08	1.24E-08	1.43E-08	1.64E-08	1.86E-08	1.86E-08
sr 90	1.44E-08	1.43E-08	1.43E-08	1.42E-08	1.42E-08	1.42E-08
cd112	1.16E-08	1.27E-08	1.38E-08	1.49E-08	1.60E-08	1.60E-08
gd158	1.10E-08	1.22E-08	1.34E-08	1.46E-08	1.58E-08	1.58E-08
li 6	1.01E-08	1.09E-08	1.17E-08	1.25E-08	1.33E-08	1.33E-08
nd142	7.35E-09	8.61E-09	9.97E-09	1.14E-08	1.30E-08	1.30E-08
ba134	7.15E-09	8.37E-09	9.69E-09	1.11E-08	1.26E-08	1.26E-08
sn117	8.77E-09	9.54E-09	1.03E-08	1.11E-08	1.19E-08	1.19E-08
sm148	6.38E-09	7.70E-09	8.91E-09	1.02E-08	1.16E-08	1.16E-08
eu154	8.37E-09	9.29E-09	1.00E-08	1.07E-08	1.15E-08	1.15E-08
ba135	5.84E-09	6.84E-09	7.93E-09	9.09E-09	1.03E-08	1.03E-08
rh105	9.45E-09	9.53E-09	9.62E-09	9.70E-09	9.78E-09	9.78E-09
sn119	6.97E-09	7.56E-09	8.16E-09	8.76E-09	9.36E-09	9.36E-09
cd116	4.39E-09	7.05E-09	7.72E-09	8.40E-09	9.09E-09	9.09E-09
pd104	4.96E-09	5.82E-09	6.74E-09	7.73E-09	8.78E-09	8.78E-09
dy164	5.45E-09	6.18E-09	6.96E-09	7.76E-09	8.61E-09	8.61E-09
sn115	6.38E-09	6.92E-09	7.47E-09	8.02E-09	8.57E-09	8.57E-09
dy162	5.00E-09	5.46E-09	6.35E-09	7.07E-09	7.83E-09	7.83E-09
pd110	4.92E-09	5.43E-09	5.95E-09	6.48E-09	7.03E-09	7.03E-09
sr 88	5.10E-09	5.51E-09	5.92E-09	6.33E-09	6.74E-09	6.74E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 .fission products page 36
0 fraction of total absorption rate
power= .00mw, burnup= 5844.mwd, flux= 2.68E+08n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d

se 82	3.47E-09	3.76E-09	4.04E-09	4.32E-09	4.60E-09	4.60E-09
sn126	3.04E-09	3.30E-09	3.57E-09	3.85E-09	4.12E-09	4.12E-09
cs137	3.71E-09	3.71E-09	3.70E-09	3.70E-09	3.70E-09	3.70E-09
se 78	2.48E-09	2.90E-09	3.12E-09	3.34E-09	3.56E-09	3.56E-09
mo 96	1.82E-09	2.11E-09	2.42E-09	2.75E-09	3.11E-09	3.11E-09
sn124	2.34E-09	2.43E-09	2.63E-09	2.82E-09	3.02E-09	3.02E-09
pr143	2.59E-09	2.58E-09	2.58E-09	2.57E-09	2.57E-09	2.57E-09
ba136	1.48E-09	1.65E-09	1.84E-09	2.03E-09	2.23E-09	2.23E-09
as 75	1.59E-09	1.72E-09	1.85E-09	1.98E-09	2.11E-09	2.11E-09
cd110	1.02E-09	1.23E-09	1.46E-09	1.72E-09	2.00E-09	2.00E-09
xe133	1.97E-09	1.97E-09	1.97E-09	1.97E-09	1.96E-09	1.96E-09
dy163	1.23E-09	1.40E-09	1.58E-09	1.76E-09	1.96E-09	1.96E-09
xe130	1.06E-09	1.22E-09	1.38E-09	1.56E-09	1.75E-09	1.75E-09
kr 82	1.11E-09	1.26E-09	1.41E-09	1.58E-09	1.74E-09	1.74E-09
in113	1.25E-09	1.36E-09	1.46E-09	1.57E-09	1.68E-09	1.68E-09
nb 93	9.33E-10	1.09E-09	1.27E-09	1.45E-09	1.65E-09	1.65E-09
ce141	1.56E-09	1.55E-09	1.55E-09	1.55E-09	1.55E-09	1.55E-09
sn118	9.13E-10	9.91E-10	1.07E-09	1.15E-09	1.23E-09	1.23E-09
ce134	7.91E-10	8.55E-10	9.19E-10	9.82E-10	1.05E-09	1.05E-09
cd116	7.69E-10	8.35E-10	9.00E-10	9.66E-10	1.03E-09	1.03E-09
sn122	7.68E-10	8.34E-10	8.99E-10	9.66E-10	1.03E-09	1.03E-09
pm149	9.59E-10	9.58E-10	9.57E-10	9.57E-10	9.56E-10	9.56E-10
nd147	9.13E-10	9.12E-10	9.11E-10	9.09E-10	9.08E-10	9.08E-10
br 79	4.75E-10	5.57E-10	6.45E-10	7.39E-10	8.40E-10	8.40E-10
sn120	3.72E-10	4.29E-10	4.70E-10	7.19E-10	7.68E-10	7.68E-10
ag107	3.13E-10	3.73E-10	4.38E-10	5.10E-10	5.88E-10	5.88E-10
ge 73	4.39E-10	4.76E-10	5.13E-10	5.50E-10	5.87E-10	5.87E-10
ce144	5.82E-10	5.81E-10	5.80E-10	5.79E-10	5.78E-10	5.78E-10
kr 85	5.50E-10	5.49E-10	5.47E-10	5.46E-10	5.44E-10	5.44E-10
xe129	2.73E-10	3.20E-10	3.71E-10	4.26E-10	4.84E-10	4.84E-10
te126	2.43E-10	2.81E-10	3.19E-10	3.60E-10	4.03E-10	4.03E-10
ru103	3.47E-10	3.67E-10	3.68E-10	3.69E-10	3.70E-10	3.70E-10
gd160	1.45E-10	1.60E-10	1.76E-10	1.93E-10	2.10E-10	2.10E-10
se 76	1.36E-10	1.69E-10	1.81E-10	1.94E-10	2.07E-10	2.07E-10

zr 95	1.61E-10	1.61E-10	1.61E-10	1.60E-10	1.60E-10	1.60E-10
ho165	9.24E-11	1.06E-10	1.20E-10	1.34E-10	1.50E-10	1.50E-10
nb 95	1.49E-10	1.48E-10	1.48E-10	1.48E-10	1.48E-10	1.48E-10
y 91	1.37E-10	1.37E-10	1.36E-10	1.36E-10	1.36E-10	1.36E-10
pm151	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
dy160	4.03E-11	4.77E-11	5.57E-11	6.44E-11	7.38E-11	7.38E-11
xe128	2.77E-11	3.24E-11	3.75E-11	4.30E-11	4.89E-11	4.89E-11
ba140	4.62E-11	4.61E-11	4.60E-11	4.60E-11	4.59E-11	4.59E-11
eu156	4.24E-11	4.30E-11	4.36E-11	4.42E-11	4.48E-11	4.48E-11
sm153	4.07E-11	4.09E-11	4.11E-11	4.14E-11	4.16E-11	4.16E-11
te124	2.51E-11	2.78E-11	3.06E-11	3.34E-11	3.63E-11	3.63E-11
ru106	3.28E-11	3.34E-11	3.39E-11	3.44E-11	3.49E-11	3.49E-11
sr 86	1.79E-11	2.05E-11	2.33E-11	2.62E-11	2.93E-11	2.93E-11
sr 89	2.03E-11	2.02E-11	2.01E-11	2.00E-11	2.09E-11	2.09E-11
sr 87	1.07E-11	2.03E-11	2.19E-11	2.35E-11	2.51E-11	2.51E-11

1 sas2h: far-field crit based on 66w 15x15 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 37
0 fraction of total absorption rate
0 powers .00mw, burnup= 5844.mwd, flux= 2.68E+08n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

kr 87	2.19E-11	2.19E-11	2.18E-11	2.17E-11	2.17E-11	2.17E-11
sn116	1.06E-11	1.24E-11	1.44E-11	1.65E-11	1.88E-11	1.88E-11
ce143	1.70E-11	1.69E-11	1.69E-11	1.69E-11	1.68E-11	1.68E-11
sb125	1.62E-11	1.63E-11	1.64E-11	1.64E-11	1.65E-11	1.65E-11
y 90	1.56E-11	1.55E-11	1.55E-11	1.54E-11	1.54E-11	1.54E-11
nb 94	1.10E-11	1.20E-11	1.30E-11	1.40E-11	1.51E-11	1.51E-11
la140	1.50E-11	1.50E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
mo 99	1.29E-11	1.29E-11	1.29E-11	1.28E-11	1.28E-11	1.28E-11
ge 74	8.02E-12	9.55E-12	1.03E-11	1.10E-11	1.18E-11	1.18E-11
se 76	6.52E-12	7.54E-12	8.19E-12	9.09E-12	1.00E-11	1.00E-11
pm148m	9.37E-12	9.37E-12	9.37E-12	9.37E-12	9.38E-12	9.38E-12
ge 72	6.15E-12	6.68E-12	7.21E-12	7.75E-12	8.29E-12	8.29E-12
te127m	8.09E-12	8.14E-12	8.19E-12	8.24E-12	8.28E-12	8.28E-12
er166	4.84E-12	5.57E-12	6.36E-12	7.19E-12	8.06E-12	8.06E-12
te122	4.41E-12	5.17E-12	5.99E-12	6.88E-12	7.82E-12	7.82E-12
i131	6.72E-12	6.72E-12	6.71E-12	6.71E-12	6.71E-12	6.71E-12
te129m	1.83E-12	1.83E-12	1.83E-12	1.84E-12	1.84E-12	1.84E-12
kr 88	4.48E-13	5.13E-13	5.83E-13	6.59E-13	7.41E-13	7.41E-13
ag111	4.66E-13	4.77E-13	4.87E-13	4.98E-13	5.08E-13	5.08E-13
eu157	3.96E-13	4.03E-13	4.10E-13	4.17E-13	4.24E-13	4.24E-13
pm148	3.47E-13	3.66E-13	3.66E-13	3.65E-13	3.65E-13	3.65E-13
er167	1.38E-13	1.88E-13	2.02E-13	2.40E-13	2.82E-13	2.82E-13
cd115m	2.32E-13	2.53E-13	2.54E-13	2.55E-13	2.56E-13	2.56E-13
cs136	1.35E-13	1.41E-13	1.47E-13	1.53E-13	1.59E-13	1.59E-13
te123	7.66E-14	9.18E-14	1.09E-13	1.28E-13	1.50E-13	1.50E-13
tb160	2.75E-14	2.11E-14	4.48E-14	4.84E-14	5.24E-14	5.24E-14
ru105	3.37E-14	3.60E-14	3.43E-14	3.65E-14	3.48E-14	3.48E-14
sn125	3.66E-14	3.87E-14	3.88E-14	3.89E-14	3.10E-14	3.10E-14
pr142	2.01E-14	2.18E-14	2.34E-14	2.50E-14	2.66E-14	2.66E-14
ba 9	1.98E-14	2.14E-14	2.30E-14	2.46E-14	2.63E-14	2.63E-14
cd108	6.84E-15	8.61E-15	1.07E-14	1.31E-14	1.58E-14	1.58E-14
rb 88	1.23E-14	1.23E-14	1.22E-14	1.22E-14	1.22E-14	1.22E-14
li 7	7.92E-15	8.57E-15	9.22E-15	9.87E-15	1.05E-14	1.05E-14
sn123	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
sb126	8.19E-15	8.63E-15	9.06E-15	9.49E-15	9.93E-15	9.93E-15
i135	9.93E-15	9.91E-15	9.90E-15	9.89E-15	9.88E-15	9.88E-15
te132	9.43E-15	9.43E-15	9.42E-15	9.41E-15	9.41E-15	9.41E-15
i130	4.42E-15	4.72E-15	5.02E-15	5.32E-15	5.62E-15	5.62E-15
te134	5.65E-15	5.64E-15	5.62E-15	5.61E-15	5.60E-15	5.60E-15
sn114	2.61E-15	3.07E-15	3.57E-15	4.10E-15	4.67E-15	4.67E-15

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     sb124      3.63E-15  3.73E-15  3.88E-15  4.00E-15  4.12E-15  4.12E-15
     in117m     2.34E-15  2.36E-15  2.38E-15  2.39E-15  2.41E-15  2.41E-15
     rb 86      1.42E-15  1.52E-15  1.61E-15  1.70E-15  1.80E-15  1.80E-15
     dy165      1.03E-15  1.10E-15  1.16E-15  1.23E-15  1.30E-15  1.30E-15
     in117      6.94E-16  7.00E-16  7.06E-16  7.12E-16  7.18E-16  7.18E-16
     cs134m     1.48E-16  1.60E-16  1.72E-16  1.84E-16  1.96E-16  1.96E-16
     cd118      1.27E-16  1.28E-16  1.28E-16  1.29E-16  1.30E-16  1.30E-16
     ge 75      8.47E-17  8.46E-17  8.45E-17  8.44E-17  8.43E-17  8.43E-17
     in119m     3.15E-17  3.16E-17  3.17E-17  3.18E-17  3.19E-17  3.19E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  38
0                                   fraction of total absorption rate
       power=     .00mw, burnup=    3846.mwd, flux= 2.68E+08n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     ag110      5.70E-18  6.38E-18  7.09E-18  7.82E-18  8.59E-18  8.59E-18
     cd109      5.12E-18  5.53E-18  5.94E-18  6.35E-18  6.78E-18  6.78E-18
     in119      2.52E-18  2.53E-18  2.55E-18  2.56E-18  2.57E-18  2.57E-18
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  39
       power= 4.000E-03mw, burnup=3.8440E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1   2.61E-04  2.83E-04  3.04E-04  3.26E-04  3.48E-04  3.48E-04
      h  2   7.77E-07  8.41E-07  9.06E-07  9.70E-07  1.03E-06  1.03E-06
      h  3   4.11E-11  4.19E-11  4.26E-11  4.29E-11  4.34E-11  4.34E-11
      h  4   1.65E-34  1.68E-34  1.70E-34  1.72E-34  1.74E-34  1.74E-34
     he  3   5.43E-09  5.83E-09  6.23E-09  6.61E-09  6.99E-09  6.99E-09
     he  4   4.32E-05  4.68E-05  5.04E-05  5.40E-05  5.76E-05  5.76E-05
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   5.19E-06  5.42E-06  6.05E-06  6.68E-06  6.91E-06  6.91E-06
     ne 21   5.10E-10  5.92E-10  6.81E-10  7.75E-10  8.74E-10  8.74E-10
     ne 22   3.43E-08  3.72E-08  4.00E-08  4.29E-08  4.57E-08  4.57E-08
     ne 23   7.12E-15  7.15E-15  7.15E-15  7.14E-15  7.14E-15  7.14E-15
     na 22   4.20E-11  4.22E-11  4.22E-11  4.21E-11  4.21E-11  4.21E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   2.85E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08
     na 24m  4.68E-15  4.56E-15  4.56E-15  4.55E-15  4.55E-15  4.55E-15
     na 25   1.61E-24  1.85E-24  2.12E-24  2.40E-24  2.69E-24  2.69E-24
     mg 24   3.97E-02  4.25E-02  4.54E-02  4.83E-02  5.11E-02  5.11E-02
     mg 25   5.57E-08  6.43E-08  7.35E-08  8.32E-08  9.35E-08  9.35E-08
     mg 26   7.76E-07  8.41E-07  9.05E-07  9.69E-07  1.03E-06  1.03E-06
     mg 27   2.13E-12  2.13E-12  2.13E-12  2.13E-12  2.13E-12  2.13E-12
     mg 28   4.28E-24  4.29E-24  4.29E-24  4.28E-24  4.27E-24  4.27E-24
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.11E-10  2.06E-10  2.06E-10  2.05E-10  2.05E-10  2.05E-10
     al 29   1.20E-22  1.40E-22  1.61E-22  1.83E-22  2.07E-22  2.07E-22
     al 30   6.81E-33  8.58E-33  1.04E-32  1.30E-32  1.56E-32  1.56E-32
     al 28   1.15E-01  1.24E-01  1.32E-01  1.41E-01  1.49E-01  1.49E-01
     al 29   4.66E-07  5.42E-07  6.23E-07  7.10E-07  8.01E-07  8.01E-07
     al 30   1.97E-12  2.49E-12  3.08E-12  3.76E-12  4.53E-12  4.53E-12
     al 31   1.40E-24  1.76E-24  2.18E-24  2.66E-24  3.20E-24  3.20E-24
     al 32   1.93E-30  2.48E-30  3.11E-30  3.84E-30  4.68E-30  4.68E-30
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
8    flux              2.68E+08  2.68E+08  2.68E+08  2.68E+08  2.68E-07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  40
       power= 4.000E-03mw, burnup=3.8440E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
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	charge	******* d	******* d	******* d	******* d	******* d
he 4	1.33E+00	1.50E+00	1.48E+00	1.86E+00	2.06E+00	2.06E+00
pb206	3.38E-04	4.21E-04	5.15E-04	6.21E-04	7.39E-04	7.39E-04
pb207	6.81E-05	8.00E-05	9.29E-05	1.07E-04	1.22E-04	1.22E-04
pb208	1.09E-05	1.28E-05	1.48E-05	1.70E-05	1.93E-05	1.93E-05
pb209	1.14E-11	1.32E-11	1.52E-11	1.73E-11	1.96E-11	1.96E-11
pb210	1.00E-05	1.16E-05	1.29E-05	1.44E-05	1.60E-05	1.60E-05
pb211	4.53E-12	4.94E-12	5.42E-12	5.70E-12	6.09E-12	6.09E-12
pb212	1.26E-11	1.36E-11	1.46E-11	1.57E-11	1.67E-11	1.67E-11
pb214	2.29E-11	2.61E-11	2.95E-11	3.29E-11	3.65E-11	3.65E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.18E-05	2.73E-05	3.42E-05	4.18E-05	5.04E-05	5.04E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	6.17E-09	7.03E-09	7.94E-09	8.87E-09	9.82E-09	9.82E-09
bi211	2.70E-13	2.93E-13	3.15E-13	3.38E-13	3.61E-13	3.61E-13
bi212	1.19E-12	1.29E-12	1.39E-12	1.49E-12	1.59E-12	1.59E-12
bi213	2.66E-12	3.09E-12	3.56E-12	4.05E-12	4.57E-12	4.57E-12
bi214	1.70E-11	1.94E-11	2.19E-11	2.44E-11	2.71E-11	2.71E-11
po210	1.70E-07	1.94E-07	2.19E-07	2.45E-07	2.71E-07	2.71E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.98E-18	3.23E-18	3.48E-18	3.74E-18	3.99E-18	3.99E-18
po212	6.26E-23	6.78E-23	7.29E-23	7.81E-23	8.33E-23	8.33E-23
po213	3.99E-21	4.65E-21	5.35E-21	6.09E-21	6.87E-21	6.87E-21
po214	2.54E-18	2.67E-18	3.01E-18	3.36E-18	3.72E-18	3.72E-18
po215	3.74E-18	4.06E-18	4.37E-18	4.69E-18	5.00E-18	5.00E-18
po216	4.75E-17	5.15E-17	5.54E-17	5.93E-17	6.33E-17	6.33E-17
po218	2.65E-12	3.02E-12	3.41E-12	3.81E-12	4.22E-12	4.22E-12
rn218	1.84E-28	1.99E-28	2.14E-28	2.29E-28	2.44E-28	2.44E-28
rn219	8.33E-15	9.03E-15	9.73E-15	1.04E-14	1.11E-14	1.11E-14
rn220	1.82E-14	1.97E-14	2.12E-14	2.28E-14	2.43E-14	2.43E-14
rn222	4.79E-09	5.37E-09	6.05E-09	6.76E-09	7.49E-09	7.49E-09
ra222	2.00E-25	2.16E-25	2.32E-25	2.48E-25	2.65E-25	2.65E-25
ra223	2.08E-09	2.25E-09	2.43E-09	2.60E-09	2.78E-09	2.78E-09
ra224	1.04E-10	1.12E-10	1.21E-10	1.29E-10	1.38E-10	1.38E-10
ra225	1.24E-09	1.43E-09	1.66E-09	1.89E-09	2.14E-09	2.14E-09
ra226	7.19E-04	8.20E-04	9.23E-04	1.03E-03	1.14E-03	1.14E-03
ra228	6.40E-12	6.93E-12	7.47E-12	8.01E-12	8.55E-12	8.55E-12
ac225	8.39E-10	9.77E-10	1.12E-09	1.28E-09	1.44E-09	1.44E-09
ac227	1.44E-06	1.57E-06	1.69E-06	1.81E-06	1.93E-06	1.93E-06
ac228	7.81E-16	8.46E-16	9.12E-16	9.78E-16	1.04E-15	1.04E-15
th226	9.73E-23	1.05E-23	1.13E-23	1.21E-23	1.29E-23	1.29E-23
th227	3.35E-09	3.43E-09	3.92E-09	4.20E-09	4.48E-09	4.48E-09
th228	1.98E-08	2.14E-08	2.31E-08	2.47E-08	2.63E-08	2.63E-08
th229	2.42E-04	2.81E-04	3.23E-04	3.68E-04	4.15E-04	4.15E-04
th230	7.71E-02	8.36E-02	9.00E-02	9.65E-02	1.03E-01	1.03E-01
th231	3.28E-09	3.30E-09	3.33E-09	3.35E-09	3.37E-09	3.37E-09
th232	1.54E-02	1.69E-02	1.83E-02	1.96E-02	2.09E-02	2.09E-02
th233	1.42E-13	1.54E-13	1.66E-13	1.78E-13	1.90E-13	1.90E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.17E-03	2.35E-03	2.54E-03	2.72E-03	2.90E-03	2.90E-03
pa232	3.69E-11	4.00E-11	4.30E-11	4.61E-11	4.91E-11	4.91E-11

sas2h: far-field crit based on 8x8 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 41
powerr 4.000E-03mw, burnup=5.6440E+03mwd, flux= 2.68E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12

pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	9.43E-21	1.02E-20	1.10E-20	1.17E-20	1.25E-20	1.25E-20
u231	3.07E-17	3.32E-17	3.57E-17	3.81E-17	4.05E-17	4.05E-17
u232	7.21E-07	7.80E-07	8.40E-07	8.99E-07	9.59E-07	9.59E-07
u233	4.00E-02	4.33E-02	4.65E-02	4.98E-02	5.30E-02	5.30E-02
u234	9.46E+00	9.49E+00	9.53E+00	9.56E+00	9.59E+00	9.59E+00
u235	7.09E+02	7.07E+02	7.05E+02	7.04E+02	7.02E+02	7.02E+02
u236	1.78E+02	1.78E+02	1.78E+02	1.79E+02	1.79E+02	1.79E+02
u237	3.17E-06	3.17E-06	3.17E-06	3.17E-06	3.18E-06	3.18E-06
u238	3.64E+04	3.64E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.18E-07	3.18E-07	3.18E-07	3.17E-07	3.17E-07	3.17E-07
u240	1.33E-39	2.77E-39	5.46E-39	9.95E-39	1.74E-38	1.74E-38
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.73E-12	8.74E-12	8.73E-12	8.72E-12	8.71E-12	8.71E-12
np236m	2.08E-12	2.08E-12	2.07E-12	2.07E-12	2.07E-12	2.07E-12
np236	5.97E-07	6.43E-07	6.94E-07	7.42E-07	7.90E-07	7.90E-07
np237	4.19E+01	4.19E+01	4.19E+01	4.19E+01	4.18E+01	4.18E+01
np238	1.54E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06
np239	4.60E-05	4.59E-05	4.59E-05	4.59E-05	4.58E-05	4.58E-05
np240m	1.14E-41	2.36E-41	4.64E-41	8.49E-41	1.49E-40	1.49E-40
np240	9.27E-15	9.25E-15	9.24E-15	9.22E-15	9.21E-15	9.21E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.12E-09	1.12E-09
pu237	3.49E-13	3.58E-13	3.66E-13	3.75E-13	3.83E-13	3.83E-13
pu238	2.33E-02	2.32E-02	2.32E-02	2.32E-02	2.31E-02	2.31E-02
pu239	1.38E+01	1.49E+01	1.59E+01	1.69E+01	1.79E+01	1.79E+01
pu240	1.85E-01	2.13E-01	2.43E-01	2.74E-01	3.07E-01	3.07E-01
pu241	7.62E-05	8.78E-05	1.00E-04	1.13E-04	1.26E-04	1.26E-04
pu242	4.36E-06	5.64E-06	7.34E-06	8.88E-06	1.09E-05	1.09E-05
pu243	9.24E-15	1.19E-14	1.51E-14	1.88E-14	2.29E-14	2.29E-14
pu244	4.88E-29	1.40E-28	2.69E-28	4.93E-28	8.48E-28	8.48E-28
pu245	2.73E-39	5.65E-39	1.09E-38	1.99E-38	3.49E-38	3.49E-38
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	4.29E-19	5.10E-19	5.96E-19	6.87E-19	7.83E-19	7.83E-19
am240	1.96E-16	2.33E-16	2.73E-16	3.14E-16	3.58E-16	3.58E-16
am241	1.54E-03	1.83E-03	2.14E-03	2.47E-03	2.82E-03	2.82E-03
am242m	6.77E-07	8.12E-07	9.59E-07	1.12E-06	1.28E-06	1.28E-06
am242	6.18E-11	7.34E-11	8.58E-11	9.91E-11	1.13E-10	1.13E-10
am243	2.23E-08	3.00E-08	3.92E-08	5.03E-08	6.34E-08	6.34E-08
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.70E-16	2.28E-16	2.98E-16	3.83E-16	4.82E-16	4.82E-16
am245	6.27E-40	1.28E-39	2.43E-39	4.42E-39	7.70E-39	7.70E-39
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	3.65E-21	4.34E-21	5.07E-21	5.85E-21	6.68E-21	6.68E-21
cm242	1.25E-08	1.48E-08	1.73E-08	2.00E-08	2.28E-08	2.28E-08
cm243	8.50E-18	1.03E-17	1.22E-17	1.43E-17	1.65E-17	1.65E-17
cm244	2.67E-12	3.58E-12	4.69E-12	6.01E-12	7.57E-12	7.57E-12

1

sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 42
power= 4.000E-03aw, burnup=5.0440E+03awd, flux= 2.68E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
cm245	1.66E-15	2.42E-15	3.42E-15	4.70E-15	6.31E-15	6.31E-15
cm246	4.73E-18	7.45E-18	1.13E-17	1.67E-17	2.38E-17	2.38E-17
cm247	2.28E-22	3.91E-22	6.42E-22	1.02E-21	1.56E-21	1.56E-21
cm248	1.09E-25	2.06E-25	3.62E-25	6.17E-25	1.01E-24	1.01E-24
cm249	2.63E-36	6.41E-36	1.46E-35	3.04E-35	5.98E-35	5.98E-35
cm250	4.70E-41	9.52E-41	1.03E-40	3.34E-40	5.86E-40	5.86E-40
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
  totals     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux              2.68E+08  2.68E+08  2.68E+08  2.68E+08  2.68E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

        cross-section data taken from position number  1 of library on unit 15.

        pass   5
        pass   1
        pass   0
        "scale-system control module sas2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        "scale-system control module sas2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ****************************************************************************
        *                                                                          *
        *            prelim lwr origen-s binary working library--id = 1143         *
        *          made from modified card-image origen-s libraries of scale 4.2   *
        *      data from the light element, actinide, and fission product libraries *
        *         decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                          *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "prepsas2" case updating all nuclides on the scale "burnup" library *
        *                                                                          *
        *                   fission product yields are from endf/b-v               *
        *                                                                          *
        *              photon libraries use an 18-energy-group structure           *
        *             the photon data are from the master photon data base,        *
        *              produced to include bremsstrahlung from uo2 matrix          *
        *                                                                          *
        *         see information above this box (if present) for later updates    *
        *                                                                          *
        ****************************************************************************
        *                                                                          *
0       ****************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft15f001
0               8/28/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0       ****************************************************************************
1    sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   43
       power=    .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
0                                                 basis =
```

```
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                    initial       ******* d     ******* d     ******* d     ******* d
     productions   1.157562E+06  1.158776E+06  1.159951E+06  1.161091E+06  1.162197E+06
     absorptions   9.515668E+05  9.525161E+05  9.534447E+05  9.543523E+05  9.552406E+05
     k infinity    1.216479E+00  1.216540E+00  1.216589E+00  1.216627E+00  1.216654E+00
0                    initial       ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions   9.405191E+05  9.413034E+05  9.420699E+05  9.428184E+05  9.435494E+05
     non-actinide
     abs. fracs.   1.161009E-02  1.177176E-02  1.193023E-02  1.208556E-02  1.223892E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page   44
0                                  fraction of total absorption rate
         powers=     .00mw, burnup=    7305.mwd, flux= 2.67E+08n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d

     sm149      5.33E-03  5.34E-03  5.34E-03  5.35E-03  5.35E-03
     eu151      7.20E-04  7.58E-04  7.95E-04  8.32E-04  8.67E-04
     nd143      5.66E-04  6.01E-04  6.35E-04  6.69E-04  7.02E-04
     rh103      2.75E-04  2.93E-04  3.10E-04  3.27E-04  3.45E-04
     xe131      1.84E-04  1.95E-04  2.06E-04  2.18E-04  2.29E-04
     gd155      1.74E-04  1.78E-04  1.82E-04  1.85E-04  1.89E-04
     cs133      1.42E-04  1.51E-04  1.60E-04  1.68E-04  1.77E-04
     sm147      1.05E-04  1.11E-04  1.18E-04  1.24E-04  1.31E-04
     tc 99      1.04E-04  1.10E-04  1.17E-04  1.23E-04  1.29E-04
     nd145      8.84E-05  8.53E-05  9.02E-05  9.51E-05  1.00E-04
     cd113      8.82E-05  8.96E-05  9.08E-05  9.19E-05  9.29E-05
     mo 95      5.59E-05  5.93E-05  6.27E-05  6.61E-05  6.95E-05
     sm152      5.12E-05  5.48E-05  5.84E-05  6.21E-05  6.58E-05
     gd157      5.02E-05  5.11E-05  5.20E-05  5.29E-05  5.37E-05
     sm150      3.60E-05  3.87E-05  4.14E-05  4.41E-05  4.68E-05
     kr 83      3.44E-05  3.65E-05  3.85E-05  4.06E-05  4.26E-05
     sm151      4.09E-05  4.10E-05  4.11E-05  4.12E-05  4.12E-05
     cs135      3.22E-05  3.41E-05  3.61E-05  3.81E-05  4.01E-05
     ru101      2.51E-05  2.66E-05  2.82E-05  2.97E-05  3.12E-05
     pr141      2.38E-05  2.52E-05  2.67E-05  2.81E-05  2.96E-05
     eu153      2.27E-05  2.42E-05  2.57E-05  2.71E-05  2.86E-05
     la139      1.94E-05  2.06E-05  2.18E-05  2.30E-05  2.42E-05
     pd105      9.15E-06  9.77E-06  1.04E-05  1.10E-05  1.16E-05
     ba137      9.21E-06  9.79E-06  1.04E-05  1.09E-05  1.15E-05
     zr 93      7.87E-06  8.35E-06  8.83E-06  9.30E-06  9.77E-06
     ag109      6.64E-06  7.26E-06  7.89E-06  8.53E-06  9.23E-06
     i129       6.88E-06  6.57E-06  6.96E-06  7.35E-06  7.74E-06
     nd144      5.86E-06  6.22E-06  6.58E-06  6.94E-06  7.30E-06
     mo 97      4.41E-06  4.69E-06  4.96E-06  5.22E-06  5.49E-06
     gd152      1.68E-06  1.89E-06  2.11E-06  2.33E-06  2.57E-06
     zr 91      2.05E-06  2.18E-06  2.30E-06  2.42E-06  2.55E-06
      y 89      1.96E-06  2.08E-06  2.20E-06  2.32E-06  2.43E-06
     pd108      1.75E-06  1.90E-06  2.05E-06  2.20E-06  2.37E-06
     ru102      1.82E-06  1.93E-06  2.04E-06  2.16E-06  2.27E-06
     xe135      2.27E-06  2.27E-06  2.27E-06  2.26E-06  2.26E-06
     ce142      1.61E-06  1.71E-06  1.81E-06  1.91E-06  2.01E-06
     nd148      1.56E-06  1.66E-06  1.75E-06  1.85E-06  1.94E-06
     nd146      1.30E-06  1.38E-06  1.46E-06  1.54E-06  1.62E-06
     in115      1.13E-06  1.20E-06  1.27E-06  1.35E-06  1.42E-06
     ba138      1.11E-06  1.18E-06  1.25E-06  1.32E-06  1.38E-06
     ce140      1.04E-06  1.11E-06  1.17E-06  1.23E-06  1.30E-06
     pd107      9.17E-07  9.90E-07  1.07E-06  1.14E-06  1.22E-06
     xe132      9.52E-07  1.01E-06  1.07E-06  1.13E-06  1.19E-06
     mo 98      6.53E-07  6.93E-07  7.33E-07  7.73E-07  8.13E-07
     mo100      6.31E-07  6.69E-07  7.08E-07  7.47E-07  7.85E-07
```

```
     xe134     4.17E-07  4.34E-07  4.92E-07  7.30E-07  7.47E-07
     zr 92     4.95E-07  5.25E-07  5.55E-07  5.85E-07  6.14E-07
      i127     4.38E-07  4.67E-07  4.96E-07  5.25E-07  5.54E-07
     ru104     4.08E-07  4.34E-07  4.60E-07  4.87E-07  5.13E-07
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   45
0                                  fraction of total absorption rate
        power=    .00mw, burnup=    7305.mwd, flux= 2.47E+08n/cm**2-sec
0             initial ********** d ********** d ********** d **********

     zr 96     3.97E-07  4.21E-07  4.45E-07  4.69E-07  4.93E-07
     nd150     3.50E-07  3.72E-07  3.94E-07  4.16E-07  4.37E-07
     xe136     3.34E-07  3.55E-07  3.75E-07  3.96E-07  4.16E-07
     br 81     2.51E-07  2.66E-07  2.81E-07  2.97E-07  3.12E-07
     rb 85     2.42E-07  2.57E-07  2.71E-07  2.86E-07  3.00E-07
     cd111     2.16E-07  2.32E-07  2.49E-07  2.66E-07  2.84E-07
     pm147     2.65E-07  2.65E-07  2.64E-07  2.64E-07  2.64E-07
     zr 94     2.12E-07  2.25E-07  2.38E-07  2.51E-07  2.63E-07
     zr 90     1.92E-07  2.04E-07  2.15E-07  2.27E-07  2.38E-07
     eu152     1.87E-07  1.96E-07  2.06E-07  2.15E-07  2.24E-07
     sm154     1.57E-07  1.67E-07  1.77E-07  1.87E-07  1.98E-07
     te130     1.53E-07  1.62E-07  1.72E-07  1.81E-07  1.90E-07
     eu155     1.83E-07  1.85E-07  1.86E-07  1.87E-07  1.89E-07
     rb 87     1.40E-07  1.48E-07  1.57E-07  1.65E-07  1.73E-07
     ru 99     1.08E-07  1.22E-07  1.36E-07  1.52E-07  1.68E-07
     se 77     9.99E-08  1.06E-07  1.12E-07  1.18E-07  1.24E-07
     pd106     8.74E-08  9.37E-08  1.00E-07  1.07E-07  1.13E-07
     gd154     5.99E-08  6.76E-08  7.59E-08  8.45E-08  9.37E-08
     gd156     6.91E-08  7.50E-08  8.10E-08  8.72E-08  9.34E-08
     kr 84     6.65E-08  7.05E-08  7.46E-08  7.86E-08  8.26E-08
     sb121     5.15E-08  5.48E-08  5.81E-08  6.14E-08  6.48E-08
     se 79     5.13E-08  5.46E-08  5.75E-08  6.07E-08  6.38E-08
     dy161     4.11E-08  4.48E-08  4.84E-08  5.25E-08  5.66E-08
     sb123     4.17E-08  4.44E-08  4.71E-08  4.97E-08  5.24E-08
     kr 86     3.66E-08  3.88E-08  4.10E-08  4.32E-08  4.54E-08
     te128     3.42E-08  3.64E-08  3.85E-08  4.07E-08  4.29E-08
     se 80     2.39E-08  2.54E-08  2.68E-08  2.83E-08  2.97E-08
     ru100     1.86E-08  2.10E-08  2.34E-08  2.61E-08  2.88E-08
     te125     2.25E-08  2.39E-08  2.54E-08  2.69E-08  2.84E-08
     tb159     2.01E-08  2.16E-08  2.33E-08  2.49E-08  2.66E-08
     gd158     1.58E-08  1.71E-08  1.84E-08  1.97E-08  2.10E-08
     cd112     1.60E-08  1.71E-08  1.82E-08  1.94E-08  2.06E-08
     nd142     1.30E-08  1.46E-08  1.63E-08  1.82E-08  2.01E-08
     ba134     1.26E-08  1.42E-08  1.59E-08  1.77E-08  1.96E-08
     sm148     1.14E-08  1.30E-08  1.46E-08  1.62E-08  1.79E-08
     ti 6      1.33E-08  1.41E-08  1.48E-08  1.56E-08  1.64E-08
     ba135     1.03E-08  1.17E-08  1.31E-08  1.45E-08  1.61E-08
     sr 90     1.62E-08  1.61E-08  1.61E-08  1.60E-08  1.60E-08
     sn117     1.19E-08  1.27E-08  1.35E-08  1.43E-08  1.51E-08
     eu154     1.13E-08  1.22E-08  1.29E-08  1.37E-08  1.44E-08
     pd104     8.79E-09  9.91E-09  1.11E-08  1.24E-08  1.37E-08
     dy164     8.60E-09  9.48E-09  1.04E-08  1.13E-08  1.23E-08
     cd114     9.10E-09  9.79E-09  1.05E-08  1.12E-08  1.19E-08
     sn119     9.35E-09  9.95E-09  1.06E-08  1.12E-08  1.18E-08
     dy162     7.83E-09  8.62E-09  9.45E-09  1.03E-08  1.12E-08
     sn115     8.56E-09  9.11E-09  9.66E-09  1.02E-08  1.08E-08
     rh103     9.77E-09  9.85E-09  9.93E-09  1.00E-08  1.01E-08
     pd110     7.03E-09  7.59E-09  8.17E-09  8.73E-09  9.35E-09
     sr 88     6.73E-09  7.14E-09  7.55E-09  7.95E-09  8.35E-09
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   46
0                                  fraction of total absorption rate
```

```
          powers=     .80mw, burnup=    7305.mwd, flux= 2.67E+08n/cm**2-sec
8                Initial *******d *******d *******d *******d

     se 82      4.60E-09  4.88E-09  5.15E-09  5.43E-09  5.71E-09
     sn126      4.12E-09  4.39E-09  4.67E-09  4.95E-09  5.24E-09
     mo 96      3.11E-09  3.49E-09  3.88E-09  4.30E-09  4.74E-09
     se 78      3.56E-09  3.78E-09  4.00E-09  4.22E-09  4.44E-09
     sn124      3.02E-09  3.21E-09  3.41E-09  3.61E-09  3.80E-09
     ba137      3.70E-09  3.69E-09  3.69E-09  3.69E-09  3.68E-09
     cd110      2.00E-09  2.31E-09  2.64E-09  2.81E-09  2.41E-09
     ba136      2.23E-09  2.44E-09  2.45E-09  2.87E-09  3.10E-09
     dy163      1.05E-09  2.16E-09  2.37E-09  2.59E-09  2.81E-09
     as 75      2.11E-09  2.24E-09  2.37E-09  2.49E-09  2.62E-09
     xe130      1.75E-09  1.94E-09  2.15E-09  2.37E-09  2.59E-09
     nb 93      1.63E-09  1.86E-09  2.09E-09  2.32E-09  2.57E-09
     pr143      2.57E-09  2.56E-09  2.56E-09  2.55E-09  2.55E-09
     kr 82      1.74E-09  1.92E-09  2.10E-09  2.29E-09  2.49E-09
     in113      1.68E-09  1.80E-09  1.91E-09  2.02E-09  2.13E-09
     xe133      1.96E-09  1.96E-09  1.96E-09  1.96E-09  1.96E-09
     sn118      1.23E-09  1.31E-09  1.39E-09  1.47E-09  1.55E-09
     ce141      1.55E-09  1.54E-09  1.54E-09  1.54E-09  1.54E-09
     br 79      8.40E-10  9.47E-10  1.06E-09  1.18E-09  1.31E-09
     sn122      1.03E-09  1.10E-09  1.16E-09  1.23E-09  1.30E-09
     ce134      1.05E-09  1.11E-09  1.17E-09  1.24E-09  1.30E-09
     cd116      1.03E-09  1.10E-09  1.17E-09  1.23E-09  1.30E-09
     sn120      7.88E-10  8.17E-10  8.47E-10  9.16E-10  9.66E-10
     ag107      5.88E-10  6.72E-10  7.63E-10  8.60E-10  9.65E-10
     pm149      9.53E-10  9.54E-10  9.54E-10  9.53E-10  9.53E-10
     nd147      9.09E-10  9.08E-10  9.06E-10  9.05E-10  9.04E-10
     xe129      4.84E-10  5.47E-10  6.13E-10  6.83E-10  7.57E-10
     ge 73      3.86E-10  4.23E-10  4.60E-10  4.97E-10  7.34E-10
     te126      4.03E-10  4.49E-10  4.97E-10  5.48E-10  6.01E-10
     ce144      3.77E-10  3.76E-10  3.75E-10  3.74E-10  3.73E-10
     kr 85      5.44E-10  5.42E-10  5.41E-10  5.40E-10  5.38E-10
     ru103      3.70E-10  3.70E-10  3.71E-10  3.72E-10  3.72E-10
     gd160      2.10E-10  2.28E-10  2.46E-10  2.64E-10  2.83E-10
     ge 74      2.07E-10  2.19E-10  2.32E-10  2.44E-10  2.57E-10
     ho165      1.50E-10  1.66E-10  1.84E-10  2.02E-10  2.21E-10
     zr 93      1.60E-10  1.60E-10  1.60E-10  1.59E-10  1.59E-10
     nb 95      1.48E-10  1.47E-10  1.47E-10  1.47E-10  1.46E-10
      y 91      1.34E-10  1.35E-10  1.35E-10  1.34E-10  1.34E-10
     dy160      7.39E-11  8.40E-11  9.49E-11  1.06E-10  1.19E-10
     pm151      1.11E-10  1.11E-10  1.11E-10  1.12E-10  1.12E-10
     xe128      4.89E-11  5.51E-11  6.18E-11  6.88E-11  7.63E-11
     te124      3.63E-11  3.93E-11  4.24E-11  4.56E-11  4.89E-11
     eu154      4.48E-11  4.54E-11  4.59E-11  4.65E-11  4.70E-11
     ba140      4.39E-11  4.58E-11  4.57E-11  4.57E-11  4.56E-11
     sr 86      2.93E-11  3.25E-11  3.60E-11  3.95E-11  4.33E-11
     sm153      4.16E-11  4.18E-11  4.21E-11  4.23E-11  4.25E-11
     ru106      3.50E-11  3.55E-11  3.60E-11  3.65E-11  3.70E-11
     sr 87      2.51E-11  2.67E-11  2.84E-11  3.00E-11  3.16E-11
     sn116      1.88E-11  2.12E-11  2.38E-11  2.65E-11  2.94E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   47
8                                  fraction of total absorption rate
          powers=     .80mw, burnup=    7305.mwd, flux= 2.67E+08n/cm**2-sec
8                Initial *******d *******d *******d *******d

     sr 89      2.89E-11  2.88E-11  2.88E-11  2.87E-11  2.86E-11
     kr 87      2.16E-11  2.16E-11  2.15E-11  2.15E-11  2.14E-11
     nb 94      1.51E-11  1.62E-11  1.73E-11  1.84E-11  1.95E-11
```

```
    sb125     1.45E-11  1.46E-11  1.47E-11  1.48E-11  1.49E-11
    ce143     1.68E-11  1.68E-11  1.68E-11  1.67E-11  1.67E-11
     y 90     1.54E-11  1.53E-11  1.53E-11  1.52E-11  1.52E-11
    la140     1.49E-11  1.49E-11  1.49E-11  1.48E-11  1.48E-11
    ge 74     1.17E-11  1.25E-11  1.32E-11  1.40E-11  1.47E-11
    se 76     1.00E-11  1.10E-11  1.20E-11  1.31E-11  1.42E-11
    mo 99     1.28E-11  1.28E-11  1.28E-11  1.28E-11  1.28E-11
    te122     7.82E-12  8.83E-12  9.90E-12  1.10E-11  1.22E-11
    er166     8.05E-12  8.97E-12  9.94E-12  1.09E-11  1.20E-11
    ge 72     8.28E-12  8.82E-12  9.36E-12  9.91E-12  1.05E-11
    pm148m    9.57E-12  9.58E-12  9.59E-12  9.59E-12  9.60E-12
    te127m    8.28E-12  8.33E-12  8.37E-12  8.42E-12  8.47E-12
     i131     6.71E-12  6.71E-12  6.71E-12  6.71E-12  6.70E-12
    te129m    1.04E-12  1.04E-12  1.04E-12  1.05E-12  1.05E-12
    kr 80     7.41E-13  8.30E-13  9.26E-13  1.03E-12  1.14E-12
    ag111     5.08E-13  5.19E-13  5.29E-13  5.38E-13  5.48E-13
    er167     2.82E-13  3.29E-13  3.80E-13  4.36E-13  4.97E-13
    eu157     4.24E-13  4.31E-13  4.37E-13  4.44E-13  4.50E-13
    pm148     3.65E-13  3.65E-13  3.65E-13  3.65E-13  3.64E-13
    cd115m    2.56E-13  2.58E-13  2.59E-13  2.60E-13  2.61E-13
    te123     1.50E-13  1.74E-13  2.00E-13  2.29E-13  2.60E-13
    cs136     1.59E-13  1.65E-13  1.71E-13  1.77E-13  1.83E-13
    tb160     5.23E-14  5.63E-14  6.02E-14  6.43E-14  6.84E-14
    ru105     3.49E-14  3.51E-14  3.54E-14  3.57E-14  3.60E-14
    pr142     2.66E-14  2.82E-14  2.98E-14  3.15E-14  3.30E-14
    be  9     2.63E-14  2.79E-14  2.95E-14  3.12E-14  3.28E-14
    sn125     3.10E-14  3.11E-14  3.12E-14  3.13E-14  3.14E-14
    cd108     1.58E-14  1.90E-14  2.25E-14  2.65E-14  3.09E-14
    ii  7     1.03E-14  1.11E-14  1.18E-14  1.24E-14  1.31E-14
    rb 88     1.22E-14  1.21E-14  1.21E-14  1.21E-14  1.20E-14
    sb126     9.92E-15  1.04E-14  1.08E-14  1.12E-14  1.17E-14
    sn123     1.03E-14  1.04E-14  1.04E-14  1.04E-14  1.04E-14
     i135     9.87E-15  9.86E-15  9.85E-15  9.84E-15  9.83E-15
    te132     9.40E-15  9.40E-15  9.39E-15  9.39E-15  9.38E-15
    sn114     4.46E-15  5.27E-15  5.92E-15  6.40E-15  7.33E-15
     i130     5.62E-15  5.91E-15  6.21E-15  6.50E-15  6.80E-15
    te134     5.59E-15  5.58E-15  5.57E-15  5.56E-15  5.55E-15
    sb124     4.12E-15  4.25E-15  4.37E-15  4.49E-15  4.61E-15
    in117m    2.41E-15  2.43E-15  2.44E-15  2.46E-15  2.48E-15
    rb 86     1.80E-15  1.89E-15  1.98E-15  2.07E-15  2.16E-15
    dy165     1.30E-15  1.37E-15  1.44E-15  1.50E-15  1.57E-15
    in117     7.17E-16  7.23E-16  7.28E-16  7.34E-16  7.39E-16
    cs134m    1.96E-16  2.08E-16  2.20E-16  2.32E-16  2.44E-16
    cd118     1.29E-16  1.30E-16  1.30E-16  1.31E-16  1.31E-16
    ge 75     8.43E-17  8.42E-17  8.41E-17  8.40E-17  8.39E-17
    in119m    3.19E-17  3.20E-17  3.21E-17  3.22E-17  3.23E-17
1   sas2h: far-field crit based on btu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  48
0                                  fraction of total absorption rate
0        power=      .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
            initial ******* d ******* d ******* d ******* d

    ag110     8.38E-18  9.38E-18  1.02E-17  1.10E-17  1.19E-17
    cd109     6.77E-19  7.20E-18  7.44E-18  8.09E-18  8.56E-18
    in119     2.57E-18  2.58E-18  2.60E-18  2.61E-18  2.62E-18
    in120     4.32E-22  4.33E-22  4.35E-22  4.36E-22  4.38E-22
    in120m    6.21E-23  6.30E-23  6.40E-23  6.49E-23  6.59E-23
1   sas2h: far-field crit based on btu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  49
     power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
```

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d
h 1	3.48E-04	3.49E-04	3.91E-04	4.13E-04	4.34E-04
h 2	1.03E-06	1.10E-06	1.16E-06	1.23E-06	1.29E-06
h 3	4.34E-11	4.42E-11	4.47E-11	4.51E-11	4.56E-11
h 4	1.74E-34	1.76E-34	1.78E-34	1.80E-34	1.82E-34
he 3	6.99E-09	7.37E-09	7.73E-09	8.09E-09	8.45E-09
he 4	5.76E-05	6.11E-05	6.47E-05	6.83E-05	7.19E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-06	7.33E-06	7.78E-06	8.21E-06	8.64E-06
ne 21	8.74E-10	9.80E-10	1.09E-09	1.21E-09	1.33E-09
ne 22	4.57E-08	4.86E-08	5.15E-08	5.43E-08	5.72E-08
ne 23	7.14E-15	7.16E-15	7.17E-15	7.17E-15	7.16E-15
na 22	4.21E-11	4.24E-11	4.23E-11	4.23E-11	4.23E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.77E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
na 24m	4.55E-15	4.54E-15	4.54E-15	4.53E-15	4.53E-15
na 25	2.69E-24	3.01E-24	3.34E-24	3.68E-24	4.04E-24
mg 24	5.11E-02	5.40E-02	5.69E-02	5.97E-02	6.26E-02
mg 25	9.35E-08	1.04E-07	1.16E-07	1.28E-07	1.40E-07
mg 26	1.03E-06	1.10E-06	1.16E-06	1.23E-06	1.29E-06
mg 27	2.13E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12
mg 28	4.27E-24	4.29E-24	4.28E-24	4.28E-24	4.27E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.05E-10	2.05E-10	2.05E-10	2.04E-10	2.04E-10
al 29	2.07E-22	2.32E-22	2.58E-22	2.86E-22	3.15E-22
al 30	1.56E-32	1.86E-32	2.20E-32	2.56E-32	2.97E-32
si 28	1.49E-01	1.57E-01	1.66E-01	1.74E-01	1.82E-01
si 29	8.01E-07	8.98E-07	1.00E-06	1.11E-06	1.22E-06
si 30	4.53E-12	5.40E-12	6.36E-12	7.43E-12	8.62E-12
si 31	3.20E-24	3.81E-24	4.49E-24	5.24E-24	6.08E-24
si 32	4.68E-30	5.62E-30	6.67E-30	7.85E-30	9.16E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.67E+08	2.67E+08	2.67E+08	2.66E+08

0
1

sas2h: far-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 50
power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d
he 4	2.86E+00	2.26E+00	2.47E+00	2.69E+00	2.91E+00
pb206	7.39E-04	8.69E-04	1.01E-03	1.17E-03	1.34E-03
pb207	1.22E-04	1.37E-04	1.54E-04	1.72E-04	1.90E-04
pb208	1.93E-05	2.18E-05	2.44E-05	2.72E-05	3.01E-05
pb209	1.96E-11	2.19E-11	2.44E-11	2.69E-11	2.96E-11
pb210	1.60E-05	1.75E-05	1.92E-05	2.08E-05	2.25E-05
pb211	6.09E-12	6.47E-12	6.85E-12	7.24E-12	7.62E-12
pb212	1.47E-11	1.78E-11	1.88E-11	1.98E-11	2.09E-11
pb214	3.63E-11	4.01E-11	4.38E-11	4.76E-11	5.14E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.04E-05	6.01E-05	7.09E-05	8.28E-05	9.60E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	9.82E-09	1.08E-08	1.18E-08	1.28E-08	1.39E-08
bi211	3.61E-13	3.84E-13	4.06E-13	4.29E-13	4.52E-13
bi212	1.59E-12	1.68E-12	1.78E-12	1.88E-12	1.98E-12
bi213	4.57E-12	5.11E-12	5.69E-12	6.29E-12	6.91E-12
bi214	2.71E-11	2.98E-11	3.25E-11	3.53E-11	3.82E-11
po210	2.71E-07	2.98E-07	3.26E-07	3.54E-07	3.83E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.99E-16	4.24E-16	4.49E-16	4.74E-16	4.99E-16

po212	8.33E-23	8.83E-23	9.37E-23	9.88E-23	1.04E-22
po213	6.87E-21	7.49E-21	8.15E-21	9.45E-21	1.04E-20
po214	3.72E-18	4.10E-18	4.47E-18	4.86E-18	5.25E-18
po215	5.00E-18	5.32E-18	5.63E-18	5.95E-18	6.27E-18
po216	6.33E-17	6.72E-17	7.11E-17	7.51E-17	7.90E-17
po218	4.22E-12	4.44E-12	5.07E-12	5.51E-12	5.95E-12
rn218	2.44E-28	2.60E-28	2.75E-28	2.90E-28	3.05E-28
rn219	1.11E-14	1.18E-14	1.25E-14	1.32E-14	1.39E-14
rn220	2.43E-14	2.58E-14	2.73E-14	2.88E-14	3.03E-14
rn222	7.49E-09	8.24E-09	9.00E-09	9.78E-09	1.06E-08
ra222	2.63E-25	2.82E-25	2.98E-25	3.14E-25	3.31E-25
ra223	2.78E-09	2.95E-09	3.13E-09	3.30E-09	3.48E-09
ra224	1.38E-10	1.47E-10	1.55E-10	1.64E-10	1.72E-10
ra225	2.14E-09	2.39E-09	2.66E-09	2.94E-09	3.23E-09
ra226	1.14E-03	1.26E-03	1.38E-03	1.49E-03	1.62E-03
ra228	8.53E-12	9.09E-12	9.64E-12	1.02E-11	1.07E-11
ac225	1.44E-09	1.42E-09	1.60E-09	1.99E-09	2.18E-09
ac227	1.93E-06	2.05E-06	2.17E-06	2.30E-06	2.42E-06
ac228	1.04E-15	1.11E-15	1.18E-15	1.24E-15	1.31E-15
th226	1.29E-23	1.38E-23	1.45E-23	1.53E-23	1.61E-23
th227	4.48E-09	4.76E-09	5.05E-09	5.33E-09	5.61E-09
th228	2.63E-08	2.80E-08	2.96E-08	3.13E-08	3.29E-08
th229	4.15E-04	4.65E-04	5.17E-04	5.72E-04	6.28E-04
th230	1.03E-01	1.10E-01	1.16E-01	1.23E-01	1.29E-01
th231	3.37E-09	3.39E-09	3.42E-09	3.44E-09	3.46E-09
th232	2.09E-02	2.22E-02	2.36E-02	2.49E-02	2.62E-02
th233	1.90E-13	2.02E-13	2.13E-13	2.25E-13	2.37E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.90E-03	3.09E-03	3.27E-03	3.45E-03	3.44E-03
pa232	4.91E-11	5.22E-11	5.53E-11	5.83E-11	6.14E-11

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 51
power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d
pa233	1.43E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	6.08E-12	6.08E-12	6.08E-12	6.08E-12	6.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.25E-20	1.33E-20	1.41E-20	1.49E-20	1.56E-20
u231	4.05E-17	4.31E-17	4.35E-17	4.79E-17	5.03E-17
u232	9.59E-07	1.02E-06	1.08E-06	1.14E-06	1.20E-06
u233	5.30E-02	5.62E-02	5.94E-02	6.26E-02	6.58E-02
u234	9.59E+00	9.63E+00	9.66E+00	9.70E+00	9.73E+00
u235	7.02E+02	7.00E+02	6.99E+02	6.97E+02	6.96E+02
u236	1.79E+02	1.79E+02	1.79E+02	1.80E+02	1.80E+02
u237	3.18E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	1.74E-38	2.96E-38	4.85E-38	7.75E-38	1.21E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.71E-12	8.75E-12	8.74E-12	8.73E-12	8.72E-12
np236m	2.07E-12	2.08E-12	2.08E-12	2.07E-12	2.07E-12
np236	7.90E-07	8.38E-07	8.66E-07	9.33E-07	9.81E-07
np237	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01
np238	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.52E-06
np239	4.58E-05	4.59E-05	4.59E-05	4.58E-05	4.58E-05
np240m	1.49E-40	2.52E-40	4.14E-40	6.61E-40	1.03E-39
np240	9.21E-15	9.22E-15	9.20E-15	9.19E-15	9.18E-15

np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.12E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	3.83E-13	3.93E-13	4.01E-13	4.09E-13	4.16E-13
pu238	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
pu239	1.79E+01	1.88E+01	1.98E+01	2.07E+01	2.17E+01
pu240	3.07E-01	3.41E-01	3.76E-01	4.13E-01	4.50E-01
pu241	1.26E-04	1.40E-04	1.55E-04	1.70E-04	1.85E-04
pu242	1.09E-05	1.31E-05	1.56E-05	1.85E-05	2.16E-05
pu243	2.29E-14	2.77E-14	3.31E-14	3.90E-14	4.55E-14
pu244	8.68E-28	1.47E-27	2.42E-27	3.86E-27	6.01E-27
pu245	3.49E-38	5.92E-38	9.73E-38	1.55E-37	2.41E-37
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	7.83E-19	8.90E-19	9.96E-19	1.11E-18	1.22E-18
am240	3.58E-16	4.07E-16	4.56E-16	5.06E-16	5.59E-16
am241	2.82E-03	3.18E-03	3.57E-03	3.97E-03	4.38E-03
am242m	1.28E-06	1.46E-06	1.64E-06	1.84E-06	2.04E-06
am242	1.13E-10	1.28E-10	1.43E-10	1.59E-10	1.76E-10
am243	6.34E-08	7.87E-08	9.63E-08	1.16E-07	1.39E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	4.82E-16	5.98E-16	7.32E-16	8.84E-16	1.06E-15
am245	7.70E-39	1.30E-38	2.12E-38	3.36E-38	5.20E-38
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	6.68E-21	7.58E-21	8.49E-21	9.44E-21	1.04E-20
cm242	2.28E-08	2.58E-08	2.90E-08	3.22E-08	3.56E-08
cm243	1.63E-17	1.88E-17	2.12E-17	2.38E-17	2.65E-17
cm244	7.57E-12	9.40E-12	1.15E-11	1.39E-11	1.66E-11

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 52
power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d
cm245	6.31E-15	8.32E-15	1.08E-14	1.38E-14	1.73E-14
cm246	2.38E-17	3.33E-17	4.56E-17	6.13E-17	8.10E-17
cm247	1.56E-21	2.33E-21	3.39E-21	4.82E-21	6.73E-21
cm248	1.81E-24	1.61E-24	2.49E-24	3.76E-24	5.54E-24
cm249	3.18E-35	5.06E-35	7.82E-35	1.18E-34	1.76E-34
cm250	5.86E-40	9.92E-40	1.63E-39	2.59E-39	4.03E-39
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.67E+08	2.67E+08	2.67E+08	2.66E+08

0 .results on logical unit no. 71, position 1, for time step 4, subcase 6. (run position 1, case position 1)
title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 53
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0 nuclide concentrations, grams
basis = single reactor assembly

	initial	304.4 d	608.8 d	912.1 d	1217.5 d	1521.9 d	1826.3 d
h 1	4.34E-04	4.34E-04	4.34E-04	4.34E-04	4.34E-04	4.34E-04	4.34E-04
h 2	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06
he 4	2.88E-04	2.88E-04	2.88E-04	2.88E-04	2.88E-04	2.88E-04	2.88E-04
na 20	1.73E-04	1.73E-04	1.73E-04	1.73E-04	1.73E-04	1.73E-04	1.73E-04
na 22	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06
na 23	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05
mg 24	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
mg 25	3.51E-06	3.51E-06	3.51E-06	3.51E-06	3.51E-06	3.51E-06	3.51E-06
mg 26	3.36E-05	3.36E-05	3.36E-05	3.36E-05	3.36E-05	3.36E-05	3.36E-05
al 27	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06
si 28	5.10E+00	5.10E+00	5.10E+00	5.10E+00	5.10E+00	5.10E+00	5.10E+00

si 29	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05
total	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 54
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

element radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.32E-06	1.26E-06	1.20E-06	1.15E-06	1.10E-06	1.05E-06	9.99E-07
na	8.43E+00	4.46E-06	3.73E-06	2.99E-06	2.39E-06	1.92E-06	1.53E-06
totals	2.56E+01	5.92E-06	4.93E-06	4.14E-06	3.49E-06	2.96E-06	2.53E-06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 55
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na	1.71E-01	6.59E-08	5.28E-08	4.23E-08	3.38E-08	2.71E-08	2.17E-08
totals	4.78E-01	6.59E-08	5.28E-08	4.23E-08	3.39E-08	2.71E-08	2.17E-08

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 56
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 22	7.56E-08	6.05E-08	4.85E-08	3.88E-08	3.11E-08	2.49E-08	1.99E-08
total	3.32E-01	6.05E-08	4.85E-08	3.88E-08	3.11E-08	2.49E-08	1.99E-08

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.92E+00	2.92E+00	2.92E+00
pb206	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03
pb207	1.90E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04
pb208	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.02E-05	3.02E-05
pb210	2.25E-05	2.25E-05	2.25E-05	2.25E-05	2.25E-05	2.25E-05	2.25E-05
bi209	9.60E-05	9.60E-05	9.61E-05	9.61E-05	9.62E-05	9.62E-05	9.63E-05
ra226	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03
ac227	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06
th229	6.28E-04	6.28E-04	6.29E-04	6.29E-04	6.29E-04	6.29E-04	6.29E-04
th230	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
th232	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02
th234	5.57E-07	5.57E-07	5.57E-07	5.57E-07	5.57E-07	5.57E-07	5.57E-07
pa231	5.64E-03	5.64E-03	5.64E-03	5.64E-03	5.64E-03	5.64E-03	5.64E-03
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
u232	1.20E-06	1.19E-06	1.18E-06	1.17E-06	1.16E-06	1.15E-06	1.14E-06
u233	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
u234	9.73E+00	9.73E+00	9.73E+00	9.73E+00	9.73E+00	9.73E+00	9.73E+00
u235	6.96E+02	6.96E+02	6.96E+02	6.96E+02	6.96E+02	6.96E+02	6.96E+02
u236	1.80E+02	1.80E+02	1.80E+02	1.80E+02	1.80E+02	1.80E+02	1.80E+02
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
np236	9.81E-07	9.81E-07	9.81E-07	9.81E-07	9.81E-07	9.81E-07	9.81E-07
np237	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01
pu238	2.31E-02	2.29E-02	2.28E-02	2.26E-02	2.25E-02	2.23E-02	2.22E-02
pu239	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01	2.17E+01
pu240	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01
pu241	1.85E-04	1.78E-04	1.71E-04	1.64E-04	1.57E-04	1.51E-04	1.45E-04
pu242	2.16E-05	2.16E-05	2.16E-05	2.16E-05	2.16E-05	2.16E-05	2.16E-05

am241	4.38E-03	4.38E-03	4.38E-03	4.38E-03	4.38E-03	4.38E-03	4.38E-03
am242m	2.04E-06	2.03E-06	2.02E-06	2.01E-06	2.00E-06	2.00E-06	1.99E-06
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 58
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.92E+00	2.92E+00	2.92E+00
pb	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03
bi	9.60E-05	9.61E-05	9.61E-05	9.62E-05	9.62E-05	9.62E-05	9.63E-05
ra	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03
ac	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06
th	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
pa	3.64E-03	3.64E-03	3.64E-03	3.64E-03	3.64E-03	3.64E-03	3.64E-03
u	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04
np	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01
pu	2.22E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01
am	4.38E-03	4.38E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 59
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01
pb206	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.76E-01	2.76E-01	2.76E-01
pb207	3.94E-02	3.94E-02	3.95E-02	3.95E-02	3.95E-02	3.95E-02	3.95E-02
pb208	6.26E-03	6.26E-03	6.27E-03	6.27E-03	6.27E-03	6.27E-03	6.27E-03
pb210	4.73E-03	4.73E-03	4.73E-03	4.73E-03	4.73E-03	4.73E-03	4.73E-03
bi209	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02
bi210	2.91E-06	2.91E-06	2.91E-06	2.91E-06	2.91E-06	2.91E-06	2.91E-06
po210	8.04E-05	7.95E-05	7.94E-05	7.93E-05	7.93E-05	7.93E-05	7.93E-05
rn222	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06
ra223	7.75E-07	7.77E-07	7.77E-07	7.77E-07	7.77E-07	7.77E-07	7.77E-07
ra225	7.27E-07	7.27E-07	7.27E-07	7.28E-07	7.28E-07	7.28E-07	7.28E-07
ra226	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.65E-01	3.66E-01	3.66E-01
ac227	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04
th227	1.27E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
th228	7.50E-06	7.49E-06	7.46E-06	7.43E-06	7.39E-06	7.34E-06	7.29E-06
th229	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
th230	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01
th231	8.00E-07	6.65E-07	6.65E-07	6.65E-07	6.65E-07	6.65E-07	6.65E-07
th232	6.08E+00	6.08E+00	6.08E+00	6.08E+00	6.08E+00	6.09E+00	6.09E+00
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	8.40E-01	8.40E-01	8.40E-01	8.40E-01	8.40E-01	8.40E-01	8.41E-01
pa233	3.36E-04	3.36E-04	3.36E-04	3.36E-04	3.36E-04	3.36E-04	3.36E-04
u232	2.78E-04	2.76E-04	2.73E-04	2.71E-04	2.69E-04	2.67E-04	2.65E-04
u233	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01
u234	2.28E+03	2.28E+03	2.28E+03	2.28E+03	2.28E+03	2.28E+03	2.28E+03
u235	1.63E+05	1.63E+05	1.63E+05	1.63E+05	1.63E+05	1.63E+05	1.63E+05
u236	4.25E+04	4.25E+04	4.25E+04	4.25E+04	4.25E+04	4.25E+04	4.25E+04
u238	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06	8.65E+06
np236	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04
np237	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03
pu238	5.49E+00	5.45E+00	5.41E+00	5.38E+00	5.34E+00	5.31E+00	5.27E+00
pu239	5.18E+03	5.18E+03	5.18E+03	5.18E+03	5.18E+03	5.18E+03	5.18E+03
pu240	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02

pu241	4.45E-02	4.28E-02	4.11E-02	3.95E-02	3.79E-02	3.44E-02	3.50E-02
pu242	5.22E-03	5.22E-03	5.22E-03	5.22E-03	5.22E-03	5.22E-03	5.22E-03
am241	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
am242m	4.93E-04	4.91E-04	4.89E-04	4.87E-04	4.85E-04	4.83E-04	4.81E-04
am243	3.38E-05	3.38E-05	3.38E-05	3.38E-05	3.38E-05	3.38E-05	3.38E-05
cm242	8.60E-06	5.29E-06	1.83E-06	1.42E-06	1.31E-06	1.27E-06	1.26E-06
total	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2 actinides page 60
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01
pb	3.25E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01
bi	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02	2.01E-02
po	8.04E-05	7.95E-05	7.94E-05	7.93E-05	7.93E-05	7.93E-05	7.93E-05
rn	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06
ra	3.65E-01	3.63E-01	3.65E-01	3.65E-01	3.65E-01	3.66E-01	3.66E-01
ac	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04	5.49E-04
th	3.59E+01	3.59E+01	3.59E+01	3.59E+01	3.59E+01	3.59E+01	3.60E+01
pa	8.40E-01	8.40E-01	8.40E-01	8.41E-01	8.41E-01	8.41E-01	8.41E-01
u	8.86E+06	8.86E+06	8.86E+06	8.86E+06	8.86E+06	8.86E+06	8.86E+06
np	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03	9.90E+03
pu	5.29E+03	5.29E+03	5.29E+03	5.29E+03	5.29E+03	5.29E+03	5.29E+03
am	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
cm	8.61E-06	5.30E-06	1.83E-06	1.43E-06	1.31E-06	1.27E-06	1.26E-06
totals	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2 actinides page 61
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	3.96E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02
tl208	2.21E-03	2.22E-03	2.21E-03	2.20E-03	2.19E-03	2.17E-03	2.16E-03
tl209	5.99E-04	5.99E-04	5.99E-04	5.99E-04	5.99E-04	6.00E-04	6.00E-04
pb209	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.84E-02
pb210	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01
pb211	3.97E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
pb212	6.15E-03	6.16E-03	6.14E-03	6.11E-03	6.08E-03	6.04E-03	6.00E-03
pb214	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.62E-01
bi210	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01
bi211	3.97E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
bi212	6.15E-03	6.16E-03	6.14E-03	6.11E-03	6.08E-03	6.04E-03	6.00E-03
bi213	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02
bi214	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.62E-01
po210	3.61E-01	3.57E-01	3.57E-01	3.56E-01	3.56E-01	3.56E-01	3.56E-01
po211	1.09E-04	1.10E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04
po212	3.94E-03	3.95E-03	3.94E-03	3.92E-03	3.90E-03	3.87E-03	3.85E-03
po213	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.79E-02	2.80E-02
po214	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01
po215	3.97E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
po216	6.15E-03	6.16E-03	6.14E-03	6.11E-03	6.08E-03	6.04E-03	6.00E-03
po218	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.62E-01	3.62E-01
at217	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02	2.86E-02
rn219	3.97E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
rn220	6.15E-03	6.16E-03	6.14E-03	6.11E-03	6.08E-03	6.04E-03	6.00E-03
rn222	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.62E-01	3.62E-01
fr221	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02	2.86E-02

fr223	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04
ra223	3.97E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
ra224	6.15E-03	6.14E-03	6.14E-03	6.11E-03	6.08E-03	6.06E-03	6.00E-03
ra225	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02	2.86E-02
ra226	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.61E-01	3.62E-01	3.62E-01
ra228	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07
ac225	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02	2.86E-02
ac227	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02
ac228	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07
th227	3.92E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02
th228	6.15E-03	6.14E-03	6.12E-03	6.09E-03	6.06E-03	6.02E-03	5.98E-03
th229	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.85E-02	2.86E-02	2.86E-02
th230	6.12E-01	6.13E-01	6.13E-01	6.13E-01	6.13E-01	6.13E-01	6.13E-01
th231	4.25E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01
th232	6.67E-07	6.67E-07	6.67E-07	6.68E-07	6.68E-07	6.68E-07	6.68E-07
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02	3.97E-02
pa233	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03
u232	6.14E-03	6.09E-03	6.04E-03	5.99E-03	5.94E-03	5.89E-03	5.84E-03
u233	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01
u234	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01
u235	3.53E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01	3.53E-01
u236	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00	2.75E+00
u237	6.18E+01	1.06E-04	1.02E-04	9.77E-05	9.38E-05	9.01E-05	8.66E-05

1

sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 62
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np236	3.05E-06	3.05E-06	3.05E-06	3.05E-06	3.05E-06	3.05E-06	3.05E-06
np237	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00	6.98E+00
np238	9.40E+01	2.32E-05	2.31E-05	2.30E-05	2.29E-05	2.28E-05	2.27E-05
np239	2.54E+03	6.76E-06	6.76E-06	6.76E-06	6.76E-06	6.76E-06	6.76E-06
pu236	1.39E-04	1.14E-04	9.34E-05	7.66E-05	6.28E-05	5.15E-05	4.22E-05
pu238	9.40E+01	9.34E+01	9.28E+01	9.22E+01	9.16E+01	9.10E+01	9.04E+01
pu239	3.22E+02	3.22E+02	3.22E+02	3.22E+02	3.22E+02	3.22E+02	3.22E+02
pu240	2.45E+01	2.45E+01	2.45E+01	2.45E+01	2.45E+01	2.45E+01	2.45E+01
pu241	4.61E+00	4.42E+00	4.25E+00	4.08E+00	3.92E+00	3.77E+00	3.62E+00
pu242	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
am241	3.62E+00	3.62E+00	3.42E+00	3.42E+00	3.63E+00	3.63E+00	3.63E+00
am242m	3.17E-03	3.15E-03	3.12E-03	3.10E-03	3.08E-03	3.06E-03	3.04E-03
am242	3.65E-02	3.92E-03	3.10E-03	3.08E-03	3.06E-03	3.04E-03	3.02E-03
am243	6.76E-06	6.76E-06	6.76E-06	6.76E-06	6.76E-06	6.76E-06	6.76E-06
cm242	2.85E-02	1.89E-02	4.85E-03	4.71E-03	4.33E-03	4.21E-03	4.17E-03
total	5.73E+03	4.92E+02	4.92E+02	4.91E+02	4.90E+02	4.89E+02	4.89E+02

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sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 63
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	1.78E-04	1.79E-04	1.79E-04	1.78E-04	1.78E-04	1.78E-04	1.77E-04
pb	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03
bi	7.27E-03	7.28E-03	7.28E-03	7.28E-03	7.28E-03	7.28E-03	7.28E-03
po	4.51E-02	4.50E-02	4.49E-02	4.49E-02	4.49E-02	4.50E-02	4.50E-02
at	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03

rn	1.38E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02
fr	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
ra	1.21E-02	1.21E-02	1.21E-02	1.21E-02	1.21E-02	1.21E-02	1.21E-02
ac	1.01E-03	1.01E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03
th	2.15E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02
pa	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02
u	7.58E+00	5.70E-01	5.70E-01	5.70E-01	5.70E-01	5.70E-01	5.70E-01
np	7.89E+00	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
pu	1.39E+01	1.39E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01
am	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
cm	1.04E-03	3.08E-04	2.21E-04	1.72E-04	1.38E-04	1.34E-04	1.32E-04
totals	2.88E+01	1.49E+01	1.49E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01

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sas2h: far-field crit based on h2u 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 64
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0

nuclide gamma power, watts
basis weight reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	5.17E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07
tl208	4.40E-05	4.41E-05	4.40E-05	4.38E-05	4.35E-05	4.33E-05	4.30E-05
tl209	7.53E-06	7.53E-06	7.53E-06	7.53E-06	7.53E-06	7.54E-06	7.54E-06
pb210	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05
pb211	1.59E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05
pb212	5.29E-06	5.30E-06	5.28E-06	5.26E-06	5.23E-06	5.20E-06	5.16E-06
pb214	5.35E-04	5.35E-04	5.35E-04	5.35E-04	5.36E-04	5.36E-04	5.36E-04
bi211	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
bi212	3.84E-06	3.84E-06	3.83E-06	3.81E-06	3.79E-06	3.77E-06	3.74E-06
bi213	2.13E-05	2.13E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05
bi214	3.23E-03	3.23E-03	3.23E-03	3.23E-03	3.23E-03	3.23E-03	3.23E-03
po210	1.02E-08	1.00E-08	1.00E-08	1.00E-08	1.00E-08	1.00E-08	1.00E-08
po214	1.78E-07	1.78E-07	1.78E-07	1.78E-07	1.78E-07	1.78E-07	1.78E-07
po215	4.13E-08	4.14E-08	4.14E-08	4.14E-08	4.14E-08	4.14E-08	4.14E-08
rn219	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05
rn220	2.22E-08	2.23E-08	2.22E-08	2.21E-08	2.20E-08	2.19E-08	2.17E-08
rn222	8.33E-07	8.33E-07	8.33E-07	8.33E-07	8.33E-07	8.34E-07	8.34E-07
fr221	5.00E-06	5.00E-06	5.00E-06	5.01E-06	5.01E-06	5.01E-06	5.01E-06
fr223	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07
ra223	3.14E-05	3.17E-05	3.17E-05	3.17E-05	3.17E-05	3.17E-05	3.17E-05
ra224	3.67E-07	3.48E-07	3.67E-07	3.65E-07	3.63E-07	3.61E-07	3.58E-07
ra225	2.43E-06	2.43E-06	2.43E-06	2.43E-06	2.44E-06	2.44E-06	2.44E-06
ra226	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05
ac225	2.84E-06	2.84E-06	2.84E-06	2.84E-06	2.84E-06	2.84E-06	2.84E-06
ac227	4.54E-08	4.54E-08	4.54E-08	4.54E-08	4.54E-08	4.54E-08	4.54E-08
th227	2.58E-05	2.58E-05	2.58E-05	2.58E-05	2.58E-05	2.58E-05	2.58E-05
th228	1.28E-07	1.28E-07	1.28E-07	1.27E-07	1.26E-07	1.26E-07	1.25E-07
th229	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05	1.60E-05
th230	6.10E-06	6.10E-06	6.10E-06	6.10E-06	6.10E-06	6.11E-06	6.11E-06
th231	7.82E-05	6.50E-05	6.50E-05	6.50E-05	6.50E-05	6.50E-05	6.50E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	9.41E-06	9.41E-06	9.41E-06	9.41E-06	9.42E-06	9.42E-06	9.42E-06
pa233	9.25E-03	9.25E-03	9.25E-03	9.25E-03	9.25E-03	9.25E-03	9.25E-03
pa234m	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04
pa234	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05
u232	7.69E-08	7.83E-08	7.77E-08	7.70E-08	7.64E-08	7.58E-08	7.52E-08
u233	1.09E-06	1.09E-06	1.09E-06	1.09E-06	1.09E-06	1.09E-06	1.09E-06
u234	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.35E-04
u235	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04
u236	2.77E-05	2.77E-05	2.77E-05	2.77E-05	2.77E-05	2.77E-05	2.77E-05
u237	5.22E-02	8.05E-08	8.40E-08	8.26E-08	7.93E-08	7.62E-08	7.32E-08
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05

np237	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03
np238	3.61E-01	8.88E-08	8.84E-08	8.81E-08	8.77E-08	8.74E-08	8.70E-08
np239	2.76E+00	7.36E-09	7.35E-09	7.35E-09	7.35E-09	7.35E-09	7.35E-09
pu238	1.06E-03	1.05E-03	1.05E-03	1.04E-03	1.03E-03	1.02E-03	1.02E-03
pu239	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03
pu240	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04
pu241	4.78E-08	4.59E-08	4.41E-08	4.23E-08	4.07E-08	3.91E-08	3.75E-08
am241	6.14E-04	6.14E-04	6.14E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04
am242m	1.87E-07	1.86E-07	1.85E-07	1.85E-07	1.84E-07	1.83E-07	1.82E-07
am242	3.97E-06	5.90E-07	5.87E-07	5.85E-07	5.83E-07	5.80E-07	5.78E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 65
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
am242	3.56E-07	1.36E-07	7.57E-08	5.89E-08	5.41E-08	5.27E-08	5.21E-08
total	3.97E+00	1.92E-02	1.92E-02	1.92E-02	1.92E-02	1.91E-02	1.91E-02

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 66
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.90E-05	3.72E-05	3.55E-05	3.38E-05	3.23E-05	3.08E-05	2.94E-05
li 6	9.49E-05	9.49E-05	9.49E-05	9.49E-05	9.49E-05	9.49E-05	9.49E-05
li 7	2.29E-06	2.29E-06	2.29E-06	2.29E-06	2.29E-06	2.29E-06	2.29E-06
be 9	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06
be 10	2.94E-05	2.94E-05	2.94E-05	2.94E-05	2.94E-05	2.94E-05	2.94E-05
c 14	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06
zn 70	5.31E-07	5.31E-07	5.31E-07	5.31E-07	5.31E-07	5.31E-07	5.31E-07
ga 71	6.77E-06	6.77E-06	6.77E-06	6.77E-06	6.77E-06	6.77E-06	6.77E-06
ga 72	6.82E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04
ga 73	2.85E-03	2.85E-03	2.85E-03	2.85E-03	2.85E-03	2.85E-03	2.85E-03
ga 74	2.47E-03	2.47E-03	2.47E-03	2.47E-03	2.47E-03	2.47E-03	2.47E-03
as 75	2.82E-02	2.82E-02	2.82E-02	2.82E-02	2.82E-02	2.82E-02	2.82E-02
ge 74	9.28E-02	9.28E-02	9.28E-02	9.28E-02	9.28E-02	9.28E-02	9.28E-02
se 76	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05
se 77	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
se 78	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01
se 79	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00
br 79	5.96E-03	5.96E-03	5.96E-03	5.96E-03	5.96E-03	5.97E-03	5.97E-03
se 80	5.37E+00	5.37E+00	5.37E+00	5.37E+00	5.37E+00	5.37E+00	5.37E+00
kr 80	5.14E-06	5.14E-06	5.14E-06	5.14E-06	5.14E-06	5.14E-06	5.14E-06
br 81	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00
se 82	8.60E+00	8.60E+00	8.60E+00	8.60E+00	8.60E+00	8.60E+00	8.60E+00
kr 82	5.27E-03	5.27E-03	5.27E-03	5.27E-03	5.27E-03	5.27E-03	5.27E-03
kr 83	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01
kr 84	2.89E+01	2.89E+01	2.89E+01	2.89E+01	2.89E+01	2.89E+01	2.89E+01
kr 85	2.98E-02	2.06E-02	1.95E-02	1.85E-02	1.75E-02	1.66E-02	1.58E-02
rb 85	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01	3.32E+01
kr 86	5.38E+01	5.38E+01	5.38E+01	5.38E+01	5.38E+01	5.38E+01	5.38E+01
sr 86	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03
rb 87	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.04E+01
sr 87	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
sr 88	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02
y 89	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
sr 90	1.36E+00	1.31E+00	1.28E+00	1.26E+00	1.23E+00	1.21E+00	1.18E+00
y 90	3.47E-04	3.40E-04	3.33E-04	3.26E-04	3.20E-04	3.13E-04	3.07E-04
zr 90	1.66E+02	1.66E+02	1.66E+02	1.66E+02	1.66E+02	1.66E+02	1.66E+02

zr 91	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02
zr 92	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02
zr 93	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02
nb 93	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
nb 93m	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03
zr 94	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02
nb 94	5.78E-05	5.78E-05	5.78E-05	5.78E-05	5.78E-05	5.78E-05	5.78E-05
mo 95	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02
zr 96	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02
mo 96	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01
mo 97	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02
mo 98	1.86E+02	1.86E+02	1.86E+02	1.86E+02	1.86E+02	1.86E+02	1.86E+02
tc 98	3.19E-05	3.19E-05	3.19E-05	3.19E-05	3.19E-05	3.19E-05	3.19E-05
tc 99	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02
ru 99	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00
mo100	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 47
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
ru100	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01
ru101	1.70E+02	1.70E+02	1.70E+02	1.70E+02	1.70E+02	1.70E+02	1.70E+02
ru102	1.45E+02	1.45E+02	1.45E+02	1.45E+02	1.45E+02	1.45E+02	1.45E+02
rh103	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02
ru104	7.03E+01	7.03E+01	7.03E+01	7.03E+01	7.03E+01	7.03E+01	7.03E+01
pd104	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
pd105	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01
ru106	7.16E-03	4.06E-03	2.30E-03	1.30E-03	7.39E-04	4.19E-04	2.37E-04
pd106	2.06E+01	2.06E+01	2.06E+01	2.06E+01	2.06E+01	2.06E+01	2.06E+01
pd107	9.81E+00	9.81E+00	9.81E+00	9.81E+00	9.81E+00	9.81E+00	9.81E+00
ag107	2.32E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03
pd108	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00
cd108	2.38E-06	2.38E-06	2.38E-06	2.38E-06	2.38E-06	2.38E-06	2.38E-06
ag109	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00
pd110	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00
cd110	2.78E-02	2.78E-02	2.78E-02	2.78E-02	2.78E-02	2.78E-02	2.78E-02
cd111	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00
cd112	7.83E-01	7.83E-01	7.83E-01	7.83E-01	7.83E-01	7.83E-01	7.83E-01
cd113	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01
cd113m	5.85E-05	4.85E-05	4.65E-05	4.47E-05	4.29E-05	4.11E-05	3.95E-05
in113	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02
cd114	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00
sn114	7.66E-06	7.66E-06	7.66E-06	7.66E-06	7.66E-06	7.66E-06	7.66E-06
in115	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01	4.50E-01
sn115	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
cd116	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01	7.12E-01
sn116	5.47E-03	5.47E-03	5.47E-03	5.47E-03	5.47E-03	5.47E-03	5.47E-03
sn117	5.02E-01	5.02E-01	5.02E-01	5.02E-01	5.02E-01	5.02E-01	5.02E-01
sn118	4.89E-01	4.89E-01	4.89E-01	4.89E-01	4.89E-01	4.89E-01	4.89E-01
sn119	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01
sn120	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01
sn121m	7.28E-05	7.20E-05	7.12E-05	7.05E-05	6.98E-05	6.90E-05	6.83E-05
sb121	5.83E-01	5.83E-01	5.83E-01	5.83E-01	5.83E-01	5.83E-01	5.83E-01
sn122	6.85E-01	6.85E-01	6.85E-01	6.85E-01	6.85E-01	6.85E-01	6.85E-01
te122	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04
sb123	7.06E-01	7.06E-01	7.06E-01	7.06E-01	7.06E-01	7.06E-01	7.06E-01
sn124	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00
te124	7.94E-04	7.94E-04	7.94E-04	7.94E-04	7.94E-04	7.94E-04	7.94E-04

sb125	1.13E-03	9.16E-04	7.41E-04	6.00E-04	4.86E-04	3.93E-04	3.18E-04
te125	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00
te125m	1.51E-05	1.30E-05	1.05E-05	8.52E-06	6.90E-06	5.58E-06	4.52E-06
sn126	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
te126	4.89E-02	4.89E-02	4.89E-02	4.89E-02	4.89E-02	4.89E-02	4.89E-02
i127	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00
te128	1.54E+01	1.54E+01	1.54E+01	1.54E+01	1.54E+01	1.54E+01	1.54E+01
xe128	2.31E-03	2.31E-03	2.31E-03	2.31E-03	2.31E-03	2.31E-03	2.31E-03
i129	3.30E+01	3.30E+01	3.30E+01	3.30E+01	3.30E+01	3.30E+01	3.30E+01
xe129	3.61E-03	3.61E-03	3.61E-03	3.62E-03	3.62E-03	3.62E-03	3.62E-03
te130	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01
xe130	4.97E-02	4.97E-02	4.97E-02	4.97E-02	4.97E-02	4.97E-02	4.97E-02
xe131	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02
xe132	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 68
decay, following reactor irradiation identified by: power= 4.800E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec

0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
cs133	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02
xe134	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02
cs134	9.42E-04	7.12E-04	5.38E-04	4.07E-04	3.07E-04	2.32E-04	1.76E-04
ba134	7.97E-01	7.97E-01	7.97E-01	7.97E-01	7.97E-01	7.97E-01	7.97E-01
cs135	2.90E+02	2.90E+02	2.90E+02	2.90E+02	2.90E+02	2.90E+02	2.90E+02
ba135	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
xe136	2.81E+02	2.81E+02	2.81E+02	2.81E+02	2.81E+02	2.81E+02	2.81E+02
ba136	5.29E-01	5.29E-01	5.29E-01	5.29E-01	5.29E-01	5.29E-01	5.29E-01
cs137	2.44E+00	2.40E+00	2.35E+00	2.31E+00	2.26E+00	2.22E+00	2.18E+00
ba137	2.80E+02	2.80E+02	2.80E+02	2.80E+02	2.80E+02	2.80E+02	2.80E+02
ba138	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02
la138	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03
la139	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02
ce140	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02
pr141	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02
ce142	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02
nd142	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
nd143	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02
ce144	9.66E-02	2.70E-02	1.29E-02	6.14E-03	2.93E-03	1.40E-03	6.66E-04
nd144	2.57E+02	2.57E+02	2.57E+02	2.57E+02	2.57E+02	2.57E+02	2.57E+02
nd145	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02
nd146	1.43E+02	1.43E+02	1.43E+02	1.43E+02	1.43E+02	1.43E+02	1.43E+02
sm146	6.38E-05	6.38E-05	6.38E-05	6.38E-05	6.38E-05	6.38E-05	6.38E-05
pm147	8.19E-02	6.65E-02	5.33E-02	4.28E-02	3.43E-02	2.75E-02	2.21E-02
sm147	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02
nd148	8.14E+01	8.14E+01	8.14E+01	8.14E+01	8.14E+01	8.14E+01	8.14E+01
sm148	6.52E-01	6.52E-01	6.52E-01	6.52E-01	6.52E-01	6.52E-01	6.52E-01
sm149	7.89E+00	7.89E+00	7.89E+00	7.89E+00	7.89E+00	7.89E+00	7.89E+00
nd150	3.33E+01	3.33E+01	3.33E+01	3.33E+01	3.33E+01	3.33E+01	3.33E+01
sm150	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01
sm151	5.80E-01	5.76E-01	5.72E-01	5.69E-01	5.65E-01	5.62E-01	5.58E-01
eu151	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
sm152	1.69E+01	1.69E+01	1.69E+01	1.69E+01	1.69E+01	1.69E+01	1.69E+01
eu152	2.19E-02	2.10E-02	2.01E-02	1.93E-02	1.84E-02	1.77E-02	1.69E-02
gd152	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00
eu153	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00
sm154	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00
eu154	7.29E-04	6.82E-04	6.37E-04	5.96E-04	5.57E-04	5.21E-04	4.87E-04
gd154	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
eu155	2.96E-03	2.62E-03	2.31E-03	2.03E-03	1.81E-03	1.60E-03	1.41E-03

gd155	4.99E-01	4.99E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01
gd156	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00
gd157	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02
gd158	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01
tb159	9.66E-02	9.66E-02	9.66E-02	9.66E-02	9.66E-02	9.66E-02	9.66E-02
gd160	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
dy160	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04
dy161	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02
dy162	6.06E-03	6.06E-03	6.06E-03	6.06E-03	6.06E-03	6.06E-03	6.06E-03
dy163	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03	2.28E-03
dy164	7.78E-04	7.78E-04	7.78E-04	7.78E-04	7.78E-04	7.78E-04	7.78E-04
ho165	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04	3.77E-04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 0% uo2 fission products page 69
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
er166	4.70E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05	4.70E-05
total	7.57E+03	7.57E+03	7.57E+03	7.57E+03	7.57E+03	7.57E+03	7.57E+03

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 0% uo2 fission products page 70
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.77E-01	3.59E-01	3.43E-01	3.27E-01	3.12E-01	2.98E-01	2.84E-01
be 10	4.58E-07	4.58E-07	4.58E-07	4.58E-07	4.58E-07	4.58E-07	4.58E-07
c 14	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05
se 79	1.55E-02	1.55E-02	1.55E-02	1.55E-02	1.55E-02	1.55E-02	1.55E-02
kr 85	8.54E+00	8.10E+00	7.67E+00	7.27E+00	6.89E+00	6.53E+00	6.18E+00
rb 87	6.02E-06	6.02E-06	6.02E-06	6.02E-06	6.02E-06	6.02E-06	6.02E-06
sr 90	1.89E+02	1.85E+02	1.81E+02	1.77E+02	1.74E+02	1.70E+02	1.67E+02
y 90	1.89E+02	1.85E+02	1.81E+02	1.77E+02	1.74E+02	1.70E+02	1.67E+02
y 91	1.91E+02	5.24E+00	1.42E-01	3.86E-03	1.05E-04	2.85E-06	7.74E-08
zr 93	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01
nb 93m	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01	3.17E-01
nb 94	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.08E-05
zr 95	2.14E+02	7.95E+00	2.94E-01	1.09E-02	4.04E-04	1.50E-05	5.54E-07
nb 95	2.14E+02	1.69E+01	1.47E-01	1.40E-02	1.09E-04	1.29E-05	1.22E-06
tc 99	3.35E+00	3.35E+00	3.35E+00	3.35E+00	3.35E+00	3.35E+00	3.35E+00
rh102	1.18E-05	9.87E-06	7.92E-06	6.49E-06	5.32E-06	4.36E-06	3.57E-06
ru106	2.37E+01	1.35E+01	7.63E+00	4.32E+00	2.45E+00	1.39E+00	7.87E-01
rh106	2.37E+01	1.35E+01	7.63E+00	4.32E+00	2.45E+00	1.39E+00	7.87E-01
pd107	5.05E-03	5.05E-03	5.05E-03	5.05E-03	5.05E-03	5.05E-03	5.05E-03
ag110m	2.47E-03	1.06E-03	4.57E-04	1.96E-04	8.43E-05	3.62E-05	1.56E-05
cd113m	1.13E-02	1.09E-02	1.04E-02	1.00E-02	9.62E-03	9.23E-03	8.86E-03
sn119m	1.77E-03	8.62E-04	4.19E-04	2.04E-04	9.94E-05	4.84E-05	2.36E-05
sn121	5.20E-01	1.80E-03	6.07E-03	2.04E-03	6.91E-03	2.08E-03	2.05E-03
sn121m	3.91E-03	3.87E-03	3.83E-03	3.79E-03	3.75E-03	3.71E-03	3.67E-03
sn123	6.09E-02	1.19E-02	2.32E-03	4.53E-04	8.83E-05	1.73E-05	3.38E-06
sb125	1.18E+00	9.60E-01	7.77E-01	6.29E-01	5.09E-01	4.12E-01	3.33E-01
te125m	2.72E-01	2.34E-01	1.90E-01	1.64E-01	1.24E-01	1.01E-01	8.14E-02
sn126	5.69E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02
sb126	1.53E-02	7.96E-03	7.96E-03	7.96E-03	7.96E-03	7.96E-03	7.96E-03
sb126m	6.70E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02
te127	4.02E+00	1.27E-01	1.03E-02	8.65E-03	7.82E-04	5.51E-05	4.06E-06
te127m	8.66E-01	1.30E-01	1.07E-02	8.70E-03	7.90E-04	5.83E-05	4.12E-06
i129	5.83E-03	5.83E-03	5.83E-03	5.83E-03	5.83E-03	5.83E-03	5.83E-03
cs134	1.22E+00	9.22E-01	6.97E-01	5.26E-01	3.98E-01	3.01E-01	2.27E-01

cs135	3.34E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01
cs137	2.13E+02	2.09E+02	2.05E+02	2.01E+02	1.97E+02	1.93E+02	1.90E+02
ba137m	2.01E+02	1.97E+02	1.93E+02	1.90E+02	1.86E+02	1.82E+02	1.79E+02
ce142	6.49E-06	6.49E-06	6.49E-06	6.49E-06	6.49E-06	6.49E-06	6.49E-06
ce144	1.80E+02	8.39E+01	4.10E+01	1.95E+01	9.32E+00	4.45E+00	2.12E+00
pr144	1.80E+02	8.39E+01	4.10E+01	1.95E+01	9.32E+00	4.45E+00	2.12E+00
pr144m	2.53E+00	1.20E+00	5.74E-01	2.74E-01	1.31E-01	6.23E-02	2.97E-02
pm147	7.59E+01	4.16E+01	4.95E+01	5.97E+01	5.48E+01	2.55E+01	2.05E+01
sm147	2.47E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06
eu150	1.11E-06	1.09E-06	1.07E-06	1.05E-06	1.04E-06	1.02E-06	1.00E-06
sm151	1.53E+01	1.52E+01	1.51E+01	1.50E+01	1.49E+01	1.48E+01	1.47E+01
eu152	3.87E+00	3.71E+00	3.55E+00	3.40E+00	3.25E+00	3.12E+00	2.98E+00
gd153	1.77E-02	7.38E-03	3.08E-03	1.29E-03	5.37E-04	2.24E-04	9.36E-05
eu154	1.97E-01	1.84E-01	1.72E-01	1.61E-01	1.51E-01	1.41E-01	1.32E-01
eu155	1.46E+00	1.29E+00	1.14E+00	1.01E+00	8.92E-01	7.88E-01	6.97E-01
ho166m	5.32E-07	5.32E-07	5.32E-07	5.32E-07	5.31E-07	5.31E-07	5.31E-07
total	2.06E+04	1.11E+03	9.42E+02	8.46E+02	8.18E+02	7.84E+02	7.58E+02

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 71
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.27E-05	1.21E-05	1.16E-05	1.10E-05	1.05E-05	1.01E-05	9.59E-06
c	5.84E-09	5.84E-09	5.84E-09	5.84E-09	5.84E-09	5.84E-09	5.84E-09
se	3.18E+00	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06
kr	1.24E+01	1.21E-02	1.15E-02	1.09E-02	1.03E-02	9.79E-03	9.27E-03
sr	1.96E+01	2.23E-01	2.10E-01	2.06E-01	2.02E-01	1.98E-01	1.94E-01
y	2.76E+01	1.04E+00	1.00E+00	9.82E-01	9.42E-01	9.42E-01	9.23E-01
zr	1.19E+01	4.01E-02	1.52E-03	9.06E-05	3.77E-05	3.57E-05	3.57E-05
nb	2.16E+01	6.11E-02	3.14E-03	1.70E-04	5.88E-05	5.47E-05	5.45E-05
tc	7.19E+00	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03
ru	9.26E-01	2.56E-03	4.62E-04	2.57E-04	1.44E-04	8.26E-05	4.68E-05
rh	4.43E-01	1.29E-01	7.31E-02	4.14E-02	2.35E-02	1.53E-02	7.55E-03
pd	4.86E-02	2.78E-07	2.78E-07	2.78E-07	2.78E-07	2.78E-07	2.78E-07
ag	8.74E-02	1.78E-05	7.66E-06	3.29E-06	1.42E-06	6.09E-07	2.62E-07
cd	7.30E-02	1.25E-05	1.14E-05	1.09E-05	1.05E-05	1.00E-05	9.46E-06
sn	1.87E+00	1.29E-04	9.90E-05	9.31E-05	9.18E-05	9.16E-05	9.15E-05
sb	7.48E+00	3.92E-03	3.34E-03	2.87E-03	2.49E-03	2.19E-03	1.94E-03
te	9.16E+00	4.78E-04	1.95E-04	1.34E-04	1.05E-04	8.48E-05	6.85E-05
i	2.06E+01	2.73E-06	2.73E-06	2.73E-06	2.73E-06	2.73E-06	2.73E-06
cs	1.80E+01	2.41E-01	2.33E-01	2.29E-01	2.23E-01	2.18E-01	2.13E-01
ba	1.18E+01	7.76E-01	7.59E-01	7.45E-01	7.31E-01	7.17E-01	7.03E-01
ce	4.34E+00	5.67E-02	2.68E-02	1.28E-02	6.10E-03	2.91E-03	1.39E-03
pr	6.18E+00	6.31E-01	3.81E-01	1.44E-01	6.85E-02	3.27E-02	1.56E-02
pm	3.61E-01	2.26E-02	1.82E-02	1.46E-02	1.17E-02	9.38E-03	7.53E-03
sm	2.66E-02	1.78E-03	1.77E-03	1.76E-03	1.75E-03	1.74E-03	1.73E-03
eu	5.48E-02	3.10E-02	2.95E-02	2.82E-02	2.69E-02	2.57E-02	2.45E-02
gd	3.26E-04	6.49E-06	2.71E-06	1.13E-06	4.72E-07	1.97E-07	8.23E-08
ho	2.50E-07	5.39E-09	5.59E-09	5.59E-09	5.59E-09	5.58E-09	5.58E-09
totals	2.58E+02	3.29E+00	2.68E+00	2.42E+00	2.27E+00	2.17E+00	2.10E+00

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 72
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 83	1.13E-04	1.07E-04	1.01E-04	9.61E-05	9.10E-05	8.63E-05	8.17E-05
y 90	1.90E-06	1.86E-06	1.82E-06	1.79E-06	1.75E-06	1.71E-06	1.68E-06
nb 93m	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06

nb 94	1.01E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07
zr 93	9.31E-01	3.45E-02	1.28E-03	4.73E-05	1.75E-06	4.49E-08	2.40E-09
nb 93	9.71E-01	7.65E-02	2.03E-03	1.09E-04	4.03E-06	1.49E-07	5.53E-09
tc 99	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08
rh102	1.51E-07	1.24E-07	1.01E-07	8.31E-08	6.81E-08	5.58E-08	4.57E-08
rh106	2.90E-02	1.64E-02	9.31E-03	5.28E-03	2.99E-03	1.70E-03	9.61E-04
ag110m	4.02E-05	1.73E-05	7.42E-06	3.19E-06	1.37E-06	5.88E-07	2.53E-07
sn121m	1.16E-07	1.15E-07	1.13E-07	1.12E-07	1.11E-07	1.10E-07	1.09E-07
sb125	3.04E-03	2.47E-03	2.00E-03	1.62E-03	1.31E-03	1.06E-03	8.58E-04
te125m	5.74E-05	4.94E-05	4.00E-05	3.24E-05	2.62E-05	2.12E-05	1.72E-05
sn126	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05
sb126	2.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
sb126m	4.17E-04	3.24E-04	3.24E-04	3.24E-04	3.24E-04	3.24E-04	3.24E-04
i129	8.51E-07	8.51E-07	8.51E-07	8.51E-07	8.51E-07	8.51E-07	8.51E-07
cs134	1.12E-02	8.50E-03	6.42E-03	4.85E-03	3.67E-03	2.77E-03	2.09E-03
ba137m	7.13E-01	7.00E-01	6.86E-01	6.73E-01	6.60E-01	6.48E-01	6.35E-01
ce144	2.03E-02	9.68E-03	4.62E-03	2.20E-03	1.05E-03	5.01E-04	2.39E-04
pr144	3.89E-02	1.47E-02	7.02E-03	3.35E-03	1.60E-03	7.62E-04	3.63E-04
pr144m	1.87E-04	8.92E-05	4.25E-05	2.03E-05	9.67E-06	4.61E-06	2.20E-06
pm147	1.97E-06	1.60E-06	1.28E-06	1.03E-06	8.27E-07	6.63E-07	5.32E-07
eu150	1.01E-08	9.89E-09	9.74E-09	9.58E-09	9.43E-09	9.28E-09	9.13E-09
sm151	1.28E-06	1.28E-06	1.27E-06	1.26E-06	1.25E-06	1.24E-06	1.24E-06
eu152	2.67E-02	2.55E-02	2.44E-02	2.34E-02	2.24E-02	2.15E-02	2.06E-02
gd153	1.13E-05	4.71E-06	1.97E-06	8.21E-07	3.43E-07	1.43E-07	5.97E-08
eu154	1.46E-03	1.37E-03	1.28E-03	1.20E-03	1.12E-03	1.05E-03	9.79E-04
eu155	5.60E-04	4.95E-04	4.38E-04	3.87E-04	3.42E-04	3.02E-04	2.67E-04
ho166m	5.14E-09	5.13E-09	5.13E-09	5.13E-09	5.13E-09	5.12E-09	5.12E-09
total	1.27E+02	8.93E-01	7.47E-01	7.17E-01	6.96E-01	6.78E-01	6.63E-01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 73
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.77E+08n/cm**2-sec
0 element gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.43E+00	1.07E-04	1.01E-04	9.61E-05	9.10E-05	8.63E-05	8.17E-05
y	9.58E+00	1.15E-04	4.88E-06	1.87E-06	1.75E-06	1.71E-06	1.68E-06
zr	4.73E+00	3.45E-02	1.28E-03	4.73E-05	1.75E-06	6.49E-08	2.40E-09
nb	9.17E+00	7.65E-02	2.04E-03	1.12E-04	7.46E-06	5.78E-06	5.63E-06
tc	3.63E+00	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08
rh	1.92E-01	1.64E-02	9.31E-03	5.28E-03	2.99E-03	1.70E-03	9.61E-04
ag	3.47E-02	1.73E-05	7.42E-06	3.19E-06	1.37E-06	5.89E-07	2.54E-07
sn	1.22E+00	4.47E-05	4.42E-05	4.41E-05	4.41E-05	4.41E-05	4.41E-05
sb	3.14E+00	3.12E-03	2.65E-03	2.27E-03	1.96E-03	1.71E-03	1.51E-03
te	5.69E+00	6.59E-05	4.18E-05	3.27E-05	2.63E-05	2.12E-05	1.72E-05
i	1.35E+01	8.51E-07	8.51E-07	8.51E-07	8.51E-07	8.51E-07	8.51E-07
cs	8.62E+00	8.50E-03	6.42E-03	4.85E-03	3.67E-03	2.77E-03	2.09E-03
ba	8.32E+00	7.00E-01	6.86E-01	6.73E-01	6.60E-01	6.48E-01	6.35E-01
ce	2.05E+00	9.81E-03	4.62E-03	2.20E-03	1.05E-03	5.01E-04	2.39E-04
pr	1.79E+00	1.48E-02	7.07E-03	3.37E-03	1.61E-03	7.67E-04	3.66E-04
pm	9.43E-02	1.67E-06	1.28E-06	1.03E-06	8.27E-07	6.64E-07	5.32E-07
sm	5.77E-03	1.28E-06	1.27E-06	1.26E-06	1.25E-06	1.24E-06	1.24E-06
eu	4.01E-02	2.74E-02	2.62E-02	2.50E-02	2.39E-02	2.28E-02	2.18E-02
gd	1.03E-04	4.71E-06	1.97E-06	8.21E-07	3.43E-07	1.43E-07	5.97E-08
ho	1.43E-08	5.13E-09	5.13E-09	5.13E-09	5.13E-09	5.12E-09	5.12E-09
totals	1.27E+02	8.93E-01	7.47E-01	7.17E-01	6.96E-01	6.78E-01	6.63E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 7305.mwd, flux= 2.77E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly
0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	5.17E+11	5.67E+04	4.54E+04	3.44E+04	2.91E+04	2.33E+04	1.87E+04
3.00E-02	1.70E+11	1.80E+04	1.44E+04	1.14E+04	9.27E+03	7.42E+03	5.95E+03
5.50E-02	1.18E+11	1.22E+04	9.76E+03	7.82E+03	6.26E+03	5.01E+03	4.02E+03
8.50E-02	4.92E+10	4.86E+03	5.69E+03	4.40E+03	3.52E+03	2.82E+03	2.26E+03
1.20E-01	4.92E+10	4.69E+03	3.75E+03	3.01E+03	2.41E+03	1.93E+03	1.54E+03
1.70E-01	5.15E+10	4.60E+03	3.69E+03	2.95E+03	2.37E+03	1.89E+03	1.52E+03
3.00E-01	5.90E+10	4.58E+03	3.67E+03	2.94E+03	2.35E+03	1.88E+03	1.51E+03
6.50E-01	2.90E+10	2.45E+05	1.96E+05	1.57E+05	1.26E+05	1.01E+05	8.07E+04
1.13E+00	4.99E+09	1.95E+05	1.56E+05	1.25E+05	1.00E+05	8.03E+04	6.43E+04
1.58E+00	9.07E+11	4.89E-01	3.91E-01	3.13E-01	2.51E-01	2.01E-01	1.61E-01
2.00E+00	1.80E+08	4.34E-02	3.48E-02	2.79E-02	2.23E-02	1.79E-02	1.43E-02
2.40E+00	3.64E+07	9.74E-03	7.80E-03	6.25E-03	5.00E-03	4.01E-03	3.21E-03
2.80E+00	2.14E+11	1.53E-04	1.22E-04	9.78E-05	7.83E-05	6.28E-05	5.03E-05
3.25E+00	1.38E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.83E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	8.15E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.37E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.19E+12	5.47E+05	4.38E+05	3.51E+05	2.81E+05	2.25E+05	1.80E+05
0 mev/sec	2.11E+12	3.84E+05	3.07E+05	2.44E+05	1.97E+05	1.58E+05	1.26E+05

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly
0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
		time after discharge					
1.00E-02	1.29E+06	1.42E-01	1.14E-01	9.09E-02	7.28E-02	5.83E-02	4.67E-02
3.00E-02	1.27E+06	1.35E-01	1.08E-01	8.68E-02	6.95E-02	5.57E-02	4.44E-02
5.50E-02	1.63E+06	1.68E-01	1.34E-01	1.07E-01	8.61E-02	6.89E-02	5.52E-02
8.50E-02	1.47E+06	1.46E-01	1.17E-01	9.35E-02	7.49E-02	6.00E-02	4.80E-02
1.20E-01	1.48E+06	1.41E-01	1.13E-01	9.02E-02	7.22E-02	5.79E-02	4.63E-02
1.70E-01	2.19E+06	1.96E-01	1.57E-01	1.25E-01	1.01E-01	8.05E-02	6.45E-02
3.00E-01	4.43E+06	3.44E-01	2.75E-01	2.20E-01	1.76E-01	1.41E-01	1.13E-01
6.50E-01	4.72E+06	3.98E+01	3.19E+01	2.55E+01	2.04E+01	1.64E+01	1.31E+01
1.13E+00	1.40E+06	5.49E+01	4.39E+01	3.52E+01	2.82E+01	2.26E+01	1.81E+01
1.58E+00	3.57E+08	1.92E-04	1.54E-04	1.23E-04	9.88E-05	7.92E-05	6.34E-05
2.00E+00	8.99E+04	2.17E-05	1.74E-05	1.39E-05	1.12E-05	8.94E-06	7.16E-06
2.40E+00	2.18E+04	5.84E-06	4.68E-06	3.75E-06	3.00E-06	2.40E-06	1.93E-06
2.80E+00	1.50E+08	1.07E-07	8.55E-08	6.85E-08	5.48E-08	4.39E-08	3.52E-08
3.25E+00	1.12E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.31E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.94E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	9.68E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.88E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.27E+01	9.59E+01	7.68E+01	6.15E+01	4.93E+01	3.95E+01	3.16E+01
0 gamma watts	3.38E-01	4.15E-08	4.92E-08	3.94E-08	3.16E-08	2.53E-08	2.03E-08

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photon spectrum as a function of time for fission products

0 ess2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 7305.mwd, flux= 2.77E+08 n**2-sec
0 spectrum of photon release rates, photons/sec
basis = single reactor assembly
0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d

1.00E-02	2.58E+14	6.27E+12	4.61E+12	5.80E+12	5.33E+12	5.07E+12	4.88E+12
3.00E-02	1.15E+14	3.63E+12	2.89E+12	2.52E+12	2.32E+12	2.19E+12	2.11E+12
5.50E-02	4.01E+13	1.84E+12	1.45E+12	1.26E+12	1.15E+12	1.09E+12	1.05E+12
8.50E-02	4.15E+13	1.07E+12	8.19E+11	6.96E+11	6.30E+11	5.91E+11	5.66E+11
1.20E-01	3.40E+13	1.11E+12	7.57E+11	5.86E+11	4.99E+11	4.51E+11	4.23E+11
1.70E-01	5.44E+13	4.84E+11	5.26E+11	4.50E+11	4.08E+11	3.84E+11	3.68E+11
3.00E-01	1.18E+14	7.96E+11	6.15E+11	5.25E+11	4.76E+11	4.47E+11	4.27E+11
6.50E-01	2.29E+14	8.41E+12	7.05E+12	6.78E+12	6.59E+12	6.43E+12	6.29E+12
1.13E+00	7.71E+13	1.34E+11	1.01E+11	8.81E+10	8.02E+10	7.48E+10	7.08E+10
1.58E+00	5.99E+13	4.76E+10	3.74E+10	3.17E+10	2.84E+10	2.62E+10	2.46E+10
2.00E+00	1.21E+13	2.91E+10	1.40E+10	6.82E+09	3.36E+09	1.69E+09	8.92E+08
2.40E+00	1.04E+13	7.82E+08	4.20E+08	2.27E+08	1.23E+08	6.72E+07	3.69E+07
2.80E+00	4.16E+12	1.09E+08	5.97E+07	3.29E+07	1.82E+07	1.01E+07	5.64E+06
3.25E+00	2.40E+12	1.50E+07	8.52E+06	4.83E+06	2.74E+06	1.55E+06	8.79E+05
3.75E+00	1.22E+12	6.63E+03	3.76E+03	2.13E+03	1.21E+03	6.84E+02	3.88E+02
4.25E+00	1.33E+12	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
4.75E+00	3.90E+11	5.03E-06	5.03E-06	5.03E-06	5.03E-06	5.03E-06	5.03E-06
5.50E+00	2.91E+11	3.73E-06	3.73E-06	3.73E-06	3.73E-06	3.73E-06	3.73E-06
total	1.03E+15	2.60E+13	2.09E+13	1.87E+13	1.75E+13	1.68E+13	1.62E+13
mev/sec	4.60E+14	8.62E+12	5.45E+12	5.13E+12	4.94E+12	4.79E+12	4.67E+12

spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	6.45E+08	2.07E+07	1.65E+07	1.45E+07	1.34E+07	1.27E+07	1.22E+07
3.00E-02	8.68E+08	2.72E+07	2.17E+07	1.89E+07	1.74E+07	1.65E+07	1.58E+07
5.50E-02	8.26E+08	2.53E+07	1.99E+07	1.73E+07	1.59E+07	1.50E+07	1.44E+07
8.50E-02	8.82E+08	2.37E+07	1.76E+07	1.48E+07	1.34E+07	1.26E+07	1.20E+07
1.20E-01	1.02E+09	2.52E+07	2.27E+07	1.76E+07	1.50E+07	1.35E+07	1.27E+07
1.70E-01	2.31E+09	2.91E+07	2.23E+07	1.91E+07	1.74E+07	1.63E+07	1.56E+07
3.00E-01	8.25E+09	5.97E+07	4.61E+07	3.94E+07	3.57E+07	3.35E+07	3.20E+07
6.50E-01	3.72E+10	1.37E+09	1.15E+09	1.10E+09	1.07E+09	1.06E+09	1.02E+09
1.13E+00	2.17E+10	3.48E+07	2.84E+07	2.48E+07	2.26E+07	2.10E+07	1.99E+07
1.58E+00	1.57E+10	1.87E+07	1.47E+07	1.25E+07	1.12E+07	1.03E+07	9.70E+06
2.00E+00	6.04E+09	1.45E+07	7.01E+06	3.41E+06	1.68E+06	8.47E+05	4.46E+05
2.40E+00	6.23E+09	4.49E+05	2.52E+05	1.46E+05	7.38E+04	4.03E+04	2.21E+04
2.80E+00	2.91E+09	7.61E+04	4.18E+04	2.30E+04	1.28E+04	7.09E+03	3.95E+03
3.25E+00	1.95E+09	1.22E+04	6.92E+03	3.92E+03	2.22E+03	1.26E+03	7.15E+02
3.75E+00	1.14E+09	6.21E+00	3.52E+00	2.00E+00	1.13E+00	6.41E-01	3.63E-01
4.25E+00	1.42E+09	1.06E-08	1.06E-08	1.06E-08	1.06E-08	1.06E-08	1.06E-08
4.75E+00	4.63E+08	5.97E-09	5.97E-09	5.97E-09	5.97E-09	5.97E-09	5.97E-09
5.50E+00	4.01E+08	5.13E-09	5.13E-09	5.13E-09	5.13E-09	5.13E-09	5.13E-09
total	1.10E+11	1.65E+09	1.36E+09	1.28E+09	1.23E+09	1.20E+09	1.17E+09
gamma watts	7.03E+01	1.06E+00	8.74E-01	8.23E-01	7.91E-01	7.68E-01	7.48E-01

principal photon sources in group 1, photons/sec
mean energy = .0180 mev. nuclides exceeding 1.0E-03 of total group release rate (5.07E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
kr 85	4.51E+10	4.27E+10	4.05E+10	3.84E+10	3.63E+10	3.44E+10	3.26E+10
sr 90	7.68E+11	7.52E+11	7.37E+11	7.22E+11	7.08E+11	6.93E+11	6.79E+11
y 90	3.77E+12	3.70E+12	3.62E+12	3.55E+12	3.48E+12	3.41E+12	3.34E+12
tc 99	5.54E+09	5.54E+09	5.54E+09	5.54E+09	5.54E+09	5.54E+09	5.54E+09
rh106	7.06E+11	6.00E+11	2.27E+11	1.29E+11	7.29E+10	4.13E+10	2.34E+10
cs137	7.51E+11	7.36E+11	7.22E+11	7.09E+11	6.95E+11	6.82E+11	6.69E+11
ba137m	3.52E+10	3.45E+10	3.39E+10	3.32E+10	3.26E+10	3.20E+10	3.14E+10
ce144	3.47E+11	1.65E+11	7.89E+10	3.76E+10	1.79E+10	8.56E+09	4.08E+09
pr144	4.60E+12	2.19E+12	1.05E+12	4.99E+11	2.38E+11	1.13E+11	5.41E+10
pm147	8.82E+10	7.16E+10	5.75E+10	4.61E+10	3.70E+10	2.97E+10	2.38E+10

eu152	1.43E+10	1.34E+10	1.31E+10	1.25E+10	1.20E+10	1.15E+10	1.10E+10

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (2.19E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	1.31E+10	1.24E+10	1.18E+10	1.12E+10	1.06E+10	1.00E+10	9.51E+09
sr 90	2.17E+11	2.13E+11	2.08E+11	2.04E+11	2.00E+11	1.96E+11	1.92E+11
y 90	1.23E+12	1.20E+12	1.18E+12	1.16E+12	1.13E+12	1.11E+12	1.09E+12
rh106	2.36E+11	1.34E+11	7.58E+10	4.30E+10	2.44E+10	1.38E+10	7.82E+09
sb125	2.17E+10	1.76E+10	1.43E+10	1.15E+10	9.34E+09	7.56E+09	6.12E+09
te125m	1.16E+10	1.00E+10	8.12E+09	6.57E+09	5.32E+09	4.30E+09	3.48E+09
cs137	2.09E+11	2.05E+11	2.01E+11	1.97E+11	1.94E+11	1.90E+11	1.86E+11
ba137m	6.05E+11	5.93E+11	5.82E+11	5.71E+11	5.60E+11	5.49E+11	5.39E+11
ce144	8.06E+11	5.84E+11	1.83E+11	6.74E+10	4.17E+10	1.99E+10	9.48E+09
pr144	1.52E+12	7.25E+11	3.46E+11	1.65E+11	7.87E+10	3.75E+10	1.79E+10
pm147	1.94E+10	1.57E+10	1.26E+10	1.01E+10	8.14E+09	6.53E+09	5.24E+09
eu152	5.66E+10	5.42E+10	5.19E+10	4.97E+10	4.76E+10	4.55E+10	4.36E+10

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (1.09E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	8.06E+09	7.63E+09	7.23E+09	6.85E+09	6.49E+09	6.15E+09	5.83E+09
sr 90	1.28E+11	1.26E+11	1.23E+11	1.21E+11	1.18E+11	1.16E+11	1.13E+11
y 90	8.50E+11	8.33E+11	8.16E+11	7.99E+11	7.83E+11	7.67E+11	7.51E+11
rh106	1.67E+11	9.47E+10	5.37E+10	3.04E+10	1.72E+10	9.78E+09	5.54E+09
cs137	1.22E+11	1.19E+11	1.17E+11	1.15E+11	1.13E+11	1.11E+11	1.08E+11
ce144	1.17E+11	5.56E+10	2.65E+10	1.26E+10	6.03E+09	2.88E+09	1.37E+09
pr144	1.07E+12	5.09E+11	2.43E+11	1.16E+11	5.52E+10	2.63E+10	1.26E+10
pm147	8.15E+09	6.62E+09	5.31E+09	4.26E+09	3.42E+09	2.74E+09	2.20E+09
eu152	4.91E+10	4.71E+10	4.51E+10	4.32E+10	4.13E+10	3.96E+10	3.79E+10
eu154	1.66E+09	1.55E+09	1.45E+09	1.36E+09	1.27E+09	1.19E+09	1.11E+09
eu155	1.13E+10	9.96E+09	8.80E+09	7.78E+09	6.87E+09	6.08E+09	5.37E+09

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0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (5.91E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	4.03E+09	3.82E+09	3.62E+09	3.43E+09	3.25E+09	3.08E+09	2.92E+09
sr 90	4.12E+10	3.99E+10	3.87E+10	3.75E+10	3.63E+10	3.52E+10	3.41E+10
y 90	4.92E+11	4.82E+11	4.72E+11	4.62E+11	4.53E+11	4.44E+11	4.35E+11
rh106	9.93E+10	5.63E+10	3.19E+10	1.81E+10	1.02E+10	5.81E+09	3.29E+09
sn126	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09
cs137	3.70E+10	3.59E+10	3.49E+10	3.38E+10	3.28E+10	3.18E+10	3.08E+10
ce144	1.65E+11	7.85E+10	3.74E+10	1.79E+10	8.51E+09	4.06E+09	1.94E+09
pr144	6.28E+11	3.00E+11	1.43E+11	6.82E+10	3.25E+10	1.55E+10	7.39E+09
pm147	2.32E+09	1.88E+09	1.51E+09	1.21E+09	9.73E+08	7.80E+08	6.26E+08
eu155	1.71E+10	1.51E+10	1.34E+10	1.18E+10	1.04E+10	9.23E+09	8.15E+09

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (4.31E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
				time after discharge			
kr 85	2.43E+09	2.30E+09	2.18E+09	2.07E+09	1.96E+09	1.86E+09	1.76E+09
sr 90	3.48E+10	3.41E+10	3.34E+10	3.27E+10	3.21E+10	3.14E+10	3.08E+10
y 90	3.46E+11	3.39E+11	3.32E+11	3.25E+11	3.19E+11	3.12E+11	3.06E+11
rh106	7.17E+10	4.06E+10	2.30E+10	1.31E+10	7.40E+09	4.20E+09	2.38E+09
cs137	3.20E+10	3.13E+10	3.07E+10	3.02E+10	2.96E+10	2.90E+10	2.85E+10
ce144	6.97E+11	3.85E+11	1.84E+11	8.75E+10	4.17E+10	1.99E+10	9.50E+09
pr144	4.50E+11	2.14E+11	1.02E+11	4.88E+10	2.33E+10	1.11E+10	5.29E+09
eu152	4.14E+10	3.96E+10	3.79E+10	3.63E+10	3.48E+10	3.33E+10	3.19E+10
eu154	3.09E+09	2.89E+09	2.70E+09	2.53E+09	2.36E+09	2.21E+09	2.07E+09

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    eu155   9.76E+09  8.43E+09  7.43E+09  6.74E+09  5.96E+09  5.27E+09  4.66E+09
0                 principal photon sources in group  6, photons/sec
    mean energy =  .1700 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.84E+11) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    kr 85   1.93E+09  1.83E+09  1.73E+09  1.64E+09  1.56E+09  1.48E+09  1.40E+09
    sr 90   2.48E+10  2.43E+10  2.38E+10  2.33E+10  2.29E+10  2.24E+10  2.20E+10
     y 90   5.57E+11  5.49E+11  5.42E+11  5.35E+11  5.29E+11  5.22E+11  5.15E+11
   rh106   7.69E+10  6.36E+10  2.67E+10  1.40E+10  7.94E+09  4.50E+09  2.55E+09
   sb125   3.27E+09  2.45E+09  2.19E+09  1.74E+09  1.41E+09  1.14E+09  9.21E+08
   cs137   2.26E+10  2.21E+10  2.17E+10  2.13E+10  2.09E+10  2.05E+10  2.01E+10
   pr144   4.75E+11  2.27E+11  1.08E+11  5.16E+10  2.46E+10  1.17E+10  5.60E+09
1                                                                                                          page 78
0                 principal photon sources in group  7, photons/sec
    mean energy =  .3000 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.47E+11) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
    kr 85   1.17E+09  1.10E+09  1.05E+09  9.92E+08  9.40E+08  8.91E+08  8.44E+08
    sr 90   1.13E+10  1.10E+10  1.08E+10  1.06E+10  1.04E+10  1.02E+10  9.95E+09
     y 90   3.96E+11  3.88E+11  3.80E+11  3.72E+11  3.65E+11  3.57E+11  3.50E+11
   rh106   9.28E+10  5.26E+10  2.98E+10  1.69E+10  9.58E+09  5.43E+09  3.08E+09
  sb126m   1.53E+09  1.30E+09  1.30E+09  1.30E+09  1.30E+09  1.30E+09  1.30E+09
   cs137   1.14E+10  1.12E+10  1.10E+10  1.08E+10  1.06E+10  1.04E+10  1.02E+10
   pr144   5.57E+11  2.65E+11  1.27E+11  6.04E+10  2.88E+10  1.37E+10  6.55E+09
   eu152   5.74E+10  5.49E+10  5.26E+10  5.04E+10  4.82E+10  4.62E+10  4.42E+10
0                 principal photon sources in group  8, photons/sec
    mean energy =  .6500 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.43E+12) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     y 90   1.67E+11  1.66E+11  1.61E+11  1.57E+11  1.54E+11  1.51E+11  1.48E+11
   rh106   2.86E+11  1.62E+11  9.20E+10  5.22E+10  2.96E+10  1.68E+10  9.50E+09
   sb125   2.66E+10  2.16E+10  1.74E+10  1.41E+10  1.14E+10  9.25E+09  7.48E+09
   cs134   1.03E+11  7.77E+10  5.67E+10  4.46E+10  3.35E+10  2.56E+10  1.92E+10
  ba137m   6.80E+12  6.67E+12  6.54E+12  6.42E+12  6.30E+12  6.18E+12  6.06E+12
   pr144   3.80E+11  1.81E+11  8.64E+10  4.12E+10  1.97E+10  9.37E+09  4.47E+09
   eu152   4.85E+10  3.88E+10  3.71E+10  3.56E+10  3.41E+10  3.26E+10  3.12E+10
0                 principal photon sources in group  9, photons/sec
    mean energy = 1.1250 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.48E+10) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     y 90   2.18E+10  2.14E+10  2.10E+10  2.05E+10  2.01E+10  1.97E+10  1.93E+10
   rh106   2.67E+10  1.51E+10  8.57E+09  4.86E+09  2.75E+09  1.56E+09  8.85E+08
   cs134   1.26E+09  9.52E+08  7.19E+08  5.44E+08  4.11E+08  3.10E+08  2.35E+08
   pr144   4.84E+10  2.32E+10  1.11E+10  5.27E+09  2.51E+09  1.20E+09  5.72E+08
   eu152   6.81E+10  5.76E+10  5.51E+10  5.28E+10  5.06E+10  4.84E+10  4.64E+10
   eu154   4.91E+09  4.59E+09  4.29E+09  4.01E+09  3.75E+09  3.51E+09  3.28E+09
0                 principal photon sources in group 10, photons/sec
    mean energy = 1.5750 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.62E+10) at  1521.9 d
nuclide                                          time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
     y 90   2.79E+09  2.73E+09  2.68E+09  2.62E+09  2.57E+09  2.52E+09  2.46E+09
   rh106   5.03E+09  2.85E+09  1.62E+09  9.16E+08  5.19E+08  2.94E+08  1.67E+08
   cs134   1.19E+09  8.99E+08  6.79E+08  5.13E+08  3.88E+08  2.93E+08  2.21E+08
   pr144   3.02E+10  1.44E+10  6.86E+09  3.28E+09  1.56E+09  7.46E+08  3.56E+08
   eu152   2.76E+10  2.65E+10  2.53E+10  2.43E+10  2.32E+10  2.22E+10  2.13E+10
   eu154   1.77E+08  1.66E+08  1.55E+08  1.45E+08  1.36E+08  1.27E+08  1.19E+08
1                                                                                                          page 79
0                 principal photon sources in group 11, photons/sec
    mean energy = 2.0000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.69E+09) at  1521.9 d
nuclide                                          time after discharge
```

```
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90   1.67E+08  1.43E+08  1.60E+08  1.57E+08  1.54E+08  1.50E+08  1.47E+08
  rh106   1.63E+09  9.27E+08  5.25E+08  2.98E+08  1.69E+08  9.57E+07  5.42E+07
  pr144   5.86E+10  2.80E+10  1.33E+10  6.36E+09  3.03E+09  1.45E+09  6.90E+08
0                 principal photon sources in group 12, photons/sec
    mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.72E+07) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90   9.73E+04  9.53E+04  9.34E+04  9.15E+04  8.96E+04  8.78E+04  8.60E+04
  rh106   9.14E+08  5.18E+08  2.94E+08  1.66E+08  9.43E+07  5.35E+07  3.03E+07
  pr144   5.54E+08  2.64E+08  1.26E+08  6.01E+07  2.87E+07  1.37E+07  6.52E+06
0                 principal photon sources in group 13, photons/sec
    mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.01E+07) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   1.54E+08  8.74E+07  4.95E+07  2.81E+07  1.59E+07  9.02E+06  5.11E+06
  pr144   4.46E+07  2.13E+07  1.02E+07  4.84E+06  2.31E+06  1.10E+06  5.25E+05
0                 principal photon sources in group 14, photons/sec
    mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.55E+06) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   2.65E+07  1.50E+07  8.52E+06  4.83E+06  2.74E+06  1.55E+06  8.79E+05
0                 principal photon sources in group 15, photons/sec
    mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (6.84E+02) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106   1.17E+04  6.63E+03  3.76E+03  2.13E+03  1.21E+03  6.84E+02  3.88E+02
0                 principal photon sources in group 16, photons/sec
    mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.00E-05) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   7.25E-06  7.25E-06  7.25E-06  7.25E-06  7.25E-06  7.25E-06  7.25E-06
  sm147   2.77E-06  2.77E-06  2.77E-06  2.77E-06  2.77E-06  2.77E-06  2.77E-06
1                                                                                                          page  80
0                 principal photon sources in group 17, photons/sec
    mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.03E-06) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   3.44E-06  3.44E-06  3.44E-06  3.44E-06  3.44E-06  3.44E-06  3.44E-06
  sm147   1.39E-06  1.39E-06  1.39E-06  1.39E-06  1.39E-06  1.39E-06  1.39E-06
0                 principal photon sources in group 18, photons/sec
    mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.73E-06) at  1521.9 d
nuclide                                   time after discharge
            initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142   2.70E-06  2.70E-06  2.70E-06  2.70E-06  2.70E-06  2.70E-06  2.70E-06
  sm147   1.03E-06  1.03E-06  1.03E-06  1.03E-06  1.03E-06  1.03E-06  1.03E-06
1                                                                                                          page  81

            photon spectrum as a function of time for heavy metals and their daughters

0                     ass2h: far-field grit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                              powers=    .00 mw, burnup=   7305.mwd, flux= 2.77E+08 n**2-sec
0                                   actinide photon release rates, photons/sec
                                 basis = single reactor assembly
0
          emean                                  time after discharge
          (mev)     initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
        1.00E-02  1.34E+14  1.96E+12  1.95E+12  1.95E+12  1.95E+12  1.94E+12  1.94E+12
        3.00E-02  8.43E+12  5.36E+10  5.36E+10  5.36E+10  5.36E+10  5.36E+10  5.36E+10
        5.50E-02  1.10E+13  7.96E+10  7.96E+10  7.96E+10  7.96E+10  7.96E+10  7.96E+10
        8.50E-02  5.25E+13  1.56E+11  1.56E+11  1.56E+11  1.56E+11  1.56E+11  1.56E+11
```

1.20E-01	5.42E+13	3.10E+10	3.10E+10	3.10E+10	3.10E+10	3.10E+10	3.10E+10
1.70E-01	1.72E+12	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10
3.00E-01	2.67E+13	1.42E+11	1.42E+11	1.42E+11	1.42E+11	1.42E+11	1.42E+11
4.50E-01	1.46E+12	1.50E+10	1.50E+10	1.50E+10	1.50E+10	1.50E+10	1.50E+10
1.13E+00	1.03E+12	4.98E+09	4.98E+09	4.98E+09	4.98E+09	4.98E+09	4.98E+09
1.58E+00	4.78E+09	4.78E+09	4.78E+09	4.78E+09	4.78E+09	4.78E+09	4.78E+09
2.00E+00	1.01E+09	1.01E+09	1.01E+09	1.01E+09	1.01E+09	1.01E+09	1.01E+09
2.40E+00	5.78E+08	5.78E+08	5.78E+08	5.78E+08	5.78E+08	5.78E+08	5.78E+08
2.80E+00	9.41E+07	9.43E+07	9.40E+07	9.37E+07	9.33E+07	9.28E+07	9.23E+07
3.25E+00	4.63E+06	4.63E+06	4.63E+06	4.63E+06	4.63E+06	4.64E+06	4.64E+06
3.75E+00	1.24E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04
4.25E+00	7.08E+03	7.08E+03	7.07E+03	7.07E+03	7.07E+03	7.06E+03	7.06E+03
4.75E+00	4.07E+03	4.06E+03	4.06E+03	4.06E+03	4.06E+03	4.05E+03	4.05E+03
5.50E+00	3.64E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.62E+03
total	2.94E+14	2.47E+12	2.46E+12	2.46E+12	2.45E+12	2.45E+12	2.45E+12
mev/sec	2.51E+13	1.15E+11	1.15E+11	1.15E+11	1.15E+11	1.15E+11	1.15E+11

actinide energy release rates, mev/watt-sec
basis = single reactor assembly

gmean (mev)	time after discharge: initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	3.36E+08	4.89E+06	4.88E+06	4.88E+06	4.87E+06	4.86E+06	4.85E+06
3.00E-02	6.34E+07	4.02E+05	4.02E+05	4.02E+05	4.02E+05	4.02E+05	4.02E+05
5.50E-02	1.51E+08	1.09E+06	1.09E+06	1.09E+06	1.09E+06	1.09E+06	1.09E+06
8.50E-02	1.12E+09	3.31E+06	3.31E+06	3.31E+06	3.31E+06	3.31E+06	3.31E+06
1.20E-01	1.63E+09	9.29E+05	9.29E+05	9.29E+05	9.29E+05	9.29E+05	9.29E+05
1.70E-01	7.31E+07	8.56E+05	8.56E+05	8.56E+05	8.56E+05	8.56E+05	8.56E+05
3.00E-01	2.15E+09	1.06E+07	1.06E+07	1.06E+07	1.06E+07	1.06E+07	1.06E+07
4.50E-01	2.37E+08	2.43E+06	2.43E+06	2.43E+06	2.43E+06	2.43E+06	2.43E+06
1.13E+00	3.15E+08	1.40E+06	1.40E+06	1.40E+06	1.40E+06	1.40E+06	1.40E+06
1.58E+00	1.88E+06	1.88E+06	1.88E+06	1.88E+06	1.88E+06	1.88E+06	1.88E+06
2.00E+00	5.86E+05	5.06E+05	5.06E+05	5.06E+05	5.06E+05	5.07E+05	5.07E+05
2.40E+00	3.47E+05	3.47E+05	3.47E+05	3.47E+05	3.47E+05	3.47E+05	3.47E+05
2.80E+00	6.59E+04	6.60E+04	6.58E+04	6.56E+04	6.53E+04	6.50E+04	6.46E+04
3.25E+00	3.76E+03	3.76E+03	3.76E+03	3.76E+03	3.77E+03	3.77E+03	3.77E+03
3.75E+00	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.15E+01
4.25E+00	7.53E+00	7.52E+00	7.52E+00	7.51E+00	7.51E+00	7.50E+00	7.50E+00
4.75E+00	4.83E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.81E+00	4.81E+00
5.50E+00	5.00E+00	5.00E+00	4.99E+00	4.99E+00	4.99E+00	4.99E+00	4.98E+00
total	8.27E+09	2.86E+07	2.87E+07	2.87E+07	2.87E+07	2.87E+07	2.87E+07
gamma watts	4.82E+00	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02

neutron source intensity as a function of time

ssa2h: far-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	8.74E-07	8.74E-07	8.74E-07	8.74E-07	8.74E-07	8.74E-07	8.74E-07
bi210	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04
bi211	6.30E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01
bi212	2.70E+00	2.69E+00	2.68E+00	2.67E+00	2.65E+00	2.63E+00	2.63E+00
bi213	6.60E-01	6.60E-01	6.60E-01	6.60E-01	6.61E-01	6.61E-01	6.61E-01
bi214	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
po210	2.75E+02	2.72E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02
po211	1.49E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
po212	1.38E+01	1.38E+01	1.37E+01	1.36E+01	1.36E+01	1.35E+01	1.35E+01
po213	8.71E+01	8.71E+01	8.71E+01	8.71E+01	8.72E+01	8.72E+01	8.72E+01

po214	9.01E+02	9.01E+02	9.02E+02	9.02E+02	9.02E+02	9.02E+02	9.03E+02
po215	8.91E+01	8.93E+01	8.93E+01	8.92E+01	8.92E+01	8.92E+01	8.92E+01
po216	1.08E+01	1.08E+01	1.08E+01	1.07E+01	1.06E+01	1.06E+01	1.05E+01
po218	4.29E+02	4.29E+02	4.29E+02	4.29E+02	4.29E+02	4.29E+02	4.29E+02
at217	5.64E+01	5.64E+01	5.65E+01	5.65E+01	5.65E+01	5.65E+01	5.65E+01
rn218	1.99E-10	7.86E-15	3.08E-19	1.21E-23	9.25E-28	.00E+00	.00E+00
rn219	7.08E+01	7.10E+01	7.10E+01	7.10E+01	7.10E+01	7.10E+01	7.10E+01
rn220	8.53E+00	8.53E+00	8.52E+00	8.48E+00	8.44E+00	8.38E+00	8.33E+00
rn222	3.13E+02	3.13E+02	3.13E+02	3.13E+02	3.13E+02	3.14E+02	3.14E+02
fr221	4.12E+01	4.12E+01	4.12E+01	4.12E+01	4.12E+01	4.12E+01	4.12E+01
fr223	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05
ra222	1.54E-10	6.06E-15	2.38E-19	9.37E-24	5.58E-28	.00E+00	.00E+00
ra223	4.10E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01
ra224	6.03E+00	6.04E+00	6.02E+00	6.00E+00	5.96E+00	5.93E+00	5.89E+00
ra226	1.03E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02
ac225	2.96E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01
ac227	3.02E-01	3.02E-01	3.02E-01	3.02E-01	3.02E-01	3.02E-01	3.02E-01
ac228	1.17E-11	1.17E-11	1.17E-11	1.17E-11	1.17E-11	1.17E-11	1.17E-11
th226	1.39E-10	5.47E-15	2.15E-19	8.46E-24	3.23E-28	.00E+00	.00E+00
th227	4.52E+01	4.53E+01	4.53E+01	4.53E+01	4.53E+01	4.53E+01	4.53E+01
th228	5.09E+00	5.08E+00	5.06E+00	5.04E+00	5.01E+00	4.98E+00	4.95E+00
th229	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01
th230	2.86E+02	2.86E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02
th232	1.48E-04	1.48E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04
pa231	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01
u230	1.10E-10	4.31E-15	1.69E-19	6.66E-24	2.54E-28	.00E+00	.00E+00
u231	7.27E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	4.73E+00	4.70E+00	4.66E+00	4.62E+00	4.58E+00	4.54E+00	4.51E+00
u233	7.81E+01	7.81E+01	7.81E+01	7.81E+01	7.82E+01	7.82E+01	7.82E+01
u234	7.12E+03	7.12E+03	7.12E+03	7.12E+03	7.12E+03	7.12E+03	7.12E+03
u235	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02
u236	1.08E+03	1.08E+03	1.08E+03	1.08E+03	1.08E+03	1.08E+03	1.08E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.44E-08	1.43E-08	8.42E-09	4.94E-09	2.90E-09	1.70E-09	1.00E-09
np237	3.32E+03	3.32E+03	3.32E+03	3.32E+03	3.32E+03	3.32E+03	3.32E+03
pu236	1.43E-01	1.18E-01	9.63E-02	7.90E-02	6.48E-02	5.31E-02	4.36E-02
pu237	4.07E-08	3.81E-10	3.57E-12	3.35E-14	3.13E-16	2.94E-18	2.75E-20
pu238	8.15E+04	8.10E+04	8.04E+04	7.99E+04	7.94E+04	7.89E+04	7.84E+04

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neutron source intensity as a function of time

6 sas2h: far-field crit based on bkw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	2.19E+05	2.19E+05	2.19E+05	2.19E+05	2.19E+05	2.19E+05	2.19E+05
pu240	1.68E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04
pu241	6.12E-02	5.87E-02	5.64E-02	5.42E-02	5.21E-02	5.00E-02	4.80E-02
pu242	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
pu244	1.15E-26	1.15E-26	1.15E-26	1.15E-26	1.15E-26	1.15E-26	1.16E-26
am239	5.32E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	5.23E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	3.12E+03	3.12E+03	3.12E+03	3.12E+03	3.12E+03	3.12E+03	3.12E+03
am242m	1.67E-02	1.66E-02	1.65E-02	1.63E-02	1.64E-02	1.63E-02	1.63E-02
am243	5.07E-03	5.07E-03	5.07E-03	5.07E-03	5.07E-03	5.07E-03	5.07E-03
cm241	4.65E-13	7.49E-16	1.20E-18	1.94E-21	3.12E-24	5.02E-27	8.19E-30
cm242	3.46E+01	1.32E+01	7.35E+00	5.72E+00	5.26E+00	5.11E+00	5.06E+00
cm243	3.61E-10	3.54E-10	3.46E-10	3.40E-10	3.33E-10	3.26E-10	3.19E-10

cm244	3.47E-04	3.36E-04	3.25E-04	3.15E-04	3.05E-04	2.96E-04	2.86E-04
cm245	6.07E-10	6.06E-10	6.06E-10	6.06E-10	6.06E-10	6.06E-10	6.06E-10
cm246	4.93E-12	4.92E-12	4.92E-12	4.92E-12	4.92E-12	4.92E-12	4.92E-12
cm247	8.85E-20	8.85E-20	8.85E-20	8.85E-20	8.85E-20	8.85E-20	8.85E-20
cm248	3.42E-21	3.42E-21	3.42E-21	3.42E-21	3.42E-21	3.42E-21	3.42E-21
bk249	5.86E-27	3.03E-27	1.57E-27	8.11E-28	4.19E-28	2.17E-28	1.12E-28
cf249	3.06E-22	3.06E-22	3.06E-22	3.06E-22	3.05E-22	3.05E-22	3.05E-22
cf250	1.14E-24	1.09E-24	1.04E-24	9.95E-25	9.52E-25	9.11E-25	8.71E-25
cf251	1.93E-28	1.95E-28	1.95E-28	1.95E-28	1.95E-28	1.95E-28	1.95E-28
0 total	3.36E+05	3.35E+05	3.35E+05	3.34E+05	3.34E+05	3.33E+05	3.33E+05

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Neutron source intensity as a function of time

0 oas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	7.33E-03	7.35E-03	7.33E-03	7.36E-03	7.36E-03	7.36E-03	7.36E-03
pa231	3.02E-03	3.02E-03	3.02E-03	3.02E-03	3.02E-03	3.02E-03	3.02E-03
u232	2.91E-04	2.88E-04	2.86E-04	2.84E-04	2.81E-04	2.79E-04	2.77E-04
u234	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01
u235	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
u236	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02
u237	1.26E-09	2.15E-15	2.07E-15	1.98E-15	1.91E-15	1.83E-15	1.76E-15
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.65E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	3.67E-08	3.67E-08	3.67E-08	3.67E-08	3.67E-08	3.67E-08	3.67E-08
np238	1.98E-08	4.87E-15	4.85E-15	4.83E-15	4.81E-15	4.79E-15	4.77E-15
np239	1.97E-05	5.25E-14	5.25E-14	5.25E-14	5.25E-14	5.25E-14	5.25E-14
pu236	9.69E-03	7.95E-03	6.52E-03	5.35E-03	4.38E-03	3.60E-03	2.95E-03
pu238	1.50E+04	1.50E+04	1.49E+04	1.48E+04	1.47E+04	1.46E+04	1.45E+04
pu239	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
pu240	1.12E+05	1.12E+05	1.12E+05	1.12E+05	1.12E+05	1.12E+05	1.12E+05
pu241	2.20E-03	2.11E-03	2.03E-03	1.95E-03	1.87E-03	1.80E-03	1.73E-03
pu242	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.02E+00	9.02E+00
pu243	7.32E-13	3.82E-30	3.82E-30	3.82E-30	3.82E-30	3.82E-30	3.82E-30
pu244	2.74E-21	2.75E-21	2.75E-21	2.75E-21	2.76E-21	2.76E-21	2.77E-21
am241	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
am242m	7.92E-02	7.89E-02	7.86E-02	7.83E-02	7.79E-02	7.76E-02	7.73E-02
am242	5.76E-04	8.57E-05	8.53E-05	8.50E-05	8.46E-05	8.43E-05	8.39E-05
am243	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05
am244	4.70E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.73E+02	6.62E+01	5.67E+01	2.86E+01	2.62E+01	2.55E+01	2.53E+01
cm243	7.84E-12	7.68E-12	7.52E-12	7.37E-12	7.23E-12	7.08E-12	6.94E-12
cm244	4.52E-02	4.38E-02	4.24E-02	4.11E-02	3.98E-02	3.86E-02	3.74E-02
cm245	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10	1.64E-10
cm246	1.78E-07	1.78E-07	1.78E-07	1.77E-07	1.77E-07	1.77E-07	1.77E-07
cm248	5.60E-14	5.60E-14	5.60E-14	5.60E-14	5.60E-14	5.60E-14	5.60E-14
cm250	6.19E-27	6.19E-27	6.19E-27	6.19E-27	6.19E-27	6.18E-27	6.18E-27
bk249	3.23E-23	1.67E-23	8.66E-24	4.47E-24	2.31E-24	1.20E-24	6.19E-25
cf249	1.86E-22	1.86E-22	1.86E-22	1.86E-22	1.86E-22	1.85E-22	1.85E-22
cf250	9.51E-20	9.10E-20	8.71E-20	8.33E-20	7.97E-20	7.63E-20	7.30E-20
0 total	2.45E+05	2.44E+05	2.44E+05	2.44E+05	2.44E+05	2.44E+05	2.44E+05
0 total	5.81E+05	5.80E+05	5.79E+05	5.78E+05	5.78E+05	5.77E+05	5.77E+05

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	6.507E+04	6.494E+04	6.483E+04	6.473E+04	6.462E+04	6.452E+04	6.442E+04
3	1.85E+00 - 3.00E+00	1.842E+05	1.839E+05	1.836E+05	1.833E+05	1.830E+05	1.828E+05	1.825E+05
4	1.40E+00 - 1.85E+00	4.967E+04	4.960E+04	4.932E+04	4.924E+04	4.916E+04	4.909E+04	4.901E+04
5	9.00E-01 - 1.40E+00	2.783E+04	2.778E+04	2.774E+04	2.770E+04	2.765E+04	2.761E+04	2.757E+04
6	4.00E-01 - 9.00E-01	8.082E+03	8.071E+03	8.058E+03	8.045E+03	8.033E+03	8.020E+03	8.007E+03
7	1.00E-01 - 4.00E-01	1.263E+03	1.261E+03	1.259E+03	1.257E+03	1.255E+03	1.253E+03	1.251E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		3.359E+05	3.354E+05	3.348E+05	3.343E+05	3.338E+05	3.332E+05	3.327E+05

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spontaneous fission neutron source spectrum as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	4.671E+03	4.667E+03	4.663E+03	4.662E+03	4.660E+03	4.658E+03	4.656E+03
2	3.00E+00 - 6.43E+00	5.120E+04	5.116E+04	5.113E+04	5.110E+04	5.108E+04	5.106E+04	5.104E+04
3	1.85E+00 - 3.00E+00	5.180E+04	5.175E+04	5.172E+04	5.169E+04	5.166E+04	5.164E+04	5.162E+04
4	1.40E+00 - 1.85E+00	5.162E+04	5.159E+04	5.157E+04	5.156E+04	5.154E+04	5.153E+04	5.152E+04
5	9.00E-01 - 1.40E+00	4.340E+04	4.336E+04	4.334E+04	4.332E+04	4.330E+04	4.328E+04	4.326E+04
6	4.00E-01 - 9.00E-01	4.836E+04	4.831E+04	4.829E+04	4.826E+04	4.824E+04	4.822E+04	4.820E+04
7	1.00E-01 - 4.00E-01	9.547E+03	9.539E+03	9.534E+03	9.529E+03	9.523E+03	9.521E+03	9.516E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	
0		2.446E+05	2.444E+05	2.442E+05	2.441E+05	2.440E+05	2.439E+05	2.438E+05	

1 page 87

total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	4.671E+03	4.667E+03	4.663E+03	4.662E+03	4.660E+03	4.658E+03	4.656E+03
2	3.00E+00 - 6.43E+00	1.163E+05	1.161E+05	1.160E+05	1.158E+05	1.157E+05	1.156E+05	1.155E+05
3	1.85E+00 - 3.00E+00	2.400E+05	2.397E+05	2.393E+05	2.390E+05	2.387E+05	2.384E+05	2.381E+05
4	1.40E+00 - 1.85E+00	8.109E+04	8.099E+04	8.089E+04	8.080E+04	8.071E+04	8.062E+04	8.052E+04
5	9.00E-01 - 1.40E+00	7.122E+04	7.114E+04	7.108E+04	7.101E+04	7.095E+04	7.089E+04	7.082E+04
6	6.00E-01 - 9.00E-01	5.644E+04	5.639E+04	5.635E+04	5.631E+04	5.628E+04	5.624E+04	5.621E+04
7	1.00E-01 - 6.00E-01	1.081E+04	1.080E+04	1.079E+04	1.079E+04	1.078E+04	1.077E+04	1.077E+04
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		5.805E+05	5.795E+05	5.791E+05	5.784E+05	5.778E+05	5.772E+05	5.765E+05

1
1 * gamma sources determined *
0case applies the following photon data base
master photon library
in binary mode
0 the sources include photons of nuclides for...

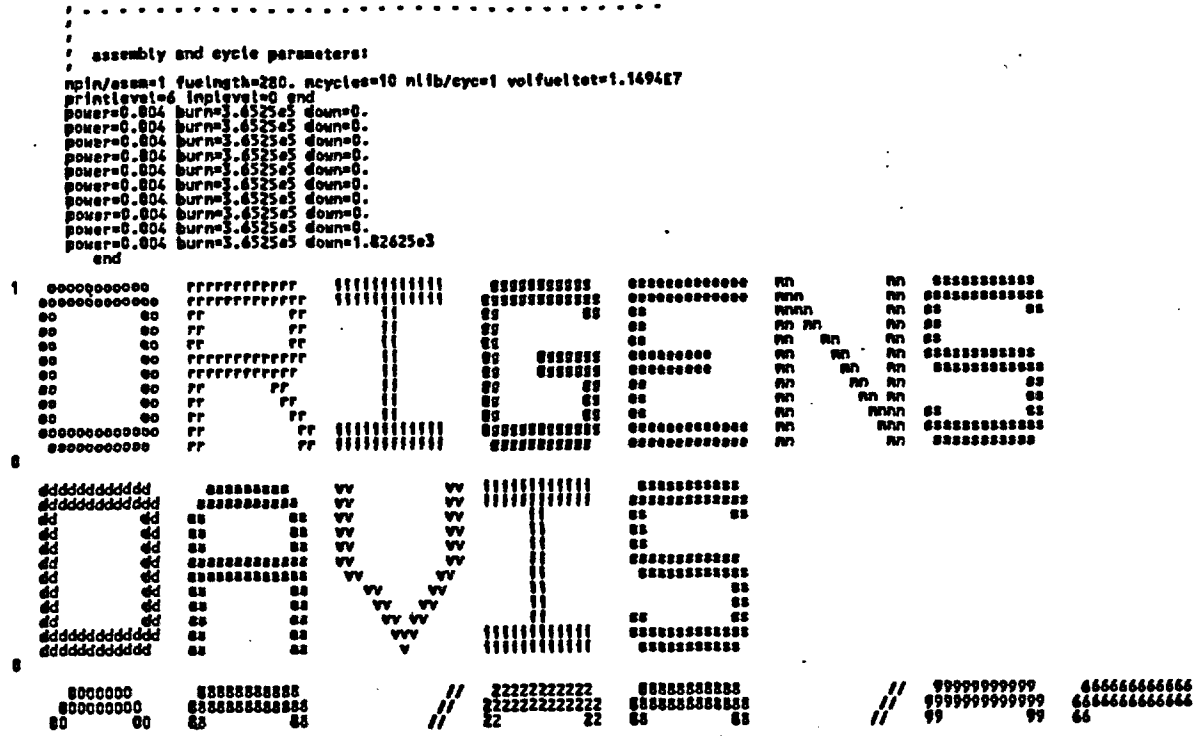
light elements
actinides
fission products

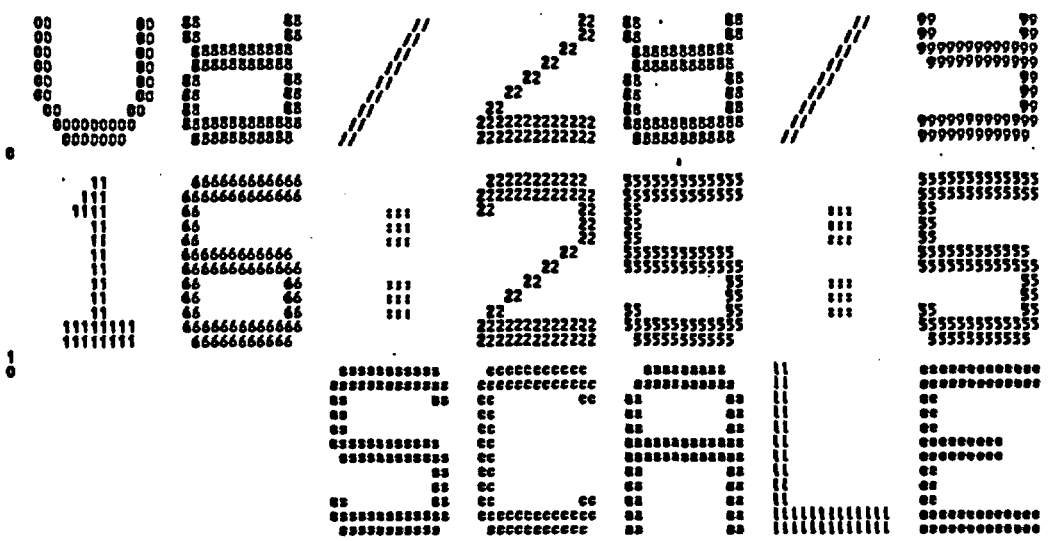
```
1                 Gamma source spectrum for gamma lines (sas2)
0                              1826.25  day time of the requested nuclides
9        energy interval in Mev        photons / second        Mev / second
8
                 1.0000E-02 to      5.0000E-02      4.5436E+12      1.3637E+11
                 5.0000E-02 to      1.0000E-01      1.5084E+12      9.0128E+10
                 1.0000E-01 to      2.0000E-01      2.0297E+11      1.2045E+11
                 2.0000E-01 to      3.0000E-01      2.5946E+11      6.4865E+10
                 3.0000E-01 to      4.0000E-01      2.9989E+11      1.0496E+11
                 4.0000E-01 to      6.0000E-01      1.6630E+11      7.3149E+10
                 6.0000E-01 to      8.0000E-01      5.7216E+12      4.0051E+12
                 8.0000E-01 to      1.0000E+00      5.1356E+10      4.6221E+10
                 1.0000E+00 to      1.3300E+00      5.0368E+10      5.8679E+10
                 1.3300E+00 to      1.6600E+00      2.7644E+10      4.1029E+10
                 1.6600E+00 to      2.0000E+00      3.5763E+09      4.5447E+09
                 2.0000E+00 to      2.5000E+00      1.8088E+09      4.0697E+09
                 2.5000E+00 to      3.0000E+00      1.0130E+08      2.7858E+08
                 3.0000E+00 to      4.0000E+00      5.1254E+06      1.7939E+07
                 4.0000E+00 to      5.0000E+00      1.0944E+04      4.9249E+04
                 5.0000E+00 to      6.5000E+00      4.5054E+03      3.4756E+04
                 6.5000E+00 to      8.0000E+00      6.2934E+02      4.0127E+03
                 8.0000E+00 to      1.0000E+01      1.7387E+02      1.5648E+03
                 totals                             1.3219E+13      4.7599E+12
8
6
0                total energy from nuclides with spectrum data    =   4.7599E+12
0                total energy from nuclides with no spectrum data =   1.0212E+06
1
0  .results on logical unit no. 71, position  2, for time step  4, subcase 7. (run position 1, case position 2)
   title: sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gud/mtu 40% h2o/ 8% uo2
0     .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h     will be called
      SAS2H: Far-Field Crit based on BZU 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ftuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
                                 13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                 26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                 92238 28.593 93237 0.033 1 1.0 538   end

      kr-83       1 0 1-20 538 end
      kr-85       1 0 1-20 538 end
      sr-90       1 0 1-20 538 end
       y-89       1 0 1-20 538 end
      mo-95       1 0 1-20 538 end
      zr-93       1 0 1-20 538 end
      zr-94       1 0 1-20 538 end
      zr-95       1 0 1-20 538 end
      nb-94       1 0 1-20 538 end
      tc-99       1 0 1-20 538 end
      rh-103      1 0 1-20 538 end
      rh-105      1 0 1-20 538 end
      ru-101      1 0 1-20 538 end
      ru-106      1 0 1-20 538 end
      pd-105      1 0 1-20 538 end
      pd-108      1 0 1-20 538 end
      ag-109      1 0 1-20 538 end
      sb-124      1 0 1-20 538 end
      xe-131      1 0 1-20 538 end
      xe-132      1 0 1-20 538 end
      xe-135      1 0 1-20 538 end
      xe-136      1 0 1-20 538 end
      cs-134      1 0 1-20 538 end
      cs-135      1 0 1-20 538 end
      cs-137      1 0 1-20 538 end
      ba-136      1 0 1-20 538 end
      la-139      1 0 1-20 538 end
      pr-141      1 0 1-20 538 end
      pr-143      1 0 1-20 538 end
      ce-144      1 0 1-20 538 end
      nd-143      1 0 1-20 538 end
      nd-145      1 0 1-20 538 end
      pm-147      1 0 1-20 538 end
      pm-148      1 0 1-20 538 end
      nd-147      1 0 1-20 538 end
      sm-147      1 0 1-20 538 end
      sm-149      1 0 1-20 538 end
      sm-150      1 0 1-20 538 end
      sm-151      1 0 1-20 538 end
      sm-152      1 0 1-20 538 end
      gd-155      1 0 1-20 538 end
      eu-153      1 0 1-20 538 end
      eu-154      1 0 1-20 538 end
      eu-155      1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 2 1.0 523.   end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                 13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                 26000 0.683 3 1.0 523.   end
```

```
;
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
;
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
;
;  fuel-pin-cell geometry:
;
symmslabcell  340.  280. 1 3 281. 2 end
;
; . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
;
;
;  assembly and cycle parameters:
;
npin/assm=1 fuelngth=280. ncycles=10 nlib/cyc=1 volfueltot=1.1494E7
printlevel=6 implevel=0 end
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=0.
power=0.804 burn=3.6525e5 down=1.82625e3
   end
```





```
program verification information
code system:    scale  version:    4.3

program:  e0e004
creation date:  03/13/96
library:  /usr1/ernl/Scale/bin
```

```
*****                test code:  origens                                  *****
*****                  version:  3.8                                      *****
*****                  jobname:  davis                                    *****
*****       date of execution:  08/28/96                                  *****
*****       time of execution:  16:25:39                                  *****
*****                                                                     *****
*************************************************************************
*************************************************************************
*************************************************************************

1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        8q array has      1 entries.
0        6q array has      1 entries.
0        8q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, exn =    7.8000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       34q array has     12 entries.
library information...

         cross-section data taken from position number  1 of library on unit 33.

         pass   1
         pass   0
         'scale-system control module sas2 library'
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         'scale-system control module sas2 library'
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ***********************************************************************
         *                                                                     *
         *          prelim lwr origen-s binary working library--id = 1143      *
         *        made from modified card-image origen-s libraries of scale 4.2 *
         *      data from the light element, actinide, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                     *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the 'prasas2' case updating all nuclides on the scale 'burnup' library *
         *                                                                     *
         *                fission product yields are from endf/b-v             *
```

```
          *                                                                    *
          *              photon libraries use an 18-energy-group structure     *
          *             the photon data are from the master photon data base,  *
          *              produced to include bremsstrahlung from uo2 matrix    *
          *                                                                    *
          *        see information above this box (if present) for later updates *
          *                                                                    *
          ***********************************************************************
          *                                                                    *
          ***********************************************************************
0                 .other identification and sizes of library.
0                  data set name:  fc33f001
0               8/28/1996    date library was produced
0                   9697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
8                   7993    number of nonzero off-diagonal matrix elements
0          ***********************************************************************
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page   1
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
   na 23   1.73E+05  1.73E+05
   al 27   1.35E+06  1.35E+06
  total    1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides         page   2
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
    u234   2.12E+03  2.12E+03
    u235   1.72E+05  1.72E+05
    u236   4.12E+04  4.12E+04
    u238   8.66E+06  8.66E+06
   np237   9.99E+03  9.99E+03
  total    8.88E+06  8.88E+06
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   3
       power=    .00mw, burnup=   1461.mwd, flux= 2.99E+08n/cm**2-sec
8                                                  basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      91313. d      182625. d      273938. d      365250. d      365250. d
    productions  1.022622E+06  1.024453E+06  1.026237E+06  1.027977E+06  1.029673E+06  1.029673E+06
    absorptions  8.468353E+05  8.494152E+05  8.515743E+05  8.534369E+05  8.550839E+05  8.550839E+05
    k infinity   1.207580E+00  1.206068E+00  1.205106E+00  1.204514E+00  1.204177E+00  1.204177E+00
8                 initial      91313. d      182625. d      273938. d      365250. d      365250. d
    actinide
    absorptions  8.430638E+05  8.441381E+05  8.451858E+05  8.462119E+05  8.472176E+05  8.472176E+05
    non-actinide
    abs. frac.   4.453659E-03  6.212592E-03  7.502079E-03  8.465767E-03  9.199560E-03  9.199560E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products      page   4
0                                          fraction of total absorption rate
       power=    .00mw, burnup=   1461.mwd, flux= 2.99E+08n/cm**2-sec
8             initial  91313. d 182625. d 273938. d 365250. d 365250. d

    sm149      .00E+00  1.54E-03  2.63E-03  3.40E-03  3.95E-03  3.95E-03
    eu151      .00E+00  3.10E-05  8.18E-05  1.34E-04  1.85E-04  1.85E-04
    nd143      .00E+00  3.63E-05  7.24E-05  1.08E-04  1.44E-04  1.44E-04
    gd155      .00E+00  2.23E-05  4.25E-05  6.03E-05  7.59E-05  7.59E-05
```

rh103	.00E+00	1.73E-05	3.45E-05	5.18E-05	6.90E-05	6.90E-05
xe131	.00E+00	1.18E-05	2.36E-05	3.53E-05	4.70E-05	4.70E-05
cd113	.00E+00	1.45E-05	2.66E-05	3.68E-05	4.53E-05	4.53E-05
sm151	.00E+00	1.37E-05	2.84E-05	3.91E-05	3.93E-05	3.93E-05
cs133	.00E+00	1.18E-06	1.83E-05	2.74E-05	3.64E-05	3.64E-05
gd157	.00E+00	1.48E-05	2.39E-05	2.98E-05	3.37E-05	3.37E-05
sm147	.00E+00	6.72E-06	1.35E-05	2.02E-05	2.70E-05	2.70E-05
tc 99	.00E+00	6.78E-06	1.35E-05	2.02E-05	2.69E-05	2.69E-05
nd145	.00E+00	5.19E-06	1.03E-05	1.55E-05	2.06E-05	2.06E-05
mo 95	.00E+00	3.61E-06	7.21E-06	1.08E-05	1.43E-05	1.43E-05
sm152	.00E+00	2.83E-06	5.73E-06	8.68E-06	1.17E-05	1.17E-05
kr 83	.00E+00	2.21E-06	4.41E-06	6.59E-06	8.76E-06	8.76E-06
cs135	.00E+00	2.06E-06	4.11E-06	6.15E-06	8.18E-06	8.18E-06
ru101	.00E+00	1.62E-06	3.24E-06	4.85E-06	6.45E-06	6.45E-06
pr141	.00E+00	1.51E-06	3.02E-06	4.52E-06	6.01E-06	6.01E-06
eu153	.00E+00	1.39E-06	2.79E-06	4.18E-06	5.58E-06	5.58E-06
sm150	.00E+00	4.29E-07	1.54E-06	3.13E-06	5.07E-06	5.07E-06
la139	.00E+00	1.24E-06	2.46E-06	3.69E-06	4.91E-06	4.91E-06
xe135	.00E+00	2.27E-06	2.27E-06	2.26E-06	2.26E-06	2.26E-06
ba137	.00E+00	4.86E-07	1.07E-06	1.65E-06	2.23E-06	2.23E-06
pd105	.00E+00	5.36E-07	1.08E-06	1.62E-06	2.17E-06	2.17E-06
zr 93	.00E+00	5.13E-07	1.02E-06	1.53E-06	2.03E-06	2.03E-06
i129	.00E+00	3.62E-07	7.63E-07	1.14E-06	1.53E-06	1.53E-06
nd144	.00E+00	3.68E-07	7.35E-07	1.10E-06	1.47E-06	1.47E-06
mo 97	.00E+00	2.81E-07	5.61E-07	8.39E-07	1.12E-06	1.12E-06
ag109	.00E+00	2.17E-07	4.64E-07	7.40E-07	1.05E-06	1.05E-06
zr 91	.00E+00	1.32E-07	2.63E-07	3.94E-07	5.23E-07	5.23E-07
y 89	.00E+00	1.26E-07	2.52E-07	3.76E-07	5.00E-07	5.00E-07
ru102	.00E+00	1.14E-07	2.28E-07	3.41E-07	4.54E-07	4.54E-07
ce142	.00E+00	1.02E-07	2.04E-07	3.05E-07	4.06E-07	4.06E-07
nd148	.00E+00	9.96E-08	1.98E-07	2.97E-07	3.95E-07	3.95E-07
nd146	.00E+00	8.27E-08	1.65E-07	2.47E-07	3.28E-07	3.28E-07
pd108	.00E+00	7.18E-08	1.49E-07	2.32E-07	3.18E-07	3.18E-07
ba138	.00E+00	7.04E-08	1.40E-07	2.10E-07	2.80E-07	2.80E-07
in115	.00E+00	6.92E-08	1.38E-07	2.08E-07	2.77E-07	2.77E-07
pm147	.00E+00	5.75E-07	2.74E-07	2.73E-07	2.72E-07	2.72E-07
ce140	.00E+00	5.59E-08	1.12E-07	1.67E-07	2.22E-07	2.22E-07
xe132	.00E+00	4.84E-08	1.00E-07	1.50E-07	2.00E-07	2.00E-07
pd107	.00E+00	4.10E-08	8.43E-08	1.30E-07	1.78E-07	1.78E-07
mo 98	.00E+00	4.22E-08	8.43E-08	1.26E-07	1.68E-07	1.68E-07
eu155	.00E+00	1.61E-07	1.63E-07	1.64E-07	1.66E-07	1.66E-07
mo100	.00E+00	4.04E-08	8.05E-08	1.21E-07	1.60E-07	1.60E-07
xe134	.00E+00	3.91E-08	7.79E-08	1.17E-07	1.55E-07	1.55E-07
zr 92	.00E+00	3.18E-08	6.33E-08	9.46E-08	1.26E-07	1.26E-07
i127	.00E+00	2.63E-08	5.27E-08	7.92E-08	1.06E-07	1.06E-07

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5

0 fraction of total absorption rate

0 power= .00mw, burnup= 1461.mwd, flux= 2.99E+08n/cm**2-sec

0 initial 91313. d 182625. d 273938. d 365250. d 365250. d

zr 96	.00E+00	2.60E-08	5.19E-08	7.77E-08	1.03E-07	1.03E-07
ru104	.00E+00	2.48E-08	4.97E-08	7.47E-08	9.98E-08	9.98E-08
gd152	.00E+00	1.29E-09	1.91E-08	5.98E-08	9.52E-08	9.52E-08
nd150	.00E+00	2.22E-08	4.42E-08	6.63E-08	8.82E-08	8.82E-08
xe136	.00E+00	2.11E-08	4.22E-08	6.31E-08	8.40E-08	8.40E-08
br 81	.00E+00	1.61E-08	3.21E-08	4.80E-08	6.39E-08	6.39E-08
rb 85	.00E+00	1.55E-08	3.10E-08	4.65E-08	6.19E-08	6.19E-08
zr 94	.00E+00	1.37E-08	2.74E-08	4.10E-08	5.45E-08	5.45E-08
eu152	.00E+00	6.12E-09	2.14E-08	3.50E-08	4.84E-08	4.84E-08
zr 90	.00E+00	1.05E-08	2.29E-08	3.52E-08	4.75E-08	4.75E-08

cd111	.00E+00	1.05E-08	2.13E-08	3.26E-08	4.43E-08	4.43E-08
te130	.00E+00	9.57E-09	1.91E-08	2.86E-08	3.81E-08	3.81E-08
sm154	.00E+00	9.39E-09	1.88E-08	2.83E-08	3.78E-08	3.78E-08
rb 87	.00E+00	9.08E-09	1.81E-08	2.71E-08	3.60E-08	3.60E-08
sr 77	.00E+00	6.33E-09	1.26E-08	1.89E-08	2.51E-08	2.51E-08
pd106	.00E+00	4.68E-09	9.50E-09	1.44E-08	1.95E-08	1.95E-08
kr 84	.00E+00	4.34E-09	8.65E-09	1.29E-08	1.72E-08	1.72E-08
sr 90	.00E+00	1.68E-08	1.68E-08	1.67E-08	1.66E-08	1.66E-08
se 79	.00E+00	3.24E-09	6.47E-09	9.68E-09	1.29E-08	1.29E-08
sb121	.00E+00	3.17E-09	6.35E-09	9.54E-09	1.27E-08	1.27E-08
cd136	.00E+00	1.94E-09	4.39E-09	7.30E-09	1.06E-08	1.06E-08
sb123	.00E+00	2.38E-09	5.16E-09	7.75E-09	1.03E-08	1.03E-08
kr 86	.00E+00	2.35E-09	4.69E-09	7.01E-09	9.32E-09	9.32E-09
rh105	.00E+00	8.37E-09	8.47E-09	8.54E-09	8.64E-09	8.64E-09
te128	.00E+00	2.13E-09	4.26E-09	6.38E-09	8.51E-09	8.51E-09
ru 99	.00E+00	4.68E-10	1.80E-09	3.98E-09	7.02E-09	7.02E-09
dy161	.00E+00	1.41E-09	2.99E-09	4.73E-09	6.64E-09	6.64E-09
se 80	.00E+00	1.52E-09	3.02E-09	4.53E-09	6.02E-09	6.02E-09
te125	.00E+00	1.33E-09	2.68E-09	4.05E-09	5.42E-09	5.42E-09
tb159	.00E+00	9.36E-10	1.92E-09	2.95E-09	4.02E-09	4.02E-09
cs137	.00E+00	3.77E-09	3.77E-09	3.76E-09	3.75E-09	3.75E-09
gd154	.00E+00	2.28E-10	9.26E-10	2.09E-09	3.73E-09	3.73E-09
cd112	.00E+00	8.77E-10	1.77E-09	2.68E-09	3.60E-09	3.60E-09
li 6	.00E+00	8.59E-10	1.71E-09	2.56E-09	3.39E-09	3.39E-09
eu156	.00E+00	7.20E-10	1.43E-09	2.14E-09	2.85E-09	2.85E-09
sn117	.00E+00	6.92E-10	1.39E-09	2.09E-09	2.80E-09	2.80E-09
gd158	.00E+00	4.26E-10	1.86E-09	1.83E-09	2.49E-09	2.49E-09
pr143	.00E+00	2.65E-09	2.64E-09	2.63E-09	2.62E-09	2.62E-09
sn119	.00E+00	5.64E-10	1.13E-09	1.69E-09	2.26E-09	2.26E-09
sn115	.00E+00	5.15E-10	1.03E-09	1.55E-09	2.07E-09	2.07E-09
xe133	.00E+00	1.98E-09	1.98E-09	1.97E-09	1.97E-09	1.97E-09
sr 88	.00E+00	4.34E-10	8.65E-10	1.29E-09	1.72E-09	1.72E-09
cd114	.00E+00	3.41E-10	7.39E-10	1.19E-09	1.67E-09	1.67E-09
ce141	.00E+00	1.57E-09	1.56E-09	1.56E-09	1.56E-09	1.56E-09
pd110	.00E+00	3.25E-10	6.67E-10	1.03E-09	1.40E-09	1.40E-09
ru100	.00E+00	7.91E-11	3.09E-10	6.87E-10	1.21E-09	1.21E-09
se 82	.00E+00	2.94E-10	5.86E-10	8.76E-10	1.16E-09	1.16E-09
dy164	.00E+00	1.83E-10	4.20E-10	7.08E-10	1.05E-09	1.05E-09
dy162	.00E+00	1.94E-10	4.35E-10	7.16E-10	1.04E-09	1.04E-09

1 ssz2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 6
8 fraction of total absorption rate
0 power= .00mw, burnup= 1461.mwd, flux= 2.99E+08n/cm**2-sec
0 initial 91313. d 182625. d 273938. d 365250. d 365250. d

sn126	.00E+00	2.36E-10	4.74E-10	7.15E-10	9.58E-10	9.58E-10
pm149	.00E+00	9.59E-10	9.57E-10	9.55E-10	9.53E-10	9.53E-10
nd147	.00E+00	9.43E-10	9.40E-10	9.38E-10	9.35E-10	9.35E-10
se 78	.00E+00	2.25E-10	4.49E-10	6.73E-10	8.96E-10	8.96E-10
nd142	.00E+00	5.19E-11	2.07E-10	4.64E-10	8.22E-10	8.22E-10
ba134	.00E+00	5.17E-11	2.06E-10	4.62E-10	8.19E-10	8.19E-10
sm148	.00E+00	5.04E-11	1.95E-10	4.33E-10	7.63E-10	7.63E-10
sn124	.00E+00	1.85E-10	3.70E-10	5.56E-10	7.43E-10	7.43E-10
ba135	.00E+00	4.96E-11	1.85E-10	3.70E-10	6.56E-10	6.56E-10
ce144	.00E+00	2.97E-10	2.95E-10	2.93E-10	2.91E-10	2.91E-10
pd104	.00E+00	5.57E-11	1.43E-10	2.20E-10	2.69E-10	2.69E-10
kr 85	.00E+00	3.66E-10	3.63E-10	3.61E-10	3.59E-10	3.59E-10
se 76	.00E+00	1.34E-10	2.68E-10	4.01E-10	5.34E-10	5.34E-10
in113	.00E+00	9.33E-11	1.95E-10	2.98E-10	4.01E-10	4.01E-10
ru103	.00E+00	3.57E-10	3.57E-10	3.58E-10	3.59E-10	3.59E-10
ba136	.00E+00	7.64E-11	1.42E-10	2.56E-10	3.59E-10	3.59E-10

sn118	.00E+00	7.59E-11	1.52E-10	2.28E-10	3.05E-10	3.05E-10
cs134	.00E+00	6.91E-11	1.37E-10	2.05E-10	2.72E-10	2.72E-10
cd116	.00E+00	6.39E-11	1.28E-10	1.92E-10	2.56E-10	2.56E-10
mo 96	.00E+00	2.67E-11	6.07E-11	1.56E-10	2.53E-10	2.53E-10
sn122	.00E+00	6.22E-11	1.25E-10	1.87E-10	2.50E-10	2.50E-10
dy163	.00E+00	4.42E-11	9.08E-11	1.67E-10	2.43E-10	2.43E-10
kr 82	.00E+00	4.37E-11	9.68E-11	1.59E-10	2.31E-10	2.31E-10
sn120	.00E+00	4.69E-11	9.39E-11	1.41E-10	1.88E-10	1.88E-10
xe130	.00E+00	2.91E-11	6.90E-11	1.20E-10	1.81E-10	1.81E-10
zr 95	.00E+00	1.68E-10	1.67E-10	1.66E-10	1.66E-10	1.66E-10
nb 95	.00E+00	1.53E-10	1.52E-10	1.52E-10	1.51E-10	1.51E-10
ge 73	.00E+00	3.63E-11	7.26E-11	1.09E-10	1.45E-10	1.45E-10
y 91	.00E+00	1.49E-10	1.40E-10	1.40E-10	1.39E-10	1.39E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10
nb 93	.00E+00	6.03E-12	2.53E-11	5.77E-11	1.03E-10	1.03E-10
cd110	.00E+00	4.89E-12	2.03E-11	4.76E-11	8.00E-11	8.00E-11
br 79	.00E+00	3.36E-12	1.34E-11	3.00E-11	5.33E-11	5.33E-11
ge 76	.00E+00	1.33E-11	2.66E-11	3.95E-11	5.26E-11	5.26E-11
ba140	.00E+00	4.70E-11	4.68E-11	4.67E-11	4.66E-11	4.66E-11
te126	.00E+00	7.59E-12	1.75E-11	2.96E-11	4.41E-11	4.41E-11
gd160	.00E+00	6.77E-12	1.82E-11	2.82E-11	3.89E-11	3.89E-11
sm153	.00E+00	3.81E-11	3.83E-11	3.85E-11	3.87E-11	3.87E-11
eu156	.00E+00	3.46E-11	3.53E-11	3.60E-11	3.68E-11	3.68E-11
ag107	.00E+00	1.80E-12	7.33E-12	1.68E-11	3.04E-11	3.04E-11
xe129	.00E+00	1.90E-12	7.59E-12	1.71E-11	3.03E-11	3.03E-11
sr 89	.00E+00	3.02E-11	3.00E-11	2.99E-11	2.98E-11	2.98E-11
ru106	.00E+00	2.66E-11	2.72E-11	2.79E-11	2.66E-11	2.66E-11
kr 87	.00E+00	2.25E-11	2.24E-11	2.23E-11	2.22E-11	2.22E-11
ho165	.00E+00	3.86E-12	6.96E-12	1.17E-11	1.73E-11	1.73E-11
se143	.00E+00	1.73E-11	1.73E-11	1.72E-11	1.72E-11	1.72E-11
y 90	.00E+00	1.60E-11	1.59E-11	1.59E-11	1.58E-11	1.58E-11
sb125	.00E+00	1.51E-11	1.52E-11	1.53E-11	1.54E-11	1.54E-11
la140	.00E+00	1.46E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7
0 fraction of total absorption rate
0 power= .00mw, burnup= 1461.mwd/mtu fluxx 2.99E+08n/cm**2-sec
0 initial 91313. d 182625. d 273938. d 365250. d 365250. d

mo 99	.00E+00	1.31E-11	1.31E-11	1.31E-11	1.30E-11	1.30E-11
pm148m	.00E+00	9.44E-12	9.63E-12	9.62E-12	9.62E-12	9.62E-12
te127m	.00E+00	7.41E-12	7.47E-12	7.52E-12	7.58E-12	7.58E-12
te124	.00E+00	1.37E-12	3.24E-12	5.00E-12	6.84E-12	6.84E-12
i131	.00E+00	4.76E-12	4.75E-12	4.74E-12	4.73E-12	4.73E-12
sr 87	.00E+00	1.32E-12	3.04E-12	4.54E-12	6.09E-12	6.09E-12
dy160	.00E+00	3.06E-13	1.12E-12	2.47E-12	4.36E-12	4.36E-12
nb 94	.00E+00	8.78E-13	1.76E-12	2.64E-12	3.54E-12	3.54E-12
xe128	.00E+00	2.54E-13	6.79E-13	1.07E-12	3.24E-12	3.24E-12
sr 86	.00E+00	5.17E-13	1.21E-12	2.09E-12	3.14E-12	3.14E-12
se 74	.00E+00	7.30E-13	1.44E-12	2.19E-12	2.91E-12	2.91E-12
ge 72	.00E+00	4.92E-13	9.85E-13	1.48E-12	1.98E-12	1.98E-12
te129m	.00E+00	1.78E-12	1.78E-12	1.79E-12	1.79E-12	1.79E-12
se 76	.00E+00	3.05E-13	6.53E-13	1.04E-12	1.48E-12	1.48E-12
sn116	.00E+00	7.63E-14	3.03E-13	6.60E-13	1.21E-12	1.21E-12
er166	.00E+00	9.78E-14	2.54E-13	4.69E-13	7.40E-13	7.40E-13
te122	.00E+00	3.37E-14	1.50E-13	2.87E-13	5.07E-13	5.07E-13
pm148	.00E+00	2.84E-13	3.85E-13	3.84E-13	3.83E-13	3.83E-13
ag111	.00E+00	2.33E-13	3.48E-13	3.62E-13	3.75E-13	3.75E-13
eu157	.00E+00	3.04E-13	3.13E-13	3.22E-13	3.31E-13	3.31E-13
cd115m	.00E+00	2.37E-13	2.38E-13	2.39E-13	2.40E-13	2.40E-13
kr 88	.00E+00	2.13E-14	4.46E-14	6.95E-14	9.71E-14	9.71E-14

cs136	.00E+00	6.30E-14	7.00E-14	7.70E-14	8.39E-14	8.39E-14
ru105	.00E+00	3.04E-14	3.08E-14	3.11E-14	3.15E-14	3.15E-14
sn125	.00E+00	2.95E-14	2.96E-14	2.98E-14	2.99E-14	2.99E-14
rb 88	.00E+00	1.26E-14	1.26E-14	1.25E-14	1.25E-14	1.25E-14
tb160	.00E+00	2.92E-15	5.64E-15	8.45E-15	1.13E-14	1.13E-14
er167	.00E+00	7.34E-16	2.59E-15	5.83E-15	1.07E-14	1.07E-14
sn123	.00E+00	1.04E-14	1.04E-14	1.04E-14	1.04E-14	1.04E-14
i135	.00E+00	9.97E-15	9.95E-15	9.92E-15	9.90E-15	9.90E-15
te123	.00E+00	1.65E-15	3.73E-15	6.38E-15	9.73E-15	9.73E-15
te132	.00E+00	9.47E-15	9.43E-15	9.43E-15	9.42E-15	9.42E-15
pr142	.00E+00	1.73E-15	3.44E-15	5.14E-15	6.83E-15	6.83E-15
kr 9	.00E+00	1.71E-15	3.41E-15	5.10E-15	6.79E-15	6.79E-15
te134	.00E+00	5.74E-15	5.72E-15	5.70E-15	5.68E-15	5.68E-15
sb126	.00E+00	3.41E-15	3.85E-15	4.28E-15	4.71E-15	4.71E-15
li 7	.00E+00	6.63E-16	1.32E-15	1.98E-15	2.63E-15	2.63E-15
sb124	.00E+00	2.23E-15	2.36E-15	2.49E-15	2.62E-15	2.62E-15
in117m	.00E+00	2.09E-15	2.11E-15	2.13E-15	2.15E-15	2.15E-15
i130	.00E+00	1.03E-15	1.34E-15	1.66E-15	1.97E-15	1.97E-15
rb 86	.00E+00	3.41E-16	4.42E-16	5.43E-16	6.43E-16	6.43E-16
in117	.00E+00	6.13E-16	6.20E-16	6.27E-16	6.34E-16	6.34E-16
dy165	.00E+00	2.76E-16	3.44E-16	4.12E-16	4.80E-16	4.80E-16
cd108	.00E+00	2.48E-17	8.36E-17	1.94E-16	3.74E-16	3.74E-16
sn114	.00E+00	1.67E-17	6.95E-17	1.58E-16	2.83E-16	2.83E-16
cd118	.00E+00	1.19E-16	1.20E-16	1.20E-16	1.21E-16	1.21E-16
ge 75	.00E+00	8.47E-17	8.43E-17	8.43E-17	8.42E-17	8.42E-17
cs134m	.00E+00	1.28E-17	2.55E-17	3.81E-17	5.06E-17	5.06E-17
in119m	.00E+00	2.98E-17	2.99E-17	3.00E-17	3.01E-17	3.01E-17

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 8
0 fraction of total absorption rate
power= .00mw, burnup= 1461.mwd, flux= 2.99E+08n/cm**2-sec
0 initial 91313. d 182625. d 273938. d 365250. d 365250. d

in119	.00E+00	2.33E-18	2.35E-18	2.36E-18	2.38E-18	2.38E-18
cd109	.00E+00	4.19E-19	1.05E-18	1.47E-18	1.89E-18	1.89E-18
ag110	.00E+00	2.83E-19	6.08E-19	9.67E-19	1.36E-18	1.36E-18

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 9
power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91313. d	182625. d	273938. d	365250. d	365250. d
h 1	.00E+00	2.22E-05	4.43E-05	6.64E-05	8.84E-05	8.84E-05
h 2	.00E+00	6.57E-08	1.31E-07	1.97E-07	2.62E-07	2.62E-07
h 3	.00E+00	3.50E-11	3.56E-11	3.63E-11	3.69E-11	3.69E-11
h 4	.00E+00	1.41E-34	1.44E-34	1.46E-34	1.49E-34	1.49E-34
he 3	.00E+00	4.77E-10	9.79E-10	1.47E-09	1.95E-09	1.95E-09
he 4	.00E+00	3.66E-06	7.32E-06	1.10E-05	1.46E-05	1.46E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	.00E+00	6.40E-07	8.79E-07	1.32E-06	1.76E-06	1.76E-06
ne 21	.00E+00	3.97E-12	1.59E-11	3.57E-11	6.33E-11	6.33E-11
ne 22	.00E+00	2.87E-09	5.77E-09	8.68E-09	1.16E-08	1.16E-08
ne 23	.00E+00	7.33E-15	7.32E-15	7.31E-15	7.30E-15	7.30E-15
na 22	.00E+00	6.31E-11	4.30E-11	4.29E-11	4.29E-11	4.29E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	.00E+00	3.65E-08	3.64E-08	3.64E-08	3.64E-08	3.64E-08
na 24m	.00E+00	6.00E-15	5.99E-15	5.98E-15	5.97E-15	5.97E-15
mg 25	.00E+00	2.40E-26	1.47E-26	1.46E-25	2.40E-25	2.40E-25
mg 24	.00E+00	3.78E-03	7.56E-03	1.13E-02	1.51E-02	1.51E-02
mg 25	.00E+00	8.61E-10	1.48E-09	6.04E-09	7.96E-09	7.96E-09
mg 26	.00E+00	6.57E-08	1.31E-07	1.97E-07	2.62E-07	2.62E-07

mg 27	.00E+00	2.19E-12	2.18E-12	2.18E-12	2.18E-12	2.18E-12
mg 28	.00E+00	4.43E-24	4.42E-24	4.41E-24	4.40E-24	4.40E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	.00E+00	2.71E-10	2.70E-10	2.70E-10	2.70E-10	2.70E-10
al 29	.00E+00	9.53E-25	7.81E-24	8.55E-24	1.52E-23	1.52E-23
al 30	.00E+00	4.34E-36	3.49E-35	1.18E-34	2.78E-34	2.78E-34
si 28	.00E+00	1.10E-02	2.20E-02	3.30E-02	4.40E-02	4.40E-02
si 29	.00E+00	5.53E-09	1.41E-08	2.17E-08	5.62E-08	5.62E-08
si 30	.00E+00	1.21E-15	9.68E-15	3.26E-14	7.71E-14	7.71E-14
si 31	.00E+00	8.67E-28	4.91E-27	2.33E-26	5.50E-26	5.50E-26
si 32	.00E+00	3.17E-34	4.28E-33	1.06E-32	5.14E-32	5.14E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		3.00E+08	3.00E+08	2.99E+08	2.99E+08	2.99E-07

0
1 sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10
power= 4.000E-03mw, burnup=1.4410E+03mwd, flux= 2.99E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91313. d	182625. d	273938. d	365250. d	d
he 4	.00E+00	4.39E-02	1.15E-01	1.97E-01	2.89E-01	2.89E-01
pb206	.00E+00	2.25E-07	1.06E-06	4.26E-06	1.47E-05	1.47E-05
pb207	.00E+00	4.16E-07	1.78E-06	4.11E-06	7.38E-06	7.38E-06
pb208	.00E+00	8.05E-08	3.16E-07	7.02E-07	1.24E-06	1.24E-06
pb209	.00E+00	8.67E-14	3.44E-13	7.67E-13	1.35E-12	1.35E-12
pb210	.00E+00	9.86E-08	3.81E-07	8.28E-07	1.42E-06	1.42E-06
pb211	.00E+00	3.77E-13	7.55E-13	1.13E-12	1.51E-12	1.51E-12
pb212	.00E+00	1.11E-12	2.14E-12	3.21E-12	4.25E-12	4.25E-12
pb214	.00E+00	2.25E-13	8.70E-13	1.89E-12	3.25E-12	3.25E-12
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	.00E+00	1.35E-08	1.07E-07	3.60E-07	8.49E-07	8.49E-07
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	.00E+00	6.07E-11	2.34E-10	5.10E-10	8.76E-10	8.76E-10
bi211	.00E+00	2.23E-14	4.47E-14	6.72E-14	8.96E-14	8.96E-14
bi212	.00E+00	1.05E-13	2.05E-13	3.04E-13	4.03E-13	4.03E-13
bi213	.00E+00	2.02E-14	8.03E-14	1.79E-13	3.16E-13	3.16E-13
bi214	.00E+00	1.47E-13	6.44E-13	1.41E-12	2.42E-12	2.42E-12
po210	.00E+00	1.48E-09	6.47E-09	1.41E-08	2.42E-08	2.42E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	.00E+00	2.47E-19	4.94E-19	7.42E-19	9.90E-19	9.90E-19
po212	.00E+00	5.52E-24	1.08E-23	1.60E-23	2.12E-23	2.12E-23
po213	.00E+00	3.04E-23	1.21E-22	2.69E-22	4.73E-22	4.73E-22
po214	.00E+00	2.30E-20	8.89E-20	1.93E-19	3.32E-19	3.32E-19
po215	.00E+00	3.10E-19	6.20E-19	9.31E-19	1.24E-18	1.24E-18
po216	.00E+00	4.19E-18	8.18E-18	1.21E-17	1.61E-17	1.61E-17
po218	.00E+00	2.61E-14	1.01E-13	2.19E-13	3.76E-13	3.76E-13
rn218	.00E+00	1.70E-29	3.31E-29	4.90E-29	6.49E-29	6.49E-29
rn219	.00E+00	6.89E-16	1.38E-15	2.07E-15	2.76E-15	2.76E-15
rn220	.00E+00	1.61E-15	3.34E-15	4.65E-15	6.17E-15	6.17E-15
rn222	.00E+00	4.63E-11	1.79E-10	3.89E-10	6.69E-10	6.69E-10
ra222	.00E+00	1.64E-26	3.59E-26	5.32E-26	7.04E-26	7.04E-26
ra223	.00E+00	1.72E-10	3.44E-10	5.17E-10	6.90E-10	6.90E-10
ra224	.00E+00	9.14E-12	3.78E-11	8.65E-11	5.51E-11	5.51E-11
ra225	.00E+00	9.47E-12	3.76E-11	8.38E-11	1.48E-10	1.48E-10
ra226	.00E+00	7.08E-06	2.73E-05	5.94E-05	1.02E-04	1.02E-04
ra228	.00E+00	5.28E-13	1.06E-12	1.59E-12	2.12E-12	2.12E-12
ac225	.00E+00	6.40E-12	2.54E-11	5.66E-11	9.98E-11	9.98E-11
ac227	.00E+00	1.20E-07	2.39E-07	3.59E-07	4.80E-07	4.80E-07
ac228	.00E+00	6.45E-17	1.29E-16	1.94E-16	2.59E-16	2.59E-16
th226	.00E+00	9.90E-25	2.73E-24	2.40E-24	3.44E-24	3.44E-24
th227	.00E+00	2.78E-10	5.56E-10	8.34E-10	1.11E-09	1.11E-09

th228	.00E+00	1.75E-09	3.41E-09	5.05E-09	6.70E-09	6.70E-09
th229	.00E+00	1.84E-06	7.30E-06	1.63E-05	2.87E-05	2.87E-05
th230	.00E+00	6.38E-03	1.28E-02	1.92E-02	2.56E-02	2.56E-02
th231	.00E+00	3.04E-09	3.07E-09	3.09E-09	3.11E-09	3.11E-09
th232	.00E+00	1.29E-03	2.59E-03	3.88E-03	5.18E-03	5.18E-03
th233	.00E+00	1.20E-14	2.39E-14	3.59E-14	4.78E-14	4.78E-14
th234	.00E+00	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	1.80E-04	3.60E-04	5.41E-04	7.21E-04	7.21E-04
pa232	.00E+00	3.09E-12	6.18E-12	9.26E-12	1.23E-11	1.23E-11

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 11
power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91313. d	182625. d	273938. d	365250. d	
pa233	.00E+00	1.46E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	.00E+00	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	8.72E-22	1.70E-21	2.32E-21	3.33E-21	3.33E-21
u231	.00E+00	2.76E-18	5.45E-18	8.16E-18	1.08E-17	1.08E-17
u232	.00E+00	6.37E-08	1.24E-07	1.84E-07	2.44E-07	2.44E-07
u233	.00E+00	3.41E-03	6.80E-03	1.02E-02	1.35E-02	1.35E-02
u234	9.06E+00	9.07E+00	9.10E+00	9.14E+00	9.18E+00	9.18E+00
u235	7.30E+02	7.29E+02	7.27E+02	7.25E+02	7.23E+02	7.23E+02
u236	1.74E+02	1.75E+02	1.75E+02	1.75E+02	1.76E+02	1.76E+02
u237	.00E+00	3.25E-06	3.25E-06	3.25E-06	3.26E-06	3.26E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.28E-07	3.28E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	9.13E-12	9.11E-12	9.10E-12	9.08E-12	9.08E-12
np236m	.00E+00	2.17E-12	2.17E-12	2.16E-12	2.16E-12	2.16E-12
np236	.00E+00	5.15E-08	1.03E-07	1.54E-07	2.05E-07	2.05E-07
np237	4.22E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	.00E+00	1.58E-06	1.58E-06	1.57E-06	1.57E-06	1.57E-06
np239	.00E+00	4.76E-05	4.76E-05	4.75E-05	4.74E-05	4.74E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.77E-15	9.74E-15	9.72E-15	9.69E-15	9.69E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.18E-09	1.18E-09	1.17E-09	1.17E-09	1.17E-09
pu237	.00E+00	2.22E-13	2.61E-13	2.76E-13	2.87E-13	2.87E-13
pu238	.00E+00	2.06E-02	2.34E-02	2.37E-02	2.38E-02	2.38E-02
pu239	.00E+00	1.27E+00	2.52E+00	3.75E+00	4.97E+00	4.97E+00
pu240	.00E+00	1.55E-03	4.10E-03	1.35E-02	2.16E-02	2.36E-02
pu241	.00E+00	6.62E-07	2.60E-06	5.76E-06	1.01E-05	1.01E-05
pu242	.00E+00	7.37E-10	8.71E-09	3.72E-08	1.04E-07	1.04E-07
pu243	.00E+00	1.62E-18	1.92E-17	8.18E-17	2.28E-16	2.28E-16
pu244	.00E+00	4.00E-39	3.81E-36	1.89E-34	2.93E-33	2.93E-33
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	.00E+00	6.45E-22	4.76E-21	1.47E-20	3.18E-20	3.18E-20
am240	.00E+00	2.95E-19	2.18E-18	6.73E-18	1.46E-17	1.46E-17
am241	.00E+00	2.23E-06	1.65E-05	5.09E-05	1.10E-04	1.10E-04
am242m	.00E+00	2.09E-10	3.64E-09	1.43E-08	3.37E-08	3.37E-08
am242	.00E+00	8.20E-14	6.25E-13	1.97E-12	4.32E-12	4.32E-12
am243	.00E+00	5.26E-13	1.38E-11	8.38E-11	2.90E-10	2.90E-10
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	.00E+00	4.15E-21	1.08E-19	6.60E-19	2.28E-18	2.28E-18
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241    .00E+00  5.04E-24  3.83E-23  1.21E-22  2.65E-22  2.65E-22
     cm242    .00E+00  1.65E-11  1.26E-10  3.98E-10  8.73E-10  8.73E-10
     cm243    .00E+00   .00E+00  1.40E-20  1.07E-19  3.36E-19  3.36E-19
     cm244    .00E+00  6.52E-17  1.70E-15  1.04E-14  3.58E-14  3.58E-14
1
     sas2h: for-field grit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   12
       power= 4.000E-03mw, burnup=1.4610E+03mwd, flux= 2.99E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge  91313. d 182625. d 273938. d 365250. d 365250. d
     cm245    .00E+00  2.05E-21  1.56E-19  1.46E-18  6.91E-18  6.91E-18
     cm246    .00E+00  6.11E-25  6.80E-23  9.96E-22  6.36E-21  6.36E-21
     cm247    .00E+00  2.25E-30  5.17E-28  1.15E-26  9.86E-26  9.86E-26
     cm248    .00E+00  8.27E-35  3.69E-32  1.29E-30  1.49E-29  1.49E-29
     cm249    .00E+00   .00E+00   .00E+00  3.89E-41  4.82E-40  4.82E-40
     cm250    .00E+00   .00E+00   .00E+00   .00E+00  1.40E-45  1.40E-45
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               3.00E+08  3.00E+08  2.99E+08  2.99E+08  2.99E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *          prelim lwr origen-s binary working library--id = 1143           *
          *        made from modified card-image origen-s libraries of scale 4.2     *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi  *
          *                                                                          *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                  fission product yields are from endf/b-v                *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
```

```
         *        see information above this box (if present) for later updates        *
         *                                                                              *
         ********************************************************************************
         *                                                                              *
         ********************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/28/1996    date library was produced
0                  1697     total number of nuclides in library
                    689     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7993     number of nonzero off-diagonal matrix elements
0        ********************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   13
       power=    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      456563. d      547875. d      639188. d      730500. d      730500. d
     productions   1.096527E+06  1.098196E+06  1.099821E+06  1.101403E+06  1.102943E+06  1.102943E+06
     absorptions   9.037613E+05  9.052724E+05  9.066773E+05  9.079868E+05  9.092220E+05  9.092220E+05
     k infinity    1.213320E+00  1.213111E+00  1.213024E+00  1.213017E+00  1.213062E+00  1.213062E+00
0                   initial      456563. d      547875. d      639188. d      730500. d      730500. d
     actinide
     absorptions   8.959688E+05  8.969688E+05  8.979682E+05  8.989073E+05  8.998463E+05  8.998463E+05
     non-actinide
     abs. fracs.   8.400354E-03  9.172499E-03  9.627581E-03  9.999692E-03  1.031184E-02  1.031184E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products      page   14
0                                  fraction of total absorption rate
       power=    .00mw, burnup=   2922.mwd, flux= 2.80E+08n/cm**2-sec
0              initial 456563. d 547875. d 639188. d 730500. d 730500. d

     sm149     3.99E-03  4.38E-03  4.66E-03  4.85E-03  4.99E-03  4.99E-03
     eu151     1.87E-04  2.38E-04  2.87E-04  3.35E-04  3.82E-04  3.82E-04
     nd143     1.45E-04  1.81E-04  2.17E-04  2.52E-04  2.87E-04  2.87E-04
     rh103     6.89E-05  8.61E-05  1.03E-04  1.20E-04  1.38E-04  1.38E-04
     gd155     7.68E-05  9.68E-05  1.03E-04  1.14E-04  1.24E-04  1.24E-04
     xe131     4.47E-05  5.83E-05  6.98E-05  8.14E-05  9.29E-05  9.29E-05
     cs133     3.62E-05  4.52E-05  5.41E-05  6.31E-05  7.20E-05  7.20E-05
     cd113     4.58E-05  5.50E-05  6.91E-05  6.43E-05  6.87E-05  6.87E-05
     sm147     2.68E-05  3.34E-05  4.01E-05  4.67E-05  5.32E-05  5.32E-05
     tc 99     2.67E-05  3.33E-05  3.98E-05  4.64E-05  5.29E-05  5.29E-05
     gd157     3.41E-05  3.68E-05  3.88E-05  4.04E-05  4.18E-05  4.18E-05
     nd145     2.04E-05  2.56E-05  3.07E-05  3.57E-05  4.08E-05  4.08E-05
     sm151     3.97E-05  3.97E-05  3.98E-05  3.99E-05  4.00E-05  4.00E-05
     mo 95     1.43E-05  1.78E-05  2.13E-05  2.48E-05  2.83E-05  2.83E-05
     sm152     1.16E-05  1.47E-05  1.78E-05  2.09E-05  2.41E-05  2.41E-05
     kr 83     8.83E-06  1.10E-05  1.32E-05  1.53E-05  1.75E-05  1.75E-05
     cs135     6.13E-06  1.02E-05  1.22E-05  1.42E-05  1.62E-05  1.62E-05
     sm150     5.08E-06  7.26E-06  9.60E-06  1.21E-05  1.46E-05  1.46E-05
     ru101     6.37E-06  7.06E-06  9.53E-06  1.31E-05  1.27E-05  1.27E-05
     pr141     4.04E-06  7.54E-06  9.03E-06  1.05E-05  1.20E-05  1.20E-05
     eu153     5.58E-06  6.98E-06  8.39E-06  9.80E-06  1.12E-05  1.12E-05
     la139     4.94E-06  6.16E-06  7.38E-06  8.59E-06  9.80E-06  9.80E-06
     ba137     2.25E-06  2.84E-06  3.42E-06  4.00E-06  4.58E-06  4.58E-06
     pd105     2.17E-06  2.72E-06  3.28E-06  3.85E-06  4.42E-06  4.42E-06
     kr 85     2.82E-06  3.52E-06  4.21E-06  4.91E-06  5.60E-06  5.60E-06
      i129     1.54E-06  1.92E-06  2.31E-06  2.69E-06  3.08E-06  3.08E-06
     nd146     1.48E-06  1.85E-06  2.21E-06  2.58E-06  2.94E-06  2.94E-06
     ag109     1.84E-06  1.37E-06  1.72E-06  2.11E-06  2.52E-06  2.52E-06
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xe135	2.28E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06
mo 97	1.12E-06	1.40E-06	1.68E-06	1.95E-06	2.23E-06	2.23E-06
zr 91	5.26E-07	4.56E-07	7.05E-07	9.14E-07	1.04E-06	1.04E-06
y 89	5.04E-07	6.28E-07	7.51E-07	8.74E-07	9.97E-07	9.97E-07
ru102	4.57E-07	5.71E-07	6.85E-07	7.98E-07	9.11E-07	9.11E-07
ce142	4.09E-07	5.11E-07	6.12E-07	7.12E-07	8.13E-07	8.13E-07
nd148	3.96E-07	4.94E-07	5.92E-07	6.89E-07	7.87E-07	7.87E-07
pd108	3.38E-07	4.11E-07	5.09E-07	6.12E-07	7.20E-07	7.20E-07
nd144	3.31E-07	4.13E-07	4.95E-07	5.76E-07	6.57E-07	6.57E-07
ba138	2.82E-07	3.52E-07	4.22E-07	4.91E-07	5.61E-07	5.61E-07
in115	2.78E-07	3.47E-07	4.17E-07	4.88E-07	5.58E-07	5.58E-07
ce140	2.64E-07	3.30E-07	3.95E-07	4.60E-07	5.25E-07	5.25E-07
xe132	2.60E-07	3.00E-07	3.39E-07	4.19E-07	4.78E-07	4.78E-07
sm152	1.62E-08	1.57E-07	2.31E-07	3.20E-07	4.21E-07	4.21E-07
pd107	1.79E-07	2.29E-07	2.81E-07	3.36E-07	3.92E-07	3.92E-07
mo 98	1.66E-07	2.07E-07	2.49E-07	2.90E-07	3.30E-07	3.30E-07
mo100	1.60E-07	2.00E-07	2.39E-07	2.79E-07	3.18E-07	3.18E-07
xe134	1.56E-07	1.95E-07	2.34E-07	2.72E-07	3.11E-07	3.11E-07
pm147	2.71E-07	2.70E-07	2.70E-07	2.69E-07	2.69E-07	2.69E-07
zr 92	1.27E-07	1.58E-07	1.89E-07	2.20E-07	2.51E-07	2.51E-07
i127	1.06E-07	1.32E-07	1.59E-07	1.87E-07	2.14E-07	2.14E-07

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 15
0 fraction of total absorption rate
0 powerm .00mw, burnup= 2922.mwd, flux= 2.80E+08n/cm**2-sec
initial 456563. d 547875. d 639188. d 730500. d 730500. d

zr 96	1.02E-07	1.27E-07	1.52E-07	1.77E-07	2.02E-07	2.02E-07
ru104	9.97E-08	1.25E-07	1.50E-07	1.75E-07	2.01E-07	2.01E-07
nd150	8.82E-08	1.10E-07	1.32E-07	1.54E-07	1.76E-07	1.76E-07
eu155	1.66E-07	1.67E-07	1.69E-07	1.70E-07	1.72E-07	1.72E-07
xe136	8.46E-08	1.06E-07	1.26E-07	1.47E-07	1.68E-07	1.68E-07
br 81	6.38E-08	7.96E-08	9.53E-08	1.11E-07	1.27E-07	1.27E-07
rb 85	6.19E-08	7.72E-08	9.25E-08	1.08E-07	1.23E-07	1.23E-07
zr 94	5.42E-08	6.76E-08	8.09E-08	9.42E-08	1.07E-07	1.07E-07
eu152	4.88E-08	6.21E-08	7.48E-08	8.73E-08	9.94E-08	9.94E-08
zr 90	4.77E-08	6.00E-08	7.22E-08	8.44E-08	9.65E-08	9.65E-08
cd111	4.47E-08	5.69E-08	6.95E-08	8.25E-08	9.58E-08	9.58E-08
sm154	3.80E-08	4.76E-08	5.72E-08	6.69E-08	7.67E-08	7.67E-08
te130	3.84E-08	4.80E-08	5.75E-08	6.70E-08	7.66E-08	7.66E-08
rb 87	3.39E-08	4.48E-08	5.56E-08	6.24E-08	7.11E-08	7.11E-08
se 77	2.54E-08	3.16E-08	3.79E-08	4.42E-08	5.04E-08	5.04E-08
pd106	1.94E-08	2.45E-08	2.97E-08	3.50E-08	4.05E-08	4.05E-08
kr 84	1.71E-08	2.13E-08	2.55E-08	2.96E-08	3.38E-08	3.38E-08
ru 99	7.00E-09	1.09E-08	1.56E-08	2.11E-08	2.75E-08	2.75E-08
gd156	1.05E-08	1.41E-08	1.81E-08	2.23E-08	2.68E-08	2.68E-08
se 79	1.30E-08	1.62E-08	1.94E-08	2.26E-08	2.58E-08	2.58E-08
sb121	1.27E-08	1.59E-08	1.91E-08	2.23E-08	2.55E-08	2.55E-08
sb123	1.03E-08	1.29E-08	1.55E-08	1.81E-08	2.07E-08	2.07E-08
kr 86	9.39E-09	1.17E-08	1.40E-08	1.63E-08	1.86E-08	1.86E-08
te128	8.51E-09	1.06E-08	1.28E-08	1.49E-08	1.70E-08	1.70E-08
sr 90	1.48E-08	1.67E-08	1.67E-08	1.66E-08	1.65E-08	1.65E-08
dy161	6.70E-09	8.77E-09	1.10E-08	1.34E-08	1.59E-08	1.59E-08
gd154	3.76E-09	5.84E-09	8.43E-09	1.15E-08	1.50E-08	1.50E-08
se 80	6.07E-09	7.57E-09	9.07E-09	1.06E-08	1.21E-08	1.21E-08
te125	5.42E-09	6.79E-09	8.18E-09	9.57E-09	1.10E-08	1.10E-08
rh105	8.72E-09	8.80E-09	8.89E-09	8.99E-09	9.08E-09	9.08E-09
tb159	4.02E-09	5.13E-09	6.29E-09	7.49E-09	8.73E-09	8.73E-09
cd112	3.62E-09	4.56E-09	5.53E-09	6.50E-09	7.49E-09	7.49E-09
li 6	5.43E-09	4.27E-09	5.11E-09	5.94E-09	6.77E-09	6.77E-09
gd158	2.68E-09	3.60E-09	4.57E-09	5.58E-09	6.61E-09	6.61E-09

sn117	2.82E-09	3.53E-09	4.26E-09	4.99E-09	5.73E-09	5.73E-09
eu154	2.87E-09	3.56E-09	4.27E-09	4.99E-09	5.70E-09	5.70E-09
ru100	1.22E-09	1.89E-09	2.71E-09	3.44E-09	4.76E-09	4.76E-09
sn119	2.28E-09	2.86E-09	3.43E-09	4.01E-09	4.60E-09	4.60E-09
sn115	2.09E-09	2.61E-09	3.14E-09	3.67E-09	4.20E-09	4.20E-09
cd114	1.66E-09	2.17E-09	2.72E-09	3.29E-09	3.88E-09	3.88E-09
cs137	3.75E-09	3.74E-09	3.74E-09	3.73E-09	3.73E-09	3.73E-09
sr 88	1.73E-09	2.15E-09	2.58E-09	3.00E-09	3.42E-09	3.42E-09
nd142	8.30E-10	1.29E-09	1.86E-09	2.52E-09	3.28E-09	3.28E-09
ba134	8.20E-10	1.27E-09	1.82E-09	2.47E-09	3.22E-09	3.22E-09
pd110	1.39E-09	1.78E-09	2.19E-09	2.61E-09	3.04E-09	3.04E-09
sm148	7.64E-10	1.18E-09	1.69E-09	2.28E-09	2.97E-09	2.97E-09
dy164	1.66E-09	1.45E-09	1.89E-09	2.37E-09	2.90E-09	2.90E-09
dy162	1.04E-09	1.40E-09	1.80E-09	2.24E-09	2.72E-09	2.72E-09
ba135	4.56E-10	1.02E-09	1.47E-09	2.00E-09	2.61E-09	2.61E-09

1 sas2h: fer-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16
0 fraction of total absorption rate
power= .00mw, burnup= 2922.mwd, flux= 2.00E+08n/cm**2-sec
0 initial 456563. d 547875. d 639188. d 730500. d 730500. d

pr143	2.63E-09	2.63E-09	2.62E-09	2.61E-09	2.61E-09	2.61E-09
se 82	1.17E-09	1.66E-09	1.75E-09	2.04E-09	2.33E-09	2.33E-09
pd104	5.44E-10	8.77E-10	1.26E-09	1.71E-09	2.23E-09	2.23E-09
sn126	9.68E-10	1.22E-09	1.47E-09	1.72E-09	1.98E-09	1.98E-09
xe133	1.99E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09
se 78	8.97E-10	1.12E-09	1.34E-09	1.57E-09	1.79E-09	1.79E-09
ce141	1.57E-09	1.57E-09	1.57E-09	1.56E-09	1.56E-09	1.56E-09
sn124	7.36E-10	9.22E-10	1.11E-09	1.30E-09	1.49E-09	1.49E-09
se 75	5.34E-10	6.46E-10	7.99E-10	9.30E-10	1.06E-09	1.06E-09
pm149	9.63E-10	9.62E-10	9.60E-10	9.59E-10	9.58E-10	9.58E-10
nd147	9.29E-10	9.27E-10	9.25E-10	9.23E-10	9.22E-10	9.22E-10
mo 96	2.53E-10	3.72E-10	5.13E-10	6.77E-10	8.62E-10	8.62E-10
ba136	5.58E-10	6.69E-10	8.08E-10	7.16E-10	8.53E-10	8.53E-10
in113	4.81E-10	5.04E-10	6.09E-10	7.14E-10	8.19E-10	8.19E-10
dy163	2.43E-10	3.36E-10	4.32E-10	5.42E-10	6.41E-10	6.41E-10
sn118	3.01E-10	3.77E-10	4.54E-10	5.30E-10	6.07E-10	6.07E-10
kr 82	2.32E-10	3.13E-10	4.02E-10	5.00E-10	6.06E-10	6.06E-10
ce144	5.93E-10	5.92E-10	5.90E-10	5.88E-10	5.87E-10	5.87E-10
kr 83	5.62E-10	5.61E-10	5.59E-10	5.57E-10	5.55E-10	5.55E-10
xe130	1.83E-10	3.35E-10	3.38E-10	4.32E-10	5.36E-10	5.36E-10
es134	2.74E-10	3.36E-10	4.02E-10	4.68E-10	5.34E-10	5.34E-10
cd116	2.54E-10	3.18E-10	3.82E-10	4.47E-10	5.11E-10	5.11E-10
sn122	2.52E-10	3.15E-10	3.79E-10	4.43E-10	5.07E-10	5.07E-10
nb 93	1.83E-10	1.42E-10	2.34E-10	3.18E-10	4.15E-10	4.15E-10
cd110	8.86E-11	1.43E-10	2.33E-10	3.09E-10	4.03E-10	4.03E-10
sn120	1.88E-10	2.36E-10	2.83E-10	3.31E-10	3.79E-10	3.79E-10
ru103	3.60E-10	3.60E-10	3.61E-10	3.62E-10	3.63E-10	3.63E-10
ge 73	1.46E-10	1.82E-10	2.19E-10	2.55E-10	2.92E-10	2.92E-10
br 79	5.34E-11	8.33E-11	1.20E-10	1.63E-10	2.12E-10	2.12E-10
zr 93	1.63E-10	1.44E-10	1.44E-10	1.43E-10	1.63E-10	1.63E-10
nb 95	1.51E-10	1.51E-10	1.51E-10	1.50E-10	1.50E-10	1.50E-10
y 91	1.40E-10	1.40E-10	1.39E-10	1.39E-10	1.38E-10	1.38E-10
ag107	3.06E-11	4.87E-11	7.03E-11	9.86E-11	1.31E-10	1.31E-10
te126	4.42E-11	6.10E-11	8.01E-11	1.02E-10	1.26E-10	1.26E-10
xe129	3.04E-11	4.74E-11	6.82E-11	9.28E-11	1.21E-10	1.21E-10
pm151	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10
se 76	2.27E-11	6.57E-11	7.87E-11	9.17E-11	1.05E-10	1.05E-10
pd108	3.69E-11	5.01E-11	6.19E-11	7.43E-11	8.73E-11	8.73E-11
ho165	1.74E-11	2.38E-11	3.11E-11	3.92E-11	4.82E-11	4.82E-11
ba140	4.68E-11	4.67E-11	4.66E-11	4.65E-11	4.64E-11	4.64E-11

eu156	3.71E-11	3.77E-11	3.84E-11	3.91E-11	3.97E-11	3.97E-11
sm153	3.89E-11	3.91E-11	3.93E-11	3.95E-11	3.97E-11	3.97E-11
ru106	2.83E-11	2.88E-11	2.95E-11	3.01E-11	3.07E-11	3.07E-11
sr 89	2.80E-11	2.99E-11	2.98E-11	2.97E-11	2.96E-11	2.96E-11
kr 87	2.24E-11	2.23E-11	2.23E-11	2.22E-11	2.21E-11	2.21E-11
dy160	4.34E-12	4.74E-12	5.75E-12	1.33E-11	1.73E-11	1.75E-11
ce143	1.72E-11	1.72E-11	1.72E-11	1.71E-11	1.71E-11	1.71E-11
sb125	1.54E-11	1.55E-11	1.56E-11	1.57E-11	1.58E-11	1.58E-11
y 90	1.59E-11	1.59E-11	1.58E-11	1.58E-11	1.57E-11	1.57E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 17
0 fraction of total absorption rate
! powerm .00mw, burnup= 3922.mwd flux= 2.80E+08n/cm**2-sec
0 initial 456563. d 547875. d 639188. d 730500. d 730500. d

te124	6.90E-12	8.86E-12	1.09E-11	1.30E-11	1.33E-11	1.33E-11
la140	1.52E-11	1.52E-11	1.52E-11	1.51E-11	1.51E-11	1.51E-11
mo 99	1.30E-11	1.30E-11	1.30E-11	1.30E-11	1.30E-11	1.30E-11
xe128	3.27E-12	5.00E-12	7.11E-12	9.59E-12	1.24E-11	1.24E-11
sr 87	6.13E-12	7.67E-12	9.23E-12	1.08E-11	1.23E-11	1.23E-11
pm148m	9.70E-12	9.57E-12	9.57E-12	9.57E-12	9.57E-12	9.57E-12
sr 86	3.17E-12	4.41E-12	5.81E-12	7.40E-12	9.15E-12	9.15E-12
te127m	7.63E-12	7.69E-12	7.74E-12	7.80E-12	7.85E-12	7.85E-12
nb 94	3.52E-12	4.42E-12	5.32E-12	6.24E-12	7.17E-12	7.17E-12
i131	6.74E-12	6.73E-12	6.73E-12	6.73E-12	6.72E-12	6.72E-12
se 74	2.94E-12	3.67E-12	4.40E-12	5.13E-12	5.86E-12	5.86E-12
sn116	1.19E-12	1.86E-12	2.67E-12	3.63E-12	4.73E-12	4.73E-12
ge 72	2.80E-12	2.50E-12	3.01E-12	3.53E-12	4.04E-12	4.04E-12
se 76	1.49E-12	1.97E-12	2.49E-12	3.06E-12	3.66E-12	3.66E-12
er166	7.45E-13	1.07E-12	1.45E-12	1.89E-12	2.38E-12	2.38E-12
te122	5.05E-13	7.82E-13	1.12E-12	1.52E-12	1.98E-12	1.98E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.81E-12	1.81E-12	1.81E-12
pd111	3.73E-13	3.85E-13	3.97E-13	4.09E-13	4.22E-13	4.22E-13
pm148	3.79E-13	3.74E-13	3.73E-13	3.72E-13	3.72E-13	3.72E-13
eu157	3.33E-13	3.40E-13	3.44E-13	3.57E-13	3.65E-13	3.65E-13
cd115m	2.42E-13	2.43E-13	2.44E-13	2.45E-13	2.46E-13	2.46E-13
kr 88	9.78E-14	1.28E-13	1.62E-13	1.99E-13	2.40E-13	2.40E-13
ce136	8.34E-14	9.00E-14	9.66E-14	1.03E-13	1.10E-13	1.10E-13
er167	1.08E-14	1.76E-14	2.65E-14	3.78E-14	5.17E-14	5.17E-14
te123	9.74E-15	1.39E-14	1.90E-14	2.52E-14	3.26E-14	3.26E-14
ru105	3.12E-14	3.15E-14	3.19E-14	3.22E-14	3.25E-14	3.25E-14
sn125	2.97E-14	2.98E-14	3.00E-14	3.01E-14	3.02E-14	3.02E-14
tb160	1.34E-14	1.43E-14	1.74E-14	2.66E-14	3.38E-14	3.38E-14
pr142	6.86E-15	8.53E-15	1.02E-14	1.19E-14	1.35E-14	1.35E-14
be 9	6.70E-15	8.56E-15	1.00E-14	1.17E-14	1.33E-14	1.33E-14
rb 88	1.26E-14	1.26E-14	1.25E-14	1.25E-14	1.24E-14	1.24E-14
sn123	1.02E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
i135	1.00E-14	9.98E-15	9.97E-15	9.95E-15	9.94E-15	9.94E-15
te132	9.47E-15	9.46E-15	9.45E-15	9.44E-15	9.44E-15	9.44E-15
sb126	6.73E-15	6.16E-15	5.59E-15	6.02E-15	6.45E-15	6.45E-15
te134	5.74E-15	5.72E-15	5.71E-15	5.69E-15	5.68E-15	5.68E-15
li 7	2.46E-15	3.32E-15	3.98E-15	4.63E-15	5.29E-15	5.29E-15
i130	1.97E-15	2.09E-15	2.59E-15	2.90E-15	3.21E-15	3.21E-15
sb124	2.02E-15	2.73E-15	2.88E-15	3.00E-15	3.12E-15	3.12E-15
in117m	2.17E-15	2.19E-15	2.21E-15	2.23E-15	2.25E-15	2.25E-15
cd108	3.74E-16	6.46E-16	1.03E-15	1.54E-15	2.20E-15	2.20E-15
sn114	2.86E-16	4.48E-16	6.46E-16	8.81E-16	1.15E-15	1.15E-15
rb 86	6.47E-16	7.44E-16	8.42E-16	9.40E-16	1.04E-15	1.04E-15
dy165	4.85E-16	5.31E-16	6.19E-16	6.87E-16	7.54E-16	7.54E-16
in117	6.41E-16	6.47E-16	6.54E-16	6.60E-16	6.67E-16	6.67E-16
cd118	1.22E-16	1.23E-16	1.23E-16	1.24E-16	1.25E-16	1.25E-16

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     cs134m    5.11E-17  6.29E-17  7.52E-17  8.74E-17  9.08E-17  9.08E-17
     ge 75     8.51E-17  8.50E-17  8.49E-17  8.48E-17  8.47E-17  8.47E-17
     in119m    3.04E-17  3.05E-17  3.06E-17  3.08E-17  3.09E-17  3.09E-17
1    sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  18
0                                  fraction of total absorption rate
        power=      .00mw, burnup=    2922.mwd, flux= 2.80E+08n/cm**2-sec
              initial 496563. d 547875. d 639188. d 730500. d 730500. d

     cd109     1.91E-18  2.31E-18  2.72E-18  3.12E-18  3.52E-18  3.52E-18
     ag110     1.38E-18  1.79E-18  2.15E-18  2.75E-18  3.27E-18  3.27E-18
     in119     2.40E-18  2.41E-18  2.43E-18  2.44E-18  2.46E-18  2.46E-18
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  19
       power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
                 charge 496563. d 547875. d 639188. d 730500. d 730500. d
      h  1    8.84E-05  1.10E-04  1.32E-04  1.53E-04  1.75E-04  1.75E-04
      h  2    2.62E-07  3.27E-07  3.91E-07  4.56E-07  5.20E-07  5.20E-07
      h  3    3.69E-11  3.71E-11  3.77E-11  3.83E-11  3.89E-11  3.89E-11
      h  4    1.49E-34  1.49E-34  1.52E-34  1.54E-34  1.56E-34  1.56E-34
     he  3    1.95E-09  2.42E-09  2.87E-09  3.32E-09  3.76E-09  3.76E-09
     he  4    1.44E-05  1.82E-05  2.18E-05  2.54E-05  2.90E-05  2.90E-05
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    1.76E-06  2.19E-06  2.62E-06  3.05E-06  3.48E-06  3.48E-06
     ne 21    6.33E-11  8.74E-11  1.38E-10  1.85E-10  2.38E-10  2.38E-10
     ne 22    1.16E-08  1.44E-08  1.73E-08  2.01E-08  2.30E-08  2.30E-08
     ne 23    7.30E-15  7.17E-15  7.17E-15  7.16E-15  7.15E-15  7.15E-15
     na 22    4.29E-11  4.22E-11  4.22E-11  4.21E-11  4.21E-11  4.21E-11
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    3.64E-08  3.08E-08  3.07E-08  3.07E-08  3.07E-08  3.07E-08
     na 24m   5.97E-15  5.05E-15  5.05E-15  5.04E-15  5.04E-15  5.04E-15
     na 25    2.60E-25  3.45E-25  4.74E-25  6.22E-25  7.88E-25  7.88E-25
     mg 24    1.51E-02  1.83E-02  2.15E-02  2.47E-02  2.78E-02  2.78E-02
     mg 25    7.96E-09  1.18E-08  1.62E-08  2.13E-08  2.70E-08  2.70E-08
     mg 26    2.62E-07  3.27E-07  3.91E-07  4.56E-07  5.20E-07  5.20E-07
     mg 27    2.18E-12  2.14E-12  2.14E-12  2.14E-12  2.13E-12  2.13E-12
     mg 28    4.40E-24  4.33E-24  4.32E-24  4.31E-24  4.31E-24  4.31E-24
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    2.70E-10  2.28E-10  2.28E-10  2.28E-10  2.27E-10  2.27E-10
     al 29    1.52E-23  2.29E-23  3.24E-23  4.38E-23  5.65E-23  5.65E-23
     al 30    2.78E-34  5.28E-34  9.06E-34  1.43E-33  2.11E-33  2.11E-33
     al 28    4.40E-02  5.32E-02  6.25E-02  7.18E-02  8.10E-02  8.10E-02
     al 29    5.62E-08  8.73E-08  1.24E-07  1.67E-07  2.16E-07  2.16E-07
     al 30    7.71E-14  1.50E-13  2.59E-13  4.08E-13  6.04E-13  6.04E-13
     al 31    5.50E-26  1.07E-25  1.84E-25  2.90E-25  4.29E-25  4.29E-25
     al 32    5.14E-32  1.12E-31  2.07E-31  3.46E-31  5.34E-31  5.34E-31
   totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0   flux                2.80E+08  2.80E+08  2.80E+08  2.80E+08  2.79E-07
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  20
       power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
                 charge 496563. d 547875. d 639188. d 730500. d 730500. d
     he  4    2.89E-01  3.89E-01  4.98E-01  6.16E-01  7.42E-01  7.42E-01
     pb206    1.47E-05  2.82E-05  4.78E-05  7.45E-05  1.09E-04  1.09E-04
     pb207    7.38E-06  1.16E-05  1.68E-05  2.30E-05  3.01E-05  3.01E-05
     pb208    1.24E-06  1.92E-06  2.76E-06  3.74E-06  4.87E-06  4.87E-06
     pb209    1.35E-12  2.09E-12  2.99E-12  4.04E-12  5.23E-12  5.23E-12
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pb210	1.42E-06	2.15E-06	3.00E-06	3.96E-06	5.01E-06	5.01E-06
pb211	1.51E-12	1.89E-12	2.27E-12	2.65E-12	3.03E-12	3.03E-12
pb212	6.25E-12	5.28E-12	6.32E-12	7.36E-12	8.40E-12	8.40E-12
pb214	3.25E-12	4.92E-12	6.86E-12	9.04E-12	1.15E-11	1.15E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	8.49E-07	1.65E-06	2.83E-06	4.46E-06	6.62E-06	6.62E-06
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	8.76E-10	1.32E-09	1.85E-09	2.44E-09	3.08E-09	3.08E-09
bi211	8.96E-14	1.12E-13	1.35E-13	1.57E-13	1.80E-13	1.80E-13
bi212	4.03E-13	5.01E-13	6.00E-13	6.99E-13	7.97E-13	7.97E-13
bi213	3.16E-13	4.89E-13	6.97E-13	9.43E-13	1.22E-12	1.22E-12
bi214	2.42E-12	3.65E-12	5.09E-12	6.72E-12	8.50E-12	8.50E-12
po210	2.62E-08	3.66E-08	5.10E-08	6.73E-08	8.52E-08	8.52E-08
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	9.90E-19	1.24E-18	1.49E-18	1.74E-18	1.99E-18	1.99E-18
po212	2.12E-23	2.63E-23	3.15E-23	3.67E-23	4.19E-23	4.19E-23
po213	4.73E-22	7.35E-22	1.05E-21	1.42E-21	1.84E-21	1.84E-21
po214	3.32E-19	5.02E-19	7.01E-19	9.24E-19	1.17E-18	1.17E-18
po215	1.24E-18	1.55E-18	1.87E-18	2.18E-18	2.49E-18	2.49E-18
po216	1.61E-17	2.00E-17	2.39E-17	2.79E-17	3.18E-17	3.18E-17
po218	3.76E-13	5.69E-13	7.93E-13	1.05E-12	1.32E-12	1.32E-12
rn218	6.49E-29	7.85E-29	9.39E-29	1.09E-28	1.24E-28	1.24E-28
rn219	2.76E-15	3.46E-15	4.15E-15	4.84E-15	5.54E-15	5.54E-15
rn220	6.17E-15	7.67E-15	9.18E-15	1.07E-14	1.22E-14	1.22E-14
rn222	6.69E-10	1.01E-09	1.41E-09	1.86E-09	2.35E-09	2.35E-09
ra222	7.04E-26	8.52E-26	1.02E-25	1.19E-25	1.35E-25	1.35E-25
ra223	6.90E-10	8.62E-10	1.04E-09	1.21E-09	1.38E-09	1.38E-09
ra224	3.51E-11	4.36E-11	5.22E-11	6.08E-11	6.94E-11	6.94E-11
ra225	1.68E-10	2.29E-10	3.27E-10	4.41E-10	5.71E-10	5.71E-10
ra226	1.02E-04	1.54E-04	2.15E-04	2.84E-04	3.60E-04	3.60E-04
ra228	2.12E-12	2.63E-12	3.18E-12	3.72E-12	4.25E-12	4.25E-12
ac225	9.98E-11	1.35E-10	2.21E-10	2.98E-10	3.86E-10	3.86E-10
ac227	4.80E-07	6.00E-07	7.20E-07	8.41E-07	9.61E-07	9.61E-07
ac228	2.39E-16	3.23E-16	3.88E-16	4.54E-16	5.19E-16	5.19E-16
th226	3.44E-24	4.16E-24	4.97E-24	5.78E-24	6.59E-24	6.59E-24
th227	1.11E-09	1.39E-09	1.67E-09	1.95E-09	2.23E-09	2.23E-09
th228	6.70E-09	8.33E-09	9.97E-09	1.16E-08	1.32E-08	1.32E-08
th229	2.87E-05	4.45E-05	6.35E-05	8.57E-05	1.11E-04	1.11E-04
th230	2.56E-02	3.20E-02	3.84E-02	4.48E-02	5.13E-02	5.13E-02
th231	3.15E-09	3.13E-09	3.15E-09	3.17E-09	3.20E-09	3.20E-09
th232	5.18E-03	6.48E-03	7.78E-03	9.08E-03	1.04E-02	1.04E-02
th233	4.78E-14	5.94E-14	7.13E-14	8.32E-14	9.50E-14	9.50E-14
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.21E-04	9.02E-04	1.08E-03	1.26E-03	1.45E-03	1.45E-03
pa232	1.23E-11	1.54E-11	1.85E-11	2.16E-11	2.46E-11	2.46E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 21
power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 456563. d	547875. d	639188. d	730500. d	730500. d	
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	3.33E-21	4.03E-21	4.82E-21	5.61E-21	6.39E-21	6.39E-21
u231	1.08E-17	1.32E-17	1.58E-17	1.83E-17	2.09E-17	2.09E-17
u232	2.44E-07	3.03E-07	3.63E-07	4.23E-07	4.82E-07	4.82E-07
u233	1.35E-02	1.69E-02	2.02E-02	2.36E-02	2.69E-02	2.69E-02
u234	9.18E+00	9.21E+00	9.25E+00	9.28E+00	9.32E+00	9.32E+00

u235	7.23E+02	7.21E+02	7.19E+02	7.18E+02	7.16E+02	7.16E+02
u236	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.77E+02	1.77E+02
u237	3.26E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	3.28E-07	3.22E-07	3.22E-07	3.22E-07	3.21E-07	3.21E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	9.88E-12	8.87E-12	8.86E-12	8.84E-12	8.83E-12	8.83E-12
np236m	2.16E-12	2.11E-12	2.11E-12	2.10E-12	2.10E-12	2.10E-12
np236	2.05E-07	2.55E-07	3.04E-07	3.53E-07	4.03E-07	4.03E-07
np237	4.21E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01
np238	1.57E-06	1.56E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.74E-05	4.66E-05	4.65E-05	4.65E-05	4.64E-05	4.64E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	9.49E-15	9.47E-15	9.43E-15	9.43E-15	9.41E-15	9.41E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.17E-09	1.14E-09	1.14E-09	1.14E-09	1.14E-09	1.14E-09
pu237	2.87E-13	2.89E-13	2.98E-13	3.07E-13	3.16E-13	3.16E-13
pu238	2.38E-02	2.36E-02	2.35E-02	2.35E-02	2.34E-02	2.34E-02
pu239	4.97E+00	6.14E+00	7.29E+00	8.43E+00	9.55E+00	9.55E+00
pu240	2.36E-02	3.62E-02	5.12E-02	6.85E-02	8.79E-02	8.79E-02
pu241	1.01E-05	1.51E-05	2.14E-05	2.86E-05	3.67E-05	3.67E-05
pu242	1.04E-07	2.27E-07	4.27E-07	7.25E-07	1.14E-06	1.14E-06
pu243	2.28E-16	4.88E-16	9.17E-16	1.56E-15	2.45E-15	2.45E-15
pu244	2.93E-33	2.38E-32	1.29E-31	5.32E-31	1.80E-30	1.80E-30
pu245	.00E+00	.00E+00	.00E+00	.00E+00	7.44E-41	7.44E-41
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	3.18E-20	5.50E-20	8.68E-20	1.26E-19	1.74E-19	1.74E-19
am240	1.46E-17	2.52E-17	3.97E-17	5.78E-17	7.95E-17	7.95E-17
am241	1.10E-04	1.95E-04	3.08E-04	4.49E-04	6.18E-04	6.18E-04
am242m	3.37E-08	6.90E-08	1.16E-07	1.76E-07	2.51E-07	2.51E-07
am242	4.32E-12	7.68E-12	1.22E-11	1.79E-11	2.47E-11	2.47E-11
am243	2.90E-10	7.34E-10	1.54E-09	2.86E-09	4.82E-09	4.82E-09
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.28E-18	5.68E-18	9.19E-17	2.20E-17	3.71E-17	3.71E-17
am245	.00E+00	.00E+00	.00E+00	.00E+00	1.49E-41	1.49E-41
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	2.65E-22	4.59E-22	7.28E-22	1.07E-21	1.47E-21	1.47E-21
cm242	8.73E-10	1.55E-09	2.46E-09	3.61E-09	4.98E-09	4.98E-09
cm243	3.36E-19	7.28E-19	1.29E-18	2.05E-18	3.00E-18	3.00E-18
cm244	3.58E-14	8.92E-14	1.87E-13	3.45E-13	5.83E-13	5.83E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 22

power= 4.000E-03mw, burnup=2.9220E+03mwd, flux= 2.80E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge 456563. d 547875. d 639188. d 730500. d					
cm245	6.91E-18	2.19E-17	5.57E-17	1.22E-16	2.56E-16	2.56E-16
cm246	4.36E-21	2.57E-20	7.08E-20	2.00E-19	4.46E-19	4.46E-19
cm247	9.86E-26	4.97E-25	1.84E-24	5.48E-24	1.40E-23	1.40E-23
cm248	1.49E-29	9.49E-29	4.24E-28	1.49E-27	4.38E-27	4.38E-27
cm249	4.82E-40	3.83E-39	1.55E-38	4.74E-38	1.39E-37	1.39E-37
cm250	1.40E-43	1.54E-44	8.83E-44	3.69E-43	1.25E-42	1.25E-42
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.80E+08	2.80E+08	2.80E+08	2.80E+08	2.79E-07

0 1q array has 20 entries.

0 3q array has 1 entries.

0 3q array has 1 entries.

0 3q array has 1 entries.

```
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

         cross-section data taken from position number  3 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ***********************************************************************
         *                                                                     *
         *            prelim lwr origen-s binary working library--id = 1143    *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                     *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                     *
         *                  fission product yields are from endf/b-v           *
         *                                                                     *
         *              photon libraries use an 18-energy-group structure      *
         *             the photon data are from the master photon data base,   *
         *              produced to include bremsstrahlung from uo2 matrix     *
         *                                                                     *
         *        see information above this box (if present) for later updates *
         *                                                                     *
         ***********************************************************************
         *                                                                     *
         ***********************************************************************
0
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/28/1996    date library was produced
0                 1697    total number of nuclides in library
                   689    number of light-element nuclides
                   129    number of actinide nuclides
                   879    number of fission product nuclides
0                 7993    number of nonzero off-diagonal matrix elements
0        ***********************************************************************
1   sas2h: far-field crit based on h2o 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   23
      power=    .80mw, burnup=   4383.mwd, flux= 8.71E+08n/cm**2-sec
0                                                  basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial     821813. d      913125. d      ******* d      ******* d      ******* d
    productions  1.133486E+06  1.135393E+06  1.136859E+06  1.138285E+06  1.139671E+06  1.139671E+06
    absorptions  9.323096E+05  9.334989E+05  9.344394E+05  9.357402E+05  9.368058E+05  9.368058E+05
    k infinity   1.216212E+00  1.216277E+00  1.216361E+00  1.216435E+00  1.216550E+00  1.216550E+00
0                 initial     821813. d      913125. d      ******* d      ******* d      ******* d
    actinide
```

```
     absorptions   9.229046E+05   9.238316E+05   9.247586E+05   9.256261E+05   9.264941E+05   9.264941E+05
     non-actinide
     abs. fracs.   1.008779E-02   1.035595E-02   1.059318E-02   1.080871E-02   1.100731E-02   1.100731E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  24
0                                   fraction of total absorption rate
        power=     .00mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
0             initial 821813. d 913125. d ******* d ******* d ******* d

     sm149     5.01E-03  5.11E-03  5.18E-03  5.23E-03  5.27E-03  5.27E-03
     eu151     3.83E-04  4.09E-04  4.74E-04  5.17E-04  5.60E-04  5.60E-04
     nd143     2.88E-04  3.24E-04  3.59E-04  3.94E-04  4.29E-04  4.29E-04
     rh103     1.38E-04  1.55E-04  1.72E-04  1.89E-04  2.06E-04  2.06E-04
     gd155     1.24E-04  1.33E-04  1.41E-04  1.48E-04  1.54E-04  1.54E-04
     xe131     9.27E-05  1.04E-04  1.16E-04  1.27E-04  1.38E-04  1.38E-04
     cs133     7.18E-05  8.07E-05  8.95E-05  9.83E-05  1.07E-04  1.07E-04
     cd113     6.89E-05  7.27E-05  7.59E-05  7.87E-05  8.11E-05  8.11E-05
     sm147     5.51E-05  5.96E-05  6.62E-05  7.27E-05  7.92E-05  7.92E-05
     tc 99     5.27E-05  5.92E-05  6.57E-05  7.21E-05  7.85E-05  7.85E-05
     nd145     4.08E-05  4.58E-05  5.08E-05  5.57E-05  6.07E-05  6.07E-05
     gd157     4.20E-05  4.32E-05  4.43E-05  4.53E-05  4.64E-05  4.64E-05
     mo 95     2.83E-05  3.18E-05  3.52E-05  3.87E-05  4.22E-05  4.22E-05
     sm151     4.02E-05  4.02E-05  4.03E-05  4.04E-05  4.05E-05  4.05E-05
     sm152     2.40E-05  2.73E-05  3.06E-05  3.39E-05  3.73E-05  3.73E-05
     kr 83     1.75E-05  1.97E-05  2.18E-05  2.39E-05  2.60E-05  2.60E-05
     sm150     1.46E-05  1.72E-05  1.99E-05  2.25E-05  2.52E-05  2.52E-05
     cs135     1.62E-05  1.82E-05  2.02E-05  2.22E-05  2.42E-05  2.42E-05
     ru101     1.26E-05  1.42E-05  1.57E-05  1.73E-05  1.89E-05  1.89E-05
     pr141     1.20E-05  1.35E-05  1.50E-05  1.65E-05  1.79E-05  1.79E-05
     eu153     1.12E-05  1.26E-05  1.41E-05  1.55E-05  1.69E-05  1.69E-05
     la139     9.82E-06  1.10E-05  1.22E-05  1.34E-05  1.46E-05  1.46E-05
     ba137     4.60E-06  5.18E-06  5.76E-06  6.34E-06  6.92E-06  6.92E-06
     pd105     4.61E-06  4.99E-06  5.37E-06  5.75E-06  6.14E-06  6.14E-06
     zr 93     3.99E-06  4.48E-06  4.97E-06  5.46E-06  5.94E-06  5.94E-06
      i129     3.89E-06  3.47E-06  3.86E-06  4.25E-06  4.63E-06  4.63E-06
     nd144     2.95E-06  3.32E-06  3.68E-06  4.05E-06  4.41E-06  4.41E-06
     ag109     2.51E-06  2.94E-06  3.40E-06  3.83E-06  4.39E-06  4.39E-06
     mo 97     2.33E-06  2.51E-06  2.78E-06  3.05E-06  3.33E-06  3.33E-06
     xe135     2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06  2.28E-06
     zr 91     1.04E-06  1.17E-06  1.30E-06  1.43E-06  1.55E-06  1.55E-06
      y 89     9.99E-07  1.12E-06  1.24E-06  1.36E-06  1.49E-06  1.49E-06
     ru102     9.13E-07  1.03E-06  1.14E-06  1.25E-06  1.37E-06  1.37E-06
     se142     8.16E-07  9.16E-07  1.02E-06  1.12E-06  1.22E-06  1.22E-06
     pd108     7.18E-07  8.30E-07  9.48E-07  1.07E-06  1.20E-06  1.20E-06
     nd148     7.08E-07  8.85E-07  9.82E-07  1.08E-06  1.18E-06  1.18E-06
     nd146     6.59E-07  7.40E-07  8.21E-07  9.02E-07  9.83E-07  9.83E-07
     gd152     4.23E-07  5.38E-07  6.66E-07  8.04E-07  9.38E-07  9.38E-07
     in115     5.58E-07  6.29E-07  7.00E-07  7.71E-07  8.42E-07  8.42E-07
     ba138     5.62E-07  6.32E-07  7.01E-07  7.70E-07  8.39E-07  8.39E-07
     se160     5.27E-07  5.92E-07  6.58E-07  7.23E-07  7.86E-07  7.86E-07
     xe132     4.78E-07  5.37E-07  5.97E-07  6.56E-07  7.15E-07  7.15E-07
     pd107     2.93E-07  3.52E-07  4.12E-07  4.73E-07  5.40E-07  5.40E-07
     mo 98     3.29E-07  3.70E-07  4.11E-07  4.51E-07  4.92E-07  4.92E-07
     mo100     3.78E-07  4.27E-07  4.06E-07  4.36E-07  4.75E-07  4.75E-07
     xe134     3.11E-07  3.50E-07  3.88E-07  4.26E-07  4.65E-07  4.65E-07
     kr 82     2.81E-07  3.02E-07  3.13E-07  3.44E-07  3.74E-07  3.74E-07
      i127     3.14E-07  3.41E-07  3.69E-07  3.97E-07  4.25E-07  4.25E-07
     ru104     2.01E-07  2.26E-07  2.52E-07  2.78E-07  3.03E-07  3.03E-07
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  25
0                                   fraction of total absorption rate
        power=     .00mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
```

```
0              initial 821813. d 913125. d ******* d ******* d *******.d
     zr 96     2.81E-07  2.25E-07  2.50E-07  2.74E-07  2.89E-07  2.99E-07
     pm147     2.68E-07  2.68E-07  2.67E-07  2.67E-07  2.66E-07  2.66E-07
     nd150     1.76E-07  1.98E-07  2.20E-07  2.41E-07  2.43E-07  2.63E-07
     xe136     1.69E-07  1.69E-07  2.10E-07  2.31E-07  2.52E-07  2.52E-07
     br 81     1.27E-07  1.42E-07  1.58E-07  1.73E-07  1.89E-07  1.89E-07
     rb 85     1.23E-07  1.38E-07  1.53E-07  1.68E-07  1.83E-07  1.83E-07
     eu155     1.72E-07  1.73E-07  1.75E-07  1.76E-07  1.78E-07  1.78E-07
     zr 94     1.07E-07  1.20E-07  1.34E-07  1.47E-07  1.60E-07  1.60E-07
     cd111     9.61E-08  1.10E-07  1.24E-07  1.38E-07  1.53E-07  1.53E-07
     eu152     9.97E-08  1.12E-07  1.23E-07  1.34E-07  1.45E-07  1.45E-07
     zr 90     9.66E-08  1.09E-07  1.21E-07  1.33E-07  1.45E-07  1.45E-07
     sm154     7.68E-08  8.66E-08  9.65E-08  1.06E-07  1.16E-07  1.16E-07
     te130     7.68E-08  8.63E-08  9.58E-08  1.05E-07  1.15E-07  1.15E-07
     rb 87     7.11E-08  7.98E-08  8.84E-08  9.71E-08  1.06E-07  1.06E-07
     se 77     5.05E-08  5.68E-08  6.30E-08  6.92E-08  7.54E-08  7.54E-08
     pd106     4.04E-08  4.59E-08  5.15E-08  5.73E-08  6.31E-08  6.31E-08
     ru 99     2.75E-08  3.47E-08  4.27E-08  5.15E-08  6.12E-08  6.12E-08
     kr 84     3.37E-08  3.79E-08  4.20E-08  4.61E-08  5.02E-08  5.02E-08
     gd156     2.67E-08  3.14E-08  3.63E-08  4.14E-08  4.66E-08  4.66E-08
     se 79     2.59E-08  2.91E-08  3.23E-08  3.55E-08  3.87E-08  3.87E-08
     sb121     2.35E-08  2.67E-08  3.19E-08  3.52E-08  3.84E-08  3.84E-08
     gd154     1.30E-08  1.90E-08  2.34E-08  2.83E-08  3.37E-08  3.37E-08
     sb123     2.06E-08  2.33E-08  2.59E-08  2.85E-08  3.11E-08  3.11E-08
     kr 86     1.86E-08  2.09E-08  2.32E-08  2.55E-08  2.77E-08  2.77E-08
     dy161     1.59E-08  1.86E-08  2.14E-08  2.44E-08  2.75E-08  2.75E-08
     te128     1.70E-08  1.92E-08  2.13E-08  2.35E-08  2.56E-08  2.56E-08
     sn 80     1.21E-08  1.36E-08  1.51E-08  1.66E-08  1.80E-08  1.80E-08
     te125     1.10E-08  1.24E-08  1.38E-08  1.52E-08  1.67E-08  1.67E-08
     sr 90     1.46E-08  1.45E-08  1.65E-08  1.64E-08  1.64E-08  1.64E-08
     tb159     8.73E-09  1.00E-08  1.13E-08  1.27E-08  1.41E-08  1.41E-08
     cd112     7.31E-09  8.32E-09  9.34E-09  1.06E-08  1.16E-08  1.16E-08
     gd158     6.61E-09  7.67E-09  8.77E-09  9.89E-09  1.10E-08  1.10E-08
     ru100     6.78E-09  6.82E-09  7.40E-09  8.92E-09  1.06E-08  1.06E-08
     li  6     6.79E-09  7.42E-09  8.44E-09  9.24E-09  1.01E-08  1.01E-08
     rh103     9.10E-09  9.19E-09  9.27E-09  9.36E-09  9.45E-09  9.45E-09
     sn117     5.74E-09  6.49E-09  7.24E-09  8.00E-09  8.77E-09  8.77E-09
     eu154     5.71E-09  6.41E-09  7.13E-09  7.85E-09  8.57E-09  8.57E-09
     nd142     3.29E-09  4.16E-09  5.12E-09  6.19E-09  7.35E-09  7.35E-09
     ba134     3.22E-09  4.06E-09  4.89E-09  6.02E-09  7.15E-09  7.15E-09
     sn119     4.61E-09  5.20E-09  5.78E-09  6.37E-09  6.97E-09  6.97E-09
     sm148     2.97E-09  3.74E-09  4.40E-09  5.53E-09  6.58E-09  6.58E-09
     cd114     3.67E-09  4.48E-09  5.10E-09  5.76E-09  6.39E-09  6.39E-09
     sn115     4.22E-09  4.75E-09  5.29E-09  5.83E-09  6.38E-09  6.38E-09
     ba135     2.61E-09  3.29E-09  4.06E-09  4.91E-09  5.64E-09  5.64E-09
     dy164     2.91E-09  3.48E-09  4.10E-09  4.75E-09  5.45E-09  5.45E-09
     sr 88     3.43E-09  3.85E-09  4.26E-09  4.68E-09  5.09E-09  5.09E-09
     dy162     2.72E-09  3.24E-09  3.79E-09  4.37E-09  5.00E-09  5.00E-09
     pd104     2.22E-09  2.80E-09  3.44E-09  4.18E-09  4.96E-09  4.96E-09
     pd110     3.04E-09  3.49E-09  3.95E-09  4.43E-09  4.92E-09  4.92E-09
1    sas2h: far-field crit based on bdw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  26
0                          fraction of total absorption rate
     power=    40mw, burnup=   4383.mwd, flux= 2.71E+08n/cm**2-sec
0              initial 821813. d 913125. d ******* d ******* d *******.d
     eu137     2.73E-09  2.72E-09  2.72E-09  2.71E-09  2.71E-09  2.71E-09
     se 82     2.33E-09  2.42E-09  2.90E-09  3.19E-09  3.47E-09  3.47E-09
     ent26     1.48E-09  2.24E-09  2.50E-09  2.77E-09  3.03E-09  3.03E-09
     se 78     1.79E-09  2.01E-09  2.23E-09  2.45E-09  2.68E-09  2.68E-09
```

pr143	2.61E-09	2.60E-09	2.60E-09	2.59E-09	2.59E-09
sn124	1.68E-09	1.67E-09	1.66E-09	2.05E-09	2.24E-09
xe133	1.98E-09	1.98E-09	1.98E-09	1.97E-09	1.97E-09
mo 96	8.61E-10	1.07E-09	1.30E-09	1.54E-09	1.82E-09
as 75	1.06E-09	1.19E-09	1.32E-09	1.46E-09	1.59E-09
ce141	1.56E-09	1.56E-09	1.56E-09	1.56E-09	1.55E-09
ba136	8.52E-10	9.96E-10	1.15E-09	1.31E-09	1.48E-09
in113	8.19E-10	9.25E-10	1.03E-09	1.14E-09	1.25E-09
dy163	6.61E-10	7.90E-10	9.09E-10	1.08E-09	1.23E-09
kr 82	6.07E-10	7.22E-10	8.45E-10	9.76E-10	1.11E-09
xe130	5.38E-10	6.53E-10	7.78E-10	9.14E-10	1.06E-09
nd110	4.04E-10	5.27E-10	6.69E-10	8.33E-10	1.02E-09
pm149	9.62E-10	9.61E-10	9.60E-10	9.59E-10	9.58E-10
nb 93	4.16E-10	5.26E-10	6.49E-10	7.85E-10	9.53E-10
nd147	9.19E-10	9.18E-10	9.16E-10	9.15E-10	9.14E-10
sn118	6.04E-10	6.81E-10	7.58E-10	8.36E-10	9.14E-10
cs134	5.35E-10	5.97E-10	6.62E-10	7.27E-10	7.91E-10
nd146	5.10E-10	5.75E-10	6.39E-10	7.04E-10	7.70E-10
sn122	5.08E-10	5.72E-10	6.37E-10	7.02E-10	7.68E-10
ce144	5.08E-10	5.86E-10	5.85E-10	5.84E-10	5.82E-10
sn120	3.79E-10	4.27E-10	4.75E-10	5.24E-10	5.72E-10
kr 85	5.36E-10	5.35E-10	5.33E-10	5.32E-10	5.30E-10
br 79	2.12E-10	2.68E-10	3.31E-10	4.00E-10	4.75E-10
ge 73	2.03E-10	3.29E-10	3.46E-10	4.03E-10	4.39E-10
ru103	5.63E-10	3.44E-10	3.45E-10	3.66E-10	3.66E-10
ag107	1.31E-10	1.69E-10	2.11E-10	2.59E-10	3.13E-10
xe129	1.21E-10	1.53E-10	1.89E-10	2.29E-10	2.73E-10
te126	1.26E-10	1.52E-10	1.81E-10	2.12E-10	2.45E-10
zr 95	1.63E-10	1.62E-10	1.62E-10	1.62E-10	1.61E-10
ge 76	1.05E-10	1.18E-10	1.30E-10	1.43E-10	1.56E-10
nb 95	1.50E-10	1.50E-10	1.49E-10	1.49E-10	1.49E-10
gd160	8.73E-11	1.01E-10	1.15E-10	1.29E-10	1.45E-10
y 91	1.39E-10	1.38E-10	1.38E-10	1.38E-10	1.37E-10
pm151	1.10E-10	1.10E-10	1.11E-10	1.11E-10	1.11E-10
he165	4.82E-11	5.80E-11	6.86E-11	8.01E-11	9.24E-11
ba140	4.65E-11	4.64E-11	4.63E-11	4.62E-11	4.62E-11
eu156	3.98E-11	4.05E-11	4.11E-11	4.18E-11	4.24E-11
sm153	3.98E-11	4.00E-11	4.02E-11	4.04E-11	4.07E-11
dy160	1.73E-11	2.22E-11	2.76E-11	3.37E-11	4.03E-11
ru106	3.06E-11	3.11E-11	3.17E-11	3.23E-11	3.28E-11
sr 89	2.97E-11	2.96E-11	2.95E-11	2.94E-11	2.93E-11
xe128	1.25E-11	1.57E-11	1.93E-11	2.33E-11	2.77E-11
te124	1.13E-11	1.76E-11	2.00E-11	2.25E-11	2.51E-11
kr 87	2.22E-11	2.21E-11	2.20E-11	2.20E-11	2.19E-11
sr 87	1.24E-11	1.39E-11	1.55E-11	1.71E-11	1.87E-11

1 sas2h: far-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 27
0 fraction of total absorption rate
0 powerm .00mw burnup 4383.mwd, flux= 2.71E+08n/cm**2-sec
initial 821813. d 913125. d ******* d ******* d ******* d

sr 86	9.18E-12	1.11E-11	1.32E-11	1.53E-11	1.79E-11
ce143	1.71E-11	1.71E-11	1.70E-11	1.70E-11	1.70E-11
sb125	1.58E-11	1.59E-11	1.60E-11	1.61E-11	1.62E-11
y 90	1.58E-11	1.57E-11	1.56E-11	1.56E-11	1.55E-11
la140	1.51E-11	1.51E-11	1.50E-11	1.50E-11	1.50E-11
mo 99	1.30E-11	1.29E-11	1.29E-11	1.29E-11	1.29E-11
nb 94	7.36E-12	8.09E-12	9.05E-12	1.00E-11	1.10E-11
sn116	4.71E-12	5.96E-12	7.35E-12	8.89E-12	1.06E-11
pm148m	9.60E-12	9.56E-12	9.56E-12	9.56E-12	9.57E-12
ge 74	5.88E-12	6.61E-12	7.35E-12	8.08E-12	8.82E-12

te127m	7.87E-12	7.93E-12	7.98E-12	8.03E-12	8.08E-12	8.08E-12
i131	6.73E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12
se 76	3.48E-12	4.33E-12	5.02E-12	5.75E-12	6.52E-12	6.52E-12
ge 72	4.05E-12	4.57E-12	5.09E-12	5.62E-12	6.15E-12	6.15E-12
er166	2.38E-12	2.92E-12	3.51E-12	4.15E-12	4.84E-12	4.84E-12
te122	1.98E-12	2.49E-12	3.07E-12	3.71E-12	4.41E-12	4.41E-12
te129m	1.81E-12	1.82E-12	1.82E-12	1.82E-12	1.83E-12	1.83E-12
sg111	4.21E-13	4.32E-13	4.44E-13	4.55E-13	4.66E-13	4.66E-13
kr 80	2.40E-13	2.85E-13	3.35E-13	3.89E-13	4.48E-13	4.48E-13
eu157	3.65E-13	3.73E-13	3.80E-13	3.88E-13	3.96E-13	3.96E-13
pm148	3.71E-13	3.68E-13	3.68E-13	3.67E-13	3.67E-13	3.67E-13
cd115m	2.47E-13	2.48E-13	2.49E-13	2.51E-13	2.52E-13	2.52E-13
er167	5.18E-14	6.86E-14	8.84E-14	1.11E-13	1.38E-13	1.38E-13
cs136	1.09E-13	1.16E-13	1.22E-13	1.28E-13	1.35E-13	1.35E-13
te123	3.26E-14	4.13E-14	5.14E-14	6.32E-14	7.66E-14	7.66E-14
tb160	2.39E-14	2.71E-14	3.05E-14	3.39E-14	3.75E-14	3.75E-14
ru105	3.24E-14	3.27E-14	3.31E-14	3.34E-14	3.37E-14	3.37E-14
sn125	3.01E-14	3.02E-14	3.04E-14	3.05E-14	3.06E-14	3.06E-14
pr142	1.36E-14	1.52E-14	1.69E-14	1.85E-14	2.01E-14	2.01E-14
he 9	1.33E-14	1.49E-14	1.65E-14	1.82E-14	1.98E-14	1.98E-14
rb 88	1.25E-14	1.24E-14	1.24E-14	1.24E-14	1.23E-14	1.23E-14
sn123	1.02E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
i135	9.97E-15	9.96E-15	9.95E-15	9.93E-15	9.92E-15	9.92E-15
te132	9.45E-15	9.45E-15	9.44E-15	9.43E-15	9.43E-15	9.43E-15
sb126	6.46E-15	6.89E-15	7.33E-15	7.76E-15	8.19E-15	8.19E-15
li 7	5.30E-15	5.96E-15	6.61E-15	7.27E-15	7.92E-15	7.92E-15
cd108	2.20E-15	3.04E-15	4.07E-15	5.33E-15	6.83E-15	6.83E-15
te134	5.70E-15	5.69E-15	5.67E-15	5.66E-15	5.65E-15	5.65E-15
i130	3.21E-15	3.52E-15	3.82E-15	4.12E-15	4.42E-15	4.42E-15
sb124	3.13E-15	3.25E-15	3.38E-15	3.50E-15	3.63E-15	3.63E-15
sn114	1.16E-15	1.46E-15	1.81E-15	2.19E-15	2.61E-15	2.61E-15
in117m	2.26E-15	2.28E-15	2.30E-15	2.32E-15	2.34E-15	2.34E-15
rb 86	1.06E-15	1.13E-15	1.23E-15	1.33E-15	1.42E-15	1.42E-15
dy165	7.57E-16	8.24E-16	8.92E-16	9.60E-16	1.03E-15	1.03E-15
in117	6.69E-16	6.75E-16	6.82E-16	6.88E-16	6.94E-16	6.94E-16
cs134m	1.00E-16	1.12E-16	1.24E-16	1.36E-16	1.48E-16	1.48E-16
cd118	1.23E-16	1.26E-16	1.26E-16	1.27E-16	1.27E-16	1.27E-16
ge 75	8.50E-17	8.49E-17	8.48E-17	8.47E-17	8.46E-17	8.46E-17
in119m	3.10E-17	3.11E-17	3.12E-17	3.13E-17	3.14E-17	3.14E-17

1 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 28
0 fraction of total absorption rate
power= .00mw, burnup= 4383.mwd, flux= 2.71E+08n/cm**2-sec
0 initial 821813. d 913125. d ******* d ******* d ******* d

sg110	3.29E-18	3.83E-18	4.42E-18	5.04E-18	5.70E-18	5.70E-18
cd109	3.53E-18	3.92E-18	4.32E-18	4.72E-18	5.12E-18	5.12E-18
in119	2.47E-18	2.48E-18	2.49E-18	2.51E-18	2.52E-18	2.52E-18

1 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 29
power= 4.800E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 821813. d	913125. d	******* d	******* d	******* d
h 1	1.75E-04	1.97E-04	2.18E-04	2.40E-04	2.61E-04	2.61E-04
h 2	5.20E-07	5.84E-07	6.48E-07	7.13E-07	7.77E-07	7.77E-07
h 3	3.89E-11	3.95E-11	4.00E-11	4.06E-11	4.11E-11	4.11E-11
h 4	1.56E-34	1.59E-34	1.61E-34	1.63E-34	1.65E-34	1.65E-34
he 3	3.76E-09	4.19E-09	4.61E-09	5.02E-09	5.43E-09	5.43E-09
he 4	2.90E-05	3.25E-05	3.61E-05	3.97E-05	4.32E-05	4.32E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ne 20	3.48E-06	3.91E-06	4.34E-06	4.76E-06	5.19E-06	5.19E-06
ne 21	2.38E-10	2.97E-10	3.62E-10	4.33E-10	5.10E-10	5.10E-10
ne 22	2.30E-08	2.58E-08	2.87E-08	3.15E-08	3.43E-08	3.43E-08
na 23	7.15E-15	7.14E-15	7.13E-15	7.13E-15	7.12E-15	7.12E-15
na 22	4.21E-11	4.21E-11	4.20E-11	4.20E-11	4.20E-11	4.20E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.07E-08	2.86E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08
na 24m	5.04E-15	4.69E-15	4.69E-15	4.68E-15	4.68E-15	4.68E-15
na 25	7.88E-25	9.63E-25	1.16E-24	1.38E-24	1.61E-24	1.61E-24
mg 24	2.78E-02	3.85E-02	3.37E-02	3.47E-02	3.97E-02	3.97E-02
mg 25	2.70E-08	3.33E-08	4.02E-08	4.76E-08	5.57E-08	5.57E-08
mg 26	5.20E-07	5.84E-07	6.48E-07	7.12E-07	7.76E-07	7.76E-07
mg 27	2.13E-12	2.13E-12	2.13E-12	2.13E-12	2.13E-12	2.13E-12
mg 28	4.31E-24	4.30E-24	4.29E-24	4.28E-24	4.28E-24	4.28E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.27E-10	2.12E-10	2.11E-10	2.11E-10	2.11E-10	2.11E-10
al 29	5.65E-23	7.80E-23	8.53E-23	1.02E-22	1.20E-22	1.20E-22
al 30	2.11E-33	2.95E-33	4.01E-33	5.29E-33	6.81E-33	6.81E-33
si 28	8.10E-02	8.96E-02	9.82E-02	1.07E-01	1.15E-01	1.15E-01
si 29	2.46E-07	2.70E-07	3.50E-07	3.95E-07	4.66E-07	4.66E-07
si 30	6.84E-13	8.52E-13	1.16E-12	1.53E-12	1.97E-12	1.97E-12
si 31	4.29E-25	6.06E-25	8.25E-25	1.09E-24	1.40E-24	1.40E-24
si 32	5.34E-31	7.81E-31	1.09E-30	1.47E-30	1.93E-30	1.93E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.72E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

0
1

gas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 30
power= 4.000E-03mw, burnup=6.383DE+03mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge 821813. g 913125. g ******* g ******* g ******* g

he 4	7.42E-01	8.77E-01	1.02E+00	1.17E+00	1.33E+00	1.33E+00
pb206	1.09E-04	1.52E-04	2.04E-04	2.66E-04	3.38E-04	3.38E-04
pb207	3.01E-05	3.81E-05	4.72E-05	5.71E-05	6.81E-05	6.81E-05
pb208	4.87E-06	6.16E-06	7.59E-06	9.17E-06	1.09E-05	1.09E-05
pb209	5.23E-12	6.56E-12	8.03E-12	9.64E-12	1.14E-11	1.14E-11
pb210	5.01E-06	6.15E-06	7.37E-06	8.66E-06	1.00E-05	1.00E-05
pb211	3.03E-12	3.41E-12	3.79E-12	4.17E-12	4.55E-12	4.55E-12
pb212	8.40E-12	9.44E-12	1.05E-11	1.15E-11	1.26E-11	1.26E-11
pb214	1.15E-11	1.41E-11	1.68E-11	1.98E-11	2.29E-11	2.29E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.62E-06	9.37E-06	1.28E-05	1.69E-05	2.18E-05	2.18E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.08E-09	3.79E-09	4.54E-09	5.33E-09	6.17E-09	6.17E-09
bi211	1.80E-15	2.02E-15	2.25E-15	2.47E-15	2.70E-15	2.70E-15
bi212	7.97E-15	8.96E-15	9.96E-15	1.09E-12	1.19E-12	1.19E-12
bi213	1.22E-12	1.53E-12	1.88E-12	2.25E-12	2.66E-12	2.66E-12
bi214	8.50E-12	1.04E-11	1.25E-11	1.47E-11	1.70E-11	1.70E-11
po210	8.52E-08	1.05E-07	1.25E-07	1.47E-07	1.70E-07	1.70E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.99E-18	2.23E-18	2.48E-18	2.73E-18	2.98E-18	2.98E-18
po212	4.19E-23	4.71E-23	5.22E-23	5.74E-23	6.26E-23	6.26E-23
po213	1.04E-21	1.50E-21	2.02E-21	2.58E-21	3.19E-21	3.19E-21
po214	1.77E-18	1.44E-18	1.72E-18	2.02E-18	2.34E-18	2.34E-18
po215	2.49E-18	2.80E-18	3.12E-18	3.43E-18	3.74E-18	3.74E-18
po216	4.58E-17	4.57E-17	4.97E-17	4.96E-17	4.75E-17	4.75E-17
po218	1.32E-12	1.63E-12	1.95E-12	2.29E-12	2.63E-12	2.63E-12
rn216	1.24E-28	1.39E-28	1.54E-28	1.69E-28	1.84E-28	1.84E-28
rn219	5.54E-15	6.24E-15	6.93E-15	7.63E-15	8.33E-15	8.33E-15
rn220	1.22E-14	1.37E-14	1.52E-14	1.67E-14	1.82E-14	1.82E-14

rn222	2.35E-09	2.89E-09	3.46E-09	4.07E-09	4.70E-09	4.70E-09
ra222	1.35E-25	1.50E-25	1.67E-25	1.83E-25	2.00E-25	2.00E-25
ra223	1.38E-09	1.56E-09	1.73E-09	1.90E-09	2.08E-09	2.08E-09
ra224	6.94E-11	7.79E-11	8.65E-11	9.51E-11	1.04E-10	1.04E-10
ra225	5.71E-10	7.17E-10	8.77E-10	1.05E-09	1.24E-09	1.24E-09
ra226	3.40E-04	4.42E-04	5.29E-04	6.22E-04	7.19E-04	7.19E-04
ra228	4.25E-12	4.79E-12	5.32E-12	5.86E-12	6.40E-12	6.40E-12
ac225	3.86E-10	4.84E-10	5.93E-10	7.11E-10	8.39E-10	8.39E-10
ac227	9.61E-07	1.08E-06	1.20E-06	1.32E-06	1.44E-06	1.44E-06
ac228	5.19E-16	5.84E-16	6.49E-16	7.15E-16	7.81E-16	7.81E-16
th226	6.59E-24	7.34E-24	8.14E-24	8.94E-24	9.73E-24	9.73E-24
th227	2.23E-09	2.51E-09	2.79E-09	3.07E-09	3.35E-09	3.35E-09
th228	1.32E-08	1.49E-08	1.65E-08	1.82E-08	1.98E-08	1.98E-08
th229	1.11E-04	1.39E-04	1.71E-04	2.05E-04	2.42E-04	2.42E-04
th230	5.13E-02	5.77E-02	6.41E-02	7.06E-02	7.71E-02	7.71E-02
th231	3.20E-09	3.22E-09	3.24E-09	3.26E-09	3.28E-09	3.28E-09
th232	1.04E-02	1.17E-02	1.30E-02	1.43E-02	1.56E-02	1.56E-02
th233	9.30E-14	1.07E-13	1.19E-13	1.30E-13	1.42E-13	1.42E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.45E-03	1.63E-03	1.81E-03	1.99E-03	2.17E-03	2.17E-03
pa232	2.46E-11	2.77E-11	3.08E-11	3.38E-11	3.69E-11	3.69E-11

sas2h: for-field crit based on btu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 31
power= 4.000E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly
charge 821813. d 913125. d ******* d ******* d ******* d

pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.39E-21	7.11E-21	7.89E-21	8.66E-21	9.43E-21	9.43E-21
u231	2.09E-17	2.32E-17	2.57E-17	2.82E-17	3.07E-17	3.07E-17
u232	4.82E-07	5.42E-07	6.01E-07	6.61E-07	7.21E-07	7.21E-07
u233	2.69E-02	3.02E-02	3.35E-02	3.68E-02	4.00E-02	4.00E-02
u234	9.32E+00	9.35E+00	9.39E+00	9.42E+00	9.46E+00	9.46E+00
u235	7.16E+02	7.16E+02	7.12E+02	7.11E+02	7.09E+02	7.09E+02
u236	1.77E+02	1.77E+02	1.77E+02	1.77E+02	1.78E+02	1.78E+02
u237	3.19E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	3.21E-07	3.19E-07	3.19E-07	3.19E-07	3.18E-07	3.18E-07
u240	.00E+00	1.03E-40	3.08E-40	6.16E-40	1.33E-39	1.33E-39
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.83E-12	8.77E-12	8.76E-12	8.75E-12	8.73E-12	8.73E-12
np236m	2.10E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12
np236	4.83E-07	4.52E-07	5.00E-07	5.49E-07	5.97E-07	5.97E-07
np237	4.20E+01	4.20E+01	4.19E+01	4.19E+01	4.19E+01	4.19E+01
np238	1.55E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06
np239	4.64E-05	4.61E-05	4.61E-05	4.61E-05	4.60E-05	4.60E-05
np240m	.00E+00	8.76E-43	2.63E-42	5.25E-42	1.14E-41	1.14E-41
np240	9.41E-15	9.32E-15	9.31E-15	9.29E-15	9.27E-15	9.27E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.14E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	3.16E-13	3.23E-13	3.32E-13	3.41E-13	3.49E-13	3.49E-13
pu238	2.34E-02	2.34E-02	2.33E-02	2.33E-02	2.33E-02	2.33E-02
pu239	9.53E+00	1.06E+01	1.17E+01	1.28E+01	1.38E+01	1.38E+01
pu240	8.79E-02	1.09E-01	1.33E-01	1.58E-01	1.85E-01	1.85E-01
pu241	3.67E-05	4.52E-05	5.48E-05	6.52E-05	7.62E-05	7.62E-05
pu242	1.14E-06	1.69E-06	2.40E-06	3.28E-06	4.36E-06	4.36E-06
pu243	2.45E-15	3.60E-15	5.10E-15	6.97E-15	9.24E-15	9.24E-15

```
     pu244    1.80E-30  5.23E-30  1.35E-29  3.17E-29  4.88E-29  4.88E-29
     pu245    7.44E-41  2.29E-40  5.35E-40  1.30E-39  2.75E-39  2.75E-39
     pu246     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239    1.74E-19  2.26E-19  2.87E-19  3.53E-19  4.29E-19  4.29E-19
     am240    7.95E-17  1.04E-16  1.31E-16  1.62E-16  1.96E-16  1.96E-16
     am241    6.18E-04  8.11E-04  1.03E-03  1.27E-03  1.54E-03  1.54E-03
     am242m   2.51E-07  3.38E-07  4.39E-07  5.52E-07  6.77E-07  6.77E-07
     am242    2.47E-11  3.24E-11  4.12E-11  5.10E-11  6.18E-11  6.18E-11
     am243    4.82E-09  7.58E-09  1.13E-08  1.62E-08  2.23E-08  2.23E-08
     am244m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244    3.71E-17  5.80E-17  8.44E-17  1.23E-16  1.70E-16  1.70E-16
     am245    1.49E-41  5.97E-41  1.34E-40  2.98E-40  6.27E-40  6.27E-40
     am246     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241    1.47E-21  1.92E-21  2.44E-21  3.02E-21  3.65E-21  3.65E-21
     cm242    4.98E-09  6.54E-09  8.32E-09  1.03E-08  1.25E-08  1.25E-08
     cm243    3.00E-18  4.12E-18  5.40E-18  6.87E-18  8.50E-18  8.50E-18
     cm244    5.83E-13  9.11E-13  1.36E-12  1.94E-12  2.67E-12  2.67E-12
1
     sas2h: for-field crit based on bbu 15x15, 3.00wt%, 20gwd/mtu 60% h2o/ 8% uo2                actinides        page   32
       power= 4.000E-03mw, burnup=4.3830E+03mwd, flux= 2.71E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge 821813. d 913125. d ******* d ******* d ******* d
     cm245    2.36E-16  4.20E-16  6.98E-16  1.10E-15  1.66E-15  1.66E-15
     cm246    4.46E-19  8.95E-19  1.66E-18  2.87E-18  4.73E-18  4.73E-18
     cm247    1.40E-23  3.18E-23  6.57E-23  1.26E-22  2.28E-22  2.28E-22
     cm248    4.38E-27  1.12E-26  2.59E-26  5.51E-26  1.09E-25  1.09E-25
     cm249    1.39E-37  3.55E-37  8.19E-37  1.74E-36  3.43E-36  3.43E-36
     cm250    1.25E-42  3.60E-42  9.27E-42  2.17E-41  4.70E-41  4.70E-41
     cm251     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0     flux               2.72E+08  2.71E+08  2.71E+08  2.71E+08  2.71E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       36q array has       12 entries.
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *         made from modified card-image origen-s libraries of scale 4.2    *
```

```
*      date from the light element, actinide, and fission product libraries    *
*        decay data, including gamma and total energy, are from endf/b-vi      *
*                                                                               *
*      neutron flux spectrum factors and cross sections were produced from     *
*     the "prezzz2" zase updating all nuclides on the scale "burnup" library   *
*                                                                               *
*                     fission product yields are from endf/b-v                  *
*                                                                               *
*              photon libraries use an 18-energy-group structure                *
*             the photon data are from the master photon data base,             *
*              produced to include bremsstrahlung from uo2 matrix               *
*                                                                               *
*        see information above this box (if present) for later updates          *
*                                                                               *
*********************************************************************************
*                                                                               *
0       *******************************************************************
0                 .other identification and sizes of library.
0                  data set name:  fc33f001
0              8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0       *******************************************************************
1    zas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   33
        power=    .00mw, burnup=   5844.mwd, flux= 2.48E+08n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.190297E+06   1.151651E+06   1.152966E+06   1.154263E+06   1.155483E+06   1.155483E+06
     absorptions   9.652068E+05   9.462478E+05   9.472621E+05   9.482513E+05   9.492169E+05   9.492169E+05
     k infinity    1.216979E+00   1.217071E+00   1.217156E+00   1.217234E+00   1.217302E+00   1.217302E+00
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   9.348808E+05   9.357344E+05   9.365691E+05   9.373831E+05   9.381828E+05   9.381828E+05
     non-actinide
     abs. fracs.   1.092452E-02   1.111060E-02   1.128829E-02   1.145917E-02   1.162446E-02   1.162446E-02
1    zas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   34
0                                                  fraction of total absorption rate
        power=    .00mw, burnup=   5844.mwd, flux= 2.48E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.27E-03  5.29E-03  5.31E-03  5.32E-03  5.33E-03  5.33E-03
     eu151      5.60E-04  6.02E-04  6.43E-04  6.82E-04  7.21E-04  7.21E-04
     nd143      4.29E-04  4.44E-04  4.58E-04  4.33E-04  4.67E-04  4.67E-04
     rh103      2.06E-04  2.24E-04  2.41E-04  2.58E-04  2.75E-04  2.75E-04
     xe131      1.38E-04  1.50E-04  1.61E-04  1.72E-04  1.84E-04  1.84E-04
     gd155      1.54E-04  1.60E-04  1.65E-04  1.70E-04  1.74E-04  1.74E-04
     cs133      1.07E-04  1.16E-04  1.25E-04  1.33E-04  1.42E-04  1.42E-04
     sm147      7.91E-05  8.56E-05  9.21E-05  9.85E-05  1.05E-04  1.05E-04
     tc 99      7.85E-05  8.49E-05  9.13E-05  9.76E-05  1.04E-04  1.04E-04
     cd113      6.12E-05  6.33E-05  6.52E-05  6.68E-05  6.83E-05  6.83E-05
     nd145      6.07E-05  6.37E-05  7.06E-05  7.35E-05  8.04E-05  8.04E-05
     mo 95      4.21E-05  4.56E-05  4.90E-05  5.24E-05  5.59E-05  5.59E-05
     sm152      3.73E-05  4.07E-05  4.42E-05  4.77E-05  5.12E-05  5.12E-05
     gd157      4.64E-05  4.74E-05  4.83E-05  4.93E-05  5.02E-05  5.02E-05
     sm151      4.05E-05  4.06E-05  4.07E-05  4.08E-05  4.09E-05  4.09E-05
     sm150      2.52E-05  2.79E-05  3.06E-05  3.33E-05  3.60E-05  3.60E-05
```

kr 83	2.40E-05	2.81E-05	3.02E-05	3.23E-05	3.44E-05	3.44E-05
ce135	2.42E-05	2.42E-05	2.82E-05	3.02E-05	3.21E-05	3.21E-05
ru101	1.89E-05	2.04E-05	2.20E-05	2.35E-05	2.50E-05	2.50E-05
pr141	1.79E-05	1.94E-05	2.09E-05	2.23E-05	2.38E-05	2.38E-05
eu153	1.69E-05	1.84E-05	1.98E-05	2.13E-05	2.27E-05	2.27E-05
la139	1.47E-05	1.39E-05	1.70E-05	1.82E-05	1.94E-05	1.94E-05
ba137	6.92E-06	7.50E-06	8.07E-06	8.65E-06	9.22E-06	9.22E-06
pd105	6.74E-06	7.34E-06	7.94E-06	8.54E-06	9.15E-06	9.15E-06
zr 93	5.94E-06	6.42E-06	6.91E-06	7.39E-06	7.86E-06	7.86E-06
ag109	4.39E-06	4.92E-06	5.47E-06	6.04E-06	6.63E-06	6.63E-06
i129	4.64E-06	5.02E-06	5.41E-06	5.80E-06	6.19E-06	6.19E-06
nd144	4.41E-06	4.77E-06	5.14E-06	5.50E-06	5.86E-06	5.86E-06
mo 97	3.33E-06	3.60E-06	3.87E-06	4.15E-06	4.42E-06	4.42E-06
xe135	2.28E-06	2.28E-06	2.27E-06	2.27E-06	2.27E-06	2.27E-06
zr 91	1.55E-06	1.68E-06	1.80E-06	1.93E-06	2.05E-06	2.05E-06
y 89	1.49E-06	1.61E-06	1.73E-06	1.85E-06	1.96E-06	1.96E-06
ru102	1.37E-06	1.48E-06	1.59E-06	1.71E-06	1.82E-06	1.82E-06
pd108	1.20E-06	1.33E-06	1.46E-06	1.60E-06	1.75E-06	1.75E-06
gd152	9.59E-07	1.12E-06	1.30E-06	1.48E-06	1.68E-06	1.68E-06
ce142	1.22E-06	1.32E-06	1.42E-06	1.51E-06	1.61E-06	1.61E-06
nd148	1.18E-06	1.27E-06	1.37E-06	1.46E-06	1.56E-06	1.56E-06
nd146	9.84E-07	1.04E-06	1.14E-06	1.22E-06	1.31E-06	1.31E-06
in115	8.42E-07	9.13E-07	9.85E-07	1.06E-06	1.13E-06	1.13E-06
ba138	8.39E-07	9.08E-07	9.77E-07	1.05E-06	1.11E-06	1.11E-06
ce140	7.86E-07	8.50E-07	9.15E-07	9.79E-07	1.04E-06	1.04E-06
xe132	7.15E-07	7.74E-07	8.34E-07	8.93E-07	9.52E-07	9.52E-07
pd107	6.40E-07	7.06E-07	7.73E-07	8.43E-07	9.17E-07	9.17E-07
mo 98	4.91E-07	5.32E-07	5.72E-07	6.12E-07	6.52E-07	6.52E-07
mo100	4.75E-07	5.14E-07	5.53E-07	5.92E-07	6.30E-07	6.30E-07
xe134	4.65E-07	5.03E-07	5.41E-07	5.79E-07	6.17E-07	6.17E-07
zr 92	3.74E-07	4.05E-07	4.35E-07	4.65E-07	4.95E-07	4.95E-07
i127	3.25E-07	3.53E-07	3.81E-07	4.10E-07	4.38E-07	4.38E-07
ru104	3.03E-07	3.29E-07	3.55E-07	3.81E-07	4.08E-07	4.08E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35

0 fraction of total absorption rate

0 power= .00mw, burnup= 3844.mwd, flux= 2.68E+08n/cm**2-sec

	Initial	d	d	d	d
zr 96	2.99E-07	3.23E-07	3.48E-07	3.72E-07	3.96E-07
nd150	2.63E-07	2.85E-07	3.07E-07	3.29E-07	3.50E-07
xe136	2.52E-07	2.72E-07	2.93E-07	3.14E-07	3.34E-07
pm147	2.66E-07	2.66E-07	2.64E-07	2.65E-07	2.65E-07
kr 81	1.89E-07	2.04E-07	2.20E-07	2.35E-07	2.51E-07
rb 85	1.83E-07	1.98E-07	2.12E-07	2.27E-07	2.42E-07
cd111	1.53E-07	1.69E-07	1.84E-07	2.00E-07	2.16E-07
zr 94	1.60E-07	1.73E-07	1.86E-07	1.99E-07	2.12E-07
zr 90	1.45E-07	1.57E-07	1.68E-07	1.80E-07	1.92E-07
eu152	1.45E-07	1.56E-07	1.67E-07	1.77E-07	1.87E-07
eu155	1.28E-07	1.39E-07	1.51E-07	1.62E-07	1.83E-07
sm154	1.16E-07	1.26E-07	1.36E-07	1.47E-07	1.57E-07
te130	1.15E-07	1.24E-07	1.34E-07	1.43E-07	1.53E-07
rb 87	1.06E-07	1.16E-07	1.23E-07	1.31E-07	1.40E-07
ru 99	6.12E-08	7.17E-08	8.10E-08	9.11E-08	1.08E-07
se 77	7.54E-08	8.16E-08	8.77E-08	9.39E-08	1.00E-07
pd106	6.31E-08	6.90E-08	7.50E-08	8.11E-08	8.73E-08
gd154	4.64E-08	5.20E-08	5.76E-08	6.32E-08	6.90E-08
kr 84	3.02E-08	3.43E-08	5.03E-08	4.24E-08	6.64E-08
gd154	3.37E-08	3.96E-08	4.59E-08	5.27E-08	5.99E-08
sb121	3.84E-08	4.17E-08	4.49E-08	4.82E-08	5.15E-08
se 79	3.87E-08	4.19E-08	4.50E-08	4.82E-08	5.13E-08

sb123	3.11E-08	3.38E-08	3.44E-08	3.90E-08	4.17E-08	4.17E-08
dy161	2.75E-08	3.07E-08	3.40E-08	3.75E-08	4.11E-08	4.11E-08
kr 86	2.77E-08	3.00E-08	3.22E-08	3.44E-08	3.67E-08	3.67E-08
te128	2.56E-08	2.78E-08	2.99E-08	3.21E-08	3.42E-08	3.42E-08
se 80	1.80E-08	1.95E-08	2.10E-08	2.25E-08	2.39E-08	2.39E-08
te125	1.67E-08	1.81E-08	1.95E-08	2.10E-08	2.25E-08	2.25E-08
tb159	1.41E-08	1.55E-08	1.70E-08	1.85E-08	2.01E-08	2.01E-08
ru100	1.06E-08	1.24E-08	1.43E-08	1.44E-08	1.66E-08	1.66E-08
sr 90	1.44E-08	1.43E-08	1.43E-08	1.42E-08	1.42E-08	1.42E-08
cd112	1.16E-08	1.27E-08	1.38E-08	1.49E-08	1.60E-08	1.60E-08
pd108	1.10E-08	1.22E-08	1.34E-08	1.46E-08	1.58E-08	1.58E-08
li 6	1.01E-08	1.09E-08	1.17E-08	1.25E-08	1.33E-08	1.33E-08
nd142	7.35E-09	8.61E-09	9.97E-09	1.14E-08	1.30E-08	1.30E-08
ba134	7.15E-09	8.37E-09	9.69E-09	1.11E-08	1.26E-08	1.26E-08
sn117	6.77E-09	9.34E-09	1.03E-08	1.11E-08	1.19E-08	1.19E-08
sm148	6.58E-09	7.70E-09	8.91E-09	1.02E-08	1.16E-08	1.16E-08
eu154	6.57E-09	9.29E-09	1.00E-08	1.07E-08	1.15E-08	1.15E-08
ba135	5.84E-09	6.84E-09	7.93E-09	9.09E-09	1.03E-08	1.03E-08
rh105	9.45E-09	9.53E-09	9.62E-09	9.70E-09	9.78E-09	9.78E-09
sn119	6.97E-09	7.56E-09	8.16E-09	8.76E-09	9.36E-09	9.36E-09
cd114	6.39E-09	7.05E-09	7.72E-09	8.40E-09	9.09E-09	9.09E-09
pd104	6.96E-09	5.82E-09	6.74E-09	7.73E-09	8.78E-09	8.78E-09
dy164	5.45E-09	6.18E-09	6.96E-09	7.76E-09	8.61E-09	8.61E-09
sn115	6.38E-09	6.92E-09	7.47E-09	8.02E-09	8.57E-09	8.57E-09
dy162	5.80E-09	5.66E-09	6.35E-09	7.07E-09	7.83E-09	7.83E-09
pd110	4.92E-09	5.43E-09	5.95E-09	6.48E-09	7.03E-09	7.03E-09
sr 88	5.10E-09	5.31E-09	5.92E-09	6.33E-09	6.74E-09	6.74E-09

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 36

0 fraction of total absorption rate

0 power= .00mw, burnup= 5844.mwd, flux= 2.48E+08n/cm**2-sec

	initial ******* g	******* g	******* g	******* g	******* g
se 82	3.47E-09	3.76E-09	4.04E-09	4.32E-09	4.60E-09	4.60E-09
sn124	3.84E-09	3.30E-09	3.57E-09	3.85E-09	4.12E-09	4.12E-09
cs137	3.71E-09	3.71E-09	3.70E-09	3.70E-09	3.70E-09	3.70E-09
se 78	2.48E-09	2.90E-09	3.12E-09	3.34E-09	3.56E-09	3.56E-09
mo 96	1.82E-09	2.11E-09	2.42E-09	2.75E-09	3.11E-09	3.11E-09
sn124	2.24E-09	2.43E-09	2.63E-09	2.82E-09	3.02E-09	3.02E-09
pr143	2.59E-09	2.38E-09	2.58E-09	2.57E-09	2.57E-09	2.57E-09
ba136	1.48E-09	1.65E-09	1.84E-09	2.03E-09	2.23E-09	2.23E-09
as 75	1.59E-09	1.72E-09	1.85E-09	1.98E-09	2.11E-09	2.11E-09
cd110	1.02E-09	1.23E-09	1.46E-09	1.72E-09	2.00E-09	2.00E-09
xe133	1.07E-09	1.07E-09	1.07E-09	1.07E-09	1.06E-09	1.06E-09
dy163	1.23E-09	1.40E-09	1.58E-09	1.76E-09	1.96E-09	1.96E-09
xe130	1.06E-09	1.22E-09	1.38E-09	1.56E-09	1.73E-09	1.73E-09
kr 82	1.11E-09	1.26E-09	1.41E-09	1.56E-09	1.74E-09	1.74E-09
in113	1.25E-09	1.36E-09	1.46E-09	1.57E-09	1.68E-09	1.68E-09
nb 93	9.33E-10	1.09E-09	1.27E-09	1.45E-09	1.65E-09	1.65E-09
ce141	1.56E-09	1.55E-09	1.55E-09	1.55E-09	1.55E-09	1.55E-09
sn118	9.13E-10	9.91E-10	1.07E-09	1.15E-09	1.23E-09	1.23E-09
se134	7.01E-10	8.35E-10	9.19E-10	9.82E-10	1.05E-09	1.05E-09
cd116	7.69E-10	8.35E-10	9.00E-10	9.66E-10	1.03E-09	1.03E-09
sn122	7.68E-10	8.34E-10	8.99E-10	9.65E-10	1.03E-09	1.03E-09
pm149	9.59E-10	9.58E-10	9.57E-10	9.57E-10	9.56E-10	9.56E-10
nd147	9.13E-10	9.12E-10	9.11E-10	9.09E-10	9.08E-10	9.08E-10
br 79	4.75E-10	5.57E-10	6.45E-10	7.39E-10	8.40E-10	8.40E-10
sn120	5.72E-10	6.21E-10	6.70E-10	7.19E-10	7.68E-10	7.68E-10
ag107	5.13E-10	5.73E-10	6.38E-10	5.10E-10	5.88E-10	5.88E-10
ge 73	4.39E-10	4.76E-10	5.13E-10	5.50E-10	5.87E-10	5.87E-10
ce144	5.82E-10	5.81E-10	5.80E-10	5.79E-10	5.78E-10	5.78E-10

kr 85	5.50E-10	5.49E-10	5.47E-10	5.46E-10	5.44E-10	5.44E-10
xe129	2.73E-10	3.20E-10	3.71E-10	4.26E-10	4.84E-10	4.84E-10
te126	2.45E-10	2.81E-10	3.19E-10	3.60E-10	4.03E-10	4.03E-10
ru103	3.67E-10	3.67E-10	3.68E-10	3.69E-10	3.70E-10	3.70E-10
nd160	1.45E-10	1.60E-10	1.76E-10	1.93E-10	2.10E-10	2.10E-10
se 76	1.56E-10	1.69E-10	1.81E-10	1.94E-10	2.07E-10	2.07E-10
zr 95	1.61E-10	1.61E-10	1.61E-10	1.60E-10	1.60E-10	1.60E-10
ba165	9.24E-11	1.06E-10	1.20E-10	1.34E-10	1.50E-10	1.50E-10
nb 95	1.49E-10	1.48E-10	1.48E-10	1.48E-10	1.48E-10	1.48E-10
y 91	1.37E-10	1.37E-10	1.36E-10	1.36E-10	1.36E-10	1.36E-10
pm151	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
dy160	4.03E-11	4.77E-11	5.57E-11	6.44E-11	7.38E-11	7.38E-11
xe128	2.77E-11	3.24E-11	3.75E-11	4.30E-11	4.89E-11	4.89E-11
ba140	4.62E-11	4.61E-11	4.60E-11	4.60E-11	4.59E-11	4.59E-11
eu156	4.24E-11	4.30E-11	4.36E-11	4.42E-11	4.48E-11	4.48E-11
sm153	4.07E-11	4.09E-11	4.11E-11	4.14E-11	4.16E-11	4.16E-11
te124	2.51E-11	2.78E-11	3.06E-11	3.34E-11	3.63E-11	3.63E-11
ru106	3.28E-11	3.34E-11	3.39E-11	3.44E-11	3.49E-11	3.49E-11
sr 86	1.79E-11	2.05E-11	2.33E-11	2.62E-11	2.93E-11	2.93E-11
sr 89	2.93E-11	2.92E-11	2.91E-11	2.90E-11	2.89E-11	2.89E-11
sr 87	1.87E-11	2.03E-11	2.19E-11	2.35E-11	2.51E-11	2.51E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 37
0 fraction of total absorption rate
0 power= .00mw, burnup= 5844.mwd, flux= 2.68E+08n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

kr 87	2.19E-11	2.19E-11	2.18E-11	2.17E-11	2.17E-11	2.17E-11
sn116	1.86E-11	1.24E-11	1.44E-11	1.65E-11	1.88E-11	1.88E-11
ce143	1.70E-11	1.69E-11	1.69E-11	1.69E-11	1.68E-11	1.68E-11
sb125	1.62E-11	1.63E-11	1.64E-11	1.64E-11	1.65E-11	1.65E-11
y 90	1.56E-11	1.55E-11	1.55E-11	1.54E-11	1.54E-11	1.54E-11
nb 94	1.10E-11	1.20E-11	1.30E-11	1.40E-11	1.51E-11	1.51E-11
la140	1.50E-11	1.50E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
mo 99	1.29E-11	1.29E-11	1.29E-11	1.28E-11	1.28E-11	1.28E-11
se 74	8.82E-12	9.55E-12	1.03E-11	1.10E-11	1.18E-11	1.18E-11
se 76	6.52E-12	7.34E-12	8.19E-12	9.09E-12	1.00E-11	1.00E-11
pm148m	9.37E-12	9.37E-12	9.37E-12	9.37E-12	9.38E-12	9.38E-12
sr 72	6.15E-12	6.68E-12	7.21E-12	7.75E-12	8.29E-12	8.29E-12
te127m	8.09E-12	8.14E-12	8.19E-12	8.24E-12	8.28E-12	8.28E-12
er166	4.84E-12	5.57E-12	6.36E-12	7.19E-12	8.06E-12	8.06E-12
te132	4.41E-12	5.17E-12	5.99E-12	6.83E-12	7.82E-12	7.82E-12
i131	6.72E-12	6.72E-12	6.71E-12	6.71E-12	6.71E-12	6.71E-12
te129m	1.03E-12	1.03E-12	1.03E-12	1.04E-12	1.04E-12	1.04E-12
kr 88	4.48E-13	5.13E-13	5.83E-13	6.59E-13	7.41E-13	7.41E-13
ag111	4.66E-13	4.77E-13	4.87E-13	4.98E-13	5.08E-13	5.08E-13
eu157	3.96E-13	4.03E-13	4.10E-13	4.17E-13	4.24E-13	4.24E-13
pm148	3.67E-13	3.66E-13	3.66E-13	3.65E-13	3.65E-13	3.65E-13
er167	1.38E-13	1.48E-13	2.02E-13	2.40E-13	2.82E-13	2.82E-13
cd115m	2.52E-13	2.53E-13	2.54E-13	2.55E-13	2.56E-13	2.56E-13
cs136	1.35E-13	1.41E-13	1.47E-13	1.53E-13	1.59E-13	1.59E-13
te123	7.66E-14	9.18E-14	1.09E-13	1.28E-13	1.50E-13	1.50E-13
tb160	3.73E-14	4.19E-14	4.48E-14	4.86E-14	5.24E-14	5.24E-14
ru105	3.37E-14	3.40E-14	3.43E-14	3.43E-14	3.48E-14	3.48E-14
sn125	2.06E-14	2.07E-14	2.08E-14	2.09E-14	2.10E-14	2.10E-14
pr142	2.01E-14	2.18E-14	2.34E-14	2.50E-14	2.66E-14	2.66E-14
ba 9	1.98E-14	2.14E-14	2.30E-14	2.46E-14	2.63E-14	2.63E-14
cd108	6.84E-15	8.51E-15	1.07E-14	1.31E-14	1.58E-14	1.58E-14
rb 88	1.23E-14	1.23E-14	1.22E-14	1.22E-14	1.22E-14	1.22E-14
li 7	7.92E-15	8.37E-15	9.22E-15	9.87E-15	1.05E-14	1.05E-14
sn123	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14

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     sb126      8.19E-15  8.63E-15  9.06E-15  9.49E-15  9.93E-15  9.93E-15
      i135      9.93E-15  9.91E-15  9.90E-15  9.89E-15  9.88E-15  9.88E-15
     te132      9.43E-15  9.43E-15  9.42E-15  9.41E-15  9.41E-15  9.41E-15
      i130      4.62E-15  4.72E-15  5.02E-15  5.32E-15  5.62E-15  5.62E-15
     te134      5.65E-15  5.64E-15  5.62E-15  5.61E-15  5.60E-15  5.60E-15
     sn114      2.61E-15  3.07E-15  3.57E-15  4.10E-15  4.67E-15  4.67E-15
     sb124      3.63E-15  3.75E-15  3.88E-15  4.00E-15  4.12E-15  4.12E-15
     in117m     2.34E-15  2.36E-15  2.38E-15  2.39E-15  2.41E-15  2.41E-15
     rb 86      1.42E-15  1.52E-15  1.61E-15  1.70E-15  1.80E-15  1.80E-15
     dy165      1.03E-15  1.10E-15  1.16E-15  1.23E-15  1.30E-15  1.30E-15
     in117      6.94E-16  7.00E-16  7.06E-16  7.12E-16  7.18E-16  7.18E-16
     cs134m     1.48E-16  1.60E-16  1.72E-16  1.84E-16  1.96E-16  1.96E-16
     cd118      1.27E-16  1.28E-16  1.28E-16  1.29E-16  1.30E-16  1.30E-16
     ge 75      8.47E-17  8.46E-17  8.45E-17  8.44E-17  8.43E-17  8.43E-17
     in119m     3.15E-17  3.16E-17  3.17E-17  3.18E-17  3.19E-17  3.19E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  38
0                                  fraction of total absorption rate
        power=     .00mw, burnup=     5844.mwd, flux= 2.68E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d

     sg110      5.70E-18  6.38E-18  7.09E-18  7.82E-18  8.59E-18  8.59E-18
     cd109      5.12E-18  5.53E-18  5.94E-18  6.35E-18  6.78E-18  6.78E-18
     in119      2.52E-18  2.53E-18  2.55E-18  2.56E-18  2.57E-18  2.57E-18
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  39
       power= 4.000E-03mw, burnup=5.8440E+03mwd, flux= 2.68E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
      h  1    2.61E-04  2.83E-04  3.04E-04  3.26E-04  3.48E-04  3.48E-04
      h  2    7.77E-07  8.41E-07  9.06E-07  9.70E-07  1.03E-06  1.03E-06
      h  3    4.11E-11  4.19E-11  4.24E-11  4.29E-11  4.34E-11  4.34E-11
      h  4    1.65E-34  1.68E-34  1.70E-34  1.72E-34  1.74E-34  1.74E-34
     he  3    5.43E-09  5.83E-09  6.23E-09  6.61E-09  6.99E-09  6.99E-09
     he  4    4.32E-05  4.68E-05  5.04E-05  5.40E-05  5.76E-05  5.76E-05
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    5.19E-06  5.62E-06  6.05E-06  6.48E-06  6.91E-06  6.91E-06
     ne 21    5.10E-10  5.92E-10  6.81E-10  7.75E-10  8.74E-10  8.74E-10
     ne 22    5.43E-08  5.72E-08  6.00E-08  6.29E-08  6.57E-08  6.57E-08
     ne 23    7.12E-15  7.15E-15  7.15E-15  7.14E-15  7.14E-15  7.14E-15
     na 22    4.20E-11  4.22E-11  4.22E-11  4.21E-11  4.21E-11  4.21E-11
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    2.85E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08  2.77E-08
     na 24m   4.68E-15  4.56E-15  4.56E-15  4.55E-15  4.55E-15  4.55E-15
     na 25    1.61E-24  1.85E-24  2.12E-24  2.40E-24  2.69E-24  2.69E-24
     mg 24    3.97E-02  4.25E-02  4.54E-02  4.83E-02  5.11E-02  5.11E-02
     mg 25    5.57E-08  6.43E-08  7.35E-08  8.32E-08  9.35E-08  9.35E-08
     mg 26    7.76E-07  8.41E-07  9.05E-07  9.69E-07  1.03E-06  1.03E-06
     mg 27    2.13E-12  2.13E-12  2.13E-12  2.13E-12  2.13E-12  2.13E-12
     mg 28    4.28E-24  4.29E-24  4.29E-24  4.28E-24  4.27E-24  4.27E-24
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    2.11E-10  2.06E-10  2.04E-10  2.05E-10  2.05E-10  2.05E-10
     al 29    1.20E-22  1.40E-22  1.61E-22  1.83E-22  2.07E-22  2.07E-22
     al 30    6.81E-33  8.38E-33  1.06E-32  1.30E-32  1.56E-32  1.56E-32
     si 28    1.15E-01  1.24E-01  1.32E-01  1.41E-01  1.49E-01  1.49E-01
     si 29    4.66E-07  5.42E-07  6.23E-07  7.10E-07  8.01E-07  8.01E-07
     si 30    1.97E-12  2.49E-12  3.08E-12  3.74E-12  4.53E-12  4.53E-12
     si 31    1.40E-24  1.76E-24  2.18E-24  2.66E-24  3.20E-24  3.20E-24
     si 32    1.93E-30  2.48E-30  3.11E-30  3.84E-30  4.68E-30  4.68E-30
   totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
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0 flux 2.68E+08 2.68E+08 2.68E+08 2.68E+08 2.68E-07
1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 40
power= 4.000E-03mw, burnup=5.6440E+03mwd, flux= 2.68E+08n/cm**2-sec
0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	1.33E+00	1.50E+00	1.68E+00	1.86E+00	2.06E+00
pb206	3.38E-04	4.21E-04	5.15E-04	6.21E-04	7.39E-04
pb207	6.81E-05	8.00E-05	9.29E-05	1.07E-04	1.22E-04
pb208	1.09E-05	1.28E-05	1.48E-05	1.70E-05	1.93E-05
pb209	1.14E-11	1.32E-11	1.52E-11	1.73E-11	1.96E-11
pb210	1.00E-05	1.14E-05	1.29E-05	1.44E-05	1.60E-05
pb211	4.55E-12	4.94E-12	5.32E-12	5.70E-12	6.09E-12
pb212	1.26E-11	1.36E-11	1.46E-11	1.57E-11	1.67E-11
pb214	2.29E-11	2.61E-11	2.95E-11	3.29E-11	3.65E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.18E-05	2.75E-05	3.42E-05	4.18E-05	5.04E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	6.17E-09	7.03E-09	7.94E-09	8.87E-09	9.82E-09
bi211	2.70E-13	2.93E-13	3.15E-13	3.38E-13	3.61E-13
bi212	1.19E-12	1.29E-12	1.39E-12	1.49E-12	1.59E-12
bi213	3.66E-12	3.89E-12	3.56E-12	4.05E-12	4.57E-12
bi214	1.70E-11	1.94E-11	2.19E-11	2.44E-11	2.71E-11
po210	1.70E-07	1.94E-07	2.19E-07	2.45E-07	2.71E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.98E-18	3.23E-18	3.48E-18	3.74E-18	3.99E-18
po212	6.26E-23	6.78E-23	7.29E-23	7.81E-23	8.33E-23
po213	3.99E-21	4.65E-21	5.35E-21	6.09E-21	6.87E-21
po214	2.34E-18	2.67E-18	3.01E-18	3.36E-18	3.72E-18
po215	3.74E-18	4.06E-18	4.37E-18	4.69E-18	5.00E-18
po216	4.75E-17	5.15E-17	5.54E-17	5.93E-17	6.33E-17
po218	2.65E-12	3.02E-12	3.41E-12	3.81E-12	4.22E-12
rn218	1.64E-28	1.99E-28	2.14E-28	2.29E-28	2.44E-28
rn219	8.33E-15	9.03E-15	9.73E-15	1.04E-14	1.11E-14
rn220	1.82E-14	1.97E-14	2.12E-14	2.28E-14	2.43E-14
rn222	4.70E-09	5.37E-09	6.05E-09	6.76E-09	7.49E-09
ra222	2.00E-25	2.16E-25	2.32E-25	2.48E-25	2.65E-25
ra223	2.08E-09	2.25E-09	2.43E-09	2.60E-09	2.78E-09
ra224	1.04E-10	1.12E-10	1.21E-10	1.29E-10	1.38E-10
ra225	1.26E-09	1.45E-09	1.66E-09	1.89E-09	2.14E-09
ra226	7.19E-04	8.20E-04	9.25E-04	1.03E-03	1.14E-03
ra228	6.40E-12	6.93E-12	7.47E-12	8.01E-12	8.55E-12
ac225	8.39E-10	9.77E-10	1.12E-09	1.28E-09	1.44E-09
ac227	1.44E-06	1.57E-06	1.69E-06	1.81E-06	1.93E-06
ac228	7.81E-16	8.46E-16	9.12E-16	9.78E-16	1.04E-15
th226	9.73E-24	1.03E-23	1.13E-23	1.21E-23	1.29E-23
th227	3.35E-09	3.63E-09	3.92E-09	4.20E-09	4.48E-09
th228	1.95E-08	2.14E-08	2.31E-08	2.47E-08	2.63E-08
th229	2.42E-04	3.01E-04	3.23E-04	3.68E-04	4.15E-04
th230	7.71E-02	8.36E-02	9.00E-02	9.65E-02	1.03E-01
th231	3.28E-09	3.30E-09	3.33E-09	3.35E-09	3.37E-09
th232	1.36E-02	1.49E-02	1.83E-02	1.96E-02	2.09E-02
th233	1.42E-13	1.54E-13	1.66E-13	1.78E-13	1.90E-13
th234	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07
pa231	2.17E-03	2.35E-03	2.54E-03	2.72E-03	2.90E-03
pa232	3.69E-11	4.00E-11	4.30E-11	4.61E-11	4.91E-11

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 41
power= 4.000E-03mw, burnup=5.6440E+03mwd, flux= 2.68E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.43E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	9.43E-21	1.02E-20	1.10E-20	1.17E-20	1.25E-20	1.25E-20
u231	3.07E-17	3.32E-17	3.57E-17	3.81E-17	4.05E-17	4.05E-17
u232	7.21E-07	7.80E-07	8.40E-07	8.99E-07	9.59E-07	9.59E-07
u233	4.00E-02	4.33E-02	4.65E-02	4.98E-02	5.30E-02	5.30E-02
u234	9.46E+00	9.49E+00	9.53E+00	9.56E+00	9.59E+00	9.59E+00
u235	7.09E+02	7.07E+02	7.05E+02	7.04E+02	7.02E+02	7.02E+02
u236	1.78E+02	1.78E+02	1.78E+02	1.79E+02	1.79E+02	1.79E+02
u237	3.17E-06	3.17E-06	3.17E-06	3.17E-06	3.18E-06	3.18E-06
u238	3.64E+04	3.64E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.18E-07	3.18E-07	3.18E-07	3.17E-07	3.17E-07	3.17E-07
u240	1.33E-39	2.77E-39	5.44E-39	9.95E-39	1.74E-38	1.74E-38
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.73E-12	8.74E-12	8.73E-12	8.72E-12	8.71E-12	8.71E-12
np236m	2.08E-12	2.08E-12	2.07E-12	2.07E-12	2.07E-12	2.07E-12
np236	8.97E-07	8.45E-07	8.94E-07	7.42E-07	7.90E-07	7.90E-07
np237	4.19E+01	4.19E+01	4.19E+01	4.19E+01	4.18E+01	4.18E+01
np238	1.54E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06
np239	4.60E-05	4.59E-05	4.59E-05	4.59E-05	4.58E-05	4.58E-05
np240m	1.14E-41	2.36E-41	4.64E-41	8.69E-41	1.49E-40	1.49E-40
np240	9.27E-15	9.25E-15	9.24E-15	9.22E-15	9.21E-15	9.21E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.12E-09	1.12E-09
pu237	3.49E-13	3.58E-13	3.66E-13	3.75E-13	3.83E-13	3.83E-13
pu238	2.33E-02	2.32E-02	2.32E-02	2.32E-02	2.31E-02	2.31E-02
pu239	1.38E+01	1.49E+01	1.59E+01	1.69E+01	1.79E+01	1.79E+01
pu240	1.85E-01	2.13E-01	2.43E-01	2.74E-01	3.07E-01	3.07E-01
pu241	7.62E-05	8.78E-05	1.00E-04	1.13E-04	1.26E-04	1.26E-04
pu242	4.36E-06	5.64E-06	7.14E-06	8.88E-06	1.09E-05	1.09E-05
pu243	9.24E-15	1.99E-14	1.51E-14	1.88E-14	2.29E-14	2.29E-14
pu244	6.88E-29	1.40E-28	2.49E-28	4.03E-28	6.48E-28	6.48E-28
pu245	2.75E-39	5.65E-39	1.09E-38	1.09E-38	3.49E-38	3.49E-38
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	4.29E-19	5.10E-19	5.96E-19	6.87E-19	7.83E-19	7.83E-19
am240	1.96E-16	2.33E-16	2.73E-16	3.14E-16	3.58E-16	3.58E-16
am241	1.34E-03	1.83E-03	2.14E-03	2.47E-03	2.82E-03	2.82E-03
am242m	4.77E-07	8.12E-07	9.59E-07	1.12E-06	1.28E-06	1.28E-06
am242	6.18E-11	7.34E-11	8.58E-11	9.91E-11	1.13E-10	1.13E-10
am243	2.23E-08	3.00E-08	3.92E-08	5.03E-08	6.34E-08	6.34E-08
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.70E-16	2.78E-16	2.88E-16	3.63E-16	4.02E-16	4.02E-16
am245	4.27E-40	1.28E-39	2.63E-39	4.42E-39	7.70E-39	7.70E-39
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	3.65E-21	4.34E-21	5.07E-21	5.85E-21	6.68E-21	6.68E-21
cm242	1.35E-08	1.48E-08	1.73E-08	2.00E-08	2.28E-08	2.28E-08
cm243	8.50E-18	1.03E-17	1.22E-17	1.43E-17	1.65E-17	1.65E-17
cm244	2.67E-12	3.58E-12	4.89E-12	6.01E-12	7.37E-12	7.37E-12

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% ss2 actinides page 42
power= 4.000E-03mw, burnup=3.8440E+03mwd, flux= 2.68E+08n/cm**2-sec

8

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
cm245	1.66E-15	2.42E-15	3.42E-15	4.70E-15	6.31E-15	6.31E-15

```
     cm246   4.73E-18  7.45E-18  1.13E-17  1.67E-17  2.38E-17  2.38E-17
     cm247   2.28E-22  3.91E-22  6.42E-22  1.02E-21  1.56E-21  1.56E-21
     cm248   1.09E-25  2.04E-25  3.42E-25  6.17E-25  1.01E-24  1.01E-24
     cm249   3.43E-36  6.41E-36  1.14E-35  1.94E-35  3.18E-35  3.18E-35
     cm250   4.70E-41  9.52E-41  1.83E-40  3.34E-40  5.86E-40  5.86E-40
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.68E+08  2.68E+08  2.68E+08  2.68E+08  2.68E-07
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *              pretim lwr origen-s binary working library--id = 1143       *
          *           made from modified card-image origen-s libraries of scale 4.2  *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
          *        neutron flux spectrum factors and cross sections were produced from *
          *       the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                     fission product yields are from endf/b-v             *
          *                                                                          *
          *                 photon libraries use an 18-energy-group structure        *
          *               the photon data are from the master photon data base,      *
          *                produced to include bremsstrahlung from uo2 matrix        *
          *                                                                          *
          *          see information above this box (if present) for later updates   *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
0         ****************************************************************************
0                   .other identification and sizes of library.
0                     data set name:  ft33f001
0                 8/28/1996     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
```

```
0                    7993    number of nonzero off-diagonal matrix elements
0        ********************************************************************
1    sas2h: far-field crit based on bzu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   43
       power=    .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
0                                                basic a
0    (note, k-infinities, eind and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d       ******* d       ******* d       ******* d       ******* d
     productions  1.157562E+06   1.158774E+06   1.159951E+06   1.161091E+06   1.162197E+06   1.162197E+06
     absorptions  9.515668E+05   9.525161E+05   9.534447E+05   9.543523E+05   9.552406E+05   9.552406E+05
     k infinity   1.216480E+00   1.216540E+00   1.216589E+00   1.216627E+00   1.216654E+00   1.216654E+00
0                 initial        ******* d       ******* d       ******* d       ******* d       ******* d
     actinide
     absorptions  9.405190E+05   9.413034E+05   9.420698E+05   9.428184E+05   9.435494E+05   9.435494E+05
     non-actinide
     abs. fracs.  1.161009E-02   1.177176E-02   1.193029E-02   1.208556E-02   1.223892E-02   1.223892E-02
1    sas2h: far-field crit based on bzu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    fission products   page   44
0                                  fraction of total absorption rate
       power=    .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
0                initial ******* d       ******* d       ******* d       ******* d
     sm149       5.33E-03   5.34E-03   5.34E-03   5.35E-03   5.35E-03   5.35E-03
     eu151       7.20E-04   7.58E-04   7.95E-04   8.32E-04   8.67E-04   8.67E-04
     nd143       5.66E-04   6.01E-04   6.35E-04   6.69E-04   7.02E-04   7.02E-04
     rh103       2.75E-04   2.93E-04   3.10E-04   3.27E-04   3.45E-04   3.45E-04
     xe131       1.84E-04   1.95E-04   2.06E-04   2.18E-04   2.29E-04   2.29E-04
     gd155       1.74E-04   1.78E-04   1.82E-04   1.85E-04   1.89E-04   1.89E-04
     cs133       1.42E-04   1.51E-04   1.60E-04   1.68E-04   1.77E-04   1.77E-04
     sm147       1.05E-04   1.11E-04   1.18E-04   1.24E-04   1.31E-04   1.31E-04
     tc 99       1.04E-04   1.10E-04   1.17E-04   1.23E-04   1.29E-04   1.29E-04
     nd145       8.04E-05   8.53E-05   9.02E-05   9.51E-05   1.00E-04   1.00E-04
     cd113       8.82E-05   8.96E-05   9.08E-05   9.19E-05   9.29E-05   9.29E-05
     mo 95       5.59E-05   5.93E-05   6.27E-05   6.61E-05   6.95E-05   6.95E-05
     sm152       5.12E-05   5.48E-05   5.84E-05   6.21E-05   6.58E-05   6.58E-05
     gd157       5.02E-05   5.19E-05   5.20E-05   5.29E-05   5.37E-05   5.37E-05
     sm150       3.60E-05   3.87E-05   4.14E-05   4.41E-05   4.68E-05   4.68E-05
     kr 83       3.44E-05   3.65E-05   3.85E-05   4.06E-05   4.26E-05   4.26E-05
     sm151       4.09E-05   4.10E-05   4.11E-05   4.12E-05   4.12E-05   4.12E-05
     ba135       3.22E-05   3.41E-05   3.61E-05   3.81E-05   4.01E-05   4.01E-05
     ru101       2.51E-05   2.66E-05   2.82E-05   2.97E-05   3.12E-05   3.12E-05
     pr141       2.38E-05   2.52E-05   2.67E-05   2.81E-05   2.96E-05   2.96E-05
     eu153       2.27E-05   2.42E-05   2.57E-05   2.71E-05   2.86E-05   2.86E-05
     la139       1.94E-05   2.06E-05   2.18E-05   2.30E-05   2.42E-05   2.42E-05
     pd105       9.15E-06   9.77E-06   1.04E-05   1.10E-05   1.16E-05   1.16E-05
     ba137       9.21E-06   9.79E-06   1.04E-05   1.09E-05   1.15E-05   1.15E-05
     zr 93       7.87E-06   8.35E-06   8.83E-06   9.30E-06   9.77E-06   9.77E-06
     ag109       6.44E-06   7.26E-06   7.89E-06   8.35E-06   9.23E-06   9.23E-06
      i129       6.18E-06   6.57E-06   6.96E-06   7.35E-06   7.74E-06   7.74E-06
     nd144       5.86E-06   6.22E-06   6.58E-06   6.94E-06   7.30E-06   7.30E-06
     mo 97       4.41E-06   4.69E-06   4.96E-06   5.22E-06   5.49E-06   5.49E-06
     gd152       1.68E-06   1.89E-06   2.11E-06   2.33E-06   2.57E-06   2.57E-06
     zr 91       2.05E-06   2.18E-06   2.30E-06   2.42E-06   2.55E-06   2.55E-06
      y 89       1.96E-06   2.08E-06   2.20E-06   2.32E-06   2.45E-06   2.45E-06
     pd108       1.75E-06   1.90E-06   2.05E-06   2.20E-06   2.37E-06   2.37E-06
     ru102       1.82E-06   1.93E-06   2.04E-06   2.16E-06   2.27E-06   2.27E-06
     xe135       2.27E-06   2.27E-06   2.27E-06   2.26E-06   2.26E-06   2.26E-06
     ce142       1.61E-06   1.71E-06   1.81E-06   1.91E-06   2.01E-06   2.01E-06
     nd148       1.56E-06   1.66E-06   1.75E-06   1.85E-06   1.94E-06   1.94E-06
     nd146       1.30E-06   1.38E-06   1.46E-06   1.54E-06   1.62E-06   1.62E-06
     in115       1.13E-06   1.20E-06   1.27E-06   1.35E-06   1.42E-06   1.42E-06
     ba138       1.11E-06   1.18E-06   1.25E-06   1.32E-06   1.38E-06   1.38E-06
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     ce140    1.06E-06  1.11E-06  1.17E-06  1.23E-06  1.30E-06  1.30E-06
     pd107    9.97E-07  9.90E-07  1.07E-06  1.14E-06  1.22E-06  1.22E-06
     xe132    9.52E-07  1.01E-06  1.07E-06  1.13E-06  1.19E-06  1.19E-06
     mo 98    6.53E-07  6.93E-07  7.33E-07  7.73E-07  8.13E-07  8.13E-07
     mo100    6.31E-07  6.69E-07  7.08E-07  7.47E-07  7.85E-07  7.85E-07
     xe134    6.17E-07  6.54E-07  6.92E-07  7.30E-07  7.67E-07  7.67E-07
     zr 92    4.95E-07  5.25E-07  5.55E-07  5.85E-07  6.14E-07  6.14E-07
      i127    4.38E-07  4.67E-07  4.96E-07  5.25E-07  5.54E-07  5.54E-07
     ru104    4.08E-07  4.34E-07  4.60E-07  4.87E-07  5.13E-07  5.13E-07
1    sas2h: fer-field crit based on b&w 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   45
0                                  fraction of total absorption rate
     ' powers    .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     zr 96    3.97E-07  4.21E-07  4.45E-07  4.69E-07  4.93E-07  4.93E-07
     nd150    3.50E-07  3.72E-07  3.94E-07  4.16E-07  4.37E-07  4.37E-07
     xe136    3.34E-07  3.55E-07  3.75E-07  3.96E-07  4.16E-07  4.16E-07
     br 81    2.91E-07  3.06E-07  3.21E-07  3.37E-07  3.12E-07  3.12E-07
     rb 85    2.42E-07  2.57E-07  2.71E-07  2.86E-07  3.00E-07  3.00E-07
     cd111    2.16E-07  2.32E-07  2.49E-07  2.66E-07  2.84E-07  2.84E-07
     pm147    2.65E-07  2.65E-07  2.64E-07  2.64E-07  2.64E-07  2.64E-07
     zr 94    2.12E-07  2.25E-07  2.38E-07  2.51E-07  2.63E-07  2.63E-07
     zr 90    1.92E-07  2.04E-07  2.15E-07  2.27E-07  2.38E-07  2.38E-07
     eu152    1.87E-07  1.96E-07  2.06E-07  2.15E-07  2.24E-07  2.24E-07
     sm154    1.57E-07  1.67E-07  1.77E-07  1.87E-07  1.98E-07  1.98E-07
     te130    1.53E-07  1.62E-07  1.72E-07  1.81E-07  1.90E-07  1.90E-07
     eu155    1.83E-07  1.83E-07  1.86E-07  1.87E-07  1.89E-07  1.89E-07
     rb 87    1.40E-07  1.48E-07  1.57E-07  1.65E-07  1.73E-07  1.73E-07
     ru 99    1.08E-07  1.22E-07  1.36E-07  1.52E-07  1.68E-07  1.68E-07
     se 77    9.99E-08  1.06E-07  1.12E-07  1.18E-07  1.24E-07  1.24E-07
     pd106    6.74E-08  9.37E-08  1.00E-07  1.07E-07  1.13E-07  1.13E-07
     gd154    5.99E-08  6.76E-08  7.59E-08  8.45E-08  9.37E-08  9.37E-08
     gd156    6.91E-08  7.50E-08  8.10E-08  8.72E-08  9.34E-08  9.34E-08
     kr 84    6.65E-08  7.05E-08  7.46E-08  7.86E-08  8.26E-08  8.26E-08
     sb121    5.15E-08  5.48E-08  5.81E-08  6.14E-08  6.48E-08  6.48E-08
     se 79    5.13E-08  5.44E-08  5.75E-08  6.07E-08  6.38E-08  6.38E-08
     dy161    4.11E-08  4.48E-08  4.86E-08  5.25E-08  5.66E-08  5.66E-08
     sb123    4.17E-08  4.44E-08  4.71E-08  4.97E-08  5.24E-08  5.24E-08
     kr 86    3.66E-08  3.88E-08  4.10E-08  4.32E-08  4.54E-08  4.54E-08
     te128    3.42E-08  3.64E-08  3.85E-08  4.07E-08  4.29E-08  4.29E-08
     se 80    2.39E-08  2.54E-08  2.68E-08  2.83E-08  2.97E-08  2.97E-08
     ru100    1.86E-08  2.10E-08  2.34E-08  2.61E-08  2.88E-08  2.88E-08
     te125    2.25E-08  2.39E-08  2.54E-08  2.69E-08  2.84E-08  2.84E-08
     tb159    2.01E-08  2.16E-08  2.33E-08  2.49E-08  2.66E-08  2.66E-08
     gd158    1.58E-08  1.71E-08  1.84E-08  1.97E-08  2.10E-08  2.10E-08
     cd112    1.60E-08  1.71E-08  1.82E-08  1.94E-08  2.06E-08  2.06E-08
     nd142    1.30E-08  1.45E-08  1.63E-08  1.82E-08  2.01E-08  2.01E-08
     ba134    1.28E-08  1.42E-08  1.59E-08  1.77E-08  1.96E-08  1.96E-08
     sm148    1.16E-08  1.30E-08  1.46E-08  1.62E-08  1.79E-08  1.79E-08
     li 6     1.33E-08  1.41E-08  1.48E-08  1.56E-08  1.64E-08  1.64E-08
     ba135    1.03E-08  1.17E-08  1.31E-08  1.45E-08  1.61E-08  1.61E-08
     sr 90    1.62E-08  1.61E-08  1.61E-08  1.60E-08  1.60E-08  1.60E-08
     sn117    1.19E-08  1.27E-08  1.35E-08  1.43E-08  1.51E-08  1.51E-08
     eu154    1.15E-08  1.22E-08  1.29E-08  1.37E-08  1.44E-08  1.44E-08
     pd104    8.79E-09  9.91E-09  1.11E-08  1.24E-08  1.37E-08  1.37E-08
     dy164    8.60E-09  9.48E-09  1.04E-08  1.13E-08  1.23E-08  1.23E-08
     cd114    9.10E-09  9.79E-09  1.05E-08  1.12E-08  1.19E-08  1.19E-08
     sn119    9.35E-09  9.95E-09  1.06E-08  1.12E-08  1.18E-08  1.18E-08
     dy162    7.83E-09  8.62E-09  9.45E-09  1.03E-08  1.12E-08  1.12E-08
     sn115    6.56E-09  9.11E-09  9.66E-09  1.02E-08  1.08E-08  1.08E-08
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     rh105     9.77E-09  9.85E-09  9.93E-09  1.00E-08  1.01E-08  1.01E-08
     pd110     7.03E-09  7.59E-09  8.17E-09  8.75E-09  9.35E-09  9.35E-09
     sr 88     6.73E-09  7.14E-09  7.55E-09  7.95E-09  8.35E-09  8.35E-09
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  46
0                                   fraction of total absorption rate
        power=     .80mw, burnup=    7305.mwd, flux= 2.67E+08n/cm**2-sec
0            initial ******* d ******* d ******* d ******* d ******* d

     se 82     4.60E-09  4.88E-09  5.15E-09  5.43E-09  5.71E-09  5.71E-09
     sn126     4.12E-09  4.39E-09  4.67E-09  4.95E-09  5.24E-09  5.24E-09
     mo 96     3.11E-09  3.49E-09  3.88E-09  4.30E-09  4.74E-09  4.74E-09
     se 78     3.56E-09  3.78E-09  4.00E-09  4.22E-09  4.44E-09  4.44E-09
     sn124     3.02E-09  3.21E-09  3.41E-09  3.61E-09  3.80E-09  3.80E-09
     cs137     3.70E-09  3.69E-09  3.69E-09  3.69E-09  3.68E-09  3.68E-09
     cd110     2.80E-09  3.31E-09  3.64E-09  3.81E-09  3.41E-09  3.41E-09
     ba134     2.23E-09  2.44E-09  2.65E-09  2.87E-09  3.10E-09  3.10E-09
     dy163     1.95E-09  2.16E-09  2.37E-09  2.59E-09  2.81E-09  2.81E-09
     es 75     2.11E-09  2.24E-09  2.37E-09  2.49E-09  2.62E-09  2.62E-09
     xe130     1.75E-09  1.94E-09  2.15E-09  2.37E-09  2.59E-09  2.59E-09
     nb 93     1.65E-09  1.86E-09  2.09E-09  2.32E-09  2.57E-09  2.57E-09
     pr143     2.37E-09  2.36E-09  2.36E-09  2.35E-09  2.35E-09  2.35E-09
     kr 82     1.74E-09  1.92E-09  2.10E-09  2.29E-09  2.49E-09  2.49E-09
     in113     1.68E-09  1.80E-09  1.91E-09  2.02E-09  2.13E-09  2.13E-09
     xe133     1.96E-09  1.96E-09  1.96E-09  1.96E-09  1.96E-09  1.96E-09
     sn118     1.23E-09  1.31E-09  1.39E-09  1.47E-09  1.55E-09  1.55E-09
     ce141     1.55E-09  1.54E-09  1.54E-09  1.54E-09  1.54E-09  1.54E-09
     br 79     8.40E-10  9.47E-10  1.06E-09  1.18E-09  1.31E-09  1.31E-09
     sn122     1.03E-09  1.10E-09  1.16E-09  1.23E-09  1.30E-09  1.30E-09
     cs134     1.05E-09  1.11E-09  1.17E-09  1.24E-09  1.30E-09  1.30E-09
     cd116     1.03E-09  1.10E-09  1.17E-09  1.23E-09  1.30E-09  1.30E-09
     sn120     7.48E-10  8.17E-10  8.47E-10  9.16E-10  9.46E-10  9.46E-10
     ag107     5.88E-10  6.72E-10  7.63E-10  8.60E-10  9.65E-10  9.65E-10
     pm149     9.55E-10  9.54E-10  9.54E-10  9.53E-10  9.53E-10  9.53E-10
     nd147     9.09E-10  9.08E-10  9.06E-10  9.05E-10  9.04E-10  9.04E-10
     xe129     6.84E-10  5.47E-10  6.13E-10  6.83E-10  7.57E-10  7.57E-10
     gr 73     5.86E-10  6.23E-10  6.60E-10  6.97E-10  7.34E-10  7.34E-10
     te126     4.83E-10  4.49E-10  4.97E-10  5.48E-10  6.01E-10  6.01E-10
     ce144     5.77E-10  5.76E-10  5.75E-10  5.74E-10  5.73E-10  5.73E-10
     kr 85     5.66E-10  5.42E-10  5.41E-10  5.40E-10  5.38E-10  5.38E-10
     ru103     3.70E-10  3.70E-10  3.71E-10  3.72E-10  3.72E-10  3.72E-10
     gd160     2.38E-10  2.28E-10  2.46E-10  2.64E-10  2.83E-10  2.83E-10
     ge 76     2.07E-10  2.19E-10  2.32E-10  2.44E-10  2.57E-10  2.57E-10
     ho165     1.38E-10  1.66E-10  1.84E-10  2.02E-10  2.21E-10  2.21E-10
     zr 95     1.60E-10  1.60E-10  1.60E-10  1.59E-10  1.59E-10  1.59E-10
     nb 95     1.48E-10  1.47E-10  1.47E-10  1.47E-10  1.46E-10  1.46E-10
      y 91     1.36E-10  1.35E-10  1.35E-10  1.34E-10  1.34E-10  1.34E-10
     dy160     7.39E-11  8.40E-11  9.49E-11  1.06E-10  1.19E-10  1.19E-10
     pm151     1.11E-10  1.11E-10  1.11E-10  1.12E-10  1.12E-10  1.12E-10
     xe128     4.89E-11  5.51E-11  6.18E-11  6.88E-11  7.63E-11  7.63E-11
     te124     3.63E-11  3.93E-11  4.24E-11  4.56E-11  4.89E-11  4.89E-11
     eu156     4.48E-11  4.54E-11  4.59E-11  4.65E-11  4.70E-11  4.70E-11
     ba140     4.39E-11  4.58E-11  4.57E-11  4.57E-11  4.56E-11  4.56E-11
     sr 86     2.93E-11  3.35E-11  3.40E-11  3.95E-11  4.33E-11  4.33E-11
     sm153     4.16E-11  4.18E-11  4.21E-11  4.23E-11  4.25E-11  4.25E-11
     ru106     3.30E-11  3.55E-11  3.60E-11  3.65E-11  3.70E-11  3.70E-11
     sr 87     2.51E-11  2.67E-11  2.84E-11  3.00E-11  3.16E-11  3.16E-11
     sn114     1.88E-11  2.12E-11  2.38E-11  2.65E-11  2.94E-11  2.94E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  47
0                                   fraction of total absorption rate
        power=     .80mw, burnup=    7305.mwd, flux= 2.67E+08n/cm**2-sec
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0                 initial ******* d ******* d ******* d ******* d ******* d

     sr 89        2.89E-11  2.88E-11  2.88E-11  2.87E-11  2.86E-11  2.86E-11
     kr 87        2.16E-11  2.16E-11  2.15E-11  2.15E-11  2.14E-11  2.14E-11
     rb 94        1.51E-11  1.42E-11  1.73E-11  1.84E-11  1.95E-11  1.95E-11
     sb125        1.65E-11  1.66E-11  1.67E-11  1.68E-11  1.69E-11  1.69E-11
     ce143        1.68E-11  1.68E-11  1.68E-11  1.67E-11  1.67E-11  1.67E-11
      y 90        1.54E-11  1.53E-11  1.53E-11  1.52E-11  1.52E-11  1.52E-11
     la140        1.49E-11  1.49E-11  1.49E-11  1.48E-11  1.48E-11  1.48E-11
     as 74        1.17E-11  1.25E-11  1.32E-11  1.40E-11  1.47E-11  1.47E-11
     se 76        1.00E-11  1.10E-11  1.20E-11  1.31E-11  1.42E-11  1.42E-11
     mo 99        1.28E-11  1.28E-11  1.28E-11  1.28E-11  1.28E-11  1.28E-11
     te122        7.82E-12  8.03E-12  9.90E-12  1.10E-11  1.22E-11  1.22E-11
     er166        8.05E-12  8.07E-12  9.94E-12  1.09E-11  1.20E-11  1.20E-11
     se 72        8.28E-12  8.82E-12  9.36E-12  9.91E-12  1.05E-11  1.05E-11
     pm148m       9.57E-12  9.58E-12  9.59E-12  9.59E-12  9.60E-12  9.60E-12
     te127m       8.28E-12  8.33E-12  8.37E-12  8.42E-12  8.47E-12  8.47E-12
      i131        6.71E-12  6.71E-12  6.71E-12  6.71E-12  6.70E-12  6.70E-12
     te129m       1.04E-12  1.04E-12  1.04E-12  1.05E-12  1.05E-12  1.05E-12
     kr 80        7.41E-13  8.30E-13  9.24E-13  1.03E-12  1.14E-12  1.14E-12
     ag111        5.08E-13  5.09E-13  5.29E-13  5.38E-13  5.48E-13  5.48E-13
     er167        2.82E-13  3.29E-13  3.80E-13  4.36E-13  4.97E-13  4.97E-13
     eu157        4.24E-13  4.31E-13  4.37E-13  4.44E-13  4.50E-13  4.50E-13
     pm148        3.65E-13  3.65E-13  3.65E-13  3.65E-13  3.64E-13  3.64E-13
     cd115m       2.56E-13  2.58E-13  2.59E-13  2.60E-13  2.61E-13  2.61E-13
     te123        1.50E-13  1.74E-13  2.00E-13  2.29E-13  2.60E-13  2.60E-13
     ce136        1.59E-13  1.65E-13  1.71E-13  1.77E-13  1.83E-13  1.83E-13
     tb160        5.23E-14  5.63E-14  6.02E-14  6.43E-14  6.84E-14  6.84E-14
     ru105        3.49E-14  3.51E-14  3.54E-14  3.57E-14  3.60E-14  3.60E-14
     pr142        2.66E-14  2.82E-14  2.98E-14  3.15E-14  3.30E-14  3.30E-14
     ba  9        2.43E-14  2.79E-14  2.95E-14  3.12E-14  3.28E-14  3.28E-14
     sn125        3.10E-14  3.11E-14  3.12E-14  3.13E-14  3.14E-14  3.14E-14
     cd108        1.58E-14  1.90E-14  2.25E-14  2.65E-14  3.09E-14  3.09E-14
     ii  7        1.05E-14  1.11E-14  1.18E-14  1.24E-14  1.31E-14  1.31E-14
     rb 88        1.22E-14  1.21E-14  1.21E-14  1.21E-14  1.20E-14  1.20E-14
     sb126        0.92E-15  1.04E-14  1.08E-14  1.12E-14  1.17E-14  1.17E-14
     sn123        1.03E-14  1.04E-14  1.04E-14  1.04E-14  1.04E-14  1.04E-14
      i135        9.87E-15  9.86E-15  9.85E-15  9.84E-15  9.83E-15  9.83E-15
     te132        9.40E-15  9.40E-15  9.39E-15  9.39E-15  9.38E-15  9.38E-15
     sn114        4.66E-15  5.27E-15  5.92E-15  6.60E-15  7.33E-15  7.33E-15
      i130        5.62E-15  5.91E-15  6.21E-15  6.50E-15  6.80E-15  6.80E-15
     te134        5.59E-15  5.58E-15  5.57E-15  5.56E-15  5.55E-15  5.55E-15
     sb124        4.92E-15  4.25E-15  4.37E-15  4.49E-15  4.61E-15  4.61E-15
     in117m       2.41E-15  2.43E-15  2.44E-15  2.46E-15  2.48E-15  2.48E-15
     rb 86        1.80E-15  1.89E-15  1.98E-15  2.07E-15  2.16E-15  2.16E-15
     dy165        1.30E-15  1.37E-15  1.44E-15  1.50E-15  1.57E-15  1.57E-15
     in117        1.17E-16  1.23E-16  1.28E-16  1.34E-16  1.39E-16  1.39E-16
     ce134m       1.96E-16  2.08E-16  2.20E-16  2.32E-16  2.44E-16  2.44E-16
     sd118        1.29E-16  1.30E-16  1.30E-16  1.31E-16  1.31E-16  1.31E-16
     ge 75        8.43E-17  8.42E-17  8.41E-17  8.40E-17  8.39E-17  8.39E-17
     in119m       3.19E-17  3.20E-17  3.21E-17  3.22E-17  3.23E-17  3.23E-17
1    sas2h: far-field crit based on 6kw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  48
0                                  fraction of total absorption rate
     power=    .00mw, burnup=   7305.mwd, flux= 2.67E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     ag110        8.18E-18  8.18E-18  1.02E-17  1.10E-17  1.19E-17  1.19E-17
     cd109        6.77E-18  7.20E-18  7.64E-18  8.09E-18  8.54E-18  8.54E-18
     in119        2.57E-18  2.59E-18  2.60E-18  2.61E-18  2.62E-18  2.62E-18
1
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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 49
power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.67E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	d	d	d	d	d
h 1	3.48E-04	3.69E-04	3.91E-04	4.13E-04	4.34E-04	4.34E-04
h 2	1.03E-06	1.10E-06	1.16E-06	1.23E-06	1.29E-06	1.29E-06
h 3	4.34E-11	4.42E-11	4.47E-11	4.51E-11	4.56E-11	4.56E-11
h 4	1.74E-34	1.76E-34	1.78E-34	1.80E-34	1.82E-34	1.82E-34
he 3	6.99E-09	7.37E-09	7.73E-09	8.09E-09	8.45E-09	8.45E-09
he 4	5.76E-05	6.11E-05	6.47E-05	6.83E-05	7.19E-05	7.19E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-06	7.35E-06	7.78E-06	8.21E-06	8.64E-06	8.64E-06
ne 21	8.74E-10	9.80E-10	1.09E-09	1.21E-09	1.33E-09	1.33E-09
ne 22	4.57E-08	4.86E-08	5.15E-08	5.43E-08	5.72E-08	5.72E-08
ne 23	7.14E-15	7.18E-15	7.17E-15	7.17E-15	7.16E-15	7.16E-15
ne 22	4.21E-11	4.24E-11	4.23E-11	4.23E-11	4.23E-11	4.23E-11
ne 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
ne 24	2.77E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
ne 24m	4.55E-15	4.54E-15	4.54E-15	4.53E-15	4.53E-15	4.53E-15
ne 25	2.69E-24	3.01E-24	3.34E-24	3.68E-24	4.04E-24	4.04E-24
mg 24	5.11E-02	5.40E-02	5.69E-02	5.97E-02	6.26E-02	6.26E-02
mg 25	9.35E-08	1.04E-07	1.16E-07	1.28E-07	1.40E-07	1.40E-07
mg 26	1.03E-06	1.10E-06	1.16E-06	1.23E-06	1.29E-06	1.29E-06
mg 27	2.15E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12
mg 28	4.27E-24	4.29E-24	4.28E-24	4.28E-24	4.27E-24	4.27E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.05E-10	2.05E-10	2.05E-10	2.04E-10	2.04E-10	2.04E-10
al 29	2.07E-22	2.32E-22	2.58E-22	2.86E-22	3.15E-22	3.15E-22
al 30	1.56E-32	1.86E-32	2.20E-32	2.56E-32	2.97E-32	2.97E-32
si 28	1.49E-01	1.57E-01	1.66E-01	1.74E-01	1.82E-01	1.82E-01
si 29	8.01E-07	8.98E-07	1.00E-06	1.11E-06	1.22E-06	1.22E-06
si 30	4.53E-12	5.40E-12	6.36E-12	7.43E-12	8.62E-12	8.62E-12
si 31	3.20E-24	3.81E-24	4.49E-24	5.24E-24	6.08E-24	6.08E-24
si 32	4.68E-30	5.62E-30	6.67E-30	7.85E-30	9.16E-30	9.16E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.67E+08	2.67E+08	2.67E+08	2.66E+08	2.66E-07

0
1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 50
power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.67E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	d	d	d	d	d
he 4	2.86E+00	2.26E+00	2.47E+00	2.69E+00	2.91E+00	2.91E+00
pb206	7.39E-04	8.69E-04	1.01E-03	1.17E-03	1.34E-03	1.34E-03
pb207	1.22E-04	1.37E-04	1.54E-04	1.72E-04	1.90E-04	1.90E-04
pb208	1.93E-03	2.18E-05	2.44E-05	2.72E-05	3.01E-05	3.01E-05
pb209	1.96E-11	2.19E-11	2.44E-11	2.69E-11	2.96E-11	2.96E-11
pb210	1.60E-05	1.75E-05	1.92E-05	2.08E-05	2.25E-05	2.25E-05
pb211	6.09E-12	6.47E-12	6.85E-12	7.24E-12	7.62E-12	7.62E-12
pb212	1.67E-11	1.72E-11	1.88E-11	1.98E-11	2.09E-11	2.09E-11
pb214	5.65E-11	4.81E-11	4.38E-11	4.76E-11	5.14E-11	5.14E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.04E-05	6.01E-05	7.09E-05	8.28E-05	9.60E-05	9.60E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	9.82E-09	1.08E-08	1.18E-08	1.28E-08	1.39E-08	1.39E-08
bi211	3.61E-13	3.84E-13	4.06E-13	4.29E-13	4.52E-13	4.52E-13
bi212	1.39E-12	1.68E-12	1.78E-12	1.88E-12	1.98E-12	1.98E-12
bi213	4.37E-12	5.11E-12	5.49E-12	6.29E-12	6.91E-12	6.91E-12
bi214	2.71E-11	2.98E-11	3.25E-11	3.53E-11	3.82E-11	3.82E-11

po210	2.71E-07	2.98E-07	3.26E-07	3.54E-07	3.83E-07	3.83E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.99E-18	4.24E-18	4.49E-18	4.74E-18	4.99E-18	4.99E-18
po212	8.33E-23	8.85E-23	9.37E-23	9.88E-23	1.04E-22	1.04E-22
po213	6.87E-21	7.69E-21	8.55E-21	9.45E-21	1.04E-20	1.04E-20
po214	3.72E-18	4.10E-18	4.47E-18	4.86E-18	5.25E-18	5.25E-18
po215	5.80E-18	5.32E-18	5.63E-18	5.95E-18	6.27E-18	6.27E-18
po216	6.33E-17	6.72E-17	7.11E-17	7.51E-17	7.90E-17	7.90E-17
po218	4.22E-12	4.64E-12	5.07E-12	5.51E-12	5.95E-12	5.95E-12
rn218	2.44E-28	2.60E-28	2.75E-28	2.90E-28	3.05E-28	3.05E-28
rn219	1.11E-14	1.18E-14	1.25E-14	1.32E-14	1.39E-14	1.39E-14
rn220	2.43E-14	2.58E-14	2.73E-14	2.88E-14	3.03E-14	3.03E-14
rn222	7.49E-09	8.24E-09	9.00E-09	9.78E-09	1.06E-08	1.06E-08
ra222	2.65E-25	2.82E-25	2.98E-25	3.14E-25	3.31E-25	3.31E-25
ra223	2.78E-09	2.95E-09	3.13E-09	3.30E-09	3.48E-09	3.48E-09
ra224	1.38E-10	1.47E-10	1.55E-10	1.64E-10	1.72E-10	1.72E-10
ra225	2.14E-09	2.39E-09	2.46E-09	2.94E-09	3.23E-09	3.23E-09
ra226	1.14E-03	1.26E-03	1.38E-03	1.49E-03	1.42E-03	1.42E-03
ra228	8.95E-12	9.09E-12	9.64E-12	1.02E-11	1.07E-11	1.07E-11
ac225	1.44E-09	1.62E-09	1.80E-09	1.99E-09	2.18E-09	2.18E-09
ac227	1.93E-06	2.05E-06	2.17E-06	2.30E-06	2.42E-06	2.42E-06
ac228	1.04E-15	1.11E-15	1.18E-15	1.24E-15	1.31E-15	1.31E-15
th226	1.29E-23	1.38E-23	1.45E-23	1.53E-23	1.61E-23	1.61E-23
th227	4.48E-09	4.76E-09	5.05E-09	5.33E-09	5.61E-09	5.61E-09
th228	2.63E-08	2.80E-08	2.96E-08	3.13E-08	3.29E-08	3.29E-08
th229	4.15E-04	4.65E-04	5.17E-04	5.72E-04	6.28E-04	6.28E-04
th230	1.03E-01	1.10E-01	1.16E-01	1.23E-01	1.29E-01	1.29E-01
th231	3.37E-09	3.39E-09	3.42E-09	3.44E-09	3.46E-09	3.46E-09
th232	2.09E-02	2.22E-02	2.36E-02	2.49E-02	2.62E-02	2.62E-02
th233	1.90E-13	2.02E-13	2.15E-13	2.25E-13	2.37E-13	2.37E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.90E-03	3.09E-03	3.27E-03	3.45E-03	3.64E-03	3.64E-03
pa232	4.91E-11	5.22E-11	5.53E-11	5.83E-11	6.14E-11	6.14E-11

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 51
power= 6.000E-03mw, burnup=7.3050E+03mwd, flux= 2.67E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.25E-20	1.33E-20	1.41E-20	1.49E-20	1.56E-20	1.56E-20
u231	4.05E-17	4.31E-17	4.55E-17	4.79E-17	5.03E-17	5.03E-17
u232	9.59E-07	1.02E-06	1.08E-06	1.14E-06	1.20E-06	1.20E-06
u233	5.50E-02	5.62E-02	5.94E-02	6.26E-02	6.58E-02	6.58E-02
u234	9.59E+00	9.63E+00	9.66E+00	9.70E+00	9.73E+00	9.73E+00
u235	7.02E+02	7.00E+02	6.99E+02	6.97E+02	6.96E+02	6.96E+02
u236	1.79E+02	1.79E+02	1.79E+02	1.80E+02	1.80E+02	1.80E+02
u237	3.18E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06	3.19E-06
u238	2.63E+04	2.63E+04	2.63E+04	2.63E+04	2.63E+04	2.63E+04
u239	2.17E-07	2.17E-07	2.17E-07	2.17E-07	2.17E-07	2.17E-07
u240	1.74E-38	2.96E-38	4.85E-38	7.75E-38	1.21E-37	1.21E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.71E-12	8.73E-12	8.74E-12	8.73E-12	8.72E-12	8.72E-12
np236m	2.07E-12	2.08E-12	2.08E-12	2.07E-12	2.07E-12	2.07E-12
np236	7.90E-07	8.38E-07	8.86E-07	9.33E-07	9.81E-07	9.81E-07
np237	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01
np238	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.52E-06	1.52E-06

```
     np239   4.58E-05  4.59E-05  4.59E-05  4.58E-05  4.58E-05  4.58E-05
     np240m  1.49E-40  2.52E-40  4.14E-40  6.61E-40  1.03E-39  1.03E-39
     np240   9.21E-15  9.22E-15  9.20E-15  9.19E-15  9.18E-15  9.18E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.12E-09  1.13E-09  1.13E-09  1.13E-09  1.13E-09  1.13E-09
     pu237   3.83E-13  3.93E-13  4.01E-13  4.09E-13  4.16E-13  4.16E-13
     pu238   2.31E-02  2.31E-02  2.31E-02  2.31E-02  2.31E-02  2.31E-02
     pu239   1.79E+01  1.88E+01  1.98E+01  2.07E+01  2.17E+01  2.17E+01
     pu240   3.07E-01  3.41E-01  3.76E-01  4.13E-01  4.50E-01  4.50E-01
     pu241   1.26E-04  1.40E-04  1.55E-04  1.70E-04  1.85E-04  1.85E-04
     pu242   1.09E-05  1.31E-05  1.56E-05  1.85E-05  2.16E-05  2.16E-05
     pu243   2.29E-14  2.77E-14  3.31E-14  3.90E-14  4.55E-14  4.55E-14
     pu244   8.68E-28  1.47E-27  2.42E-27  3.86E-27  6.01E-27  6.01E-27
     pu245   3.49E-38  5.92E-38  9.73E-38  1.55E-37  2.41E-37  2.41E-37
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   7.83E-19  8.90E-19  9.96E-19  1.11E-18  1.22E-18  1.22E-18
     am240   3.58E-16  4.07E-16  4.56E-16  5.06E-16  5.59E-16  5.59E-16
     am241   2.82E-03  3.18E-03  3.57E-03  3.97E-03  4.38E-03  4.38E-03
     am242m  1.28E-06  1.44E-06  1.64E-06  1.84E-06  2.04E-06  2.04E-06
     am242   1.13E-10  1.28E-10  1.43E-10  1.59E-10  1.76E-10  1.76E-10
     am243   6.34E-08  7.07E-08  9.63E-08  1.16E-07  1.39E-07  1.39E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   4.82E-16  5.98E-16  7.22E-16  8.64E-16  1.06E-15  1.06E-15
     am245   7.70E-38  1.30E-38  2.12E-38  3.36E-38  5.20E-38  5.20E-38
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   6.68E-21  7.58E-21  8.49E-21  9.44E-21  1.04E-20  1.04E-20
     cm242   2.28E-08  2.58E-08  2.90E-08  3.22E-08  3.56E-08  3.56E-08
     cm243   1.65E-17  1.88E-17  2.12E-17  2.38E-17  2.65E-17  2.65E-17
     cm244   7.97E-12  9.40E-12  1.15E-11  1.39E-11  1.66E-11  1.66E-11
1
     sas2h: fer-field crit based on b2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% wo2                    actinides        page   52
       power= 4.000E-03mw, burnup=7.3050E+03mwd, flux= 2.67E+08n/cm**2-sec
0                                                   nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
                 charge ******* g ******* g ******* g ******* g ******* g
     cm245   6.31E-15  8.32E-15  1.08E-14  1.38E-14  1.73E-14  1.73E-14
     cm246   3.38E-17  3.33E-17  4.36E-17  6.13E-17  8.10E-17  8.10E-17
     cm247   1.56E-21  2.33E-21  3.39E-21  4.82E-21  6.73E-21  6.73E-21
     cm248   1.01E-24  1.61E-24  2.49E-24  3.76E-24  5.54E-24  5.54E-24
     cm249   3.18E-35  5.06E-35  7.82E-35  1.18E-34  1.74E-34  1.74E-34
     cm250   8.86E-40  9.92E-40  1.63E-39  2.59E-39  4.03E-39  4.03E-39
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.67E+08  2.67E+08  2.67E+08  2.66E+08  2.66E+08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  6 of library on unit 33.

          pass  1
          pass  0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
```

```
        first library updated was...
        pass   1
        pass   0
        "scale-system control module sas2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *            pretim iwr origen-s binary working library--id = 1143    *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *      data from the light element, actinide, and fission product libraries *
        *        decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "presas2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                  fission product yields are from endf/b-v           *
        *                                                                     *
        *             photon libraries use an 18-energy-group structure       *
        *            the photon data are from the master photon data base,    *
        *             produced to include bremsstrahlung from uo2 matrix      *
        *                                                                     *
        *        see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/28/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   53
        power=    .80mw, burnup=   8766.mwd, flux= 2.66E+08n/cm**2-sec
0                                                 basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
     productions  1.163128E+06  1.164209E+06  1.165236E+06  1.166270E+06  1.167251E+06  1.167251E+06
     absorptions  9.567318E+05  9.574046E+05  9.584629E+05  9.593006E+05  9.601203E+05  9.601203E+05
     k infinity   1.215731E+00  1.215749E+00  1.215755E+00  1.215750E+00  1.215734E+00  1.215734E+00
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
     actinide
     absorptions  9.430275E+05  9.437461E+05  9.444477E+05  9.471324E+05  9.478004E+05  9.478004E+05
     non-actinide
     abs. fracs.  1.223361E-02  1.238549E-02  1.253587E-02  1.268432E-02  1.283157E-02  1.283157E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   54
0                                  fraction of total absorption rate
        power=    .80mw, burnup=   8766.mwd, flux= 2.66E+08n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149     5.34E-03  5.34E-03  5.35E-03  5.35E-03  5.35E-03  5.35E-03
     eu151     8.66E-04  9.01E-04  9.34E-04  9.67E-04  1.00E-03  1.00E-03
     nd143     7.02E-04  7.35E-04  7.69E-04  8.02E-04  8.36E-04  8.36E-04
     rh103     3.45E-04  3.62E-04  3.79E-04  3.97E-04  4.14E-04  4.14E-04
```

xe131	2.29E-04	2.40E-04	2.51E-04	2.63E-04	2.74E-04	2.74E-04
cs133	1.77E-04	1.86E-04	1.94E-04	2.03E-04	2.12E-04	2.12E-04
gd155	1.88E-04	1.91E-04	1.94E-04	1.97E-04	1.99E-04	1.99E-04
sm147	1.31E-04	1.37E-04	1.43E-04	1.50E-04	1.56E-04	1.56E-04
tc 99	1.29E-04	1.36E-04	1.42E-04	1.48E-04	1.54E-04	1.54E-04
nd145	1.00E-04	1.05E-04	1.10E-04	1.14E-04	1.19E-04	1.19E-04
cd113	9.28E-05	9.37E-05	9.46E-05	9.54E-05	9.62E-05	9.62E-05
mo 95	6.95E-05	7.29E-05	7.62E-05	7.96E-05	8.29E-05	8.29E-05
sm152	6.58E-05	6.96E-05	7.33E-05	7.71E-05	8.09E-05	8.09E-05
sm150	4.68E-05	4.95E-05	5.21E-05	5.48E-05	5.75E-05	5.75E-05
gd157	5.37E-05	5.43E-05	5.54E-05	5.62E-05	5.70E-05	5.70E-05
kr 83	4.26E-05	4.46E-05	4.67E-05	4.87E-05	5.07E-05	5.07E-05
cs135	4.01E-05	4.20E-05	4.40E-05	4.60E-05	4.79E-05	4.79E-05
sm151	4.12E-05	4.13E-05	4.14E-05	4.15E-05	4.16E-05	4.16E-05
ru101	3.13E-05	3.28E-05	3.44E-05	3.59E-05	3.74E-05	3.74E-05
pr141	2.96E-05	3.10E-05	3.25E-05	3.39E-05	3.53E-05	3.53E-05
eu153	2.86E-05	3.01E-05	3.16E-05	3.31E-05	3.46E-05	3.46E-05
la139	2.41E-05	2.53E-05	2.65E-05	2.77E-05	2.88E-05	2.88E-05
pd105	1.16E-05	1.23E-05	1.29E-05	1.35E-05	1.42E-05	1.42E-05
ba137	1.15E-05	1.21E-05	1.26E-05	1.32E-05	1.38E-05	1.38E-05
ag109	9.24E-06	9.94E-06	1.07E-05	1.14E-05	1.22E-05	1.22E-05
zr 93	9.78E-06	1.03E-05	1.07E-05	1.12E-05	1.17E-05	1.17E-05
i129	7.73E-06	8.12E-06	8.51E-06	8.90E-06	9.29E-06	9.29E-06
nd144	7.29E-06	7.45E-06	8.01E-06	8.36E-06	8.72E-06	8.72E-06
mo 97	5.49E-06	5.76E-06	6.03E-06	6.30E-06	6.56E-06	6.56E-06
gd152	2.57E-06	2.81E-06	3.07E-06	3.33E-06	3.61E-06	3.61E-06
pd108	2.37E-06	2.53E-06	2.70E-06	2.87E-06	3.05E-06	3.05E-06
zr 91	2.55E-06	2.67E-06	2.79E-06	2.91E-06	3.03E-06	3.03E-06
y 89	2.43E-06	2.55E-06	2.67E-06	2.78E-06	2.90E-06	2.90E-06
ru102	2.27E-06	2.38E-06	2.49E-06	2.60E-06	2.72E-06	2.72E-06
xe142	2.00E-06	2.10E-06	2.20E-06	2.30E-06	2.39E-06	2.39E-06
nd148	1.94E-06	2.04E-06	2.13E-06	2.23E-06	2.32E-06	2.32E-06
xe135	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06
nd146	1.62E-06	1.70E-06	1.78E-06	1.86E-06	1.94E-06	1.94E-06
in115	1.42E-06	1.49E-06	1.56E-06	1.64E-06	1.71E-06	1.71E-06
ba138	1.38E-06	1.45E-06	1.52E-06	1.59E-06	1.65E-06	1.65E-06
pd107	1.22E-06	1.30E-06	1.38E-06	1.47E-06	1.55E-06	1.55E-06
ce140	1.29E-06	1.36E-06	1.42E-06	1.48E-06	1.55E-06	1.55E-06
xe132	1.19E-06	1.25E-06	1.31E-06	1.37E-06	1.42E-06	1.42E-06
mo 98	8.14E-07	8.44E-07	8.84E-07	9.33E-07	9.73E-07	9.73E-07
mo100	7.86E-07	8.14E-07	8.63E-07	9.01E-07	9.40E-07	9.40E-07
xe134	7.47E-07	8.04E-07	8.42E-07	8.79E-07	9.17E-07	9.17E-07
zr 92	6.14E-07	6.44E-07	6.73E-07	7.03E-07	7.32E-07	7.32E-07
i127	5.53E-07	5.84E-07	6.13E-07	6.43E-07	6.73E-07	6.73E-07
ru104	5.13E-07	5.40E-07	5.67E-07	5.93E-07	6.20E-07	6.20E-07

1 sas2k: far-field crit based on bbw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 55
0 fraction of total absorption rate
0 power= .00mw, burnup= 8766.mwd, flux= 2.66E+08n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

sr 96	6.94E-07	5.98E-07	5.42E-07	5.66E-07	5.90E-07	5.90E-07
nd150	4.37E-07	4.59E-07	4.81E-07	5.03E-07	5.24E-07	5.24E-07
xe136	4.16E-07	4.56E-07	4.37E-07	4.77E-07	4.97E-07	4.97E-07
br 81	3.12E-07	3.27E-07	3.42E-07	3.57E-07	3.73E-07	3.73E-07
rb 85	3.00E-07	3.15E-07	3.29E-07	3.43E-07	3.58E-07	3.58E-07
cd111	2.84E-07	2.91E-07	2.99E-07	3.38E-07	3.56E-07	3.56E-07
sr 86	2.64E-07	2.76E-07	2.89E-07	3.02E-07	3.15E-07	3.15E-07
sr 90	2.38E-07	2.50E-07	2.61E-07	2.73E-07	2.84E-07	2.84E-07
pm147	2.64E-07	2.63E-07	2.63E-07	2.63E-07	2.62E-07	2.62E-07
eu152	2.24E-07	2.32E-07	2.41E-07	2.49E-07	2.57E-07	2.57E-07

ru 99	1.48E-07	1.83E-07	2.02E-07	2.21E-07	2.40E-07	2.40E-07
sm154	1.98E-07	2.08E-07	2.18E-07	2.29E-07	2.39E-07	2.39E-07
te130	1.90E-07	2.00E-07	2.09E-07	2.18E-07	2.28E-07	2.28E-07
rb 87	1.73E-07	1.82E-07	1.90E-07	1.98E-07	2.07E-07	2.07E-07
eu155	1.89E-07	1.90E-07.	1.91E-07	1.93E-07	1.94E-07	1.94E-07
se 77	1.24E-07	1.30E-07	1.36E-07	1.42E-07	1.48E-07	1.48E-07
pd106	1.13E-07	1.20E-07	1.27E-07	1.33E-07	1.40E-07	1.40E-07
gd154	9.36E-08	1.03E-07	1.13E-07	1.24E-07	1.35E-07	1.35E-07
gd156	9.35E-08	9.98E-08	1.06E-07	1.13E-07	1.19E-07	1.19E-07
kr 84	8.27E-08	8.67E-08	9.06E-08	9.46E-08	9.86E-08	9.86E-08
sb121	6.68E-08	6.81E-08	7.15E-08	7.48E-08	7.82E-08	7.82E-08
se 79	6.37E-08	6.68E-08	6.99E-08	7.30E-08	7.61E-08	7.61E-08
dy161	5.65E-08	6.07E-08	6.50E-08	6.94E-08	7.38E-08	7.38E-08
sb123	5.24E-08	5.51E-08	5.78E-08	6.05E-08	6.32E-08	6.32E-08
kr 86	4.34E-08	4.76E-08	4.97E-08	5.19E-08	5.41E-08	5.41E-08
te128	4.29E-08	4.50E-08	4.72E-08	4.94E-08	5.16E-08	5.16E-08
ru100	2.88E-08	3.17E-08	3.47E-08	3.79E-08	4.12E-08	4.12E-08
se 80	2.97E-08	3.12E-08	3.26E-08	3.41E-08	3.55E-08	3.55E-08
te125	2.84E-08	2.99E-08	3.14E-08	3.29E-08	3.44E-08	3.44E-08
tb159	2.66E-08	2.83E-08	3.01E-08	3.18E-08	3.37E-08	3.37E-08
nd142	2.01E-08	2.21E-08	2.42E-08	2.65E-08	2.88E-08	2.88E-08
ba134	1.96E-08	2.15E-08	2.36E-08	2.58E-08	2.80E-08	2.80E-08
gd158	2.10E-08	2.23E-08	2.37E-08	2.51E-08	2.65E-08	2.65E-08
sm148	1.79E-08	1.97E-08	2.16E-08	2.36E-08	2.56E-08	2.56E-08
cd112	2.05E-08	2.17E-08	2.29E-08	2.41E-08	2.53E-08	2.53E-08
ba135	1.61E-08	1.77E-08	1.94E-08	2.12E-08	2.31E-08	2.31E-08
pd104	1.37E-08	1.51E-08	1.66E-08	1.81E-08	1.97E-08	1.97E-08
li 6	1.44E-08	1.72E-08	1.79E-08	1.87E-08	1.95E-08	1.95E-08
sn117	1.51E-08	1.59E-08	1.67E-08	1.76E-08	1.84E-08	1.84E-08
eu154	1.44E-08	1.51E-08	1.59E-08	1.66E-08	1.74E-08	1.74E-08
dy164	1.23E-08	1.33E-08	1.43E-08	1.54E-08	1.65E-08	1.65E-08
sr 90	1.40E-08	1.59E-08	1.59E-08	1.58E-08	1.58E-08	1.58E-08
dy162	1.12E-08	1.21E-08	1.31E-08	1.40E-08	1.51E-08	1.51E-08
cd114	1.19E-08	1.26E-08	1.34E-08	1.41E-08	1.48E-08	1.48E-08
sn119	1.18E-08	1.24E-08	1.30E-08	1.36E-08	1.42E-08	1.42E-08
sn115	1.08E-08	1.13E-08	1.19E-08	1.24E-08	1.30E-08	1.30E-08
pd110	9.36E-09	9.97E-09	1.06E-08	1.12E-08	1.19E-08	1.19E-08
rh105	1.01E-08	1.01E-08	1.02E-08	1.03E-08	1.04E-08	1.04E-08
sr 88	8.35E-09	8.75E-09	9.15E-09	9.55E-09	9.94E-09	9.94E-09

1 sas2h: far-field crit based on 56w 15x15 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 56
0 fraction of total absorption rate
0 powers .60mw, burnups 8766.mwd, flux= 2.66E+08n/cm**2-sec

	initial ****** d	****** d	****** d	****** d	****** d	****** d
se 82	5.71E-09	5.98E-09	6.26E-09	6.53E-09	6.81E-09	6.81E-09
mo 96	4.74E-09	5.20E-09	5.68E-09	6.18E-09	6.71E-09	6.71E-09
sn126	5.23E-09	5.51E-09	5.80E-09	6.09E-09	6.37E-09	6.37E-09
se 78	4.44E-09	4.66E-09	4.88E-09	5.10E-09	5.32E-09	5.32E-09
cd110	3.40E-09	3.83E-09	4.29E-09	4.77E-09	5.30E-09	5.30E-09
sn124	3.81E-09	4.01E-09	4.21E-09	4.41E-09	4.61E-09	4.61E-09
ba136	3.11E-09	3.34E-09	3.59E-09	3.84E-09	4.10E-09	4.10E-09
dy163	2.81E-09	3.05E-09	3.29E-09	3.54E-09	3.80E-09	3.80E-09
nb 93	2.57E-09	2.83E-09	3.10E-09	3.38E-09	3.68E-09	3.68E-09
cs137	3.68E-09	3.68E-09	3.68E-09	3.68E-09	3.67E-09	3.67E-09
xe130	2.59E-09	2.83E-09	3.08E-09	3.33E-09	3.60E-09	3.60E-09
kr 82	2.49E-09	2.69E-09	2.90E-09	3.12E-09	3.35E-09	3.35E-09
as 75	2.62E-09	2.75E-09	2.88E-09	3.01E-09	3.14E-09	3.14E-09
in113	2.13E-09	2.25E-09	2.36E-09	2.47E-09	2.59E-09	2.59E-09
pr143	2.35E-09	2.54E-09	2.54E-09	2.54E-09	2.53E-09	2.53E-09
xe133	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09

br 79	1.31E-09	1.44E-09	1.58E-09	1.72E-09	1.87E-09	1.87E-09
sn118	1.35E-09	1.63E-09	1.71E-09	1.79E-09	1.87E-09	1.87E-09
sn122	1.30E-09	1.37E-09	1.43E-09	1.50E-09	1.57E-09	1.57E-09
cd114	1.30E-09	1.37E-09	1.43E-09	1.50E-09	1.57E-09	1.57E-09
cs134	1.30E-09	1.36E-09	1.43E-09	1.49E-09	1.55E-09	1.55E-09
ce141	1.34E-09	1.53E-09	1.33E-09	1.53E-09	1.53E-09	1.53E-09
ag107	9.44E-10	1.08E-09	1.19E-09	1.32E-09	1.45E-09	1.45E-09
sn120	9.66E-10	1.02E-09	1.07E-09	1.12E-09	1.17E-09	1.17E-09
xe129	7.36E-10	8.34E-10	9.15E-10	1.00E-09	1.09E-09	1.09E-09
pm149	9.52E-10	9.51E-10	9.50E-10	9.50E-10	9.49E-10	9.49E-10
nd147	9.05E-10	9.04E-10	9.03E-10	9.01E-10	9.00E-10	9.00E-10
ge 73	7.34E-10	7.71E-10	8.08E-10	8.45E-10	8.82E-10	8.82E-10
te126	6.01E-10	6.56E-10	7.15E-10	7.75E-10	8.39E-10	8.39E-10
ce144	5.73E-10	5.72E-10	5.71E-10	5.70E-10	5.69E-10	5.69E-10
kr 85	5.38E-10	5.37E-10	5.35E-10	5.34E-10	5.33E-10	5.33E-10
ru103	3.72E-10	3.73E-10	3.74E-10	3.74E-10	3.75E-10	3.75E-10
gd160	2.83E-10	3.02E-10	3.22E-10	3.42E-10	3.63E-10	3.63E-10
ge 76	2.57E-10	2.69E-10	2.82E-10	2.94E-10	3.07E-10	3.07E-10
he143	2.21E-10	2.41E-10	2.61E-10	2.83E-10	3.05E-10	3.05E-10
dy160	1.19E-10	1.32E-10	1.46E-10	1.61E-10	1.76E-10	1.76E-10
sr 95	1.59E-10	1.59E-10	1.59E-10	1.58E-10	1.58E-10	1.58E-10
nb 95	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10
y 91	1.34E-10	1.34E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10
pm151	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10
xe128	7.62E-11	8.40E-11	9.27E-11	1.01E-10	1.10E-10	1.10E-10
te124	4.89E-11	5.22E-11	5.57E-11	5.92E-11	6.28E-11	6.28E-11
sr 86	4.32E-11	4.71E-11	5.12E-11	5.54E-11	5.98E-11	5.98E-11
eu156	4.70E-11	4.75E-11	4.81E-11	4.86E-11	4.91E-11	4.91E-11
ba140	4.36E-11	4.35E-11	4.35E-11	4.34E-11	4.34E-11	4.34E-11
sm153	4.25E-11	4.27E-11	4.30E-11	4.32E-11	4.35E-11	4.35E-11
sn116	2.94E-11	3.24E-11	3.36E-11	3.89E-11	4.24E-11	4.24E-11
ru106	3.70E-11	3.75E-11	3.80E-11	3.84E-11	3.89E-11	3.89E-11
sr 87	3.16E-11	3.32E-11	3.49E-11	3.65E-11	3.82E-11	3.82E-11

1 sas2h: fer-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 57

0 fraction of total absorption rate

0 powerm .00mw, burnup= 8766.mwd, flux= 2.66E+08n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
sr 89	2.86E-11	2.83E-11	2.84E-11	2.83E-11	2.83E-11	2.83E-11
nb 94	1.05E-11	2.07E-11	2.10E-11	2.31E-11	2.44E-11	2.44E-11
kr 87	2.14E-11	2.13E-11	2.13E-11	2.12E-11	2.12E-11	2.12E-11
se 76	1.41E-11	1.53E-11	1.65E-11	1.77E-11	1.89E-11	1.89E-11
ge 74	1.47E-11	1.54E-11	1.61E-11	1.69E-11	1.76E-11	1.76E-11
te122	1.22E-11	1.35E-11	1.48E-11	1.62E-11	1.76E-11	1.76E-11
sb125	1.69E-11	1.70E-11	1.70E-11	1.71E-11	1.72E-11	1.72E-11
ce143	1.67E-11	1.67E-11	1.66E-11	1.66E-11	1.66E-11	1.66E-11
er166	1.20E-11	1.31E-11	1.42E-11	1.54E-11	1.66E-11	1.66E-11
y 90	1.32E-11	1.31E-11	1.31E-11	1.30E-11	1.30E-11	1.30E-11
te140	1.48E-11	1.48E-11	1.48E-11	1.48E-11	1.47E-11	1.47E-11
mo 99	1.28E-11	1.28E-11	1.27E-11	1.27E-11	1.27E-11	1.27E-11
ge 72	1.04E-11	1.10E-11	1.15E-11	1.21E-11	1.27E-11	1.27E-11
pm148m	9.59E-12	9.60E-12	9.61E-12	9.61E-12	9.62E-12	9.62E-12
te127m	8.44E-12	8.50E-12	8.55E-12	8.59E-12	8.63E-12	8.63E-12
i131	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12
te129m	1.05E-12	1.05E-12	1.05E-12	1.06E-12	1.06E-12	1.06E-12
kr 88	1.14E-12	1.26E-12	1.38E-12	1.52E-12	1.66E-12	1.66E-12
er167	4.97E-13	5.63E-13	6.34E-13	7.11E-13	7.93E-13	7.93E-13
ag111	5.48E-13	5.58E-13	5.67E-13	5.76E-13	5.85E-13	5.85E-13
eu157	4.50E-13	4.57E-13	4.63E-13	4.69E-13	4.75E-13	4.75E-13
te123	2.60E-13	2.95E-13	3.32E-13	3.72E-13	4.16E-13	4.16E-13

pm148	3.45E-13	3.45E-13	3.44E-13	3.44E-13	3.44E-13	3.44E-13
cd113m	2.61E-13	2.42E-13	2.63E-13	2.44E-13	2.45E-13	2.65E-13
cs136	1.83E-13	1.89E-13	1.95E-13	2.01E-13	2.06E-13	2.06E-13
tb160	6.83E-14	7.85E-14	7.68E-14	8.11E-14	8.54E-14	8.54E-14
cd108	3.09E-14	3.59E-14	4.13E-14	4.74E-14	5.40E-14	5.40E-14
pr142	3.30E-14	3.46E-14	3.62E-14	3.78E-14	3.94E-14	3.94E-14
be 9	3.28E-14	3.44E-14	3.60E-14	3.76E-14	3.92E-14	3.92E-14
ru105	3.40E-14	3.43E-14	3.45E-14	3.68E-14	3.70E-14	3.70E-14
sn125	3.14E-14	3.15E-14	3.16E-14	3.17E-14	3.18E-14	3.18E-14
li 7	1.31E-14	1.37E-14	1.43E-14	1.50E-14	1.56E-14	1.56E-14
sb126	1.17E-14	1.21E-14	1.25E-14	1.30E-14	1.34E-14	1.34E-14
rb 88	1.20E-14	1.20E-14	1.19E-14	1.19E-14	1.19E-14	1.19E-14
sn114	7.32E-15	8.08E-15	8.88E-15	9.72E-15	1.06E-14	1.06E-14
sn123	1.04E-14	1.04E-14	1.04E-14	1.04E-14	1.04E-14	1.04E-14
i135	9.82E-15	9.81E-15	9.80E-15	9.79E-15	9.78E-15	9.78E-15
te132	9.38E-15	9.37E-15	9.37E-15	9.37E-15	9.36E-15	9.36E-15
i130	6.79E-15	7.09E-15	7.38E-15	7.67E-15	7.96E-15	7.96E-15
te134	5.54E-15	5.53E-15	5.52E-15	5.51E-15	5.50E-15	5.50E-15
sb124	4.42E-15	4.74E-15	4.86E-15	4.98E-15	5.10E-15	5.10E-15
in117m	2.47E-15	2.49E-15	2.51E-15	2.52E-15	2.54E-15	2.54E-15
rb 86	2.16E-15	2.26E-15	2.35E-15	2.44E-15	2.53E-15	2.53E-15
dy165	1.97E-15	1.66E-15	1.71E-15	1.78E-15	1.84E-15	1.84E-15
in117	7.38E-16	7.44E-16	7.49E-16	7.54E-16	7.59E-16	7.59E-16
cs134m	2.43E-16	2.55E-16	2.67E-16	2.79E-16	2.90E-16	2.90E-16
cd118	1.31E-16	1.32E-16	1.32E-16	1.33E-16	1.33E-16	1.33E-16
sr 75	8.39E-17	8.38E-17	8.37E-17	8.36E-17	8.36E-17	8.36E-17
in119m	3.23E-17	3.24E-17	3.25E-17	3.26E-17	3.26E-17	3.26E-17

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 58
0 fraction of total absorption rate
power= .00mw, burnup= 8766.mwd, flux= 2.66E+08n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

ag110	1.19E-17	1.28E-17	1.37E-17	1.47E-17	1.56E-17	1.56E-17
cd109	8.55E-18	9.82E-18	9.52E-18	1.00E-17	1.05E-17	1.05E-17
in119	2.62E-18	2.63E-18	2.64E-18	2.65E-18	2.67E-18	2.67E-18

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 59
power= 4.000E-03mw, burnup=8.7659E+03mwd, flux= 2.66E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	4.34E-04	4.56E-04	4.78E-04	4.99E-04	5.21E-04	5.21E-04
h 2	1.29E-06	1.36E-06	1.42E-06	1.49E-06	1.55E-06	1.55E-06
h 3	4.36E-11	4.63E-11	4.68E-11	4.72E-11	4.76E-11	4.76E-11
h 4	1.82E-24	1.84E-24	1.86E-24	1.88E-24	1.89E-24	1.89E-24
he 3	8.43E-09	8.80E-09	9.14E-09	9.48E-09	9.81E-09	9.81E-09
he 4	7.19E-05	7.55E-05	7.91E-05	8.28E-05	8.64E-05	8.64E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
na 20	8.64E-06	9.07E-06	9.51E-06	9.94E-06	1.04E-05	1.04E-05
na 21	1.33E-09	1.46E-09	1.59E-09	1.73E-09	1.88E-09	1.88E-09
na 22	5.72E-08	6.00E-08	6.29E-08	6.58E-08	6.87E-08	6.87E-08
na 23	7.16E-15	7.20E-15	7.20E-15	7.19E-15	7.19E-15	7.19E-15
na 22	4.23E-11	4.25E-11	4.25E-11	4.25E-11	4.25E-11	4.25E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.75E-08	2.75E-08
na 24m	4.53E-15	4.53E-15	4.53E-15	4.53E-15	4.53E-15	4.53E-15
na 25	4.04E-24	4.43E-24	4.82E-24	5.23E-24	5.65E-24	5.65E-24
mg 24	6.26E-02	6.54E-02	6.83E-02	7.12E-02	7.40E-02	7.40E-02
mg 25	1.40E-07	1.33E-07	1.67E-07	1.61E-07	1.96E-07	1.96E-07
mg 26	1.29E-06	1.36E-06	1.42E-06	1.49E-06	1.55E-06	1.55E-06

mg 27	2.14E-12	2.15E-12	2.15E-12	2.14E-12	2.14E-12	2.14E-12
mg 28	4.27E-24	4.29E-24	4.29E-24	4.28E-24	4.28E-24	4.28E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.04E-10	2.04E-10	2.04E-10	2.04E-10	2.04E-10	2.04E-10
al 29	3.15E-22	3.46E-22	3.78E-22	4.10E-22	4.45E-22	4.45E-22
al 30	2.97E-32	3.43E-32	3.92E-32	4.45E-32	5.02E-32	5.02E-32
si 28	1.82E-01	1.90E-01	1.99E-01	2.07E-01	2.15E-01	2.15E-01
si 29	1.22E-06	1.34E-06	1.46E-06	1.59E-06	1.72E-06	1.72E-06
si 30	8.62E-12	9.92E-12	1.13E-11	1.29E-11	1.46E-11	1.46E-11
si 31	6.08E-24	6.99E-24	7.98E-24	9.07E-24	1.02E-23	1.02E-23
si 32	9.16E-30	1.06E-29	1.22E-29	1.39E-29	1.58E-29	1.58E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.66E+08	2.66E+08	2.66E+08	2.66E+08	2.66E-07

ass2h: fer-field crit based on h2v 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 60
power= 4.000E-03mw, burnup=8.7459E+03mwd, flux= 2.66E+08n/cm**2-sec

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	2.91E+00	3.15E+00	3.39E+00	3.64E+00	3.89E+00	3.89E+00
pb206	1.34E-03	1.82E-03	1.71E-03	1.92E-03	2.14E-03	2.14E-03
pb207	1.90E-04	2.10E-04	2.31E-04	2.52E-04	2.75E-04	2.75E-04
pb208	3.01E-05	3.32E-05	3.64E-05	3.98E-05	4.33E-05	4.33E-05
pb209	2.96E-11	3.23E-11	3.52E-11	3.82E-11	4.12E-11	4.12E-11
pb210	2.25E-05	2.42E-05	2.60E-05	2.77E-05	2.95E-05	2.95E-05
pb211	7.62E-12	8.01E-12	8.40E-12	8.78E-12	9.17E-12	9.17E-12
pb212	2.09E-11	2.19E-11	2.30E-11	2.40E-11	2.50E-11	2.50E-11
pb214	5.14E-11	5.33E-11	5.93E-11	6.33E-11	6.74E-11	6.74E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	9.40E-05	1.10E-04	1.26E-04	1.43E-04	1.62E-04	1.62E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.39E-08	1.49E-08	1.60E-08	1.71E-08	1.81E-08	1.81E-08
bi211	4.32E-13	4.75E-13	4.98E-13	5.21E-13	5.44E-13	5.44E-13
bi212	1.98E-12	2.08E-12	2.18E-12	2.26E-12	2.37E-12	2.37E-12
bi213	6.91E-12	7.55E-12	8.22E-12	8.91E-12	9.63E-12	9.63E-12
bi214	3.82E-11	4.11E-11	4.40E-11	4.70E-11	5.00E-11	5.00E-11
po210	3.83E-07	4.12E-07	4.41E-07	4.71E-07	5.01E-07	5.01E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.99E-18	5.25E-18	5.50E-18	5.75E-18	6.01E-18	6.01E-18
po212	1.04E-22	1.09E-22	1.14E-22	1.20E-22	1.25E-22	1.25E-22
po213	1.04E-20	1.14E-20	1.24E-20	1.34E-20	1.43E-20	1.43E-20
po214	5.25E-18	5.65E-18	6.06E-18	6.47E-18	6.88E-18	6.88E-18
po215	6.27E-18	6.58E-18	6.90E-18	7.22E-18	7.54E-18	7.54E-18
po216	7.90E-17	8.30E-17	8.69E-17	9.08E-17	9.48E-17	9.48E-17
po218	5.95E-12	6.40E-12	6.86E-12	7.32E-12	7.79E-12	7.79E-12
rn218	3.05E-28	3.21E-28	3.36E-28	3.51E-28	3.66E-28	3.66E-28
rn219	1.39E-14	1.46E-14	1.54E-14	1.61E-14	1.68E-14	1.68E-14
rn220	3.03E-14	3.18E-14	3.33E-14	3.48E-14	3.63E-14	3.63E-14
rn222	1.06E-08	1.16E-08	1.22E-08	1.30E-08	1.38E-08	1.38E-08
ra222	3.31E-25	3.48E-25	3.65E-25	3.81E-25	3.97E-25	3.97E-25
ra223	3.68E-09	3.65E-09	3.83E-09	4.01E-09	4.18E-09	4.18E-09
ra224	1.72E-10	1.81E-10	1.89E-10	1.98E-10	2.07E-10	2.07E-10
ra225	3.23E-09	3.33E-09	3.85E-09	4.17E-09	4.50E-09	4.50E-09
ra226	1.62E-03	1.74E-03	1.86E-03	1.99E-03	2.12E-03	2.12E-03
ra228	1.07E-11	1.13E-11	1.18E-11	1.24E-11	1.29E-11	1.29E-11
ac225	2.38E-09	2.39E-09	2.60E-09	2.82E-09	3.04E-09	3.04E-09
ac227	2.42E-06	2.54E-06	2.66E-06	2.79E-06	2.91E-06	2.91E-06
ac228	1.31E-15	1.38E-15	1.44E-15	1.51E-15	1.58E-15	1.58E-15
th226	1.61E-23	1.70E-23	1.78E-23	1.86E-23	1.94E-23	1.94E-23
th227	5.61E-09	5.90E-09	6.18E-09	6.47E-09	6.75E-09	6.75E-09

th228	3.29E-08	3.45E-08	3.62E-08	3.78E-08	3.95E-08	3.95E-08
th229	6.28E-04	6.87E-04	7.48E-04	8.11E-04	8.76E-04	8.76E-04
th230	1.29E-01	1.36E-01	1.42E-01	1.49E-01	1.55E-01	1.55E-01
th231	3.46E-09	3.49E-09	3.51E-09	3.53E-09	3.55E-09	3.55E-09
th232	2.62E-02	2.75E-02	2.89E-02	2.92E-02	2.15E-02	2.15E-02
th233	2.37E-13	2.49E-13	2.61E-13	2.73E-13	2.85E-13	2.85E-13
th234	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07
pa231	3.44E-03	3.82E-03	4.00E-03	4.19E-03	4.37E-03	4.37E-03
pa232	6.14E-11	6.45E-11	6.75E-11	7.06E-11	7.37E-11	7.37E-11

1 ssz2h: far-field crit based on h2o 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 61
power= 4.000E-03mw, burnup=8.7659E+03mwd, flux= 2.46E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	d	d	d	d	d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.88E-12	8.88E-12	8.88E-12	8.88E-12	8.88E-12	8.88E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.56E-20	1.65E-20	1.72E-20	1.80E-20	1.88E-20	1.88E-20
u231	5.83E-17	5.29E-17	5.55E-17	5.77E-17	6.00E-17	6.00E-17
u232	1.20E-06	1.26E-06	1.32E-06	1.38E-06	1.44E-06	1.44E-06
u233	6.58E-02	6.89E-02	7.21E-02	7.52E-02	7.83E-02	7.83E-02
u234	9.73E+00	9.76E+00	9.80E+00	9.83E+00	9.87E+00	9.87E+00
u235	6.96E+02	6.94E+02	6.92E+02	6.91E+02	6.89E+02	6.89E+02
u236	1.80E+02	1.80E+02	1.80E+02	1.81E+02	1.81E+02	1.81E+02
u237	3.19E-06	3.20E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06
u238	5.63E+04	5.63E+04	5.63E+04	5.63E+04	5.63E+04	5.63E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	1.21E-37	1.84E-37	2.74E-37	4.00E-37	5.75E-37	5.75E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.72E-12	8.76E-12	8.75E-12	8.74E-12	8.73E-12	8.73E-12
np236m	2.07E-12	2.08E-12	2.08E-12	2.08E-12	2.07E-12	2.07E-12
np236	9.81E-07	1.03E-06	1.08E-06	1.12E-06	1.17E-06	1.17E-06
np237	4.18E+01	4.17E+01	4.17E+01	4.17E+01	4.17E+01	4.17E+01
np238	1.52E-06	1.52E-06	1.52E-06	1.52E-06	1.52E-06	1.52E-06
np239	4.58E-05	4.59E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05
np240m	1.03E-39	1.57E-39	2.34E-39	3.42E-39	4.91E-39	4.91E-39
np240	9.18E-15	9.19E-15	9.18E-15	9.17E-15	9.16E-15	9.16E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	4.16E-13	4.24E-13	4.34E-13	4.41E-13	4.48E-13	4.48E-13
pu238	2.31E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02
pu239	2.17E+01	2.26E+01	2.35E+01	2.44E+01	2.53E+01	2.53E+01
pu240	4.50E-01	4.88E-01	5.28E-01	5.68E-01	6.09E-01	6.09E-01
pu241	1.85E-04	2.01E-04	2.17E-04	2.33E-04	2.50E-04	2.50E-04
pu242	2.16E-05	2.50E-05	2.87E-05	3.28E-05	3.72E-05	3.72E-05
pu243	4.55E-14	5.29E-14	6.07E-14	6.93E-14	7.84E-14	7.84E-14
pu244	6.01E-27	9.14E-27	1.36E-26	1.99E-26	2.87E-26	2.87E-26
pu245	2.41E-37	3.47E-37	5.47E-37	7.99E-37	1.15E-36	1.15E-36
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.22E-18	1.35E-18	1.47E-18	1.60E-18	1.73E-18	1.73E-18
am240	4.39E-16	6.16E-16	6.73E-16	7.30E-16	7.89E-16	7.89E-16
am241	4.38E-03	4.81E-03	5.25E-03	5.71E-03	6.17E-03	6.17E-03
am242m	1.04E-06	2.26E-06	2.46E-06	2.68E-06	2.91E-06	2.91E-06
am242	1.76E-10	1.93E-10	2.11E-10	2.29E-10	2.48E-10	2.48E-10
am243	1.39E-07	1.65E-07	2.04E-07	2.46E-07	2.61E-07	2.61E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.06E-15	1.25E-15	1.47E-15	1.71E-15	1.98E-15	1.98E-15
am245	5.20E-38	7.87E-38	1.17E-37	1.70E-37	2.43E-37	2.43E-37

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     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.04E-20  1.15E-20  1.25E-20  1.36E-20  1.47E-20  1.47E-20
     cm242   3.56E-08  3.90E-08  4.26E-08  4.63E-08  5.01E-08  5.01E-08
     cm243   2.65E-17  2.92E-17  3.21E-17  3.50E-17  3.80E-17  3.80E-17
     cm244   1.66E-11  1.97E-11  2.31E-11  2.69E-11  3.11E-11  3.11E-11
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   62
       power= 4.000E-03mw, burnup=8.7659E+03mwd, flux= 2.66E+08n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.73E-14  2.15E-14  2.64E-14  3.22E-14  3.88E-14  3.88E-14
     cm246   2.00E-17  1.05E-16  1.35E-16  1.72E-16  2.15E-16  2.15E-16
     cm247   4.73E-21  9.24E-21  1.25E-20  1.66E-20  2.18E-20  2.18E-20
     cm248   5.54E-24  8.00E-24  1.14E-23  1.58E-23  2.18E-23  2.18E-23
     cm249   1.74E-34  2.51E-34  3.56E-34  4.97E-34  6.82E-34  6.82E-34
     cm250   4.03E-39  6.12E-39  9.10E-39  1.33E-38  1.91E-38  1.91E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.66E+08  2.66E+08  2.66E+08  2.66E+08  2.66E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
ilibrary information...

          cross-section data taken from position number  7 of library on unit 33.

          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ************************************************************************
          *                                                                      *
          *            prelim lwr origen-s binary working library--id = 1143     *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                      *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                      *
          *                   fission product yields are from endf/b-v           *
          *                                                                      *
          *              photon libraries use an 18-energy-group structure       *
          *             the photon data are from the master photon data base,    *
          *              produced to include bremsstrahlung from uo2 matrix      *
          *                                                                      *
```

```
         *        see information above this box (if present) for later updates        *
         *                                                                              *
         ********************************************************************************
         *                                                                              *
         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/28/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0        ********************************************************************************
1    sas2h: fer-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   63
        power=    .00mw, burnup=  10227.mwd, flux= 2.65E+08n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial     ******* d     ******* d     ******* d     ******* d     ******* d
     productions   1.167762E+06  1.168719E+06  1.169665E+06  1.170540E+06  1.171404E+06  1.171404E+06
     absorptions   9.612581E+05  9.620653E+05  9.628549E+05  9.636281E+05  9.643840E+05  9.643840E+05
     k infinity    1.214826E+00  1.214802E+00  1.214768E+00  1.214722E+00  1.214666E+00  1.214666E+00
0                   initial     ******* d     ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions   9.489255E+05  9.495816E+05  9.502214E+05  9.508454E+05  9.514534E+05  9.514534E+05
     non-actinide
     abs. fracs.   1.282966E-02  1.297593E-02  1.312083E-02  1.326519E-02  1.340818E-02  1.340818E-02
1    sas2h: fer-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   64
0                                 fraction of total absorption rate
        power=    .00mw, burnup=  10227.mwd, flux= 2.65E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d
```

sm149	5.34E-03	5.34E-03	5.35E-03	5.35E-03	5.35E-03	5.35E-03
eu151	9.99E-04	1.03E-03	1.06E-03	1.09E-03	1.12E-03	1.12E-03
nd143	8.35E-04	8.68E-04	9.01E-04	9.34E-04	9.67E-04	9.67E-04
rh103	4.14E-04	4.31E-04	4.49E-04	4.66E-04	4.83E-04	4.83E-04
xe131	2.74E-04	2.85E-04	2.96E-04	3.08E-04	3.19E-04	3.19E-04
cs133	2.12E-04	2.20E-04	2.29E-04	2.38E-04	2.46E-04	2.46E-04
gd155	1.99E-04	2.02E-04	2.04E-04	2.06E-04	2.08E-04	2.08E-04
sm147	1.56E-04	1.62E-04	1.69E-04	1.75E-04	1.81E-04	1.81E-04
tc 99	1.55E-04	1.61E-04	1.67E-04	1.73E-04	1.79E-04	1.79E-04
nd145	1.19E-04	1.24E-04	1.29E-04	1.34E-04	1.38E-04	1.38E-04
cd113	9.61E-05	9.68E-05	9.75E-05	9.82E-05	9.88E-05	9.88E-05
sm152	8.10E-05	8.49E-05	8.88E-05	9.27E-05	9.66E-05	9.66E-05
mo 95	8.30E-05	8.63E-05	8.97E-05	9.30E-05	9.63E-05	9.63E-05
sm150	5.75E-05	6.02E-05	6.28E-05	6.55E-05	6.82E-05	6.82E-05
gd157	5.69E-05	5.77E-05	5.85E-05	5.93E-05	6.01E-05	6.01E-05
kr 83	5.07E-05	5.27E-05	5.47E-05	5.67E-05	5.87E-05	5.87E-05
cs135	4.80E-05	4.99E-05	5.19E-05	5.38E-05	5.58E-05	5.58E-05
ru101	3.75E-05	3.90E-05	4.06E-05	4.21E-05	4.36E-05	4.36E-05
sm151	4.15E-05	4.16E-05	4.17E-05	4.18E-05	4.19E-05	4.19E-05
pr141	3.53E-05	3.68E-05	3.82E-05	3.96E-05	4.10E-05	4.10E-05
eu153	3.46E-05	3.61E-05	3.76E-05	3.92E-05	4.07E-05	4.07E-05
la139	2.88E-05	3.00E-05	3.12E-05	3.23E-05	3.35E-05	3.35E-05
pd105	1.42E-05	1.48E-05	1.55E-05	1.62E-05	1.68E-05	1.68E-05
ba137	1.37E-05	1.43E-05	1.49E-05	1.54E-05	1.60E-05	1.60E-05
ag109	1.22E-05	1.29E-05	1.37E-05	1.45E-05	1.54E-05	1.54E-05
zr 93	1.17E-05	1.21E-05	1.26E-05	1.31E-05	1.35E-05	1.35E-05
i129	9.28E-06	9.67E-06	1.01E-05	1.05E-05	1.08E-05	1.08E-05
nd144	8.71E-06	9.07E-06	9.43E-06	9.78E-06	1.01E-05	1.01E-05

mo 97	6.56E-06	6.83E-06	7.09E-06	7.36E-06	7.62E-06	7.62E-06
gd152	3.60E-06	3.88E-06	4.17E-06	4.47E-06	4.78E-06	4.78E-06
pd108	3.05E-06	3.23E-06	3.42E-06	3.60E-06	3.79E-06	3.79E-06
zr 91	3.03E-06	3.15E-06	3.27E-06	3.39E-06	3.51E-06	3.51E-06
y 89	2.90E-06	3.01E-06	3.13E-06	3.24E-06	3.35E-06	3.35E-06
ru102	2.72E-06	2.83E-06	2.94E-06	3.05E-06	3.16E-06	3.16E-06
ce142	2.39E-06	2.49E-06	2.58E-06	2.68E-06	2.78E-06	2.78E-06
nd148	2.32E-06	2.41E-06	2.51E-06	2.60E-06	2.70E-06	2.70E-06
nd146	1.94E-06	2.02E-06	2.09E-06	2.17E-06	2.25E-06	2.25E-06
xe135	2.25E-06	2.25E-06	2.25E-06	2.25E-06	2.25E-06	2.25E-06
in115	1.71E-06	1.78E-06	1.86E-06	1.93E-06	2.01E-06	2.01E-06
ba138	1.65E-06	1.72E-06	1.78E-06	1.85E-06	1.92E-06	1.92E-06
pd107	1.55E-06	1.64E-06	1.73E-06	1.82E-06	1.91E-06	1.91E-06
ce140	1.55E-06	1.61E-06	1.67E-06	1.73E-06	1.80E-06	1.80E-06
xe132	1.42E-06	1.48E-06	1.54E-06	1.60E-06	1.66E-06	1.66E-06
mo 98	9.74E-07	1.01E-06	1.05E-06	1.09E-06	1.13E-06	1.13E-06
mo100	9.40E-07	9.78E-07	1.02E-06	1.06E-06	1.09E-06	1.09E-06
xe134	9.16E-07	9.53E-07	9.90E-07	1.03E-06	1.06E-06	1.06E-06
zr 92	7.31E-07	7.61E-07	7.90E-07	8.19E-07	8.48E-07	8.48E-07
i127	6.73E-07	7.03E-07	7.33E-07	7.63E-07	7.93E-07	7.93E-07
ru104	6.20E-07	6.47E-07	6.74E-07	7.01E-07	7.29E-07	7.29E-07

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 65
0 fraction of total absorption rate
0 powerw .00mw, burnup= 10227.mwd, flux= 2.65E+08n/cm**2-sec

	initial d	d	d	d	d	d
zr 96	5.91E-07	6.15E-07	6.39E-07	6.63E-07	6.87E-07	6.87E-07
nd150	5.24E-07	5.46E-07	5.68E-07	5.89E-07	6.11E-07	6.11E-07
xe136	4.97E-07	5.17E-07	5.37E-07	5.58E-07	5.78E-07	5.78E-07
br 81	3.73E-07	3.88E-07	4.03E-07	4.18E-07	4.33E-07	4.33E-07
nd111	3.56E-07	3.75E-07	3.94E-07	4.13E-07	4.33E-07	4.33E-07
rb 85	3.58E-07	3.72E-07	3.86E-07	4.01E-07	4.15E-07	4.15E-07
zr 94	3.15E-07	3.27E-07	3.40E-07	3.53E-07	3.65E-07	3.65E-07
zr 90	2.86E-07	2.95E-07	3.07E-07	3.18E-07	3.29E-07	3.29E-07
ru 99	2.40E-07	2.60E-07	2.81E-07	3.03E-07	3.25E-07	3.25E-07
eu152	2.57E-07	2.65E-07	2.73E-07	2.81E-07	2.88E-07	2.88E-07
sm154	2.39E-07	2.50E-07	2.60E-07	2.71E-07	2.81E-07	2.81E-07
te130	2.28E-07	2.37E-07	2.46E-07	2.56E-07	2.65E-07	2.65E-07
pm147	2.43E-07	2.62E-07	2.62E-07	2.62E-07	2.61E-07	2.61E-07
rb 87	2.07E-07	2.15E-07	2.23E-07	2.31E-07	2.39E-07	2.39E-07
eu155	1.94E-07	1.95E-07	1.96E-07	1.97E-07	1.99E-07	1.99E-07
gd154	1.35E-07	1.47E-07	1.59E-07	1.71E-07	1.84E-07	1.84E-07
se 77	1.48E-07	1.54E-07	1.60E-07	1.66E-07	1.72E-07	1.72E-07
pd106	1.40E-07	1.47E-07	1.54E-07	1.61E-07	1.69E-07	1.69E-07
gd156	1.19E-07	1.24E-07	1.33E-07	1.39E-07	1.44E-07	1.44E-07
kr 84	9.87E-08	1.03E-07	1.07E-07	1.11E-07	1.14E-07	1.14E-07
dy161	7.38E-08	7.84E-08	8.30E-08	8.78E-08	9.27E-08	9.27E-08
sb121	7.82E-08	8.16E-08	8.50E-08	8.84E-08	9.18E-08	9.18E-08
se 79	7.40E-08	7.91E-08	8.22E-08	8.53E-08	8.83E-08	8.83E-08
sb123	6.33E-08	6.60E-08	6.87E-08	7.14E-08	7.42E-08	7.42E-08
kr 86	5.40E-08	5.62E-08	5.83E-08	6.05E-08	6.26E-08	6.26E-08
te128	5.16E-08	5.38E-08	5.59E-08	5.81E-08	6.03E-08	6.03E-08
ru100	4.92E-08	5.44E-08	5.67E-08	5.89E-08	6.17E-08	6.17E-08
se 80	3.55E-08	3.69E-08	3.83E-08	3.98E-08	4.12E-08	4.12E-08
tb159	3.37E-08	3.55E-08	3.74E-08	3.93E-08	4.12E-08	4.12E-08
te125	3.44E-08	3.59E-08	3.75E-08	3.90E-08	4.05E-08	4.05E-08
nd142	2.87E-08	3.11E-08	3.46E-08	3.62E-08	3.89E-08	3.89E-08
ba134	2.80E-08	3.03E-08	3.28E-08	3.53E-08	3.72E-08	3.72E-08
sm148	2.56E-08	2.78E-08	3.00E-08	3.23E-08	3.47E-08	3.47E-08
gd158	2.65E-08	2.79E-08	2.93E-08	3.08E-08	3.23E-08	3.23E-08

ba135	2.31E-08	2.51E-08	2.71E-08	2.92E-08	3.14E-08	3.14E-08
cd112	2.53E-08	2.65E-08	2.78E-08	2.90E-08	3.03E-08	3.03E-08
pd104	1.97E-08	2.14E-08	2.31E-08	2.49E-08	2.68E-08	2.68E-08
li 6	1.94E-08	2.02E-08	2.09E-08	2.17E-08	2.24E-08	2.24E-08
sn117	1.84E-08	1.92E-08	2.01E-08	2.09E-08	2.18E-08	2.18E-08
dy164	1.65E-08	1.76E-08	1.87E-08	1.99E-08	2.11E-08	2.11E-08
eu154	1.73E-08	1.81E-08	1.89E-08	1.96E-08	2.04E-08	2.04E-08
dy162	1.50E-08	1.61E-08	1.72E-08	1.83E-08	1.94E-08	1.94E-08
cd114	1.48E-08	1.56E-08	1.63E-08	1.71E-08	1.78E-08	1.78E-08
sn119	1.42E-08	1.48E-08	1.54E-08	1.61E-08	1.67E-08	1.67E-08
sr 90	1.38E-08	1.37E-08	1.37E-08	1.37E-08	1.36E-08	1.36E-08
sn115	1.30E-08	1.36E-08	1.41E-08	1.47E-08	1.53E-08	1.53E-08
pd110	1.19E-08	1.25E-08	1.32E-08	1.39E-08	1.46E-08	1.46E-08
sr 88	9.94E-09	1.03E-08	1.07E-08	1.11E-08	1.15E-08	1.15E-08
rh105	1.04E-08	1.04E-08	1.05E-08	1.06E-08	1.06E-08	1.06E-08

1 eas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 66
0 fraction of total absorption rate
power .00mw, burnup= 10227.mwd, flux= 2.63E+08n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

mo 96	6.71E-09	7.25E-09	7.81E-09	8.40E-09	9.00E-09	9.00E-09
se 82	6.80E-09	7.08E-09	7.35E-09	7.62E-09	7.89E-09	7.89E-09
cd110	5.29E-09	5.85E-09	6.44E-09	7.06E-09	7.73E-09	7.73E-09
sn124	6.37E-09	6.66E-09	6.95E-09	7.24E-09	7.54E-09	7.54E-09
se 78	5.32E-09	5.53E-09	5.75E-09	5.97E-09	6.19E-09	6.19E-09
sn124	4.61E-09	4.81E-09	5.02E-09	5.22E-09	5.42E-09	5.42E-09
ba136	4.10E-09	4.37E-09	4.64E-09	4.92E-09	5.21E-09	5.21E-09
nb 93	3.68E-09	3.99E-09	4.31E-09	4.64E-09	4.99E-09	4.99E-09
dy163	3.80E-09	4.06E-09	4.34E-09	4.62E-09	4.91E-09	4.91E-09
xe130	3.60E-09	3.87E-09	4.16E-09	4.45E-09	4.76E-09	4.76E-09
kr 82	3.34E-09	3.57E-09	3.81E-09	4.05E-09	4.30E-09	4.30E-09
cs137	3.67E-09	3.67E-09	3.67E-09	3.66E-09	3.66E-09	3.66E-09
as 75	3.14E-09	3.27E-09	3.39E-09	3.52E-09	3.65E-09	3.65E-09
in113	2.59E-09	2.70E-09	2.82E-09	2.93E-09	3.05E-09	3.05E-09
br 79	1.87E-09	2.03E-09	2.19E-09	2.36E-09	2.54E-09	2.54E-09
pr143	2.53E-09	2.53E-09	2.52E-09	2.52E-09	2.52E-09	2.52E-09
sn118	1.88E-09	1.96E-09	2.04E-09	2.12E-09	2.20E-09	2.20E-09
cs107	1.45E-09	1.59E-09	1.74E-09	1.90E-09	2.06E-09	2.06E-09
xe133	1.94E-09	1.94E-09	1.94E-09	1.94E-09	1.94E-09	1.94E-09
sn122	1.57E-09	1.64E-09	1.71E-09	1.77E-09	1.84E-09	1.84E-09
cd114	1.57E-09	1.64E-09	1.71E-09	1.77E-09	1.84E-09	1.84E-09
cs134	1.55E-09	1.61E-09	1.68E-09	1.74E-09	1.80E-09	1.80E-09
ce141	1.53E-09	1.52E-09	1.52E-09	1.52E-09	1.52E-09	1.52E-09
xe129	1.09E-09	1.18E-09	1.28E-09	1.38E-09	1.48E-09	1.48E-09
sn120	1.17E-09	1.22E-09	1.27E-09	1.32E-09	1.37E-09	1.37E-09
te126	8.38E-10	9.04E-10	9.73E-10	1.04E-09	1.12E-09	1.12E-09
ge 73	8.81E-10	9.18E-10	9.55E-10	9.92E-10	1.03E-09	1.03E-09
pm149	9.48E-10	9.48E-10	9.47E-10	9.47E-10	9.46E-10	9.46E-10
nd147	9.01E-10	9.00E-10	8.99E-10	8.98E-10	8.97E-10	8.97E-10
ce144	5.48E-10	5.67E-10	5.46E-10	5.64E-10	5.65E-10	5.65E-10
kr 83	5.32E-10	5.31E-10	5.30E-10	5.29E-10	5.28E-10	5.28E-10
pd108	4.63E-10	4.64E-10	4.64E-10	4.48E-10	4.50E-10	4.50E-10
ho165	3.05E-10	3.28E-10	3.52E-10	3.77E-10	4.02E-10	4.02E-10
ru103	2.75E-10	2.76E-10	2.76E-10	2.77E-10	2.78E-10	2.78E-10
ge 76	3.06E-10	3.19E-10	3.31E-10	3.44E-10	3.56E-10	3.56E-10
dy160	1.76E-10	1.93E-10	2.10E-10	2.28E-10	2.47E-10	2.47E-10
sr 95	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.57E-10	1.57E-10
xe128	1.10E-10	1.19E-10	1.29E-10	1.39E-10	1.50E-10	1.50E-10
nb 95	1.46E-10	1.45E-10	1.45E-10	1.45E-10	1.45E-10	1.45E-10
y 91	1.33E-10	1.32E-10	1.32E-10	1.32E-10	1.31E-10	1.31E-10

pm151	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10
sr 86	5.97E-11	6.45E-11	6.90E-11	7.38E-11	7.88E-11	7.88E-11
te124	6.28E-11	6.45E-11	7.02E-11	7.51E-11	7.81E-11	7.81E-11
sn116	4.25E-11	4.41E-11	4.99E-11	5.38E-11	5.79E-11	5.79E-11
eu156	4.90E-11	4.96E-11	5.01E-11	5.05E-11	5.10E-11	5.10E-11
ba140	4.53E-11	4.53E-11	4.52E-11	4.52E-11	4.51E-11	4.51E-11
sr 87	3.82E-11	3.98E-11	4.15E-11	4.32E-11	4.49E-11	4.49E-11
sm153	4.34E-11	4.37E-11	4.39E-11	4.41E-11	4.44E-11	4.44E-11
ru106	3.89E-11	3.94E-11	3.98E-11	4.03E-11	4.07E-11	4.07E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 67
0 fraction of total absorption rate
0 powers .00mw, burnup= 10227.mwd, flux= 2.63E+08n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
nb 94	2.44E-11	2.57E-11	2.70E-11	2.83E-11	2.96E-11	2.96E-11
sr 89	2.82E-11	2.82E-11	2.81E-11	2.80E-11	2.79E-11	2.79E-11
se 76	1.89E-11	2.02E-11	2.15E-11	2.29E-11	2.43E-11	2.43E-11
te122	1.76E-11	1.91E-11	2.07E-11	2.23E-11	2.40E-11	2.40E-11
er164	1.66E-11	1.78E-11	1.91E-11	2.05E-11	2.18E-11	2.18E-11
kr 87	2.11E-11	2.11E-11	2.10E-11	2.10E-11	2.09E-11	2.09E-11
se 74	1.74E-11	1.83E-11	1.91E-11	1.98E-11	2.05E-11	2.05E-11
sb125	1.72E-11	1.73E-11	1.74E-11	1.74E-11	1.75E-11	1.75E-11
ce143	1.66E-11	1.66E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11
se 72	1.26E-11	1.32E-11	1.38E-11	1.43E-11	1.49E-11	1.49E-11
y 90	1.50E-11	1.49E-11	1.49E-11	1.49E-11	1.48E-11	1.48E-11
la140	1.47E-11	1.47E-11	1.47E-11	1.47E-11	1.47E-11	1.47E-11
mo 99	1.27E-11	1.27E-11	1.27E-11	1.27E-11	1.27E-11	1.27E-11
pm148m	9.61E-12	9.62E-12	9.63E-12	9.63E-12	9.64E-12	9.64E-12
te127m	8.63E-12	8.67E-12	8.71E-12	8.75E-12	8.79E-12	8.79E-12
i131	6.70E-12	6.70E-12	6.69E-12	6.69E-12	6.69E-12	6.69E-12
kr 85	1.66E-12	1.82E-12	1.98E-12	2.15E-12	2.33E-12	2.33E-12
te129m	1.86E-12	1.86E-12	1.86E-12	1.87E-12	1.87E-12	1.87E-12
er167	7.92E-13	8.40E-13	9.74E-13	1.07E-12	1.18E-12	1.18E-12
te123	4.16E-13	4.63E-13	5.13E-13	5.67E-13	6.25E-13	6.25E-13
cs111	5.86E-13	5.95E-13	6.03E-13	6.12E-13	6.21E-13	6.21E-13
eu157	4.75E-13	4.81E-13	4.87E-13	4.93E-13	4.98E-13	4.98E-13
pm148	3.64E-13	3.64E-13	3.64E-13	3.64E-13	3.64E-13	3.64E-13
cd115m	2.65E-13	2.66E-13	2.67E-13	2.68E-13	2.69E-13	2.69E-13
cs136	2.07E-13	2.12E-13	2.18E-13	2.24E-13	2.29E-13	2.29E-13
tb160	8.54E-14	8.99E-14	9.43E-14	9.89E-14	1.03E-13	1.03E-13
cd108	5.40E-14	6.12E-14	6.91E-14	7.78E-14	8.71E-14	8.71E-14
be 9	3.93E-14	4.09E-14	4.25E-14	4.41E-14	4.57E-14	4.57E-14
pr142	3.94E-14	4.10E-14	4.25E-14	4.41E-14	4.57E-14	4.57E-14
ru105	3.70E-14	3.73E-14	3.75E-14	3.78E-14	3.80E-14	3.80E-14
sn125	3.18E-14	3.19E-14	3.19E-14	3.20E-14	3.21E-14	3.21E-14
tl 7	1.56E-14	1.62E-14	1.69E-14	1.75E-14	1.81E-14	1.81E-14
sb126	1.34E-14	1.38E-14	1.43E-14	1.47E-14	1.51E-14	1.51E-14
sn114	1.06E-14	1.15E-14	1.25E-14	1.35E-14	1.45E-14	1.45E-14
rb 88	1.19E-14	1.18E-14	1.18E-14	1.18E-14	1.18E-14	1.18E-14
sn123	1.05E-14	1.05E-14	1.05E-14	1.05E-14	1.05E-14	1.05E-14
i135	9.78E-15	9.77E-15	9.76E-15	9.75E-15	9.74E-15	9.74E-15
te132	9.36E-15	9.35E-15	9.35E-15	9.34E-15	9.34E-15	9.34E-15
i130	7.96E-15	8.25E-15	8.54E-15	8.82E-15	9.11E-15	9.11E-15
sb124	5.10E-15	5.23E-15	5.35E-15	5.47E-15	5.59E-15	5.59E-15
te134	5.50E-15	5.49E-15	5.48E-15	5.47E-15	5.46E-15	5.46E-15
rb 86	2.52E-15	2.62E-15	2.70E-15	2.79E-15	2.88E-15	2.88E-15
in117m	2.54E-15	2.55E-15	2.57E-15	2.58E-15	2.60E-15	2.60E-15
dy165	1.84E-15	1.91E-15	1.98E-15	2.05E-15	2.12E-15	2.12E-15
in117	7.58E-16	7.63E-16	7.68E-16	7.73E-16	7.78E-16	7.78E-16
cs134m	2.90E-16	3.02E-16	3.14E-16	3.25E-16	3.37E-16	3.37E-16

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     cd118      1.33E-16  1.34E-16  1.34E-16  1.34E-16  1.35E-16  1.35E-16
     ce 75      8.35E-17  8.34E-17  8.33E-17  8.33E-17  8.32E-17  8.32E-17
     in119m     3.26E-17  3.27E-17  3.28E-17  3.29E-17  3.30E-17  3.30E-17
1    sas2h: far-field crit based on blw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  68
0                                  fraction of total absorption rate
        power=     .00mw, burnup=  10227.mwd, flux= 2.65E+08n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d

     ag110      1.56E-17  1.66E-17  1.77E-17  1.87E-17  1.97E-17  1.97E-17
     cd109      1.05E-17  1.11E-17  1.16E-17  1.22E-17  1.28E-17  1.28E-17
     in119      2.66E-18  2.67E-18  2.68E-18  2.69E-18  2.71E-18  2.71E-18
1
     sas2h: far-field crit based on blw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  69
       power= 4.000E-03mw, burnup=1.0227E+04mwd, flux= 2.65E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
      h  1    5.21E-04  5.43E-04  5.65E-04  5.86E-04  6.08E-04  6.08E-04
      h  2    1.55E-06  1.62E-06  1.68E-06  1.75E-06  1.81E-06  1.81E-06
      h  3    4.76E-11  4.83E-11  4.87E-11  4.91E-11  4.96E-11  4.96E-11
      h  4    1.89E-34  1.92E-34  1.93E-34  1.95E-34  1.97E-34  1.97E-34
     he  3    9.81E-09  1.01E-08  1.05E-08  1.08E-08  1.11E-08  1.11E-08
     he  4    8.64E-05  9.00E-05  9.36E-05  9.72E-05  1.01E-04  1.01E-04
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    1.04E-05  1.08E-05  1.12E-05  1.17E-05  1.21E-05  1.21E-05
     ne 21    1.88E-09  2.03E-09  2.19E-09  2.35E-09  2.52E-09  2.52E-09
     ne 22    6.87E-08  7.16E-08  7.44E-08  7.73E-08  8.02E-08  8.02E-08
     na 23    7.19E-15  7.25E-15  7.22E-15  7.22E-15  7.22E-15  7.22E-15
     na 22    4.25E-11  4.27E-11  4.27E-11  4.27E-11  4.27E-11  4.27E-11
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    2.75E-08  2.76E-08  2.76E-08  2.76E-08  2.76E-08  2.76E-08
     na 24m   4.53E-15  4.53E-15  4.53E-15  4.53E-15  4.53E-15  4.53E-15
     na 25    5.45E-24  6.11E-24  6.57E-24  7.04E-24  7.53E-24  7.53E-24
     mg 24    7.40E-02  7.69E-02  7.97E-02  8.26E-02  8.54E-02  8.54E-02
     mg 25    1.96E-07  2.11E-07  2.27E-07  2.44E-07  2.61E-07  2.61E-07
     mg 26    1.55E-06  1.62E-06  1.68E-06  1.75E-06  1.81E-06  1.81E-06
     mg 27    2.14E-12  2.15E-12  2.15E-12  2.15E-12  2.15E-12  2.15E-12
     mg 28    4.28E-24  4.29E-24  4.29E-24  4.29E-24  4.28E-24  4.28E-24
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    2.04E-10  2.05E-10  2.04E-10  2.04E-10  2.04E-10  2.04E-10
     al 29    4.45E-22  4.62E-22  4.79E-22  4.97E-22  5.96E-22  5.96E-22
     al 30    5.02E-32  5.67E-32  6.34E-32  7.07E-32  7.84E-32  7.84E-32
     al 28    2.15E-01  2.24E-01  2.32E-01  2.40E-01  2.49E-01  2.49E-01
     al 29    1.72E-06  1.66E-06  2.00E-06  2.15E-06  2.31E-06  2.31E-06
     al 30    1.46E-11  1.44E-11  1.83E-11  2.04E-11  2.27E-11  2.27E-11
     al 31    1.02E-23  1.15E-23  1.29E-23  1.44E-23  1.59E-23  1.59E-23
     al 32    1.58E-29  1.78E-29  2.00E-29  2.23E-29  2.48E-29  2.48E-29
   totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                 2.65E+08  2.65E+08  2.65E+08  2.65E+08  2.65E+07
1
     sas2h: far-field crit based on blw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  70
       power= 4.000E-03mw, burnup=1.0227E+04mwd, flux= 2.65E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
     he  4    5.89E+00  6.16E+00  6.43E+00  6.71E+00  5.00E+00  5.00E+00
     pb206    1.44E-03  1.48E-03  1.63E-03  1.89E-03  1.17E-03  1.17E-03
     pb207    1.75E-04  1.99E-04  2.23E-04  2.49E-04  1.75E-04  1.75E-04
     pb208    4.23E-05  4.70E-05  5.08E-05  5.48E-05  5.89E-05  5.89E-05
     pb209    4.12E-11  4.44E-11  4.76E-11  5.09E-11  5.43E-11  5.43E-11
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pb210	2.95E-05	3.13E-05	3.31E-05	3.49E-05	3.67E-05	3.67E-05
pb211	9.17E-12	9.56E-12	9.95E-12	1.03E-11	1.07E-11	1.07E-11
pb212	2.50E-11	2.61E-11	2.71E-11	2.82E-11	2.92E-11	2.92E-11
pb214	6.74E-11	7.14E-11	7.56E-11	7.97E-11	8.39E-11	8.39E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.62E-04	1.82E-04	2.03E-04	2.26E-04	2.51E-04	2.51E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.81E-08	1.92E-08	2.04E-08	2.15E-08	2.26E-08	2.26E-08
bi211	5.44E-13	5.67E-13	5.90E-13	6.13E-13	6.36E-13	6.36E-13
bi212	2.37E-12	2.47E-12	2.57E-12	2.67E-12	2.77E-12	2.77E-12
bi213	9.63E-12	1.04E-11	1.11E-11	1.19E-11	1.27E-11	1.27E-11
bi214	5.00E-11	5.30E-11	5.61E-11	5.92E-11	6.23E-11	6.23E-11
po210	5.01E-07	5.31E-07	5.62E-07	5.93E-07	6.24E-07	6.24E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.01E-18	4.26E-18	4.52E-18	4.77E-18	7.03E-18	7.03E-18
po212	1.25E-22	1.30E-22	1.35E-22	1.40E-22	1.46E-22	1.46E-22
po213	1.45E-20	1.54E-20	1.67E-20	1.79E-20	1.91E-20	1.91E-20
po214	6.88E-18	7.30E-18	7.72E-18	8.14E-18	8.57E-18	8.57E-18
po215	7.84E-18	7.86E-18	8.17E-18	8.49E-18	8.81E-18	8.81E-18
po216	9.48E-17	9.87E-17	1.03E-16	1.07E-16	1.11E-16	1.11E-16
po218	7.79E-12	8.27E-12	8.74E-12	9.22E-12	9.71E-12	9.71E-12
rn218	3.66E-28	3.82E-28	3.97E-28	4.12E-28	4.28E-28	4.28E-28
rn219	1.68E-14	1.75E-14	1.82E-14	1.89E-14	1.96E-14	1.96E-14
rn220	3.63E-14	3.79E-14	3.94E-14	4.09E-14	4.24E-14	4.24E-14
rn222	1.38E-08	1.47E-08	1.55E-08	1.64E-08	1.72E-08	1.72E-08
ra222	3.97E-25	4.15E-25	4.31E-25	4.48E-25	6.64E-25	6.64E-25
ra223	4.18E-09	4.36E-09	4.54E-09	4.71E-09	4.89E-09	4.89E-09
ra224	2.07E-10	2.15E-10	2.24E-10	2.33E-10	2.41E-10	2.41E-10
ra225	4.50E-09	4.85E-09	5.20E-09	5.56E-09	5.94E-09	5.94E-09
ra226	2.12E-03	2.24E-03	2.37E-03	2.50E-03	2.64E-03	2.64E-03
ra228	1.29E-11	1.35E-11	1.40E-11	1.46E-11	1.51E-11	1.51E-11
ac225	3.04E-09	3.27E-09	3.51E-09	3.76E-09	4.01E-09	4.01E-09
ac227	2.91E-06	3.03E-06	3.16E-06	3.28E-06	3.40E-06	3.40E-06
ac228	1.58E-15	1.66E-15	1.71E-15	1.78E-15	1.84E-15	1.84E-15
th226	1.94E-23	2.02E-23	2.10E-23	2.18E-23	2.26E-23	2.26E-23
th227	6.75E-09	7.04E-09	7.32E-09	7.61E-09	7.90E-09	7.90E-09
th228	3.95E-08	4.11E-08	4.28E-08	4.44E-08	4.61E-08	4.61E-08
th229	8.76E-04	9.43E-04	1.01E-03	1.08E-03	1.15E-03	1.15E-03
th230	1.53E-01	1.62E-01	1.68E-01	1.75E-01	1.82E-01	1.82E-01
th231	3.55E-09	3.58E-09	3.60E-09	3.62E-09	3.65E-09	3.65E-09
th232	3.15E-02	3.29E-02	3.42E-02	3.56E-02	3.69E-02	3.69E-02
th233	2.03E-13	2.07E-13	2.09E-13	2.21E-13	2.33E-13	2.33E-13
th234	5.37E-07	5.37E-07	5.37E-07	5.36E-07	5.36E-07	5.36E-07
pa231	4.37E-03	4.56E-03	4.74E-03	4.93E-03	5.11E-03	5.11E-03
pa232	7.37E-11	7.68E-11	7.99E-11	8.29E-11	8.60E-11	8.60E-11

1

sas2h: far-field crit based on blw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 71

power= 4.000E-03mw, burnup=1.0227E+04mwd, flux= 2.65E+08n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.88E-20	1.96E-20	2.04E-20	2.12E-20	2.20E-20	2.20E-20
u231	6.00E-17	6.26E-17	6.49E-17	6.73E-17	6.96E-17	6.96E-17
u232	1.44E-06	1.50E-06	1.56E-06	1.62E-06	1.68E-06	1.68E-06
u233	7.83E-02	8.14E-02	8.45E-02	8.76E-02	9.07E-02	9.07E-02
u234	9.87E+00	9.90E+00	9.93E+00	9.97E+00	1.00E+01	1.00E+01

u235	6.89E+02	6.88E+02	6.86E+02	6.85E+02	6.83E+02	6.83E+02
u236	1.81E+02	1.81E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02
u237	3.21E-06	3.22E-06	3.22E-06	3.23E-06	3.23E-06	3.23E-06
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	5.75E-37	8.14E-37	1.14E-36	1.34E-36	2.13E-36	2.13E-36
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.73E-12	8.77E-12	8.76E-12	8.76E-12	8.75E-12	8.75E-12
np236m	2.07E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12
np236	1.17E-06	1.22E-06	1.27E-06	1.31E-06	1.36E-06	1.36E-06
np237	4.17E+01	4.17E+01	4.17E+01	4.16E+01	4.16E+01	4.16E+01
np238	1.52E-06	1.52E-06	1.52E-06	1.52E-06	1.51E-06	1.51E-06
np239	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05
np240m	4.91E-39	6.95E-39	9.70E-39	1.33E-38	1.81E-38	1.81E-38
np240	9.16E-15	9.17E-15	9.16E-15	9.16E-15	9.15E-15	9.15E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	4.48E-13	4.58E-13	4.65E-13	4.72E-13	4.79E-13	4.79E-13
pu238	2.30E-02	2.30E-02	2.30E-02	2.29E-02	2.29E-02	2.29E-02
pu239	2.53E+01	2.61E+01	2.70E+01	2.78E+01	2.87E+01	2.87E+01
pu240	6.09E-01	6.51E-01	6.93E-01	7.36E-01	7.80E-01	7.80E-01
pu241	2.50E-04	2.67E-04	2.84E-04	3.02E-04	3.20E-04	3.20E-04
pu242	3.72E-05	4.19E-05	4.70E-05	5.25E-05	5.83E-05	5.83E-05
pu243	7.86E-14	8.87E-14	9.95E-14	1.11E-13	1.23E-13	1.23E-13
pu244	2.87E-26	4.06E-26	5.66E-26	7.79E-26	1.06E-25	1.06E-25
pu245	1.15E-36	1.62E-36	2.26E-36	3.12E-36	4.23E-36	4.23E-36
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.73E-18	1.87E-18	2.00E-18	2.14E-18	2.28E-18	2.28E-18
am240	7.89E-16	8.54E-16	9.16E-16	9.80E-16	1.04E-15	1.04E-15
am241	6.17E-03	6.65E-03	7.13E-03	7.63E-03	8.13E-03	8.13E-03
am242m	2.91E-06	3.14E-06	3.38E-06	3.62E-06	3.87E-06	3.87E-06
am242	2.48E-10	2.67E-10	2.87E-10	3.07E-10	3.27E-10	3.27E-10
am243	2.61E-07	3.00E-07	3.43E-07	3.90E-07	4.40E-07	4.40E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.98E-15	2.28E-15	2.60E-15	2.96E-15	3.34E-15	3.34E-15
am245	2.43E-37	3.43E-37	4.77E-37	6.54E-37	8.86E-37	8.86E-37
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	1.47E-20	1.59E-20	1.71E-20	1.83E-20	1.95E-20	1.95E-20
cm242	5.01E-08	5.40E-08	5.79E-08	6.19E-08	6.60E-08	6.60E-08
cm243	3.80E-17	4.12E-17	4.43E-17	4.75E-17	5.08E-17	5.08E-17
cm244	3.11E-11	3.58E-11	4.09E-11	4.64E-11	5.25E-11	5.25E-11

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 72
power= 4.000E-03mw, burnup=1.0227E+04mwd, flux= 2.65E+08n/cm**2-sec
0. nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* g	******* g	******* g	******* g	******* g
cm245	3.88E-14	4.64E-14	5.50E-14	6.47E-14	7.57E-14
cm246	2.15E-16	2.67E-16	3.29E-16	4.01E-16	4.85E-16
cm247	5.18E-20	5.83E-20	6.43E-20	6.91E-20	5.60E-20
cm248	2.18E-23	2.95E-23	3.95E-23	5.22E-23	6.82E-23
cm249	6.82E-34	9.26E-34	1.24E-33	1.64E-33	2.16E-33
cm250	1.91E-38	2.69E-38	3.73E-38	5.15E-38	7.00E-38
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.65E+08	2.65E+08	2.65E+08	2.65E-07

0 1 1q array has 20 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.

```
0        4q array has      1 entries.
0       54q array has     12 entries.
1library information...

         cross-section data taken from position number  8 of library on unit 33.

         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         "scale-system control module sas2 library"
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ************************************************************************
         *                                                                      *
         *              prelim lwr origen-s binary working library--id = 1143   *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *       data from the light element, actinide, and fission product libraries *
         *         decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                      *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "pressx2" case updating all nuclides on the scale "burnup" library *
         *                                                                      *
         *                  fission product yields are from endf/b-v            *
         *                                                                      *
         *              photon libraries use an 18-energy-group structure       *
         *             the photon data are from the master photon data base,    *
         *              produced to include bremsstrahlung from uo2 matrix      *
         *                                                                      *
         *        see information above this box (if present) for later updates *
         *                                                                      *
         ************************************************************************
         *                                                                      *
0        ************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/28/1996    date library was produced
0                   1697    total number of nuclides in library
                     489    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0        ************************************************************************
1    sas2h: far-field crit based on 8lv 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   73
       power=    .80mw, burnup=  11688.mwd, flux= 2.65E+08n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.171770E+06  1.172613E+06  1.173425E+06  1.174209E+06  1.174963E+06  1.174963E+06
     absorptions  9.653493E+05  9.660934E+05  9.668211E+05  9.675327E+05  9.682284E+05  9.682284E+05
     k infinity   1.213830E+00  1.213767E+00  1.213694E+00  1.213611E+00  1.213519E+00  1.213519E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
```

```
     absorptions   9.524083E+05   9.530068E+05   9.535861E+05   9.541523E+05   9.547033E+05   9.547033E+05
     non-actinide
     abs. fracs.   1.340544E-02   1.354790E-02   1.368910E-02   1.382947E-02   1.396894E-02   1.396894E-02
1    sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  74
0                                   fraction of total absorption rate
       power=     .00mw, burnup=  11688.mwd, flux= 2.65E+08n/cm**2-sec
0            initial *******d *******d *******d *******d *******d

     sm149     5.34E-03  5.34E-03  5.34E-03  5.34E-03  5.34E-03  5.34E-03
     eu151     1.12E-03  1.15E-03  1.18E-03  1.20E-03  1.23E-03  1.23E-03
     nd143     9.66E-04  9.99E-04  1.03E-03  1.06E-03  1.10E-03  1.10E-03
     rh103     4.83E-04  5.01E-04  5.18E-04  5.35E-04  5.53E-04  5.53E-04
     xe131     3.19E-04  3.30E-04  3.41E-04  3.52E-04  3.63E-04  3.63E-04
     cs133     2.46E-04  2.55E-04  2.63E-04  2.72E-04  2.81E-04  2.81E-04
     gd155     2.08E-04  2.10E-04  2.12E-04  2.14E-04  2.15E-04  2.15E-04
     sm147     1.81E-04  1.87E-04  1.94E-04  2.00E-04  2.06E-04  2.06E-04
     tc 99     1.79E-04  1.86E-04  1.92E-04  1.98E-04  2.04E-04  2.04E-04
     nd145     1.39E-04  1.43E-04  1.48E-04  1.53E-04  1.58E-04  1.58E-04
     sm152     9.67E-05  1.01E-04  1.05E-04  1.09E-04  1.13E-04  1.13E-04
     mo 95     9.66E-05  9.97E-05  1.03E-04  1.06E-04  1.10E-04  1.10E-04
     cd113     9.87E-05  9.93E-05  9.99E-05  1.00E-04  1.01E-04  1.01E-04
     sm150     6.82E-05  7.08E-05  7.35E-05  7.61E-05  7.88E-05  7.88E-05
     kr 83     5.86E-05  6.06E-05  6.26E-05  6.45E-05  6.65E-05  6.65E-05
     cs135     5.58E-05  5.78E-05  5.97E-05  6.17E-05  6.36E-05  6.36E-05
     gd157     4.00E-05  4.08E-05  4.15E-05  4.22E-05  4.29E-05  4.29E-05
     ru101     4.37E-05  4.52E-05  4.67E-05  4.83E-05  4.98E-05  4.98E-05
     eu153     4.07E-05  4.22E-05  4.38E-05  4.53E-05  4.69E-05  4.69E-05
     pr141     4.10E-05  4.24E-05  4.39E-05  4.53E-05  4.67E-05  4.67E-05
     sm151     4.18E-05  4.19E-05  4.20E-05  4.21E-05  4.22E-05  4.22E-05
     la139     3.35E-05  3.46E-05  3.58E-05  3.70E-05  3.81E-05  3.81E-05
     pd105     1.68E-05  1.75E-05  1.82E-05  1.88E-05  1.95E-05  1.95E-05
     ag109     1.54E-05  1.62E-05  1.71E-05  1.80E-05  1.89E-05  1.89E-05
     ba137     1.60E-05  1.66E-05  1.71E-05  1.77E-05  1.82E-05  1.82E-05
     zr 93     1.36E-05  1.40E-05  1.45E-05  1.49E-05  1.54E-05  1.54E-05
      i129     1.08E-05  1.12E-05  1.16E-05  1.20E-05  1.24E-05  1.24E-05
     nd144     1.01E-05  1.05E-05  1.08E-05  1.12E-05  1.16E-05  1.16E-05
     mo 97     7.62E-06  7.89E-06  8.15E-06  8.42E-06  8.68E-06  8.68E-06
     gd152     4.77E-06  5.09E-06  5.41E-06  5.74E-06  6.07E-06  6.07E-06
     pd108     3.80E-06  3.99E-06  4.19E-06  4.39E-06  4.59E-06  4.59E-06
     zr 91     3.51E-06  3.63E-06  3.75E-06  3.87E-06  3.99E-06  3.99E-06
      y 89     3.35E-06  3.47E-06  3.58E-06  3.69E-06  3.81E-06  3.81E-06
     ru102     3.16E-06  3.27E-06  3.39E-06  3.50E-06  3.61E-06  3.61E-06
     ce142     2.77E-06  2.87E-06  2.97E-06  3.06E-06  3.16E-06  3.16E-06
     nd148     2.70E-06  2.79E-06  2.88E-06  2.98E-06  3.07E-06  3.07E-06
     nd146     2.25E-06  2.33E-06  2.41E-06  2.48E-06  2.56E-06  2.56E-06
     in115     2.00E-06  2.08E-06  2.15E-06  2.23E-06  2.30E-06  2.30E-06
     pd107     1.91E-06  2.00E-06  2.09E-06  2.19E-06  2.29E-06  2.29E-06
     xe135     2.25E-06  2.24E-06  2.24E-06  2.24E-06  2.24E-06  2.24E-06
     ba138     1.92E-06  1.98E-06  2.05E-06  2.12E-06  2.18E-06  2.18E-06
     ce140     1.79E-06  1.86E-06  1.92E-06  1.98E-06  2.04E-06  2.04E-06
     xe132     1.66E-06  1.72E-06  1.78E-06  1.84E-06  1.90E-06  1.90E-06
     mo 98     1.13E-06  1.17E-06  1.21E-06  1.25E-06  1.29E-06  1.29E-06
     mo100     1.09E-06  1.13E-06  1.17E-06  1.21E-06  1.25E-06  1.25E-06
     xe134     1.06E-06  1.10E-06  1.14E-06  1.18E-06  1.21E-06  1.21E-06
     zr 92     8.48E-07  8.77E-07  9.05E-07  9.34E-07  9.63E-07  9.63E-07
      i127     7.94E-07  8.24E-07  8.55E-07  8.85E-07  9.16E-07  9.16E-07
     ru104     7.29E-07  7.56E-07  7.83E-07  8.11E-07  8.38E-07  8.38E-07
1    sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  75
0                                   fraction of total absorption rate
       power=     .00mw, burnup=  11688.mwd, flux= 2.65E+08n/cm**2-sec
```

0 Initial ******* d ******* d ******* d ******* d ******* d

sr 96	6.88E-07	7.12E-07	7.36E-07	7.59E-07	7.83E-07	7.83E-07
nd150	6.11E-07	6.33E-07	6.54E-07	6.74E-07	6.98E-07	6.98E-07
xe136	5.78E-07	5.98E-07	6.18E-07	6.38E-07	6.58E-07	6.58E-07
cd111	4.32E-07	4.52E-07	4.73E-07	4.93E-07	5.14E-07	5.14E-07
br 81	4.33E-07	4.48E-07	4.63E-07	4.78E-07	4.93E-07	4.93E-07
rb 85	4.15E-07	4.29E-07	4.43E-07	4.57E-07	4.71E-07	4.71E-07
ru 99	3.26E-07	3.49E-07	3.73E-07	3.98E-07	4.23E-07	4.23E-07
zr 94	3.66E-07	3.78E-07	3.91E-07	4.03E-07	4.16E-07	4.16E-07
zr 90	3.29E-07	3.41E-07	3.52E-07	3.63E-07	3.74E-07	3.74E-07
sm154	2.81E-07	2.92E-07	3.03E-07	3.13E-07	3.24E-07	3.24E-07
eu152	2.88E-07	2.93E-07	3.02E-07	3.09E-07	3.16E-07	3.16E-07
te130	2.65E-07	2.74E-07	2.84E-07	2.93E-07	3.02E-07	3.02E-07
rb 87	2.39E-07	2.48E-07	2.56E-07	2.64E-07	2.72E-07	2.72E-07
pm147	2.42E-07	2.61E-07	2.41E-07	2.61E-07	2.61E-07	2.61E-07
gd154	1.84E-07	1.98E-07	2.12E-07	2.26E-07	2.41E-07	2.41E-07
eu155	1.99E-07	2.00E-07	2.01E-07	2.02E-07	2.03E-07	2.03E-07
pd106	1.49E-07	1.76E-07	1.83E-07	1.91E-07	1.98E-07	1.98E-07
se 77	1.72E-07	1.78E-07	1.84E-07	1.90E-07	1.96E-07	1.96E-07
pd104	1.44E-07	1.53E-07	1.60E-07	1.67E-07	1.74E-07	1.74E-07
kr 84	1.15E-07	1.19E-07	1.22E-07	1.26E-07	1.30E-07	1.30E-07
dy161	9.26E-08	9.76E-08	1.03E-07	1.08E-07	1.13E-07	1.13E-07
sb121	9.18E-08	9.52E-08	9.86E-08	1.02E-07	1.05E-07	1.05E-07
se 79	8.83E-08	9.13E-08	9.44E-08	9.74E-08	1.00E-07	1.00E-07
sb123	7.42E-08	7.69E-08	7.97E-08	8.24E-08	8.52E-08	8.52E-08
ru100	5.36E-08	5.96E-08	6.37E-08	6.79E-08	7.23E-08	7.23E-08
kr 86	6.26E-08	6.67E-08	6.88E-08	6.89E-08	7.10E-08	7.10E-08
te128	6.03E-08	6.23E-08	6.47E-08	6.69E-08	6.91E-08	6.91E-08
nd142	5.89E-08	6.16E-08	6.45E-08	6.75E-08	5.05E-08	5.05E-08
ba134	3.79E-08	4.06E-08	4.34E-08	4.63E-08	4.93E-08	4.93E-08
tb159	4.12E-08	4.32E-08	4.52E-08	4.72E-08	4.92E-08	4.92E-08
se 80	4.12E-08	4.26E-08	4.40E-08	4.55E-08	4.69E-08	4.69E-08
te125	4.05E-08	4.21E-08	4.36E-08	4.52E-08	4.68E-08	4.68E-08
sm148	3.47E-08	3.71E-08	3.97E-08	4.23E-08	4.51E-08	4.51E-08
ba135	3.14E-08	3.36E-08	3.59E-08	3.84E-08	4.08E-08	4.08E-08
gd158	3.23E-08	3.38E-08	3.53E-08	3.68E-08	3.83E-08	3.83E-08
cd112	3.03E-08	3.15E-08	3.28E-08	3.41E-08	3.54E-08	3.54E-08
pd106	2.68E-08	2.88E-08	3.08E-08	3.28E-08	3.50E-08	3.50E-08
dy164	2.11E-08	2.23E-08	2.36E-08	2.48E-08	2.61E-08	2.61E-08
ti 6	2.26E-08	2.32E-08	2.39E-08	2.46E-08	2.54E-08	2.54E-08
sn117	2.17E-08	2.26E-08	2.35E-08	2.43E-08	2.52E-08	2.52E-08
dy162	1.94E-08	2.05E-08	2.17E-08	2.29E-08	2.42E-08	2.42E-08
eu154	2.04E-08	2.11E-08	2.19E-08	2.27E-08	2.34E-08	2.34E-08
cd114	1.78E-08	1.86E-08	1.94E-08	2.01E-08	2.09E-08	2.09E-08
sn119	1.67E-08	1.73E-08	1.79E-08	1.85E-08	1.92E-08	1.92E-08
sn115	1.52E-08	1.58E-08	1.64E-08	1.70E-08	1.75E-08	1.75E-08
pd110	1.44E-08	1.53E-08	1.60E-08	1.67E-08	1.74E-08	1.74E-08
sr 90	1.54E-08	1.56E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08
sr 88	1.15E-08	1.19E-08	1.23E-08	1.27E-08	1.31E-08	1.31E-08
mo 96	9.00E-09	9.63E-09	1.03E-08	1.09E-08	1.16E-08	1.16E-08

1 gas2h: far-field grit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ BX uo2 fission products page 76

0 Fraction of total absorption rate

power= .00mw, burnup= 11688.mwd, flux= 2.65E+08n/cm**2-sec

0 Initial ******* d ******* d ******* d ******* d ******* d

rh103	1.06E-08	1.07E-08	1.07E-08	1.08E-08	1.09E-08	1.09E-08
cd110	7.72E-09	8.42E-09	9.15E-09	9.93E-09	1.07E-08	1.07E-08
se 82	7.89E-09	8.16E-09	8.43E-09	8.70E-09	8.97E-09	8.97E-09
sn126	7.53E-09	7.83E-09	8.13E-09	8.43E-09	8.73E-09	8.73E-09

se 78	6.19E-09	6.41E-09	6.63E-09	6.85E-09	7.06E-09	7.06E-09
nb 93	4.98E-09	5.34E-09	5.71E-09	6.09E-09	6.48E-09	6.48E-09
ba136	5.21E-09	5.51E-09	5.81E-09	6.12E-09	6.44E-09	6.44E-09
sn124	5.43E-09	5.63E-09	5.84E-09	6.04E-09	6.25E-09	6.25E-09
dy163	4.91E-09	5.20E-09	5.50E-09	5.81E-09	6.13E-09	6.13E-09
xe130	4.76E-09	5.07E-09	5.40E-09	5.73E-09	6.08E-09	6.08E-09
kr 82	4.30E-09	4.56E-09	4.82E-09	5.09E-09	5.36E-09	5.36E-09
as 75	3.65E-09	3.78E-09	3.90E-09	4.03E-09	4.16E-09	4.16E-09
cs137	3.66E-09	3.66E-09	3.66E-09	3.66E-09	3.65E-09	3.65E-09
in113	3.05E-09	3.17E-09	3.29E-09	3.40E-09	3.52E-09	3.52E-09
br 79	2.54E-09	2.72E-09	2.91E-09	3.10E-09	3.30E-09	3.30E-09
ag107	2.04E-09	2.23E-09	2.43E-09	2.60E-09	2.80E-09	2.80E-09
sn118	2.21E-09	2.29E-09	2.37E-09	2.45E-09	2.54E-09	2.54E-09
pr143	2.32E-09	2.51E-09	2.51E-09	2.50E-09	2.50E-09	2.50E-09
sn122	1.84E-09	1.91E-09	1.98E-09	2.05E-09	2.12E-09	2.12E-09
cd116	1.84E-09	1.91E-09	1.98E-09	2.05E-09	2.12E-09	2.12E-09
se134	1.80E-09	1.86E-09	1.92E-09	1.99E-09	2.05E-09	2.05E-09
xe129	1.48E-09	1.59E-09	1.70E-09	1.82E-09	1.94E-09	1.94E-09
xe133	1.94E-09	1.94E-09	1.93E-09	1.93E-09	1.93E-09	1.93E-09
sn120	1.37E-09	1.42E-09	1.47E-09	1.52E-09	1.57E-09	1.57E-09
ce141	1.32E-09	1.32E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09
te126	1.12E-09	1.19E-09	1.27E-09	1.35E-09	1.44E-09	1.44E-09
ge 73	1.03E-09	1.07E-09	1.10E-09	1.14E-09	1.18E-09	1.18E-09
pm149	9.45E-10	9.45E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10
nd147	8.98E-10	8.97E-10	8.96E-10	8.95E-10	8.94E-10	8.94E-10
ce144	5.64E-10	5.63E-10	5.63E-10	5.62E-10	5.61E-10	5.61E-10
gd160	4.50E-10	4.72E-10	4.96E-10	5.19E-10	5.43E-10	5.43E-10
kr 85	5.27E-10	5.26E-10	5.25E-10	5.24E-10	5.23E-10	5.23E-10
ho165	4.02E-10	4.29E-10	4.56E-10	4.84E-10	5.13E-10	5.13E-10
ge 76	3.56E-10	3.68E-10	3.80E-10	3.92E-10	4.05E-10	4.05E-10
ru103	3.78E-10	3.78E-10	3.79E-10	3.79E-10	3.80E-10	3.80E-10
dy160	2.47E-10	2.67E-10	2.87E-10	3.09E-10	3.31E-10	3.31E-10
xe128	1.90E-10	1.61E-10	1.72E-10	1.84E-10	1.96E-10	1.96E-10
zr 95	1.58E-10	1.57E-10	1.57E-10	1.57E-10	1.57E-10	1.57E-10
nb 95	1.45E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
y 91	1.31E-10	1.31E-10	1.31E-10	1.30E-10	1.30E-10	1.30E-10
pm151	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.13E-10	1.13E-10
sr 86	7.87E-11	8.39E-11	8.92E-11	9.47E-11	1.00E-10	1.00E-10
te124	7.80E-11	8.20E-11	8.62E-11	9.04E-11	9.46E-11	9.46E-11
sn116	5.80E-11	6.32E-11	6.86E-11	7.31E-11	7.58E-11	7.58E-11
eu154	5.10E-11	5.15E-11	5.19E-11	5.24E-11	5.28E-11	5.28E-11
sr 87	4.48E-11	4.65E-11	4.82E-11	4.99E-11	5.16E-11	5.16E-11
sm153	4.44E-11	4.44E-11	4.43E-11	4.33E-11	4.33E-11	4.33E-11
ba140	4.51E-11	4.50E-11	4.50E-11	4.49E-11	4.49E-11	4.49E-11
ru106	4.07E-11	4.11E-11	4.16E-11	4.20E-11	4.24E-11	4.24E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 77
0 fraction of total absorption rate
0 powers= .00mw, burnup= 11688.mwd, flux= 2.65E+08n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d
nb 94	2.97E-11	3.11E-11	3.25E-11	3.39E-11	3.54E-11	3.54E-11
te122	2.40E-11	2.58E-11	2.76E-11	2.95E-11	3.14E-11	3.14E-11
se 74	2.43E-11	2.57E-11	2.72E-11	2.88E-11	3.03E-11	3.03E-11
er166	2.18E-11	2.32E-11	2.47E-11	2.62E-11	2.77E-11	2.77E-11
sr 89	2.79E-11	2.78E-11	2.78E-11	2.77E-11	2.77E-11	2.77E-11
ge 74	2.05E-11	2.12E-11	2.20E-11	2.27E-11	2.34E-11	2.34E-11
kr 87	2.09E-11	2.09E-11	2.08E-11	2.08E-11	2.07E-11	2.07E-11
sb125	1.75E-11	1.76E-11	1.77E-11	1.77E-11	1.78E-11	1.78E-11
ge 72	1.49E-11	1.54E-11	1.60E-11	1.66E-11	1.72E-11	1.72E-11
ce143	1.65E-11	1.65E-11	1.64E-11	1.64E-11	1.64E-11	1.64E-11

y 90	1.48E-11	1.48E-11	1.48E-11	1.47E-11	1.47E-11	1.47E-11
la140	1.47E-11	1.47E-11	1.47E-11	1.46E-11	1.46E-11	1.46E-11
mo 99	1.27E-11	1.27E-11	1.27E-11	1.26E-11	1.26E-11	1.26E-11
pm148m	9.63E-12	9.64E-12	9.65E-12	9.65E-12	9.66E-12	9.66E-12
te127m	8.79E-12	8.82E-12	8.86E-12	8.90E-12	8.94E-12	8.94E-12
i131	6.69E-12	6.69E-12	6.69E-12	6.69E-12	6.69E-12	6.69E-12
kr 88	2.33E-12	2.52E-12	2.73E-12	2.94E-12	3.17E-12	3.17E-12
te129m	1.87E-12	1.87E-12	1.87E-12	1.88E-12	1.88E-12	1.88E-12
er167	1.18E-12	1.29E-12	1.41E-12	1.54E-12	1.67E-12	1.67E-12
te123	6.25E-13	6.87E-13	7.52E-13	8.22E-13	8.96E-13	8.96E-13
ag111	4.21E-13	4.29E-13	4.37E-13	4.46E-13	4.54E-13	4.54E-13
cu187	4.98E-13	5.04E-13	5.09E-13	5.15E-13	5.20E-13	5.20E-13
pm148	3.64E-13	3.64E-13	3.64E-13	3.64E-13	3.63E-13	3.63E-13
cd115m	2.68E-13	2.69E-13	2.70E-13	2.71E-13	2.72E-13	2.72E-13
cs136	2.30E-13	2.35E-13	2.41E-13	2.46E-13	2.52E-13	2.52E-13
cd108	8.71E-14	9.72E-14	1.08E-13	1.20E-13	1.32E-13	1.32E-13
tb160	1.03E-13	1.08E-13	1.13E-13	1.18E-13	1.22E-13	1.22E-13
be 9	4.58E-14	4.74E-14	4.90E-14	5.06E-14	5.22E-14	5.22E-14
pr142	4.57E-14	4.72E-14	4.88E-14	5.03E-14	5.19E-14	5.19E-14
ru105	3.80E-14	3.83E-14	3.85E-14	3.87E-14	3.90E-14	3.90E-14
sn125	3.21E-14	3.22E-14	3.23E-14	3.24E-14	3.24E-14	3.24E-14
li 7	1.81E-14	1.88E-14	1.94E-14	2.00E-14	2.06E-14	2.06E-14
sn114	1.45E-14	1.55E-14	1.67E-14	1.78E-14	1.90E-14	1.90E-14
sb126	1.51E-14	1.56E-14	1.60E-14	1.64E-14	1.69E-14	1.69E-14
rb 88	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.16E-14	1.16E-14
sn123	1.05E-14	1.05E-14	1.05E-14	1.05E-14	1.05E-14	1.05E-14
i130	9.11E-15	9.40E-15	9.68E-15	9.97E-15	1.03E-14	1.03E-14
i135	9.73E-15	9.72E-15	9.72E-15	9.71E-15	9.70E-15	9.70E-15
te132	9.33E-15	9.33E-15	9.33E-15	9.32E-15	9.32E-15	9.32E-15
sb124	5.59E-15	5.71E-15	5.83E-15	5.96E-15	6.08E-15	6.08E-15
te134	5.45E-15	5.44E-15	5.43E-15	5.43E-15	5.42E-15	5.42E-15
rb 86	2.88E-15	2.97E-15	3.06E-15	3.15E-15	3.23E-15	3.23E-15
in117m	2.59E-15	2.61E-15	2.62E-15	2.64E-15	2.65E-15	2.65E-15
dy165	2.11E-15	2.18E-15	2.25E-15	2.32E-15	2.39E-15	2.39E-15
in117	7.77E-16	7.82E-16	7.86E-16	7.91E-16	7.95E-16	7.95E-16
cs134m	3.37E-16	3.49E-16	3.60E-16	3.72E-16	3.83E-16	3.83E-16
cd118	1.35E-16	1.35E-16	1.36E-16	1.36E-16	1.36E-16	1.36E-16
ge 75	8.31E-17	8.31E-17	8.30E-17	8.29E-17	8.29E-17	8.29E-17
in119m	3.30E-17	3.30E-17	3.31E-17	3.32E-17	3.33E-17	3.33E-17

1 sas2h: far-field crit based on 6kw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 78

0 fraction of total absorption rate

0 power= .80mw, burnup= 11688.mwd, flux= 2.65E+08n/cm**2-sec

	initial *******	*******	*******	*******	*******
ag110	1.97E-17	2.08E-17	2.19E-17	2.31E-17	2.42E-17	2.42E-17
cd109	1.28E-17	1.34E-17	1.41E-17	1.48E-17	1.55E-17	1.55E-17
in119	2.70E-18	2.71E-18	2.72E-18	2.73E-18	2.74E-18	2.74E-18

1 sas2h: far-field crit based on 6kw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 79

power= 4.000E-03mw, burnup=1.1688E+04mwd, flux= 2.65E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge *******	*******	*******	*******	*******
h 1	6.88E-04	6.30E-04	6.52E-04	6.74E-04	6.96E-04	6.96E-04
h 2	1.01E-06	1.08E-06	1.05E-06	2.03E-06	2.08E-06	2.08E-06
h 3	4.96E-11	5.02E-11	5.06E-11	5.10E-11	5.14E-11	5.14E-11
h 4	1.97E-34	1.99E-34	2.00E-34	2.02E-34	2.03E-34	2.03E-34
he 3	1.11E-08	1.14E-08	1.17E-08	1.20E-08	1.23E-08	1.23E-08
he 4	1.01E-04	1.04E-04	1.08E-04	1.12E-04	1.15E-04	1.15E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

na 20	1.21E-05	1.26E-05	1.30E-05	1.34E-05	1.39E-05	1.39E-05
na 21	2.52E-09	2.70E-09	2.88E-09	3.06E-09	3.24E-09	3.24E-09
na 22	8.02E-08	8.31E-08	8.60E-08	8.89E-08	9.18E-08	9.18E-08
na 23	7.22E-15	7.25E-15	7.25E-15	7.24E-15	7.24E-15	7.24E-15
na 22	4.27E-11	4.29E-11	4.29E-11	4.29E-11	4.28E-11	4.28E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
na 24m	4.53E-15	4.53E-15	4.53E-15	4.53E-15	4.53E-15	4.53E-15
na 25	7.53E-24	8.05E-24	8.58E-24	9.11E-24	9.66E-24	9.66E-24
mg 24	8.54E-02	8.83E-02	9.12E-02	9.40E-02	9.69E-02	9.69E-02
mg 25	2.81E-07	2.78E-07	2.96E-07	3.15E-07	3.34E-07	3.34E-07
mg 26	1.81E-06	1.88E-06	1.94E-06	2.01E-06	2.07E-06	2.07E-06
mg 27	2.15E-12	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.16E-12
mg 28	4.28E-24	4.30E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.04E-10	2.05E-10	2.04E-10	2.04E-10	2.04E-10	2.04E-10
al 29	5.96E-22	6.39E-22	6.81E-22	7.25E-22	7.70E-22	7.70E-22
al 30	7.84E-32	8.70E-32	9.59E-32	1.05E-31	1.15E-31	1.15E-31
si 28	2.49E-01	2.57E-01	2.65E-01	2.74E-01	2.82E-01	2.82E-01
si 29	2.31E-06	2.47E-06	2.63E-06	2.80E-06	2.97E-06	2.97E-06
si 30	2.27E-11	2.31E-11	2.77E-11	3.04E-11	3.33E-11	3.33E-11
si 31	1.59E-23	1.76E-23	1.94E-23	2.13E-23	2.34E-23	2.34E-23
si 32	2.48E-29	2.75E-29	3.04E-29	3.35E-29	3.68E-29	3.68E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.65E+08	2.65E+08	2.65E+08	2.65E+08	2.64E-07

sas2h: far-field crit based on 6x6w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 80
power= 4.000E-03mw, burnup=1.1688E+04mwd, flux= 2.65E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* g	******* g	******* g	******* g	******* g
he 4	5.00E+00	5.29E+00	5.59E+00	5.90E+00	6.22E+00	6.22E+00
pb206	3.17E-03	3.47E-03	3.77E-03	4.10E-03	4.43E-03	4.43E-03
pb207	3.75E-04	4.03E-04	4.31E-04	4.61E-04	4.91E-04	4.91E-04
pb208	5.49E-05	6.32E-05	6.76E-05	7.22E-05	7.69E-05	7.69E-05
pb209	5.43E-11	5.78E-11	6.14E-11	6.50E-11	6.88E-11	6.88E-11
pb210	3.47E-05	3.86E-05	4.04E-05	4.23E-05	4.42E-05	4.42E-05
pb211	1.07E-11	1.11E-11	1.15E-11	1.19E-11	1.23E-11	1.23E-11
pb212	2.92E-11	3.03E-11	3.13E-11	3.24E-11	3.34E-11	3.34E-11
pb214	8.39E-11	8.81E-11	9.24E-11	9.66E-11	1.01E-10	1.01E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.51E-04	2.77E-04	3.03E-04	3.34E-04	3.66E-04	3.66E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.26E-08	2.37E-08	2.49E-08	2.60E-08	2.72E-08	2.72E-08
bi211	6.36E-13	6.59E-13	6.82E-13	7.05E-13	7.29E-13	7.29E-13
bi212	2.77E-12	2.87E-12	2.97E-12	3.07E-12	3.17E-12	3.17E-12
bi213	1.77E-11	1.33E-11	1.43E-11	1.42E-11	1.41E-11	1.41E-11
bi214	6.23E-11	6.54E-11	6.86E-11	7.17E-11	7.49E-11	7.49E-11
po210	6.24E-07	6.56E-07	6.87E-07	7.19E-07	7.51E-07	7.51E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	7.03E-18	7.28E-18	7.54E-18	7.79E-18	8.05E-18	8.05E-18
po212	1.44E-22	1.51E-22	1.54E-22	1.61E-22	1.67E-22	1.67E-22
po213	1.91E-20	2.03E-20	2.16E-20	2.28E-20	2.41E-20	2.41E-20
po214	8.57E-18	9.00E-18	9.44E-18	9.87E-18	1.03E-17	1.03E-17
po215	8.81E-18	9.34E-18	9.46E-18	9.78E-18	1.01E-17	1.01E-17
po216	1.11E-16	1.15E-16	1.19E-16	1.23E-16	1.27E-16	1.27E-16
po218	1.71E-12	1.02E-11	1.07E-11	1.12E-11	1.17E-11	1.17E-11
rn218	4.28E-28	4.44E-28	4.59E-28	4.74E-28	4.90E-28	4.90E-28
rn219	1.96E-16	2.03E-16	2.10E-16	2.18E-16	2.25E-16	2.25E-16
rn220	4.24E-14	4.39E-14	4.55E-14	4.70E-14	4.85E-14	4.85E-14

rn222	1.72E-08	1.81E-08	1.90E-08	1.99E-08	2.07E-08	2.07E-08
ra222	4.64E-25	4.82E-25	4.99E-25	5.15E-25	5.32E-25	5.32E-25
ra223	4.89E-09	5.07E-09	5.25E-09	5.43E-09	5.61E-09	5.61E-09
ra224	2.61E-10	2.30E-10	2.59E-10	2.67E-10	2.76E-10	2.76E-10
ra225	5.94E-09	6.32E-09	6.71E-09	7.10E-09	7.51E-09	7.51E-09
ra226	2.64E-03	2.77E-03	2.90E-03	3.03E-03	3.17E-03	3.17E-03
ra228	1.51E-11	1.57E-11	1.62E-11	1.68E-11	1.73E-11	1.73E-11
ac225	4.81E-09	4.27E-09	4.53E-09	4.80E-09	5.07E-09	5.07E-09
ac227	3.40E-06	3.53E-06	3.65E-06	3.77E-06	3.90E-06	3.90E-06
ac228	1.84E-15	1.91E-15	1.98E-15	2.05E-15	2.11E-15	2.11E-15
th226	2.26E-23	2.35E-23	2.43E-23	2.51E-23	2.59E-23	2.59E-23
th227	7.90E-09	8.18E-09	8.47E-09	8.76E-09	9.05E-09	9.05E-09
th228	4.61E-08	4.77E-08	4.94E-08	5.10E-08	5.27E-08	5.27E-08
th229	1.15E-03	1.23E-03	1.30E-03	1.38E-03	1.46E-03	1.46E-03
th230	1.82E-01	1.88E-01	1.95E-01	2.01E-01	2.08E-01	2.08E-01
th231	3.65E-09	3.67E-09	3.70E-09	3.72E-09	3.74E-09	3.74E-09
th232	3.69E-02	3.83E-02	3.96E-02	4.10E-02	4.23E-02	4.23E-02
th233	3.33E-13	3.45E-13	3.57E-13	3.69E-13	3.81E-13	3.81E-13
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	5.11E-03	5.30E-03	5.49E-03	5.67E-03	5.86E-03	5.86E-03
pa232	8.60E-11	8.91E-11	9.22E-11	9.53E-11	9.84E-11	9.84E-11

1 sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 81

power= 4.000E-03mw, burnup=1.1688E+04mwd, flux= 2.63E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.20E-20	2.38E-20	2.36E-20	2.44E-20	2.51E-20	2.51E-20
u231	6.96E-17	7.22E-17	7.45E-17	7.68E-17	7.91E-17	7.91E-17
u232	1.68E-06	1.74E-06	1.80E-06	1.86E-06	1.92E-06	1.92E-06
u233	9.07E-02	9.38E-02	9.68E-02	9.99E-02	1.03E-01	1.03E-01
u234	1.00E+01	1.00E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
u235	6.03E+02	6.02E+02	6.00E+02	6.79E+02	6.77E+02	6.77E+02
u236	1.02E+02	1.02E+02	1.03E+02	1.03E+02	1.03E+02	1.03E+02
u237	3.23E-06	3.24E-06	3.24E-06	3.25E-06	3.25E-06	3.25E-06
u238	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	2.13E-36	2.86E-36	3.80E-36	5.00E-36	6.53E-36	6.53E-36
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.75E-12	8.79E-12	8.78E-12	8.77E-12	8.77E-12	8.77E-12
np236m	2.08E-12	2.09E-12	2.08E-12	2.08E-12	2.08E-12	2.08E-12
np236	1.36E-06	1.41E-06	1.46E-06	1.50E-06	1.55E-06	1.55E-06
np237	4.16E+01	4.16E+01	4.16E+01	4.16E+01	4.16E+01	4.16E+01
np238	1.51E-06	1.51E-06	1.51E-06	1.51E-06	1.51E-06	1.51E-06
np239	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05
np240m	1.81E-38	2.44E-38	3.24E-38	4.27E-38	5.57E-38	5.57E-38
np240	9.15E-15	9.16E-15	9.15E-15	9.14E-15	9.14E-15	9.14E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
pu237	2.79E-13	2.89E-13	2.95E-13	2.82E-13	2.89E-13	2.89E-13
pu238	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
pu239	2.87E+01	2.95E+01	3.03E+01	3.11E+01	3.19E+01	3.19E+01
pu240	7.80E-01	8.24E-01	8.69E-01	9.14E-01	9.60E-01	9.60E-01
pu241	2.20E-04	3.38E-04	3.54E-04	2.73E-04	3.93E-04	3.93E-04
pu242	5.83E-05	6.45E-05	7.10E-05	7.79E-05	8.53E-05	8.53E-05
pu243	1.23E-13	1.36E-13	1.50E-13	1.65E-13	1.80E-13	1.80E-13

```
     pu244   1.86E-25  1.42E-25  1.89E-25  2.49E-25  3.25E-25  3.25E-25
     pu245   4.23E-34  5.69E-34  7.34E-34  9.95E-34  1.30E-33  1.30E-33
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   2.28E-18  2.44E-18  2.58E-18  2.73E-18  2.88E-18  2.88E-18
     am240   1.04E-15  1.11E-15  1.18E-15  1.25E-15  1.32E-15  1.32E-15
     am241   8.13E-03  8.65E-03  9.17E-03  9.70E-03  1.02E-02  1.02E-02
     am242m  3.87E-06  4.12E-06  4.37E-06  4.63E-06  4.89E-06  4.89E-06
     am242   3.27E-10  3.48E-10  3.68E-10  3.90E-10  4.11E-10  4.11E-10
     am243   4.40E-07  4.95E-07  5.55E-07  6.19E-07  6.87E-07  6.87E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   3.34E-15  3.76E-15  4.21E-15  4.69E-15  5.21E-15  5.21E-15
     am245   8.66E-37  1.19E-36  1.57E-36  2.07E-36  2.69E-36  2.69E-36
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.95E-20  2.08E-20  2.20E-20  2.33E-20  2.45E-20  2.45E-20
     cm242   6.60E-08  7.02E-08  7.44E-08  7.87E-08  8.30E-08  8.30E-08
     cm243   5.08E-17  5.42E-17  5.76E-17  6.11E-17  6.45E-17  6.45E-17
     cm244   5.25E-11  5.91E-11  6.61E-11  7.37E-11  8.19E-11  8.19E-11
1
     sas2h: far-field crit based on b2u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   82
       power= 4.000E-03mw, burnup=1.1688E+04mwd,  flux= 2.65E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   7.57E-14  8.81E-14  1.02E-13  1.17E-13  1.34E-13  1.34E-13
     cm246   4.85E-16  5.82E-16  6.96E-16  8.21E-16  9.67E-16  9.67E-16
     cm247   5.80E-20  7.24E-20  8.96E-20  1.10E-19  1.34E-19  1.34E-19
     cm248   6.82E-23  8.64E-23  1.13E-22  1.44E-22  1.82E-22  1.82E-22
     cm249   2.14E-33  2.77E-33  3.56E-33  4.52E-33  5.70E-33  5.70E-33
     cm250   7.00E-38  9.39E-38  1.25E-37  1.64E-37  2.13E-37  2.13E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.65E+08  2.65E+08  2.65E+08  2.65E+08  2.64E-07
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        5q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

          cross-section data taken from position number  9 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ************************************************************************
          *                                                                      *
          *            prelim lwr origen-s binary working library--id = 1143     *
          *         made from modified card-image origen-s libraries of scale 4.2 *
```

```
*       data from the light element, actinide, and fission product libraries    *
*         decay data, including gamma and total energy, are from endf/b-vi       *
*                                                                                *
*       neutron flux spectrum factors and cross sections were produced from      *
*      the "process2" case updating all nuclides on the scale "burnup" library   *
*                                                                                *
*                        fission product yields are from endf/b-v                *
*                                                                                *
*                  photon libraries use an 18-energy-group structure             *
*                 the photon data are from the master photon data base,          *
*                  produced to include bremsstrahlung from uo2 matrix            *
*                                                                                *
*          see information above this box (if present) for later updates         *
*                                                                                *
**********************************************************************************
*                                                                                *
**********************************************************************************
0
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/28/1996    date library was produced
0                  1697     total number of nuclides in library
                    689     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7993     number of nonzero off-diagonal matrix elements
0
0       ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   83
       power=    .00mw, burnup=  13149.mwd, flux= 2.64E+08n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial       ******* d       ******* d       ******* d       ******* d       ******* d
     productions  1.175230E+06  1.175964E+06  1.176671E+06  1.177350E+06  1.178002E+06  1.178002E+06
     absorptions  9.690727E+05  9.697574E+05  9.704266E+05  9.710801E+05  9.717191E+05  9.717191E+05
     k infinity   1.212737E+00  1.212638E+00  1.212529E+00  1.212412E+00  1.212286E+00  1.212286E+00
                   initial      ******* d       ******* d       ******* d       ******* d       ******* d
0
     actinide
     absorptions  9.555376E+05  9.560779E+05  9.566034E+05  9.571143E+05  9.576114E+05  9.576114E+05
     non-actinide
     abs. fracs.  1.396710E-02  1.410609E-02  1.424450E-02  1.438147E-02  1.451826E-02  1.451826E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   84
0                                                fraction of total absorption rate
       power=    .00mw, burnup=  13149.mwd, flux= 2.64E+08n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149        5.34E-03  5.34E-03  5.34E-03  5.34E-03  5.34E-03  5.34E-03
     eu151        1.23E-03  1.26E-03  1.28E-03  1.31E-03  1.33E-03  1.33E-03
     nd143        1.10E-03  1.13E-03  1.16E-03  1.19E-03  1.22E-03  1.22E-03
     rh103        5.53E-04  5.70E-04  5.88E-04  6.05E-04  6.22E-04  6.22E-04
     xe131        5.43E-04  5.75E-04  5.86E-04  5.97E-04  6.08E-04  6.08E-04
     cs133        2.81E-04  2.89E-04  2.98E-04  3.06E-04  3.15E-04  3.15E-04
     sm147        2.06E-04  2.13E-04  2.19E-04  2.25E-04  2.31E-04  2.31E-04
     tc 99        2.04E-04  2.10E-04  2.16E-04  2.22E-04  2.29E-04  2.29E-04
     gd155        2.15E-04  2.17E-04  2.19E-04  2.20E-04  2.22E-04  2.22E-04
     nd145        1.58E-04  1.62E-04  1.67E-04  1.72E-04  1.76E-04  1.76E-04
     sm152        1.13E-04  1.17E-04  1.21E-04  1.25E-04  1.29E-04  1.29E-04
     mo 95        1.10E-04  1.13E-04  1.16E-04  1.20E-04  1.23E-04  1.23E-04
     cd113        1.01E-04  1.02E-04  1.02E-04  1.03E-04  1.03E-04  1.03E-04
     sm150        7.88E-05  8.14E-05  8.40E-05  8.67E-05  8.93E-05  8.93E-05
     kr 83        6.65E-05  6.84E-05  7.04E-05  7.23E-05  7.43E-05  7.43E-05
     cs135        6.36E-05  6.56E-05  6.75E-05  6.95E-05  7.14E-05  7.14E-05
```

gd157	6.29E-05	6.36E-05	6.43E-05	6.50E-05	6.57E-05	6.57E-05
ru101	4.99E-05	5.14E-05	5.29E-05	5.44E-05	5.60E-05	5.60E-05
eu153	4.69E-05	4.85E-05	5.00E-05	5.16E-05	5.32E-05	5.32E-05
pr141	4.67E-05	4.81E-05	4.95E-05	5.09E-05	5.23E-05	5.23E-05
la139	3.81E-05	3.92E-05	4.04E-05	4.16E-05	4.27E-05	4.27E-05
sm151	4.21E-05	4.22E-05	4.23E-05	4.24E-05	4.25E-05	4.25E-05
ag109	1.89E-05	1.98E-05	2.07E-05	2.17E-05	2.26E-05	2.26E-05
pd105	1.95E-05	2.02E-05	2.09E-05	2.16E-05	2.23E-05	2.23E-05
ba137	1.82E-05	1.88E-05	1.93E-05	1.99E-05	2.05E-05	2.05E-05
zr 93	1.54E-05	1.59E-05	1.63E-05	1.68E-05	1.73E-05	1.73E-05
i129	1.24E-05	1.28E-05	1.32E-05	1.36E-05	1.40E-05	1.40E-05
nd144	1.15E-05	1.19E-05	1.23E-05	1.26E-05	1.30E-05	1.30E-05
mo 97	8.68E-06	8.94E-06	9.20E-06	9.47E-06	9.73E-06	9.73E-06
gd152	6.07E-06	6.41E-06	6.76E-06	7.11E-06	7.48E-06	7.48E-06
pd108	4.60E-06	4.80E-06	5.02E-06	5.23E-06	5.45E-06	5.45E-06
zr 91	3.99E-06	4.10E-06	4.22E-06	4.34E-06	4.46E-06	4.46E-06
y 89	3.80E-06	3.92E-06	4.03E-06	4.14E-06	4.25E-06	4.25E-06
ru102	3.61E-06	3.72E-06	3.83E-06	3.94E-06	4.06E-06	4.06E-06
ce142	3.16E-06	3.25E-06	3.35E-06	3.64E-06	3.54E-06	3.54E-06
nd148	3.07E-06	3.16E-06	3.26E-06	3.35E-06	3.44E-06	3.44E-06
nd146	2.56E-06	2.64E-06	2.72E-06	2.79E-06	2.87E-06	2.87E-06
pd107	2.29E-06	2.38E-06	2.48E-06	2.58E-06	2.69E-06	2.69E-06
in115	2.30E-06	2.38E-06	2.45E-06	2.53E-06	2.60E-06	2.60E-06
ba138	2.18E-06	2.25E-06	2.31E-06	2.38E-06	2.44E-06	2.44E-06
ce140	2.04E-06	2.10E-06	2.16E-06	2.23E-06	2.29E-06	2.29E-06
xe135	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.23E-06	2.23E-06
xe132	1.90E-06	1.96E-06	2.01E-06	2.07E-06	2.13E-06	2.13E-06
mo 98	1.29E-06	1.33E-06	1.37E-06	1.41E-06	1.45E-06	1.45E-06
mo100	1.25E-06	1.29E-06	1.32E-06	1.36E-06	1.40E-06	1.40E-06
xe134	1.21E-06	1.25E-06	1.28E-06	1.32E-06	1.36E-06	1.36E-06
zr 92	9.63E-07	9.91E-07	1.02E-06	1.05E-06	1.08E-06	1.08E-06
i127	9.16E-07	9.67E-07	9.79E-07	1.01E-06	1.04E-06	1.04E-06
ru104	8.39E-07	8.66E-07	8.94E-07	9.22E-07	9.50E-07	9.50E-07

1 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 85
0 fraction of total absorption rate
0 power= .00mw, burnup= 13149.mwd, flux= 2.44E+08n/cm^2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	7.84E-07	8.08E-07	8.32E-07	8.55E-07	8.79E-07	8.79E-07
nd150	6.98E-07	7.19E-07	7.41E-07	7.63E-07	7.84E-07	7.84E-07
xe136	6.58E-07	6.78E-07	6.98E-07	7.18E-07	7.38E-07	7.38E-07
cd111	5.13E-07	5.34E-07	5.55E-07	5.77E-07	5.98E-07	5.98E-07
br 81	4.93E-07	5.08E-07	5.23E-07	5.38E-07	5.53E-07	5.53E-07
ru 99	4.23E-07	4.50E-07	4.77E-07	5.05E-07	5.33E-07	5.33E-07
rb 85	4.71E-07	4.85E-07	4.99E-07	5.13E-07	5.27E-07	5.27E-07
zr 94	4.14E-07	4.29E-07	4.41E-07	4.54E-07	4.66E-07	4.66E-07
zr 90	3.74E-07	3.85E-07	3.96E-07	4.07E-07	4.18E-07	4.18E-07
sm154	3.24E-07	3.35E-07	3.46E-07	3.57E-07	3.68E-07	3.68E-07
eu152	3.16E-07	3.22E-07	3.29E-07	3.35E-07	3.41E-07	3.41E-07
te130	3.02E-07	3.11E-07	3.21E-07	3.30E-07	3.39E-07	3.39E-07
gd154	2.41E-07	2.57E-07	2.73E-07	2.89E-07	3.06E-07	3.06E-07
rb 87	2.72E-07	2.80E-07	2.88E-07	2.96E-07	3.04E-07	3.04E-07
pm147	2.61E-07	2.60E-07	2.60E-07	2.60E-07	2.60E-07	2.60E-07
pd104	1.98E-07	2.06E-07	2.14E-07	2.21E-07	2.29E-07	2.29E-07
se 77	1.95E-07	2.03E-07	2.07E-07	2.13E-07	2.19E-07	2.19E-07
eu155	2.03E-07	2.04E-07	2.05E-07	2.06E-07	2.07E-07	2.07E-07
gd156	1.74E-07	1.82E-07	1.89E-07	1.96E-07	2.03E-07	2.03E-07
kr 84	1.30E-07	1.34E-07	1.38E-07	1.42E-07	1.46E-07	1.46E-07
dy161	1.13E-07	1.18E-07	1.24E-07	1.29E-07	1.35E-07	1.35E-07
sb121	1.06E-07	1.09E-07	1.12E-07	1.16E-07	1.19E-07	1.19E-07

se 79	1.00E-07	1.03E-07	1.06E-07	1.09E-07	1.13E-07	1.13E-07
sb123	8.52E-08	8.80E-08	9.08E-08	9.35E-08	9.63E-08	9.63E-08
ru100	7.22E-08	7.67E-08	8.14E-08	8.61E-08	9.10E-08	9.10E-08
kr 86	7.10E-08	7.31E-08	7.52E-08	7.73E-08	7.94E-08	7.94E-08
te128	6.91E-08	7.13E-08	7.35E-08	7.57E-08	7.79E-08	7.79E-08
nd142	5.05E-08	5.46E-08	5.68E-08	6.02E-08	6.36E-08	6.36E-08
ba134	4.93E-08	5.24E-08	5.56E-08	5.88E-08	6.22E-08	6.22E-08
tb159	4.92E-08	5.13E-08	5.34E-08	5.55E-08	5.77E-08	5.77E-08
sm148	4.50E-08	4.78E-08	5.07E-08	5.37E-08	5.67E-08	5.67E-08
te125	4.68E-08	4.83E-08	4.99E-08	5.15E-08	5.31E-08	5.31E-08
se 80	4.68E-08	4.83E-08	4.97E-08	5.11E-08	5.25E-08	5.25E-08
ba135	4.08E-08	4.34E-08	4.61E-08	4.88E-08	5.16E-08	5.16E-08
gd158	3.84E-08	3.99E-08	4.15E-08	4.31E-08	4.47E-08	4.47E-08
pd104	3.50E-08	3.72E-08	3.95E-08	4.19E-08	4.43E-08	4.43E-08
cd112	3.54E-08	3.67E-08	3.80E-08	3.93E-08	4.07E-08	4.07E-08
dy164	2.61E-08	2.74E-08	2.88E-08	3.01E-08	3.15E-08	3.15E-08
dy162	2.42E-08	2.54E-08	2.67E-08	2.80E-08	2.94E-08	2.94E-08
sn117	2.52E-08	2.61E-08	2.69E-08	2.78E-08	2.87E-08	2.87E-08
li 6	2.54E-08	2.61E-08	2.68E-08	2.75E-08	2.82E-08	2.82E-08
eu154	2.34E-08	2.42E-08	2.50E-08	2.57E-08	2.65E-08	2.65E-08
sd114	2.09E-08	2.17E-08	2.24E-08	2.32E-08	2.40E-08	2.40E-08
sn119	1.92E-08	1.98E-08	2.04E-08	2.11E-08	2.17E-08	2.17E-08
pd110	1.74E-08	1.82E-08	1.89E-08	1.97E-08	2.05E-08	2.05E-08
sn115	1.75E-08	1.81E-08	1.87E-08	1.93E-08	1.98E-08	1.98E-08
sr 90	1.54E-08	1.54E-08	1.54E-08	1.53E-08	1.53E-08	1.53E-08
sr 88	1.51E-08	1.54E-08	1.58E-08	1.42E-08	1.46E-08	1.46E-08
mo 96	1.14E-08	1.23E-08	1.31E-08	1.38E-08	1.46E-08	1.46E-08

1 sas2h: fer-field crit based on 64w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 86
0 fraction of total absorption rate
0 powers= .00mw, burnup= 13149.mwd, flux= 2.44E+08n/cm**2-sec

	Initial ******* d	******* d	******* d	******* d	******* d
cd110	1.07E-08	1.16E-08	1.25E-08	1.34E-08	1.44E-08
rh105	1.09E-08	1.09E-08	1.10E-08	1.10E-08	1.11E-08
se 82	8.96E-09	9.23E-09	9.50E-09	9.76E-09	1.00E-08
sn126	8.72E-09	9.02E-09	9.33E-09	9.63E-09	9.94E-09
nb 93	6.48E-09	6.88E-09	7.30E-09	7.73E-09	8.17E-09
se 78	7.06E-09	7.28E-09	7.50E-09	7.72E-09	7.94E-09
ba136	6.44E-09	6.76E-09	7.10E-09	7.43E-09	7.78E-09
xe130	6.07E-09	6.42E-09	6.79E-09	7.16E-09	7.55E-09
dy163	6.13E-09	6.45E-09	6.78E-09	7.12E-09	7.47E-09
sn124	6.26E-09	6.46E-09	6.67E-09	6.88E-09	7.09E-09
kr 82	5.36E-09	5.44E-09	5.02E-09	4.21E-09	4.51E-09
se 75	4.14E-09	4.29E-09	4.41E-09	4.54E-09	4.67E-09
br 79	3.30E-09	3.51E-09	3.72E-09	3.94E-09	4.17E-09
in113	3.52E-09	3.64E-09	3.76E-09	3.88E-09	4.00E-09
as107	2.79E-09	3.00E-09	3.21E-09	3.44E-09	3.67E-09
as137	3.65E-09	3.45E-09	3.65E-09	3.63E-09	3.64E-09
sn118	2.54E-09	2.62E-09	2.71E-09	2.79E-09	2.88E-09
pr143	2.50E-09	2.50E-09	2.49E-09	2.49E-09	2.49E-09
xe129	1.94E-09	2.06E-09	2.19E-09	2.32E-09	2.45E-09
sn122	2.12E-09	2.19E-09	2.26E-09	2.33E-09	2.40E-09
cd116	2.12E-09	2.19E-09	2.26E-09	2.33E-09	2.40E-09
se134	2.03E-09	2.11E-09	2.17E-09	2.23E-09	2.29E-09
xe133	1.93E-09	1.93E-09	1.93E-09	1.93E-09	1.92E-09
te126	1.44E-09	1.52E-09	1.61E-09	1.70E-09	1.80E-09
sn120	1.57E-09	1.62E-09	1.68E-09	1.73E-09	1.78E-09
se141	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.50E-09
ge 73	1.18E-09	1.21E-09	1.25E-09	1.29E-09	1.33E-09
pm149	9.43E-10	9.42E-10	9.42E-10	9.41E-10	9.41E-10

nd147	8.95E-10	8.96E-10	8.93E-10	8.92E-10	8.91E-10	8.91E-10
pd160	5.43E-10	5.67E-10	5.92E-10	6.16E-10	6.42E-10	6.42E-10
ho165	5.13E-10	5.43E-10	5.74E-10	6.05E-10	6.37E-10	6.37E-10
ce144	5.61E-10	5.60E-10	5.59E-10	5.58E-10	5.57E-10	5.57E-10
kr 85	5.23E-10	5.22E-10	5.21E-10	5.20E-10	5.19E-10	5.19E-10
se 76	4.05E-10	4.17E-10	4.29E-10	4.41E-10	4.53E-10	4.53E-10
dy160	3.31E-10	3.54E-10	3.79E-10	4.04E-10	4.30E-10	4.30E-10
ru103	3.80E-10	3.81E-10	3.81E-10	3.82E-10	3.82E-10	3.82E-10
xe128	1.96E-10	2.08E-10	2.21E-10	2.35E-10	2.49E-10	2.49E-10
zr 95	1.57E-10	1.57E-10	1.56E-10	1.56E-10	1.56E-10	1.56E-10
nb 95	1.44E-10	1.44E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
y 91	1.30E-10	1.30E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10
sr 86	1.00E-10	1.06E-10	1.12E-10	1.18E-10	1.24E-10	1.24E-10
pm151	1.12E-10	1.13E-10	1.13E-10	1.13E-10	1.13E-10	1.13E-10
te126	9.46E-11	9.89E-11	1.03E-10	1.08E-10	1.13E-10	1.13E-10
sn116	7.59E-11	8.07E-11	8.58E-11	9.09E-11	9.62E-11	9.62E-11
sr 87	5.16E-11	5.33E-11	5.50E-11	5.67E-11	5.84E-11	5.84E-11
eu156	5.28E-11	5.32E-11	5.37E-11	5.41E-11	5.45E-11	5.45E-11
gd153	4.53E-11	4.56E-11	4.58E-11	4.60E-11	4.63E-11	4.63E-11
ba140	4.49E-11	4.48E-11	4.48E-11	4.47E-11	4.47E-11	4.47E-11
ru106	4.24E-11	4.28E-11	4.32E-11	4.36E-11	4.40E-11	4.40E-11

1 ess2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 87
0 fraction of total absorption rate
powers .80mw, burnup= 13169.mwd, flux= 2.64E+08n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

nb 94	3.55E-11	3.70E-11	3.86E-11	4.02E-11	4.18E-11	4.18E-11
te122	3.14E-11	3.34E-11	3.55E-11	3.76E-11	3.98E-11	3.98E-11
se 76	3.03E-11	3.19E-11	3.35E-11	3.52E-11	3.69E-11	3.69E-11
er166	2.77E-11	2.92E-11	3.08E-11	3.24E-11	3.41E-11	3.41E-11
sr 89	2.76E-11	2.76E-11	2.75E-11	2.74E-11	2.74E-11	2.74E-11
se 74	2.34E-11	2.42E-11	2.49E-11	2.56E-11	2.64E-11	2.64E-11
kr 87	2.07E-11	2.07E-11	2.06E-11	2.06E-11	2.05E-11	2.05E-11
se 72	1.71E-11	1.77E-11	1.83E-11	1.89E-11	1.95E-11	1.95E-11
sb125	1.78E-11	1.79E-11	1.79E-11	1.80E-11	1.81E-11	1.81E-11
ce143	1.64E-11	1.64E-11	1.63E-11	1.63E-11	1.63E-11	1.63E-11
la140	1.46E-11	1.46E-11	1.46E-11	1.46E-11	1.46E-11	1.46E-11
y 90	1.47E-11	1.46E-11	1.46E-11	1.46E-11	1.45E-11	1.45E-11
mo 99	1.26E-11	1.26E-11	1.26E-11	1.26E-11	1.26E-11	1.26E-11
pm148m	9.65E-12	9.67E-12	9.67E-12	9.68E-12	9.68E-12	9.68E-12
te127m	8.93E-12	8.97E-12	9.01E-12	9.04E-12	9.08E-12	9.08E-12
i131	6.69E-12	6.69E-12	6.69E-12	6.68E-12	6.68E-12	6.68E-12
kr 88	3.17E-12	3.40E-12	3.63E-12	3.91E-12	4.19E-12	4.19E-12
er167	1.67E-12	1.81E-12	1.95E-12	2.10E-12	2.27E-12	2.27E-12
te129m	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.69E-12	1.69E-12
te123	8.96E-13	9.74E-13	1.06E-12	1.14E-12	1.24E-12	1.24E-12
ag111	6.54E-13	6.62E-13	6.69E-13	6.77E-13	6.85E-13	6.85E-13
eu157	5.20E-13	5.25E-13	5.30E-13	5.35E-13	5.40E-13	5.40E-13
pm148	3.64E-13	3.64E-13	3.64E-13	3.63E-13	3.63E-13	3.63E-13
cd115m	2.72E-13	2.73E-13	2.74E-13	2.75E-13	2.75E-13	2.75E-13
cs136	2.52E-13	2.58E-13	2.63E-13	2.68E-13	2.74E-13	2.74E-13
cd108	1.32E-13	1.46E-13	1.60E-13	1.76E-13	1.92E-13	1.92E-13
tb160	1.22E-13	1.27E-13	1.32E-13	1.37E-13	1.42E-13	1.42E-13
be 9	3.23E-14	3.39E-14	3.55E-14	3.70E-14	3.86E-14	3.86E-14
pr142	3.19E-14	3.35E-14	3.50E-14	3.66E-14	3.81E-14	3.81E-14
ru105	3.00E-14	3.02E-14	3.04E-14	3.06E-14	3.08E-14	3.08E-14
sn125	3.25E-14	3.25E-14	3.26E-14	3.27E-14	3.28E-14	3.28E-14
sn114	1.90E-14	2.02E-14	2.15E-14	2.28E-14	2.42E-14	2.42E-14
li 7	2.06E-14	2.13E-14	2.19E-14	2.25E-14	2.31E-14	2.31E-14
sb126	1.69E-14	1.73E-14	1.77E-14	1.82E-14	1.86E-14	1.86E-14

rb 88	1.16E-14	1.16E-14	1.16E-14	1.15E-14	1.15E-14	1.15E-14
i130	1.03E-14	1.05E-14	1.08E-14	1.11E-14	1.14E-14	1.14E-14
en123	1.06E-14	1.06E-14	1.06E-14	1.06E-14	1.06E-14	1.06E-14
i135	9.69E-15	9.69E-15	9.68E-15	9.67E-15	9.66E-15	9.66E-15
te132	9.32E-15	9.31E-15	9.31E-15	9.31E-15	9.30E-15	9.30E-15
sb124	6.08E-15	6.20E-15	6.32E-15	6.44E-15	6.56E-15	6.56E-15
te134	5.41E-15	5.40E-15	5.40E-15	5.39E-15	5.38E-15	5.38E-15
rb 86	3.23E-15	3.32E-15	3.41E-15	3.49E-15	3.58E-15	3.58E-15
in117m	2.65E-15	2.66E-15	2.67E-15	2.69E-15	2.70E-15	2.70E-15
dy165	2.39E-15	2.45E-15	2.52E-15	2.59E-15	2.66E-15	2.66E-15
in117	7.94E-16	7.99E-16	8.03E-16	8.07E-16	8.12E-16	8.12E-16
cs134m	3.83E-16	3.95E-16	4.06E-16	4.18E-16	4.29E-16	4.29E-16
cd118	1.36E-16	1.37E-16	1.37E-16	1.38E-16	1.38E-16	1.38E-16
ge 75	8.28E-17	8.27E-17	8.27E-17	8.26E-17	8.26E-17	8.26E-17
in119m	3.33E-17	3.34E-17	3.34E-17	3.35E-17	3.36E-17	3.36E-17

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 68

0 fraction of total absorption rate

power= .00mw, burnup= 13149.mwd, flux= 2.64E+08n/cm**2-sec

0 initial ******* d ******* d ******* d ******* d

ag110	2.62E-17	2.54E-17	2.63E-17	2.78E-17	2.90E-17	2.90E-17
cd109	1.55E-17	1.62E-17	1.70E-17	1.78E-17	1.86E-17	1.86E-17
in119	2.74E-18	2.75E-18	2.76E-18	2.77E-18	2.78E-18	2.78E-18

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 89

power= 4.000E-03mw, burnup=1.3149E+04mwd, flux= 2.64E+08n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	6.96E-04	7.13E-04	7.40E-04	7.61E-04	7.83E-04	7.83E-04
h 2	2.08E-06	2.14E-06	2.21E-06	2.27E-06	2.34E-06	2.34E-06
h 3	5.14E-11	5.19E-11	5.23E-11	5.27E-11	5.30E-11	5.30E-11
h 4	2.03E-34	2.05E-34	2.07E-34	2.08E-34	2.10E-34	2.10E-34
he 3	1.23E-08	1.26E-08	1.29E-08	1.31E-08	1.34E-08	1.34E-08
he 4	1.15E-04	1.19E-04	1.23E-04	1.26E-04	1.30E-04	1.30E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.39E-05	1.43E-05	1.47E-05	1.52E-05	1.56E-05	1.56E-05
ne 21	3.26E-09	3.46E-09	3.66E-09	3.87E-09	4.09E-09	4.09E-09
ne 22	9.18E-08	9.47E-08	9.76E-08	1.01E-07	1.03E-07	1.03E-07
na 23	7.24E-15	7.27E-15	7.27E-15	7.27E-15	7.26E-15	7.26E-15
na 22	4.28E-11	4.30E-11	4.30E-11	4.30E-11	4.30E-11	4.30E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
na 24m	4.53E-15	4.54E-15	4.53E-15	4.53E-15	4.53E-15	4.53E-15
na 25	9.66E-24	1.03E-23	1.08E-23	1.16E-23	1.21E-23	1.21E-23
mg 24	9.69E-02	9.87E-02	1.03E-01	1.05E-01	1.08E-01	1.08E-01
mg 25	3.34E-07	3.54E-07	3.74E-07	3.95E-07	4.16E-07	4.16E-07
mg 26	2.07E-06	2.14E-06	2.21E-06	2.27E-06	2.34E-06	2.34E-06
mg 27	2.16E-12	2.17E-12	2.17E-12	2.16E-12	2.16E-12	2.16E-12
mg 28	4.29E-24	4.30E-24	4.30E-24	4.30E-24	4.29E-24	4.29E-24
si 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
si 28	2.04E-10	2.03E-10	2.05E-10	2.04E-10	2.04E-10	2.04E-10
si 29	7.70E-22	8.19E-22	8.66E-22	9.15E-22	9.66E-22	9.66E-22
si 30	1.15E-31	1.24E-31	1.38E-31	1.50E-31	1.62E-31	1.62E-31
si 28	2.82E-01	2.90E-01	2.99E-01	3.07E-01	3.15E-01	3.15E-01
si 29	2.97E-06	3.15E-06	3.34E-06	3.53E-06	3.72E-06	3.72E-06
si 30	3.33E-11	3.44E-11	3.97E-11	4.32E-11	4.68E-11	4.68E-11
si 31	2.34E-23	2.53E-23	2.78E-23	3.02E-23	3.28E-23	3.28E-23
si 32	3.68E-29	4.03E-29	4.40E-29	4.79E-29	5.20E-29	5.20E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04

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0   flux                2.64E+08  2.64E+08  2.64E+08  2.64E+08  2.64E-07
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   90
      power= 4.000E-03mw, burnup=1.3149E+04mwd, flux= 2.64E+08n/cm**2-sec
0                                                   nuclide concentrations, gram atoms
                                                     basis = single reactor assembly
              charge ******* g ******* g ******* g ******* g ******* g
    he  4    6.22E+00  6.54E+00  6.87E+00  7.21E+00  7.56E+00  7.56E+00
    pb206    4.43E-03  4.78E-03  5.15E-03  5.53E-03  5.93E-03  5.93E-03
    pb207    4.91E-04  5.22E-04  5.55E-04  5.88E-04  6.23E-04  6.23E-04
    pb208    7.69E-05  8.18E-05  8.68E-05  9.20E-05  9.73E-05  9.73E-05
    pb209    6.88E-11  7.25E-11  7.64E-11  8.03E-11  8.43E-11  8.43E-11
    pb210    4.42E-05  4.61E-05  4.79E-05  4.98E-05  5.17E-05  5.17E-05
    pb211    1.23E-11  1.27E-11  1.31E-11  1.35E-11  1.39E-11  1.39E-11
    pb212    3.34E-11  3.45E-11  3.55E-11  3.66E-11  3.76E-11  3.76E-11
    pb214    1.01E-10  1.05E-10  1.10E-10  1.14E-10  1.18E-10  1.18E-10
    bi208     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    bi209    3.66E-04  3.99E-04  4.33E-04  4.70E-04  5.09E-04  5.09E-04
    bi210m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    bi210    2.72E-08  2.83E-08  2.95E-08  3.07E-08  3.18E-08  3.18E-08
    bi211    7.29E-13  7.52E-13  7.75E-13  7.98E-13  8.22E-13  8.22E-13
    bi212    3.17E-12  3.27E-12  3.37E-12  3.47E-12  3.57E-12  3.57E-12
    bi213    1.61E-11  1.69E-11  1.78E-11  1.88E-11  1.97E-11  1.97E-11
    bi214    7.49E-11  7.81E-11  8.13E-11  8.45E-11  8.78E-11  8.78E-11
    po210    7.51E-07  7.83E-07  8.15E-07  8.47E-07  8.79E-07  8.79E-07
    po211m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    po211    8.05E-18  8.31E-18  8.57E-18  8.82E-18  9.08E-18  9.08E-18
    po212    1.67E-22  1.72E-22  1.77E-22  1.82E-22  1.88E-22  1.88E-22
    po213    2.41E-20  2.55E-20  2.68E-20  2.82E-20  2.96E-20  2.96E-20
    po214    1.03E-17  1.07E-17  1.12E-17  1.16E-17  1.21E-17  1.21E-17
    po215    1.01E-17  1.04E-17  1.07E-17  1.11E-17  1.14E-17  1.14E-17
    po216    1.27E-16  1.31E-16  1.35E-16  1.39E-16  1.43E-16  1.43E-16
    po218    1.17E-11  1.22E-11  1.27E-11  1.32E-11  1.37E-11  1.37E-11
    rn218    4.90E-28  5.06E-28  5.22E-28  5.37E-28  5.52E-28  5.52E-28
    rn219    2.25E-14  2.32E-14  2.39E-14  2.46E-14  2.53E-14  2.53E-14
    rn220    4.45E-14  5.00E-14  5.16E-14  5.31E-14  5.46E-14  5.46E-14
    rn222    2.07E-08  2.14E-08  2.25E-08  2.34E-08  2.43E-08  2.43E-08
    ra222    5.32E-25  5.50E-25  5.64E-25  5.83E-25  6.00E-25  6.00E-25
    ra223    5.61E-09  5.78E-09  5.96E-09  6.14E-09  6.32E-09  6.32E-09
    ra224    2.76E-10  2.85E-10  2.93E-10  3.02E-10  3.11E-10  3.11E-10
    ra225    7.51E-09  7.92E-09  8.35E-09  8.78E-09  9.21E-09  9.21E-09
    ra226    5.17E-03  5.30E-03  5.44E-03  5.58E-03  5.71E-03  5.71E-03
    ra228    1.73E-11  1.79E-11  1.84E-11  1.90E-11  1.95E-11  1.95E-11
    ac225    5.07E-09  5.35E-09  5.64E-09  5.93E-09  6.22E-09  6.22E-09
    ac227    2.90E-06  4.02E-06  4.15E-06  4.27E-06  4.40E-06  4.40E-06
    ac228    2.11E-15  2.18E-15  2.25E-15  2.32E-15  2.38E-15  2.38E-15
    th226    2.39E-23  2.68E-23  2.76E-23  2.85E-23  2.93E-23  2.93E-23
    th227    9.05E-09  9.54E-09  9.83E-09  9.92E-09  1.02E-08  1.02E-08
    th228    5.27E-08  5.43E-08  5.60E-08  5.77E-08  5.93E-08  5.93E-08
    th229    1.44E-03  1.54E-03  1.62E-03  1.71E-03  1.79E-03  1.79E-03
    th230    2.08E-01  2.15E-01  2.21E-01  2.28E-01  2.34E-01  2.34E-01
    th231    5.74E-09  5.77E-09  5.79E-09  5.81E-09  5.84E-09  5.84E-09
    th232    4.23E-02  4.37E-02  4.50E-02  4.64E-02  4.77E-02  4.77E-02
    th233    3.81E-13  3.94E-13  4.06E-13  4.18E-13  4.30E-13  4.30E-13
    th234    5.36E-07  5.36E-07  5.36E-07  5.36E-07  5.36E-07  5.36E-07
    pa231    5.84E-03  6.05E-03  6.24E-03  6.42E-03  6.61E-03  6.61E-03
    pa232    9.84E-11  1.02E-10  1.05E-10  1.08E-10  1.11E-10  1.11E-10
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   91
      power= 4.000E-03mw, burnup=1.3149E+04mwd, flux= 2.64E+08n/cm**2-sec
```

8

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.61E-11	1.61E-11	1.61E-11	1.61E-11	1.61E-11	1.61E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.51E-20	2.60E-20	2.68E-20	2.76E-20	2.84E-20	2.84E-20
u231	7.91E-17	8.17E-17	8.40E-17	8.62E-17	8.85E-17	8.85E-17
u232	1.92E-06	1.98E-06	2.04E-06	2.10E-06	2.16E-06	2.16E-06
u233	1.03E-01	1.06E-01	1.09E-01	1.12E-01	1.15E-01	1.15E-01
u234	1.01E+01	1.02E+01	1.02E+01	1.02E+01	1.03E+01	1.03E+01
u235	6.77E+02	6.76E+02	6.74E+02	6.73E+02	6.71E+02	6.71E+02
u236	1.83E+02	1.83E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02
u237	3.25E-06	3.26E-06	3.26E-06	3.26E-06	3.27E-06	3.27E-06
u238	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04	3.43E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	6.53E-36	8.44E-36	1.08E-35	1.38E-35	1.74E-35	1.74E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.77E-12	8.80E-12	8.79E-12	8.79E-12	8.78E-12	8.78E-12
np236m	2.08E-12	2.09E-12	2.09E-12	2.09E-12	2.08E-12	2.08E-12
np236	1.55E-06	1.60E-06	1.64E-06	1.69E-06	1.74E-06	1.74E-06
np237	4.16E+01	4.16E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01
np238	1.51E-06	1.51E-06	1.51E-06	1.51E-06	1.51E-06	1.51E-06
np239	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05	4.58E-05
np240m	5.57E-38	7.20E-38	9.24E-38	1.18E-37	1.49E-37	1.49E-37
np240	9.14E-15	9.15E-15	9.14E-15	9.14E-15	9.13E-15	9.13E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.13E-09	1.14E-09	1.14E-09	1.14E-09	1.13E-09	1.13E-09
pu237	5.09E-13	5.18E-13	5.24E-13	5.31E-13	5.37E-13	5.37E-13
pu238	2.29E-02	2.29E-02	2.29E-02	2.28E-02	2.28E-02	2.28E-02
pu239	3.19E+01	3.27E+01	3.34E+01	3.42E+01	3.49E+01	3.49E+01
pu240	9.40E-01	1.01E+00	1.05E+00	1.10E+00	1.15E+00	1.15E+00
pu241	3.93E-04	4.12E-04	4.31E-04	4.50E-04	4.69E-04	4.69E-04
pu242	8.53E-05	9.29E-05	1.01E-04	1.09E-04	1.18E-04	1.18E-04
pu243	1.80E-13	1.97E-13	2.14E-13	2.32E-13	2.50E-13	2.50E-13
pu244	3.25E-25	4.20E-25	5.39E-25	6.86E-25	8.67E-25	8.67E-25
pu245	1.30E-35	1.68E-35	2.15E-35	2.74E-35	3.46E-35	3.46E-35
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	2.88E-18	3.05E-18	3.20E-18	3.35E-18	3.51E-18	3.51E-18
am240	1.32E-15	1.39E-15	1.46E-15	1.53E-15	1.60E-15	1.60E-15
am241	1.02E-02	1.08E-02	1.13E-02	1.19E-02	1.24E-02	1.24E-02
am242m	4.89E-06	5.16E-06	5.42E-06	5.69E-06	5.97E-06	5.97E-06
am242	4.11E-10	4.33E-10	4.54E-10	4.77E-10	4.99E-10	4.99E-10
am243	6.87E-07	7.61E-07	8.39E-07	9.23E-07	1.01E-06	1.01E-06
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	5.21E-15	5.78E-15	6.37E-15	7.00E-15	7.67E-15	7.67E-15
am245	2.69E-36	3.47E-36	4.44E-36	5.64E-36	7.12E-36	7.12E-36
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	2.45E-20	2.59E-20	2.72E-20	2.85E-20	2.99E-20	2.99E-20
cm242	8.30E-08	8.74E-08	9.18E-08	9.62E-08	1.01E-07	1.01E-07
cm243	6.45E-17	6.81E-17	7.17E-17	7.53E-17	7.89E-17	7.89E-17
cm244	8.99E-11	9.07E-11	1.00E-10	1.10E-10	1.21E-10	1.21E-10

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 92
power= 4.000E-03mw, burnup=1.3149E+04mwd, flux= 2.64E+08n/cm**2-sec

8

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
cm245	1.34E-13	1.53E-13	1.73E-13	1.95E-13	2.20E-13	2.20E-13

```
     cm246   9.67E-16  1.13E-15  1.32E-15  1.53E-15  1.76E-15  1.76E-15
     cm247   1.34E-19  1.62E-19  1.95E-19  2.34E-19  2.78E-19  2.78E-19
     cm248   1.82E-22  2.27E-22  2.82E-22  3.49E-22  4.27E-22  4.27E-22
     cm249   5.70E-33  7.14E-33  8.87E-33  1.09E-32  1.34E-32  1.34E-32
     cm250   2.13E-37  2.76E-37  3.53E-37  4.49E-37  5.66E-37  5.66E-37
     cm251     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux             2.64E+08  2.64E+08  2.64E+08  2.64E+08  2.64E-07
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       34q array has      12 entries.
library information...

        cross-section data taken from position number  1 of library on unit 15.

        pass  10
        pass   1
        pass   0
        "scale-system control module xsx2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        "scale-system control module xsx2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ****************************************************************************
        *                                                                          *
        *            prelim lwr origen-s binary working library--id = 1143         *
        *          made from modified card-image origen-s libraries of scale 4.2   *
        *      data from the light element, actinide, and fission product libraries *
        *        decay data, including gamma and total energy, are from endf/b-vi  *
        *                                                                          *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "process2" xsxs updating all nuclides on the scale "burnup" library *
        *                                                                          *
        *                  fission product yields are from endf/b-v                *
        *                                                                          *
        *              photon libraries use an 18-energy-group structure           *
        *             the photon data are from the master photon data base,        *
        *              produced to include bremsstrahlung from uo2 matrix          *
        *                                                                          *
        *       use information above this box (if present) for later updates      *
        *                                                                          *
        ****************************************************************************
        *                                                                          *
0       ****************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft15f001
0              8/28/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
```

```
                    879    number of fission product nuclides
                   7993    number of nonzero off-diagonal matrix elements
0        ***********************************************************************
0
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   93
         power=     .00mw, burnup=  14610.mwd, flux= 2.64E+08n/cm**2-sec
0                                                   basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      ******* d     ******* d     ******* d     ******* d
     productions   1.178193E+06  1.178826E+06  1.179432E+06  1.180014E+06  1.180570E+06
     absorptions   9.724615E+05  9.730900E+05  9.737038E+05  9.743031E+05  9.748882E+05
     k infinity    1.211557E+00  1.211425E+00  1.211285E+00  1.211136E+00  1.210979E+00
0                   initial      ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions   9.583446E+05  9.588312E+05  9.593039E+05  9.597630E+05  9.602088E+05
     non-actinide
     abs. frac.    1.451671E-02  1.465315E-02  1.478875E-02  1.492357E-02  1.505756E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   94
0                                   fraction of total absorption rate
         power=     .00mw, burnup=  14610.mwd, flux= 2.64E+08n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d
```

sm149	5.33E-03	5.33E-03	5.33E-03	5.33E-03	5.33E-03
eu151	1.33E-03	1.36E-03	1.38E-03	1.40E-03	1.43E-03
nd143	1.22E-03	1.26E-03	1.29E-03	1.32E-03	1.35E-03
rh103	6.22E-04	6.40E-04	6.57E-04	6.75E-04	6.92E-04
xe131	4.08E-04	4.19E-04	4.30E-04	4.41E-04	4.52E-04
cs133	3.15E-04	3.23E-04	3.32E-04	3.40E-04	3.49E-04
sm147	2.31E-04	2.37E-04	2.44E-04	2.50E-04	2.56E-04
tc 99	2.29E-04	2.35E-04	2.41E-04	2.47E-04	2.53E-04
gd155	2.22E-04	2.23E-04	2.25E-04	2.26E-04	2.27E-04
nd145	1.76E-04	1.81E-04	1.86E-04	1.91E-04	1.95E-04
sm152	1.29E-04	1.34E-04	1.38E-04	1.42E-04	1.46E-04
mo 95	1.23E-04	1.26E-04	1.29E-04	1.33E-04	1.36E-04
cd113	1.03E-04	1.03E-04	1.04E-04	1.04E-04	1.05E-04
sm150	8.93E-05	9.19E-05	9.46E-05	9.72E-05	9.98E-05
kr 83	7.42E-05	7.61E-05	7.81E-05	8.00E-05	8.19E-05
cs135	7.15E-05	7.34E-05	7.53E-05	7.73E-05	7.92E-05
gd157	6.56E-05	6.63E-05	6.69E-05	6.76E-05	6.82E-05
ru101	5.60E-05	5.75E-05	5.91E-05	6.06E-05	6.21E-05
eu153	5.32E-05	5.48E-05	5.64E-05	5.80E-05	5.96E-05
pr141	5.23E-05	5.37E-05	5.51E-05	5.65E-05	5.79E-05
la139	4.27E-05	4.38E-05	4.50E-05	4.61E-05	4.73E-05
sm151	4.24E-05	4.25E-05	4.26E-05	4.27E-05	4.28E-05
ag109	2.27E-05	2.46E-05	2.66E-05	2.86E-05	2.67E-05
pd105	2.23E-05	2.30E-05	2.37E-05	2.44E-05	2.51E-05
ba137	2.04E-05	2.10E-05	2.16E-05	2.21E-05	2.27E-05
zr 93	1.73E-05	1.77E-05	1.82E-05	1.86E-05	1.91E-05
i129	1.39E-05	1.43E-05	1.47E-05	1.51E-05	1.55E-05
nd144	1.29E-05	1.33E-05	1.37E-05	1.40E-05	1.44E-05
mo 97	9.73E-06	9.99E-06	1.03E-05	1.05E-05	1.08E-05
gd152	7.47E-06	7.84E-06	8.21E-06	8.59E-06	8.98E-06
pd108	5.65E-06	5.67E-06	5.89E-06	6.12E-06	6.35E-06
zr 91	4.46E-06	4.67E-06	4.69E-06	4.81E-06	4.92E-06
y 89	4.25E-06	4.36E-06	4.47E-06	4.58E-06	4.69E-06
ru102	4.05E-06	4.16E-06	4.28E-06	4.39E-06	4.50E-06
ce142	3.53E-06	3.63E-06	3.72E-06	3.82E-06	3.91E-06
nd148	2.44E-06	2.53E-06	2.63E-06	2.72E-06	2.81E-06
nd146	2.07E-06	2.95E-06	3.02E-06	3.10E-06	3.18E-06
pd107	2.69E-06	2.79E-06	2.89E-06	3.00E-06	3.11E-06
in115	2.60E-06	2.68E-06	2.75E-06	2.83E-06	2.90E-06

ba138	2.44E-06	2.51E-06	2.57E-06	2.64E-06	2.71E-06
ce140	2.29E-06	2.35E-06	2.41E-06	2.47E-06	2.53E-06
xe132	2.13E-06	2.19E-06	2.25E-06	2.31E-06	2.37E-06
xe135	2.23E-06	2.23E-06	2.23E-06	2.23E-06	2.23E-06
mo 98	1.45E-06	1.49E-06	1.53E-06	1.57E-06	1.61E-06
mo100	1.40E-06	1.44E-06	1.48E-06	1.51E-06	1.55E-06
xe134	1.36E-06	1.39E-06	1.43E-06	1.47E-06	1.50E-06
zr 92	1.08E-06	1.10E-06	1.13E-06	1.16E-06	1.19E-06
1127	1.04E-06	1.07E-06	1.10E-06	1.14E-06	1.17E-06
ru104	9.50E-07	9.78E-07	1.01E-06	1.03E-06	1.06E-06

1 sas2h: far-field crit based on b&u 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 95
0 fraction of total absorption rate
0 powerm .00mw, burnupm 16610.mwd, fluxm 2.64E+08n/cm**2-sec

	initial ******* d	******* d	******* d	******* d
zr 96	8.80E-07	9.04E-07	9.27E-07	9.51E-07	9.74E-07
nd150	7.84E-07	8.06E-07	8.28E-07	8.49E-07	8.71E-07
xe136	7.38E-07	7.58E-07	7.78E-07	7.98E-07	8.18E-07
cd111	5.98E-07	6.20E-07	6.42E-07	6.64E-07	6.87E-07
ru 99	5.33E-07	5.63E-07	5.93E-07	6.24E-07	6.54E-07
br 81	5.53E-07	5.68E-07	5.83E-07	5.97E-07	6.12E-07
rb 85	5.27E-07	5.41E-07	5.55E-07	5.69E-07	5.83E-07
zr 94	4.66E-07	4.79E-07	4.91E-07	5.04E-07	5.16E-07
zr 90	4.18E-07	4.29E-07	4.40E-07	4.51E-07	4.62E-07
sm154	3.67E-07	3.78E-07	3.89E-07	4.00E-07	4.11E-07
gd154	3.06E-07	3.23E-07	3.42E-07	3.60E-07	3.79E-07
te130	3.39E-07	3.48E-07	3.58E-07	3.67E-07	3.76E-07
eu152	3.41E-07	3.47E-07	3.53E-07	3.59E-07	3.65E-07
rb 87	3.04E-07	3.12E-07	3.20E-07	3.28E-07	3.36E-07
pd106	2.29E-07	2.37E-07	2.45E-07	2.53E-07	2.61E-07
pm147	2.40E-07	2.40E-07	2.39E-07	2.39E-07	2.39E-07
se 77	2.19E-07	2.25E-07	2.31E-07	2.36E-07	2.42E-07
gd156	2.03E-07	2.11E-07	2.18E-07	2.26E-07	2.33E-07
eu155	2.07E-07	2.08E-07	2.09E-07	2.10E-07	2.11E-07
kr 84	1.46E-07	1.50E-07	1.54E-07	1.58E-07	1.62E-07
dy161	1.33E-07	1.40E-07	1.46E-07	1.52E-07	1.58E-07
sb121	1.19E-07	1.23E-07	1.26E-07	1.30E-07	1.33E-07
se 79	1.12E-07	1.15E-07	1.18E-07	1.21E-07	1.24E-07
ru100	9.89E-08	9.59E-08	1.01E-07	1.06E-07	1.12E-07
sb123	9.64E-08	9.91E-08	1.02E-07	1.05E-07	1.08E-07
kr 86	7.93E-08	8.14E-08	8.35E-08	8.56E-08	8.76E-08
te128	7.79E-08	8.01E-08	8.23E-08	8.45E-08	8.67E-08
nd142	6.35E-08	6.70E-08	7.06E-08	7.43E-08	7.81E-08
ba134	6.22E-08	6.46E-08	6.71E-08	7.28E-08	7.65E-08
sm148	5.67E-08	5.99E-08	6.31E-08	6.44E-08	6.97E-08
tb159	5.77E-08	5.98E-08	6.21E-08	6.43E-08	6.65E-08
ba135	5.16E-08	5.46E-08	5.76E-08	6.06E-08	6.35E-08
te125	5.31E-08	5.67E-08	5.63E-08	5.79E-08	5.95E-08
se 80	5.25E-08	5.39E-08	5.53E-08	5.67E-08	5.81E-08
pd104	4.43E-08	4.68E-08	4.93E-08	5.20E-08	5.47E-08
gd158	4.47E-08	4.63E-08	4.80E-08	4.96E-08	5.13E-08
cd112	4.07E-08	4.20E-08	4.34E-08	4.47E-08	4.61E-08
dy164	3.15E-08	3.29E-08	3.43E-08	3.57E-08	3.72E-08
dy162	2.94E-08	3.07E-08	3.21E-08	3.36E-08	3.50E-08
sn117	2.87E-08	2.94E-08	3.05E-08	3.14E-08	3.23E-08
li 6	2.82E-08	2.89E-08	2.97E-08	3.04E-08	3.11E-08
eu154	2.45E-08	2.73E-08	2.81E-08	2.89E-08	2.97E-08
cd114	2.40E-08	2.48E-08	2.56E-08	2.64E-08	2.72E-08
sn119	2.17E-08	2.23E-08	2.29E-08	2.36E-08	2.42E-08
pd110	2.05E-08	2.13E-08	2.20E-08	2.28E-08	2.37E-08

sn115	1.98E-08	2.04E-08	2.10E-08	2.16E-08	2.22E-08
cd110	1.44E-08	1.54E-08	1.65E-08	1.76E-08	1.87E-08
mo 96	1.46E-08	1.54E-08	1.62E-08	1.70E-08	1.78E-08
sr 88	1.46E-08	1.50E-08	1.54E-08	1.57E-08	1.61E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 96
0 fraction of total absorption rate
0 power= .00mw, burnup= 14610.mwd, flux= 2.44E+08n/cm**2-sec
initial ******* d ******* d ******* d ******* d

sr 90	1.53E-08	1.53E-08	1.52E-08	1.52E-08	1.52E-08
rh105	1.11E-08	1.12E-08	1.12E-08	1.13E-08	1.13E-08
sn126	9.93E-09	1.02E-08	1.05E-08	1.09E-08	1.12E-08
se 82	1.00E-08	1.03E-08	1.06E-08	1.08E-08	1.11E-08
nb 93	8.17E-09	8.62E-09	9.08E-09	9.55E-09	1.00E-08
ba136	7.78E-09	8.13E-09	8.49E-09	8.86E-09	9.23E-09
xe130	7.54E-09	7.93E-09	8.33E-09	8.75E-09	9.17E-09
dy163	7.46E-09	7.81E-09	8.17E-09	8.53E-09	8.90E-09
se 78	7.94E-09	8.15E-09	8.37E-09	8.59E-09	8.81E-09
sn124	7.10E-09	7.31E-09	7.52E-09	7.73E-09	7.94E-09
kr 82	6.51E-09	6.81E-09	7.12E-09	7.43E-09	7.75E-09
as 75	4.47E-09	4.79E-09	4.92E-09	5.04E-09	5.17E-09
br 79	4.17E-09	4.40E-09	4.44E-09	4.88E-09	5.13E-09
ag107	3.67E-09	3.91E-09	4.16E-09	4.42E-09	4.68E-09
in113	4.00E-09	4.12E-09	4.25E-09	4.37E-09	4.49E-09
cs137	3.64E-09	3.64E-09	3.64E-09	3.64E-09	3.64E-09
sn118	2.88E-09	2.97E-09	3.05E-09	3.14E-09	3.22E-09
xe129	2.45E-09	2.59E-09	2.73E-09	2.88E-09	3.03E-09
sn122	2.40E-09	2.47E-09	2.54E-09	2.61E-09	2.68E-09
cd116	2.40E-09	2.47E-09	2.54E-09	2.61E-09	2.68E-09
ce134	2.29E-09	2.36E-09	2.42E-09	2.48E-09	2.54E-09
pr143	2.49E-09	2.48E-09	2.48E-09	2.48E-09	2.47E-09
te126	1.80E-09	1.90E-09	1.99E-09	2.10E-09	2.20E-09
sn120	1.78E-09	1.83E-09	1.88E-09	1.94E-09	1.99E-09
xe132	1.92E-09	1.92E-09	1.92E-09	1.92E-09	1.92E-09
ce141	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09
se 77	1.33E-09	1.46E-09	1.40E-09	1.44E-09	1.48E-09
pm149	9.40E-10	9.40E-10	9.40E-10	9.39E-10	9.39E-10
nd147	8.92E-10	8.91E-10	8.90E-10	8.89E-10	8.88E-10
ho165	6.37E-10	6.70E-10	7.04E-10	7.39E-10	7.75E-10
gd160	6.42E-10	6.67E-10	6.93E-10	7.19E-10	7.46E-10
ce144	5.57E-10	5.56E-10	5.56E-10	5.55E-10	5.54E-10
dy160	4.50E-10	4.57E-10	4.85E-10	5.14E-10	5.44E-10
kr 85	5.18E-10	5.17E-10	5.16E-10	5.15E-10	5.14E-10
se 76	4.53E-10	4.65E-10	4.77E-10	4.89E-10	5.01E-10
ru103	2.82E-10	2.83E-10	2.83E-10	2.84E-10	2.84E-10
xe128	2.48E-10	2.63E-10	2.77E-10	2.92E-10	3.08E-10
zr 95	1.56E-10	1.56E-10	1.56E-10	1.55E-10	1.55E-10
sr 86	1.24E-10	1.30E-10	1.37E-10	1.44E-10	1.50E-10
nb 95	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.42E-10
te124	1.12E-10	1.17E-10	1.22E-10	1.27E-10	1.32E-10
y 91	1.29E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10
sn116	9.63E-11	1.02E-10	1.07E-10	1.13E-10	1.19E-10
pm151	1.13E-10	1.13E-10	1.13E-10	1.13E-10	1.13E-10
sr 87	6.84E-11	6.01E-11	5.19E-11	5.34E-11	5.44E-11
eu154	5.45E-11	5.49E-11	5.53E-11	5.57E-11	5.61E-11
te122	4.99E-11	4.21E-11	4.45E-11	4.69E-11	4.93E-11
nb 94	4.18E-11	4.35E-11	4.52E-11	4.70E-11	4.88E-11
sm153	4.63E-11	4.65E-11	4.67E-11	4.70E-11	4.72E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 97
0 fraction of total absorption rate

```
0          power=     .00mw, burnup=  14610.mwd, flux= 2.64E+08n/cm**2-sec
                 initial ******* d ******* d ******* d ******* d
```

ru106	4.40E-11	4.44E-11	4.48E-11	4.51E-11	4.55E-11
ba140	4.47E-11	4.46E-11	4.46E-11	4.46E-11	4.45E-11
se 76	3.69E-11	3.87E-11	4.05E-11	4.23E-11	4.42E-11
er166	3.41E-11	3.58E-11	3.75E-11	3.93E-11	4.11E-11
ge 74	2.64E-11	2.71E-11	2.78E-11	2.86E-11	2.93E-11
sr 89	2.74E-11	2.73E-11	2.72E-11	2.72E-11	2.71E-11
ge 72	1.94E-11	2.00E-11	2.06E-11	2.12E-11	2.18E-11
kr 87	2.05E-11	2.05E-11	2.04E-11	2.04E-11	2.03E-11
sb125	1.81E-11	1.81E-11	1.82E-11	1.83E-11	1.83E-11
ce143	1.63E-11	1.63E-11	1.62E-11	1.62E-11	1.62E-11
la140	1.46E-11	1.46E-11	1.45E-11	1.45E-11	1.45E-11
y 90	1.45E-11	1.45E-11	1.45E-11	1.44E-11	1.44E-11
mo 99	1.26E-11	1.26E-11	1.26E-11	1.26E-11	1.26E-11
pm146m	9.68E-12	9.69E-12	9.70E-12	9.70E-12	9.71E-12
te127m	9.07E-12	9.11E-12	9.14E-12	9.18E-12	9.21E-12
i131	6.68E-12	6.68E-12	6.68E-12	6.68E-12	6.68E-12
kr 80	4.19E-12	4.47E-12	4.77E-12	5.09E-12	5.41E-12
er167	2.26E-12	2.43E-12	2.61E-12	2.79E-12	2.98E-12
te129m	1.89E-12	1.89E-12	1.89E-12	1.89E-12	1.90E-12
te123	1.24E-12	1.33E-12	1.44E-12	1.54E-12	1.66E-12
ag111	6.85E-13	6.92E-13	7.00E-13	7.07E-13	7.14E-13
eu157	5.40E-13	5.45E-13	5.50E-13	5.55E-13	5.59E-13
pm148	5.64E-13	5.64E-13	5.64E-13	5.63E-13	5.63E-13
cs136	2.74E-13	2.80E-13	2.85E-13	2.90E-13	2.96E-13
cd115m	2.75E-13	2.76E-13	2.77E-13	2.78E-13	2.79E-13
cd108	1.92E-13	2.10E-13	2.28E-13	2.48E-13	2.69E-13
tb160	1.42E-13	1.47E-13	1.53E-13	1.58E-13	1.63E-13
be 9	5.07E-14	6.03E-14	6.19E-14	6.35E-14	6.51E-14
pr142	5.81E-14	5.96E-14	6.12E-14	6.27E-14	6.43E-14
ru105	3.99E-14	4.01E-14	4.03E-14	4.05E-14	4.07E-14
sn125	3.28E-14	3.28E-14	3.29E-14	3.30E-14	3.31E-14
sn114	2.42E-14	2.56E-14	2.70E-14	2.85E-14	3.00E-14
li 7	2.31E-14	2.37E-14	2.44E-14	2.50E-14	2.56E-14
sb126	1.86E-14	1.91E-14	1.95E-14	1.99E-14	2.04E-14
i130	1.14E-14	1.17E-14	1.20E-14	1.22E-14	1.25E-14
rb 88	1.15E-14	1.15E-14	1.15E-14	1.14E-14	1.14E-14
sn123	1.06E-14	1.06E-14	1.06E-14	1.06E-14	1.06E-14
i135	9.66E-15	9.65E-15	9.64E-15	9.64E-15	9.63E-15
te132	9.30E-15	9.30E-15	9.29E-15	9.29E-15	9.29E-15
sb124	6.56E-15	6.68E-15	6.80E-15	6.92E-15	7.04E-15
te134	5.38E-15	5.37E-15	5.36E-15	5.35E-15	5.34E-15
rb 86	3.58E-15	3.67E-15	3.75E-15	3.84E-15	3.92E-15
dy165	2.66E-15	2.72E-15	2.79E-15	2.86E-15	2.93E-15
in117m	2.70E-15	2.71E-15	2.72E-15	2.74E-15	2.75E-15
in117	6.11E-16	6.15E-16	6.19E-16	6.23E-16	6.27E-16
cs134m	4.29E-16	4.41E-16	4.52E-16	4.64E-16	4.75E-16
cd118	1.38E-16	1.38E-16	1.39E-16	1.39E-16	1.39E-16
ge 75	8.25E-17	8.25E-17	8.24E-17	8.24E-17	8.23E-17
ag110	2.89E-17	3.02E-17	3.15E-17	3.28E-17	3.41E-17

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1          ssz2h: far-field crit based on bbu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2,          fission products          page   92
6                                  fraction of total absorption rate
6          power=     .00mw, burnup=  14610.mwd, flux= 2.64E+08n/cm**2-sec
                 initial ******* d ******* d ******* d ******* d
```

in119m	3.36E-17	3.37E-17	3.37E-17	3.38E-17	3.39E-17
cd109	1.86E-17	1.95E-17	2.04E-17	2.13E-17	2.23E-17
in119	2.78E-18	2.78E-18	2.79E-18	2.80E-18	2.81E-18

in120	4.62E-22	4.63E-22	4.64E-22	4.65E-22	4.66E-22
in120m	7.96E-23	8.04E-23	8.11E-23	8.18E-23	8.25E-23

1

sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 99
power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d
h 1	7.83E-04	8.05E-04	8.27E-04	8.49E-04	8.71E-04
h 2	2.34E-06	2.41E-06	2.47E-06	2.54E-06	2.60E-06
h 3	5.30E-11	5.36E-11	5.39E-11	5.43E-11	5.46E-11
h 4	2.10E-34	2.12E-34	2.13E-34	2.14E-34	2.16E-34
he 3	1.34E-08	1.37E-08	1.39E-08	1.42E-08	1.45E-08
he 4	1.30E-04	1.34E-04	1.37E-04	1.41E-04	1.45E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
na 20	1.56E-05	1.61E-05	1.65E-05	1.69E-05	1.74E-05
na 21	4.09E-09	4.31E-09	4.53E-09	4.77E-09	5.01E-09
na 22	1.03E-07	1.06E-07	1.09E-07	1.12E-07	1.15E-07
na 23	7.26E-15	7.29E-15	7.29E-15	7.29E-15	7.29E-15
na 22	4.30E-11	4.32E-11	4.32E-11	4.32E-11	4.32E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
na 24m	4.53E-15	4.54E-15	4.54E-15	4.54E-15	4.54E-15
na 25	1.21E-23	1.27E-23	1.34E-23	1.40E-23	1.47E-23
mg 24	1.08E-01	1.11E-01	1.14E-01	1.17E-01	1.20E-01
mg 25	4.16E-07	4.38E-07	4.61E-07	4.84E-07	5.08E-07
mg 26	2.34E-06	2.40E-06	2.47E-06	2.53E-06	2.60E-06
mg 27	2.16E-12	2.17E-12	2.17E-12	2.17E-12	2.17E-12
mg 28	4.29E-24	4.31E-24	4.31E-24	4.30E-24	4.30E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.04E-10	2.03E-10	2.05E-10	2.05E-10	2.05E-10
al 29	9.66E-22	1.02E-21	1.07E-21	1.13E-21	1.18E-21
al 30	1.62E-31	1.76E-31	1.90E-31	2.05E-31	2.20E-31
si 28	3.15E-01	3.24E-01	3.32E-01	3.40E-01	3.49E-01
si 29	3.72E-06	3.92E-06	4.13E-06	4.34E-06	4.55E-06
si 30	4.68E-11	5.07E-11	5.47E-11	5.90E-11	6.35E-11
si 31	3.28E-23	3.54E-23	3.83E-23	4.12E-23	4.44E-23
si 32	5.20E-29	5.64E-29	6.10E-29	6.58E-29	7.09E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
6 flux		2.64E+08	2.64E+08	2.64E+08	2.64E+08

1

sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 100
power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
6 nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d
he 4	7.56E+00	7.91E+00	8.27E+00	8.63E+00	9.00E+00
pb206	5.93E-03	6.34E-03	6.76E-03	7.20E-03	7.66E-03
pb207	6.23E-04	6.58E-04	6.95E-04	7.32E-04	7.70E-04
pb208	9.73E-05	1.03E-04	1.08E-04	1.14E-04	1.20E-04
pb209	8.43E-11	8.84E-11	9.25E-11	9.67E-11	1.01E-10
pb210	5.17E-05	5.37E-05	5.54E-05	5.75E-05	5.94E-05
pb211	1.39E-11	1.43E-11	1.47E-11	1.51E-11	1.54E-11
pb212	3.76E-11	3.87E-11	3.98E-11	4.08E-11	4.19E-11
pb214	1.18E-10	1.23E-10	1.27E-10	1.31E-10	1.36E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.09E-04	5.49E-04	5.91E-04	6.35E-04	6.81E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.18E-08	3.30E-08	3.42E-08	3.54E-08	3.66E-08
bi211	8.22E-13	8.45E-13	8.69E-13	8.92E-13	9.16E-13

bi212	3.57E-12	3.47E-12	3.77E-12	3.87E-12	3.87E-12
bi213	1.97E-11	2.06E-11	2.16E-11	2.26E-11	2.36E-11
bi214	8.78E-11	9.10E-11	9.43E-11	9.75E-11	1.01E-10
po210	8.79E-07	9.12E-07	9.44E-07	9.77E-07	1.01E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	9.08E-18	9.34E-18	9.60E-18	9.86E-18	1.01E-17
po212	1.88E-22	1.93E-22	1.98E-22	2.03E-22	2.09E-22
po213	2.96E-20	3.10E-20	3.25E-20	3.40E-20	3.54E-20
po214	1.21E-17	1.25E-17	1.30E-17	1.34E-17	1.39E-17
po215	1.14E-17	1.17E-17	1.20E-17	1.24E-17	1.27E-17
po216	1.43E-16	1.47E-16	1.51E-16	1.55E-16	1.59E-16
po218	1.37E-11	1.42E-11	1.47E-11	1.52E-11	1.57E-11
rn218	5.52E-28	5.69E-28	5.85E-28	6.00E-28	6.16E-28
rn219	2.53E-14	2.61E-14	2.68E-14	2.75E-14	2.82E-14
rn220	5.46E-14	5.62E-14	5.77E-14	5.93E-14	6.08E-14
rn222	2.43E-08	2.52E-08	2.61E-08	2.70E-08	2.79E-08
ra222	6.00E-25	6.18E-25	6.35E-25	6.52E-25	6.69E-25
ra223	6.32E-09	6.50E-09	6.68E-09	6.86E-09	7.05E-09
ra224	3.11E-10	3.20E-10	3.28E-10	3.37E-10	3.46E-10
ra225	9.21E-09	9.46E-09	1.01E-08	1.06E-08	1.10E-08
ra226	3.71E-03	3.85E-03	3.99E-03	4.12E-03	4.26E-03
ra228	1.95E-11	2.01E-11	2.06E-11	2.12E-11	2.18E-11
ac225	6.22E-09	6.52E-09	6.83E-09	7.15E-09	7.45E-09
ac227	4.40E-06	4.52E-06	4.65E-06	4.77E-06	4.90E-06
ac228	2.38E-15	2.45E-15	2.52E-15	2.59E-15	2.66E-15
th226	2.93E-23	3.02E-23	3.10E-23	3.18E-23	3.26E-23
th227	1.02E-08	1.05E-08	1.08E-08	1.11E-08	1.14E-08
th228	5.93E-08	6.10E-08	6.27E-08	6.44E-08	6.60E-08
th229	1.79E-03	1.88E-03	1.96E-03	2.05E-03	2.14E-03
th230	2.34E-01	2.41E-01	2.48E-01	2.54E-01	2.61E-01
th231	3.84E-09	3.84E-09	3.89E-09	3.91E-09	3.94E-09
th232	4.77E-02	4.91E-02	5.05E-02	5.18E-02	5.32E-02
th233	4.30E-13	4.42E-13	4.54E-13	4.67E-13	4.79E-13
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	6.41E-03	6.80E-03	6.99E-03	7.18E-03	7.37E-03
pa232	1.11E-10	1.14E-10	1.17E-10	1.20E-10	1.23E-10

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 101
power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d
pa233	1.46E-06	1.43E-06	1.43E-06	1.43E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.84E-20	2.92E-20	3.00E-20	3.08E-20
u231	8.85E-17	9.10E-17	9.33E-17	9.56E-17
u232	2.14E-06	2.22E-06	2.28E-06	2.34E-06
u233	1.15E-01	1.18E-01	1.21E-01	1.24E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.04E+01
u235	6.71E+02	6.70E+02	6.68E+02	6.67E+02
u236	1.84E+02	1.85E+02	1.85E+02	1.85E+02
u237	3.27E-06	3.28E-06	3.28E-06	3.29E-06
u238	3.43E+04	3.43E+04	3.43E+04	3.43E+04
u239	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	1.74E-35	2.98E-35	3.72E-35	4.36E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.78E-12	8.82E-12	8.81E-12	8.81E-12
np236m	2.08E-12	2.09E-12	2.09E-12	2.09E-12

```
     np236   1.74E-06  1.79E-06  1.83E-06  1.88E-06  1.93E-06
     np237   4.15E+01  4.15E+01  4.15E+01  4.15E+01  4.15E+01
     np238   1.51E-06  1.51E-06  1.51E-06  1.51E-06  1.51E-06
     np239   4.58E-05  4.58E-05  4.58E-05  4.58E-05  4.58E-05
     np240m  1.49E-37  1.66E-37  2.32E-37  2.88E-37  3.55E-37
     np240   9.13E-15  9.14E-15  9.14E-15  9.13E-15  9.13E-15
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.13E-09  1.14E-09  1.14E-09  1.14E-09  1.14E-09
     pu237   5.37E-13  5.46E-13  5.52E-13  5.58E-13  5.64E-13
     pu238   2.28E-02  2.28E-02  2.28E-02  2.28E-02  2.28E-02
     pu239   3.49E+01  3.57E+01  3.64E+01  3.71E+01  3.78E+01
     pu240   1.15E+00  1.19E+00  1.24E+00  1.29E+00  1.34E+00
     pu241   4.69E-04  4.89E-04  5.08E-04  5.28E-04  5.47E-04
     pu242   1.18E-04  1.28E-04  1.37E-04  1.47E-04  1.58E-04
     pu243   2.50E-13  2.70E-13  2.91E-13  3.12E-13  3.34E-13
     pu244   8.47E-25  1.09E-24  1.36E-24  1.65E-24  2.07E-24
     pu245   3.46E-35  4.33E-35  5.40E-35  6.69E-35  8.24E-35
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   3.51E-18  3.68E-18  3.84E-18  4.00E-18  4.16E-18
     am240   1.60E-15  1.68E-15  1.75E-15  1.83E-15  1.90E-15
     am241   1.24E-02  1.30E-02  1.35E-02  1.41E-02  1.47E-02
     am242m  5.97E-06  6.24E-06  6.52E-06  6.80E-06  7.07E-06
     am242   4.99E-10  5.21E-10  5.44E-10  5.66E-10  5.89E-10
     am243   1.01E-06  1.11E-06  1.21E-06  1.31E-06  1.42E-06
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   7.67E-15  8.40E-15  9.16E-15  9.96E-15  1.08E-14
     am245   7.12E-36  8.92E-36  1.11E-35  1.37E-35  1.69E-35
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   2.99E-20  3.13E-20  3.27E-20  3.40E-20  3.54E-20
     cm242   1.01E-07  1.05E-07  1.10E-07  1.14E-07  1.19E-07
     cm243   7.89E-17  8.27E-17  8.64E-17  9.01E-17  9.38E-17
     cm244   1.21E-10  1.32E-10  1.44E-10  1.56E-10  1.70E-10
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page  102
       power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d
     cm245   2.20E-13  2.46E-13  2.75E-13  3.06E-13  3.40E-13
     cm246   1.76E-15  2.02E-15  2.31E-15  2.64E-15  2.99E-15
     cm247   2.70E-19  3.29E-19  3.87E-19  4.56E-19  5.30E-19
     cm248   4.27E-22  5.21E-22  6.31E-22  7.61E-22  9.12E-22
     cm249   1.34E-32  1.64E-32  1.98E-32  2.39E-32  2.86E-32
     cm250   5.66E-37  7.09E-37  8.83E-37  1.09E-36  1.34E-36
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux              2.64E+08  2.64E+08  2.64E+08  2.64E+08
0  .results on logical unit no. 71, position  1, for time step  4, subcase11, (run position 1, case position 1)
   title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements          page  103
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0                                                  nuclide concentrations, grams
                                                   basis =single reactor assembly
                 initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
       h  1      8.71E-04  8.71E-04  8.71E-04  8.71E-04  8.71E-04  8.71E-04  8.71E-04
       h  2      5.21E-06  5.21E-06  5.21E-06  5.21E-06  5.21E-06  5.21E-06  5.21E-06
      he  4      5.78E-04  5.78E-04  5.78E-04  5.78E-04  5.78E-04  5.78E-04  5.78E-04
      ne 20      3.47E-04  3.47E-04  3.47E-04  3.47E-04  3.47E-04  3.47E-04  3.47E-04
      ne 22      2.53E-06  2.53E-06  2.53E-06  2.53E-06  2.53E-06  2.53E-06  2.53E-06
```

na 23	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05
mg 24	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
mg 25	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05
mg 26	6.76E-05	6.76E-05	6.76E-05	6.76E-05	6.76E-05	6.76E-05	6.76E-05
al 27	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06
si 28	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00	9.76E+00
si 29	1.32E-04	1.32E-04	1.32E-04	1.32E-04	1.32E-04	1.32E-04	1.32E-04
total	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 104
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0
element radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.58E-06	1.51E-06	1.44E-06	1.38E-06	1.31E-06	1.25E-06	1.20E-06
na	8.44E+00	4.75E-06	3.81E-06	3.05E-06	2.44E-06	1.96E-06	1.57E-06
totals	2.57E+01	4.26E-06	3.25E-06	4.43E-06	3.76E-06	3.21E-06	2.76E-06

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 105
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0
element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na	1.71E-01	6.73E-08	5.39E-08	4.31E-08	3.44E-08	2.77E-08	2.22E-08
totals	4.79E-01	6.73E-08	5.39E-08	4.32E-08	3.44E-08	2.77E-08	2.22E-08

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 106
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0
nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 22	7.71E-08	6.18E-08	4.95E-08	3.96E-08	3.17E-08	2.54E-08	2.04E-08
total	3.33E-01	6.18E-08	4.95E-08	3.96E-08	3.17E-08	2.54E-08	2.04E-08

1

sas2h: far-field crit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 107
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0
nuclide concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	9.00E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00
pb206	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.67E-03	7.67E-03
pb207	7.70E-04	7.71E-04	7.71E-04	7.71E-04	7.71E-04	7.71E-04	7.71E-04
pb208	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04
pb210	5.94E-05	5.94E-05	5.94E-05	5.94E-05	5.94E-05	5.94E-05	5.94E-05
bi209	6.81E-06	6.82E-06	6.82E-06	6.82E-06	6.82E-06	6.82E-06	6.82E-06
po210	1.01E-06	1.00E-06	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07
ra226	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.27E-03	4.27E-03
ac227	4.90E-06	4.90E-06	4.90E-06	4.90E-06	4.90E-06	4.90E-06	4.90E-06
th229	2.14E-03	2.14E-03	2.14E-03	2.14E-03	2.15E-03	2.15E-03	2.15E-03
th230	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01	2.61E-01
th232	5.32E-02	5.32E-02	5.32E-02	5.32E-02	5.32E-02	5.32E-02	5.32E-02
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03
pa233	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06
u232	2.40E-06	2.38E-06	2.36E-06	2.33E-06	2.33E-06	2.31E-06	2.29E-06
u233	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
u234	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01
u235	6.65E+02	6.65E+02	6.65E+02	6.65E+02	6.65E+02	6.65E+02	6.65E+02
u236	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04

np236	1.93E-06	1.93E-06	1.93E-06	1.93E-06	1.93E-06	1.93E-06	1.93E-06
np237	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01
pu238	2.28E-02	2.27E-02	2.25E-02	2.24E-02	2.22E-02	2.21E-02	2.19E-02
pu239	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01
pu240	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00	1.34E+00
pu241	5.47E-04	5.26E-04	5.05E-04	4.85E-04	4.66E-04	4.47E-04	4.30E-04
pu242	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04
am241	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02
am242m	7.07E-06	7.05E-06	7.02E-06	6.99E-06	6.96E-06	6.93E-06	6.90E-06
am243	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 108
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec

0

element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	9.00E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00	9.01E+00
pb	8.61E-03	8.61E-03	8.61E-03	8.61E-03	8.61E-03	8.62E-03	8.62E-03
bi	6.81E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04	6.82E-04
po	1.01E-06	1.00E-06	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07
ra	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.27E-03	4.27E-03
ac	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06
th	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.16E-01	3.17E-01	3.17E-01
pa	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03	7.37E-03
u	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04	3.72E+04
np	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.15E+01
pu	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01
am	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 109
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide concentrations, grams
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01
pb206	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00
pb207	1.39E-01	1.39E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
pb208	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02
pb210	1.25E-02	1.25E-02	1.25E-02	1.25E-02	1.25E-02	1.25E-02	1.25E-02
bi209	1.42E-01	1.42E-01	1.42E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
bi210	7.68E-06	7.68E-06	7.68E-06	7.68E-06	7.68E-06	7.68E-06	7.68E-06
po210	2.12E-04	2.10E-04	2.09E-04	2.09E-04	2.09E-04	2.09E-04	2.09E-04
rn222	6.19E-06	6.19E-06	6.19E-06	6.19E-06	6.20E-06	6.20E-06	6.20E-06
ra223	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06
ra225	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06
ra226	9.63E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01
ac225	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06
ac227	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03
th227	2.58E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06
th228	1.31E-05	1.30E-05	1.30E-05	1.49E-05	1.48E-05	1.47E-05	1.46E-05
th229	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01
th230	6.80E+01	6.80E+01	6.80E+01	6.81E+01	6.81E+01	6.81E+01	6.81E+01
th231	9.09E-07	6.36E-07	6.36E-07	6.36E-07	6.36E-07	6.36E-07	6.36E-07
th232	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01
th234	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04
pa231	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00
pa233	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04
u232	5.58E-04	5.53E-04	5.49E-04	5.44E-04	5.40E-04	5.35E-04	5.31E-04

u233	2.95E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01	2.96E+01
u234	2.43E+03	2.43E+03	2.43E+03	2.43E+03	2.43E+03	2.43E+03	2.43E+03
u235	1.56E+05	1.56E+05	1.56E+05	1.56E+05	1.56E+05	1.56E+05	1.56E+05
u236	4.37E+04	4.37E+04	4.37E+04	4.37E+04	4.37E+04	4.37E+04	4.37E+04
u238	8.64E+06	8.64E+06	8.64E+06	8.64E+06	8.64E+06	8.64E+06	8.64E+06
np236	4.54E-04	4.54E-04	4.54E-04	4.54E-04	4.54E-04	4.54E-04	4.54E-04
np237	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03
pu238	5.43E+00	5.39E+00	5.36E+00	5.32E+00	5.29E+00	5.25E+00	5.22E+00
pu239	9.03E+03	9.03E+03	9.03E+03	9.03E+03	9.03E+03	9.03E+03	9.03E+03
pu240	3.21E+02	3.21E+02	3.21E+02	3.21E+02	3.21E+02	3.21E+02	3.21E+02
pu241	1.32E-01	1.27E-01	1.22E-01	1.17E-01	1.12E-01	1.08E-01	1.04E-01
pu242	3.82E-02	3.82E-02	3.82E-02	3.82E-02	3.82E-02	3.82E-02	3.82E-02
am241	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00
am242m	1.71E-03	1.71E-03	1.70E-03	1.69E-03	1.68E-03	1.68E-03	1.67E-03
am243	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04	3.46E-04
cm242	2.88E-05	1.11E-05	6.26E-06	4.91E-06	4.33E-06	4.41E-06	4.37E-06
total	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 110
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01	3.60E+01
pb	1.77E+00	1.77E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00
bi	1.42E-01	1.42E-01	1.42E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
po	2.12E-04	2.10E-04	2.09E-04	2.09E-04	2.09E-04	2.09E-04	2.09E-04
rn	6.19E-06	6.19E-06	6.19E-06	6.19E-06	6.20E-06	6.20E-06	6.20E-06
ra	9.63E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01	9.64E-01
ac	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03
th	7.29E+01	7.29E+01	7.29E+01	7.29E+01	7.29E+01	7.29E+01	7.29E+01
pa	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00	1.70E+00
u	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06
np	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03	9.83E+03
pu	9.36E+03	9.36E+03	9.36E+03	9.36E+03	9.36E+03	9.36E+03	9.36E+03
am	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00	3.54E+00
cm	2.88E-05	1.12E-05	6.30E-06	4.95E-06	4.57E-06	4.45E-06	4.40E-06
totals	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 111
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl206	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06	1.26E-06
tl207	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.04E-02	8.04E-02	8.04E-02
tl208	4.44E-03	4.45E-03	4.43E-03	4.41E-03	4.39E-03	4.36E-03	4.33E-03
tl209	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03
pb209	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
pb210	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01
pb211	8.05E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02
pb212	1.23E-02	1.24E-02	1.23E-02	1.23E-02	1.22E-02	1.21E-02	1.20E-02
pb214	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01
bi210	9.53E-01	9.54E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01
bi211	8.05E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02
bi212	1.23E-02	1.24E-02	1.23E-02	1.23E-02	1.22E-02	1.21E-02	1.20E-02
bi213	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
bi214	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01
po210	9.53E-01	9.43E-01	9.41E-01	9.41E-01	9.41E-01	9.41E-01	9.41E-01
po211	2.21E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04

pa212	7.91E-03	7.93E-03	7.90E-03	7.86E-03	7.82E-03	7.77E-03	7.72E-03
pa213	9.52E-02	9.53E-02	9.53E-02	9.53E-02	9.53E-02	9.53E-02	9.53E-02
pa214	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01
pa215	8.05E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02
pa216	1.23E-02	1.24E-02	1.23E-02	1.23E-02	1.22E-02	1.21E-02	1.20E-02
pa218	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.54E-01
at217	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
rn219	8.05E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02
rn220	1.23E-02	1.24E-02	1.23E-02	1.23E-02	1.22E-02	1.21E-02	1.20E-02
rn222	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.54E-01
fr221	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
fr223	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03
ra223	8.05E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02	8.07E-02
ra224	1.23E-02	1.24E-02	1.23E-02	1.23E-02	1.22E-02	1.21E-02	1.20E-02
ra225	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
ra226	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.53E-01	9.54E-01
ra228	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06
ac225	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
ac227	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02
ac228	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06
th227	7.94E-02	7.96E-02	7.96E-02	7.96E-02	7.96E-02	7.96E-02	7.96E-02
th228	1.23E-02	1.23E-02	1.23E-02	1.22E-02	1.22E-02	1.21E-02	1.20E-02
th229	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.73E-02	9.74E-02	9.74E-02
th230	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00
th231	4.83E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01
th232	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.35E-06	1.36E-06
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	8.04E-02	8.04E-02	8.04E-02	8.04E-02	8.04E-02	8.04E-02	8.04E-02
pa233	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	5.78E-03	5.78E-03	5.78E-03	5.78E-03	5.78E-03	5.78E-03	5.78E-03
u232	1.23E-02	1.22E-02	1.21E-02	1.20E-02	1.19E-02	1.18E-02	1.17E-02
u233	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.85E-01
u234	1.51E+01	1.51E+01	1.51E+01	1.51E+01	1.51E+01	1.51E+01	1.51E+01
u235	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01
u236	2.83E+00	2.83E+00	2.83E+00	2.83E+00	2.83E+00	2.83E+00	2.83E+00

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/stu 40% h2o/ 8% uo2 actinides page 112
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4410E+04mwd, flux= 2.71E+08n/cm**2-sec
0 nuclide radioactivity, curies
basis:single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
u237	6.37E+01	5.13E-04	1.01E-04	2.09E-04	1.78E-04	2.67E-04	2.54E-04
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np236	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06
np237	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00	6.93E+00
np238	9.29E+01	8.04E-05	8.03E-05	7.98E-05	7.94E-05	7.91E-05	7.88E-05
np239	2.54E+03	6.91E-05	6.91E-05	6.91E-05	6.91E-05	6.91E-05	6.91E-05
pu236	1.40E-04	1.15E-04	9.44E-05	7.75E-05	6.36E-05	5.22E-05	4.29E-05
pu238	9.30E+01	9.24E+01	9.18E+01	9.12E+01	9.06E+01	9.00E+01	8.94E+01
pu239	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02
pu240	7.28E+01	7.28E+01	7.28E+01	7.28E+01	7.28E+01	7.28E+01	7.28E+01
pu241	1.36E+01	1.31E+01	1.26E+01	1.21E+01	1.16E+01	1.12E+01	1.07E+01
pu242	1.51E-04	1.51E-04	1.51E-04	1.51E-04	1.51E-04	1.51E-04	1.51E-04
am241	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
am242m	1.79E-02	1.79E-02	1.78E-02	1.77E-02	1.77E-02	1.76E-02	1.75E-02
am242	1.15E-01	1.78E-02	1.77E-02	1.76E-02	1.76E-02	1.75E-02	1.74E-02
am243	6.91E-05	6.91E-05	6.91E-05	6.91E-05	6.91E-05	6.91E-05	6.91E-05
cm242	9.33E-02	2.69E-02	2.07E-02	1.63E-02	1.30E-02	1.44E-02	1.45E-02
cm244	3.35E-06	3.25E-06	3.15E-06	3.05E-06	2.95E-06	2.86E-06	2.77E-06

total	6.04E+03	8.04E+02	8.03E+02	8.02E+02	8.01E+02	8.00E+02	7.99E+02

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sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 113
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

element thermal power, watts
basis weingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	3.74E-04	3.75E-04	3.75E-04	3.74E-04	3.74E-04	3.73E-04	3.72E-04
pb	3.68E-03	3.68E-03	3.68E-03	3.68E-03	3.68E-03	3.68E-03	3.68E-03
bi	1.82E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02	1.83E-02
po	1.19E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
at	4.15E-03	4.15E-03	4.15E-03	4.15E-03	4.15E-03	4.15E-03	4.16E-03
rn	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02
fr	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03
ra	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02
ac	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03	3.44E-03
th	4.30E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02
pa	3.44E-02	3.44E-02	3.44E-02	3.44E-02	3.44E-02	3.44E-02	3.44E-02
u	7.62E+00	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
np	7.09E+00	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
pu	2.28E+01	2.28E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01
am	4.05E-01	4.05E-01	4.05E-01	4.05E-01	4.05E-01	4.05E-01	4.05E-01
cm	3.48E-03	1.35E-03	7.57E-04	5.96E-04	5.48E-04	5.34E-04	5.28E-04
totals	3.82E+01	2.43E+01	2.42E+01	2.42E+01	2.42E+01	2.42E+01	2.42E+01

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sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 114
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide gamma power, watts
basis weingle reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
tl208	8.86E-05	8.86E-05	8.83E-05	8.79E-05	8.74E-05	8.68E-05	8.63E-05
tl209	2.57E-05	2.57E-05	2.57E-05	2.57E-05	2.57E-05	2.57E-05	2.57E-05
pb210	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05
pb211	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05
pb212	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.05E-05	1.04E-05	1.04E-05
pb214	1.41E-03	1.41E-03	1.41E-03	1.41E-03	1.41E-03	1.41E-03	1.41E-03
bi211	2.23E-05	2.24E-05	2.24E-05	2.24E-05	2.24E-05	2.24E-05	2.24E-05
bi212	7.70E-06	7.72E-06	7.69E-06	7.65E-06	7.61E-06	7.56E-06	7.51E-06
bi213	7.28E-05	7.28E-05	7.28E-05	7.29E-05	7.29E-05	7.29E-05	7.29E-05
bi214	8.51E-03	8.52E-03	8.52E-03	8.52E-03	8.52E-03	8.52E-03	8.52E-03
po210	4.80E-08	4.75E-08	4.74E-08	4.74E-08	4.74E-08	4.74E-08	4.74E-08
po211	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08
po214	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07
po215	8.37E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08
rn219	2.67E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05	2.68E-05
rn220	4.46E-08	4.47E-08	4.46E-08	4.44E-08	4.41E-08	4.39E-08	4.36E-08
rn222	2.20E-06	2.20E-06	2.20E-06	2.20E-06	2.20E-06	2.20E-06	2.20E-06
fr221	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05	1.71E-05
fr223	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07
ra223	6.41E-05	6.43E-05	6.43E-05	6.43E-05	6.43E-05	6.43E-05	6.43E-05
ra224	7.37E-07	7.38E-07	7.36E-07	7.33E-07	7.29E-07	7.24E-07	7.19E-07
ra225	8.30E-06	8.30E-06	8.30E-06	8.30E-06	8.31E-06	8.31E-06	8.31E-06
ra226	4.08E-05	4.08E-05	4.08E-05	4.08E-05	4.08E-05	4.08E-05	4.08E-05
ac225	9.69E-06	9.69E-06	9.69E-06	9.69E-06	9.69E-06	9.70E-06	9.70E-06
ac227	9.21E-08	9.21E-08	9.21E-08	9.21E-08	9.21E-08	9.21E-08	9.21E-08
ac228	7.06E-09	7.07E-09	7.07E-09	7.07E-09	7.07E-09	7.07E-09	7.07E-09
th227	5.32E-05	5.24E-05	5.24E-05	5.24E-05	5.24E-05	5.24E-05	5.23E-05
th228	2.58E-07	2.57E-07	2.56E-07	2.55E-07	2.54E-07	2.52E-07	2.50E-07
th229	5.46E-05	5.46E-05	5.46E-05	5.46E-05	5.46E-05	5.46E-05	5.46E-05

th230	1.23E-05	1.23E-05	1.23E-05	1.23E-05	1.23E-05	1.23E-05	1.23E-05
th231	6.69E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05	6.22E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	1.91E-05	1.91E-05	1.91E-05	1.91E-05	1.91E-05	1.91E-05	1.91E-05
pa233	9.19E-03	9.19E-03	9.19E-03	9.19E-03	9.19E-03	9.19E-03	9.19E-03
pa234m	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04
pa234	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05	4.39E-05
u232	1.58E-07	1.57E-07	1.56E-07	1.55E-07	1.53E-07	1.52E-07	1.51E-07
u233	2.09E-06	2.09E-06	2.09E-06	2.09E-06	2.10E-06	2.10E-06	2.10E-06
u234	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04
u235	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04
u236	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05	2.85E-05
u237	5.38E-02	2.65E-07	2.55E-07	2.44E-07	2.35E-07	2.26E-07	2.17E-07
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np236	5.22E-09	5.22E-09	5.22E-09	5.22E-09	5.22E-09	5.22E-09	5.22E-09
np237	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03
np238	3.56E-01	3.88E-07	3.07E-07	2.06E-07	2.05E-07	2.03E-07	2.02E-07
np239	2.76E+00	7.52E-08	7.52E-08	7.52E-08	7.52E-08	7.52E-08	7.52E-08
pu238	1.05E-03	1.04E-03	1.03E-03	1.03E-03	1.02E-03	1.01E-03	1.01E-03
pu239	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03
pu240	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04	7.12E-04
pu241	1.41E-07	1.36E-07	1.31E-07	1.25E-07	1.20E-07	1.14E-07	1.11E-07

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 115
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
am241	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03
am242m	6.49E-07	6.46E-07	6.43E-07	6.41E-07	6.38E-07	6.36E-07	6.33E-07
am242	1.33E-05	2.05E-06	2.04E-06	2.03E-06	2.02E-06	2.02E-06	2.01E-06
am243	2.40E-08	2.40E-08	2.40E-08	2.40E-08	2.40E-08	2.40E-08	2.40E-08
cm242	1.19E-06	4.61E-07	2.59E-07	2.04E-07	1.88E-07	1.83E-07	1.81E-07
total	3.97E+00	2.87E-02	2.87E-02	2.86E-02	2.86E-02	2.86E-02	2.86E-02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 116
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.94E-05	3.76E-05	3.59E-05	3.42E-05	3.27E-05	3.12E-05	2.97E-05
li 6	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04
li 7	4.58E-06	4.58E-06	4.58E-06	4.58E-06	4.58E-06	4.58E-06	4.58E-06
be 9	8.83E-06	8.83E-06	8.83E-06	8.83E-06	8.83E-06	8.83E-06	8.83E-06
be 10	5.87E-05	5.87E-05	5.87E-05	5.87E-05	5.87E-05	5.87E-05	5.87E-05
c 14	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06
zn 70	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06
ga 71	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05
ga 72	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03
ga 73	5.82E-03	5.82E-03	5.82E-03	5.82E-03	5.82E-03	5.82E-03	5.82E-03
ga 74	5.01E-03	5.01E-03	5.01E-03	5.01E-03	5.01E-03	5.01E-03	5.01E-03
ga 75	5.65E-02	5.65E-02	5.65E-02	5.65E-02	5.65E-02	5.65E-02	5.65E-02
ga 76	1.84E-01	1.84E-01	1.84E-01	1.84E-01	1.84E-01	1.84E-01	1.84E-01
ge 76	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05
ge 77	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01	4.12E-01
ge 78	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00
ge 79	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00
br 79	2.57E-02	2.57E-02	2.57E-02	2.58E-02	2.58E-02	2.58E-02	2.58E-02
ge 80	6.71E+00	6.71E+00	6.71E+00	6.71E+00	6.71E+00	6.71E+00	6.71E+00
kr 80	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05

br 81	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01
se 82	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01
kr 82	1.67E-02	1.67E-02	1.67E-02	1.67E-02	1.67E-02	1.67E-02	1.67E-02
kr 83	2.78E+01	2.78E+01	2.78E+01	2.78E+01	2.78E+01	2.78E+01	2.78E+01
kr 84	5.71E+01	5.71E+01	5.71E+01	5.71E+01	5.71E+01	5.71E+01	5.71E+01
kr 85	2.12E-02	2.01E-02	1.90E-02	1.80E-02	1.71E-02	1.62E-02	1.53E-02
rb 85	6.55E+01	6.55E+01	6.55E+01	6.55E+01	6.55E+01	6.55E+01	6.55E+01
kr 86	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02
sr 86	4.05E-03	4.05E-03	4.05E-03	4.05E-03	4.05E-03	4.05E-03	4.05E-03
rb 87	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02
sr 87	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04
sr 88	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02	1.99E+02
y 89	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02	2.70E+02
sr 90	1.29E+00	1.27E+00	1.24E+00	1.21E+00	1.19E+00	1.17E+00	1.14E+00
y 90	3.36E-04	3.29E-04	3.22E-04	3.16E-04	3.09E-04	3.03E-04	2.97E-04
zr 90	3.28E+02	3.28E+02	3.28E+02	3.28E+02	3.28E+02	3.28E+02	3.28E+02
zr 91	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02
zr 92	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02
zr 93	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02
nb 93	5.67E-01	5.67E-01	5.67E-01	5.67E-01	5.67E-01	5.67E-01	5.67E-01
nb 93m	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03	2.62E-03
zr 94	3.86E+02	3.86E+02	3.86E+02	3.86E+02	3.86E+02	3.86E+02	3.86E+02
nb 94	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04
mo 95	3.94E+02	3.94E+02	3.94E+02	3.94E+02	3.94E+02	3.94E+02	3.94E+02
zr 96	3.88E+02	3.88E+02	3.88E+02	3.88E+02	3.88E+02	3.88E+02	3.88E+02
mo 96	9.32E-01	9.32E-01	9.32E-01	9.32E-01	9.32E-01	9.32E-01	9.32E-01
mo 97	3.55E+02	3.55E+02	3.55E+02	3.55E+02	3.55E+02	3.55E+02	3.55E+02
mo 98	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02
tc 98	8.28E-05	8.28E-05	8.28E-05	8.28E-05	8.28E-05	8.28E-05	8.28E-05
tc 99	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02
ru 99	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.42E+00	4.42E+00	4.42E+00
mo100	4.11E+02	4.11E+02	4.11E+02	4.11E+02	4.11E+02	4.11E+02	4.11E+02

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sas2h: for-field crit based on k∞ 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 117
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
ru100	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00
ru101	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02
ru102	2.94E+02	2.94E+02	2.94E+02	2.94E+02	2.94E+02	2.94E+02	2.94E+02
rh103	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02
ru104	1.47E+02	1.47E+02	1.47E+02	1.47E+02	1.47E+02	1.47E+02	1.47E+02
pd104	4.78E+00	4.78E+00	4.78E+00	4.78E+00	4.78E+00	4.78E+00	4.78E+00
pd105	9.04E+01	9.04E+01	9.04E+01	9.04E+01	9.04E+01	9.04E+01	9.04E+01
ru106	8.89E-03	5.04E-03	2.86E-03	1.62E-03	9.18E-04	5.20E-04	2.95E-04
pd106	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01
pd107	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01
ag107	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02
pd108	1.45E+01	1.45E+01	1.45E+01	1.45E+01	1.45E+01	1.45E+01	1.45E+01
cd108	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05
ag109	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01	1.05E+01
pd110	4.79E+00	4.79E+00	4.79E+00	4.79E+00	4.79E+00	4.79E+00	4.79E+00
cd110	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
cd111	2.78E+00	2.78E+00	2.78E+00	2.78E+00	2.78E+00	2.78E+00	2.78E+00
cd112	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00
cd113	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
cd113m	5.60E-05	5.47E-05	5.14E-05	4.95E-05	4.75E-05	4.56E-05	4.38E-05
in113	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02	2.46E-02
cd114	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00

sn114	3.20E-05	3.20E-05	3.20E-05	3.20E-05	3.20E-05	3.20E-05	3.20E-05
in115	9.35E-01	9.35E-01	9.35E-01	9.35E-01	9.35E-01	9.35E-01	9.35E-01
sn115	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
sd116	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00
sn116	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
sn117	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
sn118	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00
sn119	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00
sn120	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00
sn121m	8.73E-05	8.44E-05	8.35E-05	8.44E-05	8.37E-05	8.28E-05	8.20E-05
sb121	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
sn122	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
te122	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03
sb123	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00
sn124	2.44E+00	2.44E+00	2.44E+00	2.44E+00	2.44E+00	2.44E+00	2.44E+00
te124	2.18E-03	2.18E-03	2.18E-03	2.18E-03	2.18E-03	2.18E-03	2.18E-03
sb125	1.24E-03	1.01E-03	8.16E-04	6.60E-04	5.34E-04	4.33E-04	3.50E-04
te125	2.85E+00	2.85E+00	2.85E+00	2.85E+00	2.85E+00	2.85E+00	2.85E+00
te125m	1.66E-05	1.43E-05	1.16E-05	9.38E-06	7.59E-06	6.14E-06	4.97E-06
sn126	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00
te126	1.82E-01	1.82E-01	1.82E-01	1.82E-01	1.82E-01	1.82E-01	1.82E-01
i127	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
te128	3.17E+01	3.17E+01	3.17E+01	3.17E+01	3.17E+01	3.17E+01	3.17E+01
xe128	9.50E-03	9.50E-03	9.50E-03	9.50E-03	9.50E-03	9.50E-03	9.50E-03
i129	6.75E+01	6.75E+01	6.75E+01	6.75E+01	6.75E+01	6.75E+01	6.75E+01
xe129	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02	1.47E-02
te130	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02
xe130	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
xe131	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02	2.49E+02
xe132	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02

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sas2h: far-field crit based on h&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 118
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
ba132	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06
cs133	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02
xe134	6.84E+02	6.84E+02	6.84E+02	6.84E+02	6.84E+02	6.84E+02	6.84E+02
cs134	1.68E-03	1.42E-03	1.07E-03	8.10E-04	6.12E-04	4.62E-04	3.49E-04
ba134	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00
cs135	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02	5.81E+02
ba135	8.75E-01	8.75E-01	8.76E-01	8.76E-01	8.76E-01	8.76E-01	8.76E-01
xe136	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02
ba136	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
cs137	2.45E+00	2.40E+00	2.35E+00	2.31E+00	2.27E+00	2.22E+00	2.18E+00
ba137	5.62E+02	5.62E+02	5.62E+02	5.62E+02	5.62E+02	5.62E+02	5.62E+02
ba138	5.99E+02	5.99E+02	5.99E+02	5.99E+02	5.99E+02	5.99E+02	5.99E+02
la138	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03
la139	5.72E+02	5.72E+02	5.72E+02	5.72E+02	5.72E+02	5.72E+02	5.72E+02
ce140	5.73E+02	5.73E+02	5.73E+02	5.73E+02	5.73E+02	5.73E+02	5.73E+02
pr141	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02
ce142	5.38E+02	5.38E+02	5.38E+02	5.38E+02	5.38E+02	5.38E+02	5.38E+02
nd142	5.58E-01	5.58E-01	5.58E-01	5.58E-01	5.58E-01	5.58E-01	5.58E-01
nd143	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02	5.30E+02
ce144	5.57E-02	2.65E-02	1.27E-02	6.04E-03	2.88E-03	1.37E-03	6.55E-04
nd144	5.16E+02	5.16E+02	5.16E+02	5.16E+02	5.16E+02	5.16E+02	5.16E+02
nd145	3.64E+02	3.64E+02	3.64E+02	3.64E+02	3.64E+02	3.64E+02	3.64E+02
nd146	2.84E+02	2.84E+02	2.84E+02	2.84E+02	2.84E+02	2.84E+02	2.84E+02
sm146	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04

pm147	8.14E-02	6.40E-02	5.30E-02	4.25E-02	3.41E-02	2.74E-02	2.20E-02
sm147	2.14E+02	2.14E+02	2.14E+02	2.14E+02	2.14E+02	2.14E+02	2.14E+02
nd148	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02
sm148	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00	2.58E+00
sm149	8.02E+00	8.02E+00	8.02E+00	8.02E+00	8.02E+00	8.02E+00	8.02E+00
nd150	6.73E+01	6.73E+01	6.73E+01	6.73E+01	6.73E+01	6.73E+01	6.73E+01
sm150	9.83E+01	9.83E+01	9.83E+01	9.83E+01	9.83E+01	9.83E+01	9.83E+01
sm151	6.13E-01	6.09E-01	6.05E-01	6.01E-01	5.97E-01	5.93E-01	5.89E-01
eu151	2.77E+01	2.77E+01	2.77E+01	2.77E+01	2.77E+01	2.77E+01	2.77E+01
sm152	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01
eu152	3.64E-02	3.49E-02	3.34E-02	3.20E-02	3.06E-02	2.93E-02	2.81E-02
gd152	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00
eu153	1.90E+01	1.90E+01	1.90E+01	1.90E+01	1.90E+01	1.90E+01	1.90E+01
sm154	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00	8.99E+00
eu154	1.53E-03	1.43E-03	1.34E-03	1.25E-03	1.17E-03	1.10E-03	1.02E-03
gd154	5.95E-01	5.95E-01	5.95E-01	5.96E-01	5.96E-01	5.96E-01	5.96E-01
eu155	3.36E-03	2.97E-03	2.63E-03	2.32E-03	2.05E-03	1.81E-03	1.60E-03
gd155	8.59E-01	8.59E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.61E-01
gd156	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00	5.66E+00
gd157	7.02E-02	7.02E-02	7.02E-02	7.02E-02	7.02E-02	7.02E-02	7.02E-02
gd158	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
tb159	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
gd160	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02
dy160	6.86E-04	6.86E-04	6.86E-04	6.86E-04	6.86E-04	6.86E-04	6.86E-04
dy161	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02
dy162	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
dy163	7.35E-03	7.35E-03	7.35E-03	7.35E-03	7.35E-03	7.35E-03	7.35E-03
dy164	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 119
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
ho165	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03	1.34E-03
ho166m	6.33E-07	6.33E-07	6.33E-07	6.33E-07	6.33E-07	6.33E-07	6.32E-07
er166	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04
total	1.51E+04	1.51E+04	1.51E+04	1.51E+04	1.51E+04	1.51E+04	1.51E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 120
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.01E-01	3.64E-01	3.47E-01	3.31E-01	3.16E-01	3.01E-01	2.88E-01
be 10	1.31E-06	1.31E-06	1.31E-06	1.31E-06	1.31E-06	1.31E-06	1.31E-06
c 14	3.08E-05	3.08E-05	3.08E-05	3.08E-05	3.08E-05	3.08E-05	3.08E-05
se 79	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02	3.09E-02
kr 85	8.31E+00	7.88E+00	7.46E+00	7.07E+00	6.70E+00	6.35E+00	6.02E+00
rb 87	1.18E-05	1.18E-05	1.18E-05	1.18E-05	1.18E-05	1.18E-05	1.18E-05
sr 90	1.82E+02	1.79E+02	1.75E+02	1.71E+02	1.68E+02	1.65E+02	1.61E+02
y 90	1.82E+02	1.79E+02	1.75E+02	1.72E+02	1.68E+02	1.65E+02	1.61E+02
y 91	1.86E+02	5.08E+00	1.38E-01	3.75E-03	1.02E-04	2.77E-06	7.51E-08
zr 93	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01
nb 93m	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01	6.25E-01
nb 94	2.74E-05	2.74E-05	2.74E-05	2.74E-05	2.74E-05	2.74E-05	2.74E-05
zr 95	2.12E+02	7.84E+00	2.90E-01	1.08E-02	3.98E-04	1.48E-05	5.47E-07
nb 95	2.11E+02	1.67E+01	8.38E-01	2.37E-02	8.77E-04	3.25E-05	1.20E-06
tc 99	6.62E+00	6.62E+00	6.62E+00	6.62E+00	6.62E+00	6.62E+00	6.62E+00
rh102	1.61E-05	1.32E-05	1.08E-05	8.87E-06	7.27E-06	5.96E-06	4.88E-06

ru106	2.95E+01	1.47E+01	9.47E+00	5.37E+00	3.04E+00	1.72E+00	9.78E-01
rh106	2.95E+01	1.47E+01	9.47E+00	5.37E+00	3.04E+00	1.72E+00	9.78E-01
pd107	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02
ag110	1.78E-01	4.17E-05	1.79E-05	7.70E-06	3.31E-06	1.42E-06	6.11E-07
ag110m	7.14E-03	5.07E-03	1.32E-03	5.67E-04	2.43E-04	1.05E-04	4.49E-05
cd113m	1.24E-02	1.21E-02	1.14E-02	1.11E-02	1.07E-02	1.02E-02	9.82E-03
sn119m	1.95E-03	9.49E-04	4.62E-04	2.25E-04	1.10E-04	5.33E-05	2.59E-05
sn121	5.57E-01	3.60E-03	3.56E-03	3.53E-03	3.49E-03	3.45E-03	3.42E-03
sn121m	4.69E-03	4.64E-03	4.59E-03	4.54E-03	4.50E-03	4.45E-03	4.40E-03
sn123	6.29E-02	1.23E-02	2.40E-03	4.68E-04	9.14E-05	1.78E-05	3.49E-06
sb125	1.30E+00	1.06E+00	8.55E-01	6.92E-01	5.60E-01	4.53E-01	3.67E-01
te125m	3.00E-01	2.58E-01	2.09E-01	1.69E-01	1.37E-01	1.11E-01	8.96E-02
sn126	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01
sb126	2.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02
sb126m	1.37E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01	1.24E-01
te127	5.45E+00	1.41E-01	2.83E-02	2.93E-03	4.23E-04	6.11E-05	8.82E-06
te127m	9.59E-01	1.44E-01	2.07E-02	2.99E-03	4.32E-04	6.23E-05	9.00E-06
i129	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
cs134	2.43E+00	1.84E+00	1.39E+00	1.05E+00	7.92E-01	5.98E-01	4.52E-01
cs135	6.70E-01	6.70E-01	6.70E-01	6.70E-01	6.70E-01	6.70E-01	6.70E-01
cs137	2.13E+02	2.09E+02	2.05E+02	2.01E+02	1.97E+02	1.93E+02	1.90E+02
ba137m	2.01E+02	1.97E+02	1.93E+02	1.90E+02	1.86E+02	1.83E+02	1.79E+02
ce142	1.29E-05	1.29E-05	1.29E-05	1.29E-05	1.29E-05	1.29E-05	1.29E-05
ce144	1.77E+02	8.45E+01	4.03E+01	1.92E+01	9.17E+00	4.37E+00	2.09E+00
pr144	1.77E+02	8.45E+01	4.03E+01	1.92E+01	9.17E+00	4.37E+00	2.09E+00
pr144m	2.68E+00	1.18E+00	5.44E-01	2.69E-01	1.28E-01	6.12E-02	2.92E-02
pm147	7.55E+01	6.12E+01	4.91E+01	3.94E+01	3.16E+01	2.54E+01	2.04E+01
sm147	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06	4.91E-06
eu150	1.88E-06	1.83E-06	1.82E-06	1.79E-06	1.76E-06	1.73E-06	1.70E-06
sm151	1.61E+01	1.60E+01	1.59E+01	1.58E+01	1.57E+01	1.56E+01	1.55E+01
eu152	6.43E+00	6.16E+00	5.90E+00	5.65E+00	5.41E+00	5.18E+00	4.96E+00
gd153	6.24E-02	2.61E-02	1.09E-02	4.54E-03	1.90E-03	7.92E-04	3.31E-04
eu154	4.15E-01	3.88E-01	3.62E-01	3.39E-01	3.17E-01	2.96E-01	2.77E-01
eu155	1.66E+00	1.47E+00	1.30E+00	1.15E+00	1.01E+00	8.95E-01	7.91E-01
ho166m	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06
total	2.05E+04	1.11E+03	9.42E+02	8.64E+02	8.35E+02	7.82E+02	7.54E+02

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ssa2b: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 121
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec
0

element thermal power, watts
basis: single reactor assembly

	Initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.29E-05	1.23E-05	1.17E-05	1.12E-05	1.07E-05	1.02E-05	9.70E-06
e	9.02E-09	9.02E-09	9.02E-09	9.02E-09	9.02E-09	9.02E-09	9.02E-09
ge	3.07E+00	9.70E-06	9.70E-06	9.70E-06	9.70E-06	9.70E-06	9.70E-06
kr	1.19E+01	1.18E-02	1.12E-02	1.06E-02	1.00E-02	9.52E-03	9.02E-03
rb	2.35E+01	5.98E-09	5.73E-09	5.73E-09	5.73E-09	5.73E-09	5.73E-09
sr	1.91E+01	2.16E-01	2.03E-01	1.99E-01	1.95E-01	1.91E-01	1.87E-01
y	2.71E+01	1.01E+00	9.70E-01	9.50E-01	9.30E-01	9.12E-01	8.93E-01
zr	1.18E+01	2.96E-02	1.43E-03	1.25E-04	7.24E-05	7.05E-05	7.04E-05
nb	2.17E+01	8.01E-02	3.17E-03	2.21E-04	1.32E-04	1.08E-04	1.08E-04
tc	7.72E+00	3.32E-03	3.32E-03	3.32E-03	3.32E-03	3.32E-03	3.32E-03
ru	1.08E+00	2.84E-03	5.72E-04	3.99E-04	3.81E-04	3.03E-04	5.81E-05
rh	8.41E-01	7.60E-01	9.08E-02	2.35E-02	2.92E-02	1.65E-02	9.37E-03
pd	1.90E-02	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07
ag	9.78E-02	5.35E-05	2.21E-05	9.50E-06	4.09E-06	1.76E-06	7.57E-07
cd	7.63E-02	3.38E-05	1.26E-05	5.21E-05	3.16E-05	1.11E-05	3.87E-05
sn	1.07E+00	2.35E-04	2.04E-04	1.98E-04	1.07E-04	1.06E-04	1.06E-04
sb	7.45E+00	1.26E-03	4.43E-03	4.11E-03	3.49E-03	3.36E-03	2.08E-03
te	9.06E+00	3.35E-04	2.35E-04	1.48E-04	1.16E-04	9.33E-05	7.54E-05

i	2.05E+01	5.58E-06	5.58E-06	5.58E-06	5.58E-06	5.58E-06	5.58E-06
cs	1.78E+01	2.51E-01	2.42E-01	2.34E-01	2.27E-01	2.21E-01	2.16E-01
ba	1.16E+01	7.75E-01	7.60E-01	7.46E-01	7.31E-01	7.18E-01	7.04E-01
ce	4.29E+00	5.57E-02	2.64E-02	1.26E-02	6.00E-03	2.86E-03	1.36E-03
pr	6.13E+00	6.21E-01	2.96E-01	1.41E-01	6.73E-02	3.21E-02	1.53E-02
pm	3.77E-01	2.25E-02	1.80E-02	1.43E-02	1.14E-02	9.32E-03	7.48E-03
sm	3.07E-02	1.88E-03	1.87E-03	1.86E-03	1.85E-03	1.84E-03	1.82E-03
eu	8.43E-02	5.17E-02	4.93E-02	4.71E-02	4.50E-02	4.29E-02	4.10E-02
gd	5.02E-04	2.29E-05	9.57E-06	3.99E-06	1.67E-06	6.96E-07	2.91E-07
ho	4.01E-07	1.20E-08	1.20E-08	1.20E-08	1.20E-08	1.19E-08	1.19E-08
totals	2.55E+02	3.31E+00	2.68E+00	2.42E+00	2.26E+00	2.16E+00	2.09E+00

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 122
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec

0

nuclide gamma power, watts
basis single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.10E-04	1.04E-04	9.86E-05	9.35E-05	8.86E-05	8.39E-05	7.95E-05
y 90	1.84E-06	1.80E-06	1.76E-06	1.73E-06	1.69E-06	1.66E-06	1.63E-06
nb 93m	6.97E-06	6.97E-06	6.97E-06	6.97E-06	6.97E-06	6.97E-06	6.97E-06
nb 94	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07
zr 93	9.18E-01	3.40E-02	1.26E-03	4.67E-05	1.73E-06	6.40E-08	2.37E-09
nb 93	9.58E-01	7.94E-02	2.89E-03	1.07E-04	3.98E-06	1.47E-07	5.45E-09
tc 99	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08
rh102	2.06E-07	1.69E-07	1.39E-07	1.14E-07	9.31E-08	7.63E-08	6.25E-08
rh106	3.60E-02	2.84E-02	1.16E-02	6.56E-03	3.72E-03	2.11E-03	1.19E-03
ag110m	1.16E-04	4.98E-05	2.14E-05	9.20E-06	3.95E-06	1.70E-06	7.30E-07
sn121m	1.39E-07	1.38E-07	1.36E-07	1.35E-07	1.33E-07	1.32E-07	1.31E-07
sb125	3.35E-03	2.72E-03	2.20E-03	1.78E-03	1.44E-03	1.17E-03	9.44E-04
te125m	6.32E-05	5.44E-05	4.41E-05	3.57E-05	2.89E-05	2.34E-05	1.89E-05
sn126	9.57E-05	9.57E-05	9.57E-05	9.57E-05	9.57E-05	9.57E-05	9.57E-05
sb126	4.45E-04	2.83E-04	2.83E-04	2.83E-04	2.83E-04	2.83E-04	2.83E-04
sb126m	1.27E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03
i129	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06
cs134	2.24E-02	1.69E-02	1.28E-02	9.66E-03	7.30E-03	5.52E-03	4.17E-03
ba137m	7.14E-01	7.00E-01	6.87E-01	6.74E-01	6.61E-01	6.48E-01	6.36E-01
ce144	2.80E-02	9.52E-03	4.54E-03	2.14E-03	1.03E-03	4.92E-04	2.35E-04
pr144	3.04E-02	1.45E-02	6.91E-03	3.29E-03	1.57E-03	7.49E-04	3.57E-04
pr144m	1.84E-04	8.77E-05	4.18E-05	1.99E-05	9.51E-06	4.54E-06	2.16E-06
pm147	1.96E-06	1.39E-06	1.28E-06	1.02E-06	8.21E-07	6.59E-07	5.29E-07
eu150	1.71E-08	1.68E-08	1.65E-08	1.63E-08	1.60E-08	1.58E-08	1.55E-08
sm151	1.36E-06	1.35E-06	1.34E-06	1.33E-06	1.32E-06	1.31E-06	1.31E-06
eu152	4.43E-02	4.24E-02	4.06E-02	3.89E-02	3.73E-02	3.57E-02	3.42E-02
gd153	3.98E-05	1.66E-05	6.94E-06	2.90E-06	1.21E-06	5.05E-07	2.11E-07
eu154	3.08E-03	2.88E-03	2.69E-03	2.52E-03	2.35E-03	2.20E-03	2.06E-03
eu155	6.36E-04	5.62E-04	4.97E-04	4.39E-04	3.88E-04	3.43E-04	3.03E-04
ho166m	1.10E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08
total	1.26E+02	9.23E-01	7.75E-01	7.41E-01	7.18E-01	6.98E-01	6.81E-01

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 123
decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+04mwd, flux= 2.71E+08n/cm**2-sec

0

element gamma power, watts
basis single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.21E+00	1.04E-04	9.86E-05	9.35E-05	8.86E-05	8.39E-05	7.95E-05
y	9.41E+00	1.11E-04	4.73E-06	1.61E-06	1.70E-06	1.66E-06	1.63E-06
zr	4.70E+00	3.40E-02	1.26E-03	4.67E-05	1.73E-06	6.40E-08	2.37E-09
nb	9.80E+00	7.53E-02	2.90E-03	1.15E-04	1.12E-05	7.37E-06	7.23E-06
tc	3.91E+00	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08
rh	2.55E-01	2.84E-02	1.16E-02	6.56E-03	3.72E-03	2.11E-03	1.19E-03

as	3.77E-02	4.98E-05	2.14E-05	9.20E-06	3.94E-06	1.70E-06	7.33E-07
sn	1.22E+00	9.44E-05	9.60E-05	9.59E-05	9.58E-05	9.58E-05	9.58E-05
sb	5.13E+00	4.14E-03	3.62E-03	3.20E-03	2.86E-03	2.59E-03	2.37E-03
te	5.43E+00	7.24E-05	4.60E-05	3.60E-05	2.89E-05	2.34E-05	1.89E-05
i	1.35E+01	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06
cs	8.52E+00	1.49E-02	1.28E-02	9.66E-03	7.30E-03	5.52E-03	4.17E-03
ba	5.24E+00	7.80E-01	6.87E-01	4.74E-01	4.61E-01	6.48E-01	6.36E-01
ce	2.03E+00	9.65E-03	4.54E-03	2.16E-03	1.03E-03	4.92E-04	2.35E-04
pr	1.78E+00	1.46E-02	4.95E-03	5.31E-03	1.58E-03	7.54E-04	3.59E-04
pm	1.01E-01	1.66E-06	1.28E-06	1.02E-06	8.22E-07	6.57E-07	5.29E-07
sm	6.82E-03	1.35E-06	1.34E-06	1.33E-06	1.32E-06	1.31E-06	1.31E-06
eu	4.38E-02	4.59E-02	4.58E-02	4.19E-02	4.00E-02	3.82E-02	3.65E-02
gd	1.74E-04	1.66E-05	6.94E-06	2.90E-06	1.21E-06	5.05E-07	2.11E-07
ho	2.68E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08
totals	1.26E+02	9.23E-01	7.75E-01	7.41E-01	7.18E-01	6.98E-01	6.81E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on hzu 15x15, 3.80wt%, 20gwd/mtu 40% hZo/ 8% uo2
powers= .80 mw, burnup= 14610.mwd, flux= 2.71E+08 n**2-sec

0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	5.17E+11	5.79E+04	4.64E+04	3.71E+04	2.97E+04	2.38E+04	1.91E+04
3.00E-02	1.70E+11	1.84E+04	1.48E+04	1.18E+04	9.46E+03	7.58E+03	6.07E+03
5.50E-02	1.19E+11	1.24E+04	9.96E+03	7.98E+03	6.39E+03	5.12E+03	4.10E+03
8.50E-02	6.93E+10	7.60E+03	5.61E+03	4.69E+03	3.60E+03	2.88E+03	2.31E+03
1.20E-01	4.93E+10	4.79E+03	3.83E+03	3.07E+03	2.46E+03	1.97E+03	1.58E+03
1.70E-01	5.15E+10	4.70E+03	3.76E+03	3.01E+03	2.41E+03	1.93E+03	1.55E+03
3.00E-01	5.91E+10	4.68E+03	3.75E+03	3.00E+03	2.40E+03	1.92E+03	1.54E+03
6.50E-01	2.91E+10	2.50E+03	2.00E+03	1.40E+03	1.28E+03	1.03E+03	8.23E+04
1.13E+00	5.00E+09	1.09E+05	1.59E+05	1.28E+05	1.02E+05	8.19E+04	6.56E+04
1.58E+00	9.09E+11	4.99E-01	3.99E-01	3.20E-01	2.56E-01	2.05E-01	1.64E-01
2.00E+00	7.80E+08	4.44E-02	3.55E-02	2.83E-02	2.28E-02	1.83E-02	1.46E-02
2.40E+00	3.65E+07	9.94E-03	7.96E-03	6.38E-03	5.11E-03	4.09E-03	3.28E-03
2.80E+00	2.15E+11	1.56E-04	1.25E-04	9.99E-05	8.00E-05	6.41E-05	5.13E-05
3.25E+00	1.40E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.40E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.83E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.05E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.02E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.19E+12	5.59E+05	4.48E+05	3.59E+05	2.87E+05	2.30E+05	1.84E+05
0 mev/sec	2.11E+12	5.92E+05	3.14E+05	2.51E+05	2.01E+05	1.61E+05	1.29E+05

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	1.29E+06	1.45E-01	1.16E-01	9.28E-02	7.44E-02	5.96E-02	4.77E-02
3.00E-02	1.28E+06	1.38E-01	1.11E-01	8.86E-02	7.10E-02	5.68E-02	4.55E-02
5.50E-02	1.63E+06	1.71E-01	1.37E-01	1.10E-01	8.79E-02	7.04E-02	5.64E-02
8.50E-02	1.47E+06	1.49E-01	1.19E-01	9.54E-02	7.64E-02	6.12E-02	4.90E-02
1.20E-01	1.48E+06	1.44E-01	1.15E-01	9.21E-02	7.38E-02	5.91E-02	4.73E-02
1.70E-01	2.19E+06	2.00E-01	1.60E-01	1.28E-01	1.03E-01	8.22E-02	6.58E-02
3.00E-01	4.43E+06	3.51E-01	2.81E-01	2.25E-01	1.80E-01	1.44E-01	1.16E-01
6.50E-01	4.73E+06	4.06E+01	3.25E+01	2.60E+01	2.09E+01	1.67E+01	1.34E+01
1.13E+00	1.41E+06	5.60E+01	4.49E+01	3.59E+01	2.88E+01	2.30E+01	1.85E+01
1.58E+00	3.58E+08	1.96E-04	1.57E-04	1.26E-04	1.01E-04	8.08E-05	6.47E-05

	2.00E+00	9.00E+04	2.22E-05	1.78E-05	1.42E-05	1.14E-05	9.13E-06	7.31E-06
	2.40E+00	2.19E+04	5.97E-06	4.78E-06	3.83E-06	3.07E-06	2.45E-06	1.97E-06
	2.80E+00	1.50E+08	1.09E-07	8.73E-08	6.99E-08	5.60E-08	4.48E-08	3.59E-08
	3.25E+00	1.14E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	3.75E+00	1.31E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.25E+00	1.04E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	7.19E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	1.40E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	5.28E+08	9.79E+01	7.84E+01	6.28E+01	5.03E+01	4.03E+01	3.23E+01
0	gamma watts	3.39E-01	6.28E-08	5.03E-08	4.03E-08	3.23E-08	2.58E-08	2.07E-08

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photon spectrum as a function of time for fission products

0 ses2h: far-field grit based on h&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
0 power= .00 mw, burnup= 14610.mwd, flux= 2.71E+08 n**2-sec
0 spectrum of photon release rates, photons/sec
0 basis = single reactor assembly

gmean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	2.55E+14	8.20E+12	6.52E+12	5.70E+12	5.26E+12	4.96E+12	4.78E+12
3.00E-02	1.12E+14	3.44E+12	2.89E+12	2.52E+12	2.31E+12	2.19E+12	2.10E+12
5.50E-02	5.95E+13	1.86E+12	1.46E+12	1.27E+12	1.16E+12	1.09E+12	1.05E+12
8.50E-02	4.11E+13	1.06E+12	8.10E+11	6.86E+11	6.18E+11	5.79E+11	5.53E+11
1.20E-01	3.36E+13	1.13E+12	7.75E+11	6.03E+11	5.15E+11	4.66E+11	4.37E+11
1.70E-01	5.39E+13	4.79E+11	5.18E+11	4.41E+11	3.99E+11	3.74E+11	3.58E+11
3.00E-01	1.10E+14	8.30E+11	6.45E+11	5.51E+11	5.00E+11	4.69E+11	4.48E+11
6.50E-01	2.28E+14	8.55E+12	7.16E+12	6.87E+12	6.66E+12	6.49E+12	6.34E+12
1.13E+00	7.64E+13	1.70E+11	1.44E+11	1.29E+11	1.18E+11	1.11E+11	1.05E+11
1.58E+00	3.95E+13	6.65E+10	5.52E+10	4.86E+10	4.44E+10	4.14E+10	3.91E+10
2.00E+00	1.19E+13	2.88E+10	1.59E+10	6.78E+09	3.36E+09	1.69E+09	8.89E+08
2.40E+00	1.02E+13	9.03E+08	4.69E+08	2.66E+08	1.45E+08	7.99E+07	4.41E+07
2.80E+00	4.10E+12	1.29E+08	7.15E+07	3.96E+07	2.20E+07	1.23E+07	6.87E+06
3.25E+00	2.35E+12	1.87E+07	1.06E+07	6.00E+06	3.40E+06	1.93E+06	1.09E+06
3.75E+00	1.18E+12	8.23E+03	4.66E+03	2.64E+03	1.50E+03	8.49E+02	4.82E+02
4.25E+00	1.29E+12	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05
4.75E+00	3.77E+11	9.99E-06	9.99E-06	9.99E-06	9.99E-06	9.99E-06	9.99E-06
5.50E+00	2.82E+11	7.41E-06	7.41E-06	7.41E-06	7.41E-06	7.41E-06	7.41E-06
0 total	1.84E+15	2.62E+13	2.10E+13	1.88E+13	1.76E+13	1.68E+13	1.62E+13
0 mev/sec	4.36E+14	6.80E+12	5.61E+12	5.27E+12	5.06E+12	4.90E+12	4.77E+12

0 spectrum of energy release rates, mev/watt-sec
0 basis = single reactor assembly

gmean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
			time after discharge				
1.00E-02	6.38E+08	2.05E+07	1.63E+07	1.43E+07	1.31E+07	1.24E+07	1.19E+07
3.00E-02	8.41E+08	2.73E+07	2.17E+07	1.89E+07	1.74E+07	1.64E+07	1.58E+07
5.50E-02	8.18E+08	2.55E+07	2.01E+07	1.74E+07	1.59E+07	1.50E+07	1.44E+07
8.50E-02	8.73E+08	2.26E+07	1.72E+07	1.46E+07	1.31E+07	1.23E+07	1.18E+07
1.20E-01	1.01E+09	3.38E+07	2.53E+07	1.81E+07	1.54E+07	1.40E+07	1.31E+07
1.70E-01	2.29E+09	2.09E+07	2.20E+07	1.87E+07	1.69E+07	1.59E+07	1.52E+07
3.00E-01	2.23E+09	6.22E+07	4.63E+07	4.16E+07	3.73E+07	3.51E+07	3.36E+07
6.50E-01	3.71E+10	1.39E+09	1.16E+09	1.12E+09	1.08E+09	1.06E+09	1.03E+09
1.13E+00	2.15E+10	4.80E+07	4.05E+07	3.62E+07	3.33E+07	3.12E+07	2.95E+07
1.58E+00	9.53E+10	2.42E+07	2.17E+07	1.91E+07	1.75E+07	1.63E+07	1.54E+07
2.00E+00	3.96E+09	1.44E+07	4.96E+06	2.39E+06	1.67E+06	6.44E+05	4.44E+05
2.40E+00	4.13E+09	5.42E+05	2.93E+05	1.60E+05	8.72E+04	4.80E+04	2.65E+04
2.80E+00	2.67E+09	9.06E+04	3.01E+04	2.77E+04	1.54E+04	8.60E+03	4.81E+03
3.25E+00	1.91E+09	1.32E+04	6.60E+03	4.07E+03	2.76E+03	1.37E+03	6.87E+02
3.75E+00	1.11E+09	7.71E+00	4.57E+00	2.48E+00	1.40E+00	7.94E-01	4.51E-01

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          4.25E+00  1.37E+09  2.12E-08  2.12E-08  2.12E-08  2.12E-08  2.12E-08  2.12E-08
          4.75E+00  4.47E+08  1.19E-08  1.19E-08  1.19E-08  1.19E-08  1.19E-08  1.19E-08
          5.50E+00  3.87E+08  1.02E-08  1.02E-08  1.02E-08  1.02E-08  1.02E-08  1.02E-08
0            total  1.09E+11  1.70E+09  1.40E+09  1.32E+09  1.26E+09  1.22E+09  1.19E+09
0     gamma watts   6.99E+01  1.09E+00  8.99E-01  8.45E-01  8.11E-01  7.85E-01  7.64E-01
1                                                                                          page 126
0                 principal photon sources in group  1, photons/sec
   mean energy =  .0100 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.96E+12) at  1521.9 d
nuclide                                   time after discharge
          initial  304.4 d  608.8 d  913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   4.39E+10  4.16E+10  3.94E+10  3.73E+10  3.54E+10  3.35E+10  3.17E+10
 sr 90   7.43E+11  7.28E+11  7.13E+11  6.99E+11  6.85E+11  6.71E+11  6.57E+11
  y 90   3.65E+12  3.58E+12  3.51E+12  3.43E+12  3.36E+12  3.30E+12  3.23E+12
 tc 99   1.10E+10  1.10E+10  1.10E+10  1.10E+10  1.10E+10  1.10E+10  1.10E+10
 rh106   5.77E+11  4.97E+11  2.82E+11  1.60E+11  9.06E+10  5.13E+10  2.91E+10
 cs137   7.51E+11  7.37E+11  7.23E+11  7.09E+11  6.96E+11  6.82E+11  6.69E+11
 ba137m  3.52E+10  3.46E+10  3.39E+10  3.33E+10  3.26E+10  3.20E+10  3.14E+10
 ce144   3.41E+11  1.63E+11  7.76E+10  3.70E+10  1.76E+10  8.42E+09  4.01E+09
 pr144   4.52E+12  2.16E+12  1.03E+12  4.90E+11  2.34E+11  1.12E+11  5.32E+10
 pm147   8.77E+10  7.12E+10  5.71E+10  4.58E+10  3.68E+10  2.95E+10  2.37E+10
 eu152   2.37E+10  2.27E+10  2.17E+10  2.08E+10  1.99E+10  1.91E+10  1.83E+10
0                 principal photon sources in group  2, photons/sec
   mean energy =  .0300 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.19E+12) at  1521.9 d
nuclide                                   time after discharge
          initial  304.4 d  608.8 d  913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   1.28E+10  1.21E+10  1.15E+10  1.09E+10  1.03E+10  9.76E+09  9.25E+09
 sr 90   2.10E+11  2.06E+11  2.02E+11  1.97E+11  1.93E+11  1.90E+11  1.86E+11
  y 90   1.19E+12  1.17E+12  1.14E+12  1.12E+12  1.10E+12  1.07E+12  1.05E+12
 tc 99   2.65E+09  2.65E+09  2.65E+09  2.65E+09  2.65E+09  2.65E+09  2.65E+09
 rh106   2.93E+11  1.66E+11  9.41E+10  5.34E+10  3.02E+10  1.71E+10  9.72E+09
 sb125   2.39E+10  1.94E+10  1.57E+10  1.27E+10  1.03E+10  8.32E+09  6.73E+09
 te125m  1.28E+10  1.10E+10  8.94E+09  7.23E+09  5.85E+09  4.74E+09  3.83E+09
 cs137   2.09E+11  2.05E+11  2.01E+11  1.98E+11  1.94E+11  1.90E+11  1.87E+11
 ba137m  6.06E+11  5.94E+11  5.83E+11  5.71E+11  5.61E+11  5.50E+11  5.39E+11
 ce144   7.92E+11  3.78E+11  1.80E+11  8.59E+10  4.10E+10  1.95E+10  9.32E+09
 pr144   1.50E+12  7.13E+11  3.40E+11  1.62E+11  7.74E+10  3.69E+10  1.76E+10
 pm147   1.93E+10  1.56E+10  1.26E+10  1.01E+10  8.08E+09  6.69E+09  5.20E+09
 eu152   9.40E+10  9.00E+10  8.62E+10  8.25E+10  7.90E+10  7.57E+10  7.25E+10
0                 principal photon sources in group  3, photons/sec
   mean energy =  .0550 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.09E+12) at  1521.9 d
nuclide                                   time after discharge
          initial  304.4 d  608.8 d  913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   7.84E+09  7.43E+09  7.04E+09  6.67E+09  6.32E+09  5.99E+09  5.67E+09
 sr 90   1.24E+11  1.22E+11  1.19E+11  1.17E+11  1.14E+11  1.12E+11  1.10E+11
  y 90   8.22E+11  8.06E+11  7.89E+11  7.73E+11  7.58E+11  7.42E+11  7.27E+11
 tc 99   1.28E+09  1.28E+09  1.28E+09  1.28E+09  1.28E+09  1.28E+09  1.28E+09
 rh106   2.08E+11  1.18E+11  6.67E+10  3.78E+10  2.14E+10  1.21E+10  6.88E+09
 cs137   1.22E+11  1.20E+11  1.17E+11  1.15E+11  1.13E+11  1.11E+11  1.09E+11
 ce144   1.15E+11  5.46E+10  2.61E+10  1.24E+10  5.93E+09  2.83E+09  1.35E+09
 pr144   1.05E+12  5.01E+11  2.39E+11  1.14E+11  5.43E+10  2.59E+10  1.24E+10
 pm147   8.10E+09  6.57E+09  5.28E+09  4.23E+09  3.40E+09  2.73E+09  2.19E+09
 eu152   8.17E+10  7.82E+10  7.49E+10  7.17E+10  6.87E+10  6.58E+10  6.30E+10
 eu154   3.30E+09  3.27E+09  3.06E+09  2.86E+09  2.67E+09  2.50E+09  2.34E+09
 eu155   1.28E+10  1.13E+10  9.99E+09  8.83E+09  7.80E+09  6.90E+09  6.10E+09
1                                                                                          page 127
0                 principal photon sources in group  4, photons/sec
   mean energy =  .0850 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.79E+11) at  1521.9 d
nuclide                                   time after discharge
          initial  304.4 d  608.8 d  913.1 d  1217.5 d  1521.9 d  1826.3 d
 kr 85   3.92E+09  3.72E+09  3.52E+09  3.34E+09  3.16E+09  3.00E+09  2.84E+09
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sr 90	5.92E+10	5.80E+10	5.68E+10	5.56E+10	5.45E+10	5.34E+10	5.23E+10
y 90	4.76E+11	4.66E+11	4.57E+11	4.47E+11	4.38E+11	4.29E+11	4.21E+11
rh106	1.23E+11	6.99E+10	3.96E+10	2.25E+10	1.27E+10	7.21E+09	4.09E+09
sn126	2.17E+09	2.17E+09	2.17E+09	2.17E+09	2.17E+09	2.17E+09	2.17E+09
cs137	5.71E+10	5.60E+10	5.49E+10	5.39E+10	5.28E+10	5.18E+10	5.08E+10
ce144	1.62E+11	7.72E+10	3.68E+10	1.76E+10	8.37E+09	3.99E+09	1.90E+09
pr144	6.18E+11	2.95E+11	1.41E+11	6.70E+10	3.20E+10	1.52E+10	7.27E+09
pm147	2.30E+09	1.87E+09	1.50E+09	1.20E+09	9.66E+08	7.75E+08	6.22E+08
eu155	1.94E+10	1.72E+10	1.52E+10	1.34E+10	1.18E+10	1.05E+10	9.26E+09

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (4.66E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	2.57E+09	2.24E+09	2.12E+09	2.01E+09	1.91E+09	1.81E+09	1.71E+09
sr 90	3.37E+10	3.30E+10	3.23E+10	3.17E+10	3.10E+10	3.04E+10	2.98E+10
y 90	3.33E+11	3.28E+11	3.21E+11	3.15E+11	3.08E+11	3.02E+11	2.96E+11
rh106	8.91E+10	5.05E+10	2.86E+10	1.62E+10	9.19E+09	5.21E+09	2.95E+09
cs137	3.20E+10	3.14E+10	3.08E+10	3.02E+10	2.96E+10	2.90E+10	2.85E+10
ce144	7.93E+11	3.78E+11	1.80E+11	8.61E+10	4.10E+10	1.96E+10	9.34E+09
pr144	4.42E+11	2.11E+11	1.01E+11	4.80E+10	2.29E+10	1.09E+10	5.20E+09
eu152	6.88E+10	6.59E+10	6.31E+10	6.04E+10	5.78E+10	5.54E+10	5.30E+10
eu154	6.50E+09	6.08E+09	5.68E+09	5.31E+09	4.97E+09	4.65E+09	4.34E+09
eu155	1.11E+10	9.80E+09	8.46E+09	7.63E+09	6.76E+09	5.98E+09	5.29E+09

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (3.76E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.88E+09	1.78E+09	1.69E+09	1.60E+09	1.51E+09	1.44E+09	1.36E+09
sr 90	2.60E+10	2.55E+10	2.31E+10	2.26E+10	2.21E+10	2.17E+10	2.12E+10
y 90	3.45E+11	3.38E+11	3.31E+11	3.24E+11	3.18E+11	3.11E+11	3.05E+11
rh106	9.55E+10	5.41E+10	3.07E+10	1.74E+10	9.86E+09	5.59E+09	3.17E+09
sb125	3.60E+09	2.92E+09	2.36E+09	1.91E+09	1.55E+09	1.25E+09	1.01E+09
cs137	2.26E+10	2.22E+10	2.17E+10	2.13E+10	2.09E+10	2.05E+10	2.01E+10
pr144	4.67E+11	2.23E+11	1.06E+11	5.07E+10	2.42E+10	1.15E+10	5.50E+09

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0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (4.69E+11) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.13E+09	1.08E+09	1.02E+09	9.65E+08	9.15E+08	8.67E+08	8.21E+08
sr 90	1.09E+10	1.07E+10	1.05E+10	1.02E+10	1.00E+10	9.83E+09	9.63E+09
y 90	3.83E+11	3.75E+11	3.68E+11	3.60E+11	3.53E+11	3.46E+11	3.39E+11
rh106	1.15E+11	6.53E+10	3.70E+10	2.10E+10	1.19E+10	6.74E+09	3.82E+09
sb125	1.36E+09	1.11E+09	8.95E+08	7.24E+08	5.86E+08	4.74E+08	3.84E+08
sb126m	3.13E+09	2.82E+09	2.82E+09	2.82E+09	2.82E+09	2.82E+09	2.82E+09
cs137	1.14E+10	1.12E+10	1.10E+10	1.08E+10	1.06E+10	1.04E+10	1.02E+10
pr144	5.67E+11	2.61E+11	1.24E+11	5.94E+10	2.83E+10	1.35E+10	6.44E+09
eu152	9.54E+10	9.13E+10	8.74E+10	8.37E+10	8.02E+10	7.68E+10	7.35E+10
eu154	9.84E+08	9.29E+08	8.69E+08	8.12E+08	7.59E+08	7.10E+08	6.64E+08

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (6.49E+12) at 1521.9 d

nuclide	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	1.62E+11	1.59E+11	1.55E+11	1.52E+11	1.49E+11	1.46E+11	1.43E+11
rh106	3.56E+11	2.02E+11	1.14E+11	6.48E+10	3.67E+10	2.08E+10	1.18E+10
sb125	2.92E+10	2.37E+10	1.92E+10	1.55E+10	1.26E+10	1.02E+10	8.24E+09
sb126m	1.04E+10	9.39E+09	9.39E+09	9.39E+09	9.39E+09	9.39E+09	9.39E+09
cs134	2.05E+11	1.55E+11	1.17E+11	8.84E+10	6.68E+10	5.05E+10	3.81E+10
ba137m	6.81E+12	6.68E+12	6.55E+12	6.42E+12	6.30E+12	6.18E+12	6.06E+12
pr144	3.74E+11	1.78E+11	8.50E+10	4.05E+10	1.93E+10	9.22E+09	4.40E+09

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    eu152   4.73E+10  4.45E+10  4.17E+10  3.91E+10  3.66E+10  3.42E+10  3.19E+10.
0                principal photon sources in group  9, photons/sec
    mean energy = 1.1250 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.11E+11) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90    2.11E+10  2.07E+10  2.03E+10  1.99E+10  1.95E+10  1.91E+10  1.87E+10
  rh106    3.31E+10  1.88E+10  1.06E+10  6.03E+09  3.42E+09  1.94E+09  1.10E+09
 sb126m    1.65E+08  1.49E+08  1.49E+08  1.49E+08  1.49E+08  1.49E+08  1.49E+08
  cs134    2.51E+09  1.90E+09  1.43E+09  1.08E+09  8.18E+08  6.18E+08  4.67E+08
  pr144    4.78E+10  2.28E+10  1.09E+10  5.18E+09  2.47E+09  1.18E+09  5.62E+08
  eu152    1.00E+11  9.57E+10  9.17E+10  8.78E+10  8.40E+10  8.05E+10  7.71E+10
  eu154    1.03E+10  9.45E+09  9.02E+09  8.43E+09  7.89E+09  7.37E+09  6.89E+09
0                principal photon sources in group 10, photons/sec
    mean energy = 1.3750 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.14E+10) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90    2.70E+09  2.64E+09  2.59E+09  2.54E+09  2.48E+09  2.43E+09  2.38E+09
  rh106    6.25E+09  3.54E+09  2.01E+09  1.14E+09  6.45E+08  3.66E+08  2.07E+08
  cs134    2.37E+09  1.79E+09  1.35E+09  1.02E+09  7.72E+08  5.83E+08  4.41E+08
  pr144    2.97E+10  1.42E+10  6.76E+09  3.23E+09  1.54E+09  7.34E+08  3.50E+08
  eu152    4.59E+10  4.40E+10  4.21E+10  4.03E+10  3.86E+10  3.70E+10  3.54E+10
  eu154    3.73E+08  3.49E+08  3.26E+08  3.05E+08  2.85E+08  2.67E+08  2.49E+08
1                                                                                                          page 129
0                principal photon sources in group 11, photons/sec
    mean energy = 2.0000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.69E+09) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90    1.61E+08  1.58E+08  1.55E+08  1.52E+08  1.49E+08  1.46E+08  1.43E+08
  rh106    2.03E+09  1.15E+09  6.52E+08  3.70E+08  2.10E+08  1.19E+08  6.73E+07
  pr144    5.77E+10  2.75E+10  1.31E+10  6.26E+09  2.98E+09  1.42E+09  6.79E+08
0                principal photon sources in group 12, photons/sec
    mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.99E+07) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
   y 90    9.41E+04  9.22E+04  9.04E+04  8.85E+04  8.67E+04  8.50E+04  8.32E+04
  rh106    1.13E+09  6.43E+08  3.65E+08  2.07E+08  1.17E+08  6.64E+07  3.76E+07
  pr144    5.45E+08  2.60E+08  1.24E+08  5.91E+07  2.82E+07  1.34E+07  6.41E+06
0                principal photon sources in group 13, photons/sec
    mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.23E+07) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106    1.91E+08  1.09E+08  6.15E+07  3.49E+07  1.98E+07  1.12E+07  6.35E+06
  pr144    4.39E+07  2.09E+07  9.98E+06  4.76E+06  2.27E+06  1.08E+06  5.16E+05
0                principal photon sources in group 14, photons/sec
    mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.93E+06) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106    3.29E+07  1.87E+07  1.06E+07  6.00E+06  3.40E+06  1.93E+06  1.09E+06
0                principal photon sources in group 15, photons/sec
    mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (8.49E+02) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  rh106    1.43E+04  6.23E+03  4.66E+03  2.64E+03  1.50E+03  8.49E+02  4.82E+02
0                principal photon sources in group 16, photons/sec
    mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.99E-05) at  1521.9 d
nuclide                                                time after discharge
             initial  304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d
  ce142    1.44E-05  1.44E-05  1.44E-05  1.44E-05  1.44E-05  1.44E-05  1.44E-05
  sm147    5.48E-06  5.48E-06  5.48E-06  5.48E-06  5.48E-06  5.48E-06  5.48E-06
1                                                                                                          page 130
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0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 1.0E-03 of total group release rate (9.99E-06) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
ce142	7.24E-06	7.24E-06	7.24E-06	7.24E-06	7.24E-06	7.24E-06	7.24E-06
sm147	2.75E-06	2.75E-06	2.75E-06	2.75E-06	2.75E-06	2.75E-06	2.75E-06

0 principal photon sources in group 18, photons/sec

mean energy = 5.5000 mev. nuclides exceeding 1.0E-03 of total group release rate (7.41E-06) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
ce142	5.37E-06	5.37E-06	5.37E-06	5.37E-06	5.37E-06	5.37E-06	5.37E-06
sm147	2.04E-06	2.04E-06	2.04E-06	2.04E-06	2.04E-06	2.04E-06	2.04E-06

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photon spectrum as a function of time for heavy metals and their daughters

0 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2

powerm .60 mw, burnup= 14610.mwd, flux= 2.71E+08 n*2-sec

0 actinide photon release rates, photons/sec

0 basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
1.00E-02	1.35E+14	2.83E+12	2.83E+12	2.82E+12	2.82E+12	2.82E+12	2.81E+12
3.00E-02	6.47E+12	6.75E+10	6.75E+10	6.75E+10	6.75E+10	6.75E+10	6.75E+10
5.50E-02	1.11E+13	2.10E+11	2.10E+11	2.10E+11	2.10E+11	2.10E+11	2.10E+11
8.50E-02	5.26E+13	1.64E+11	1.64E+11	1.64E+11	1.64E+11	1.64E+11	1.64E+11
1.20E-01	5.42E+13	3.35E+10	3.35E+10	3.35E+10	3.35E+10	3.35E+10	3.35E+10
1.70E-01	1.72E+12	2.23E+10	2.23E+10	2.23E+10	2.23E+10	2.23E+10	2.23E+10
3.00E-01	2.87E+13	1.60E+11	1.60E+11	1.60E+11	1.60E+11	1.60E+11	1.60E+11
6.50E-01	1.47E+12	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10
1.13E+00	1.82E+12	1.16E+10	1.16E+10	1.16E+10	1.16E+10	1.16E+10	1.16E+10
1.58E+00	1.24E+10	1.24E+10	1.24E+10	1.24E+10	1.24E+10	1.24E+10	1.25E+10
2.00E+00	2.61E+09	2.61E+09	2.61E+09	2.61E+09	2.61E+09	2.61E+09	2.61E+09
2.40E+00	1.52E+09	1.52E+09	1.52E+09	1.52E+09	1.52E+09	1.52E+09	1.53E+09
2.80E+00	2.00E+08	2.00E+08	2.00E+08	1.99E+08	1.98E+08	1.98E+08	1.97E+08
3.25E+00	1.22E+07	1.22E+07	1.22E+07	1.22E+07	1.22E+07	1.22E+07	1.22E+07
3.75E+00	2.25E+04	2.25E+04	2.25E+04	2.24E+04	2.24E+04	2.24E+04	2.24E+04
4.25E+00	1.29E+04	1.29E+04	1.29E+04	1.29E+04	1.29E+04	1.29E+04	1.29E+04
4.75E+00	7.41E+03	7.41E+03	7.40E+03	7.40E+03	7.40E+03	7.40E+03	7.39E+03
5.50E+00	6.64E+03	6.63E+03	6.63E+03	6.63E+03	6.62E+03	6.62E+03	6.62E+03
0 total	2.75E+14	3.55E+12	3.54E+12	3.54E+12	3.54E+12	3.53E+12	3.53E+12
0 mev/sec	2.51E+13	1.73E+11	1.73E+11	1.73E+11	1.73E+11	1.73E+11	1.73E+11

0 actinide energy release rates, mev/watt-sec

0 basis = single reactor assembly

emean (mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
	time after discharge						
1.00E-02	3.38E+08	7.08E+06	7.07E+06	7.06E+06	7.05E+06	7.04E+06	7.03E+06
3.00E-02	6.35E+07	5.06E+05	5.06E+05	5.06E+05	5.06E+05	5.06E+05	5.06E+05
5.50E-02	1.53E+08	2.89E+06	2.89E+06	2.89E+06	2.89E+06	2.89E+06	2.89E+06
8.50E-02	1.12E+09	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06	3.49E+06
1.20E-01	1.63E+09	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1.70E-01	7.33E+07	9.47E+05	9.47E+05	9.47E+05	9.47E+05	9.47E+05	9.47E+05
3.00E-01	2.15E+09	1.20E+07	1.20E+07	1.20E+07	1.20E+07	1.20E+07	1.20E+07
6.50E-01	2.39E+08	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06	4.73E+06
1.13E+00	5.12E+08	3.27E+06	3.27E+06	3.27E+06	3.27E+06	3.27E+06	3.27E+06
1.58E+00	4.90E+06	4.90E+06	4.90E+06	4.90E+06	4.90E+06	4.90E+06	4.90E+06
2.00E+00	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.31E+06
2.40E+00	9.15E+05	9.15E+05	9.15E+05	9.15E+05	9.15E+05	9.15E+05	9.15E+05
2.80E+00	1.40E+05	1.40E+05	1.40E+05	1.39E+05	1.39E+05	1.38E+05	1.38E+05

	3.25E+00	9.91E+03	9.91E+03	9.92E+03	9.92E+03	9.92E+03	9.92E+03	9.92E+03
	3.75E+00	2.11E+01	2.11E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01
	4.25E+00	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01
	4.75E+00	8.80E+00	8.80E+00	8.79E+00	8.79E+00	8.79E+00	8.78E+00	8.78E+00
	5.50E+00	9.13E+00	9.12E+00	9.12E+00	9.11E+00	9.11E+00	9.11E+00	9.10E+00
0	total	4.28E+09	4.32E+07	4.32E+07	4.32E+07	4.32E+07	4.32E+07	4.32E+07
0	gamma matte	4.03E+00	2.77E-02	2.77E-02	2.77E-02	2.77E-02	2.77E-02	2.77E-02

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06
bi210	5.88E-04	5.89E-04	5.89E-04	5.89E-04	5.89E-04	5.89E-04	5.89E-04
bi211	1.28E+02	1.28E+02	1.28E+02	1.28E+02	1.28E+02	1.28E+02	1.28E+02
bi212	5.41E+00	5.42E+00	5.40E+00	5.38E+00	5.35E+00	5.32E+00	5.28E+00
bi213	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00
bi214	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
po210	7.23E+02	7.18E+02	7.16E+02	7.16E+02	7.16E+02	7.16E+02	7.16E+02
po211	5.03E-01	5.07E-01	5.07E-01	5.07E-01	5.07E-01	5.07E-01	5.07E-01
po212	2.77E+01	2.78E+01	2.77E+01	2.75E+01	2.74E+01	2.72E+01	2.70E+01
po213	2.97E+02	2.97E+02	2.97E+02	2.97E+02	2.97E+02	2.97E+02	2.97E+02
po214	2.38E+03	2.38E+03	2.38E+03	2.38E+03	2.38E+03	2.38E+03	2.38E+03
po215	1.80E+02	1.81E+02	1.81E+02	1.81E+02	1.81E+02	1.81E+02	1.81E+02
po216	2.16E+01	2.17E+01	2.16E+01	2.15E+01	2.14E+01	2.12E+01	2.11E+01
po218	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03
at217	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02
rn218	4.03E-10	1.59E-14	6.23E-19	2.45E-23	9.25E-28	.00E+00	.00E+00
rn219	1.43E+02	1.44E+02	1.44E+02	1.44E+02	1.44E+02	1.44E+02	1.44E+02
rn220	1.71E+01	1.72E+01	1.71E+01	1.70E+01	1.69E+01	1.68E+01	1.67E+01
rn222	8.26E+02	8.26E+02	8.27E+02	8.27E+02	8.27E+02	8.27E+02	8.27E+02
fr221	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02
fr223	5.44E-05	5.44E-05	5.44E-05	5.44E-05	5.44E-05	5.44E-05	5.44E-05
ra222	5.11E-10	1.23E-14	4.82E-19	1.90E-23	7.51E-28	.00E+00	.00E+00
ra223	8.31E+01	8.32E+01	8.32E+01	8.32E+01	8.32E+01	8.32E+01	8.32E+01
ra224	1.21E+01	1.21E+01	1.21E+01	1.20E+01	1.20E+01	1.19E+01	1.18E+01
ra226	4.83E+02	4.83E+02	4.83E+02	4.83E+02	4.83E+02	4.83E+02	4.83E+02
ac225	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02
ac227	6.12E-01	6.12E-01	6.12E-01	6.12E-01	6.12E-01	6.12E-01	6.12E-01
ac228	2.36E-11	2.37E-11	2.37E-11	2.37E-11	2.37E-11	2.37E-11	2.37E-11
th226	2.81E-10	1.11E-14	4.35E-19	1.71E-23	6.78E-28	.00E+00	.00E+00
th227	9.16E+01	9.18E+01	9.18E+01	9.18E+01	9.18E+01	9.18E+01	9.18E+01
th228	1.02E+01	1.02E+01	1.02E+01	1.01E+01	1.01E+01	9.99E+00	9.93E+00
th229	5.90E+01	5.90E+01	5.90E+01	5.90E+01	5.91E+01	5.91E+01	5.91E+01
th230	5.79E+02	5.79E+02	5.79E+02	5.79E+02	5.79E+02	5.80E+02	5.80E+02
th232	5.01E-04	5.01E-04	5.01E-04	5.01E-04	5.01E-04	5.02E-04	5.02E-04
pa231	4.88E+01	4.88E+01	4.88E+01	4.88E+01	4.88E+01	4.88E+01	4.88E+01
u230	2.21E-10	8.71E-15	3.42E-19	1.35E-23	5.34E-28	.00E+00	.00E+00
u231	1.41E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	9.30E+00	9.42E+00	9.35E+00	9.27E+00	9.20E+00	9.12E+00	9.05E+00
u233	1.51E+02	1.51E+02	1.51E+02	1.51E+02	1.51E+02	1.51E+02	1.51E+02
u234	7.61E+03	7.61E+03	7.61E+03	7.61E+03	7.61E+03	7.61E+03	7.61E+03
u235	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02
u236	1.11E+03	1.11E+03	1.11E+03	1.11E+03	1.11E+03	1.11E+03	1.11E+03
u238	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02
np235	2.46E-08	1.45E-08	8.50E-09	4.99E-09	2.93E-09	1.72E-09	1.01E-09

np237	3.30E+03	3.30E+03	3.30E+03	3.30E+03	3.30E+03	3.30E+03	3.30E+03
pu236	1.45E-01	1.19E-01	9.74E-02	7.99E-02	4.56E-02	8.38E-02	4.62E-02
pu237	5.51E-08	5.16E-10	4.84E-12	4.53E-14	4.25E-16	5.08E-18	3.73E-20
pu238	8.06E+04	8.01E+04	7.96E+04	7.90E+04	7.85E+04	7.80E+04	7.75E+04

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	3.82E+05	3.82E+05	3.82E+05	3.82E+05	3.82E+05	3.82E+05	3.82E+05
pu240	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
pu241	1.81E-01	1.74E-01	1.67E-01	1.60E-01	1.54E-01	1.48E-01	1.42E-01
pu242	8.46E-02	8.46E-02	8.46E-02	8.46E-02	8.46E-02	8.46E-02	8.46E-02
pu244	3.95E-24	3.95E-24	3.96E-24	3.96E-24	3.96E-24	3.97E-24	3.97E-24
am239	1.13E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	1.78E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.04E+04	1.05E+04	1.05E+04	1.05E+04	1.05E+04	1.05E+04	1.04E+04
am242m	5.79E-02	5.77E-02	5.74E-02	5.72E-02	5.70E-02	5.67E-02	5.65E-02
am243	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02	5.18E-02
cm241	1.58E-12	2.54E-15	4.09E-18	6.59E-21	1.06E-23	1.71E-26	2.74E-29
cm242	1.16E+02	4.48E+01	2.52E+01	1.98E+01	1.62E+01	1.78E+01	1.76E+01
cm243	1.28E-09	1.25E-09	1.23E-09	1.20E-09	1.18E-09	1.16E-09	1.13E-09
cm244	3.56E-03	3.43E-03	3.33E-03	3.22E-03	3.12E-03	3.02E-03	2.93E-03
cm245	1.19E-08	1.19E-08	1.19E-08	1.19E-08	1.19E-08	1.19E-08	1.19E-08
cm246	1.82E-10	1.82E-10	1.82E-10	1.82E-10	1.82E-10	1.82E-10	1.82E-10
cm247	6.96E-18	6.96E-18	6.96E-18	6.96E-18	6.96E-18	6.96E-18	6.96E-18
cm248	5.64E-19	5.64E-19	5.64E-19	5.64E-19	5.64E-19	5.64E-19	5.64E-19
bk249	9.66E-25	5.00E-25	2.58E-25	1.34E-25	6.91E-26	3.58E-26	1.85E-26
cf249	6.63E-20	6.63E-20	6.62E-20	6.61E-20	6.60E-20	6.59E-20	6.58E-20
cf250	2.44E-22	2.33E-22	2.23E-22	2.13E-22	2.04E-22	1.95E-22	1.87E-22
cf251	6.64E-26	6.63E-26	6.63E-26	6.63E-26	6.62E-26	6.62E-26	6.61E-26
cf252	4.18E-27	3.37E-27	2.69E-27	2.16E-27	1.74E-27	1.40E-27	1.12E-27
0 total	5.44E+05	5.43E+05	5.43E+05	5.42E+05	5.41E+05	5.41E+05	5.40E+05

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02
pa231	6.11E-03	6.12E-03	6.12E-03	6.12E-03	6.12E-03	6.12E-03	6.12E-03
u232	5.84E-04	5.79E-04	5.74E-04	5.70E-04	5.65E-04	5.60E-04	5.56E-04
u234	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01
u235	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00
u236	1.67E+02	1.67E+02	1.67E+02	1.67E+02	1.67E+02	1.67E+02	1.67E+02
u237	1.29E-09	6.37E-15	6.12E-15	5.88E-15	5.64E-15	5.42E-15	5.21E-15
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.65E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.21E-08	7.21E-08	7.21E-08	7.21E-08	7.21E-08	7.21E-08	7.21E-08
np238	1.96E-08	1.69E-14	1.69E-14	1.68E-14	1.67E-14	1.66E-14	1.66E-14
np239	1.97E-05	5.37E-13	5.37E-13	5.37E-13	5.37E-13	5.37E-13	5.37E-13
pu236	9.79E-03	8.04E-03	6.59E-03	5.41E-03	4.44E-03	3.64E-03	2.99E-03
pu238	1.49E+04	1.48E+04	1.47E+04	1.46E+04	1.45E+04	1.44E+04	1.43E+04

	pu239	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02
	pu240	3.32E+05	3.32E+05	3.32E+05	3.32E+05	3.32E+05	3.32E+05	3.32E+05
	pu241	6.51E-03	6.26E-03	6.01E-03	5.77E-03	5.55E-03	5.33E-03	5.12E-03
	pu242	6.59E+01	6.59E+01	6.59E+01	6.59E+01	6.59E+01	6.59E+01	6.59E+01
	pu243	5.37E-12	3.01E-28	3.01E-28	3.01E-28	3.01E-28	3.01E-28	3.01E-28
	pu244	9.43E-19	9.46E-19	9.44E-19	9.47E-19	9.48E-19	9.48E-19	9.49E-19
	am241	4.02E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00	4.02E+00
	am242m	2.75E-01	2.74E-01	2.73E-01	2.72E-01	2.71E-01	2.70E-01	2.68E-01
	am242	1.93E-03	2.98E-04	2.96E-04	2.95E-04	2.94E-04	2.93E-04	2.92E-04
	am243	2.39E-04	2.39E-04	2.38E-04	2.38E-04	2.38E-04	2.38E-04	2.38E-04
	am244	4.01E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	cm242	5.78E+02	2.26E+02	1.26E+02	9.87E+01	9.10E+01	8.86E+01	8.77E+01
	cm243	2.78E-11	2.72E-11	2.67E-11	2.62E-11	2.56E-11	2.51E-11	2.46E-11
	cm244	4.62E-01	4.48E-01	4.34E-01	4.20E-01	4.07E-01	3.94E-01	3.82E-01
	cm245	3.23E-09	3.23E-09	3.23E-09	3.23E-09	3.23E-09	3.23E-09	3.23E-09
	cm246	6.56E-06	6.56E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06
	cm248	9.23E-12	9.23E-12	9.23E-12	9.23E-12	9.23E-12	9.23E-12	9.23E-12
	cm250	2.07E-24	2.07E-24	2.07E-24	2.07E-24	2.07E-24	2.07E-24	2.07E-24
	bk249	3.32E-21	2.75E-21	1.42E-21	7.37E-22	3.81E-22	1.97E-22	1.02E-22
	cf249	4.83E-20	4.03E-20	4.03E-20	4.02E-20	4.02E-20	4.01E-20	4.00E-20
	cf250	2.04E-17	1.95E-17	1.87E-17	1.79E-17	1.71E-17	1.64E-17	1.56E-17
	cf252	1.46E-20	1.18E-20	9.45E-21	7.40E-21	6.11E-21	4.91E-21	3.95E-21
0	total	4.65E+05	4.65E+05	4.64E+05	4.64E+05	4.64E+05	4.64E+05	4.64E+05
	---	---	---	---	---	---	---	---
0	total	1.01E+06	1.01E+06	1.01E+06	1.01E+06	1.00E+06	1.00E+06	

1 page 135

alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 aas2h: far-field crit based on bEu 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	1.055E+05	1.052E+05	1.051E+05	1.050E+05	1.049E+05	1.047E+05	1.046E+05
3	1.85E+00 - 3.00E+00	2.081E+05	2.078E+05	2.075E+05	2.072E+05	2.069E+05	2.066E+05	2.064E+05
4	1.40E+00 - 1.85E+00	8.002E+04	7.997E+04	7.990E+04	7.982E+04	7.974E+04	7.967E+04	7.959E+04
5	9.00E-01 - 1.40E+00	4.500E+04	4.498E+04	4.494E+04	4.490E+04	4.485E+04	4.481E+04	4.477E+04
6	4.00E-01 - 9.00E-01	1.307E+04	1.306E+04	1.305E+04	1.304E+04	1.303E+04	1.302E+04	1.300E+04
7	1.00E-01 - 4.00E-01	2.042E+03	2.042E+03	2.040E+03	2.038E+03	2.036E+03	2.034E+03	2.032E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	5.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 5.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

```
 26 1.80E-08 - 3.80E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.80E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                       5.437E+05 5.431E+05 5.425E+05 5.420E+05 5.414E+05 5.409E+05 5.404E+05
1                                                                                                  page 136
                          spontaneous fission neutron source spectrum as a function of time

0                         sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                            spontaneous fission neutron spectra, neutrons/sec/basis
                                basis = single reactor assembly

     boundaries, mev    initial   304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d

  1 6.43E+00 - 2.00E+01 8.884E+03 8.876E+03 8.870E+03 8.867E+03 8.864E+03 8.862E+03 8.860E+03
  2 3.00E+00 - 6.43E+00 9.737E+04 9.727E+04 9.722E+04 9.719E+04 9.714E+04 9.714E+04 9.711E+04
  3 1.85E+00 - 3.00E+00 1.061E+05 1.060E+05 1.059E+05 1.059E+05 1.059E+05 1.059E+05 1.058E+05
  4 1.40E+00 - 1.85E+00 6.013E+04 6.007E+04 6.004E+04 6.002E+04 6.000E+04 5.999E+04 5.997E+04
  5 9.00E-01 - 1.40E+00 8.253E+04 8.245E+04 8.241E+04 8.238E+04 8.236E+04 8.234E+04 8.231E+04
  6 4.80E-01 - 9.00E-01 9.196E+04 9.187E+04 9.182E+04 9.179E+04 9.176E+04 9.174E+04 9.172E+04
  7 1.00E-01 - 4.00E-01 1.016E+04 1.016E+04 1.013E+04 1.012E+04 1.012E+04 1.011E+04 1.011E+04
  8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 11 1.00E-04 - 5.50E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 12 3.00E-05 - 1.00E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 13 1.00E-05 - 3.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 14 3.05E-06 - 1.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 15 1.77E-06 - 3.05E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 16 1.30E-06 - 1.77E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 17 1.13E-06 - 1.30E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 18 1.00E-06 - 1.13E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 19 8.00E-07 - 1.00E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 20 4.00E-07 - 8.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 21 3.25E-07 - 4.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 22 2.25E-07 - 3.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 23 1.80E-07 - 2.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 24 5.80E-08 - 1.80E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 25 3.80E-08 - 5.80E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 26 1.00E-08 - 3.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                       4.651E+05 4.647E+05 4.644E+05 4.643E+05 4.642E+05 4.640E+05 4.639E+05
1                                                                                                  page 137
                  total (alpha-n plus spon. fission) neutron source spectrum as a function of time
                          (using reaction spectra for uranium dioxide)

0                         sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                                neutron spectra, neutrons/sec/basis
                                basis = single reactor assembly

     boundaries, mev    initial   304.4 d   608.8 d   913.1 d  1217.5 d  1521.9 d  1826.3 d

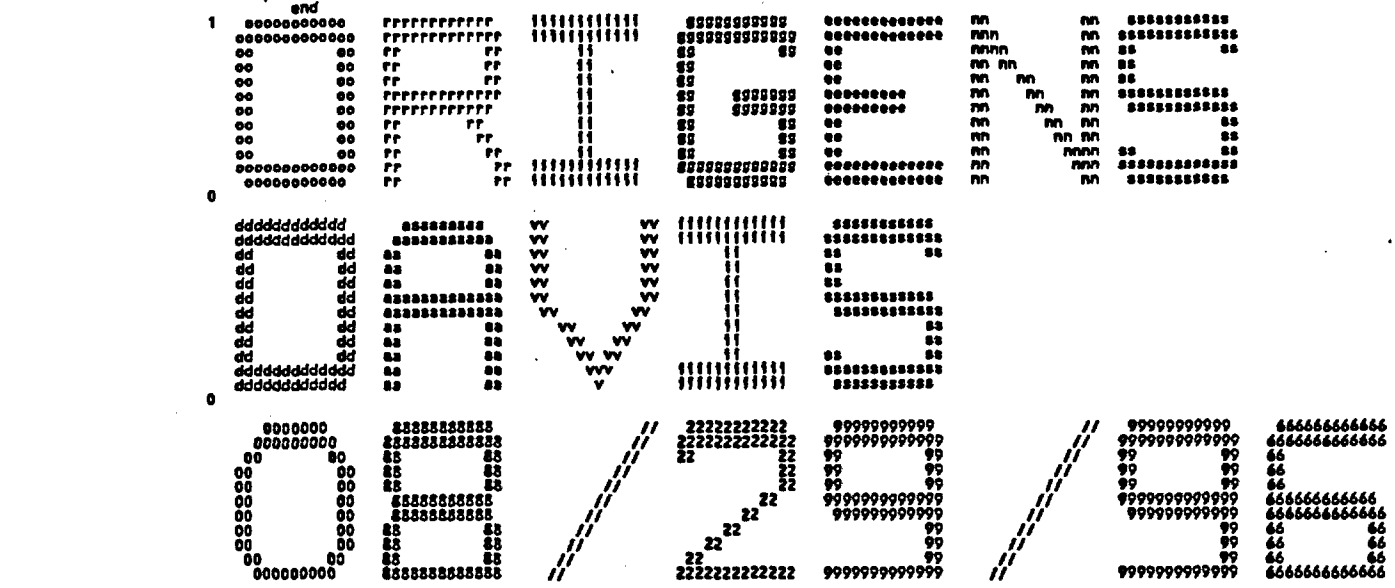
  1 6.43E+00 - 2.00E+01 8.884E+03 8.876E+03 8.870E+03 8.867E+03 8.864E+03 8.862E+03 8.860E+03
  2 3.00E+00 - 6.43E+00 2.028E+05 2.025E+05 2.023E+05 2.022E+05 2.020E+05 2.019E+05 2.018E+05
  3 1.85E+00 - 3.00E+00 4.042E+05 4.038E+05 4.035E+05 4.031E+05 4.028E+05 4.025E+05 4.022E+05
  4 1.40E+00 - 1.85E+00 1.401E+05 1.400E+05 1.399E+05 1.398E+05 1.397E+05 1.397E+05 1.396E+05
  5 9.00E-01 - 1.40E+00 1.275E+05 1.274E+05 1.273E+05 1.273E+05 1.272E+05 1.271E+05 1.271E+05
  6 4.80E-01 - 9.00E-01 1.050E+05 1.049E+05 1.049E+05 1.048E+05 1.048E+05 1.048E+05 1.047E+05
  7 1.00E-01 - 4.00E-01 2.020E+04 2.018E+04 2.017E+04 2.016E+04 2.015E+04 2.015E+04 2.014E+04
  8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
```

```
 11 1.00E-04 - 5.50E-04  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 12 3.00E-05 - 1.00E-04  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 13 1.00E-05 - 3.00E-05  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 14 3.05E-06 - 1.00E-05  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 15 1.77E-06 - 3.05E-06  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 16 1.30E-06 - 1.77E-06  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 17 1.13E-06 - 1.30E-06  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 18 1.00E-06 - 1.13E-06  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 19 8.00E-07 - 1.00E-06  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 20 4.00E-07 - 8.00E-07  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 21 3.25E-07 - 4.00E-07  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 22 2.25E-07 - 3.25E-07  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 23 1.00E-07 - 2.25E-07  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 24 5.00E-08 - 1.00E-07  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 25 3.00E-08 - 5.00E-08  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 26 1.00E-08 - 3.00E-08  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
 27 1.00E-11 - 1.00E-08  .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00 .000E+00
0                       1.009E+06 1.008E+06 1.007E+06 1.006E+06 1.006E+06 1.005E+06 1.004E+06
1
1                     * gamma sources determined *
0case applies the following photon data base
                     master photon library
                      in binary mode
0    the sources include photons of nuclides for...

       light elements
       actinides
       fission products
1                     gamma source spectrum for gamma lines (sas2)
0                                  1826.25  day time of the requested nuclides
0                        energy interval in mev      photons / second      mev / second
0
                      1.0000E-02 to      5.0000E-02       4.8566E+12        1.4570E+11
                      5.0000E-02 to      1.0000E-01       1.3861E+12        1.8396E+11
                      1.0000E-01 to      2.0000E-01       8.6684E+11        1.2103E+11
                      2.0000E-01 to      3.0000E-01       2.6815E+11        6.7037E+10
                      3.0000E-01 to      4.0000E-01       1.2436E+11        1.1353E+11
                      4.0000E-01 to      6.0000E-01       1.6178E+11        8.0890E+10
                      6.0000E-01 to      8.0000E-01       5.7639E+12        4.0347E+12
                      8.0000E-01 to      1.0000E+00       7.2819E+10        4.5537E+10
                      1.0000E+00 to      1.3300E+00       7.9188E+10        9.2254E+10
                      1.3300E+00 to      1.6600E+00       4.5611E+10        6.8188E+10
                      1.6600E+00 to      2.0000E+00       8.4544E+09        1.5472E+10
                      2.0000E+00 to      2.5000E+00       3.6691E+09        8.2556E+09
                      2.5000E+00 to      3.0000E+00       2.8944E+08        5.7652E+08
                      3.0000E+00 to      4.0000E+00       1.2362E+07        4.3268E+07
                      4.0000E+00 to      5.0000E+00       1.9958E+04        8.9818E+04
                      5.0000E+00 to      6.5000E+00       7.8676E+03        4.5239E+04
                      6.5000E+00 to      8.0000E+00       1.5184E+03        1.1009E+04
                      8.0000E+00 to      1.0000E+01       3.1876E+02        2.8689E+03
0                     totals                              1.3778E+13        4.9172E+12
0
0                     total energy from nuclides with spectrum data     =   4.9172E+12
0                     total energy from nuclides with no spectrum data  =   1.3011E+06
1
0  .results on logical unit no. 71, position  2, for time step  6, subcase12, (run position 1, case position 2)
   title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
0    .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```

```
1          primary module access and input record ( scale driver - 95/03/29 - 09:06:37 )
-   module sas2h     will be called
      SAS2H: Far-Field Crit based on BEW 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
      44group     latticecell
      '
      '  mixtures of tuff infinite slabs:
      arbm-ftuff  2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.370 12000 0.354
                                13027 4.434 14000 20.193 19000 1.370 20000 1.439
                                26000 0.494 92235 0.567 92234 0.007 92236 0.136
                                92238 28.593 93237 0.033 1 1.0 538   end
      kr-83      1 0 1-20 538 end
      kr-85      1 0 1-20 538 end
      sr-90      1 0 1-20 538 end
       y-89      1 0 1-20 538 end
      mo-95      1 0 1-20 538 end
      zr-93      1 0 1-20 538 end
      zr-94      1 0 1-20 538 end
      zr-95      1 0 1-20 538 end
      nb-94      1 0 1-20 538 end
      tc-99      1 0 1-20 538 end
      rh-103     1 0 1-20 538 end
      rh-105     1 0 1-20 538 end
      ru-101     1 0 1-20 538 end
      ru-106     1 0 1-20 538 end
      pd-105     1 0 1-20 538 end
      pd-108     1 0 1-20 538 end
      ag-109     1 0 1-20 538 end
      sb-124     1 0 1-20 538 end
      xe-131     1 0 1-20 538 end
      xe-132     1 0 1-20 538 end
      xe-135     1 0 1-20 538 end
      xe-136     1 0 1-20 538 end
      cs-134     1 0 1-20 538 end
      cs-135     1 0 1-20 538 end
      cs-137     1 0 1-20 538 end
      ba-136     1 0 1-20 538 end
      la-139     1 0 1-20 538 end
      pr-141     1 0 1-20 538 end
      pr-143     1 0 1-20 538 end
      ce-144     1 0 1-20 538 end
      nd-143     1 0 1-20 538 end
      nd-145     1 0 1-20 538 end
      pm-147     1 0 1-20 538 end
      pm-148     1 0 1-20 538 end
      nd-147     1 0 1-20 538 end
      sm-147     1 0 1-20 538 end
      sm-149     1 0 1-20 538 end
      sm-150     1 0 1-20 538 end
      sm-151     1 0 1-20 538 end
      sm-152     1 0 1-20 538 end
      gd-155     1 0 1-20 538 end
      eu-153     1 0 1-20 538 end
      eu-154     1 0 1-20 538 end
      eu-155     1 0 1-20 538 end
      arbm-tuff1  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                26000 0.483 2 1.0 523.   end
      arbm-tuff2  1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
                                13027 6.130 14000 27.919 19000 1.894 20000 1.989
                                26000 0.483 3 1.0 523.   end
```

```
'
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
end comp
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'  fuel-pin-cell geometry:
'
symmslabcell  340.  280. 1 3 281. 2 end
' . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
'
'
'  assembly and cycle parameters:
'
npin/assm=1 fuelngth=280. ncycles=3 nlib/cyc=10 volfuel1tot=1.1494E7
printlevel=6 inplevel=0 end
power=1.468E-3 burn=9.13125e6 down=0 temkcyc=398
power=9.79E-4 burn=9.13125e6 down=0. temkcyc=372
power=4.89E-4 burn=9.13125e6 down=9.13125e6 temkcyc=346
   end
```



```
   9000000       88888888888                //   22222222222     99999999999                //   99999999999     666666666666
  000000000     888888888888               //  2222222222222   9999999999999              //  9999999999999   6666666666666
 00       00    88        88              //  22          22  99          99              //  99          99  66
00         00  88        88              //                22  99          99              //  99          99  66
00         00  88        88              //                22  99          99              //  99          99  66
00         00   88888888888              //              22    9999999999999               //  9999999999999   666666666666
00         00   88888888888              //            22       999999999999               //   999999999999   6666666666666
00         00  88        88              //          22                   99              //               99  66         66
00         00  88        88              //        22                     99              //               99  66         66
 00       00    88        88              //      22                       99              //               99  66         66
  000000000     888888888888              //    22                         99              //               99  6666666666666
```

```
     0000000       88888888888    //          2222222222222   999999999999    //          999999999999    66666666666
0
       11           0000000                     33333333333      0000000                     22222222222    666666666666
      111          000000000                   3333333333333    000000000                   2222222222222  6666666666666
     1111         00       00        :::      33         33   00       00        :::      22          22  66
       11        00         00       :::                 33   00         00      :::                 22  66
       11        00         00       :::                 33   00         00      :::                 22  66
       11        00         00                         333    00         00                        22   666666666666
       11        00         00                         333    00         00                      22    6666666666666
       11        00         00       :::                 33   00         00      :::           22      66          66
       11        00         00       :::                 33   00         00      :::         22        66          66
       11         00       00        :::      33         33    00       00        :::      22          66          66
   11111111       000000000                   3333333333333     000000000                 2222222222222  6666666666666
   11111111        0000000                     33333333333       0000000                  2222222222222   66666666666
1
0                                  ssssssssss    eeeeeeeeeee     aaaaaaaa     ll            ooooooooooooo
                                 ssssssssssss  eeeeeeeeeeee    aaaaaaaaaa    ll            ooooooooooooo
                                 ss        ss  ee        ee    aa        aa  ll            oo
                                 ss            ee              aa        aa  ll            oo
                                 ss            ee              aa        aa  ll            oo
                                 ssssssssssss  ee              aaaaaaaaaaaa  ll            oooooooooo
                                  ssssssssssss ee              aaaaaaaaaaaa  ll            oooooooooo
                                           ss  ee              aa        aa  ll            oo
                                           ss  ee              aa        aa  ll            oo
                                 ss        ss  ee        ee    aa        aa  ll            oo
                                 ssssssssssss  eeeeeeeeeeee    aa        aa  llllllllllll  ooooooooooooo
                                  ssssssssss    eeeeeeeeeee    aa        aa  llllllllllll  ooooooooooooo
```

program verification information

code system: scale version: 4.3

program: e0e004

creation date: 03/13/96

library: /usr1/ernl/Scale/bin

test code: origsns

version: 3.0

jobname: davis

date of execution: 08/29/96

```
                    *****    time of execution:  10:30:26                                    *****
                    *****                                                                    *****
                    *****                                                                    *****
                    ************************************************************************
                    ************************************************************************
                    ************************************************************************
1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has     20 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        3q array has      1 entries.
0        4q array has      1 entries.
0       54q array has     12 entries.
ilibrary information...

         cross-section data taken from position number  1 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ************************************************************************
         *                                                                      *
         *            prelim lwr origen-s binary working library--id = 1143     *
         *          made from modified card-image origen-s libraries of scale 4.2 *
         *      data from the light element, actinids, and fission product libraries *
         *        decay data, including gamma and total energy, are from endf/b-vi *
         *                                                                      *
         *      neutron flux spectrum factors and cross sections were produced from *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                      *
         *                  fission product yields are from endf/b-v            *
         *                                                                      *
         *              photon libraries use an 18-energy-group structure       *
         *             the photon data are from the master photon data base,    *
         *              produced to include bremsstrahlung from uo2 matrix      *
         *                                                                      *
         *        see information above this box (if present) for later updates *
         *                                                                      *
         ************************************************************************
```

```
          *                                                                    *
0         ***********************************************************************
0                   .other identification and sizes of library.
0                     data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements        page   1
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
     na 23   1.73E+05  1.73E+05
     al 27   1.35E+06  1.35E+06
   total     1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   2
0                                          nuclide concentrations, grams
                                           basis =single reactor assembly
              initial  1E-18 d
      u234   2.12E+03  2.12E+03
      u235   1.72E+05  1.72E+05
      u236   4.12E+04  4.12E+04
      u238   8.66E+06  8.66E+06
     np237   9.99E+03  9.99E+03
   total     8.88E+06  8.88E+06
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                page   3
        power=    .00mw, burnup=   1340.mwd, flux= 1.07E+08n/cm**2-sec
                                          basis =
0
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      228281. d     456563. d     684844. d     913125. d     913125. d
    productions   1.048802E+06  1.049862E+06  1.050874E+06  1.051840E+06  1.052761E+06  1.052761E+06
    absorptions   8.561503E+05  8.561003E+05  8.577262E+05  8.591095E+05  8.603048E+05  8.603048E+05
    k infinity    1.227889E+00  1.226330E+00  1.225186E+00  1.224337E+00  1.223707E+00  1.223707E+00
0                  initial      228281. d     456563. d     684844. d     913125. d     913125. d
    actinide
    absorptions   8.502696E+05  8.508874E+05  8.514795E+05  8.520488E+05  8.525959E+05  8.525959E+05
    non-actinide
    abs. fracs.   4.543424E-03  4.089091E-03  7.282853E-03  8.218706E-03  8.960545E-03  8.960545E-03
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products      page   4
0                                   fraction of total absorption rate
        power=    .00mw, burnup=   1340.mwd, flux= 1.07E+08n/cm**2-sec
0             initial 228281. d 456563. d 684844. d 913125. d 913125. d

    sm149     .00E+00  1.34E-03  2.35E-03  3.10E-03  3.67E-03  3.67E-03
    eu151     .00E+00  4.09E-05  9.12E-05  1.40E-04  1.88E-04  1.88E-04
    nd143     .00E+00  3.36E-05  6.71E-05  1.00E-04  1.34E-04  1.34E-04
    gd155     .00E+00  2.33E-05  4.39E-05  6.20E-05  7.78E-05  7.78E-05
    rh103     .00E+00  1.57E-05  3.13E-05  4.69E-05  6.26E-05  6.26E-05
    xe131     .00E+00  1.09E-05  2.18E-05  3.26E-05  4.34E-05  4.34E-05
    cd113     .00E+00  1.35E-05  2.49E-05  3.46E-05  4.29E-05  4.29E-05
    cs133     .00E+00  8.49E-06  1.69E-05  2.54E-05  3.38E-05  3.38E-05
    gd157     .00E+00  1.38E-05  2.27E-05  2.86E-05  3.25E-05  3.25E-05
    sm147     .00E+00  6.28E-06  1.26E-05  1.88E-05  2.51E-05  2.51E-05
    tc 99     .00E+00  6.26E-06  1.25E-05  1.87E-05  2.48E-05  2.48E-05
    nd145     .00E+00  4.79E-06  9.56E-06  1.43E-05  1.90E-05  1.90E-05
```

sm151	.00E+00	1.66E-05	1.67E-05	1.67E-05	1.68E-05	1.68E-05
mo 95	.00E+00	3.34E-06	6.66E-06	9.97E-06	1.33E-05	1.33E-05
sm152	.00E+00	2.60E-06	5.26E-06	7.96E-06	1.07E-05	1.07E-05
kr 83	.00E+00	2.05E-06	4.10E-06	6.13E-06	8.15E-06	8.15E-06
cs135	.00E+00	1.90E-06	3.79E-06	5.68E-06	7.56E-06	7.56E-06
ru101	.00E+00	1.50E-06	2.99E-06	4.48E-06	5.97E-06	5.97E-06
pr141	.00E+00	1.40E-06	2.79E-06	4.17E-06	5.55E-06	5.55E-06
eu153	.00E+00	1.31E-06	2.62E-06	3.94E-06	5.26E-06	5.26E-06
la139	.00E+00	1.14E-06	2.27E-06	3.41E-06	4.53E-06	4.53E-06
sm150	.00E+00	3.38E-07	1.24E-06	2.55E-06	4.18E-06	4.18E-06
ba137	.00E+00	5.04E-07	1.04E-06	1.58E-06	2.12E-06	2.12E-06
pd105	.00E+00	4.93E-07	9.89E-07	1.49E-06	1.99E-06	1.99E-06
zr 93	.00E+00	4.73E-07	9.43E-07	1.41E-06	1.88E-06	1.88E-06
i129	.00E+00	3.52E-07	7.04E-07	1.06E-06	1.41E-06	1.41E-06
nd144	.00E+00	3.40E-07	6.80E-07	1.02E-06	1.36E-06	1.36E-06
mo 97	.00E+00	2.59E-07	5.18E-07	7.75E-07	1.03E-06	1.03E-06
ag109	.00E+00	1.96E-07	4.14E-07	6.52E-07	9.11E-07	9.11E-07
xe135	.00E+00	8.36E-07	8.34E-07	8.33E-07	8.32E-07	8.14E-07
zr 91	.00E+00	1.22E-07	2.43E-07	3.64E-07	4.84E-07	4.84E-07
y 89	.00E+00	1.16E-07	2.32E-07	3.47E-07	4.62E-07	4.62E-07
ru102	.00E+00	1.05E-07	2.10E-07	3.15E-07	4.19E-07	4.19E-07
ce142	.00E+00	9.43E-08	1.88E-07	2.82E-07	3.75E-07	3.75E-07
nd148	.00E+00	9.16E-08	1.83E-07	2.74E-07	3.65E-07	3.65E-07
nd146	.00E+00	7.63E-08	1.52E-07	2.28E-07	3.04E-07	3.04E-07
pd108	.00E+00	6.53E-08	1.35E-07	2.08E-07	2.85E-07	2.85E-07
ba138	.00E+00	6.50E-08	1.30E-07	1.94E-07	2.58E-07	2.58E-07
in115	.00E+00	6.37E-08	1.27E-07	1.91E-07	2.55E-07	2.55E-07
ce140	.00E+00	6.08E-08	1.21E-07	1.82E-07	2.42E-07	2.42E-07
xe132	.00E+00	5.56E-08	1.11E-07	1.66E-07	2.22E-07	2.22E-07
pd107	.00E+00	3.74E-08	7.65E-08	1.17E-07	1.59E-07	1.59E-07
mo 98	.00E+00	3.89E-08	7.77E-08	1.16E-07	1.55E-07	1.55E-07
mo100	.00E+00	3.72E-08	7.43E-08	1.11E-07	1.48E-07	1.48E-07
xe134	.00E+00	3.60E-08	7.19E-08	1.08E-07	1.43E-07	1.43E-07
zr 92	.00E+00	2.93E-08	5.85E-08	8.75E-08	1.16E-07	1.16E-07
pm147	.00E+00	1.02E-07	1.02E-07	1.01E-07	1.01E-07	1.01E-07
i127	.00E+00	2.42E-08	4.85E-08	7.29E-08	9.74E-08	9.74E-08
zr 96	.00E+00	2.40E-08	4.79E-08	7.17E-08	9.54E-08	9.54E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5
8 fraction of total absorption rate
power= .00mw, burnup= 1340.mwd, flux= 1.07E+08n/cm**2-sec
0 initial 228281. d 436563. d 484844. d 913125. d 913125. d

gd152	.00E+00	4.47E-09	2.16E-08	5.16E-08	9.42E-08	9.42E-08
ru104	.00E+00	2.29E-08	4.58E-08	6.87E-08	9.18E-08	9.18E-08
nd150	.00E+00	2.04E-08	4.08E-08	6.11E-08	8.14E-08	8.14E-08
xe136	.00E+00	1.95E-08	3.89E-08	5.82E-08	7.75E-08	7.75E-08
br 81	.00E+00	1.48E-08	2.96E-08	4.44E-08	5.90E-08	5.90E-08
rb 85	.00E+00	1.44E-08	2.88E-08	4.31E-08	5.74E-08	5.74E-08
eu155	.00E+00	5.37E-08	5.61E-08	5.65E-08	5.70E-08	5.70E-08
zr 94	.00E+00	1.27E-08	2.52E-08	3.78E-08	5.03E-08	5.03E-08
zr 90	.00E+00	1.08E-08	2.23E-08	3.37E-08	4.50E-08	4.50E-08
cd111	.00E+00	9.59E-09	1.95E-08	2.97E-08	4.01E-08	4.01E-08
te130	.00E+00	8.83E-09	1.76E-08	2.66E-08	3.52E-08	3.52E-08
sm154	.00E+00	8.64E-09	1.73E-08	2.60E-08	3.47E-08	3.47E-08
rb 87	.00E+00	8.38E-09	1.67E-08	2.50E-08	3.33E-08	3.33E-08
se 77	.00E+00	5.84E-09	1.17E-08	1.75E-08	2.32E-08	2.32E-08
eu152	.00E+00	3.89E-09	8.66E-09	1.33E-08	1.78E-08	1.78E-08
pd106	.00E+00	4.31E-09	8.70E-09	1.32E-08	1.77E-08	1.77E-08
ru 99	.00E+00	1.03E-09	4.05E-09	9.84E-09	1.60E-08	1.60E-08
kr 84	.00E+00	4.00E-09	7.98E-09	1.19E-08	1.59E-08	1.59E-08

```
     se 79      .00E+00  2.99E-09  5.97E-09  8.93E-09  1.19E-08  1.19E-08
     sb121      .00E+00  2.92E-09  5.85E-09  8.78E-09  1.17E-08  1.17E-08
     gd156      .00E+00  1.78E-09  4.04E-09  6.70E-09  9.74E-09  9.74E-09
     sb123      .00E+00  2.37E-09  4.75E-09  7.13E-09  9.51E-09  9.51E-09
     kr 86      .00E+00  2.17E-09  4.33E-09  6.48E-09  8.62E-09  8.62E-09
     te128      .00E+00  1.96E-09  3.92E-09  5.89E-09  7.85E-09  7.85E-09
     sr 90      .00E+00  4.22E-09  4.20E-09  4.18E-09  4.16E-09  4.16E-09
     dy161      .00E+00  1.28E-09  2.67E-09  4.18E-09  5.80E-09  5.80E-09
     se 80      .00E+00  1.40E-09  2.79E-09  4.18E-09  5.57E-09  5.57E-09
     te125      .00E+00  1.24E-09  2.48E-09  3.74E-09  4.99E-09  4.99E-09
     tb159      .00E+00  8.55E-10  1.74E-09  2.66E-09  3.62E-09  3.62E-09
     cd112      .00E+00  8.05E-10  1.62E-09  2.45E-09  3.29E-09  3.29E-09
     gd154      .00E+00  2.01E-10  8.04E-10  1.81E-09  3.21E-09  3.21E-09
     li 6       .00E+00  7.93E-10  1.58E-09  2.36E-09  3.14E-09  3.14E-09
     rh105      .00E+00  3.06E-09  3.09E-09  3.12E-09  3.15E-09  3.13E-09
     sn117      .00E+00  8.36E-10  1.28E-09  1.92E-09  2.57E-09  2.57E-09
     gd158      .00E+00  3.80E-10  9.40E-10  1.62E-09  2.38E-09  2.38E-09
     sn119      .00E+00  5.19E-10  1.04E-09  1.56E-09  2.08E-09  2.08E-09
     sn115      .00E+00  4.74E-10  9.49E-10  1.42E-09  1.90E-09  1.90E-09
     sr 88      .00E+00  4.00E-10  7.98E-10  1.19E-09  1.59E-09  1.59E-09
     ba135      .00E+00  9.52E-11  3.80E-10  8.53E-10  1.51E-09  1.51E-09
     cd114      .00E+00  3.11E-10  6.71E-10  1.07E-09  1.51E-09  1.51E-09
     cs137      .00E+00  1.39E-09  1.39E-09  1.39E-09  1.38E-09  1.38E-09
     pd110      .00E+00  2.97E-10  6.86E-10  9.27E-10  1.26E-09  1.26E-09
     se 82      .00E+00  2.71E-10  5.41E-10  8.10E-10  1.08E-09  1.08E-09
     ru100      .00E+00  6.65E-11  2.59E-10  5.77E-10  1.02E-09  1.02E-09
     pr143      .00E+00  9.76E-10  9.73E-10  9.71E-10  9.69E-10  9.68E-10
     dy162      .00E+00  1.75E-10  3.81E-10  6.16E-10  8.80E-10  8.80E-10
     sn126      .00E+00  2.17E-10  4.35E-10  6.54E-10  8.75E-10  8.75E-10
     dy164      .00E+00  1.62E-10  3.62E-10  5.98E-10  8.70E-10  8.70E-10
     eu154      .00E+00  2.15E-10  4.27E-10  6.39E-10  8.52E-10  8.52E-10
1    sas2h: far-field crit based on 64w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page    6
0                          fraction of total absorption rate
          power=     .00mw, burnup=    1340.mwd, flux= 1.07E+08n/cm**2-sec
0                 initial.228281. d 456563. d 684844. d 913125. d 913125. d

     se 78      .00E+00  2.08E-10  4.15E-10  6.21E-10  8.28E-10  8.28E-10
     xe133      .00E+00  7.32E-10  7.30E-10  7.29E-10  7.28E-10  7.28E-10
     ba134      .00E+00  4.37E-11  1.74E-10  3.89E-10  6.90E-10  6.90E-10
     nd142      .00E+00  4.34E-11  1.73E-10  3.89E-10  6.89E-10  6.89E-10
     sn124      .00E+00  1.70E-10  3.41E-10  5.12E-10  6.83E-10  6.83E-10
     sm148      .00E+00  4.08E-11  1.61E-10  3.59E-10  6.36E-10  6.36E-10
     ce141      .00E+00  5.79E-10  5.78E-10  5.76E-10  5.75E-10  5.75E-10
     as 75      .00E+00  1.24E-10  2.47E-10  3.70E-10  4.93E-10  4.93E-10
     pd104      .00E+00  2.34E-11  1.17E-10  2.64E-10  4.68E-10  4.68E-10
     in113      .00E+00  9.84E-11  1.84E-10  2.78E-10  3.73E-10  3.73E-10
     pm149      .00E+00  3.54E-10  3.53E-10  3.53E-10  3.52E-10  3.49E-10
     nd147      .00E+00  3.49E-10  3.48E-10  3.47E-10  3.46E-10  3.45E-10
     ba136      .00E+00  6.98E-11  1.47E-10  2.30E-10  3.21E-10  3.21E-10
     sn118      .00E+00  6.98E-11  1.40E-10  2.10E-10  2.80E-10  2.80E-10
     nb 93      .00E+00  1.48E-11  6.81E-11  1.36E-10  2.42E-10  2.42E-10
     cd116      .00E+00  5.88E-11  1.18E-10  1.77E-10  2.36E-10  2.36E-10
     sn122      .00E+00  5.73E-11  1.15E-10  1.72E-10  2.30E-10  2.30E-10
     ce144      .00E+00  2.20E-10  2.19E-10  2.19E-10  2.18E-10  2.18E-10
     mo 96      .00E+00  2.55E-11  7.64E-11  1.35E-10  2.18E-10  2.18E-10
     kr 85      .00E+00  2.09E-10  2.08E-10  2.07E-10  2.07E-10  2.07E-10
     dy163      .00E+00  3.93E-11  8.67E-11  1.42E-10  2.05E-10  2.05E-10
     kr 82      .00E+00  3.94E-11  8.58E-11  1.39E-10  1.99E-10  1.99E-10
     sn120      .00E+00  4.32E-11  8.64E-11  1.30E-10  1.73E-10  1.73E-10
     xe130      .00E+00  2.63E-11  6.13E-11  1.05E-10  1.57E-10  1.57E-10
```

ge 73	.00E+00	3.35E-11	6.69E-11	1.00E-10	1.34E-10	1.34E-10
ru103	.00E+00	1.31E-10	1.31E-10	1.32E-10	1.32E-10	1.32E-10
br 79	.00E+00	7.73E-12	3.09E-11	6.93E-11	1.23E-10	1.23E-10
cs134	.00E+00	2.32E-11	4.60E-11	6.88E-11	9.15E-11	9.15E-11
cd110	.00E+00	4.04E-12	1.66E-11	3.86E-11	7.08E-11	7.08E-11
xe129	.00E+00	4.38E-12	1.75E-11	3.94E-11	6.99E-11	6.99E-11
ag107	.00E+00	4.12E-12	1.67E-11	3.81E-11	6.87E-11	6.87E-11
te126	.00E+00	8.39E-12	2.13E-11	3.90E-11	6.15E-11	6.15E-11
zr 95	.00E+00	6.17E-11	6.15E-11	6.14E-11	6.12E-11	6.12E-11
nb 95	.00E+00	5.64E-11	5.62E-11	5.61E-11	5.60E-11	5.60E-11
y 91	.00E+00	5.20E-11	5.18E-11	5.17E-11	5.15E-11	5.15E-11
ge 76	.00E+00	1.22E-11	2.44E-11	3.65E-11	4.86E-11	4.86E-11
pm151	.00E+00	4.00E-11	4.00E-11	4.01E-11	4.01E-11	3.82E-11
gd160	.00E+00	7.98E-12	1.64E-11	2.53E-11	3.46E-11	3.46E-11
ba140	.00E+00	1.73E-11	1.73E-11	1.73E-11	1.72E-11	1.71E-11
ho165	.00E+00	2.72E-12	6.04E-12	9.97E-12	1.45E-11	1.45E-11
sm153	.00E+00	1.40E-11	1.41E-11	1.42E-11	1.42E-11	1.38E-11
eu156	.00E+00	1.26E-11	1.28E-11	1.31E-11	1.33E-11	1.33E-11
sr 89	.00E+00	1.11E-11	1.11E-11	1.11E-11	1.10E-11	1.10E-11
ru106	.00E+00	9.69E-12	9.88E-12	1.01E-11	1.02E-11	1.02E-11
te124	.00E+00	1.45E-12	2.97E-12	4.56E-12	6.23E-12	6.23E-12
ce143	.00E+00	6.40E-12	6.38E-12	6.36E-12	6.35E-12	6.10E-12
y 90	.00E+00	5.91E-12	5.89E-12	5.87E-12	5.85E-12	5.85E-12
sr 87	.00E+00	1.40E-12	2.81E-12	4.23E-12	5.66E-12	5.66E-12
sb125	.00E+00	5.56E-12	5.59E-12	5.61E-12	5.64E-12	5.64E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 7
0 fraction of total absorption rate
power= .00mw, burnup= 1340.mwd, flux= 1.07E+08n/cm**2-sec
0 initial 228281. d 456563. d 684844. d 913125. d 913125. d

la140	.00E+00	5.67E-12	5.66E-12	5.65E-12	5.64E-12	5.64E-12
mo 99	.00E+00	4.85E-12	4.84E-12	4.83E-12	4.82E-12	4.71E-12
dy160	.00E+00	2.34E-13	9.18E-13	2.00E-12	3.52E-12	3.52E-12
nb 94	.00E+00	8.05E-13	1.60E-12	2.39E-12	3.19E-12	3.19E-12
sr 86	.00E+00	4.70E-13	1.09E-12	1.86E-12	2.78E-12	2.78E-12
te127m	.00E+00	2.73E-12	2.74E-12	2.76E-12	2.77E-12	2.77E-12
xe128	.00E+00	2.17E-13	7.41E-13	1.57E-12	2.71E-12	2.71E-12
ge 74	.00E+00	6.74E-13	1.35E-12	2.02E-12	2.69E-12	2.69E-12
i131	.00E+00	2.49E-12	2.49E-12	2.49E-12	2.48E-12	2.47E-12
kr 87	.00E+00	8.30E-12	8.27E-12	8.24E-12	8.22E-12	2.40E-12
ge 72	.00E+00	4.53E-13	9.08E-13	1.36E-12	1.82E-12	1.82E-12
se 76	.00E+00	2.80E-13	5.95E-13	9.46E-13	1.33E-12	1.33E-12
pm148m	.00E+00	1.30E-12	1.31E-12	1.31E-12	1.32E-12	1.31E-12
sn116	.00E+00	8.37E-14	2.53E-13	5.68E-13	1.01E-12	1.01E-12
te129m	.00E+00	6.56E-13	6.57E-13	6.57E-13	6.58E-13	6.58E-13
er166	.00E+00	8.39E-14	2.10E-13	3.76E-13	5.82E-13	5.82E-13
te122	.00E+00	2.84E-14	1.09E-13	2.41E-13	4.24E-13	4.24E-13
ag111	.00E+00	1.22E-13	1.26E-13	1.30E-13	1.33E-13	1.32E-13
eu157	.00E+00	1.11E-13	1.14E-13	1.16E-13	1.19E-13	1.08E-13
kr 88	.00E+00	1.96E-14	4.10E-14	6.49E-14	9.20E-14	9.20E-14
cd115m	.00E+00	8.70E-14	8.74E-14	8.77E-14	8.81E-14	8.80E-14
pm148	.00E+00	5.10E-14	5.10E-14	5.10E-14	5.10E-14	5.04E-14
cs136	.00E+00	2.29E-14	2.51E-14	2.72E-14	2.94E-14	2.93E-14
sn125	.00E+00	1.09E-14	1.09E-14	1.09E-14	1.10E-14	1.09E-14
ru105	.00E+00	1.12E-14	1.13E-14	1.14E-14	1.15E-14	8.29E-15
te123	.00E+00	1.49E-15	3.29E-15	5.50E-15	8.23E-15	8.23E-15
er167	.00E+00	5.97E-16	2.01E-15	4.40E-15	7.94E-15	7.94E-15
be 9	.00E+00	1.58E-15	3.15E-15	4.71E-15	6.27E-15	6.27E-15
sn123	.00E+00	3.82E-15	3.82E-15	3.82E-15	3.82E-15	3.82E-15
tb160	.00E+00	9.56E-16	1.83E-15	2.72E-15	3.64E-15	3.63E-15

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     te132      .00E+00  3.49E-15  3.49E-15  3.48E-15  3.48E-15  3.41E-15
     rb 88      .00E+00  4.67E-15  4.65E-15  4.64E-15  4.62E-15  2.90E-15
      i135      .00E+00  3.48E-15  3.67E-15  3.67E-15  3.66E-15  2.88E-15
     li  7      .00E+00  6.11E-16  1.22E-15  1.83E-15  2.43E-15  2.43E-15
     sb126      .00E+00  1.40E-15  1.69E-15  1.99E-15  2.29E-15  2.28E-15
     pr142      .00E+00  5.77E-16  1.15E-15  1.72E-15  2.29E-15  2.11E-15
     sb124      .00E+00  8.16E-16  8.58E-16  9.00E-16  9.41E-16  9.40E-16
     in117m     .00E+00  7.66E-16  7.72E-16  7.78E-16  7.84E-16  6.59E-16
      i130      .00E+00  3.65E-16  4.67E-16  5.69E-16  6.70E-16  5.92E-16
     cd108      .00E+00  2.44E-17  9.59E-17  2.50E-16  5.26E-16  5.26E-16
     sn114      .00E+00  1.47E-17  5.95E-17  1.34E-16  2.40E-16  2.40E-16
     rb 86      .00E+00  1.22E-16  1.56E-16  1.90E-16  2.23E-16  2.22E-16
     te134      .00E+00  2.12E-15  2.11E-15  2.11E-15  2.10E-15  2.10E-16
     in117      .00E+00  2.25E-16  2.27E-16  2.29E-16  2.31E-16  1.97E-16
     dy165      .00E+00  9.59E-17  1.15E-16  1.34E-16  1.53E-16  7.98E-17
     ge 75      .00E+00  3.13E-17  3.12E-17  3.12E-17  3.11E-17  1.02E-17
     cs134m     .00E+00  4.29E-18  8.56E-18  1.28E-17  1.70E-17  9.91E-18
     cd118      .00E+00  4.39E-17  4.41E-17  4.42E-17  4.44E-17  6.77E-18
     cd109      .00E+00  1.93E-19  3.12E-19  4.31E-19  5.49E-19  5.49E-19
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page    8
0                                  fraction of total absorption rate
        power=     .00mw, burnup=    1340.mwd, flux= 1.07E+08n/cm**2-sec
0             initial 228281. d 456563. d 684844. d 913125. d 913125. d

     in119m     .00E+00  1.10E-17  1.10E-17  1.10E-17  1.11E-17  6.41E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page    9
       power= 1.468E-03mw, burnup=1.3405E+03mwd, flux= 1.07E+08n/cm**2-sec
0                                  nuclide concentrations, gram atoms
                                   basis = single reactor assembly
             charge 228281. d 456563. d 684844. d 913125. d 913125. d
      h  1    .00E+00  2.05E-05  4.09E-05  6.14E-05  8.18E-05  8.18E-05
      h  2    .00E+00  6.08E-08  1.21E-07  1.82E-07  2.43E-07  2.43E-07
      h  3    .00E+00  1.29E-11  1.31E-11  1.33E-11  1.36E-11  1.36E-11
      h  4    .00E+00  1.89E-35  1.92E-35  1.95E-35  1.98E-35   .00E+00
     he  3    .00E+00  4.41E-10  8.87E-10  1.33E-09  1.76E-09  1.76E-09
     he  4    .00E+00  3.38E-06  6.77E-06  1.01E-05  1.35E-05  1.35E-05
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    .00E+00  4.86E-07  8.13E-07  1.22E-06  1.62E-06  1.62E-06
     ne 21    .00E+00  3.32E-12  1.33E-11  2.98E-11  5.30E-11  5.30E-11
     ne 22    .00E+00  2.66E-09  5.33E-09  8.00E-09  1.07E-08  1.07E-08
     ne 23    .00E+00  2.71E-15  2.71E-15  2.70E-15  2.70E-15  2.70E-30
     na 22    .00E+00  1.60E-11  1.59E-11  1.59E-11  1.59E-11  1.59E-11
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    .00E+00  1.34E-08  1.34E-08  1.34E-08  1.34E-08  1.21E-08
     na 24m   .00E+00  2.21E-15  2.21E-15  2.21E-15  2.21E-15  2.21E-30
     na 25    .00E+00  8.34E-27  2.36E-26  4.57E-26  7.47E-26  7.47E-41
     mg 24    .00E+00  3.48E-03  6.97E-03  1.04E-02  1.39E-02  1.39E-02
     mg 25    .00E+00  7.62E-10  2.16E-09  4.18E-09  6.83E-09  6.83E-09
     mg 26    .00E+00  6.07E-08  1.21E-07  1.82E-07  2.43E-07  2.43E-07
     mg 27    .00E+00  8.09E-13  8.08E-13  8.08E-13  8.07E-13  3.66E-17
     mg 28    .00E+00  5.94E-25  5.94E-25  5.93E-25  5.92E-25  5.49E-25
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    .00E+00  9.97E-11  9.97E-11  9.96E-11  9.96E-11  1.01E-25
     al 29    .00E+00  2.89E-25  1.15E-24  2.60E-24  4.61E-24  2.54E-30
     al 30    .00E+00  1.20E-36  9.61E-36  3.24E-35  7.67E-35   .00E+00
     si 28    .00E+00  1.01E-02  2.03E-02  3.04E-02  4.05E-02  4.05E-02
     si 29    .00E+00  2.95E-09  1.18E-08  2.63E-08  4.71E-08  4.71E-08
     si 30    .00E+00  9.18E-16  7.34E-15  2.48E-14  5.86E-14  5.86E-14
     si 31    .00E+00  2.38E-28  1.90E-27  6.42E-27  1.52E-26  8.32E-27
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al 32	.00E+00	6.21E-35	7.19E-34	2.83E-33	7.29E-33	7.29E-33
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E-07

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 10
power= 1.468E-03mw, burnup=1.3405E+03mwd, flux= 1.07E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

charge 228281. d 456563. d 684844. d 913125. d 913125. d

he 4	.00E+00	7.58E-02	1.80E-01	3.05E-01	4.49E-01	4.49E-01
pb206	.00E+00	3.69E-06	2.83E-05	9.05E-05	2.03E-04	2.03E-04
pb207	.00E+00	2.82E-06	1.15E-05	2.61E-05	4.65E-05	4.65E-05
pb208	.00E+00	1.77E-07	6.93E-07	1.54E-06	2.73E-06	2.73E-06
pb209	.00E+00	5.36E-13	2.10E-12	4.63E-12	8.08E-12	8.13E-12
pb210	.00E+00	5.84E-07	2.14E-06	4.45E-06	7.31E-06	7.31E-06
pb211	.00E+00	9.38E-13	1.87E-12	2.80E-12	3.71E-12	3.71E-12
pb212	.00E+00	9.71E-13	1.91E-12	2.84E-12	3.76E-12	3.76E-12
pb214	.00E+00	1.34E-12	4.90E-12	1.02E-11	1.67E-11	1.62E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	.00E+00	2.09E-07	1.63E-06	5.49E-06	1.28E-05	1.28E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	.00E+00	3.60E-10	1.32E-09	2.74E-09	4.50E-09	4.50E-09
bi211	.00E+00	5.56E-14	1.11E-13	1.66E-13	2.20E-13	2.21E-13
bi212	.00E+00	9.21E-14	1.81E-13	2.69E-13	3.57E-13	3.57E-13
bi213	.00E+00	1.25E-13	4.91E-13	1.08E-12	1.89E-12	1.83E-12
bi214	.00E+00	9.91E-13	3.64E-12	7.55E-12	1.24E-11	1.22E-11
po210	.00E+00	9.93E-09	3.63E-08	7.56E-08	1.24E-07	1.24E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	.00E+00	6.15E-19	1.23E-18	1.83E-18	2.43E-18	2.44E-18
po212	.00E+00	4.84E-24	9.51E-24	1.41E-23	1.87E-23	1.88E-23
po213	.00E+00	1.88E-22	7.38E-22	1.63E-21	2.84E-21	2.75E-21
po214	.00E+00	1.36E-19	5.01E-19	1.04E-18	1.71E-18	1.67E-18
po215	.00E+00	7.71E-19	1.54E-18	2.30E-18	3.05E-18	3.05E-18
po216	.00E+00	3.68E-18	7.23E-18	1.07E-17	1.42E-17	1.42E-17
po218	.00E+00	1.54E-13	5.67E-13	1.18E-12	1.93E-12	1.93E-12
rn218	.00E+00	5.40E-30	1.06E-29	1.58E-29	2.09E-29	2.08E-29
rn219	.00E+00	1.72E-15	3.42E-15	5.11E-15	6.79E-15	6.79E-15
rn220	.00E+00	1.41E-15	2.77E-15	4.12E-15	5.46E-15	5.46E-15
rn222	.00E+00	2.74E-10	1.01E-09	2.09E-09	3.43E-09	3.43E-09
ra222	.00E+00	9.86E-27	1.19E-26	1.71E-26	2.27E-26	2.26E-26
ra223	.00E+00	4.28E-10	8.53E-10	1.28E-09	1.69E-09	1.69E-09
ra224	.00E+00	8.02E-12	1.58E-11	2.34E-11	3.11E-11	3.11E-11
ra225	.00E+00	5.85E-11	2.29E-10	5.06E-10	8.83E-10	8.83E-10
ra226	.00E+00	4.19E-05	1.54E-04	3.19E-04	5.25E-04	5.25E-04
ra228	.00E+00	1.32E-12	2.64E-12	3.97E-12	5.30E-12	5.30E-12
ac225	.00E+00	3.95E-11	1.55E-10	3.42E-10	5.96E-10	5.96E-10
ac227	.00E+00	2.98E-07	5.93E-07	8.87E-07	1.18E-06	1.18E-06
ac228	.00E+00	1.61E-16	3.23E-16	4.84E-16	6.46E-16	6.46E-16
th226	.00E+00	2.86E-25	5.62E-25	8.35E-25	1.11E-24	1.10E-24
th227	.00E+00	6.91E-10	1.38E-09	2.06E-09	2.74E-09	2.74E-09
th228	.00E+00	1.53E-09	3.01E-09	4.47E-09	5.93E-09	5.93E-09
th229	.00E+00	1.14E-05	4.46E-05	9.84E-05	1.72E-04	1.72E-04
th230	.00E+00	1.59E-02	3.18E-02	4.76E-02	6.34E-02	6.34E-02
th231	.00E+00	3.04E-09	3.06E-09	3.08E-09	3.10E-09	3.09E-09
th232	.00E+00	3.23E-03	6.46E-03	9.70E-03	1.29E-02	1.29E-02
th233	.00E+00	1.09E-14	2.17E-14	3.26E-14	4.34E-14	6.23E-16
th234	.00E+00	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	4.48E-04	8.93E-04	1.33E-03	1.77E-03	1.77E-03
pa232	.00E+00	2.79E-12	5.56E-12	8.30E-12	1.10E-11	1.05E-11

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 11
power= 1.468E-03mw, burnup=1.3405E+03mwd, flux= 1.07E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge 228281. d	436563. d	684844. d	913125. d	913125. d	
pa233	.00E+00	1.46E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	.00E+00	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	2.77E-22	5.45E-22	8.09E-22	1.07E-21	1.07E-21
u231	.00E+00	2.47E-18	4.92E-18	7.36E-18	9.78E-18	9.62E-18
u232	.00E+00	5.58E-08	1.10E-07	1.63E-07	2.16E-07	2.16E-07
u233	.00E+00	8.51E-03	1.70E-02	2.54E-02	3.38E-02	3.38E-02
u234	9.06E+00	9.07E+00	9.10E+00	9.12E+00	9.14E+00	9.14E+00
u235	7.30E+02	7.29E+02	7.27E+02	7.25E+02	7.24E+02	7.24E+02
u236	1.74E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	.00E+00	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.17E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	1.16E-07	1.16E-07	1.16E-07	1.16E-07	2.06E-09
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	1.40E-45
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	3.30E-12	3.30E-12	3.29E-12	3.29E-12	3.29E-12
np236m	.00E+00	7.83E-13	7.84E-13	7.83E-13	7.82E-13	7.29E-13
np236	.00E+00	4.65E-08	9.27E-08	1.39E-07	1.85E-07	1.85E-07
np237	4.22E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	.00E+00	5.67E-07	5.66E-07	5.65E-07	5.65E-07	5.48E-07
np239	.00E+00	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.64E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	1.25E-15	1.25E-15	1.25E-15	1.25E-15	2.70E-16
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	4.26E-10	4.25E-10	4.25E-10	4.25E-10	4.25E-10
pu237	.00E+00	3.51E-14	3.88E-14	4.23E-14	4.56E-14	4.55E-14
pu238	.00E+00	8.51E-03	8.57E-03	8.54E-03	8.55E-03	8.55E-03
pu239	.00E+00	1.12E+00	2.21E+00	3.27E+00	4.31E+00	4.31E+00
pu240	.00E+00	1.01E-03	3.92E-03	8.56E-03	1.47E-02	1.47E-02
pu241	.00E+00	1.55E-07	6.01E-07	1.31E-06	2.26E-06	2.26E-06
pu242	.00E+00	2.44E-10	2.94E-09	1.22E-08	3.25E-08	3.25E-08
pu243	.00E+00	1.95E-19	2.34E-18	9.69E-18	2.59E-17	1.88E-17
pu244	.00E+00	8.66E-40	6.78E-37	3.00E-35	4.22E-34	4.22E-34
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	.00E+00	1.26E-22	8.08E-22	2.23E-21	4.41E-21	3.86E-21
am240	.00E+00	5.77E-20	3.70E-19	1.02E-18	2.02E-18	1.96E-18
am241	.00E+00	1.20E-06	7.72E-06	2.13E-05	4.22E-05	4.22E-05
am242m	.00E+00	9.98E-11	9.07E-10	2.87E-09	6.09E-09	6.09E-09
am242	.00E+00	1.53E-14	1.02E-13	2.86E-13	5.71E-13	5.25E-13
am243	.00E+00	1.61E-13	3.32E-12	1.75E-11	5.41E-11	5.41E-11
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	.00E+00	4.58E-22	9.44E-21	4.96E-20	1.54E-19	1.31E-19
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	.00E+00	3.41E-25	2.26E-24	6.35E-24	1.27E-23	1.26E-23
cm242	.00E+00	3.10E-12	2.06E-11	5.77E-11	1.15E-10	1.15E-10
cm243	.00E+00	2.64E-17	1.75E-16	4.91E-16	9.79E-16	9.79E-16
cm244	.00E+00	7.20E-18	1.48E-16	7.79E-16	2.41E-15	2.41E-15

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 12
power= 1.468E-03mw, burnup=1.3405E+03mwd, flux= 1.07E+08n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

```
                charge 228281. d 456563. d 684844. d 913125. d 913125. d
      cm245     .00E+00  3.16E-22  1.36E-20  1.11E-19  4.67E-19  4.67E-19
      cm246     .00E+00  6.24E-26  5.57E-24  6.93E-23  3.92E-22  3.92E-22
      cm247     .00E+00  2.12E-31  3.92E-29  7.50E-28  5.76E-27  5.76E-27
      cm248     .00E+00  7.12E-36  2.72E-33  7.92E-32  8.23E-31  8.23E-31
      cm249     .00E+00   .00E+00   .00E+00   .00E+00  7.78E-42  1.78E-42
      cm250     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      cm251     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    totals     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0     flux                1.07E+08  1.07E+08  1.07E+08  1.07E+08  1.07E-07
0         1q array has      20 entries.
0         3q array has       1 entries.
0         3q array has       1 entries.
0         3q array has       1 entries.
0         4q array has       1 entries.
0        54q array has      12 entries.
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi  *
          *                                                                          *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                  fission product yields are from endf/b-v                *
          *                                                                          *
          *              photon libraries use an 18-energy-group structure           *
          *             the photon data are from the master photon data base,        *
          *              produced to include bremsstrahlung from uo2 matrix          *
          *                                                                          *
          *        see information above this box (if present) for later updates     *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
0         ****************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
```

```
                    129    number of actinide nuclides
                    879    number of fission product nuclides
                   7993    number of nonzero off-diagonal matrix elements
0
0       ***********************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page   13
       power=    .00mw, burnup=   2681.mwd, flux= 9.84E+07n/cm**2-sec
0                                                basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial          ******* d        ******* d        ******* d        ******* d        ******* d
    productions   1.147176E+06   1.148034E+06   1.148847E+06   1.149617E+06   1.150344E+06   1.150344E+06
    absorptions   9.285851E+05   9.296731E+05   9.306356E+05   9.314987E+05   9.322818E+05   9.322817E+05
    k infinity    1.235402E+00   1.234879E+00   1.234476E+00   1.234158E+00   1.233901E+00   1.233902E+00
0                  initial       ******* d        ******* d        ******* d        ******* d        ******* d
    actinide
    absorptions   9.209394E+05   9.214599E+05   9.219582E+05   9.224346E+05   9.228896E+05   9.228896E+05
    non-actinide
    abs. fracs.   8.233726E-03   8.834422E-03   9.324193E-03   9.730697E-03   1.007444E-02   1.007432E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  fission products   page   14
0                                  fraction of total absorption rate
       power=    .00mw, burnup=   2681.mwd, flux= 9.84E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d
```

	initial	******* d	******* d	******* d	******* d	******* d
sm149	3.72E-03	4.14E-03	4.46E-03	4.71E-03	4.89E-03	4.89E-03
eu151	1.90E-04	2.38E-04	2.84E-04	3.29E-04	3.74E-04	3.74E-04
nd143	1.35E-04	1.68E-04	2.02E-04	2.35E-04	2.68E-04	2.68E-04
gd155	7.90E-05	9.30E-05	1.05E-04	1.16E-04	1.26E-04	1.26E-04
rh103	6.24E-05	7.79E-05	9.35E-05	1.09E-04	1.25E-04	1.25E-04
xe131	4.31E-05	5.38E-05	6.45E-05	7.51E-05	8.58E-05	8.58E-05
cs133	3.35E-05	4.18E-05	5.01E-05	5.84E-05	6.67E-05	6.67E-05
cd113	4.35E-05	5.06E-05	5.66E-05	6.18E-05	6.63E-05	6.63E-05
sm147	2.48E-05	3.10E-05	3.72E-05	4.33E-05	4.94E-05	4.94E-05
tc 99	2.46E-05	3.06E-05	3.67E-05	4.27E-05	4.87E-05	4.87E-05
gd157	3.30E-05	3.57E-05	3.76E-05	3.91E-05	4.04E-05	4.04E-05
nd145	1.90E-05	2.37E-05	2.84E-05	3.31E-05	3.78E-05	3.78E-05
mo 95	1.32E-05	1.65E-05	1.97E-05	2.30E-05	2.62E-05	2.62E-05
sm152	1.06E-05	1.34E-05	1.62E-05	1.90E-05	2.19E-05	2.19E-05
sm151	1.70E-05	1.70E-05	1.70E-05	1.71E-05	1.71E-05	1.71E-05
kr 83	8.23E-06	1.03E-05	1.23E-05	1.43E-05	1.63E-05	1.63E-05
cs135	7.52E-06	9.39E-06	1.13E-05	1.31E-05	1.50E-05	1.50E-05
sm150	4.19E-06	6.06E-06	8.10E-06	1.03E-05	1.26E-05	1.26E-05
ru101	5.87E-06	7.33E-06	8.79E-06	1.02E-05	1.17E-05	1.17E-05
pr141	5.59E-06	6.97E-06	8.36E-06	9.74E-06	1.11E-05	1.11E-05
eu153	5.25E-06	6.57E-06	7.89E-06	9.22E-06	1.06E-05	1.06E-05
la139	4.57E-06	5.70E-06	6.83E-06	7.96E-06	9.09E-06	9.09E-06
ba137	2.14E-06	2.69E-06	3.23E-06	3.77E-06	4.31E-06	4.31E-06
pd105	1.98E-06	2.49E-06	3.00E-06	3.51E-06	4.02E-06	4.02E-06
zr 93	1.84E-06	2.32E-06	2.78E-06	3.24E-06	3.69E-06	3.69E-06
i129	1.42E-06	1.78E-06	2.13E-06	2.49E-06	2.85E-06	2.85E-06
nd144	1.37E-06	1.71E-06	2.05E-06	2.39E-06	2.73E-06	2.73E-06
ag109	9.01E-07	1.18E-06	1.47E-06	1.78E-06	2.11E-06	2.11E-06
mo 97	1.04E-06	1.29E-06	1.55E-06	1.81E-06	2.06E-06	2.06E-06
zr 91	4.87E-07	6.08E-07	7.28E-07	8.48E-07	9.68E-07	9.68E-07
y 89	4.66E-07	5.82E-07	6.97E-07	8.12E-07	9.26E-07	9.26E-07
ru102	4.23E-07	5.28E-07	6.33E-07	7.39E-07	8.44E-07	8.44E-07
xe135	8.26E-07	8.44E-07	8.43E-07	8.43E-07	8.42E-07	7.83E-07
ce142	3.79E-07	4.74E-07	5.68E-07	6.62E-07	7.55E-07	7.55E-07
nd148	3.66E-07	4.57E-07	5.48E-07	6.38E-07	7.29E-07	7.29E-07
pd108	2.81E-07	3.61E-07	4.44E-07	5.30E-07	6.20E-07	6.20E-07
nd146	5.06E-07	5.83E-07	4.59E-07	5.34E-07	6.10E-07	6.10E-07
ba138	2.62E-07	3.26E-07	3.91E-07	4.56E-07	5.21E-07	5.21E-07

in115	2.55E-07	3.19E-07	3.84E-07	4.48E-07	5.13E-07	5.13E-07
ce140	2.45E-07	3.06E-07	3.67E-07	4.27E-07	4.88E-07	4.88E-07
xe132	2.21E-07	2.76E-07	3.31E-07	3.86E-07	4.41E-07	4.41E-07
gd152	9.55E-08	1.51E-07	2.19E-07	2.99E-07	3.90E-07	3.90E-07
pd107	1.60E-07	2.04E-07	2.50E-07	2.96E-07	3.45E-07	3.45E-07
mo 98	1.53E-07	1.91E-07	2.29E-07	2.67E-07	3.05E-07	3.05E-07
mo100	1.48E-07	1.84E-07	2.21E-07	2.57E-07	2.94E-07	2.94E-07
xe134	1.45E-07	1.81E-07	2.17E-07	2.52E-07	2.88E-07	2.88E-07
zr 92	1.17E-07	1.46E-07	1.75E-07	2.04E-07	2.33E-07	2.33E-07
i127	9.70E-08	1.22E-07	1.46E-07	1.71E-07	1.96E-07	1.96E-07
zr 96	9.33E-08	1.16E-07	1.40E-07	1.63E-07	1.86E-07	1.86E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 15
0 fraction of total absorption rate
0 power= .00mw, burnup= 2681.mwd, flux= 9.84E+07n/cm**2-sec

	initial	******* d	******* d	******* d	******* d	******* d
ru104	9.16E-08	1.15E-07	1.38E-07	1.61E-07	1.84E-07	1.84E-07
nd150	8.14E-08	1.02E-07	1.22E-07	1.42E-07	1.62E-07	1.62E-07
xe136	7.82E-08	9.76E-08	1.17E-07	1.36E-07	1.56E-07	1.56E-07
br 81	5.89E-08	7.35E-08	8.81E-08	1.03E-07	1.17E-07	1.17E-07
rb 85	5.73E-08	7.16E-08	8.57E-08	9.99E-08	1.14E-07	1.14E-07
pm147	1.00E-07	1.00E-07	1.00E-07	1.00E-07	9.99E-08	9.99E-08
zr 94	4.99E-08	6.23E-08	7.46E-08	8.69E-08	9.92E-08	9.92E-08
zr 90	4.53E-08	5.67E-08	6.81E-08	7.95E-08	9.08E-08	9.08E-08
cd111	4.05E-08	5.14E-08	6.25E-08	7.39E-08	8.55E-08	8.55E-08
te130	3.56E-08	4.44E-08	5.33E-08	6.21E-08	7.10E-08	7.10E-08
sm154	3.49E-08	4.38E-08	5.26E-08	6.15E-08	7.04E-08	7.04E-08
rb 87	3.32E-08	4.14E-08	4.96E-08	5.78E-08	6.59E-08	6.59E-08
ru 99	1.59E-08	2.48E-08	3.56E-08	4.83E-08	6.30E-08	6.30E-08
eu155	5.68E-08	5.71E-08	5.75E-08	5.79E-08	5.84E-08	5.83E-08
se 77	2.35E-08	2.94E-08	3.52E-08	4.10E-08	4.68E-08	4.68E-08
pd106	1.76E-08	2.22E-08	2.68E-08	3.14E-08	3.64E-08	3.64E-08
eu152	1.80E-08	2.26E-08	2.70E-08	3.12E-08	3.54E-08	3.54E-08
kr 84	1.57E-08	1.96E-08	2.35E-08	2.74E-08	3.13E-08	3.13E-08
gd156	9.59E-09	1.29E-08	1.65E-08	2.03E-08	2.44E-08	2.44E-08
se 79	1.20E-08	1.50E-08	1.80E-08	2.10E-08	2.39E-08	2.39E-08
sb121	1.17E-08	1.46E-08	1.75E-08	2.04E-08	2.34E-08	2.34E-08
sb123	9.46E-09	1.18E-08	1.42E-08	1.66E-08	1.90E-08	1.90E-08
kr 86	8.70E-09	1.09E-08	1.30E-08	1.52E-08	1.73E-08	1.73E-08
te128	7.85E-09	9.81E-09	1.18E-08	1.37E-08	1.57E-08	1.57E-08
dy161	5.87E-09	7.61E-09	9.45E-09	1.14E-08	1.34E-08	1.34E-08
gd154	3.25E-09	5.05E-09	7.26E-09	9.67E-09	1.29E-08	1.29E-08
se 80	5.62E-09	7.02E-09	8.42E-09	9.81E-09	1.12E-08	1.12E-08
te125	4.99E-09	6.25E-09	7.52E-09	8.79E-09	1.01E-08	1.01E-08
tb159	3.61E-09	4.59E-09	5.60E-09	6.63E-09	7.70E-09	7.70E-09
cd112	3.31E-09	4.16E-09	5.03E-09	5.90E-09	6.79E-09	6.79E-09
li 6	3.18E-09	3.96E-09	4.74E-09	5.52E-09	6.29E-09	6.29E-09
sr 90	6.22E-09	6.21E-09	6.19E-09	6.17E-09	6.16E-09	6.16E-09
ba135	1.51E-09	2.36E-09	3.39E-09	4.61E-09	6.02E-09	6.02E-09
gd158	2.37E-09	3.18E-09	4.03E-09	4.92E-09	5.83E-09	5.83E-09
sn117	2.58E-09	3.24E-09	3.90E-09	4.57E-09	5.24E-09	5.24E-09
sn119	2.11E-09	2.63E-09	3.17E-09	3.70E-09	4.23E-09	4.23E-09
ru100	1.03E-09	1.59E-09	2.28E-09	3.08E-09	4.01E-09	4.01E-09
sn115	1.93E-09	2.41E-09	2.90E-09	3.38E-09	3.87E-09	3.87E-09
cd114	1.49E-09	1.95E-09.	2.44E-09	2.94E-09	3.47E-09	3.47E-09
rh105	3.16E-09	3.19E-09	3.22E-09	3.24E-09	3.27E-09	3.20E-09
sr 88	1.60E-09	2.00E-09	2.39E-09	2.79E-09	3.18E-09	3.18E-09
nd142	6.98E-10	1.09E-09	1.56E-09	2.12E-09	2.77E-09	2.77E-09
ba134	6.91E-10	1.07E-09	1.53E-09	2.08E-09	2.71E-09	2.71E-09
pd110	1.25E-09	1.59E-09	1.94E-09	2.30E-09	2.68E-09	2.68E-09

sm148	6.37E-10	9.86E-10	1.41E-09	1.91E-09	2.49E-09	2.49E-09
dy164	8.81E-10	1.19E-09	1.53E-09	1.90E-09	2.30E-09	2.30E-09
dy162	8.82E-10	1.17E-09	1.49E-09	1.83E-09	2.20E-09	2.20E-09
se 82	1.09E-09	1.36E-09	1.63E-09	1.89E-09	2.16E-09	2.16E-09
pd104	4.62E-10	7.19E-10	1.03E-09	1.40E-09	1.83E-09	1.83E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 16

0 fraction of total absorption rate

0 power= .00mw, burnup= 2681.mwd, flux= 9.84E+07n/cm**2-sec

	initial	******* d	******* d	******* d	******* d	******* d
sn126	8.85E-10	1.11E-09	1.34E-09	1.56E-09	1.79E-09	1.79E-09
eu154	8.59E-10	1.06E-09	1.28E-09	1.49E-09	1.70E-09	1.70E-09
se 78	8.29E-10	1.04E-09	1.24E-09	1.45E-09	1.65E-09	1.65E-09
cs137	1.38E-09	1.38E-09	1.38E-09	1.38E-09	1.38E-09	1.38E-09
sn124	6.75E-10	8.45E-10	1.02E-09	1.19E-09	1.36E-09	1.36E-09
as 75	4.93E-10	6.16E-10	7.39E-10	8.61E-10	9.83E-10	9.83E-10
nb 93	2.43E-10	3.79E-10	5.46E-10	7.43E-10	9.69E-10	9.69E-10
pr143	9.73E-10	9.72E-10	9.71E-10	9.69E-10	9.67E-10	9.67E-10
in113	3.72E-10	4.67E-10	5.63E-10	6.58E-10	7.55E-10	7.55E-10
ba136	3.20E-10	4.17E-10	5.21E-10	6.31E-10	7.48E-10	7.48E-10
mo 96	2.17E-10	3.18E-10	4.38E-10	5.77E-10	7.34E-10	7.34E-10
xe133	7.36E-10	7.36E-10	7.35E-10	7.34E-10	7.33E-10	7.32E-10
ce141	5.82E-10	5.82E-10	5.81E-10	5.80E-10	5.80E-10	5.79E-10
sn118	2.76E-10	3.45E-10	4.15E-10	4.85E-10	5.55E-10	5.55E-10
dy163	2.06E-10	2.76E-10	3.53E-10	4.37E-10	5.29E-10	5.29E-10
kr 82	2.00E-10	2.67E-10	3.39E-10	4.19E-10	5.04E-10	5.04E-10
br 79	1.23E-10	1.92E-10	2.76E-10	3.76E-10	4.90E-10	4.90E-10
cd116	2.33E-10	2.92E-10	3.51E-10	4.10E-10	4.69E-10	4.69E-10
sn122	2.32E-10	2.90E-10	3.49E-10	4.07E-10	4.66E-10	4.66E-10
xe130	1.59E-10	2.21E-10	2.92E-10	3.71E-10	4.59E-10	4.59E-10
sn120	1.73E-10	2.17E-10	2.61E-10	3.04E-10	3.48E-10	3.48E-10
pm149	3.53E-10	3.56E-10	3.56E-10	3.56E-10	3.55E-10	3.45E-10
nd147	3.41E-10	3.43E-10	3.42E-10	3.42E-10	3.41E-10	3.38E-10
cd110	7.14E-11	1.14E-10	1.68E-10	2.35E-10	3.15E-10	3.15E-10
ag107	6.94E-11	1.10E-10	1.60E-10	2.21E-10	2.92E-10	2.92E-10
xe129	7.01E-11	1.09E-10	1.58E-10	2.14E-10	2.80E-10	2.80E-10
ge 73	1.35E-10	1.69E-10	2.02E-10	2.36E-10	2.70E-10	2.70E-10
ce144	2.19E-10	2.19E-10	2.18E-10	2.18E-10	2.18E-10	2.18E-10
kr 83	2.08E-10	2.08E-10	2.07E-10	2.07E-10	2.07E-10	2.07E-10
te126	6.16E-11	8.89E-11	1.21E-10	1.58E-10	1.99E-10	1.99E-10
cs134	9.22E-11	1.13E-10	1.35E-10	1.58E-10	1.80E-10	1.80E-10
ru103	1.32E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10
ge 76	4.88E-11	6.09E-11	7.29E-11	8.50E-11	9.70E-11	9.70E-11
gd160	3.46E-11	4.43E-11	5.44E-11	6.49E-11	7.58E-11	7.58E-11
zr 95	6.05E-11	6.05E-11	6.04E-11	6.03E-11	6.02E-11	6.01E-11
nb 95	5.59E-11	5.58E-11	5.57E-11	5.56E-11	5.56E-11	5.56E-11
y 91	5.21E-11	5.20E-11	5.19E-11	5.18E-11	5.16E-11	5.16E-11
ho165	1.45E-11	1.96E-11	2.53E-11	3.16E-11	3.84E-11	3.84E-11
pm151	3.86E-11	4.05E-11	4.05E-11	4.06E-11	4.06E-11	3.66E-11
ba140	1.72E-11	1.73E-11	1.73E-11	1.72E-11	1.72E-11	1.70E-11
eu156	1.34E-11	1.35E-11	1.37E-11	1.39E-11	1.41E-11	1.41E-11
dy160	3.50E-12	5.43E-12	7.81E-12	1.06E-11	1.39E-11	1.39E-11
te124	6.30E-12	8.05E-12	9.82E-12	1.18E-11	1.38E-11	1.38E-11
sm153	1.39E-11	1.43E-11	1.44E-11	1.45E-11	1.46E-11	1.36E-11
sr 87	5.70E-12	7.15E-12	8.60E-12	1.01E-11	1.15E-11	1.15E-11
sr 89	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.10E-11	1.10E-11
ru106	1.01E-11	1.03E-11	1.04E-11	1.06E-11	1.07E-11	1.07E-11
xe128	2.74E-12	4.18E-12	5.93E-12	7.99E-12	1.04E-11	1.04E-11
sr 86	2.80E-12	3.88E-12	5.09E-12	6.46E-12	7.97E-12	7.97E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 17

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0                                   fraction of total absorption rate
        power=     .00mw, burnup=    2681.mwd, flux= 9.84E+07n/cm**2-sec
0             initial *******d *******d *******d *******d *******d

     nb 94      3.17E-12  3.96E-12  4.75E-12  5.55E-12  6.37E-12  6.37E-12
      y 90      5.91E-12  5.90E-12  5.89E-12  5.87E-12  5.86E-12  5.86E-12
     ce143      6.13E-12  6.37E-12  6.36E-12  6.35E-12  6.34E-12  6.01E-12
     sb125      5.63E-12  5.65E-12  5.68E-12  5.71E-12  5.74E-12  5.74E-12
     la140      5.61E-12  5.61E-12  5.60E-12  5.59E-12  5.58E-12  5.58E-12
     ge 74      2.72E-12  3.40E-12  4.07E-12  4.75E-12  5.43E-12  5.43E-12
     mo 99      4.70E-12  4.81E-12  4.80E-12  4.80E-12  4.79E-12  4.57E-12
     sn116      9.92E-13  1.54E-12  2.22E-12  3.02E-12  3.94E-12  3.94E-12
     ge 72      1.84E-12  2.31E-12  2.78E-12  3.25E-12  3.72E-12  3.72E-12
     se 76      1.35E-12  1.78E-12  2.24E-12  2.74E-12  3.27E-12  3.27E-12
    te127m      2.80E-12  2.81E-12  2.83E-12  2.84E-12  2.86E-12  2.86E-12
      i131      2.48E-12  2.49E-12  2.48E-12  2.48E-12  2.48E-12  2.46E-12
     er166      5.87E-13  8.33E-13  1.12E-12  1.44E-12  1.79E-12  1.79E-12
     te122      4.22E-13  6.53E-13  9.34E-13  1.27E-12  1.65E-12  1.65E-12
    pm148m      1.33E-12  1.31E-12  1.32E-12  1.33E-12  1.33E-12  1.33E-12
     kr 87      2.43E-12  8.31E-12  8.29E-12  8.27E-12  8.25E-12  6.98E-13
    te129m      6.62E-13  6.63E-13  6.64E-13  6.65E-13  6.66E-13  6.65E-13
     kr 80      9.27E-14  1.24E-13  1.60E-13  2.02E-13  2.49E-13  2.49E-13
     ag111      1.31E-13  1.35E-13  1.39E-13  1.42E-13  1.45E-13  1.43E-13
     eu157      1.09E-13  1.21E-13  1.23E-13  1.26E-13  1.28E-13  1.05E-13
    cd115m      8.85E-14  8.88E-14  8.92E-14  8.96E-14  8.99E-14  8.97E-14
     pm148      4.98E-14  4.95E-14  4.96E-14  4.96E-14  4.96E-14  4.85E-14
     cs136      2.91E-14  3.12E-14  3.33E-14  3.54E-14  3.74E-14  3.70E-14
     er167      8.01E-15  1.29E-14  1.92E-14  2.71E-14  3.68E-14  3.68E-14
     te123      8.24E-15  1.16E-14  1.56E-14  2.04E-14  2.61E-14  2.61E-14
      be  9     6.15E-15  7.68E-15  9.21E-15  1.07E-14  1.23E-14  1.23E-14
     sn125      1.08E-14  1.09E-14  1.10E-14  1.10E-14  1.10E-14  1.09E-14
     tb160      5.67E-15  4.57E-15  5.53E-15  6.50E-15  7.50E-15  7.48E-15
     ru105      8.20E-15  1.14E-14  1.15E-14  1.16E-14  1.17E-14  5.92E-15
      li  7     2.46E-15  3.08E-15  3.69E-15  4.30E-15  4.91E-15  4.91E-15
     pr142      2.12E-15  2.87E-15  3.43E-15  4.00E-15  4.57E-15  3.87E-15
     sn123      3.76E-15  3.76E-15  3.77E-15  3.77E-15  3.77E-15  3.77E-15
     cd108      5.29E-16  9.66E-16  1.60E-15  2.48E-15  3.65E-15  3.65E-15
     sb126      2.29E-15  2.60E-15  2.90E-15  3.20E-15  3.50E-15  3.49E-15
     te132      3.43E-15  3.50E-15  3.50E-15  3.50E-15  3.49E-15  3.36E-15
      i135      2.91E-15  3.70E-15  3.70E-15  3.69E-15  3.69E-15  2.28E-15
     rb 88      2.94E-15  4.67E-15  4.66E-15  4.65E-15  4.44E-15  1.67E-15
     sb124      9.40E-16  9.80E-16  1.02E-15  1.06E-15  1.10E-15  1.10E-15
     sn114      2.43E-16  3.79E-16  5.45E-16  7.42E-16  9.69E-16  9.69E-16
      i130      5.94E-16  7.74E-16  8.74E-16  9.74E-16  1.07E-15  8.36E-16
    in117m      6.68E-16  7.99E-16  8.05E-16  8.10E-16  8.16E-16  4.76E-16
     rb 86      2.24E-16  2.57E-16  2.90E-16  3.23E-16  3.56E-16  3.53E-16
     in117      2.00E-16  2.36E-16  2.38E-16  2.39E-16  2.41E-16  1.46E-16
     dy165      8.08E-17  1.73E-16  1.92E-16  2.10E-16  2.29E-16  6.05E-17
     te134      2.21E-16  2.13E-15  2.12E-15  2.12E-15  2.11E-15  2.28E-17
    cs134m      1.00E-17  2.12E-17  2.54E-17  2.95E-17  3.37E-17  1.14E-17
     ge 75      1.03E-17  3.16E-17  3.15E-17  3.15E-17  3.15E-17  3.29E-18
     cd118      6.86E-18  4.51E-17  4.52E-17  4.54E-17  4.56E-17  1.06E-18
     cd109      5.55E-19  6.65E-19  7.85E-19  9.04E-19  1.01E-18  1.01E-18
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   18
0                                   fraction of total absorption rate
        power=     .00mw, burnup=    2681.mwd, flux= 9.84E+07n/cm**2-sec
0             initial *******d *******d *******d *******d *******d

1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page   19
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power= 1.468E-03mw, burnup=2.6809E+03mwd, flux= 9.84E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	8.18E-05	1.02E-04	1.21E-04	1.41E-04	1.61E-04	1.61E-04
h 2	2.43E-07	3.02E-07	3.61E-07	4.20E-07	4.79E-07	4.79E-07
h 3	1.36E-11	1.34E-11	1.36E-11	1.38E-11	1.40E-11	1.40E-11
h 4	.00E+00	1.97E-35	2.00E-35	2.03E-35	2.06E-35	.00E+00
he 3	1.76E-09	2.17E-09	2.57E-09	2.96E-09	3.35E-09	3.35E-09
he 4	1.35E-05	1.68E-05	2.01E-05	2.34E-05	2.66E-05	2.66E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.62E-06	2.02E-06	2.41E-06	2.81E-06	3.20E-06	3.20E-06
ne 21	5.30E-11	8.12E-11	1.15E-10	1.53E-10	1.97E-10	1.97E-10
ne 22	1.07E-08	1.33E-08	1.59E-08	1.84E-08	2.10E-08	2.10E-08
ne 23	2.70E-30	2.62E-15	2.62E-15	2.62E-15	2.62E-15	2.62E-30
na 22	1.59E-11	1.55E-11	1.55E-11	1.55E-11	1.55E-11	1.55E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	1.21E-08	1.10E-08	1.10E-08	1.10E-08	1.10E-08	8.85E-09
na 24m	2.21E-30	1.81E-15	1.81E-15	1.80E-15	1.80E-15	1.80E-30
na 25	7.47E-41	1.06E-25	1.46E-25	1.90E-25	2.41E-25	2.40E-40
mg 24	1.39E-02	1.68E-02	1.96E-02	2.25E-02	2.53E-02	2.53E-02
mg 25	6.83E-09	1.01E-08	1.38E-08	1.80E-08	2.28E-08	2.28E-08
mg 26	2.43E-07	3.02E-07	3.61E-07	4.20E-07	4.78E-07	4.78E-07
mg 27	3.66E-17	7.84E-13	7.83E-13	7.83E-13	7.83E-13	1.61E-21
mg 28	5.49E-25	5.77E-25	5.77E-25	5.76E-25	5.76E-25	4.95E-25
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.01E-25	8.15E-11	8.15E-11	8.14E-11	8.14E-11	8.23E-26
al 29	2.56E-30	6.91E-24	9.82E-24	1.32E-23	1.70E-23	5.17E-36
al 30	.00E+00	1.45E-34	2.49E-34	3.92E-34	5.80E-34	.00E+00
si 28	4.05E-02	4.68E-02	5.71E-02	6.54E-02	7.37E-02	7.37E-02
si 29	4.71E-08	7.31E-08	1.04E-07	1.40E-07	1.80E-07	1.80E-07
si 30	5.86E-14	1.14E-13	1.97E-13	3.10E-13	4.59E-13	4.59E-13
si 31	8.32E-27	2.97E-26	5.19E-26	8.05E-26	1.19E-25	3.58E-26
si 32	7.29E-33	1.51E-32	2.69E-32	4.36E-32	6.58E-32	6.58E-32
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		9.84E+07	9.84E+07	9.83E+07	9.83E+07	9.83E-08

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 20

power= 1.468E-03mw, burnup=2.6809E+03mwd, flux= 9.84E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	4.49E-01	6.12E-01	7.93E-01	9.93E-01	1.21E+00	1.21E+00
pb206	2.03E-04	3.76E-04	6.16E-04	9.29E-04	1.32E-03	1.32E-03
pb207	4.65E-05	7.27E-05	1.05E-04	1.42E-04	1.85E-04	1.85E-04
pb208	2.73E-06	4.24E-06	6.07E-06	8.23E-06	1.07E-05	1.07E-05
pb209	8.13E-12	1.24E-11	1.75E-11	2.34E-11	2.99E-11	2.99E-11
pb210	7.31E-06	1.06E-05	1.42E-05	1.81E-05	2.21E-05	2.21E-05
pb211	3.71E-12	4.63E-12	5.53E-12	6.43E-12	7.32E-12	7.32E-12
pb212	3.76E-12	4.67E-12	5.58E-12	6.48E-12	7.37E-12	7.37E-12
pb214	1.62E-11	2.42E-11	3.25E-11	4.13E-11	5.05E-11	5.06E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.28E-05	2.47E-05	4.20E-05	6.58E-05	9.68E-05	9.68E-05
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	6.50E-09	6.52E-09	8.74E-09	1.11E-08	1.36E-08	1.36E-08
bi211	2.21E-13	2.74E-13	3.28E-13	3.81E-13	4.34E-13	4.34E-13
bi212	3.57E-13	4.43E-13	5.29E-13	6.14E-13	6.99E-13	6.99E-13
bi213	1.83E-12	2.89E-12	4.08E-12	5.45E-12	6.99E-12	6.83E-12
bi214	1.22E-11	1.80E-11	2.41E-11	3.06E-11	3.75E-11	3.76E-11
po210	1.24E-07	1.80E-07	2.41E-07	3.07E-07	3.75E-07	3.75E-07

po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.44E-18	3.03E-18	3.62E-18	4.21E-18	4.80E-18	4.80E-18
po212	1.88E-23	2.33E-23	2.78E-23	3.23E-23	3.67E-23	3.67E-23
po213	2.75E-21	4.35E-21	6.14E-21	8.20E-21	1.05E-20	1.03E-20
po214	1.67E-18	2.47E-18	3.32E-18	4.22E-18	5.16E-18	5.18E-18
po215	3.05E-18	3.80E-18	4.55E-18	5.28E-18	6.02E-18	6.02E-18
po216	1.42E-17	1.77E-17	2.11E-17	2.45E-17	2.79E-17	2.79E-17
po218	1.93E-12	2.80E-12	3.76E-12	4.77E-12	5.84E-12	5.84E-12
rn218	2.08E-29	2.50E-29	2.99E-29	3.47E-29	3.95E-29	3.93E-29
rn219	6.79E-15	8.46E-15	1.01E-14	1.18E-14	1.34E-14	1.34E-14
rn220	5.46E-15	6.78E-15	8.10E-15	9.40E-15	1.07E-14	1.07E-14
rn222	3.43E-09	4.98E-09	6.67E-09	8.48E-09	1.04E-08	1.04E-08
ra222	2.26E-26	2.72E-26	3.25E-26	3.77E-26	4.29E-26	4.26E-26
ra223	1.69E-09	2.11E-09	2.52E-09	2.93E-09	3.34E-09	3.34E-09
ra224	3.11E-11	3.86E-11	4.60E-11	5.35E-11	6.08E-11	6.08E-11
ra225	8.83E-10	1.35E-09	1.91E-09	2.55E-09	3.27E-09	3.27E-09
ra226	5.25E-04	7.61E-04	1.02E-03	1.30E-03	1.59E-03	1.59E-03
ra228	5.30E-12	6.62E-12	7.95E-12	9.29E-12	1.06E-11	1.06E-11
ac225	5.96E-10	9.14E-10	1.29E-09	1.72E-09	2.21E-09	2.21E-09
ac227	1.18E-06	1.47E-06	1.75E-06	2.04E-06	2.32E-06	2.32E-06
ac228	6.46E-16	8.08E-16	9.71E-16	1.13E-15	1.30E-15	1.30E-15
th226	1.10E-24	1.33E-24	1.58E-24	1.84E-24	2.09E-24	2.08E-24
th227	2.74E-09	3.41E-09	4.07E-09	4.73E-09	5.39E-09	5.39E-09
th228	5.93E-09	7.36E-09	8.79E-09	1.02E-08	1.16E-08	1.16E-08
th229	1.72E-04	2.63E-04	3.71E-04	4.96E-04	6.36E-04	6.36E-04
th230	6.34E-02	7.91E-02	9.48E-02	1.10E-01	1.26E-01	1.26E-01
th231	3.09E-09	3.12E-09	3.14E-09	3.16E-09	3.18E-09	3.15E-09
th232	1.29E-02	1.62E-02	1.94E-02	2.27E-02	2.60E-02	2.60E-02
th233	6.23E-16	5.39E-16	6.47E-16	7.55E-16	8.63E-16	1.78E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.77E-03	2.21E-03	2.64E-03	3.07E-03	3.49E-03	3.49E-03
pa232	1.05E-11	1.37E-11	1.64E-11	1.91E-11	2.17E-11	1.96E-11

1

sas2h: fer-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 21

power= 1.468E-03mw, burnup=2.6809E+03mwd, flux= 9.84E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d	
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.07E-21	1.29E-21	1.53E-21	1.78E-21	2.03E-21	2.01E-21
u231	9.62E-18	1.18E-17	1.41E-17	1.64E-17	1.87E-17	1.81E-17
u232	2.16E-07	2.68E-07	3.21E-07	3.72E-07	4.24E-07	4.24E-07
u233	3.38E-02	4.21E-02	5.04E-02	5.86E-02	6.68E-02	6.68E-02
u234	9.14E+00	9.17E+00	9.19E+00	9.22E+00	9.24E+00	9.24E+00
u235	7.24E+02	7.22E+02	7.20E+02	7.19E+02	7.17E+02	7.17E+02
u236	1.75E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02
u237	1.17E-06	1.15E-06	1.13E-06	1.15E-06	1.15E-06	1.13E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.06E-09	1.14E-07	1.14E-07	1.13E-07	1.13E-07	3.56E-11
u240	1.40E-45	.00E+00	.00E+00	.00E+00	.00E+00	7.88E-43
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.29E-12	3.19E-12	3.18E-12	3.18E-12	3.18E-12	3.18E-12
np236m	7.29E-13	7.58E-13	7.57E-13	7.56E-13	7.56E-13	6.57E-13
np236	1.85E-07	2.29E-07	2.73E-07	3.16E-07	3.60E-07	3.60E-07
np237	4.21E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01
np238	5.48E-07	5.59E-07	5.58E-07	5.57E-07	5.57E-07	5.23E-07
np239	1.64E-05	1.64E-05	1.64E-05	1.64E-05	1.64E-05	1.56E-05

```
     np240m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np240   2.70E-16  1.21E-15  1.21E-15  1.21E-15  1.21E-15  5.68E-17
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   4.25E-10  4.11E-10  4.11E-10  4.11E-10  4.11E-10  4.11E-10
     pu237   4.55E-14  4.70E-14  5.00E-14  5.30E-14  5.59E-14  5.57E-14
     pu238   8.55E-03  8.45E-03  8.44E-03  8.43E-03  8.43E-03  8.43E-03
     pu239   4.31E+00  5.30E+00  6.26E+00  7.21E+00  8.13E+00  8.13E+00
     pu240   1.47E-02  2.23E-02  3.10E-02  4.08E-02  5.16E-02  5.16E-02
     pu241   2.26E-06  3.33E-06  4.63E-06  6.10E-06  7.71E-06  7.71E-06
     pu242   3.25E-08  6.76E-08  1.21E-07  1.97E-07  2.99E-07  2.99E-07
     pu243   1.88E-17  5.24E-17  9.60E-17  1.53E-16  2.31E-16  1.22E-16
     pu244   4.22E-34  3.15E-33  1.59E-32  6.13E-32  1.96E-31  1.96E-31
     pu245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   3.86E-21  6.95E-21  1.03E-20  1.41E-20  1.85E-20  1.42E-20
     am240   1.96E-18  3.18E-18  4.70E-18  6.47E-18  8.46E-18  7.95E-18
     am241   4.22E-05  6.87E-05  1.01E-04  1.40E-04  1.83E-04  1.83E-04
     am242m  6.09E-09  1.03E-08  1.55E-08  2.18E-08  2.89E-08  2.89E-08
     am242   5.25E-13  9.25E-13  1.37E-12  1.89E-12  2.48E-12  2.10E-12
     am243   5.41E-11  1.25E-10  2.45E-10  4.27E-10  6.88E-10  6.88E-10
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.31E-19  3.48E-19  6.79E-19  1.19E-18  1.91E-18  1.40E-18
     am245    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00  4.48E-44
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.26E-23  1.99E-23  2.95E-23  4.06E-23  5.33E-23  5.31E-23
     cm242   1.15E-10  1.87E-10  2.77E-10  3.82E-10  5.01E-10  5.01E-10
     cm243   9.79E-16  1.56E-15  2.31E-15  3.19E-15  4.18E-15  4.18E-15
     cm244   2.41E-15  5.46E-15  1.07E-14  1.86E-14  3.00E-14  3.00E-14
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   22
       power= 1.468E-03mw, burnup=2.6809E+03mwd, flux= 9.84E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   4.67E-19  1.33E-18  3.12E-18  6.36E-18  1.17E-17  1.17E-17
     cm246   3.92E-22  1.43E-21  4.03E-21  9.52E-21  1.99E-20  1.99E-20
     cm247   5.76E-27  2.64E-26  9.00E-26  2.51E-25  6.04E-25  6.04E-25
     cm248   8.23E-31  4.81E-30  1.99E-29  6.33E-29  1.81E-28  1.81E-28
     cm249   1.78E-42  5.45E-41  2.33E-40  7.55E-40  2.09E-39  1.09E-40
     cm250    .00E+00   .00E+00  1.40E-45  5.61E-45  1.82E-44  1.82E-44
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.84E+07  9.84E+07  9.83E+07  9.83E+07  9.83E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
```

```
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "pressz2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/29/1996    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   23
         power=    .00mw, burnup=   4021.mwd, flux= 9.45E+07n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.195375E+06  1.196047E+06  1.196678E+06  1.197269E+06  1.197821E+06  1.197820E+06
     absorptions  9.651504E+05  9.658723E+05  9.665383E+05  9.671569E+05  9.677351E+05  9.677341E+05
     k infinity   1.238537E+00  1.238308E+00  1.238108E+00  1.237927E+00  1.237757E+00  1.237758E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  9.556894E+05  9.561186E+05  9.565269E+05  9.569147E+05  9.572821E+05  9.572820E+05
     non-actinide
     abs. fracs.  9.802699E-03  1.009834E-02  1.035804E-02  1.059002E-02  1.080143E-02  1.080060E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page   24
0                                 fraction of total absorption rate
         power=    .00mw, burnup=   4021.mwd, flux= 9.45E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

     sm149     4.91E-03  5.05E-03  5.15E-03  5.22E-03  5.28E-03  5.28E-03
     eu151     3.75E-04  4.19E-04  4.62E-04  5.03E-04  5.44E-04  5.44E-04
     nd143     2.69E-04  3.02E-04  3.36E-04  3.68E-04  4.01E-04  4.01E-04
     rh103     1.25E-04  1.40E-04  1.56E-04  1.71E-04  1.87E-04  1.87E-04
     gd155     1.27E-04  1.35E-04  1.43E-04  1.49E-04  1.55E-04  1.55E-04
```

xe131	8.55E-05	9.61E-05	1.07E-04	1.17E-04	1.28E-04	1.28E-04
cs133	6.64E-05	7.47E-05	8.29E-05	9.11E-05	9.93E-05	9.93E-05
cd113	6.66E-05	7.05E-05	7.38E-05	7.66E-05	7.91E-05	7.91E-05
sm147	4.92E-05	5.53E-05	6.14E-05	6.75E-05	7.36E-05	7.36E-05
tc 99	4.85E-05	5.44E-05	6.04E-05	6.63E-05	7.22E-05	7.22E-05
nd145	3.77E-05	4.24E-05	4.71E-05	5.17E-05	5.64E-05	5.64E-05
gd157	4.06E-05	4.16E-05	4.25E-05	4.33E-05	4.41E-05	4.41E-05
mo 95	2.62E-05	2.94E-05	3.26E-05	3.59E-05	3.91E-05	3.91E-05
sm152	2.19E-05	2.48E-05	2.78E-05	3.08E-05	3.39E-05	3.39E-05
kr 83	1.64E-05	1.84E-05	2.04E-05	2.24E-05	2.44E-05	2.44E-05
cs135	1.50E-05	1.68E-05	1.87E-05	2.05E-05	2.24E-05	2.24E-05
sm150	1.26E-05	1.49E-05	1.73E-05	1.98E-05	2.22E-05	2.22E-05
ru101	1.16E-05	1.31E-05	1.45E-05	1.60E-05	1.74E-05	1.74E-05
sm151	1.72E-05	1.72E-05	1.73E-05	1.73E-05	1.73E-05	1.72E-05
pr141	1.11E-05	1.25E-05	1.39E-05	1.53E-05	1.67E-05	1.67E-05
eu153	1.05E-05	1.19E-05	1.32E-05	1.46E-05	1.59E-05	1.59E-05
la139	9.12E-06	1.02E-05	1.14E-05	1.25E-05	1.36E-05	1.36E-05
ba137	4.33E-06	4.88E-06	5.42E-06	5.96E-06	6.50E-06	6.50E-06
pd105	4.02E-06	4.53E-06	5.06E-06	5.58E-06	6.11E-06	6.11E-06
zr 93	3.68E-06	4.14E-06	4.59E-06	5.04E-06	5.49E-06	5.49E-06
i129	2.86E-06	3.22E-06	3.58E-06	3.94E-06	4.30E-06	4.30E-06
nd144	2.75E-06	3.09E-06	3.43E-06	3.77E-06	4.11E-06	4.11E-06
ag109	2.10E-06	2.44E-06	2.80E-06	3.18E-06	3.57E-06	3.57E-06
mo 97	2.07E-06	2.33E-06	2.58E-06	2.84E-06	3.09E-06	3.09E-06
zr 91	9.70E-07	1.09E-06	1.21E-06	1.33E-06	1.45E-06	1.45E-06
y 89	9.30E-07	1.04E-06	1.16E-06	1.27E-06	1.39E-06	1.39E-06
ru102	8.47E-07	9.52E-07	1.06E-06	1.16E-06	1.27E-06	1.27E-06
ce142	7.59E-07	8.53E-07	9.47E-07	1.04E-06	1.13E-06	1.13E-06
nd148	7.30E-07	8.21E-07	9.11E-07	1.00E-06	1.09E-06	1.09E-06
pd108	6.17E-07	7.10E-07	8.06E-07	9.04E-07	1.01E-06	1.01E-06
nd146	6.12E-07	6.88E-07	7.64E-07	8.40E-07	9.16E-07	9.16E-07
gd152	3.92E-07	4.95E-07	6.10E-07	7.35E-07	8.71E-07	8.71E-07
ba138	5.23E-07	5.88E-07	6.53E-07	7.18E-07	7.82E-07	7.82E-07
in115	5.13E-07	5.77E-07	6.42E-07	7.07E-07	7.72E-07	7.72E-07
ce140	4.90E-07	5.51E-07	6.11E-07	6.72E-07	7.33E-07	7.33E-07
xe132	4.41E-07	4.96E-07	5.51E-07	6.06E-07	6.61E-07	6.61E-07
pd107	3.45E-07	3.95E-07	4.46E-07	4.98E-07	5.52E-07	5.52E-07
mo 98	3.03E-07	3.41E-07	3.78E-07	4.16E-07	4.54E-07	4.54E-07
mo100	2.94E-07	3.30E-07	3.67E-07	4.03E-07	4.39E-07	4.39E-07
xe134	2.89E-07	3.25E-07	3.61E-07	3.97E-07	4.33E-07	4.33E-07
zr 92	2.34E-07	2.63E-07	2.92E-07	3.20E-07	3.49E-07	3.49E-07
i127	1.96E-07	2.21E-07	2.46E-07	2.71E-07	2.96E-07	2.96E-07
ru104	1.84E-07	2.07E-07	2.31E-07	2.54E-07	2.78E-07	2.78E-07
zr 96	1.84E-07	2.07E-07	2.30E-07	2.52E-07	2.75E-07	2.75E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 25

0 fraction of total absorption rate

0 power= .00mw, burnup= 4021.mwd, flux= 9.45E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
nd150	1.62E-07	1.83E-07	2.03E-07	2.23E-07	2.43E-07	2.43E-07
xe136	1.56E-07	1.76E-07	1.95E-07	2.15E-07	2.34E-07	2.34E-07
br 81	1.17E-07	1.32E-07	1.46E-07	1.61E-07	1.75E-07	1.75E-07
rb 85	1.14E-07	1.28E-07	1.42E-07	1.56E-07	1.70E-07	1.70E-07
zr 94	9.89E-08	1.11E-07	1.23E-07	1.36E-07	1.48E-07	1.48E-07
ru 99	6.28E-08	7.94E-08	9.78E-08	1.18E-07	1.40E-07	1.40E-07
zr 90	9.10E-08	1.02E-07	1.14E-07	1.25E-07	1.36E-07	1.36E-07
cd111	8.58E-08	9.78E-08	1.10E-07	1.22E-07	1.35E-07	1.35E-07
te130	7.13E-08	8.02E-08	8.91E-08	9.79E-08	1.07E-07	1.07E-07
sm154	7.06E-08	7.96E-08	8.86E-08	9.76E-08	1.07E-07	1.07E-07
rb 87	6.59E-08	7.40E-08	8.21E-08	9.02E-08	9.82E-08	9.82E-08

pm147	9.96E-08	9.95E-08	9.94E-08	9.93E-08	9.92E-08	8.23E-08
se 77	4.70E-08	5.29E-08	5.87E-08	6.45E-08	7.03E-08	7.03E-08
pd106	3.62E-08	4.11E-08	4.60E-08	5.10E-08	5.61E-08	5.61E-08
eu155	5.83E-08	5.86E-08	5.90E-08	5.94E-08	5.98E-08	5.35E-08
eu152	3.56E-08	3.97E-08	4.38E-08	4.77E-08	5.15E-08	4.96E-08
kr 84	3.11E-08	3.50E-08	3.88E-08	4.26E-08	4.65E-08	4.65E-08
gd156	2.42E-08	2.85E-08	3.29E-08	3.75E-08	4.22E-08	4.22E-08
se 79	2.40E-08	2.70E-08	3.00E-08	3.29E-08	3.59E-08	3.59E-08
sb121	2.33E-08	2.63E-08	2.92E-08	3.22E-08	3.52E-08	3.52E-08
gd154	1.29E-08	1.64E-08	2.02E-08	2.44E-08	2.91E-08	2.91E-08
sb123	1.89E-08	2.13E-08	2.37E-08	2.61E-08	2.85E-08	2.85E-08
kr 86	1.74E-08	1.95E-08	2.16E-08	2.38E-08	2.59E-08	2.59E-08
te128	1.57E-08	1.77E-08	1.97E-08	2.16E-08	2.36E-08	2.36E-08
dy161	1.35E-08	1.57E-08	1.79E-08	2.02E-08	2.27E-08	2.27E-08
se 80	1.12E-08	1.26E-08	1.40E-08	1.54E-08	1.68E-08	1.68E-08
te125	1.01E-08	1.14E-08	1.26E-08	1.39E-08	1.52E-08	1.52E-08
ba135	6.02E-09	7.61E-09	9.39E-09	1.14E-08	1.35E-08	1.35E-08
tb159	7.69E-09	8.79E-09	9.90E-09	1.10E-08	1.22E-08	1.22E-08
cd112	6.81E-09	7.71E-09	8.62E-09	9.54E-09	1.05E-08	1.05E-08
gd158	5.82E-09	6.75E-09	7.70E-09	8.67E-09	9.66E-09	9.66E-09
li 6	6.33E-09	7.10E-09	7.87E-09	8.64E-09	9.40E-09	9.40E-09
ru100	4.02E-09	5.07E-09	6.23E-09	7.51E-09	8.91E-09	8.91E-09
sn117	5.25E-09	5.93E-09	6.61E-09	7.29E-09	7.98E-09	7.98E-09
sn119	4.25E-09	4.79E-09	5.33E-09	5.87E-09	6.41E-09	6.41E-09
nd142	2.78E-09	3.52E-09	4.34E-09	5.24E-09	6.23E-09	6.23E-09
ba134	2.71E-09	3.42E-09	4.21E-09	5.08E-09	6.03E-09	6.03E-09
sr 90	6.18E-09	6.17E-09	6.16E-09	6.14E-09	6.13E-09	6.02E-09
sn115	3.89E-09	4.38E-09	4.88E-09	5.38E-09	5.87E-09	5.87E-09
cd114	3.45E-09	4.00E-09	4.55E-09	5.12E-09	5.70E-09	5.70E-09
sm148	2.49E-09	3.14E-09	3.87E-09	4.67E-09	5.54E-09	5.54E-09
sr 88	3.19E-09	3.58E-09	3.97E-09	4.37E-09	4.76E-09	4.76E-09
pd110	2.67E-09	3.05E-09	3.44E-09	3.84E-09	4.25E-09	4.25E-09
dy164	2.31E-09	2.74E-09	3.20E-09	3.69E-09	4.20E-09	4.20E-09
pd104	1.82E-09	2.30E-09	2.83E-09	3.42E-09	4.07E-09	4.07E-09
dy162	2.21E-09	2.60E-09	3.02E-09	3.46E-09	3.93E-09	3.93E-09
se 82	2.17E-09	2.44E-09	2.70E-09	2.97E-09	3.24E-09	3.24E-09
sn126	1.80E-09	2.03E-09	2.26E-09	2.49E-09	2.72E-09	2.72E-09
se 78	1.65E-09	1.86E-09	2.07E-09	2.27E-09	2.48E-09	2.48E-09

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 26

0 fraction of total absorption rate

0 powerm .00mw, burnup= 4021.mwd, flux= 9.45E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	
eu154	1.71E-09	1.92E-09	2.13E-09	2.35E-09	2.56E-09	2.41E-09
nb 93	9.71E-10	1.25E-09	1.51E-09	1.83E-09	2.18E-09	2.18E-09
sn124	1.35E-09	1.53E-09	1.70E-09	1.87E-09	2.04E-09	2.04E-09
mo 96	7.33E-10	9.07E-10	1.10E-09	1.31E-09	1.54E-09	1.54E-09
as 75	9.83E-10	1.11E-09	1.23E-09	1.35E-09	1.47E-09	1.47E-09
cs137	1.38E-09	1.38E-09	1.37E-09	1.37E-09	1.37E-09	1.35E-09
ba136	7.47E-10	8.70E-10	9.99E-10	1.14E-09	1.28E-09	1.28E-09
in113	7.54E-10	8.51E-10	9.48E-10	1.05E-09	1.14E-09	1.14E-09
br 79	4.90E-10	6.20E-10	7.64E-10	9.24E-10	1.10E-09	1.10E-09
dy163	5.29E-10	6.27E-10	7.31E-10	8.42E-10	9.58E-10	9.58E-10
kr 82	5.05E-10	5.96E-10	6.93E-10	7.96E-10	9.04E-10	9.04E-10
xe130	4.61E-10	5.58E-10	6.63E-10	7.77E-10	9.00E-10	9.00E-10
sn118	5.51E-10	6.21E-10	6.91E-10	7.61E-10	8.32E-10	8.32E-10
cd110	3.16E-10	4.09E-10	5.17E-10	6.39E-10	7.78E-10	7.78E-10
sn122	4.67E-10	5.27E-10	5.86E-10	6.46E-10	7.06E-10	7.06E-10
cd116	4.67E-10	5.26E-10	5.85E-10	6.44E-10	7.04E-10	7.04E-10
ag107	2.93E-10	3.75E-10	4.69E-10	5.74E-10	6.91E-10	6.91E-10

xe129	2.80E-10	3.55E-10	4.38E-10	5.30E-10	6.30E-10	6.31E-10
sn120	3.49E-10	3.93E-10	4.37E-10	4.81E-10	5.26E-10	5.26E-10
te126	2.00E-10	2.46E-10	2.98E-10	3.54E-10	4.15E-10	4.15E-10
ge 73	2.71E-10	3.05E-10	3.39E-10	3.73E-10	4.07E-10	4.07E-10
cs134	1.80E-10	2.01E-10	2.23E-10	2.45E-10	2.67E-10	2.08E-10
kr 85	2.07E-10	2.07E-10	2.06E-10	2.06E-10	2.06E-10	1.96E-10
ge 76	9.71E-11	1.09E-10	1.21E-10	1.33E-10	1.45E-10	1.45E-10
gd160	7.58E-11	8.70E-11	9.86E-11	1.11E-10	1.23E-10	1.23E-10
ce144	2.18E-10	2.18E-10	2.17E-10	2.17E-10	2.17E-10	1.11E-10
ho165	3.84E-11	4.58E-11	5.38E-11	6.23E-11	7.13E-11	7.13E-11
dy160	1.39E-11	1.76E-11	2.18E-11	2.65E-11	3.17E-11	3.17E-11
xe128	1.04E-11	1.31E-11	1.61E-11	1.94E-11	2.30E-11	2.30E-11
te124	1.38E-11	1.59E-11	1.80E-11	2.02E-11	2.25E-11	2.25E-11
sr 87	1.16E-11	1.31E-11	1.46E-11	1.61E-11	1.76E-11	1.76E-11
sr 86	8.00E-12	9.66E-12	1.15E-11	1.34E-11	1.55E-11	1.55E-11
nb 94	6.35E-12	7.17E-12	8.01E-12	8.87E-12	9.74E-12	9.74E-12
sn116	3.91E-12	4.94E-12	6.10E-12	7.38E-12	8.78E-12	8.78E-12
ge 74	5.46E-12	6.14E-12	6.82E-12	7.51E-12	8.19E-12	8.19E-12
ru106	1.07E-11	1.08E-11	1.10E-11	1.11E-11	1.13E-11	6.77E-12
nb 95	5.55E-11	5.55E-11	5.54E-11	5.53E-11	5.53E-11	5.98E-12
se 76	3.29E-12	3.86E-12	4.47E-12	5.11E-12	5.79E-12	5.79E-12
y 90	5.88E-12	5.87E-12	5.86E-12	5.85E-12	5.83E-12	5.73E-12
ge 72	3.74E-12	4.22E-12	4.70E-12	5.18E-12	5.66E-12	5.66E-12
sb125	5.73E-12	5.76E-12	5.78E-12	5.81E-12	5.84E-12	4.84E-12
te122	1.65E-12	2.08E-12	2.56E-12	3.09E-12	3.68E-12	3.68E-12
er166	1.80E-12	2.19E-12	2.61E-12	3.07E-12	3.56E-12	3.56E-12
zr 95	5.99E-11	5.99E-11	5.98E-11	5.97E-11	5.97E-11	3.07E-12
y 91	5.19E-11	5.18E-11	5.17E-11	5.16E-11	5.15E-11	2.02E-12
ce141	5.82E-10	5.82E-10	5.81E-10	5.81E-10	5.80E-10	1.69E-12
ru103	1.33E-10	1.34E-10	1.34E-10	1.34E-10	1.34E-10	1.06E-12
te127m	2.87E-12	2.88E-12	2.90E-12	2.91E-12	2.93E-12	5.31E-13
kr 80	2.50E-13	3.05E-13	3.67E-13	4.38E-13	5.18E-13	5.18E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 27
0 fraction of total absorption rate
0 power= .00mw, burnup= 4021.mwd, flux= 9.45E+07n/cm**2-sec

	initial	******* d	******* d	******* d	******* d	******* d
sr 89	1.11E-11	1.11E-11	1.10E-11	1.10E-11	1.10E-11	2.57E-13
er167	3.69E-14	4.85E-14	6.21E-14	7.79E-14	9.59E-14	9.59E-14
te123	2.62E-14	3.29E-14	4.06E-14	4.96E-14	5.98E-14	5.98E-14
be 9	1.22E-14	1.37E-14	1.52E-14	1.67E-14	1.82E-14	1.82E-14
pm148m	1.33E-12	1.33E-12	1.34E-12	1.34E-12	1.35E-12	1.36E-14
cd108	3.66E-15	5.16E-15	7.03E-15	9.33E-15	1.21E-14	1.21E-14
li 7	4.93E-15	5.55E-15	6.16E-15	6.77E-15	7.38E-15	7.38E-15
sb126	3.49E-15	3.80E-15	4.11E-15	4.41E-15	4.71E-15	5.14E-15
te129m	6.67E-13	6.69E-13	6.70E-13	6.71E-13	6.72E-13	2.37E-15
sn114	9.75E-16	1.23E-15	1.52E-15	1.84E-15	2.20E-15	2.20E-15
cd115m	8.99E-14	9.04E-14	9.08E-14	9.11E-14	9.15E-14	1.29E-15
pr143	9.69E-10	9.68E-10	9.67E-10	9.66E-10	9.65E-10	8.91E-16
sn123	3.74E-15	3.75E-15	3.75E-15	3.76E-15	3.76E-15	8.65E-16
tb160	7.52E-15	8.52E-15	9.55E-15	1.06E-14	1.17E-14	8.44E-16
eu156	1.41E-11	1.43E-11	1.45E-11	1.47E-11	1.48E-11	5.63E-17
sb124	1.10E-15	1.14E-15	1.18E-15	1.22E-15	1.26E-15	5.37E-17
pm148	4.82E-14	4.91E-14	4.91E-14	4.92E-14	4.92E-14	2.34E-17
nd147	3.36E-10	3.40E-10	3.39E-10	3.39E-10	3.39E-10	1.04E-17
ba140	1.71E-11	1.72E-11	1.72E-11	1.72E-11	1.72E-11	5.85E-18
la140	5.57E-12	5.57E-12	5.56E-12	5.56E-12	5.55E-12	2.18E-18
cd109	1.02E-18	1.14E-18	1.26E-18	1.39E-18	1.51E-18	1.01E-18
cs136	3.69E-14	3.92E-14	4.12E-14	4.32E-14	4.52E-14	2.77E-20
rb 86	3.54E-16	3.89E-16	4.21E-16	4.54E-16	4.86E-16	1.85E-20

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 28

power= 1.468E-03mw, burnup=4.0214E+03mwd, flux= 9.45E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
h 1	1.61E-04	1.81E-04	2.00E-04	2.20E-04	2.40E-04	2.40E-04
h 2	4.79E-07	5.37E-07	5.96E-07	6.54E-07	7.13E-07	7.13E-07
h 3	1.40E-11	1.42E-11	1.43E-11	1.45E-11	1.47E-11	1.41E-11
h 4	.00E+00	2.08E-35	2.11E-35	2.13E-35	2.16E-35	.00E+00
he 3	3.35E-09	3.73E-09	4.10E-09	4.47E-09	4.83E-09	4.83E-09
he 4	2.66E-05	2.99E-05	3.32E-05	3.64E-05	3.97E-05	3.97E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.20E-06	3.59E-06	3.98E-06	4.38E-06	4.77E-06	4.77E-06
ne 21	1.97E-10	2.45E-10	2.98E-10	3.56E-10	4.18E-10	4.18E-10
ne 22	2.10E-08	2.36E-08	2.62E-08	2.88E-08	3.13E-08	3.13E-08
ne 23	2.62E-30	2.60E-15	2.60E-15	2.60E-15	2.60E-15	2.60E-30
na 22	1.55E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.26E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	8.85E-09	1.01E-08	1.00E-08	1.00E-08	1.00E-08	1.00E-23
na 24m	1.80E-30	1.65E-15	1.65E-15	1.65E-15	1.65E-15	1.65E-30
na 25	2.40E-40	2.92E-25	3.52E-25	4.16E-25	4.85E-25	4.85E-40
mg 24	2.53E-02	2.79E-02	3.05E-02	3.31E-02	3.57E-02	3.57E-02
mg 25	2.28E-08	2.81E-08	3.38E-08	4.00E-08	4.67E-08	4.67E-08
mg 26	4.78E-07	5.37E-07	5.96E-07	6.54E-07	7.13E-07	7.13E-07
mg 27	1.61E-21	7.78E-13	7.78E-13	7.77E-13	7.77E-13	7.77E-28
mg 28	4.95E-25	5.73E-25	5.73E-25	5.72E-25	5.72E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	8.23E-26	7.45E-11	7.45E-11	7.45E-11	7.45E-11	7.45E-26
al 29	5.17E-36	2.10E-23	2.56E-23	3.06E-23	3.60E-23	3.60E-38
al 30	.00E+00	8.08E-34	1.10E-33	1.45E-33	1.86E-33	.00E+00
si 28	7.37E-02	8.13E-02	8.88E-02	9.64E-02	1.04E-01	1.04E-01
si 29	1.80E-07	2.25E-07	2.74E-07	3.28E-07	3.87E-07	3.87E-07
si 30	4.59E-13	6.49E-13	8.82E-13	1.16E-12	1.50E-12	1.50E-12
si 31	3.58E-26	1.68E-25	2.29E-25	3.02E-25	3.88E-25	3.82E-40
si 32	6.58E-32	9.45E-32	1.30E-31	1.73E-31	2.25E-31	2.24E-31
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		9.46E+07	9.46E+07	9.45E+07	9.45E+07	9.45E-08

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 29

power= 1.468E-03mw, burnup=4.0214E+03mwd, flux= 9.45E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	1.21E+00	1.45E+00	1.70E+00	1.97E+00	2.25E+00	2.26E+00
pb206	1.32E-03	1.79E-03	2.34E-03	2.98E-03	3.70E-03	3.70E-03
pb207	1.85E-04	2.34E-04	2.89E-04	3.49E-04	4.14E-04	4.14E-04
pb208	1.07E-05	1.35E-05	1.66E-05	2.01E-05	2.38E-05	2.38E-05
pb209	2.99E-11	3.72E-11	4.50E-11	5.35E-11	6.25E-11	6.25E-11
pb210	2.21E-05	2.42E-05	3.05E-05	3.48E-05	3.92E-05	3.92E-05
pb211	7.32E-12	8.21E-12	9.08E-12	9.96E-12	1.08E-11	1.08E-11
pb212	7.37E-12	8.25E-12	9.13E-12	1.00E-11	1.09E-11	1.09E-11
pb214	5.06E-11	6.00E-11	6.97E-11	7.96E-11	8.97E-11	8.97E-11
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	9.68E-05	1.36E-04	1.84E-04	2.41E-04	3.09E-04	3.09E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.36E-08	1.62E-08	1.88E-08	2.14E-08	2.41E-08	2.42E-08
bi211	4.34E-13	4.86E-13	5.39E-13	5.90E-13	6.42E-13	6.43E-13
bi212	6.99E-13	7.83E-13	8.66E-13	9.49E-13	1.03E-12	1.03E-12
bi213	6.83E-12	8.68E-12	1.05E-11	1.25E-11	1.46E-11	1.46E-11

bi214	3.76E-11	4.45E-11	5.18E-11	5.91E-11	6.66E-11	6.66E-11
po210	3.75E-07	4.44E-07	5.19E-07	5.92E-07	6.67E-07	6.60E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.80E-18	5.38E-18	5.95E-18	6.52E-18	7.09E-18	7.11E-18
po212	3.67E-23	4.11E-23	4.55E-23	4.99E-23	5.42E-23	5.44E-23
po213	1.03E-20	1.31E-20	1.58E-20	1.88E-20	2.19E-20	2.19E-20
po214	5.18E-18	6.13E-18	7.12E-18	8.14E-18	9.16E-18	9.16E-18
po215	6.02E-18	6.74E-18	7.47E-18	8.18E-18	8.89E-18	8.91E-18
po216	2.79E-17	3.12E-17	3.46E-17	3.79E-17	4.12E-17	4.13E-17
po218	5.84E-12	6.94E-12	8.07E-12	9.21E-12	1.04E-11	1.04E-11
rn218	3.93E-29	4.36E-29	4.82E-29	5.28E-29	5.74E-29	6.21E-33
rn219	1.34E-14	1.50E-14	1.66E-14	1.82E-14	1.98E-14	1.98E-14
rn220	1.07E-14	1.20E-14	1.33E-14	1.45E-14	1.58E-14	1.58E-14
rn222	1.04E-08	1.23E-08	1.43E-08	1.64E-08	1.84E-08	1.84E-08
ra222	4.26E-26	4.73E-26	5.24E-26	5.74E-26	6.23E-26	6.75E-30
ra223	3.34E-09	3.74E-09	4.14E-09	4.54E-09	4.94E-09	4.95E-09
ra224	6.08E-11	6.81E-11	7.54E-11	8.26E-11	8.97E-11	9.00E-11
ra225	3.27E-09	4.06E-09	4.92E-09	5.84E-09	6.83E-09	6.83E-09
ra226	1.59E-03	1.88E-03	2.19E-03	2.50E-03	2.82E-03	2.82E-03
ra228	1.06E-11	1.20E-11	1.33E-11	1.46E-11	1.60E-11	1.60E-11
ac225	2.21E-09	2.74E-09	3.32E-09	3.95E-09	4.61E-09	4.61E-09
ac227	2.32E-06	2.60E-06	2.88E-06	3.16E-06	3.43E-06	3.43E-06
ac228	1.30E-15	1.46E-15	1.62E-15	1.79E-15	1.95E-15	1.95E-15
th226	2.88E-24	2.31E-24	2.56E-24	2.80E-24	3.04E-24	3.29E-28
th227	5.39E-09	6.04E-09	6.69E-09	7.33E-09	7.97E-09	7.99E-09
th228	1.16E-08	1.30E-08	1.44E-08	1.58E-08	1.71E-08	1.71E-08
th229	6.36E-04	7.89E-04	9.57E-04	1.14E-03	1.33E-03	1.33E-03
th230	1.26E-01	1.41E-01	1.57E-01	1.72E-01	1.88E-01	1.88E-01
th231	3.15E-09	3.19E-09	3.21E-09	3.23E-09	3.25E-09	2.94E-09
th232	2.60E-02	2.92E-02	3.25E-02	3.58E-02	3.90E-02	3.90E-02
th233	1.78E-17	9.69E-14	1.08E-13	1.19E-13	1.29E-13	1.29E-28
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	3.49E-03	3.91E-03	4.33E-03	4.75E-03	5.16E-03	5.16E-03
pa232	1.96E-11	2.43E-11	2.69E-11	2.95E-11	3.20E-11	3.20E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 30
power= 1.468E-03mw, burnup=4.0214E+03mwd, flux= 9.45E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.09E-12	8.09E-12	8.08E-12	8.08E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.01E-21	2.24E-21	2.48E-21	2.71E-21	2.95E-21	3.19E-25
u231	1.81E-17	2.07E-17	2.29E-17	2.51E-17	2.73E-17	2.73E-32
u232	4.24E-07	4.75E-07	5.25E-07	5.75E-07	6.25E-07	6.21E-07
u233	6.68E-02	7.50E-02	8.31E-02	9.12E-02	9.92E-02	9.92E-02
u234	9.24E+00	9.26E+00	9.29E+00	9.31E+00	9.33E+00	9.33E+00
u235	7.17E+02	7.16E+02	7.14E+02	7.13E+02	7.11E+02	7.11E+02
u236	1.76E+02	1.77E+02	1.77E+02	1.77E+02	1.77E+02	1.77E+02
u237	1.13E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	4.49E-13
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	3.56E-11	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	7.88E-43	.00E+00	.00E+00	1.03E-40	1.03E-40	1.03E-40
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.18E-12	3.14E-12	3.14E-12	3.14E-12	3.13E-12	1.94E-12
np236m	6.57E-13	7.46E-13	7.46E-13	7.45E-13	7.45E-13	7.45E-28
np236	3.60E-07	4.03E-07	4.45E-07	4.88E-07	5.30E-07	5.30E-07
np237	4.20E+01	4.19E+01	4.19E+01	4.19E+01	4.19E+01	4.19E+01

```
     np238   5.23E-07  5.54E-07  5.54E-07  5.53E-07  5.53E-07  1.17E-16
     np239   1.56E-05  1.62E-05  1.62E-05  1.62E-05  1.62E-05  2.44E-15
     np240m   .00E+00   .00E+00   .00E+00  8.76E-43  8.76E-43  8.76E-43
     np240   5.68E-17  1.19E-15  1.19E-15  1.19E-15  1.19E-15  1.80E-40
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   4.11E-10  4.06E-10  4.05E-10  4.05E-10  4.05E-10  3.39E-10
     pu237   5.57E-14  5.79E-14  6.06E-14  6.32E-14  6.57E-14  9.81E-16
     pu238   8.43E-03  8.39E-03  8.38E-03  8.37E-03  8.37E-03  8.32E-03
     pu239   8.13E+00  9.02E+00  9.89E+00  1.07E+01  1.16E+01  1.16E+01
     pu240   5.16E-02  6.32E-02  7.56E-02  8.86E-02  1.02E-01  1.02E-01
     pu241   7.71E-06  9.35E-06  1.12E-05  1.31E-05  1.51E-05  1.46E-05
     pu242   2.99E-07  4.27E-07  5.86E-07  7.76E-07  1.00E-06  1.00E-06
     pu243   1.22E-16  3.27E-16  4.49E-16  5.04E-16  7.66E-16  7.66E-31
     pu244   1.96E-31  5.40E-31  1.33E-30  2.99E-30  6.23E-30  6.24E-30
     pu245    .00E+00   .00E+00   .00E+00  7.44E-41  7.44E-41   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.42E-20  2.29E-20  2.79E-20  3.32E-20  3.89E-20  3.89E-35
     am240   7.95E-18  1.05E-17  1.28E-17  1.52E-17  1.78E-17  1.78E-32
     am241   1.83E-04  2.29E-04  2.79E-04  3.33E-04  3.89E-04  3.89E-04
     am242m  2.89E-08  3.63E-08  4.48E-08  5.38E-08  6.33E-08  6.31E-08
     am242   2.10E-12  3.10E-12  3.78E-12  4.51E-12  5.29E-12  8.14E-13
     am243   6.88E-10  1.04E-09  1.50E-09  2.08E-09  2.79E-09  2.79E-09
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.40E-18  2.86E-18  4.11E-18  5.70E-18  7.67E-18  7.67E-33
     am245   4.48E-44   .00E+00   .00E+00  1.49E-41  1.49E-41   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.31E-23  6.57E-23  8.02E-23  9.58E-23  1.12E-22  3.43E-25
     cm242   5.01E-10  6.25E-10  7.63E-10  9.11E-10  1.07E-09  4.47E-10
     cm243   4.18E-15  5.18E-15  6.33E-15  7.55E-15  8.85E-15  8.69E-15
     cm244   3.00E-14  4.49E-14  6.46E-14  8.96E-14  1.20E-13  1.17E-13
1
     sas2h: fer-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   31
       power= 1.468E-03mw, burnup=4.0214E+03mwd, flux= 9.45E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                     basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.17E-17  1.97E-17  3.14E-17  4.76E-17  6.95E-17  6.95E-17
     cm246   1.99E-20  3.77E-20  6.63E-20  1.10E-19  1.76E-19  1.76E-19
     cm247   6.04E-25  1.29E-24  2.54E-24  4.67E-24  8.10E-24  8.10E-24
     cm248   1.81E-28  4.40E-28  9.69E-28  1.97E-27  3.74E-27  3.74E-27
     cm249   1.09E-40  5.03E-39  1.10E-38  2.24E-38  4.27E-38   .00E+00
     cm250   1.82E-44  4.90E-44  1.19E-43  2.66E-43  5.52E-43  5.52E-43
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.46E+07  9.46E+07  9.45E+07  9.45E+07  9.45E+08
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
```

```
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        *scale-system control module sas2 library*
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *            prelim lwr origen-s binary working library--id = 1143    *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *       data from the light element, actinide, and fission product libraries *
        *         decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "prosas2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                  fission product yields are from endf/b-v           *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *        see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                .other identification and sizes of library.
0                 data set name:  fc33f001
0              8/29/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   32
      power=    .00mw, burnup=   5362.mwd, flux= 9.28E+07n/cm**2-sec
0                                          basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
    productions   1.220108E+06  1.220614E+06  1.221082E+06  1.221515E+06  1.221911E+06  1.221910E+06
    absorptions   9.842423E+05  9.847863E+05  9.852970E+05  9.857796E+05  9.862358E+05  9.862345E+05
    k infinity    1.239641E+00  1.239471E+00  1.239304E+00  1.239136E+00  1.238964E+00  1.238965E+00
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
    actinide
    absorptions   9.737211E+05  9.740664E+05  9.743921E+05  9.746986E+05  9.749863E+05  9.749859E+05
    non-actinide
    abs. fracs.   1.068962E-02  1.088548E-02  1.106763E-02  1.124084E-02  1.140648E-02  1.140565E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   33
0                                  fraction of total absorption rate
      power=    .00mw, burnup=   5362.mwd, flux= 9.28E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

    sm149     5.29E-03  5.33E-03  5.37E-03  5.39E-03  5.41E-03  5.41E-03
    eu151     5.45E-04  5.85E-04  6.24E-04  6.62E-04  7.00E-04  7.00E-04
    nd143     4.02E-04  4.35E-04  4.68E-04  5.01E-04  5.33E-04  5.33E-04
```

rh103	1.87E-04	2.02E-04	2.18E-04	2.34E-04	2.49E-04	2.49E-04
gd155	1.56E-04	1.61E-04	1.66E-04	1.70E-04	1.74E-04	1.74E-04
xe131	1.28E-04	1.38E-04	1.49E-04	1.59E-04	1.70E-04	1.70E-04
cs133	9.92E-05	1.07E-04	1.16E-04	1.24E-04	1.32E-04	1.32E-04
sm147	7.34E-05	7.95E-05	8.55E-05	9.16E-05	9.76E-05	9.76E-05
tc 99	7.20E-05	7.79E-05	8.37E-05	8.96E-05	9.54E-05	9.54E-05
cd113	7.93E-05	8.15E-05	8.34E-05	8.50E-05	8.65E-05	8.65E-05
nd145	5.64E-05	6.10E-05	6.56E-05	7.02E-05	7.49E-05	7.49E-05
mo 95	3.91E-05	4.23E-05	4.55E-05	4.87E-05	5.19E-05	5.19E-05
gd157	4.41E-05	4.49E-05	4.55E-05	4.62E-05	4.69E-05	4.69E-05
sm152	3.38E-05	3.69E-05	4.00E-05	4.32E-05	4.64E-05	4.64E-05
kr 83	2.45E-05	2.65E-05	2.85E-05	3.05E-05	3.24E-05	3.24E-05
sm150	2.22E-05	2.47E-05	2.72E-05	2.98E-05	3.23E-05	3.23E-05
cs135	2.24E-05	2.42E-05	2.61E-05	2.79E-05	2.98E-05	2.98E-05
ru101	1.73E-05	1.88E-05	2.02E-05	2.17E-05	2.31E-05	2.31E-05
pr141	1.67E-05	1.81E-05	1.94E-05	2.08E-05	2.22E-05	2.22E-05
eu153	1.59E-05	1.73E-05	1.86E-05	2.00E-05	2.14E-05	2.14E-05
la139	1.36E-05	1.48E-05	1.59E-05	1.70E-05	1.81E-05	1.81E-05
sm151	1.73E-05	1.74E-05	1.74E-05	1.75E-05	1.75E-05	1.74E-05
ba137	6.51E-06	7.06E-06	7.60E-06	8.14E-06	8.68E-06	8.68E-06
pd105	6.11E-06	6.64E-06	7.18E-06	7.71E-06	8.26E-06	8.26E-06
zr 93	5.48E-06	5.93E-06	6.38E-06	6.83E-06	7.28E-06	7.28E-06
i129	4.30E-06	4.66E-06	5.03E-06	5.39E-06	5.75E-06	5.75E-06
nd144	4.12E-06	4.46E-06	4.80E-06	5.15E-06	5.49E-06	5.49E-06
ag109	3.56E-06	3.97E-06	4.39E-06	4.82E-06	5.27E-06	5.27E-06
mo 97	3.10E-06	3.35E-06	3.61E-06	3.86E-06	4.12E-06	4.12E-06
zr 91	1.45E-06	1.57E-06	1.69E-06	1.81E-06	1.92E-06	1.92E-06
y 89	1.39E-06	1.50E-06	1.62E-06	1.73E-06	1.84E-06	1.84E-06
ru102	1.27E-06	1.38E-06	1.48E-06	1.59E-06	1.69E-06	1.69E-06
gd152	8.73E-07	1.02E-06	1.18E-06	1.34E-06	1.52E-06	1.52E-06
ce142	1.14E-06	1.23E-06	1.32E-06	1.42E-06	1.51E-06	1.51E-06
nd148	1.09E-06	1.18E-06	1.27E-06	1.36E-06	1.45E-06	1.45E-06
pd108	1.00E-06	1.11E-06	1.22E-06	1.33E-06	1.44E-06	1.44E-06
nd146	9.17E-07	9.93E-07	1.07E-06	1.14E-06	1.22E-06	1.22E-06
ba138	7.84E-07	8.49E-07	9.13E-07	9.78E-07	1.04E-06	1.04E-06
in115	7.72E-07	8.38E-07	9.03E-07	9.69E-07	1.03E-06	1.03E-06
ce140	7.34E-07	7.95E-07	8.55E-07	9.16E-07	9.76E-07	9.76E-07
xe132	6.61E-07	7.16E-07	7.71E-07	8.26E-07	8.81E-07	8.81E-07
pd107	5.53E-07	6.07E-07	6.64E-07	7.21E-07	7.80E-07	7.80E-07
mo 98	4.53E-07	4.90E-07	5.27E-07	5.65E-07	6.02E-07	6.02E-07
mo100	4.39E-07	4.75E-07	5.12E-07	5.48E-07	5.84E-07	5.84E-07
xe134	4.33E-07	4.69E-07	5.05E-07	5.41E-07	5.76E-07	5.76E-07
zr 92	3.49E-07	3.78E-07	4.07E-07	4.35E-07	4.64E-07	4.64E-07
i127	2.96E-07	3.22E-07	3.47E-07	3.73E-07	3.99E-07	3.99E-07
ru104	2.78E-07	3.01E-07	3.25E-07	3.49E-07	3.73E-07	3.73E-07
zr 96	2.74E-07	2.97E-07	3.19E-07	3.42E-07	3.64E-07	3.64E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 34
0 fraction of total absorption rate
power= .00mw, burnup= 3362.mwd, flux= 9.28E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

nd150	2.43E-07	2.64E-07	2.84E-07	3.04E-07	3.24E-07	3.24E-07
xe136	2.34E-07	2.54E-07	2.73E-07	2.92E-07	3.12E-07	3.12E-07
ru 99	1.40E-07	1.66E-07	1.90E-07	2.18E-07	2.48E-07	2.48E-07
br 81	1.75E-07	1.89E-07	2.04E-07	2.18E-07	2.33E-07	2.33E-07
rb 85	1.70E-07	1.84E-07	1.98E-07	2.12E-07	2.26E-07	2.26E-07
zr 94	1.48E-07	1.60E-07	1.72E-07	1.84E-07	1.96E-07	1.96E-07
cd111	1.35E-07	1.48E-07	1.61E-07	1.75E-07	1.88E-07	1.88E-07
zr 90	1.36E-07	1.47E-07	1.59E-07	1.70E-07	1.81E-07	1.81E-07
sm154	1.07E-07	1.16E-07	1.25E-07	1.34E-07	1.44E-07	1.44E-07

te130	1.07E-07	1.16E-07	1.25E-07	1.34E-07	1.43E-07	1.43E-07
rb 87	9.82E-08	1.06E-07	1.14E-07	1.22E-07	1.30E-07	1.30E-07
se 77	7.05E-08	7.63E-08	8.21E-08	8.79E-08	9.37E-08	9.37E-08
pd106	5.60E-08	6.11E-08	6.63E-08	7.15E-08	7.68E-08	7.68E-08
pm147	8.22E-08	9.90E-08	9.89E-08	9.88E-08	9.88E-08	7.67E-08
eu152	4.97E-08	5.54E-08	5.91E-08	6.27E-08	6.63E-08	6.29E-08
gd156	4.21E-08	4.69E-08	5.19E-08	5.69E-08	6.21E-08	6.21E-08
kr 84	4.64E-08	5.02E-08	5.40E-08	5.78E-08	6.16E-08	6.16E-08
eu155	5.34E-08	6.01E-08	6.04E-08	6.08E-08	6.11E-08	5.27E-08
gd154	2.91E-08	3.41E-08	3.96E-08	4.55E-08	5.18E-08	5.18E-08
se 79	3.60E-08	3.89E-08	4.19E-08	4.48E-08	4.77E-08	4.77E-08
sb121	3.51E-08	3.81E-08	4.11E-08	4.41E-08	4.71E-08	4.71E-08
sb123	2.85E-08	3.09E-08	3.33E-08	3.58E-08	3.82E-08	3.82E-08
kr 86	2.59E-08	2.80E-08	3.02E-08	3.23E-08	3.44E-08	3.44E-08
dy161	2.27E-08	2.52E-08	2.78E-08	3.05E-08	3.32E-08	3.32E-08
te128	2.36E-08	2.56E-08	2.76E-08	2.96E-08	3.16E-08	3.16E-08
ba135	1.35E-08	1.58E-08	1.84E-08	2.11E-08	2.40E-08	2.40E-08
se 80	1.68E-08	1.82E-08	1.96E-08	2.10E-08	2.24E-08	2.24E-08
te125	1.52E-08	1.65E-08	1.79E-08	1.92E-08	2.05E-08	2.05E-08
tb159	1.22E-08	1.34E-08	1.46E-08	1.59E-08	1.71E-08	1.71E-08
ru100	8.93E-09	1.04E-08	1.21E-08	1.38E-08	1.57E-08	1.57E-08
cd112	1.05E-08	1.14E-08	1.24E-08	1.33E-08	1.43E-08	1.43E-08
gd158	9.65E-09	1.07E-08	1.17E-08	1.27E-08	1.38E-08	1.38E-08
li 6	9.42E-09	1.02E-08	1.09E-08	1.17E-08	1.25E-08	1.25E-08
nd142	6.24E-09	7.32E-09	8.48E-09	9.73E-09	1.11E-08	1.11E-08
sn117	7.99E-09	8.69E-09	9.38E-09	1.01E-08	1.08E-08	1.08E-08
ba134	6.03E-09	7.07E-09	8.18E-09	9.38E-09	1.07E-08	1.07E-08
sm148	5.54E-09	6.49E-09	7.51E-09	8.60E-09	9.77E-09	9.77E-09
sn119	6.43E-09	6.97E-09	7.52E-09	8.07E-09	8.62E-09	8.62E-09
cd114	5.69E-09	6.28E-09	6.88E-09	7.48E-09	8.10E-09	8.10E-09
sn115	5.89E-09	6.39E-09	6.89E-09	7.39E-09	7.90E-09	7.90E-09
pd104	4.86E-09	4.76E-09	5.52E-09	6.33E-09	7.20E-09	7.20E-09
dy164	4.21E-09	4.75E-09	5.32E-09	5.90E-09	6.52E-09	6.52E-09
sr 88	4.76E-09	5.15E-09	5.54E-09	5.93E-09	6.32E-09	6.32E-09
dy162	3.93E-09	4.42E-09	4.94E-09	5.47E-09	6.03E-09	6.03E-09
pd110	4.24E-09	4.66E-09	5.09E-09	5.52E-09	5.97E-09	5.97E-09
sr 90	6.03E-09	6.13E-09	6.12E-09	6.11E-09	6.10E-09	5.95E-09
se 82	3.24E-09	3.51E-09	3.78E-09	4.04E-09	4.31E-09	4.31E-09
nb 93	2.18E-09	2.56E-09	2.96E-09	3.40E-09	3.86E-09	3.86E-09
sn126	2.73E-09	2.96E-09	3.20E-09	3.43E-09	3.67E-09	3.67E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35
0 fraction of total absorption rate
power= .00mw, burnup= 5362.mwd, flux= 9.28E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

se 78	2.48E-09	2.69E-09	2.89E-09	3.10E-09	3.30E-09	3.30E-09
eu154	2.42E-09	2.78E-09	3.00E-09	3.22E-09	3.44E-09	3.17E-09
sn124	2.04E-09	2.21E-09	2.39E-09	2.56E-09	2.74E-09	2.74E-09
mo 96	1.54E-09	1.79E-09	2.05E-09	2.34E-09	2.64E-09	2.64E-09
as 75	1.47E-09	1.59E-09	1.72E-09	1.84E-09	1.96E-09	1.96E-09
br 79	1.10E-09	1.29E-09	1.49E-09	1.71E-09	1.95E-09	1.95E-09
ba136	1.28E-09	1.42E-09	1.58E-09	1.74E-09	1.91E-09	1.91E-09
in113	1.14E-09	1.24E-09	1.34E-09	1.44E-09	1.54E-09	1.54E-09
cd110	7.79E-10	9.33E-10	1.10E-09	1.29E-09	1.50E-09	1.50E-09
dy163	9.59E-10	1.08E-09	1.21E-09	1.34E-09	1.48E-09	1.48E-09
xe130	9.02E-10	1.03E-09	1.17E-09	1.32E-09	1.46E-09	1.46E-09
kr 82	9.85E-10	1.02E-09	1.14E-09	1.26E-09	1.39E-09	1.39E-09
cs137	1.35E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.34E-09
ag107	6.92E-10	8.21E-10	9.62E-10	1.12E-09	1.28E-09	1.28E-09
xe129	6.31E-10	7.40E-10	8.59E-10	9.86E-10	1.12E-09	1.12E-09

sn118	8.29E-10	9.00E-10	9.71E-10	1.04E-09	1.11E-09	1.11E-09
sn122	7.07E-10	7.67E-10	8.27E-10	8.88E-10	9.48E-10	9.48E-10
cd116	7.02E-10	7.62E-10	8.22E-10	8.82E-10	9.42E-10	9.42E-10
te126	4.15E-10	4.81E-10	5.52E-10	6.28E-10	7.09E-10	7.09E-10
sn120	5.26E-10	5.70E-10	6.15E-10	6.60E-10	7.05E-10	7.05E-10
ge 73	4.07E-10	4.42E-10	4.76E-10	5.10E-10	5.44E-10	5.44E-10
cs134	2.08E-10	2.89E-10	3.11E-10	3.33E-10	3.55E-10	2.53E-10
ge 76	1.45E-10	1.57E-10	1.69E-10	1.81E-10	1.93E-10	1.93E-10
kr 83	1.96E-10	2.06E-10	2.05E-10	2.05E-10	2.05E-10	1.92E-10
gd140	1.23E-10	1.36E-10	1.48E-10	1.62E-10	1.75E-10	1.75E-10
ho165	7.14E-11	8.10E-11	9.12E-11	1.02E-10	1.13E-10	1.13E-10
ce144	1.11E-10	2.17E-10	2.16E-10	2.16E-10	2.16E-10	8.88E-11
dy160	3.17E-11	3.74E-11	4.36E-11	5.03E-11	5.75E-11	5.75E-11
xe128	2.30E-11	2.70E-11	3.12E-11	3.58E-11	4.07E-11	4.07E-11
te124	2.25E-11	2.48E-11	2.73E-11	2.97E-11	3.23E-11	3.23E-11
sr 86	1.55E-11	1.78E-11	2.02E-11	2.27E-11	2.53E-11	2.53E-11
sr 87	1.76E-11	1.92E-11	2.07E-11	2.23E-11	2.38E-11	2.38E-11
sn116	8.75E-12	1.03E-11	1.19E-11	1.37E-11	1.56E-11	1.56E-11
nb 94	9.73E-12	1.06E-11	1.16E-11	1.25E-11	1.35E-11	1.35E-11
ge 74	8.20E-12	8.89E-12	9.58E-12	1.03E-11	1.10E-11	1.10E-11
se 76	5.80E-12	6.51E-12	7.26E-12	8.05E-12	8.87E-12	8.87E-12
ge 72	5.67E-12	6.16E-12	6.65E-12	7.14E-12	7.63E-12	7.63E-12
te122	3.67E-12	4.30E-12	4.99E-12	5.72E-12	6.51E-12	6.51E-12
ru106	6.75E-12	1.14E-11	1.15E-11	1.17E-11	1.18E-11	5.97E-12
er166	3.56E-12	4.89E-12	4.64E-12	5.22E-12	5.83E-12	5.83E-12
y 90	5.74E-12	5.83E-12	5.82E-12	5.81E-12	5.80E-12	5.66E-12
sb125	4.83E-12	5.86E-12	5.88E-12	5.91E-12	5.93E-12	4.61E-12
nb 95	5.97E-12	5.52E-11	5.51E-11	5.51E-11	5.50E-11	2.35E-12
zr 95	5.07E-12	5.95E-11	5.94E-11	5.94E-11	5.93E-11	1.14E-12
kr 80	5.18E-13	6.08E-13	7.08E-13	8.19E-13	9.43E-13	9.43E-13
y 91	2.02E-12	5.15E-11	5.14E-11	5.13E-11	5.12E-11	6.81E-13
te127m	5.32E-13	2.94E-12	2.96E-12	2.97E-12	2.98E-12	5.03E-13
ce141	1.69E-12	5.81E-10	5.80E-10	5.80E-10	5.80E-10	2.41E-13
ru103	1.07E-12	1.35E-10	1.35E-10	1.35E-10	1.35E-10	2.14E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 36
0 fraction of total absorption rate
0 power= .00mw, burnup= 3362.mwd, flux= 9.28E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

er167	9.60E-14	1.16E-13	1.39E-13	1.63E-13	1.93E-13	1.93E-13
te123	5.98E-14	7.14E-14	8.44E-14	9.91E-14	1.15E-13	1.15E-13
sr 89	2.57E-13	1.10E-11	1.10E-11	1.10E-11	1.09E-11	7.31E-14
cd108	1.21E-14	1.54E-14	1.93E-14	2.37E-14	2.89E-14	2.89E-14
be 9	1.82E-14	1.97E-14	2.12E-14	2.27E-14	2.41E-14	2.41E-14
li 7	7.40E-15	8.01E-15	8.62E-15	9.23E-15	9.84E-15	9.84E-15
sb126	3.14E-15	5.01E-15	5.31E-15	5.62E-15	5.92E-15	4.22E-15
sn114	2.20E-15	2.59E-15	3.00E-15	3.45E-15	3.93E-15	3.93E-15
pm148m	1.36E-14	1.35E-12	1.36E-12	1.36E-12	1.37E-12	2.97E-15
sn123	8.62E-16	3.75E-15	3.76E-15	3.76E-15	3.77E-15	5.30E-16
tb160	8.46E-16	1.28E-14	1.39E-14	1.50E-14	1.61E-14	4.87E-16
te129m	2.37E-15	6.73E-13	6.74E-13	6.75E-13	6.76E-13	3.63E-16
cd115m	1.29E-15	9.19E-14	9.22E-14	9.25E-14	9.28E-14	3.18E-16
sb124	5.37E-17	1.30E-15	1.34E-15	1.38E-15	1.42E-15	2.11E-17
pr143	8.92E-16	9.64E-10	9.63E-10	9.62E-10	9.61E-10	8.40E-18
pm148	2.34E-17	4.90E-14	4.91E-14	4.91E-14	4.92E-14	5.11E-18
cd109	1.01E-18	1.65E-18	1.78E-18	1.93E-18	2.09E-18	1.21E-18
eu156	5.64E-17	1.50E-11	1.52E-11	1.53E-11	1.55E-11	9.14E-19
nd147	1.04E-17	3.38E-10	3.38E-10	3.38E-10	3.37E-10	3.69E-20
ba140	5.86E-18	1.72E-11	1.72E-11	1.71E-11	1.71E-11	3.69E-20
la140	2.17E-18	5.54E-12	5.54E-12	5.53E-12	5.53E-12	1.85E-20

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 37

power= 1.468E-03mw, burnup=5.3618E+03mwd, flux= 9.28E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
h 1	2.40E-04	2.39E-04	2.79E-04	2.99E-04	3.18E-04
h 2	7.13E-07	7.72E-07	8.30E-07	8.89E-07	9.47E-07
h 3	1.61E-11	1.49E-11	1.51E-11	1.53E-11	1.54E-11
h 4	.00E+00	2.19E-35	2.21E-35	2.24E-35	2.26E-35
he 3	4.83E-09	5.18E-09	5.53E-09	5.87E-09	6.20E-09
he 4	3.97E-05	4.29E-05	4.62E-05	4.95E-05	5.27E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	4.77E-06	5.16E-06	5.55E-06	5.94E-06	6.33E-06
ne 21	4.18E-10	4.85E-10	5.56E-10	6.31E-10	7.11E-10
ne 22	3.13E-08	3.39E-08	3.65E-08	3.91E-08	4.16E-08
ne 23	2.60E-30	2.60E-15	2.60E-15	2.60E-15	2.60E-30
na 22	1.26E-11	1.54E-11	1.54E-11	1.54E-11	1.18E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	1.80E-23	9.66E-09	9.66E-09	9.66E-09	9.66E-24
na 24m	1.65E-30	1.59E-15	1.59E-15	1.59E-15	1.59E-30
na 25	4.85E-40	5.56E-25	6.35E-25	7.18E-25	8.06E-25
mg 24	3.57E-02	3.82E-02	4.07E-02	4.32E-02	4.57E-02
mg 25	4.67E-08	5.38E-08	6.14E-08	6.94E-08	7.79E-08
mg 26	7.13E-07	7.71E-07	8.30E-07	8.88E-07	9.47E-07
mg 27	7.77E-28	7.77E-13	7.77E-13	7.77E-13	7.77E-28
mg 28	.00E+00	5.72E-25	5.72E-25	5.72E-25	5.72E-25
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.45E-26	7.16E-11	7.16E-11	7.16E-11	7.16E-26
al 29	3.60E-38	4.16E-23	4.78E-23	5.44E-23	6.13E-38
al 30	.00E+00	2.34E-33	2.90E-33	3.53E-33	4.26E-33
si 28	1.04E-01	1.11E-01	1.19E-01	1.26E-01	1.33E-01
si 29	3.87E-07	4.49E-07	5.16E-07	5.87E-07	6.62E-07
si 30	1.50E-12	1.89E-12	2.34E-12	2.86E-12	3.46E-12
si 31	3.82E-40	4.90E-25	6.07E-25	7.40E-25	8.92E-25
si 32	2.24E-31	2.86E-31	3.57E-31	4.37E-31	5.29E-31
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		9.28E+07	9.28E+07	9.28E+07	9.27E-08

0

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 38

power= 1.468E-03mw, burnup=5.3618E+03mwd, flux= 9.28E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	2.26E+00	2.56E+00	2.88E+00	3.21E+00	3.56E+00
pb206	3.70E-03	4.51E-03	5.40E-03	6.38E-03	7.45E-03
pb207	4.14E-04	4.85E-04	5.61E-04	6.43E-04	7.30E-04
pb208	2.38E-05	2.79E-05	3.22E-05	3.69E-05	4.18E-05
pb209	6.25E-11	7.20E-11	8.20E-11	9.25E-11	1.03E-10
pb210	3.92E-05	4.37E-05	4.81E-05	5.25E-05	5.70E-05
pb211	1.08E-11	1.17E-11	1.25E-11	1.34E-11	1.42E-11
pb212	1.09E-11	1.17E-11	1.26E-11	1.34E-11	1.43E-11
pb214	8.97E-11	9.98E-11	1.10E-10	1.20E-10	1.30E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	3.09E-04	3.88E-04	4.77E-04	5.79E-04	6.94E-04
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.42E-08	2.69E-08	2.96E-08	3.23E-08	3.51E-08
bi211	6.43E-13	6.93E-13	7.43E-13	7.93E-13	8.43E-13
bi212	1.03E-12	1.11E-12	1.19E-12	1.27E-12	1.35E-12
bi213	1.46E-11	1.68E-11	1.92E-11	2.16E-11	2.41E-11

bi214	6.66E-11	7.41E-11	8.16E-11	8.92E-11	9.68E-11	9.68E-11
po210	6.60E-07	7.42E-07	8.17E-07	8.93E-07	9.69E-07	9.59E-07
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	7.11E-18	7.65E-18	8.21E-18	8.77E-18	9.32E-18	9.34E-18
po212	5.44E-23	5.85E-23	6.27E-23	6.70E-23	7.12E-23	7.13E-23
po213	2.19E-20	2.53E-20	2.88E-20	3.25E-20	3.63E-20	3.63E-20
po214	9.16E-18	1.02E-17	1.12E-17	1.23E-17	1.33E-17	1.33E-17
po215	8.91E-18	9.60E-18	1.03E-17	1.10E-17	1.17E-17	1.17E-17
po216	4.13E-17	4.64E-17	4.76E-17	5.09E-17	5.40E-17	5.42E-17
po218	1.04E-11	1.15E-11	1.27E-11	1.39E-11	1.51E-11	1.51E-11
rn218	6.21E-33	6.16E-29	6.61E-29	7.05E-29	7.49E-29	3.88E-34
rn219	1.98E-14	2.14E-14	2.29E-14	2.45E-14	2.60E-14	2.61E-14
rn220	1.58E-14	1.70E-14	1.83E-14	1.95E-14	2.07E-14	2.08E-14
rn222	1.84E-08	2.05E-08	2.26E-08	2.47E-08	2.68E-08	2.68E-08
ra222	6.73E-30	6.69E-26	7.17E-26	7.66E-26	8.14E-26	4.21E-31
ra223	4.95E-09	5.33E-09	5.72E-09	6.10E-09	6.49E-09	6.50E-09
ra224	9.00E-11	9.68E-11	1.04E-10	1.11E-10	1.18E-10	1.18E-10
ra225	6.83E-09	7.87E-09	8.96E-09	1.01E-08	1.13E-08	1.13E-08
ra226	2.82E-03	3.13E-03	3.45E-03	3.77E-03	4.09E-03	4.09E-03
ra228	1.60E-11	1.73E-11	1.87E-11	2.00E-11	2.14E-11	2.14E-11
ac225	4.61E-09	5.31E-09	6.05E-09	6.82E-09	7.63E-09	7.63E-09
ac227	3.43E-06	3.71E-06	3.98E-06	4.25E-06	4.51E-06	4.51E-06
ac228	1.95E-15	2.11E-15	2.28E-15	2.44E-15	2.61E-15	2.61E-15
th226	3.29E-28	3.26E-24	3.50E-24	3.74E-24	3.97E-24	2.06E-29
th227	7.99E-09	8.60E-09	9.23E-09	9.85E-09	1.05E-08	1.05E-08
th228	1.71E-08	1.85E-08	1.98E-08	2.12E-08	2.25E-08	2.25E-08
th229	1.33E-03	1.53E-03	1.74E-03	1.96E-03	2.20E-03	2.20E-03
th230	1.88E-01	2.03E-01	2.18E-01	2.33E-01	2.49E-01	2.49E-01
th231	2.94E-09	3.27E-09	3.29E-09	3.31E-09	3.33E-09	2.92E-09
th232	3.90E-02	4.23E-02	4.56E-02	4.89E-02	5.22E-02	5.22E-02
th233	1.29E-28	1.40E-13	1.51E-13	1.62E-13	1.73E-13	1.73E-28
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.16E-03	5.57E-03	5.98E-03	6.39E-03	6.79E-03	6.79E-03
pa232	3.20E-26	3.46E-11	3.71E-11	3.96E-11	4.21E-11	4.21E-26

1

sas2h: for-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 39

power= 1.468E-03mw, burnup=5.3618E+03mwd, flux= 9.28E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.45E-06	1.45E-06	1.45E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	3.19E-25	3.16E-21	3.39E-21	3.62E-21	3.85E-21	1.99E-26
u231	2.73E-32	2.94E-17	3.15E-17	3.37E-17	3.58E-17	3.58E-32
u232	6.21E-07	6.74E-07	7.26E-07	7.72E-07	8.21E-07	8.13E-07
u233	9.92E-02	1.07E-01	1.15E-01	1.23E-01	1.31E-01	1.31E-01
u234	9.33E+00	9.33E+00	9.38E+00	9.40E+00	9.42E+00	9.42E+00
u235	7.11E+02	7.10E+02	7.08E+02	7.07E+02	7.06E+02	7.06E+02
u236	1.77E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02
u237	4.49E-13	1.14E-06	1.14E-06	1.14E-06	1.14E-06	6.96E-13
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	1.03E-40	2.05E-40	4.10E-40	8.21E-40	1.33E-39	1.33E-39
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.94E-12	3.12E-12	3.12E-12	3.12E-12	3.11E-12	1.44E-12
np236m	7.45E-28	7.41E-13	7.41E-13	7.40E-13	7.40E-13	7.40E-28
np236	5.30E-07	5.72E-07	6.14E-07	6.55E-07	6.97E-07	6.97E-07
np237	4.19E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01	4.18E+01

```
     np238   1.17E-14  5.52E-07  5.51E-07  5.51E-07  5.51E-07  1.93E-14
     np239   2.44E-15  1.62E-05  1.62E-05  1.62E-05  1.62E-05  6.38E-15
     np240m  8.76E-43  1.75E-42  3.38E-42  7.01E-42  1.14E-41  1.14E-41
     np240   1.80E-40  1.19E-15  1.19E-15  1.19E-15  1.19E-15  4.66E-40
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   3.39E-10  4.03E-10  4.03E-10  4.03E-10  4.03E-10  3.18E-10
     pu237   9.81E-16  6.79E-14  7.04E-14  7.27E-14  7.51E-14  2.76E-16
     pu238   8.32E-03  8.35E-03  8.34E-03  8.34E-03  8.33E-03  8.27E-03
     pu239   1.16E+01  1.24E+01  1.32E+01  1.39E+01  1.47E+01  1.47E+01
     pu240   1.02E-01  1.16E-01  1.31E-01  1.46E-01  1.61E-01  1.61E-01
     pu241   1.46E-05  1.71E-05  1.93E-05  2.15E-05  2.37E-05  2.26E-05
     pu242   1.00E-06  1.26E-06  1.56E-06  1.89E-06  2.26E-06  2.26E-06
     pu243   7.66E-31  9.61E-16  1.19E-15  1.44E-15  1.72E-15  1.73E-30
     pu244   6.24E-30  1.22E-29  2.27E-29  4.03E-29  6.88E-29  6.88E-29
     pu245    .00E+00  1.53E-40  3.06E-40  6.11E-40  9.93E-40   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   3.89E-33  4.45E-20  5.06E-20  5.69E-20  6.33E-20  6.34E-35
     am240   1.78E-32  2.04E-17  2.32E-17  2.60E-17  2.90E-17  2.90E-32
     am241   3.89E-04  4.47E-04  5.08E-04  5.72E-04  6.36E-04  6.36E-04
     am242m  6.31E-08  7.30E-08  8.32E-08  9.39E-08  1.05E-07  1.04E-07
     am242   8.14E-13  6.07E-12  6.90E-12  7.76E-12  8.64E-12  1.35E-12
     am243   2.79E-09  3.66E-09  4.69E-09  5.89E-09  7.29E-09  7.29E-09
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   7.67E-33  1.00E-17  1.28E-17  1.61E-17  1.99E-17  1.99E-32
     am245    .00E+00  2.98E-41  5.97E-41  1.19E-40  2.09E-40   .00E+00
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   3.43E-25  1.28E-22  1.46E-22  1.64E-22  1.83E-22  8.12E-26
     cm242   4.67E-10  1.23E-09  1.39E-09  1.57E-09  1.75E-09  5.85E-10
     cm243   8.69E-15  1.01E-14  1.15E-14  1.29E-14  1.44E-14  1.41E-14
     cm244   1.17E-13  1.57E-13  2.01E-13  2.53E-13  3.13E-13  3.01E-13
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page   40
       power= 1.468E-03mw, burnup=5.3618E+03mwd, flux= 9.28E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   6.95E-17  9.78E-17  1.34E-16  1.79E-16  2.35E-16  2.35E-16
     cm246   1.74E-19  2.63E-19  3.85E-19  5.48E-19  7.60E-19  7.60E-19
     cm247   8.10E-24  1.34E-23  2.12E-23  3.25E-23  4.83E-23  4.83E-23
     cm248   3.74E-27  6.74E-27  1.16E-26  1.91E-26  3.04E-26  3.04E-26
     cm249    .00E+00  7.65E-38  1.31E-37  2.17E-37  3.45E-37   .00E+00
     cm250   5.52E-43  1.08E-42  1.99E-42  3.52E-42  6.00E-42  6.00E-42
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.28E+07  9.28E+07  9.28E+07  9.28E+07  9.27E-08
0        1q array has        20 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        3q array has         1 entries.
0        4q array has         1 entries.
0       54q array has        12 entries.
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
```

```
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        *scale-system control module sas2 library*
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *            prelim lwr origen-s binary working library--id = 1143    *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *      data from the light element, actinide, and fission product libraries *
        *        decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "prepsas2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                   fission product yields are from endf/b-v          *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *        see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                 1697    total number of nuclides in library
                   689    number of light-element nuclides
                   129    number of actinide nuclides
                   879    number of fission product nuclides
0                 7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   41
      power=    .00mw, burnup=   6702.mwd, flux= 9.23E+07n/cm**2-sec
0                                                  basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
    productions   1.227834E+06  1.228216E+06  1.228540E+06  1.228833E+06  1.229094E+06  1.229093E+06
    absorptions   9.908031E+05  9.912365E+05  9.916465E+05  9.920353E+05  9.924036E+05  9.924018E+05
    k infinity    1.239251E+00  1.239072E+00  1.238889E+00  1.238699E+00  1.238502E+00  1.238503E+00
0                 initial      ******* d    ******* d    ******* d    ******* d    ******* d
    actinide
    absorptions   9.795352E+05  9.798043E+05  9.800555E+05  9.802891E+05  9.805056E+05  9.805048E+05
    non-actinide
    abs. fracs.   1.137245E-02  1.153332E-02  1.168865E-02  1.184052E-02  1.198888E-02  1.198804E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   42
0                                  fraction of total absorption rate
      power=    .00mw, burnup=   6702.mwd, flux= 9.23E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

    sm149     5.41E-03  5.42E-03  5.43E-03  5.44E-03  5.44E-03  5.44E-03
    eu151     7.00E-04  7.37E-04  7.72E-04  8.08E-04  8.42E-04  8.42E-04
    nd143     5.33E-04  5.66E-04  5.99E-04  6.31E-04  6.63E-04  6.63E-04
```

rh103	2.49E-04	2.65E-04	2.81E-04	2.96E-04	3.12E-04	3.12E-04
xe131	1.70E-04	1.80E-04	1.91E-04	2.01E-04	2.12E-04	2.12E-04
gd155	1.74E-04	1.78E-04	1.81E-04	1.84E-04	1.86E-04	1.87E-04
cs133	1.32E-04	1.40E-04	1.48E-04	1.56E-04	1.64E-04	1.64E-04
sm147	9.76E-05	1.04E-04	1.10E-04	1.16E-04	1.22E-04	1.22E-04
tc 99	9.54E-05	1.01E-04	1.07E-04	1.13E-04	1.18E-04	1.18E-04
nd145	7.49E-05	7.95E-05	8.41E-05	8.87E-05	9.33E-05	9.33E-05
cd113	8.65E-05	8.78E-05	8.90E-05	9.00E-05	9.09E-05	9.09E-05
mo 95	5.19E-05	5.51E-05	5.83E-05	6.15E-05	6.47E-05	6.47E-05
sm152	4.64E-05	4.96E-05	5.29E-05	5.62E-05	5.95E-05	5.95E-05
gd157	4.69E-05	4.75E-05	4.81E-05	4.87E-05	4.93E-05	4.93E-05
sm150	3.23E-05	3.48E-05	3.74E-05	3.99E-05	4.25E-05	4.25E-05
kr 83	3.24E-05	3.44E-05	3.64E-05	3.84E-05	4.03E-05	4.03E-05
cs135	2.98E-05	3.16E-05	3.35E-05	3.53E-05	3.71E-05	3.71E-05
ru101	2.31E-05	2.45E-05	2.59E-05	2.74E-05	2.88E-05	2.88E-05
pr141	2.22E-05	2.36E-05	2.49E-05	2.63E-05	2.77E-05	2.77E-05
eu153	2.14E-05	2.27E-05	2.41E-05	2.55E-05	2.69E-05	2.69E-05
la139	1.82E-05	1.93E-05	2.04E-05	2.15E-05	2.26E-05	2.26E-05
sm151	1.74E-05	1.76E-05	1.76E-05	1.76E-05	1.77E-05	1.75E-05
ba137	8.68E-06	9.23E-06	9.77E-06	1.03E-05	1.08E-05	1.08E-05
pd105	8.26E-06	8.80E-06	9.35E-06	9.90E-06	1.05E-05	1.05E-05
zr 93	7.28E-06	7.73E-06	8.17E-06	8.62E-06	9.06E-06	9.06E-06
i129	5.75E-06	6.11E-06	6.48E-06	6.84E-06	7.20E-06	7.20E-06
ag109	5.27E-06	5.73E-06	6.21E-06	6.70E-06	7.20E-06	7.20E-06
nd144	5.49E-06	5.83E-06	6.17E-06	6.52E-06	6.86E-06	6.86E-06
mo 97	4.12E-06	4.37E-06	4.63E-06	4.88E-06	5.14E-06	5.14E-06
zr 91	1.92E-06	2.04E-06	2.16E-06	2.28E-06	2.39E-06	2.39E-06
gd152	1.52E-06	1.71E-06	1.90E-06	2.11E-06	2.32E-06	2.32E-06
y 89	1.84E-06	1.96E-06	2.07E-06	2.18E-06	2.29E-06	2.29E-06
ru102	1.69E-06	1.80E-06	1.91E-06	2.01E-06	2.12E-06	2.12E-06
pd108	1.44E-06	1.55E-06	1.67E-06	1.79E-06	1.92E-06	1.92E-06
ce142	1.51E-06	1.60E-06	1.70E-06	1.79E-06	1.88E-06	1.88E-06
nd148	1.45E-06	1.54E-06	1.63E-06	1.72E-06	1.81E-06	1.81E-06
nd146	1.22E-06	1.30E-06	1.37E-06	1.45E-06	1.52E-06	1.52E-06
ba138	1.04E-06	1.11E-06	1.17E-06	1.24E-06	1.30E-06	1.30E-06
in115	1.03E-06	1.10E-06	1.17E-06	1.23E-06	1.30E-06	1.30E-06
ce140	9.76E-07	1.04E-06	1.10E-06	1.16E-06	1.22E-06	1.22E-06
xe132	8.81E-07	9.36E-07	9.91E-07	1.05E-06	1.10E-06	1.10E-06
pd107	7.80E-07	8.39E-07	9.00E-07	9.62E-07	1.03E-06	1.03E-06
mo 98	6.02E-07	6.39E-07	6.77E-07	7.14E-07	7.51E-07	7.51E-07
mo100	5.84E-07	6.21E-07	6.57E-07	6.93E-07	7.29E-07	7.29E-07
xe134	5.76E-07	6.12E-07	6.48E-07	6.84E-07	7.19E-07	7.19E-07
zr 92	4.64E-07	4.93E-07	5.21E-07	5.50E-07	5.78E-07	5.78E-07
i127	3.99E-07	4.25E-07	4.51E-07	4.77E-07	5.03E-07	5.03E-07
ru104	3.73E-07	3.97E-07	4.21E-07	4.45E-07	4.69E-07	4.69E-07
zr 96	3.64E-07	3.87E-07	4.09E-07	4.31E-07	4.54E-07	4.54E-07

1 sas2h: far-field crit based on bzw 15x15, 3.80wt%, 20gwd/mtu 48% h2o/ 8% uo2 fission products page 43

0 fraction of total absorption rate

power= .00mw, burnup= 4702.mwd, flux= 9.23E+07n/cm**2-sec

0 initial ******* d ******* d ******* d ******* d ******* d

nd150	3.24E-07	3.45E-07	3.65E-07	3.85E-07	4.06E-07	4.06E-07
xe136	3.12E-07	3.31E-07	3.50E-07	3.70E-07	3.89E-07	3.89E-07
ru 99	2.48E-07	2.80E-07	3.13E-07	3.48E-07	3.86E-07	3.86E-07
br 81	2.33E-07	2.47E-07	2.62E-07	2.76E-07	2.90E-07	2.90E-07
rb 85	2.26E-07	2.40E-07	2.54E-07	2.67E-07	2.81E-07	2.81E-07
cd111	1.88E-07	2.02E-07	2.16E-07	2.30E-07	2.45E-07	2.45E-07
zr 94	1.96E-07	2.08E-07	2.20E-07	2.32E-07	2.44E-07	2.44E-07
zr 90	1.81E-07	1.92E-07	2.03E-07	2.14E-07	2.26E-07	2.26E-07
sm154	1.44E-07	1.53E-07	1.62E-07	1.72E-07	1.81E-07	1.81E-07

te130	1.43E-07	1.51E-07	1.60E-07	1.69E-07	1.78E-07	1.78E-07
rb 87	1.30E-07	1.38E-07	1.46E-07	1.54E-07	1.62E-07	1.62E-07
se 77	9.37E-08	9.95E-08	1.05E-07	1.11E-07	1.17E-07	1.17E-07
pd106	7.68E-08	8.22E-08	8.76E-08	9.31E-08	9.86E-08	9.86E-08
gd156	6.21E-08	6.73E-08	7.26E-08	7.80E-08	8.35E-08	8.35E-08
pd154	5.18E-08	5.85E-08	6.56E-08	7.31E-08	8.11E-08	8.11E-08
kr 84	6.16E-08	6.54E-08	6.92E-08	7.30E-08	7.68E-08	7.68E-08
eu152	6.29E-08	6.98E-08	7.32E-08	7.65E-08	7.98E-08	7.47E-08
pm147	7.67E-08	9.87E-08	9.86E-08	9.85E-08	9.85E-08	7.16E-08
se 79	4.77E-08	5.07E-08	5.36E-08	5.65E-08	5.94E-08	5.94E-08
sb121	4.71E-08	5.01E-08	5.31E-08	5.61E-08	5.92E-08	5.92E-08
eu155	5.27E-08	6.14E-08	6.18E-08	6.21E-08	6.24E-08	5.19E-08
sb123	3.82E-08	4.06E-08	4.31E-08	4.55E-08	4.79E-08	4.79E-08
dy161	3.32E-08	3.61E-08	3.90E-08	4.20E-08	4.50E-08	4.50E-08
kr 86	3.44E-08	3.65E-08	3.86E-08	4.07E-08	4.28E-08	4.28E-08
te128	3.16E-08	3.36E-08	3.56E-08	3.76E-08	3.96E-08	3.96E-08
ba135	2.40E-08	2.70E-08	3.03E-08	3.38E-08	3.74E-08	3.74E-08
se 80	2.24E-08	2.38E-08	2.52E-08	2.66E-08	2.79E-08	2.79E-08
te125	2.05E-08	2.18E-08	2.32E-08	2.45E-08	2.59E-08	2.59E-08
ru100	1.57E-08	1.77E-08	1.98E-08	2.20E-08	2.44E-08	2.44E-08
tb159	1.71E-08	1.84E-08	1.97E-08	2.11E-08	2.24E-08	2.24E-08
cd112	1.43E-08	1.53E-08	1.63E-08	1.73E-08	1.83E-08	1.83E-08
gd158	1.38E-08	1.48E-08	1.59E-08	1.70E-08	1.81E-08	1.81E-08
nd142	1.11E-08	1.25E-08	1.40E-08	1.56E-08	1.72E-08	1.72E-08
ba134	1.07E-08	1.20E-08	1.35E-08	1.50E-08	1.66E-08	1.66E-08
li 6	1.25E-08	1.32E-08	1.40E-08	1.47E-08	1.55E-08	1.55E-08
sm148	9.77E-09	1.10E-08	1.23E-08	1.37E-08	1.52E-08	1.52E-08
sn117	1.08E-08	1.15E-08	1.22E-08	1.29E-08	1.37E-08	1.37E-08
pd104	7.20E-09	8.12E-09	9.10E-09	1.01E-08	1.12E-08	1.12E-08
sn119	8.62E-09	9.18E-09	9.73E-09	1.03E-08	1.08E-08	1.08E-08
cd114	8.10E-09	8.71E-09	9.34E-09	9.97E-09	1.06E-08	1.06E-08
sn115	7.90E-09	8.40E-09	8.91E-09	9.42E-09	9.93E-09	9.93E-09
dy164	6.52E-09	7.15E-09	7.80E-09	8.48E-09	9.18E-09	9.18E-09
dy162	6.03E-09	6.61E-09	7.21E-09	7.83E-09	8.47E-09	8.47E-09
sr 88	6.32E-09	6.71E-09	7.09E-09	7.48E-09	7.87E-09	7.87E-09
pd110	5.97E-09	6.42E-09	6.88E-09	7.35E-09	7.83E-09	7.83E-09
nb 93	3.86E-09	4.36E-09	4.88E-09	5.44E-09	6.02E-09	6.02E-09
sr 90	5.93E-09	6.09E-09	6.08E-09	6.07E-09	6.06E-09	5.87E-09
se 82	4.31E-09	4.37E-09	4.84E-09	5.10E-09	5.37E-09	5.37E-09
sn126	3.67E-09	3.91E-09	4.15E-09	4.39E-09	4.63E-09	4.63E-09

1 sas2h: far-field crit based on bLw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 44
0 fraction of total absorption rate
0 powers= .00mw, burnup= 6702.mwd, flux= 9.23E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

se 78	3.30E-09	3.51E-09	3.72E-09	3.92E-09	4.13E-09	4.13E-09
mo 96	2.64E-09	2.96E-09	3.30E-09	3.65E-09	4.03E-09	4.03E-09
eu154	3.17E-09	3.66E-09	3.88E-09	4.10E-09	4.32E-09	3.91E-09
sn124	2.74E-09	2.92E-09	3.09E-09	3.27E-09	3.45E-09	3.45E-09
br 79	1.95E-09	2.20E-09	2.46E-09	2.74E-09	3.03E-09	3.03E-09
ba136	1.91E-09	2.08E-09	2.26E-09	2.44E-09	2.63E-09	2.63E-09
cd110	1.50E-09	1.73E-09	1.97E-09	2.23E-09	2.52E-09	2.52E-09
as 75	1.96E-09	2.08E-09	2.20E-09	2.32E-09	2.45E-09	2.45E-09
xe130	1.48E-09	1.64E-09	1.82E-09	2.00E-09	2.19E-09	2.19E-09
dy163	1.48E-09	1.63E-09	1.78E-09	1.94E-09	2.10E-09	2.10E-09
ag107	1.28E-09	1.46E-09	1.66E-09	1.86E-09	2.09E-09	2.09E-09
kr 82	1.39E-09	1.53E-09	1.67E-09	1.81E-09	1.96E-09	1.96E-09
in113	1.54E-09	1.64E-09	1.74E-09	1.84E-09	1.94E-09	1.94E-09
xe129	1.12E-09	1.27E-09	1.42E-09	1.58E-09	1.75E-09	1.75E-09
sn118	1.11E-09	1.18E-09	1.26E-09	1.33E-09	1.40E-09	1.40E-09

cs137	1.34E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.33E-09
sn122	9.49E-10	1.01E-09	1.07E-09	1.13E-09	1.19E-09	1.19E-09
cd116	9.41E-10	1.00E-09	1.06E-09	1.12E-09	1.18E-09	1.18E-09
te126	7.09E-10	7.95E-10	8.86E-10	9.81E-10	1.08E-09	1.08E-09
sn120	7.05E-10	7.50E-10	7.95E-10	8.40E-10	8.86E-10	8.86E-10
ge 73	5.45E-10	5.79E-10	6.13E-10	6.48E-10	6.82E-10	6.82E-10
cs134	2.53E-10	3.76E-10	3.98E-10	4.20E-10	4.42E-10	2.90E-10
ge 76	1.93E-10	2.05E-10	2.17E-10	2.29E-10	2.41E-10	2.41E-10
gd160	1.75E-10	1.89E-10	2.03E-10	2.18E-10	2.33E-10	2.33E-10
kr 85	1.92E-10	2.04E-10	2.04E-10	2.04E-10	2.04E-10	1.88E-10
ho165	1.13E-10	1.25E-10	1.37E-10	1.50E-10	1.66E-10	1.66E-10
dy160	5.75E-11	6.53E-11	7.36E-11	8.25E-11	9.19E-11	9.19E-11
ce144	8.85E-11	2.16E-10	2.16E-10	2.15E-10	2.15E-10	7.08E-11
xe128	4.07E-11	4.59E-11	5.14E-11	5.72E-11	6.34E-11	6.34E-11
te124	3.23E-11	3.49E-11	3.76E-11	4.04E-11	4.32E-11	4.32E-11
sr 86	2.53E-11	2.82E-11	3.11E-11	3.42E-11	3.74E-11	3.74E-11
sr 87	2.38E-11	2.54E-11	2.70E-11	2.86E-11	3.02E-11	3.02E-11
sn116	1.56E-11	1.76E-11	1.97E-11	2.20E-11	2.43E-11	2.43E-11
nb 94	1.35E-11	1.45E-11	1.55E-11	1.66E-11	1.77E-11	1.77E-11
ge 74	1.10E-11	1.16E-11	1.23E-11	1.30E-11	1.37E-11	1.37E-11
se 76	8.87E-12	9.73E-12	1.06E-11	1.15E-11	1.25E-11	1.25E-11
te122	6.51E-12	7.35E-12	8.24E-12	9.18E-12	1.02E-11	1.02E-11
ge 72	7.63E-12	8.13E-12	8.62E-12	9.12E-12	9.62E-12	9.62E-12
er166	5.84E-12	6.48E-12	7.15E-12	7.84E-12	8.57E-12	8.57E-12
y 90	5.66E-12	5.79E-12	5.78E-12	5.78E-12	5.77E-12	5.59E-12
ru106	5.97E-12	1.19E-11	1.20E-11	1.22E-11	1.23E-11	5.25E-12
sb125	4.61E-12	5.95E-12	5.98E-12	6.00E-12	6.02E-12	4.40E-12
kr 80	9.43E-13	1.08E-12	1.23E-12	1.39E-12	1.57E-12	1.57E-12
nb 95	2.35E-12	5.50E-11	5.49E-11	5.49E-11	5.48E-11	8.62E-13
zr 95	1.14E-12	5.92E-11	5.92E-11	5.91E-11	5.91E-11	4.21E-13
er167	1.93E-13	2.25E-13	2.59E-13	2.96E-13	3.36E-13	3.36E-13
y 91	4.81E-13	5.11E-11	5.11E-11	5.10E-11	5.09E-11	2.29E-13
te123	1.15E-13	1.33E-13	1.53E-13	1.75E-13	1.99E-13	1.99E-13
te127m	3.03E-13	3.00E-12	3.01E-12	3.02E-12	3.03E-12	1.72E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 45
0 fraction of total absorption rate
power= .00mw, burnup= 6702.mwd, flux= 9.23E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

cd108	2.89E-14	3.48E-14	4.15E-14	4.90E-14	5.74E-14	5.74E-14
ru103	2.14E-13	1.36E-10	1.36E-10	1.36E-10	1.36E-10	4.29E-14
ce141	2.41E-13	5.79E-10	5.79E-10	5.79E-10	5.78E-10	3.43E-14
be 9	2.41E-14	2.56E-14	2.71E-14	2.86E-14	3.01E-14	3.01E-14
sr 89	7.32E-14	1.09E-11	1.09E-11	1.09E-11	1.09E-11	2.08E-14
li 7	9.84E-15	1.05E-14	1.11E-14	1.17E-14	1.23E-14	1.23E-14
sn114	3.93E-15	4.44E-15	4.98E-15	5.56E-15	6.17E-15	6.17E-15
sb126	4.22E-15	6.22E-15	6.52E-15	6.83E-15	7.13E-15	5.32E-15
pm148m	2.97E-15	1.37E-12	1.38E-12	1.38E-12	1.38E-12	6.50E-16
sn123	5.30E-16	3.77E-15	3.77E-15	3.77E-15	3.78E-15	3.26E-16
tb160	4.87E-16	1.73E-14	1.85E-14	1.97E-14	2.09E-14	2.62E-16
cd115m	3.18E-16	9.31E-14	9.34E-14	9.37E-14	9.40E-14	7.78E-17
te129m	3.63E-16	6.77E-13	6.78E-13	6.79E-13	6.80E-13	5.54E-17
sb124	2.11E-17	1.46E-15	1.50E-15	1.53E-15	1.57E-15	8.19E-18
cd109	1.21E-18	2.24E-18	2.42E-18	2.59E-18	2.78E-18	1.40E-18
pm148	5.12E-18	4.92E-14	4.93E-14	4.93E-14	4.94E-14	1.12E-18
pr143	8.40E-18	9.60E-10	9.59E-10	9.59E-10	9.58E-10	8.30E-20
eu156	9.14E-19	1.56E-11	1.58E-11	1.59E-11	1.61E-11	1.84E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 46
power= 1.468E-03mw, burnup=6.7023E+03mwd, flux= 9.23E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
h 1	3.18E-04	3.38E-04	3.58E-04	3.78E-04	3.97E-04	3.97E-04
h 2	9.47E-07	1.01E-06	1.07E-06	1.12E-06	1.18E-06	1.18E-06
h 3	1.46E-11	1.57E-11	1.58E-11	1.60E-11	1.62E-11	1.51E-11
h 4	.00E+00	2.30E-35	2.32E-35	2.35E-35	2.37E-35	.00E+00
he 3	6.20E-09	6.53E-09	6.86E-09	7.18E-09	7.49E-09	7.49E-09
he 4	5.27E-05	5.60E-05	5.92E-05	6.25E-05	6.58E-05	6.58E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.33E-06	6.73E-06	7.12E-06	7.51E-06	7.90E-06	7.90E-06
ne 21	7.11E-10	7.96E-10	8.85E-10	9.79E-10	1.08E-09	1.08E-09
ne 22	4.16E-08	4.42E-08	4.68E-08	4.94E-08	5.20E-08	5.20E-08
ne 23	2.60E-30	2.61E-15	2.61E-15	2.61E-15	2.61E-15	2.61E-30
na 22	1.18E-11	1.56E-11	1.56E-11	1.56E-11	1.56E-11	1.11E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.66E-24	9.55E-09	9.55E-09	9.55E-09	9.55E-09	9.55E-24
na 24m	1.59E-30	1.57E-15	1.57E-15	1.57E-15	1.57E-15	1.57E-30
na 25	8.06E-40	8.98E-25	9.95E-25	1.10E-24	1.20E-24	1.20E-39
mg 24	4.57E-02	4.82E-02	5.07E-02	5.32E-02	5.56E-02	5.56E-02
mg 25	7.79E-08	8.69E-08	9.63E-08	1.06E-07	1.16E-07	1.16E-07
mg 26	9.47E-07	1.01E-06	1.06E-06	1.12E-06	1.18E-06	1.18E-06
mg 27	7.77E-28	7.79E-13	7.79E-13	7.79E-13	7.79E-13	7.79E-28
mg 28	.00E+00	5.74E-25	5.74E-25	5.74E-25	5.74E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.16E-26	7.08E-11	7.08E-11	7.08E-11	7.08E-11	7.08E-26
al 29	6.13E-38	6.87E-23	7.64E-23	8.45E-23	9.30E-23	9.30E-38
al 30	.00E+00	5.07E-33	5.97E-33	6.98E-33	8.09E-33	.00E+00
si 28	1.33E-01	1.40E-01	1.48E-01	1.55E-01	1.62E-01	1.62E-01
si 29	6.62E-07	7.42E-07	8.25E-07	9.13E-07	1.01E-06	1.01E-06
si 30	3.44E-12	4.10E-12	4.83E-12	5.64E-12	6.54E-12	6.54E-12
si 31	8.97E-40	1.06E-24	1.25E-24	1.46E-24	1.70E-24	1.70E-39
si 32	5.27E-31	6.33E-31	7.49E-31	8.78E-31	1.02E-30	1.02E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		9.23E+07	9.23E+07	9.23E+07	9.23E+07	9.23E+08

0
1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 47
power= 1.468E-03mw, burnup=6.7023E+03mwd, flux= 9.23E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	3.56E+00	3.92E+00	4.30E+00	4.70E+00	5.10E+00	5.11E+00
pb206	7.45E-03	8.61E-03	9.85E-03	1.12E-02	1.26E-02	1.26E-02
pb207	7.30E-04	8.22E-04	9.20E-04	1.02E-03	1.13E-03	1.13E-03
pb208	4.18E-05	4.71E-05	5.27E-05	5.85E-05	6.47E-05	6.47E-05
pb209	1.03E-10	1.15E-10	1.26E-10	1.38E-10	1.51E-10	1.51E-10
pb210	5.70E-05	6.15E-05	6.59E-05	7.04E-05	7.49E-05	7.49E-05
pb211	1.43E-11	1.51E-11	1.59E-11	1.67E-11	1.75E-11	1.76E-11
pb212	1.43E-11	1.51E-11	1.59E-11	1.68E-11	1.76E-11	1.76E-11
pb214	1.30E-10	1.41E-10	1.51E-10	1.61E-10	1.71E-10	1.71E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.94E-04	8.21E-04	9.62E-04	1.12E-03	1.28E-03	1.28E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.51E-08	3.78E-08	4.06E-08	4.33E-08	4.61E-08	4.61E-08
bi211	8.45E-13	8.93E-13	9.42E-13	9.91E-13	1.04E-12	1.04E-12
bi212	1.36E-12	1.43E-12	1.51E-12	1.59E-12	1.67E-12	1.67E-12
bi213	2.41E-11	2.68E-11	2.95E-11	3.23E-11	3.52E-11	3.52E-11
bi214	9.68E-11	1.04E-10	1.12E-10	1.19E-10	1.27E-10	1.27E-10
po210	9.59E-07	1.04E-06	1.12E-06	1.20E-06	1.27E-06	1.26E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

po211	9.34E-18	9.87E-18	1.04E-17	1.10E-17	1.15E-17	1.15E-17
po212	7.13E-23	7.53E-23	7.95E-23	8.36E-23	8.77E-23	8.78E-23
po213	3.63E-20	4.03E-20	4.43E-20	4.86E-20	5.29E-20	5.29E-20
po214	1.33E-17	1.44E-17	1.54E-17	1.64E-17	1.75E-17	1.75E-17
po215	1.17E-17	1.24E-17	1.31E-17	1.37E-17	1.44E-17	1.44E-17
po216	5.42E-17	5.72E-17	6.04E-17	6.35E-17	6.66E-17	6.67E-17
po218	1.51E-11	1.63E-11	1.74E-11	1.86E-11	1.98E-11	1.98E-11
rn218	3.88E-34	7.93E-29	8.37E-29	8.80E-29	9.23E-29	2.27E-35
rn219	2.61E-14	2.75E-14	2.91E-14	3.06E-14	3.21E-14	3.21E-14
rn220	2.08E-14	2.19E-14	2.31E-14	2.43E-14	2.55E-14	2.56E-14
rn222	2.68E-08	2.89E-08	3.10E-08	3.31E-08	3.52E-08	3.52E-08
rn222	4.21E-31	8.61E-26	9.08E-26	9.55E-26	1.00E-25	2.47E-32
ra223	6.50E-09	6.87E-09	7.25E-09	7.62E-09	8.00E-09	8.02E-09
ra224	1.18E-10	1.25E-10	1.32E-10	1.38E-10	1.45E-10	1.45E-10
ra225	1.13E-08	1.25E-08	1.38E-08	1.51E-08	1.64E-08	1.65E-08
ra226	4.09E-03	4.41E-03	4.73E-03	5.05E-03	5.37E-03	5.37E-03
ra228	2.14E-11	2.27E-11	2.41E-11	2.54E-11	2.68E-11	2.68E-11
ac225	7.63E-09	8.46E-09	9.32E-09	1.02E-08	1.11E-08	1.11E-08
ac227	4.51E-06	4.78E-06	5.04E-06	5.30E-06	5.56E-06	5.56E-06
ac228	2.61E-15	2.77E-15	2.94E-15	3.10E-15	3.27E-15	3.27E-15
th226	2.06E-29	4.20E-24	4.43E-24	4.66E-24	4.89E-24	1.20E-30
th227	1.05E-08	1.11E-08	1.17E-08	1.23E-08	1.29E-08	1.29E-08
th228	2.25E-08	2.38E-08	2.51E-08	2.64E-08	2.77E-08	2.77E-08
th229	2.20E-03	2.44E-03	2.68E-03	2.94E-03	3.20E-03	3.20E-03
th230	2.49E-01	2.64E-01	2.79E-01	2.94E-01	3.09E-01	3.09E-01
th231	2.92E-09	3.34E-09	3.36E-09	3.38E-09	3.40E-09	2.90E-09
th232	5.22E-02	5.55E-02	5.88E-02	6.21E-02	6.54E-02	6.55E-02
th233	1.73E-28	1.84E-13	1.95E-13	2.05E-13	2.16E-13	2.16E-28
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	6.79E-03	7.19E-03	7.58E-03	7.98E-03	8.37E-03	8.37E-03
pa232	4.21E-26	4.45E-11	4.70E-11	4.94E-11	5.19E-11	5.19E-26

1

sss2h: fer-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 48

power= 1.468E-03mw, burnup=6.7823E+03mwd, flux= 9.23E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.99E-26	4.07E-21	4.30E-21	4.52E-21	4.74E-21	1.17E-27
u231	3.58E-32	3.80E-17	4.01E-17	4.22E-17	4.43E-17	4.43E-32
u232	8.13E-07	8.69E-07	9.17E-07	9.64E-07	1.01E-06	9.99E-07
u233	1.31E-01	1.39E-01	1.47E-01	1.54E-01	1.62E-01	1.62E-01
u234	9.42E+00	9.44E+00	9.47E+00	9.49E+00	9.51E+00	9.51E+00
u235	7.06E+02	7.04E+02	7.03E+02	7.01E+02	7.00E+02	7.00E+02
u236	1.78E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02
u237	6.96E-13	1.14E-06	1.14E-06	1.14E-06	1.14E-06	9.56E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	1.33E-39	2.26E-39	3.49E-39	5.44E-39	8.62E-39	8.62E-39
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.64E-12	3.12E-12	3.11E-12	3.11E-12	3.11E-12	1.40E-12
np236m	7.40E-28	7.40E-13	7.40E-13	7.39E-13	7.39E-13	7.39E-28
np236	6.97E-07	7.38E-07	7.79E-07	8.20E-07	8.60E-07	8.60E-07
np237	4.18E+01	4.18E+01	4.17E+01	4.17E+01	4.17E+01	4.17E+01
np238	1.93E-14	5.50E-07	5.50E-07	5.49E-07	5.49E-07	2.77E-14
np239	6.38E-15	1.62E-05	1.62E-05	1.62E-05	1.62E-05	1.32E-14
np240m	1.14E-41	1.93E-41	3.15E-41	4.82E-41	7.36E-41	7.36E-41

```
     np240   4.66E-40  1.18E-15  1.18E-15  1.18E-15  1.18E-15  9.61E-40
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   3.18E-10  4.03E-10  4.03E-10  4.03E-10  4.03E-10  2.99E-10
     pu237   2.76E-16  7.74E-14  7.96E-14  8.18E-14  8.39E-14  7.60E-17
     pu238   8.27E-03  8.32E-03  8.32E-03  8.31E-03  8.31E-03  8.23E-03
     pu239   1.47E+01  1.54E+01  1.61E+01  1.68E+01  1.75E+01  1.75E+01
     pu240   1.61E-01  1.76E-01  1.92E-01  2.08E-01  2.24E-01  2.24E-01
     pu241   2.26E-05  2.60E-05  2.83E-05  3.06E-05  3.30E-05  3.10E-05
     pu242   2.26E-06  2.68E-06  3.13E-06  3.63E-06  4.16E-06  4.16E-06
     pu243   1.73E-30  2.04E-15  2.38E-15  2.76E-15  3.17E-15  3.18E-30
     pu244   6.88E-29  1.13E-28  1.81E-28  2.82E-28  4.29E-28  4.30E-28
     pu245    .00E+00  1.68E-39  2.67E-39  4.20E-39  6.34E-39   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   6.34E-35  6.99E-20  7.67E-20  8.35E-20  9.03E-20  9.04E-35
     am240   2.90E-32  3.20E-17  3.51E-17  3.82E-17  4.13E-17  4.13E-32
     am241   6.36E-04  7.02E-04  7.69E-04  8.37E-04  9.07E-04  9.07E-04
     am242m  1.04E-07  1.16E-07  1.27E-07  1.39E-07  1.50E-07  1.50E-07
     am242   1.35E-12  9.53E-12  1.84E-11  1.14E-11  1.23E-11  1.93E-12
     am243   7.29E-09  8.89E-09  1.07E-08  1.28E-08  1.50E-08  1.50E-08
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.99E-32  2.43E-17  2.92E-17  3.48E-17  4.11E-17  4.11E-32
     am245    .00E+00  5.43E-40  5.37E-40  8.50E-40  1.28E-39  1.49E-41
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   8.12E-26  2.02E-22  2.21E-22  2.41E-22  2.61E-22  1.68E-26
     cm242   5.85E-10  1.92E-09  2.11E-09  2.30E-09  2.49E-09  6.92E-10
     cm243   1.41E-14  1.59E-14  1.74E-14  1.90E-14  2.05E-14  1.99E-14
     cm244   3.01E-13  3.81E-13  4.59E-13  5.47E-13  6.45E-13  6.15E-13
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   49
       power= 1.468E-03mw, burnup=6.7023E+03mwd, flux= 9.23E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   2.35E-16  3.03E-16  3.84E-16  4.80E-16  5.92E-16  5.92E-16
     cm246   7.60E-19  1.03E-18  1.37E-18  1.79E-18  2.31E-18  2.31E-18
     cm247   4.83E-23  7.00E-23  9.91E-23  1.37E-22  1.87E-22  1.87E-22
     cm248   3.04E-26  4.70E-26  7.07E-26  1.04E-25  1.50E-25  1.50E-25
     cm249    .00E+00  5.33E-37  8.02E-37  1.18E-36  1.70E-36   .00E+00
     cm250   6.00E-42  9.86E-42  1.37E-41  2.44E-41  3.70E-41  3.70E-41
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.23E+07  9.23E+07  9.23E+07  9.23E+07  9.23E+08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number  6 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *       see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/29/1996    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   50
       power=    .00mw, burnup=   8043.mwd, flux= 9.22E+07n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     productions  1.230308E+06  1.230539E+06  1.230739E+06  1.230910E+06  1.231051E+06  1.231049E+06
     absorptions  9.935671E+05  9.939184E+05  9.942503E+05  9.945639E+05  9.948606E+05  9.948588E+05
     k infinity   1.238274E+00  1.238068E+00  1.237857E+00  1.237638E+00  1.237410E+00  1.237411E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions  9.816583E+05  9.818589E+05  9.820431E+05  9.822113E+05  9.823639E+05  9.823629E+05
     non-actinide
     abs. fracs.  1.198596E-02  1.213330E-02  1.227772E-02  1.242018E-02  1.256132E-02  1.256043E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   51
0                                  fraction of total absorption rate
       power=    .00mw, burnup=   8043.mwd, flux= 9.22E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.44E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03
     eu151      8.42E-04  8.76E-04  9.09E-04  9.41E-04  9.73E-04  9.73E-04
     nd143      6.63E-04  6.96E-04  7.28E-04  7.60E-04  7.92E-04  7.92E-04
     rh103      3.12E-04  3.28E-04  3.43E-04  3.59E-04  3.75E-04  3.75E-04
     xe131      2.12E-04  2.22E-04  2.33E-04  2.43E-04  2.54E-04  2.54E-04
     cs133      1.64E-04  1.73E-04  1.81E-04  1.89E-04  1.97E-04  1.97E-04
```

gd155	1.86E-04	1.89E-04	1.91E-04	1.93E-04	1.95E-04	1.95E-04
sm147	1.22E-04	1.28E-04	1.34E-04	1.40E-04	1.45E-04	1.46E-04
tc 99	1.18E-04	1.24E-04	1.30E-04	1.36E-04	1.41E-04	1.41E-04
nd145	9.33E-05	9.79E-05	1.02E-04	1.07E-04	1.12E-04	1.12E-04
cd113	9.09E-05	9.18E-05	9.25E-05	9.32E-05	9.39E-05	9.39E-05
mo 95	6.47E-05	6.79E-05	7.10E-05	7.42E-05	7.74E-05	7.74E-05
sm152	5.96E-05	6.29E-05	6.63E-05	6.98E-05	7.32E-05	7.32E-05
sm150	4.25E-05	4.50E-05	4.76E-05	5.01E-05	5.26E-05	5.26E-05
gd157	4.93E-05	4.99E-05	5.04E-05	5.10E-05	5.15E-05	5.15E-05
kr 83	4.03E-05	4.23E-05	4.43E-05	4.62E-05	4.82E-05	4.82E-05
cs135	3.71E-05	3.90E-05	4.08E-05	4.27E-05	4.45E-05	4.45E-05
ru101	2.88E-05	3.03E-05	3.17E-05	3.31E-05	3.46E-05	3.46E-05
pr141	2.77E-05	2.90E-05	3.04E-05	3.18E-05	3.31E-05	3.31E-05
eu153	2.69E-05	2.83E-05	2.97E-05	3.11E-05	3.25E-05	3.25E-05
la139	2.26E-05	2.38E-05	2.49E-05	2.60E-05	2.71E-05	2.71E-05
sm151	1.75E-05	1.77E-05	1.77E-05	1.78E-05	1.78E-05	1.76E-05
ba137	1.08E-05	1.14E-05	1.19E-05	1.25E-05	1.30E-05	1.30E-05
pd105	1.05E-05	1.10E-05	1.16E-05	1.21E-05	1.27E-05	1.27E-05
zr 93	9.07E-06	9.51E-06	9.95E-06	1.04E-05	1.08E-05	1.08E-05
ag109	7.20E-06	7.71E-06	8.24E-06	8.78E-06	9.33E-06	9.33E-06
i129	7.20E-06	7.56E-06	7.93E-06	8.29E-06	8.66E-06	8.66E-06
nd144	6.86E-06	7.20E-06	7.54E-06	7.88E-06	8.23E-06	8.23E-06
mo 97	5.14E-06	5.39E-06	5.65E-06	5.90E-06	6.15E-06	6.15E-06
gd152	2.32E-06	2.54E-06	2.77E-06	3.01E-06	3.26E-06	3.26E-06
zr 91	2.39E-06	2.51E-06	2.63E-06	2.75E-06	2.86E-06	2.86E-06
y 89	2.29E-06	2.40E-06	2.52E-06	2.63E-06	2.74E-06	2.74E-06
ru102	2.12E-06	2.22E-06	2.33E-06	2.43E-06	2.54E-06	2.54E-06
pd108	1.92E-06	2.04E-06	2.17E-06	2.30E-06	2.44E-06	2.44E-06
ce142	1.88E-06	1.98E-06	2.07E-06	2.16E-06	2.26E-06	2.26E-06
nd148	1.81E-06	1.90E-06	1.99E-06	2.08E-06	2.17E-06	2.17E-06
nd146	1.52E-06	1.60E-06	1.67E-06	1.75E-06	1.82E-06	1.82E-06
in115	1.30E-06	1.36E-06	1.43E-06	1.50E-06	1.56E-06	1.56E-06
ba138	1.30E-06	1.36E-06	1.43E-06	1.49E-06	1.56E-06	1.56E-06
ce140	1.22E-06	1.28E-06	1.34E-06	1.40E-06	1.46E-06	1.46E-06
xe132	1.10E-06	1.16E-06	1.21E-06	1.27E-06	1.32E-06	1.32E-06
pd107	1.03E-06	1.09E-06	1.15E-06	1.22E-06	1.29E-06	1.29E-06
mo 98	7.51E-07	7.89E-07	8.26E-07	8.63E-07	9.00E-07	9.00E-07
mo100	7.29E-07	7.66E-07	8.02E-07	8.38E-07	8.74E-07	8.74E-07
xe134	7.19E-07	7.55E-07	7.90E-07	8.26E-07	8.62E-07	8.62E-07
zr 92	5.78E-07	6.06E-07	6.35E-07	6.63E-07	6.91E-07	6.91E-07
i127	5.03E-07	5.30E-07	5.56E-07	5.83E-07	6.09E-07	6.09E-07
ru104	4.69E-07	4.93E-07	5.17E-07	5.42E-07	5.66E-07	5.66E-07
ru 99	3.86E-07	4.25E-07	4.65E-07	5.08E-07	5.53E-07	5.53E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 52

0 fraction of total absorption rate

power= .00mw, burnup= 8043.mwd, flux= 9.22E+07n/cm**2-sec

0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	4.54E-07	4.77E-07	4.99E-07	5.21E-07	5.44E-07	5.44E-07
nd150	4.06E-07	4.26E-07	4.46E-07	4.66E-07	4.87E-07	4.87E-07
xe136	3.89E-07	4.08E-07	4.28E-07	4.47E-07	4.66E-07	4.66E-07
br 81	2.90E-07	3.05E-07	3.19E-07	3.33E-07	3.48E-07	3.48E-07
rb 85	2.81E-07	2.95E-07	3.09E-07	3.22E-07	3.36E-07	3.36E-07
cd111	2.45E-07	2.59E-07	2.74E-07	2.89E-07	3.04E-07	3.04E-07
zr 94	2.44E-07	2.56E-07	2.69E-07	2.81E-07	2.93E-07	2.93E-07
zr 90	2.26E-07	2.37E-07	2.48E-07	2.59E-07	2.70E-07	2.70E-07
sm154	1.81E-07	1.90E-07	2.00E-07	2.09E-07	2.19E-07	2.19E-07
te130	1.78E-07	1.87E-07	1.96E-07	2.05E-07	2.14E-07	2.14E-07
rb 87	1.62E-07	1.70E-07	1.78E-07	1.86E-07	1.94E-07	1.94E-07
se 77	1.17E-07	1.23E-07	1.28E-07	1.34E-07	1.40E-07	1.40E-07

pd106	9.86E-08	1.04E-07	1.10E-07	1.16E-07	1.21E-07	1.21E-07
gd154	8.11E-08	8.94E-08	9.82E-08	1.07E-07	1.17E-07	1.17E-07
gd156	8.35E-08	8.91E-08	9.47E-08	1.00E-07	1.06E-07	1.06E-07
kr 84	7.68E-08	8.06E-08	8.43E-08	8.81E-08	9.19E-08	9.19E-08
eu152	7.47E-08	8.29E-08	8.61E-08	8.91E-08	9.21E-08	8.52E-08
sb121	5.92E-08	6.22E-08	6.52E-08	6.83E-08	7.13E-08	7.13E-08
se 79	5.94E-08	6.23E-08	6.52E-08	6.81E-08	7.10E-08	7.10E-08
pm147	7.16E-08	9.84E-08	9.84E-08	9.83E-08	9.83E-08	6.69E-08
dy161	4.50E-08	4.82E-08	5.13E-08	5.46E-08	5.79E-08	5.79E-08
sb123	4.79E-08	5.04E-08	5.29E-08	5.53E-08	5.78E-08	5.78E-08
ba135	3.74E-08	4.12E-08	4.52E-08	4.94E-08	5.38E-08	5.38E-08
kr 86	4.28E-08	4.49E-08	4.70E-08	4.91E-08	5.12E-08	5.12E-08
eu155	5.19E-08	6.27E-08	6.30E-08	6.33E-08	6.36E-08	5.09E-08
te128	3.96E-08	4.16E-08	4.36E-08	4.56E-08	4.76E-08	4.76E-08
ru100	2.44E-08	2.68E-08	2.94E-08	3.21E-08	3.49E-08	3.49E-08
se 80	2.79E-08	2.93E-08	3.07E-08	3.21E-08	3.35E-08	3.35E-08
te125	2.59E-08	2.72E-08	2.86E-08	2.99E-08	3.13E-08	3.13E-08
tb159	2.24E-08	2.38E-08	2.52E-08	2.66E-08	2.81E-08	2.81E-08
nd142	1.72E-08	1.90E-08	2.08E-08	2.28E-08	2.48E-08	2.48E-08
ba134	1.66E-08	1.83E-08	2.00E-08	2.19E-08	2.38E-08	2.38E-08
gd158	1.81E-08	1.92E-08	2.04E-08	2.15E-08	2.27E-08	2.27E-08
cd112	1.83E-08	1.93E-08	2.03E-08	2.13E-08	2.24E-08	2.24E-08
sm148	1.52E-08	1.67E-08	1.83E-08	2.00E-08	2.18E-08	2.18E-08
li 6	1.54E-08	1.62E-08	1.69E-08	1.77E-08	1.84E-08	1.84E-08
sn117	1.37E-08	1.44E-08	1.51E-08	1.59E-08	1.66E-08	1.66E-08
pd104	1.12E-08	1.24E-08	1.36E-08	1.49E-08	1.62E-08	1.62E-08
cd114	1.06E-08	1.12E-08	1.19E-08	1.25E-08	1.32E-08	1.32E-08
sn119	1.08E-08	1.14E-08	1.20E-08	1.25E-08	1.31E-08	1.31E-08
dy164	9.17E-09	9.89E-09	1.06E-08	1.14E-08	1.21E-08	1.21E-08
sn115	9.93E-09	1.04E-08	1.10E-08	1.15E-08	1.20E-08	1.20E-08
dy162	8.47E-09	9.13E-09	9.81E-09	1.05E-08	1.12E-08	1.12E-08
pd110	7.83E-09	8.31E-09	8.81E-09	9.31E-09	9.81E-09	9.81E-09
sr 88	7.86E-09	8.25E-09	8.63E-09	9.02E-09	9.40E-09	9.40E-09
nb 93	6.02E-09	6.63E-09	7.28E-09	7.95E-09	8.65E-09	8.65E-09
se 82	5.37E-09	5.63E-09	5.90E-09	6.16E-09	6.42E-09	6.42E-09
sr 90	5.87E-09	6.05E-09	6.04E-09	6.03E-09	6.02E-09	5.80E-09
mo 96	4.03E-09	4.42E-09	4.83E-09	5.26E-09	5.71E-09	5.71E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 53

0 fraction of total absorption rate

power= .00mw, burnup= 8043.mwd, flux= 9.22E+07n/cm**2-sec

0 initial ******* d ******* d ******* d ******* d ******* d

sn126	4.62E-09	4.86E-09	5.10E-09	5.34E-09	5.59E-09	5.59E-09
se 78	4.13E-09	4.34E-09	4.54E-09	4.75E-09	4.95E-09	4.95E-09
eu154	3.91E-09	4.35E-09	4.77E-09	5.00E-09	5.23E-09	4.63E-09
br 79	3.03E-09	3.34E-09	3.66E-09	4.00E-09	4.35E-09	4.35E-09
sn124	3.45E-09	3.63E-09	3.81E-09	3.99E-09	4.17E-09	4.17E-09
cd110	2.52E-09	2.82E-09	3.15E-09	3.50E-09	3.87E-09	3.87E-09
ba136	2.63E-09	2.83E-09	3.03E-09	3.24E-09	3.46E-09	3.46E-09
ag107	2.09E-09	2.32E-09	2.57E-09	2.83E-09	3.11E-09	3.11E-09
xe130	2.19E-09	2.39E-09	2.60E-09	2.82E-09	3.04E-09	3.04E-09
as 75	2.45E-09	2.57E-09	2.69E-09	2.81E-09	2.93E-09	2.93E-09
dy163	2.10E-09	2.27E-09	2.44E-09	2.61E-09	2.80E-09	2.80E-09
kr 82	1.96E-09	2.12E-09	2.28E-09	2.44E-09	2.61E-09	2.61E-09
xe129	1.75E-09	1.94E-09	2.12E-09	2.32E-09	2.53E-09	2.53E-09
in113	1.94E-09	2.04E-09	2.15E-09	2.25E-09	2.35E-09	2.35E-09
sn118	1.40E-09	1.47E-09	1.54E-09	1.62E-09	1.69E-09	1.69E-09
te126	1.08E-09	1.19E-09	1.30E-09	1.41E-09	1.54E-09	1.54E-09
sn122	1.19E-09	1.25E-09	1.32E-09	1.38E-09	1.44E-09	1.44E-09
cd116	1.18E-09	1.24E-09	1.30E-09	1.37E-09	1.43E-09	1.43E-09

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     cs137     1.33E-09  1.37E-09  1.37E-09  1.37E-09  1.37E-09  1.32E-09
     sn120     8.86E-10  9.31E-10  9.77E-10  1.02E-09  1.07E-09  1.07E-09
     ge 73     6.82E-10  7.17E-10  7.51E-10  7.86E-10  8.20E-10  8.20E-10
     cs134     2.90E-10  4.64E-10  4.86E-10  5.08E-10  5.30E-10  3.20E-10
     gd160     2.33E-10  2.48E-10  2.63E-10  2.79E-10  2.95E-10  2.95E-10
     ge 76     2.41E-10  2.52E-10  2.64E-10  2.76E-10  2.88E-10  2.88E-10
     ho165     1.66E-10  1.78E-10  1.92E-10  2.07E-10  2.23E-10  2.23E-10
     kr 85     1.88E-10  2.03E-10  2.03E-10  2.03E-10  2.02E-10  1.84E-10
     dy160     9.19E-11  1.02E-10  1.12E-10  1.24E-10  1.35E-10  1.35E-10
     xe128     6.34E-11  6.99E-11  7.67E-11  8.38E-11  9.13E-11  9.13E-11
     ce144     7.08E-11  2.15E-10  2.15E-10  2.14E-10  2.14E-10  2.65E-11
     te124     4.32E-11  4.61E-11  4.91E-11  5.21E-11  5.53E-11  5.53E-11
     sr 86     3.74E-11  4.08E-11  4.43E-11  4.80E-11  5.18E-11  5.18E-11
     sr 87     3.02E-11  3.18E-11  3.34E-11  3.51E-11  3.67E-11  3.67E-11
     sn116     2.43E-11  2.69E-11  2.95E-11  3.23E-11  3.51E-11  3.51E-11
     nb 94     1.77E-11  1.88E-11  2.00E-11  2.13E-11  2.25E-11  2.25E-11
     se 76     1.25E-11  1.35E-11  1.45E-11  1.56E-11  1.67E-11  1.67E-11
     ge 74     1.37E-11  1.44E-11  1.51E-11  1.58E-11  1.65E-11  1.65E-11
     te122     1.02E-11  1.12E-11  1.23E-11  1.35E-11  1.47E-11  1.47E-11
     er166     8.57E-12  9.32E-12  1.01E-11  1.09E-11  1.17E-11  1.17E-11
     ge 72     9.62E-12  1.01E-11  1.06E-11  1.11E-11  1.16E-11  1.16E-11
      y 90     5.59E-12  5.76E-12  5.75E-12  5.74E-12  5.73E-12  5.52E-12
     ru106     5.25E-12  1.24E-11  1.25E-11  1.26E-11  1.28E-11  4.59E-12
     sb125     4.40E-12  6.04E-12  6.06E-12  6.08E-12  6.10E-12  4.18E-12
     kr 80     1.57E-12  1.76E-12  1.97E-12  2.20E-12  2.45E-12  2.45E-12
     er167     3.36E-13  3.80E-13  4.27E-13  4.78E-13  5.32E-13  5.32E-13
     nb 95     8.62E-13  5.48E-11  5.47E-11  5.47E-11  5.46E-11  3.18E-13
     te123     1.99E-13  2.25E-13  2.53E-13  2.84E-13  3.17E-13  3.17E-13
     zr 95     4.21E-13  5.90E-11  5.90E-11  5.90E-11  5.89E-11  1.56E-13
     cd108     5.74E-14  6.68E-14  7.72E-14  8.86E-14  1.01E-13  1.01E-13
     te127m    1.72E-13  3.04E-12  3.06E-12  3.07E-12  3.08E-12  9.79E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   54
0                          fraction of total absorption rate
        power=      .00mw, burnup=    8043.mwd, flux= 9.22E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d

      y 91     2.29E-13  5.08E-11  5.08E-11  5.07E-11  5.06E-11  7.72E-14
     be  9     3.02E-14  3.17E-14  3.31E-14  3.46E-14  3.61E-14  3.61E-14
     li  7     1.23E-14  1.29E-14  1.35E-14  1.41E-14  1.47E-14  1.47E-14
     sn114     6.17E-15  6.81E-15  7.48E-15  8.19E-15  8.93E-15  8.93E-15
     ru103     4.29E-14  1.36E-10  1.37E-10  1.37E-10  1.37E-10  8.60E-15
     sb126     5.32E-15  7.43E-15  7.73E-15  8.03E-15  8.34E-15  6.42E-15
     sr 89     2.08E-14  1.08E-11  1.08E-11  1.08E-11  1.08E-11  5.89E-15
     ce141     3.43E-14  5.78E-10  5.77E-10  5.77E-10  5.77E-10  4.87E-15
     sn123     3.26E-16  3.78E-15  3.79E-15  3.79E-15  3.79E-15  2.00E-16
     pm148m    6.49E-16  1.39E-12  1.39E-12  1.40E-12  1.40E-12  1.42E-16
     tb160     2.62E-16  2.21E-14  2.33E-14  2.46E-14  2.59E-14  1.35E-16
     cd115m    7.78E-17  9.43E-14  9.46E-14  9.48E-14  9.51E-14  1.90E-17
     te129m    5.54E-17  6.80E-13  6.81E-13  6.82E-13  6.83E-13  8.45E-18
     sb124     8.19E-18  1.61E-15  1.65E-15  1.69E-15  1.73E-15  3.14E-18
     cd109     1.40E-18  2.98E-18  3.20E-18  3.42E-18  3.66E-18  1.61E-18
     pm148     1.11E-18  4.94E-14  4.95E-14  4.95E-14  4.96E-14  2.48E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page   55
       power= 1.468E-03mw, burnup=8.0428E+03mwd, flux= 9.22E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                        basis = single reactor assembly
            charge ******* d ******* d ******* d ******* d ******* d
      h  1   3.97E-04  4.17E-04  4.37E-04  4.57E-04  4.77E-04  4.77E-04
      h  2   1.18E-06  1.24E-06  1.30E-06  1.36E-06  1.42E-06  1.42E-06
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h 3	1.51E-11	1.64E-11	1.65E-11	1.67E-11	1.68E-11	1.55E-11
h 4	.00E+00	2.40E-35	2.42E-35	2.45E-35	2.47E-35	.00E+00
he 3	7.49E-09	7.80E-09	8.10E-09	8.40E-09	8.70E-09	8.70E-09
he 4	6.58E-05	6.91E-05	7.24E-05	7.56E-05	7.89E-05	7.89E-05
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	7.90E-06	8.30E-06	8.69E-06	9.09E-06	9.48E-06	9.48E-06
ne 21	1.08E-09	1.18E-09	1.29E-09	1.40E-09	1.51E-09	1.51E-09
ne 22	5.20E-08	5.46E-08	5.72E-08	5.98E-08	6.24E-08	6.24E-08
ne 23	2.61E-30	2.62E-15	2.62E-15	2.62E-15	2.62E-15	2.62E-30
na 22	1.11E-11	1.55E-11	1.55E-11	1.55E-11	1.55E-11	1.04E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.55E-24	9.56E-09	9.56E-09	9.56E-09	9.56E-09	9.56E-24
na 24m	1.57E-30	1.57E-15	1.57E-15	1.57E-15	1.57E-15	1.57E-30
na 25	1.20E-39	1.52E-24	1.43E-24	1.55E-24	1.68E-24	1.68E-39
mg 24	5.56E-02	5.81E-02	6.06E-02	6.31E-02	6.55E-02	6.55E-02
mg 25	1.16E-07	1.27E-07	1.38E-07	1.50E-07	1.62E-07	1.62E-07
mg 26	1.18E-06	1.24E-06	1.30E-06	1.36E-06	1.42E-06	1.42E-06
mg 27	7.79E-28	7.82E-13	7.82E-13	7.82E-13	7.82E-13	7.82E-28
mg 28	.00E+00	5.76E-25	5.76E-25	5.76E-25	5.76E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.08E-26	7.08E-11	7.08E-11	7.08E-11	7.08E-11	7.09E-26
al 29	9.30E-38	1.02E-22	1.11E-22	1.21E-22	1.31E-22	1.31E-37
al 30	.00E+00	9.32E-33	1.07E-32	1.21E-32	1.37E-32	.00E+00
si 28	1.62E-01	1.69E-01	1.76E-01	1.84E-01	1.91E-01	1.91E-01
si 29	1.01E-06	1.10E-06	1.20E-06	1.31E-06	1.42E-06	1.42E-06
si 30	6.54E-12	7.53E-12	8.60E-12	9.78E-12	1.11E-11	1.11E-11
si 31	1.70E-39	1.95E-24	2.23E-24	2.53E-24	2.86E-24	2.86E-39
si 32	1.02E-30	1.18E-30	1.35E-30	1.54E-30	1.74E-30	1.73E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		9.22E+07	9.22E+07	9.22E+07	9.22E+07	9.22E-08

sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 56
power= 1.468E-03mw, burnup=8.0428E+03mwd, flux= 9.22E+07n/cm**2-sec

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	5.11E+00	5.53E+00	5.96E+00	6.41E+00	6.87E+00	6.87E+00
pb206	1.26E-02	1.41E-02	1.57E-02	1.74E-02	1.91E-02	1.91E-02
pb207	1.13E-03	1.24E-03	1.36E-03	1.49E-03	1.61E-03	1.61E-03
pb208	6.47E-05	7.12E-05	7.79E-05	8.49E-05	9.23E-05	9.23E-05
pb209	1.51E-10	1.63E-10	1.76E-10	1.89E-10	2.03E-10	2.03E-10
pb210	7.49E-05	7.93E-05	8.37E-05	8.82E-05	9.26E-05	9.26E-05
pb211	1.76E-11	1.84E-11	1.92E-11	2.00E-11	2.08E-11	2.08E-11
pb212	1.76E-11	1.84E-11	1.92E-11	2.00E-11	2.08E-11	2.08E-11
pb214	1.71E-10	1.81E-10	1.91E-10	2.01E-10	2.12E-10	2.12E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.28E-03	1.47E-03	1.67E-03	1.88E-03	2.11E-03	2.11E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	4.61E-08	4.88E-08	5.15E-08	5.43E-08	5.70E-08	5.70E-08
bi211	1.04E-12	1.09E-12	1.14E-12	1.18E-12	1.23E-12	1.23E-12
bi212	1.67E-12	1.75E-12	1.82E-12	1.90E-12	1.98E-12	1.97E-12
bi213	3.52E-11	3.81E-11	4.11E-11	4.42E-11	4.73E-11	4.73E-11
bi214	1.27E-10	1.35E-10	1.42E-10	1.50E-10	1.57E-10	1.57E-10
po210	1.26E-06	1.35E-06	1.42E-06	1.50E-06	1.57E-06	1.56E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.15E-17	1.20E-17	1.26E-17	1.31E-17	1.36E-17	1.36E-17
po212	8.78E-23	9.17E-23	9.58E-23	9.98E-23	1.04E-22	1.04E-22
po213	5.29E-20	5.73E-20	6.18E-20	6.64E-20	7.11E-20	7.11E-20
po214	1.75E-17	1.85E-17	1.96E-17	2.06E-17	2.16E-17	2.16E-17
po215	1.44E-17	1.51E-17	1.57E-17	1.64E-17	1.71E-17	1.71E-17

po216	6.67E-17	6.97E-17	7.28E-17	7.58E-17	7.88E-17	7.88E-17
po218	1.98E-11	2.10E-11	2.21E-11	2.33E-11	2.45E-11	2.45E-11
rn218	2.27E-35	9.67E-29	1.01E-28	1.05E-28	1.09E-28	1.28E-36
rn219	3.21E-14	3.35E-14	3.50E-14	3.65E-14	3.80E-14	3.80E-14
rn220	2.56E-14	2.67E-14	2.79E-14	2.91E-14	3.02E-14	3.02E-14
rn222	3.52E-08	3.73E-08	3.93E-08	4.14E-08	4.35E-08	4.35E-08
ra222	2.47E-32	1.05E-25	1.10E-25	1.14E-25	1.19E-25	1.39E-33
ra223	8.02E-09	8.37E-09	8.74E-09	9.10E-09	9.47E-09	9.49E-09
ra224	1.45E-10	1.52E-10	1.59E-10	1.65E-10	1.72E-10	1.72E-10
ra225	1.65E-08	1.78E-08	1.92E-08	2.07E-08	2.21E-08	2.21E-08
ra226	5.37E-03	5.69E-03	6.01E-03	6.33E-03	6.64E-03	6.64E-03
ra228	2.68E-11	2.81E-11	2.95E-11	3.09E-11	3.22E-11	3.22E-11
ac225	1.11E-08	1.20E-08	1.30E-08	1.40E-08	1.49E-08	1.50E-08
ac227	5.56E-06	5.82E-06	6.08E-06	6.33E-06	6.58E-06	6.58E-06
ac228	3.27E-15	3.43E-15	3.60E-15	3.77E-15	3.93E-15	3.93E-15
th226	1.20E-30	5.12E-24	5.35E-24	5.57E-24	5.80E-24	6.79E-32
th227	1.29E-08	1.35E-08	1.41E-08	1.47E-08	1.53E-08	1.53E-08
th228	2.77E-08	2.90E-08	3.03E-08	3.16E-08	3.28E-08	3.27E-08
th229	3.20E-03	3.47E-03	3.74E-03	4.02E-03	4.30E-03	4.30E-03
th230	3.09E-01	3.26E-01	3.38E-01	3.53E-01	3.68E-01	3.68E-01
th231	2.90E-09	3.42E-09	3.44E-09	3.46E-09	3.68E-09	2.67E-09
th232	6.55E-02	6.88E-02	7.21E-02	7.54E-02	7.88E-02	7.88E-02
th233	2.16E-28	2.27E-13	2.38E-13	2.49E-13	2.61E-13	2.61E-28
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	8.37E-03	8.75E-03	9.14E-03	9.52E-03	9.90E-03	9.90E-03
pa232	5.19E-26	5.43E-11	5.67E-11	5.90E-11	6.14E-11	6.14E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57
power= 1.468E-03mw, burnup=8.0428E+03mwd, flux= 9.22E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.17E-27	4.96E-21	5.18E-21	5.40E-21	5.62E-21	6.57E-29
u231	4.43E-32	4.65E-17	4.86E-17	5.06E-17	5.27E-17	5.27E-32
u232	9.99E-07	1.06E-06	1.11E-06	1.15E-06	1.20E-06	1.18E-06
u233	1.62E-01	1.70E-01	1.77E-01	1.85E-01	1.92E-01	1.92E-01
u234	9.51E+00	9.53E+00	9.56E+00	9.58E+00	9.60E+00	9.60E+00
u235	7.00E+02	6.99E+02	6.97E+02	6.96E+02	6.95E+02	6.95E+02
u236	1.79E+02	1.80E+02	1.80E+02	1.80E+02	1.80E+02	1.80E+02
u237	9.56E-13	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.22E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	8.62E-39	1.28E-38	1.87E-38	2.68E-38	3.78E-38	3.78E-38
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.40E-12	3.12E-12	3.12E-12	3.11E-12	3.11E-12	1.19E-12
np236m	7.39E-28	7.40E-13	7.40E-13	7.40E-13	7.39E-13	7.39E-28
np236	8.60E-07	9.01E-07	9.61E-07	9.82E-07	1.02E-06	1.02E-06
np237	4.17E+01	4.17E+01	4.16E+01	4.16E+01	4.16E+01	4.16E+01
np238	2.77E-14	3.49E-07	5.49E-07	5.48E-07	5.48E-07	3.64E-14
np239	1.32E-14	1.62E-05	1.62E-05	1.62E-05	1.62E-05	2.34E-14
np240m	7.36E-41	1.09E-40	1.59E-40	2.29E-40	3.22E-40	3.22E-40
np240	9.61E-40	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.72E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.99E-10	4.04E-10	4.03E-10	4.03E-10	4.03E-10	2.83E-10
pu237	7.60E-17	8.62E-14	8.82E-14	9.02E-14	9.22E-14	2.85E-17
pu238	8.23E-03	8.31E-03	8.30E-03	8.30E-03	8.30E-03	8.20E-03

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     pu239   1.75E+01  1.82E+01  1.88E+01  1.95E+01  2.01E+01  2.01E+01
     pu240   2.24E-01  2.40E-01  2.56E-01  2.72E-01  2.89E-01  2.89E-01
     pu241   3.10E-05  3.53E-05  3.77E-05  4.01E-05  4.25E-05  3.95E-05
     pu242   4.16E-06  4.74E-06  5.36E-06  6.02E-06  6.73E-06  6.73E-06
     pu243   3.18E-30  3.61E-15  4.08E-15  4.59E-15  5.13E-15  5.15E-30
     pu244   4.30E-28  6.39E-28  9.31E-28  1.33E-27  1.88E-27  1.88E-27
     pu245    .00E+00  9.48E-39  1.38E-38  1.97E-38  2.78E-38   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   9.04E-35  9.75E-20  1.05E-19  1.12E-19  1.19E-19  1.19E-34
     am240   4.13E-32  4.46E-17  4.78E-17  5.10E-17  5.43E-17  5.43E-32
     am241   9.07E-04  9.76E-04  1.05E-03  1.12E-03  1.19E-03  1.19E-03
     am242m  1.50E-07  1.62E-07  1.74E-07  1.86E-07  1.98E-07  1.97E-07
     am242   1.93E-12  1.33E-11  1.42E-11  1.52E-11  1.62E-11  2.54E-12
     am243   1.50E-08  1.76E-08  2.04E-08  2.34E-08  2.68E-08  2.68E-08
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   4.11E-32  4.80E-17  5.56E-17  6.40E-17  7.32E-17  7.31E-32
     am245   1.49E-41  1.91E-39  2.78E-39  3.97E-39  5.59E-39  4.48E-41
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.68E-26  2.81E-22  3.01E-22  3.22E-22  3.42E-22  3.20E-27
     cm242   6.92E-10  2.68E-09  2.87E-09  3.07E-09  3.26E-09  7.81E-10
     cm243   1.99E-14  2.21E-14  2.37E-14  2.53E-14  2.69E-14  2.60E-14
     cm244   6.15E-13  7.54E-13  8.74E-13  1.01E-12  1.15E-12  1.09E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   58
       power= 1.468E-03mw, burnup=8.0428E+03mwd, flux= 9.22E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                    basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   5.92E-16  7.21E-16  8.70E-16  1.04E-15  1.23E-15  1.23E-15
     cm246   2.31E-18  2.93E-18  3.67E-18  4.55E-18  5.57E-18  5.57E-18
     cm247   1.87E-22  2.50E-22  3.31E-22  4.30E-22  5.53E-22  5.53E-22
     cm248   1.50E-25  2.11E-25  2.93E-25  4.00E-25  5.39E-25  5.39E-25
     cm249    .00E+00  2.40E-36  3.32E-36  4.54E-36  6.11E-36   .00E+00
     cm250   3.70E-41  5.48E-41  7.98E-41  1.14E-40  1.60E-40  1.60E-40
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.22E+07  9.22E+07  9.22E+07  9.22E+07  9.22E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number  7 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
```

```
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *              prelim lwr origen-s binary working library--id = 1143       *
          *            made from modified card-image origen-s libraries of scale 4.2 *
          *         data from the light element, actinide, and fission product libraries *
          *           decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
          *        neutron flux spectrum factors and cross sections were produced from *
          *       the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                          *
          *                      fission product yields are from endf/b-v            *
          *                                                                          *
          *                 photon libraries use an 18-energy-group structure        *
          *                the photon data are from the master photon data base,     *
          *                 produced to include bremsstrahlung from uo2 matrix       *
          *                                                                          *
          *          see information above this box (if present) for later updates  *
          *                                                                          *
          ****************************************************************************
          *                                                                          *
0         ****************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ****************************************************************************
1    sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   59
        power=    .00mw, burnup=   9383.mwd, flux= 9.22E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.232141E+06  1.232253E+06  1.232342E+06  1.232401E+06  1.232434E+06  1.232432E+06
     absorptions   9.958843E+05  9.961657E+05  9.964301E+05  9.966786E+05  9.969119E+05  9.969099E+05
     k infinity    1.237233E+00  1.236998E+00  1.236757E+00  1.236508E+00  1.236251E+00  1.236252E+00
0                  initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   9.833770E+05  9.835148E+05  9.836378E+05  9.837461E+05  9.838402E+05  9.838389E+05
     non-actinide
     abs. fracs.   1.255894E-02  1.269954E-02  1.283813E-02  1.297551E-02  1.311225E-02  1.311159E-02
1    sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products     page   60
0                                  fraction of total absorption rate
        power=    .00mw, burnup=   9383.mwd, flux= 9.22E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03
     eu151      9.72E-04  1.00E-03  1.03E-03  1.06E-03  1.09E-03  1.09E-03
     nd143      7.92E-04  8.24E-04  8.56E-04  8.88E-04  9.20E-04  9.20E-04
     rh103      3.75E-04  3.91E-04  4.06E-04  4.22E-04  4.38E-04  4.38E-04
     xe131      2.54E-04  2.64E-04  2.75E-04  2.85E-04  2.96E-04  2.96E-04
     cs133      1.97E-04  2.05E-04  2.13E-04  2.21E-04  2.30E-04  2.30E-04
     gd155      1.95E-04  1.97E-04  1.99E-04  2.00E-04  2.02E-04  2.02E-04
     sm147      1.46E-04  1.51E-04  1.57E-04  1.63E-04  1.69E-04  1.69E-04
     tc 99      1.41E-04  1.47E-04  1.53E-04  1.58E-04  1.64E-04  1.64E-04
     nd145      1.12E-04  1.16E-04  1.21E-04  1.25E-04  1.30E-04  1.30E-04
     cd113      9.39E-05  9.45E-05  9.50E-05  9.55E-05  9.60E-05  9.60E-05
```

mo 95	7.74E-05	8.06E-05	8.38E-05	8.69E-05	9.01E-05	9.01E-05
sm152	7.32E-05	7.67E-05	8.03E-05	8.38E-05	8.74E-05	8.74E-05
sm150	5.26E-05	5.52E-05	5.77E-05	6.03E-05	6.28E-05	6.28E-05
kr 83	4.82E-05	5.01E-05	5.21E-05	5.40E-05	5.60E-05	5.60E-05
gd157	5.15E-05	5.20E-05	5.25E-05	5.30E-05	5.35E-05	5.35E-05
cs135	4.45E-05	4.64E-05	4.82E-05	5.00E-05	5.19E-05	5.19E-05
ru101	3.46E-05	3.60E-05	3.74E-05	3.89E-05	4.03E-05	4.03E-05
pr141	3.31E-05	3.45E-05	3.59E-05	3.72E-05	3.86E-05	3.86E-05
eu153	3.25E-05	3.39E-05	3.53E-05	3.68E-05	3.82E-05	3.82E-05
la139	2.71E-05	2.82E-05	2.93E-05	3.05E-05	3.16E-05	3.16E-05
sm151	1.76E-05	1.78E-05	1.79E-05	1.79E-05	1.79E-05	1.77E-05
ba137	1.30E-05	1.35E-05	1.41E-05	1.46E-05	1.52E-05	1.52E-05
pd105	1.27E-05	1.33E-05	1.38E-05	1.44E-05	1.50E-05	1.50E-05
zr 93	1.08E-05	1.13E-05	1.17E-05	1.22E-05	1.26E-05	1.26E-05
ag109	9.33E-06	9.89E-06	1.05E-05	1.10E-05	1.16E-05	1.16E-05
i129	8.65E-06	9.02E-06	9.39E-06	9.75E-06	1.01E-05	1.01E-05
nd144	8.22E-06	8.57E-06	8.91E-06	9.25E-06	9.60E-06	9.60E-06
mo 97	6.15E-06	6.41E-06	6.66E-06	6.91E-06	7.17E-06	7.17E-06
gd152	3.26E-06	3.51E-06	3.77E-06	4.05E-06	4.32E-06	4.32E-06
zr 91	2.86E-06	2.98E-06	3.10E-06	3.21E-06	3.33E-06	3.33E-06
y 89	2.74E-06	2.85E-06	2.96E-06	3.07E-06	3.19E-06	3.19E-06
pd108	2.44E-06	2.57E-06	2.71E-06	2.85E-06	2.99E-06	2.99E-06
ru102	2.54E-06	2.65E-06	2.75E-06	2.86E-06	2.96E-06	2.96E-06
ce142	2.26E-06	2.35E-06	2.44E-06	2.54E-06	2.63E-06	2.63E-06
nd148	2.17E-06	2.26E-06	2.35E-06	2.44E-06	2.53E-06	2.53E-06
nd146	1.82E-06	1.90E-06	1.97E-06	2.05E-06	2.13E-06	2.13E-06
in115	1.56E-06	1.63E-06	1.70E-06	1.77E-06	1.83E-06	1.83E-06
ba138	1.56E-06	1.62E-06	1.69E-06	1.75E-06	1.81E-06	1.81E-06
ce140	1.46E-06	1.52E-06	1.58E-06	1.64E-06	1.70E-06	1.70E-06
pd107	1.29E-06	1.36E-06	1.42E-06	1.49E-06	1.57E-06	1.57E-06
xe132	1.32E-06	1.38E-06	1.43E-06	1.49E-06	1.54E-06	1.54E-06
mo 98	9.01E-07	9.38E-07	9.75E-07	1.01E-06	1.05E-06	1.05E-06
mo100	8.74E-07	9.11E-07	9.47E-07	9.83E-07	1.02E-06	1.02E-06
xe134	8.61E-07	8.97E-07	9.33E-07	9.68E-07	1.00E-06	1.00E-06
zr 92	6.91E-07	7.19E-07	7.47E-07	7.76E-07	8.04E-07	8.04E-07
ru 99	5.53E-07	5.99E-07	6.47E-07	6.97E-07	7.49E-07	7.49E-07
i127	6.09E-07	6.36E-07	6.63E-07	6.90E-07	7.17E-07	7.17E-07
ru104	5.66E-07	5.91E-07	6.15E-07	6.40E-07	6.64E-07	6.64E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 61
0 fraction of total absorption rate
0 power= .00mw, burnup= 9383.mwd, flux= 9.22E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d
zr 96	5.44E-07	5.66E-07	5.89E-07	6.11E-07	6.33E-07	6.33E-07
nd150	4.87E-07	5.07E-07	5.27E-07	5.48E-07	5.68E-07	5.68E-07
xe136	4.66E-07	4.86E-07	5.05E-07	5.24E-07	5.43E-07	5.43E-07
br 81	3.48E-07	3.62E-07	3.76E-07	3.91E-07	4.05E-07	4.05E-07
rb 85	3.36E-07	3.50E-07	3.64E-07	3.77E-07	3.91E-07	3.91E-07
cd111	3.04E-07	3.19E-07	3.35E-07	3.51E-07	3.66E-07	3.66E-07
zr 94	2.93E-07	3.05E-07	3.17E-07	3.29E-07	3.41E-07	3.41E-07
zr 90	2.70E-07	2.81E-07	2.92E-07	3.03E-07	3.14E-07	3.14E-07
sm154	2.19E-07	2.28E-07	2.38E-07	2.47E-07	2.57E-07	2.57E-07
te130	2.14E-07	2.23E-07	2.31E-07	2.40E-07	2.49E-07	2.49E-07
rb 87	1.94E-07	2.02E-07	2.10E-07	2.18E-07	2.25E-07	2.25E-07
se 77	1.40E-07	1.46E-07	1.51E-07	1.57E-07	1.63E-07	1.63E-07
gd154	1.17E-07	1.27E-07	1.38E-07	1.49E-07	1.60E-07	1.60E-07
pd106	1.21E-07	1.27E-07	1.33E-07	1.39E-07	1.45E-07	1.45E-07
gd156	1.06E-07	1.12E-07	1.18E-07	1.24E-07	1.29E-07	1.29E-07
kr 84	9.19E-08	9.57E-08	9.94E-08	1.03E-07	1.07E-07	1.07E-07
eu152	8.52E-08	9.51E-08	9.80E-08	1.01E-07	1.04E-07	9.46E-08

sb121	7.13E-08	7.44E-08	7.75E-08	8.06E-08	8.36E-08	8.36E-08
se 79	7.10E-08	7.39E-08	7.68E-08	7.97E-08	8.26E-08	8.26E-08
ba135	5.38E-08	5.83E-08	6.31E-08	6.80E-08	7.31E-08	7.31E-08
dy161	5.79E-08	6.13E-08	6.48E-08	6.83E-08	7.18E-08	7.18E-08
sb123	5.78E-08	6.03E-08	6.28E-08	6.52E-08	6.77E-08	6.77E-08
pm147	6.69E-08	9.82E-08	9.82E-08	9.81E-08	9.81E-08	6.25E-08
kr 86	5.12E-08	5.33E-08	5.53E-08	5.76E-08	5.95E-08	5.95E-08
te128	4.76E-08	4.96E-08	5.16E-08	5.37E-08	5.57E-08	5.57E-08
eu155	5.09E-08	6.39E-08	6.42E-08	6.45E-08	6.47E-08	4.99E-08
ru100	3.49E-08	3.78E-08	4.08E-08	4.40E-08	4.73E-08	4.73E-08
se 80	3.34E-08	3.48E-08	3.62E-08	3.76E-08	3.90E-08	3.90E-08
te125	3.13E-08	3.26E-08	3.40E-08	3.54E-08	3.68E-08	3.68E-08
tb159	2.81E-08	2.95E-08	3.10E-08	3.25E-08	3.40E-08	3.40E-08
nd142	2.48E-08	2.68E-08	2.90E-08	3.13E-08	3.36E-08	3.36E-08
ba134	2.38E-08	2.58E-08	2.79E-08	3.01E-08	3.23E-08	3.23E-08
sm148	2.18E-08	2.36E-08	2.55E-08	2.75E-08	2.96E-08	2.96E-08
gd158	2.27E-08	2.38E-08	2.50E-08	2.62E-08	2.74E-08	2.74E-08
cd112	2.24E-08	2.34E-08	2.45E-08	2.55E-08	2.66E-08	2.66E-08
pd104	1.62E-08	1.76E-08	1.90E-08	2.05E-08	2.20E-08	2.20E-08
li 6	1.84E-08	1.91E-08	1.98E-08	2.06E-08	2.13E-08	2.13E-08
sn117	1.66E-08	1.73E-08	1.81E-08	1.88E-08	1.96E-08	1.96E-08
cd114	1.32E-08	1.39E-08	1.45E-08	1.52E-08	1.58E-08	1.58E-08
dy164	1.21E-08	1.29E-08	1.37E-08	1.45E-08	1.54E-08	1.54E-08
sn119	1.31E-08	1.37E-08	1.42E-08	1.48E-08	1.54E-08	1.54E-08
dy162	1.12E-08	1.20E-08	1.27E-08	1.35E-08	1.43E-08	1.43E-08
sn115	1.20E-08	1.25E-08	1.30E-08	1.35E-08	1.41E-08	1.41E-08
pd110	9.81E-09	1.03E-08	1.08E-08	1.14E-08	1.19E-08	1.19E-08
nb 93	8.65E-09	9.38E-09	1.01E-08	1.09E-08	1.17E-08	1.17E-08
sr 88	9.40E-09	9.78E-09	1.02E-08	1.05E-08	1.09E-08	1.09E-08
mo 96	5.71E-09	6.17E-09	6.65E-09	7.16E-09	7.68E-09	7.68E-09
se 82	6.42E-09	6.69E-09	6.95E-09	7.21E-09	7.47E-09	7.47E-09
sn126	5.58E-09	5.83E-09	6.07E-09	6.31E-09	6.55E-09	6.55E-09

1 sas2h: far-field crit based on b&w 15x15 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
0 fraction of total absorption rate
0 powers .00mw, burnup= 9383.mwd, flux= 9.22E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d
br 79	4.35E-09	4.72E-09	5.10E-09	5.50E-09	5.91E-09	5.91E-09
se 78	4.95E-09	5.16E-09	5.37E-09	5.57E-09	5.78E-09	5.78E-09
sr 90	5.80E-09	6.01E-09	6.00E-09	6.00E-09	5.99E-09	5.74E-09
cd110	3.87E-09	4.26E-09	4.68E-09	5.12E-09	5.59E-09	5.59E-09
eu154	4.63E-09	5.45E-09	5.68E-09	5.91E-09	6.14E-09	5.34E-09
sn124	4.17E-09	4.35E-09	4.53E-09	4.72E-09	4.90E-09	4.90E-09
ag107	3.11E-09	3.41E-09	3.72E-09	4.04E-09	4.38E-09	4.38E-09
ba136	3.46E-09	3.68E-09	3.90E-09	4.14E-09	4.37E-09	4.37E-09
xe130	3.04E-09	3.27E-09	3.51E-09	3.76E-09	4.02E-09	4.02E-09
dy163	2.80E-09	2.98E-09	3.17E-09	3.37E-09	3.57E-09	3.57E-09
xe129	2.53E-09	2.75E-09	2.97E-09	3.20E-09	3.45E-09	3.45E-09
as 75	2.93E-09	3.05E-09	3.17E-09	3.30E-09	3.42E-09	3.42E-09
kr 82	2.61E-09	2.78E-09	2.96E-09	3.14E-09	3.33E-09	3.33E-09
in113	2.35E-09	2.45E-09	2.56E-09	2.66E-09	2.77E-09	2.77E-09
te126	1.54E-09	1.66E-09	1.79E-09	1.93E-09	2.07E-09	2.07E-09
sn118	1.69E-09	1.76E-09	1.84E-09	1.91E-09	1.98E-09	1.98E-09
sn122	1.44E-09	1.50E-09	1.57E-09	1.63E-09	1.69E-09	1.69E-09
cd116	1.43E-09	1.49E-09	1.55E-09	1.61E-09	1.67E-09	1.67E-09
cs137	1.32E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.31E-09
sn120	1.07E-09	1.11E-09	1.16E-09	1.21E-09	1.25E-09	1.25E-09
ge 73	8.20E-10	8.55E-10	8.90E-10	9.24E-10	9.59E-10	9.59E-10
gd160	2.95E-10	3.11E-10	3.27E-10	3.44E-10	3.61E-10	3.61E-10
cs134	3.20E-10	5.52E-10	5.73E-10	5.95E-10	6.17E-10	3.43E-10

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     ge 76      2.88E-10  3.00E-10  3.12E-10  3.23E-10  3.35E-10  3.35E-10
     ho165      2.23E-10  2.39E-10  2.35E-10  2.72E-10  2.90E-10  2.90E-10
     dy160      1.35E-10  1.48E-10  1.60E-10  1.74E-10  1.88E-10  1.88E-10
     kr 85      1.84E-10  2.02E-10  2.02E-10  2.02E-10  2.02E-10  1.80E-10
     xe128      9.13E-11  9.91E-11  1.07E-10  1.16E-10  1.25E-10  1.25E-10
     te124      5.53E-11  5.84E-11  6.17E-11  6.50E-11  6.84E-11  6.84E-11
     sr 86      5.18E-11  5.57E-11  5.98E-11  6.40E-11  6.84E-11  6.84E-11
     sn116      3.51E-11  3.82E-11  4.13E-11  4.46E-11  4.80E-11  4.80E-11
     ce144      5.65E-11  2.14E-10  2.14E-10  2.14E-10  2.14E-10  4.51E-11
     sr 87      3.67E-11  3.84E-11  4.00E-11  4.17E-11  4.34E-11  4.34E-11
     nb 94      2.25E-11  2.39E-11  2.52E-11  2.66E-11  2.81E-11  2.81E-11
     se 76      1.67E-11  1.78E-11  1.90E-11  2.02E-11  2.15E-11  2.15E-11
     te122      1.47E-11  1.59E-11  1.72E-11  1.86E-11  2.00E-11  2.00E-11
     ge 74      1.65E-11  1.72E-11  1.79E-11  1.85E-11  1.92E-11  1.92E-11
     er166      1.17E-11  1.26E-11  1.35E-11  1.44E-11  1.53E-11  1.53E-11
     se 72      1.16E-11  1.21E-11  1.27E-11  1.32E-11  1.37E-11  1.37E-11
      y 90      5.52E-12  5.72E-12  5.71E-12  5.71E-12  5.70E-12  5.46E-12
     ru106      4.59E-12  1.29E-11  1.30E-11  1.31E-11  1.32E-11  4.00E-12
     sb125      4.18E-12  6.12E-12  6.14E-12  6.16E-12  6.18E-12  3.97E-12
     kr 80      2.45E-12  2.71E-12  2.99E-12  3.29E-12  3.62E-12  3.62E-12
     er167      5.32E-13  5.89E-13  6.51E-13  7.16E-13  7.86E-13  7.86E-13
     te123      3.17E-13  3.53E-13  3.91E-13  4.32E-13  4.76E-13  4.76E-13
     cd108      1.01E-13  1.15E-13  1.30E-13  1.46E-13  1.64E-13  1.64E-13
     nb 95      3.18E-13  5.46E-11  5.46E-11  5.45E-11  5.45E-11  1.18E-13
     zr 95      1.56E-13  5.89E-11  5.88E-11  5.88E-11  5.88E-11  5.78E-14
     te127m     9.79E-14  3.09E-12  3.10E-12  3.11E-12  3.12E-12  5.55E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page   63
0                                  fraction of total absorption rate
         power=     .00mw, burnup=    9383.mwd, flux= 9.22E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     be  9      3.62E-14  3.77E-14  3.91E-14  4.06E-14  4.21E-14  4.21E-14
      y 91      7.72E-14  5.05E-11  5.05E-11  5.04E-11  5.04E-11  2.60E-14
     Li  7      1.47E-14  1.53E-14  1.59E-14  1.65E-14  1.71E-14  1.71E-14
     sn114      8.92E-15  9.70E-15  1.05E-14  1.13E-14  1.22E-14  1.22E-14
     sb126      6.42E-15  8.64E-15  8.94E-15  9.24E-15  9.54E-15  7.54E-15
     ru103      8.60E-15  1.37E-10  1.37E-10  1.38E-10  1.38E-10  1.72E-15
     sr 89      5.89E-15  1.08E-11  1.08E-11  1.08E-11  1.07E-11  1.67E-15
     ce141      4.87E-15  5.76E-10  5.76E-10  5.76E-10  5.76E-10  6.91E-16
     sn123      2.00E-16  3.80E-15  3.80E-15  3.80E-15  3.81E-15  1.23E-16
     tb160      1.35E-16  2.72E-14  2.85E-14  2.98E-14  3.11E-14  6.77E-17
     pm148m     1.42E-16  1.41E-12  1.41E-12  1.41E-12  1.42E-12  3.09E-17
     cd115m     1.90E-17  9.54E-14  9.56E-14  9.59E-14  9.61E-14  4.64E-18
     cd109      1.61E-18  3.92E-18  4.19E-18  4.47E-18  4.79E-18  1.84E-18
     te129m     8.44E-18  6.84E-13  6.84E-13  6.85E-13  6.86E-13  1.29E-18
     sb124      3.16E-18  1.77E-15  1.81E-15  1.85E-15  1.88E-15  1.19E-18
     pm148      2.48E-19  4.97E-14  4.97E-14  4.98E-14  4.98E-14  5.51E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page   64
       power= 1.468E-03mw, burnup=9.3832E+03mwd, flux= 9.22E+07n/cm**2-sec
0                                     nuclide concentrations, gram atoms
                                        basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1    4.77E-04  4.96E-04  5.16E-04  5.36E-04  5.56E-04  5.56E-04
      h  2    1.42E-06  1.48E-06  1.54E-06  1.60E-06  1.66E-06  1.66E-06
      h  3    1.35E-11  1.70E-11  1.72E-11  1.73E-11  1.75E-11  1.58E-11
      h  4     .00E+00  2.50E-35  2.92E-35  2.54E-35  2.56E-35   .00E+00
     he  3    8.70E-09  8.99E-09  9.27E-09  9.55E-09  9.83E-09  9.83E-09
     he  4    7.89E-05  8.22E-05  8.55E-05  8.88E-05  9.21E-05  9.21E-05
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
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ne 20	9.48E-06	9.88E-06	1.03E-05	1.07E-05	1.11E-05	1.11E-05
ne 21	1.51E-09	1.63E-09	1.76E-09	1.89E-09	2.02E-09	2.02E-09
ne 22	6.24E-08	6.50E-08	6.76E-08	7.02E-08	7.28E-08	7.28E-08
ne 23	2.62E-30	2.63E-15	2.63E-15	2.63E-15	2.63E-15	2.63E-30
na 22	1.04E-11	1.56E-11	1.56E-11	1.56E-11	1.56E-11	9.76E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.56E-24	9.56E-09	9.56E-09	9.56E-09	9.56E-09	9.57E-24
na 24m	1.57E-30	1.57E-15	1.57E-15	1.57E-15	1.57E-15	1.57E-30
na 25	1.68E-39	1.81E-24	1.94E-24	2.08E-24	2.23E-24	2.23E-39
mg 24	6.55E-02	6.80E-02	7.05E-02	7.30E-02	7.55E-02	7.55E-02
mg 25	1.62E-07	1.75E-07	1.88E-07	2.01E-07	2.15E-07	2.15E-07
mg 26	1.42E-06	1.48E-06	1.54E-06	1.60E-06	1.65E-06	1.65E-06
mg 27	7.82E-28	7.84E-13	7.84E-13	7.84E-13	7.84E-13	7.84E-28
mg 28	.00E+00	5.77E-25	5.78E-25	5.78E-25	5.78E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.09E-26	7.09E-11	7.09E-11	7.09E-11	7.09E-11	7.09E-26
al 29	1.31E-37	1.42E-22	1.53E-22	1.64E-22	1.76E-22	1.76E-37
al 30	.00E+00	1.54E-32	1.72E-32	1.92E-32	2.14E-32	.00E+00
si 28	1.91E-01	1.98E-01	2.05E-01	2.12E-01	2.20E-01	2.20E-01
si 29	1.42E-06	1.53E-06	1.65E-06	1.77E-06	1.89E-06	1.89E-06
si 30	1.11E-11	1.24E-11	1.39E-11	1.55E-11	1.72E-11	1.72E-11
si 31	2.86E-39	3.22E-24	3.61E-24	4.02E-24	4.47E-24	4.47E-39
si 32	1.73E-30	1.96E-30	2.20E-30	2.46E-30	2.73E-30	2.72E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		9.21E+07	9.22E+07	9.22E+07	9.22E+07	9.22E-08

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 65

power= 1.468E-03mw, burnup=9.3832E+03mwd, flux= 9.22E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	6.87E+00	7.35E+00	7.84E+00	8.34E+00	8.85E+00	8.85E+00
pb206	1.91E-02	2.10E-02	2.29E-02	2.50E-02	2.71E-02	2.71E-02
pb207	1.61E-03	1.75E-03	1.89E-03	2.03E-03	2.18E-03	2.18E-03
pb208	9.23E-05	9.99E-05	1.08E-04	1.16E-04	1.24E-04	1.24E-04
pb209	2.03E-10	2.16E-10	2.30E-10	2.44E-10	2.58E-10	2.58E-10
pb210	9.26E-05	9.70E-05	1.01E-04	1.06E-04	1.10E-04	1.10E-04
pb211	2.08E-11	2.16E-11	2.23E-11	2.31E-11	2.39E-11	2.40E-11
pb212	2.08E-11	2.16E-11	2.24E-11	2.32E-11	2.40E-11	2.39E-11
pb214	2.12E-10	2.22E-10	2.32E-10	2.42E-10	2.52E-10	2.52E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.11E-03	2.35E-03	2.61E-03	2.89E-03	3.18E-03	3.18E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	5.70E-08	5.97E-08	6.24E-08	6.51E-08	6.77E-08	6.78E-08
bi211	1.23E-12	1.28E-12	1.32E-12	1.37E-12	1.42E-12	1.42E-12
bi212	1.97E-12	2.05E-12	2.13E-12	2.20E-12	2.27E-12	2.27E-12
bi213	4.73E-11	5.05E-11	5.37E-11	5.70E-11	6.03E-11	6.03E-11
bi214	1.57E-10	1.65E-10	1.72E-10	1.79E-10	1.87E-10	1.87E-10
po210	1.56E-06	1.65E-06	1.72E-06	1.80E-06	1.87E-06	1.85E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.36E-17	1.41E-17	1.46E-17	1.51E-17	1.57E-17	1.57E-17
po212	1.04E-22	1.08E-22	1.12E-22	1.16E-22	1.20E-22	1.19E-22
po213	7.11E-20	7.59E-20	8.08E-20	8.57E-20	9.06E-20	9.07E-20
po214	2.14E-17	2.26E-17	2.37E-17	2.47E-17	2.57E-17	2.57E-17
po215	1.71E-17	1.77E-17	1.84E-17	1.90E-17	1.96E-17	1.97E-17
po216	7.88E-17	8.19E-17	8.49E-17	8.78E-17	9.08E-17	9.06E-17
po218	2.45E-11	2.56E-11	2.68E-11	2.80E-11	2.91E-11	2.91E-11
rn218	1.28E-36	1.14E-28	1.18E-28	1.22E-28	1.26E-28	7.02E-38
rn219	3.80E-14	3.94E-14	4.08E-14	4.23E-14	4.37E-14	4.38E-14
rn220	3.02E-14	3.14E-14	3.25E-14	3.37E-14	3.48E-14	3.48E-14

rn222	4.35E-08	4.55E-08	4.76E-08	4.97E-08	5.17E-08	5.17E-08
ra222	1.39E-33	1.23E-25	1.28E-25	1.33E-25	1.37E-25	7.63E-35
ra223	9.49E-09	9.83E-09	1.02E-08	1.05E-08	1.09E-08	1.09E-08
ra224	1.72E-10	1.79E-10	1.85E-10	1.92E-10	1.98E-10	1.98E-10
ra225	2.21E-08	2.36E-08	2.51E-08	2.67E-08	2.82E-08	2.82E-08
ra226	6.64E-03	6.96E-03	7.27E-03	7.59E-03	7.90E-03	7.90E-03
ra228	3.22E-11	3.36E-11	3.50E-11	3.63E-11	3.77E-11	3.77E-11
ac225	1.50E-08	1.60E-08	1.70E-08	1.80E-08	1.90E-08	1.91E-08
ac227	6.58E-06	6.84E-06	7.09E-06	7.33E-06	7.58E-06	7.58E-06
ac228	3.93E-15	4.10E-15	4.27E-15	4.43E-15	4.60E-15	4.60E-15
th226	6.79E-32	6.02E-24	6.25E-24	6.47E-24	6.68E-24	3.72E-33
th227	1.53E-08	1.59E-08	1.64E-08	1.70E-08	1.76E-08	1.76E-08
th228	3.27E-08	3.41E-08	3.53E-08	3.66E-08	3.78E-08	3.76E-08
th229	4.30E-03	4.59E-03	4.89E-03	5.18E-03	5.48E-03	5.48E-03
th230	3.68E-01	3.83E-01	3.97E-01	4.12E-01	4.27E-01	4.27E-01
th231	2.87E-09	3.50E-09	3.52E-09	3.53E-09	3.55E-09	2.85E-09
th232	7.88E-02	8.21E-02	8.54E-02	8.88E-02	9.21E-02	9.22E-02
th233	2.61E-28	2.72E-13	2.83E-13	2.94E-13	3.05E-13	3.05E-28
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	9.90E-03	1.03E-02	1.07E-02	1.10E-02	1.14E-02	1.14E-02
pa232	6.14E-26	6.38E-11	6.61E-11	6.84E-11	7.07E-11	7.07E-26

1

sas2h: far-ffield crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 66
power= 1.468E-03mw, burnup=9.3832E+03mwd, flux= 9.22E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
pa233	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.43E-06	1.43E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.57E-29	5.84E-21	6.05E-21	6.27E-21	6.48E-21	3.60E-30
u231	5.27E-32	5.48E-17	5.69E-17	5.89E-17	6.10E-17	6.10E-32
u232	1.18E-06	1.24E-06	1.29E-06	1.33E-06	1.38E-06	1.36E-06
u233	1.92E-01	2.00E-01	2.07E-01	2.15E-01	2.22E-01	2.22E-01
u234	9.60E+00	9.62E+00	9.64E+00	9.67E+00	9.69E+00	9.69E+00
u235	6.95E+02	6.94E+02	6.92E+02	6.91E+02	6.90E+02	6.90E+02
u236	1.80E+02	1.81E+02	1.81E+02	1.81E+02	1.81E+02	1.81E+02
u237	1.22E-12	1.15E-06	1.15E-06	1.16E-06	1.16E-06	1.47E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	3.78E-38	5.23E-38	7.17E-38	9.69E-38	1.29E-37	1.30E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.19E-12	3.12E-12	3.12E-12	3.12E-12	3.11E-12	1.02E-12
np236m	7.39E-28	7.41E-13	7.40E-13	7.40E-13	7.40E-13	7.40E-28
np236	1.02E-06	1.06E-06	1.10E-06	1.14E-06	1.18E-06	1.18E-06
np237	4.16E+01	4.16E+01	4.16E+01	4.15E+01	4.15E+01	4.15E+01
np238	3.64E-14	5.48E-07	5.48E-07	5.48E-07	5.47E-07	4.52E-14
np239	2.34E-14	1.62E-05	1.62E-05	1.62E-05	1.62E-05	3.77E-14
np240m	3.22E-40	4.47E-40	6.12E-40	8.27E-40	1.10E-39	1.11E-39
np240	1.72E-39	1.19E-15	1.19E-15	1.19E-15	1.19E-15	2.78E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.83E-10	4.04E-10	4.04E-10	4.04E-10	4.04E-10	2.67E-10
pu237	2.05E-17	9.43E-14	9.61E-14	9.80E-14	9.97E-14	5.47E-18
pu238	8.20E-03	8.29E-03	8.29E-03	8.29E-03	8.28E-03	8.17E-03
pu239	2.01E+01	2.07E+01	2.13E+01	2.19E+01	2.24E+01	2.24E+01
pu240	2.89E-01	3.05E-01	3.21E-01	3.37E-01	3.53E-01	3.53E-01
pu241	3.95E-05	4.49E-05	4.72E-05	4.96E-05	5.20E-05	4.78E-05
pu242	6.73E-06	7.48E-06	8.27E-06	9.10E-06	9.98E-06	9.98E-06
pu243	5.15E-30	5.70E-15	6.30E-15	6.94E-15	7.61E-15	7.66E-30

```
     pu244   1.88E-27  2.61E-27  3.57E-27  4.83E-27  6.45E-27  6.45E-27
     pu245    .00E+00  3.86E-38  5.28E-38  7.14E-38  9.54E-38   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.19E-34  1.26E-19  1.33E-19  1.40E-19  1.47E-19  1.47E-34
     am240   5.43E-32  5.76E-17  6.08E-17  6.41E-17  6.73E-17  6.73E-32
     am241   1.19E-03  1.26E-03  1.33E-03  1.40E-03  1.47E-03  1.47E-03
     am242m  1.97E-07  2.10E-07  2.22E-07  2.34E-07  2.46E-07  2.44E-07
     am242   2.54E-12  1.71E-11  1.81E-11  1.90E-11  2.00E-11  3.15E-12
     am243   2.68E-08  3.04E-08  3.43E-08  3.86E-08  4.31E-08  4.31E-08
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   7.31E-32  8.31E-17  9.38E-17  1.05E-16  1.18E-16  1.18E-31
     am245   4.48E-41  7.76E-39  1.06E-38  1.43E-38  1.91E-38  1.19E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   3.20E-27  3.63E-22  3.84E-22  4.05E-22  4.25E-22  5.76E-28
     cm242   7.81E-10  3.45E-09  3.65E-09  3.84E-09  4.04E-09  8.62E-10
     cm243   2.60E-14  2.83E-14  3.01E-14  3.18E-14  3.34E-14  3.20E-14
     cm244   1.09E-12  1.31E-12  1.47E-12  1.66E-12  1.85E-12  1.73E-12
!
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page   67
       power= 1.468E-03mw, burnup=9.3832E+03mwd, flux= 9.22E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.23E-15  1.45E-15  1.69E-15  1.96E-15  2.26E-15  2.26E-15
     cm246   5.57E-18  6.77E-18  8.15E-18  9.73E-18  1.15E-17  1.15E-17
     cm247   5.53E-22  7.03E-22  8.84E-22  1.10E-21  1.36E-21  1.36E-21
     cm248   5.39E-25  7.15E-25  9.39E-25  1.22E-24  1.57E-24  1.57E-24
     cm249    .00E+00  8.13E-36  1.07E-35  1.38E-35  1.78E-35   .00E+00
     cm250   1.60E-40  2.22E-40  3.03E-40  4.08E-40  5.44E-40  5.44E-40
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.21E+07  9.22E+07  9.22E+07  9.22E+07  9.22E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

          cross-section data taken from position number  8 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi       *
          *                                                                               *
          *      neutron flux spectrum factors and cross sections were produced from      *
          *     the "prasas2" case updating all nuclides on the scale "burnup" library    *
          *                                                                               *
          *                    fission product yields are from endf/b-v                   *
          *                                                                               *
          *              photon libraries use an 18-energy-group structure                *
          *             the photon data are from the master photon data base,             *
          *              produced to include bremsstrahlung from uo2 matrix               *
          *                                                                               *
          *        see information above this box (if present) for later updates          *
          *********************************************************************************
          *                                                                               *
          *********************************************************************************
0                .other identification and sizes of library.
0                  data set name:  ft33f001
0              8/29/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   68
        power=    .00mw, burnup=  10724.mwd, flux= 9.22E+07n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.233181E+06   1.233189E+06   1.233173E+06   1.233132E+06   1.233067E+06   1.233064E+06
     absorptions   9.976366E+05   9.978565E+05   9.980606E+05   9.982511E+05   9.984277E+05   9.984253E+05
     k infinity    1.236103E+00   1.235838E+00   1.235569E+00   1.235292E+00   1.235008E+00   1.235009E+00
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   9.845568E+05   9.846375E+05   9.847045E+05   9.847583E+05   9.847991E+05   9.847976E+05
     non-actinide
     abs. fracs.   1.311076E-02   1.324737E-02   1.338202E-02   1.351643E-02   1.365000E-02   1.364917E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products      page   69
0                                  fraction of total absorption rate
        power=    .00mw, burnup=  10724.mwd, flux= 9.22E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03
     eu151      1.09E-03  1.12E-03  1.15E-03  1.18E-03  1.20E-03  1.20E-03
     nd143      9.20E-04  9.52E-04  9.84E-04  1.02E-03  1.05E-03  1.05E-03
     rh103      4.38E-04  4.54E-04  4.69E-04  4.85E-04  5.01E-04  5.01E-04
     xe131      2.96E-04  3.06E-04  3.17E-04  3.27E-04  3.38E-04  3.38E-04
     cs133      2.30E-04  2.38E-04  2.46E-04  2.54E-04  2.62E-04  2.62E-04
     gd155      2.02E-04  2.03E-04  2.05E-04  2.06E-04  2.07E-04  2.07E-04
     sm147      1.69E-04  1.75E-04  1.81E-04  1.87E-04  1.93E-04  1.93E-04
     tc 99      1.64E-04  1.70E-04  1.75E-04  1.81E-04  1.86E-04  1.86E-04
     nd145      1.30E-04  1.34E-04  1.39E-04  1.44E-04  1.48E-04  1.48E-04
     mo 95      9.01E-05  9.33E-05  9.64E-05  9.96E-05  1.03E-04  1.03E-04
     sm152      8.74E-05  9.10E-05  9.46E-05  9.83E-05  1.02E-04  1.02E-04
     cd113      9.60E-05  9.64E-05  9.69E-05  9.73E-05  9.77E-05  9.77E-05
     sm150      6.28E-05  6.54E-05  6.79E-05  7.04E-05  7.30E-05  7.30E-05
     kr 83      5.60E-05  5.79E-05  5.98E-05  6.18E-05  6.37E-05  6.37E-05
     cs135      5.19E-05  5.37E-05  5.56E-05  5.74E-05  5.92E-05  5.92E-05
```

gd157	5.35E-05	5.40E-05	5.44E-05	5.49E-05	5.53E-05	5.53E-05
ru101	4.03E-05	4.17E-05	4.32E-05	4.46E-05	4.60E-05	4.60E-05
pr141	3.86E-05	4.00E-05	4.13E-05	4.27E-05	4.41E-05	4.41E-05
eu153	3.82E-05	3.96E-05	4.11E-05	4.25E-05	4.40E-05	4.40E-05
la139	3.16E-05	3.27E-05	3.38E-05	3.49E-05	3.60E-05	3.60E-05
sm151	1.77E-05	1.80E-05	1.80E-05	1.80E-05	1.81E-05	1.78E-05
pd105	1.50E-05	1.56E-05	1.62E-05	1.67E-05	1.73E-05	1.73E-05
ba137	1.52E-05	1.57E-05	1.62E-05	1.68E-05	1.73E-05	1.73E-05
zr 93	1.26E-05	1.31E-05	1.35E-05	1.39E-05	1.44E-05	1.44E-05
ag109	1.16E-05	1.22E-05	1.29E-05	1.35E-05	1.41E-05	1.41E-05
i129	1.01E-05	1.05E-05	1.08E-05	1.12E-05	1.16E-05	1.16E-05
nd144	9.59E-06	9.94E-06	1.03E-05	1.06E-05	1.10E-05	1.10E-05
mo 97	7.17E-06	7.42E-06	7.67E-06	7.93E-06	8.18E-06	8.18E-06
gd152	4.32E-06	4.61E-06	4.90E-06	5.20E-06	5.51E-06	5.51E-06
zr 91	3.33E-06	3.44E-06	3.56E-06	3.68E-06	3.79E-06	3.79E-06
y 89	3.18E-06	3.30E-06	3.41E-06	3.52E-06	3.63E-06	3.63E-06
pd108	2.99E-06	3.13E-06	3.28E-06	3.43E-06	3.58E-06	3.58E-06
ru102	2.96E-06	3.07E-06	3.18E-06	3.28E-06	3.39E-06	3.39E-06
ce142	2.63E-06	2.72E-06	2.81E-06	2.91E-06	3.00E-06	3.00E-06
nd148	2.53E-06	2.62E-06	2.71E-06	2.80E-06	2.89E-06	2.89E-06
nd146	2.13E-06	2.20E-06	2.28E-06	2.35E-06	2.43E-06	2.43E-06
in115	1.83E-06	1.90E-06	1.97E-06	2.03E-06	2.10E-06	2.10E-06
ba138	1.81E-06	1.88E-06	1.94E-06	2.01E-06	2.07E-06	2.07E-06
ce140	1.70E-06	1.76E-06	1.82E-06	1.88E-06	1.94E-06	1.94E-06
pd107	1.56E-06	1.64E-06	1.71E-06	1.78E-06	1.86E-06	1.86E-06
xe132	1.54E-06	1.60E-06	1.65E-06	1.71E-06	1.77E-06	1.77E-06
mo 98	1.05E-06	1.09E-06	1.12E-06	1.16E-06	1.20E-06	1.20E-06
mo100	1.02E-06	1.06E-06	1.09E-06	1.13E-06	1.16E-06	1.16E-06
xe134	1.00E-06	1.04E-06	1.07E-06	1.11E-06	1.15E-06	1.15E-06
ru 99	7.49E-07	8.03E-07	8.58E-07	9.16E-07	9.75E-07	9.75E-07
zr 92	6.04E-07	6.32E-07	6.60E-07	6.88E-07	9.16E-07	9.16E-07
i127	7.17E-07	7.44E-07	7.71E-07	7.98E-07	8.26E-07	8.26E-07
ru104	6.64E-07	6.89E-07	7.14E-07	7.39E-07	7.64E-07	7.64E-07

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 70

0 fraction of total absorption rate

0 powers= .00mw, burnup= 10724.mwd, flux= 9.22E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
zr 96	6.34E-07	6.56E-07	6.78E-07	7.01E-07	7.23E-07	7.23E-07
nd150	5.68E-07	5.89E-07	6.09E-07	6.29E-07	6.50E-07	6.50E-07
xe136	5.43E-07	5.63E-07	5.82E-07	6.01E-07	6.20E-07	6.20E-07
br 81	4.05E-07	4.19E-07	4.34E-07	4.48E-07	4.62E-07	4.62E-07
rb 85	3.91E-07	4.05E-07	4.18E-07	4.32E-07	4.46E-07	4.46E-07
cd111	3.66E-07	3.82E-07	3.99E-07	4.15E-07	4.31E-07	4.31E-07
zr 94	3.41E-07	3.53E-07	3.65E-07	3.77E-07	3.89E-07	3.89E-07
zr 90	3.14E-07	3.25E-07	3.35E-07	3.46E-07	3.57E-07	3.57E-07
sm154	2.57E-07	2.67E-07	2.76E-07	2.86E-07	2.96E-07	2.96E-07
te130	2.49E-07	2.58E-07	2.67E-07	2.76E-07	2.85E-07	2.85E-07
rb 87	2.25E-07	2.33E-07	2.41E-07	2.49E-07	2.57E-07	2.57E-07
gd154	1.60E-07	1.72E-07	1.84E-07	1.97E-07	2.10E-07	2.10E-07
se 77	1.63E-07	1.69E-07	1.76E-07	1.80E-07	1.86E-07	1.86E-07
pd106	1.45E-07	1.51E-07	1.57E-07	1.63E-07	1.69E-07	1.69E-07
gd156	1.29E-07	1.35E-07	1.41E-07	1.47E-07	1.54E-07	1.54E-07
kr 84	1.07E-07	1.11E-07	1.14E-07	1.18E-07	1.22E-07	1.22E-07
eu152	9.45E-08	1.06E-07	1.09E-07	1.12E-07	1.14E-07	1.03E-07
sb121	8.36E-08	8.67E-08	8.98E-08	9.29E-08	9.60E-08	9.60E-08
ba135	7.31E-08	7.84E-08	8.39E-08	8.96E-08	9.54E-08	9.55E-08
se 79	8.25E-08	8.54E-08	8.83E-08	9.12E-08	9.40E-08	9.40E-08
dy161	7.18E-08	7.54E-08	7.91E-08	8.28E-08	8.66E-08	8.66E-08
sb123	6.77E-08	7.02E-08	7.27E-08	7.52E-08	7.78E-08	7.78E-08

kr 86	5.95E-08	6.16E-08	6.36E-08	6.57E-08	6.78E-08	6.78E-08
te128	5.57E-08	5.77E-08	5.97E-08	6.18E-08	6.38E-08	6.38E-08
ru100	4.73E-08	5.06E-08	5.41E-08	5.78E-08	6.15E-08	6.15E-08
pm147	6.25E-08	9.81E-08	9.80E-08	9.80E-08	9.79E-08	5.84E-08
eu155	4.99E-08	4.50E-08	4.52E-08	4.55E-08	4.57E-08	4.89E-08
se 80	3.90E-08	4.03E-08	4.17E-08	4.31E-08	4.45E-08	4.45E-08
nd142	3.36E-08	3.61E-08	3.86E-08	4.12E-08	4.39E-08	4.39E-08
te125	3.68E-08	3.82E-08	3.96E-08	4.10E-08	4.24E-08	4.24E-08
ba134	3.23E-08	3.47E-08	3.71E-08	3.96E-08	4.22E-08	4.22E-08
tb159	3.40E-08	3.55E-08	3.71E-08	3.86E-08	4.02E-08	4.02E-08
sm148	2.96E-08	3.17E-08	3.39E-08	3.62E-08	3.86E-08	3.86E-08
gd158	2.74E-08	2.86E-08	2.98E-08	3.11E-08	3.23E-08	3.23E-08
cd112	2.66E-08	2.77E-08	2.88E-08	2.98E-08	3.09E-08	3.09E-08
pd104	2.20E-08	2.36E-08	2.53E-08	2.70E-08	2.88E-08	2.88E-08
li 6	2.13E-08	2.20E-08	2.27E-08	2.34E-08	2.42E-08	2.42E-08
sn117	1.96E-08	2.03E-08	2.11E-08	2.19E-08	2.26E-08	2.26E-08
dy164	1.54E-08	1.62E-08	1.71E-08	1.80E-08	1.88E-08	1.88E-08
cd114	1.58E-08	1.65E-08	1.72E-08	1.79E-08	1.85E-08	1.85E-08
sn119	1.54E-08	1.59E-08	1.65E-08	1.71E-08	1.76E-08	1.76E-08
dy162	1.43E-08	1.51E-08	1.59E-08	1.68E-08	1.76E-08	1.76E-08
sn115	1.41E-08	1.46E-08	1.51E-08	1.56E-08	1.62E-08	1.62E-08
nb 93	1.17E-08	1.26E-08	1.35E-08	1.44E-08	1.53E-08	1.53E-08
pd110	1.19E-08	1.25E-08	1.30E-08	1.36E-08	1.41E-08	1.41E-08
sr 88	1.09E-08	1.13E-08	1.17E-08	1.21E-08	1.25E-08	1.25E-08
mo 96	7.68E-09	8.21E-09	8.77E-09	9.34E-09	9.94E-09	9.94E-09
se 82	7.47E-09	7.73E-09	8.00E-09	8.26E-09	8.52E-09	8.52E-09
br 79	5.91E-09	6.34E-09	6.77E-09	7.23E-09	7.70E-09	7.70E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 71

0 fraction of total absorption rate

0 power= .00mw, burnup= 10724.mwd, flux= 9.22E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
cd110	5.58E-09	6.07E-09	6.59E-09	7.13E-09	7.70E-09	7.70E-09
sn126	6.55E-09	6.79E-09	7.04E-09	7.28E-09	7.53E-09	7.53E-09
se 78	5.78E-09	5.99E-09	6.19E-09	6.40E-09	6.61E-09	6.61E-09
eu154	5.33E-09	6.38E-09	6.61E-09	6.84E-09	7.08E-09	6.02E-09
ag107	6.38E-09	6.74E-09	5.11E-09	5.50E-09	5.90E-09	5.90E-09
sr 90	5.73E-09	5.98E-09	5.97E-09	5.97E-09	5.96E-09	5.67E-09
sn124	6.90E-09	5.08E-09	5.27E-09	5.45E-09	5.63E-09	5.63E-09
ba136	4.37E-09	4.62E-09	4.87E-09	5.12E-09	5.38E-09	5.38E-09
xe130	4.02E-09	4.89E-09	4.56E-09	4.85E-09	5.14E-09	5.14E-09
xe129	3.45E-09	3.70E-09	3.96E-09	4.23E-09	4.51E-09	4.51E-09
dy163	3.57E-09	3.77E-09	3.98E-09	4.19E-09	4.41E-09	4.41E-09
kr 82	3.33E-09	3.52E-09	3.71E-09	3.91E-09	4.12E-09	4.12E-09
as 75	3.42E-09	3.54E-09	3.66E-09	3.78E-09	3.90E-09	3.90E-09
in113	2.77E-09	2.87E-09	2.98E-09	3.08E-09	3.19E-09	3.19E-09
te126	2.07E-09	2.21E-09	2.37E-09	2.52E-09	2.68E-09	2.68E-09
sn118	1.99E-09	2.06E-09	2.13E-09	2.21E-09	2.28E-09	2.28E-09
sn122	1.69E-09	1.75E-09	1.82E-09	1.88E-09	1.94E-09	1.94E-09
cd116	1.67E-09	1.74E-09	1.80E-09	1.86E-09	1.92E-09	1.92E-09
sn120	1.25E-09	1.30E-09	1.35E-09	1.39E-09	1.44E-09	1.44E-09
cs137	1.31E-09	1.36E-09	1.36E-09	1.36E-09	1.36E-09	1.30E-09
ge 73	9.59E-10	9.94E-10	1.03E-09	1.06E-09	1.10E-09	1.10E-09
gd160	3.61E-10	3.78E-10	3.95E-10	4.13E-10	4.31E-10	4.31E-10
ge 76	3.35E-10	3.47E-10	3.59E-10	3.71E-10	3.82E-10	3.82E-10
ho165	2.90E-10	3.08E-10	3.27E-10	3.46E-10	3.66E-10	3.66E-10
cs134	3.43E-10	6.39E-10	6.61E-10	6.83E-10	7.05E-10	3.60E-10
dy160	1.88E-10	2.03E-10	2.18E-10	2.34E-10	2.51E-10	2.51E-10
kr 83	1.80E-10	2.01E-10	2.01E-10	2.01E-10	2.01E-10	1.76E-10
xe128	1.25E-10	1.34E-10	1.43E-10	1.53E-10	1.63E-10	1.63E-10

sr 86	6.84E-11	7.29E-11	7.75E-11	8.23E-11	8.73E-11	8.73E-11
te124	6.84E-11	7.19E-11	7.54E-11	7.90E-11	8.27E-11	8.27E-11
sn116	4.80E-11	5.15E-11	5.51E-11	5.89E-11	6.28E-11	6.28E-11
sr 87	4.34E-11	4.51E-11	4.68E-11	4.85E-11	5.02E-11	5.02E-11
ce144	4.51E-11	2.13E-10	2.13E-10	2.13E-10	2.13E-10	3.60E-11
nb 94	2.81E-11	2.96E-11	3.12E-11	3.28E-11	3.45E-11	3.45E-11
se 76	2.15E-11	2.27E-11	2.40E-11	2.54E-11	2.68E-11	2.68E-11
te122	2.00E-11	2.15E-11	2.30E-11	2.46E-11	2.62E-11	2.62E-11
ge 74	1.92E-11	1.99E-11	2.06E-11	2.13E-11	2.20E-11	2.20E-11
er166	1.53E-11	1.62E-11	1.72E-11	1.82E-11	1.92E-11	1.92E-11
ge 72	1.37E-11	1.42E-11	1.47E-11	1.52E-11	1.58E-11	1.58E-11
y 90	5.46E-12	5.69E-12	5.68E-12	5.68E-12	5.67E-12	5.40E-12
kr 80	3.62E-12	3.96E-12	4.33E-12	4.72E-12	5.13E-12	5.13E-12
sb125	3.97E-12	6.20E-12	6.32E-12	6.24E-12	6.25E-12	3.77E-12
ru106	4.80E-12	1.33E-11	1.34E-11	1.35E-11	1.36E-11	3.47E-12
er167	7.85E-13	8.59E-13	9.36E-13	1.02E-12	1.10E-12	1.10E-12
te123	4.76E-13	5.23E-13	5.74E-13	6.27E-13	6.83E-13	6.83E-13
cd108	1.64E-13	1.84E-13	2.04E-13	2.27E-13	2.51E-13	2.51E-13
be 9	4.22E-14	4.37E-14	4.51E-14	4.66E-14	4.81E-14	4.81E-14
nb 95	1.18E-13	5.44E-11	5.44E-11	5.44E-11	5.43E-11	4.36E-14
te127m	5.55E-14	3.13E-12	3.14E-12	3.15E-12	3.16E-12	3.13E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 72
0 fraction of total absorption rate
power= .00mw, burnup= 10724.mwd, flux= 9.22E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 95	5.78E-14	5.87E-11	5.87E-11	5.87E-11	5.86E-11	2.14E-14
li 7	1.71E-14	1.77E-14	1.84E-14	1.90E-14	1.96E-14	1.96E-14
sn114	1.22E-14	1.31E-14	1.41E-14	1.50E-14	1.60E-14	1.60E-14
y 91	2.60E-14	5.03E-11	5.02E-11	5.02E-11	5.01E-11	8.73E-15
sb126	7.54E-15	9.84E-15	1.01E-14	1.04E-14	1.07E-14	8.66E-15
sr 89	1.67E-15	1.07E-11	1.07E-11	1.07E-11	1.07E-11	4.73E-16
ru103	1.72E-15	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.42E-16
ce141	6.91E-16	5.75E-10	5.75E-10	5.75E-10	5.75E-10	9.75E-17
sn123	1.23E-16	3.81E-15	3.81E-15	3.82E-15	3.82E-15	7.55E-17
tb160	6.77E-17	3.25E-14	3.38E-14	3.52E-14	3.66E-14	3.30E-17
pm148m	3.09E-17	1.42E-12	1.43E-12	1.43E-12	1.43E-12	6.70E-18
cd109	1.84E-18	5.11E-18	5.45E-18	5.82E-18	6.21E-18	2.07E-18
cd113m	4.64E-18	9.64E-14	9.66E-14	9.68E-14	9.71E-14	1.13E-18
sb124	1.19E-18	1.92E-15	1.96E-15	2.00E-15	2.04E-15	4.49E-19
te129m	1.28E-18	6.87E-13	6.88E-13	6.88E-13	6.89E-13	1.93E-19
pm148	5.51E-20	4.99E-14	4.99E-14	5.00E-14	5.01E-14	9.17E-21

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 73
power= 1.468E-03mw, burnup=1.0724E+04mwd, flux= 9.22E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly
charge ******* d ******* d ******* d ******* d ******* d

h 1	5.56E-04	5.76E-04	5.96E-04	6.16E-04	6.36E-04	6.36E-04
h 2	1.66E-06	1.72E-06	1.78E-06	1.84E-06	1.89E-06	1.89E-06
h 3	1.58E-11	1.76E-11	1.78E-11	1.79E-11	1.81E-11	1.61E-11
h 4	.00E+00	2.59E-35	2.61E-35	2.63E-35	2.65E-35	.00E+00
he 3	9.83E-09	1.01E-08	1.04E-08	1.06E-08	1.09E-08	1.09E-08
he 4	9.21E-05	9.54E-05	9.87E-05	1.02E-04	1.05E-04	1.05E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.11E-05	1.15E-05	1.19E-05	1.23E-05	1.27E-05	1.27E-05
ne 21	2.02E-09	2.16E-09	2.30E-09	2.45E-09	2.60E-09	2.60E-09
ne 22	7.28E-08	7.54E-08	7.80E-08	8.06E-08	8.33E-08	8.33E-08
ne 23	2.63E-30	2.64E-15	2.64E-15	2.64E-15	2.64E-15	2.64E-30
na 22	9.76E-12	1.56E-11	1.56E-11	1.56E-11	1.56E-11	9.16E-12

na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.57E-24	9.57E-09	9.57E-09	9.57E-09	9.58E-09	9.58E-24
na 24m	1.57E-30	1.57E-15	1.57E-15	1.57E-15	1.57E-15	1.57E-30
na 25	2.23E-39	2.38E-24	2.53E-24	2.69E-24	2.86E-24	2.86E-39
mg 24	7.55E-02	7.79E-02	8.04E-02	8.29E-02	8.54E-02	8.54E-02
mg 25	2.15E-07	2.29E-07	2.44E-07	2.59E-07	2.75E-07	2.75E-07
mg 26	1.65E-06	1.71E-06	1.77E-06	1.83E-06	1.89E-06	1.89E-06
mg 27	7.84E-28	7.86E-13	7.86E-13	7.87E-13	7.87E-13	7.87E-28
mg 28	.00E+00	5.79E-25	5.80E-25	5.80E-25	5.80E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.09E-26	7.09E-11	7.10E-11	7.10E-11	7.10E-11	7.10E-26
al 29	1.76E-37	1.88E-22	2.00E-22	2.13E-22	2.27E-22	2.27E-37
al 30	.00E+00	2.37E-32	2.61E-32	2.87E-32	3.14E-32	.00E+00
si 28	2.20E-01	2.27E-01	2.34E-01	2.41E-01	2.48E-01	2.48E-01
si 29	1.89E-06	2.02E-06	2.16E-06	2.29E-06	2.44E-06	2.44E-06
si 30	1.72E-11	1.91E-11	2.10E-11	2.31E-11	2.53E-11	2.53E-11
si 31	4.47E-39	4.96E-24	5.45E-24	5.99E-24	6.57E-24	6.56E-39
si 32	2.72E-30	3.03E-30	3.35E-30	3.69E-30	4.05E-30	4.01E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		9.21E+07	9.22E+07	9.22E+07	9.22E+07	9.22E-08

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 60% h2o/ 8% uo2 actinides page 74
power= 1.468E-03mw, burnup=1.0724E+04mwd, flux= 9.22E+07n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	8.85E+00	9.37E+00	9.91E+00	1.05E+01	1.10E+01	1.10E+01
pb206	2.71E-02	2.93E-02	3.15E-02	3.39E-02	3.63E-02	3.63E-02
pb207	2.18E-03	2.33E-03	2.49E-03	2.65E-03	2.82E-03	2.82E-03
pb208	1.24E-04	1.33E-04	1.42E-04	1.51E-04	1.61E-04	1.61E-04
pb209	2.58E-10	2.72E-10	2.87E-10	3.02E-10	3.16E-10	3.16E-10
pb210	1.10E-04	1.14E-04	1.19E-04	1.23E-04	1.27E-04	1.27E-04
pb211	2.40E-11	2.47E-11	2.54E-11	2.62E-11	2.70E-11	2.70E-11
pb212	2.39E-11	2.48E-11	2.55E-11	2.63E-11	2.71E-11	2.70E-11
pb214	2.52E-10	2.62E-10	2.71E-10	2.81E-10	2.91E-10	2.91E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	3.18E-03	3.49E-03	3.82E-03	4.16E-03	4.52E-03	4.53E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	6.78E-08	7.04E-08	7.31E-08	7.57E-08	7.84E-08	7.84E-08
bi211	1.42E-12	1.46E-12	1.51E-12	1.55E-12	1.60E-12	1.60E-12
bi212	2.27E-12	2.35E-12	2.42E-12	2.50E-12	2.57E-12	2.56E-12
bi213	6.03E-11	6.36E-11	6.70E-11	7.04E-11	7.39E-11	7.39E-11
bi214	1.87E-10	1.94E-10	2.02E-10	2.09E-10	2.16E-10	2.16E-10
po210	1.85E-06	1.94E-06	2.02E-06	2.09E-06	2.16E-06	2.15E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.57E-17	1.62E-17	1.67E-17	1.72E-17	1.77E-17	1.77E-17
po212	1.19E-22	1.23E-22	1.27E-22	1.31E-22	1.35E-22	1.35E-22
po213	9.07E-20	9.57E-20	1.01E-19	1.06E-19	1.11E-19	1.11E-19
po214	2.57E-17	2.67E-17	2.77E-17	2.87E-17	2.97E-17	2.97E-17
po215	1.97E-17	2.03E-17	2.09E-17	2.15E-17	2.22E-17	2.22E-17
po216	9.86E-17	9.37E-17	9.67E-17	9.96E-17	1.02E-16	1.02E-16
po218	2.91E-11	3.03E-11	3.14E-11	3.25E-11	3.37E-11	3.37E-11
rn218	7.02E-38	1.30E-28	1.35E-28	1.39E-28	1.43E-28	3.73E-39
rn219	4.38E-14	4.51E-14	4.65E-14	4.79E-14	4.93E-14	4.94E-14
rn220	3.48E-14	3.59E-14	3.71E-14	3.82E-14	3.93E-14	3.92E-14
rn222	5.17E-08	5.37E-08	5.58E-08	5.78E-08	5.98E-08	5.98E-08
ra222	7.63E-35	1.42E-25	1.46E-25	1.50E-25	1.55E-25	4.05E-36
ra223	1.09E-08	1.13E-08	1.16E-08	1.20E-08	1.23E-08	1.23E-08
ra224	1.98E-10	2.04E-10	2.11E-10	2.17E-10	2.24E-10	2.23E-10
ra225	2.82E-08	2.98E-08	3.13E-08	3.29E-08	3.45E-08	3.45E-08

ra226	7.90E-03	8.21E-03	8.52E-03	8.83E-03	9.14E-03	9.14E-03
ra228	3.77E-11	3.91E-11	4.04E-11	4.18E-11	4.32E-11	4.32E-11
ac225	1.91E-08	2.01E-08	2.12E-08	2.22E-08	2.33E-08	2.33E-08
ac227	7.58E-06	7.83E-06	8.07E-06	8.31E-06	8.55E-06	8.55E-06
ac228	4.60E-15	4.77E-15	4.94E-15	5.10E-15	5.27E-15	5.27E-15
th226	3.72E-33	6.91E-24	7.13E-24	7.34E-24	7.56E-24	1.97E-34
th227	1.76E-08	1.82E-08	1.87E-08	1.93E-08	1.98E-08	1.99E-08
th228	3.76E-08	3.90E-08	4.03E-08	4.15E-08	4.27E-08	4.24E-08
th229	5.48E-03	5.79E-03	6.09E-03	6.40E-03	6.72E-03	6.72E-03
th230	4.27E-01	4.41E-01	4.56E-01	4.70E-01	4.84E-01	4.84E-01
th231	2.85E-09	3.37E-09	3.59E-09	3.61E-09	3.63E-09	2.83E-09
th232	9.22E-02	9.55E-02	9.89E-02	1.02E-01	1.06E-01	1.06E-01
th233	3.05E-28	3.16E-13	3.27E-13	3.39E-13	3.50E-13	3.50E-28
th234	5.37E-07	5.37E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.14E-02	1.18E-02	1.21E-02	1.25E-02	1.29E-02	1.29E-02
pa232	7.07E-26	7.30E-11	7.53E-11	7.76E-11	7.98E-11	7.99E-26

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 75

power= 1.468E-03mw, burnup=1.0724E+04mwd, flux= 9.22E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	3.60E-30	6.70E-21	6.91E-21	7.12E-21	7.33E-21	1.91E-31
u231	6.10E-32	6.30E-17	6.50E-17	6.71E-17	6.90E-17	6.91E-32
u232	1.36E-06	1.42E-06	1.47E-06	1.51E-06	1.56E-06	1.53E-06
u233	2.22E-01	2.29E-01	2.37E-01	2.44E-01	2.51E-01	2.51E-01
u234	9.69E+00	9.71E+00	9.73E+00	9.75E+00	9.77E+00	9.77E+00
u235	6.90E+02	6.89E+02	6.87E+02	6.86E+02	6.85E+02	6.85E+02
u236	1.81E+02	1.82E+02	1.82E+02	1.82E+02	1.83E+02	1.83E+02
u237	1.47E-12	1.16E-06	1.16E-06	1.16E-06	1.17E-06	1.71E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	1.30E-37	1.71E-37	2.24E-37	2.90E-37	3.72E-37	3.73E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.02E-12	3.12E-12	3.12E-12	3.12E-12	3.12E-12	8.67E-13
np236m	7.40E-28	7.41E-13	7.41E-13	7.40E-13	7.40E-13	7.40E-28
np236	1.18E-06	1.22E-06	1.26E-06	1.30E-06	1.34E-06	1.34E-06
np237	4.15E+01	4.15E+01	4.15E+01	4.15E+01	4.14E+01	4.14E+01
np238	4.52E-14	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.38E-14
np239	3.77E-14	1.62E-05	1.62E-05	1.62E-05	1.62E-05	5.64E-14
np240m	1.11E-39	1.46E-39	1.91E-39	2.47E-39	3.18E-39	3.18E-39
np240	2.78E-39	1.19E-15	1.19E-15	1.19E-15	1.19E-15	4.17E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.67E-10	4.04E-10	4.04E-10	4.04E-10	4.04E-10	2.52E-10
pu237	5.47E-18	1.02E-13	1.03E-13	1.05E-13	1.07E-13	1.43E-18
pu238	8.17E-03	8.28E-03	8.28E-03	8.28E-03	8.27E-03	8.14E-03
pu239	2.24E+01	2.30E+01	2.35E+01	2.41E+01	2.44E+01	2.44E+01
pu240	3.53E-01	3.69E-01	3.85E-01	4.00E-01	4.16E-01	4.16E-01
pu241	4.78E-05	5.43E-05	5.66E-05	5.89E-05	6.12E-05	5.56E-05
pu242	9.98E-06	1.09E-05	1.19E-05	1.29E-05	1.39E-05	1.39E-05
pu243	7.66E-30	8.31E-15	9.05E-15	9.81E-15	1.06E-14	1.07E-29
pu244	4.45E-27	8.52E-27	1.11E-26	1.44E-26	1.85E-26	1.86E-26
pu245	.00E+00	1.26E-37	1.65E-37	2.14E-37	2.74E-37	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.47E-34	1.54E-19	1.61E-19	1.68E-19	1.75E-19	1.75E-34
am240	6.73E-32	7.06E-17	7.38E-17	7.70E-17	8.02E-17	8.02E-32

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     am241   1.47E-03  1.54E-03  1.61E-03  1.68E-03  1.75E-03  1.75E-03
     am242m  2.44E-07  2.58E-07  2.70E-07  2.82E-07  2.94E-07  2.91E-07
     am242   3.15E-12  2.89E-11  2.19E-11  2.29E-11  2.38E-11  3.75E-12
     am243   4.31E-08  4.79E-08  5.31E-08  5.86E-08  6.44E-08  6.44E-08
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.18E-31  1.31E-16  1.45E-16  1.60E-16  1.76E-16  1.76E-31
     am245   1.19E-40  2.52E-38  3.30E-38  4.27E-38  5.48E-38  2.54E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.76E-28  4.46E-22  4.66E-22  4.87E-22  5.07E-22  9.87E-29
     cm242   8.62E-10  4.23E-09  4.42E-09  4.61E-09  4.80E-09  9.40E-10
     cm243   3.20E-14  3.49E-14  3.66E-14  3.82E-14  3.97E-14  3.79E-14
     cm244   1.73E-12  2.06E-12  2.28E-12  2.52E-12  2.77E-12  2.57E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page   76
       power= 1.468E-03mw, burnup=1.0724E+04mwd, flux= 9.22E+07n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                  basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   2.26E-15  2.59E-15  2.95E-15  3.35E-15  3.78E-15  3.77E-15
     cm246   1.15E-17  1.36E-17  1.58E-17  1.84E-17  2.13E-17  2.13E-17
     cm247   1.36E-21  1.66E-21  2.02E-21  2.44E-21  2.92E-21  2.92E-21
     cm248   1.57E-24  1.99E-24  2.51E-24  3.14E-24  3.90E-24  3.90E-24
     cm249    .00E+00  2.26E-35  2.86E-35  3.57E-35  4.43E-35   .00E+00
     cm250   3.44E-40  7.17E-40  9.35E-40  1.21E-39  1.55E-39  1.55E-39
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               9.21E+07  9.22E+07  9.22E+07  9.22E+07  9.22E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

          cross-section data taken from position number  9 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *      data from the light element, actinide, and fission product libraries *
          *        decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
```

```
          *                                                                      *
          *                 fission product yields are from endf/b-v             *
          *                                                                      *
          *            photon libraries use an 18-energy-group structure         *
          *           the photon data are from the master photon data base,      *
          *            produced to include bremsstrahlung from uo2 matrix        *
          *                                                                      *
          *       see information above this box (if present) for later updates  *
          *                                                                      *
          ************************************************************************
          *                                                                      *
0         ************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7993     number of nonzero off-diagonal matrix elements
0         ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   77
       power=    .00mw, burnup=  12064.mwd, flux= 9.22E+07n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      ******* d     ******* d     ******* d     ******* d     ******* d
     productions   1.234046E+06  1.233959E+06  1.233848E+06  1.233716E+06  1.233562E+06  1.233559E+06
     absorptions   9.992796E+05  9.994441E+05  9.995941E+05  9.997313E+05  9.998563E+05  9.998534E+05
     k infinity    1.234936E+00  1.234645E+00  1.234349E+00  1.234047E+00  1.233739E+00  1.233740E+00
0                   initial      ******* d     ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions   9.856426E+05  9.856710E+05  9.856871E+05  9.856911E+05  9.856834E+05  9.856814E+05
     non-actinide
     abs. frac.    1.366678E-02  1.378077E-02  1.391262E-02  1.404399E-02  1.417500E-02  1.417610E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products   page   78
0                                   fraction of total absorption rate
       power=    .00mw, burnup=  12064.mwd, flux= 9.22E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03  5.45E-03
     eu151      1.20E-03  1.23E-03  1.26E-03  1.28E-03  1.31E-03  1.31E-03
     nd143      1.05E-03  1.08E-03  1.11E-03  1.14E-03  1.17E-03  1.17E-03
     rh103      5.01E-04  5.17E-04  5.32E-04  5.48E-04  5.64E-04  5.64E-04
     xe131      3.38E-04  3.48E-04  3.58E-04  3.69E-04  3.79E-04  3.79E-04
     cs133      2.62E-04  2.70E-04  2.78E-04  2.86E-04  2.94E-04  2.94E-04
     sm147      1.93E-04  1.99E-04  2.05E-04  2.11E-04  2.17E-04  2.17E-04
     gd155      2.07E-04  2.08E-04  2.09E-04  2.10E-04  2.11E-04  2.11E-04
     tc 99      1.86E-04  1.92E-04  1.98E-04  2.03E-04  2.09E-04  2.09E-04
     nd145      1.48E-04  1.53E-04  1.57E-04  1.62E-04  1.66E-04  1.66E-04
     sm152      1.02E-04  1.06E-04  1.09E-04  1.13E-04  1.17E-04  1.17E-04
     mo 95      1.03E-04  1.06E-04  1.09E-04  1.12E-04  1.15E-04  1.15E-04
     cd113      9.77E-05  9.60E-05  9.64E-05  9.67E-05  9.90E-05  9.90E-05
     sm150      7.30E-05  7.55E-05  7.81E-05  8.06E-05  8.31E-05  8.31E-05
     kr 83      6.37E-05  6.56E-05  6.75E-05  6.95E-05  7.14E-05  7.14E-05
     cs135      5.92E-05  6.11E-05  6.29E-05  6.48E-05  6.66E-05  6.66E-05
     gd157      5.53E-05  5.57E-05  5.62E-05  5.66E-05  5.70E-05  5.70E-05
     ru101      4.60E-05  4.75E-05  4.89E-05  5.03E-05  5.18E-05  5.18E-05
     eu153      4.40E-05  4.54E-05  4.69E-05  4.84E-05  4.99E-05  4.99E-05
     pr141      4.41E-05  4.54E-05  4.68E-05  4.81E-05  4.95E-05  4.95E-05
     la139      3.60E-05  3.71E-05  3.83E-05  3.94E-05  4.05E-05  4.05E-05
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pd105	1.73E-05	1.79E-05	1.85E-05	1.91E-05	1.97E-05	1.97E-05
ba137	1.73E-05	1.79E-05	1.84E-05	1.89E-05	1.95E-05	1.95E-05
sm151	1.78E-05	1.81E-05	1.81E-05	1.82E-05	1.82E-05	1.79E-05
ag109	1.41E-05	1.48E-05	1.54E-05	1.61E-05	1.67E-05	1.67E-05
zr 93	1.44E-05	1.48E-05	1.52E-05	1.57E-05	1.61E-05	1.61E-05
i129	1.16E-05	1.20E-05	1.23E-05	1.27E-05	1.31E-05	1.31E-05
nd144	1.10E-05	1.13E-05	1.17E-05	1.20E-05	1.23E-05	1.23E-05
mo 97	8.18E-06	8.44E-06	8.69E-06	8.94E-06	9.20E-06	9.20E-06
gd152	5.31E-06	5.82E-06	6.14E-06	6.47E-06	6.80E-06	6.80E-06
zr 91	3.79E-06	3.91E-06	4.02E-06	4.14E-06	4.26E-06	4.26E-06
pd108	3.58E-06	3.73E-06	3.88E-06	4.04E-06	4.20E-06	4.20E-06
y 89	3.63E-06	3.74E-06	3.85E-06	3.96E-06	4.07E-06	4.07E-06
ru102	3.39E-06	3.50E-06	3.60E-06	3.71E-06	3.82E-06	3.82E-06
ce142	3.00E-06	3.09E-06	3.18E-06	3.28E-06	3.37E-06	3.37E-06
nd148	2.89E-06	2.98E-06	3.07E-06	3.16E-06	3.25E-06	3.25E-06
nd146	2.43E-06	2.50E-06	2.58E-06	2.65E-06	2.73E-06	2.73E-06
in115	2.10E-06	2.17E-06	2.24E-06	2.31E-06	2.37E-06	2.37E-06
ba138	2.07E-06	2.13E-06	2.20E-06	2.26E-06	2.33E-06	2.33E-06
ce140	1.94E-06	2.00E-06	2.06E-06	2.12E-06	2.18E-06	2.18E-06
pd107	1.86E-06	1.93E-06	2.01E-06	2.08E-06	2.16E-06	2.16E-06
xe132	1.77E-06	1.82E-06	1.88E-06	1.93E-06	1.99E-06	1.99E-06
mo 98	1.20E-06	1.24E-06	1.27E-06	1.31E-06	1.35E-06	1.35E-06
mo100	1.16E-06	1.20E-06	1.24E-06	1.27E-06	1.31E-06	1.31E-06
xe134	1.15E-06	1.18E-06	1.22E-06	1.25E-06	1.29E-06	1.29E-06
ru 99	9.75E-07	1.04E-06	1.10E-06	1.16E-06	1.23E-06	1.23E-06
zr 92	9.16E-07	9.44E-07	9.72E-07	1.00E-06	1.03E-06	1.03E-06
i127	8.26E-07	8.53E-07	8.81E-07	9.09E-07	9.36E-07	9.36E-07
ru104	7.64E-07	7.89E-07	8.14E-07	8.39E-07	8.64E-07	8.64E-07

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 79
0 fraction of total absorption rate
power= .00mw, burnup= 12064.mwd, flux= 9.22E+07n/cm**2-sec
0 initial *******d ******* d ******* d ******* d ******* d

zr 96	7.23E-07	7.45E-07	7.68E-07	7.90E-07	8.12E-07	8.12E-07
nd150	6.50E-07	6.70E-07	6.91E-07	7.11E-07	7.31E-07	7.31E-07
xe136	6.20E-07	6.40E-07	6.59E-07	6.78E-07	6.98E-07	6.98E-07
br 81	4.62E-07	4.77E-07	4.91E-07	5.05E-07	5.20E-07	5.20E-07
rb 85	4.46E-07	4.59E-07	4.73E-07	4.87E-07	5.00E-07	5.00E-07
cd111	4.31E-07	4.48E-07	4.65E-07	4.82E-07	4.99E-07	4.99E-07
zr 94	3.89E-07	4.01E-07	4.12E-07	4.24E-07	4.36E-07	4.36E-07
zr 90	3.57E-07	3.68E-07	3.79E-07	3.90E-07	4.01E-07	4.01E-07
sm154	2.96E-07	3.05E-07	3.15E-07	3.25E-07	3.35E-07	3.35E-07
te130	2.85E-07	2.94E-07	3.03E-07	3.12E-07	3.21E-07	3.21E-07
rb 87	2.57E-07	2.65E-07	2.73E-07	2.80E-07	2.88E-07	2.88E-07
gd154	2.10E-07	2.24E-07	2.38E-07	2.52E-07	2.67E-07	2.67E-07
se 77	1.86E-07	1.92E-07	1.97E-07	2.03E-07	2.09E-07	2.09E-07
pd106	1.69E-07	1.75E-07	1.82E-07	1.88E-07	1.94E-07	1.94E-07
gd156	1.54E-07	1.60E-07	1.66E-07	1.72E-07	1.78E-07	1.78E-07
kr 84	1.22E-07	1.26E-07	1.30E-07	1.33E-07	1.37E-07	1.37E-07
ba135	9.54E-08	1.01E-07	1.08E-07	1.14E-07	1.21E-07	1.21E-07
eu152	1.03E-07	1.17E-07	1.19E-07	1.22E-07	1.24E-07	1.10E-07
sb121	9.60E-08	9.92E-08	1.02E-07	1.05E-07	1.09E-07	1.09E-07
se 79	9.40E-08	9.69E-08	9.97E-08	1.03E-07	1.05E-07	1.05E-07
dy161	8.66E-08	9.05E-08	9.43E-08	9.83E-08	1.02E-07	1.02E-07
sb123	7.78E-08	8.03E-08	8.28E-08	8.53E-08	8.78E-08	8.78E-08
ru100	6.15E-08	6.53E-08	6.93E-08	7.34E-08	7.76E-08	7.76E-08
kr 86	6.78E-08	6.99E-08	7.19E-08	7.40E-08	7.61E-08	7.61E-08
te128	6.38E-08	6.59E-08	6.79E-08	6.99E-08	7.20E-08	7.20E-08
nd142	4.39E-08	4.67E-08	4.95E-08	5.25E-08	5.55E-08	5.55E-08
pm147	5.84E-08	9.79E-08	9.79E-08	9.78E-08	9.78E-08	5.46E-08

ba134	4.22E-08	4.48E-08	4.76E-08	5.04E-08	5.33E-08	5.33E-08
se 80	4.45E-08	4.58E-08	4.72E-08	4.86E-08	5.00E-08	5.00E-08
sm148	3.86E-08	4.10E-08	4.35E-08	4.61E-08	4.87E-08	4.87E-08
te125	4.24E-08	4.38E-08	4.52E-08	4.66E-08	4.80E-08	4.80E-08
eu155	4.89E-08	6.60E-08	6.62E-08	6.65E-08	6.67E-08	4.78E-08
tb159	4.02E-08	4.18E-08	4.34E-08	4.51E-08	4.67E-08	4.67E-08
gd158	3.23E-08	3.36E-08	3.49E-08	3.61E-08	3.74E-08	3.74E-08
pd104	2.88E-08	3.06E-08	3.25E-08	3.45E-08	3.65E-08	3.65E-08
cd112	3.09E-08	3.20E-08	3.32E-08	3.43E-08	3.54E-08	3.54E-08
li 6	2.42E-08	2.49E-08	2.56E-08	2.63E-08	2.70E-08	2.70E-08
sn117	2.26E-08	2.34E-08	2.42E-08	2.49E-08	2.57E-08	2.57E-08
dy164	1.88E-08	1.97E-08	2.07E-08	2.16E-08	2.25E-08	2.25E-08
cd114	1.85E-08	1.92E-08	1.99E-08	2.06E-08	2.13E-08	2.13E-08
dy162	1.76E-08	1.85E-08	1.94E-08	2.03E-08	2.12E-08	2.12E-08
sn119	1.76E-08	1.82E-08	1.88E-08	1.94E-08	2.00E-08	2.00E-08
nb 93	1.53E-08	1.63E-08	1.73E-08	1.83E-08	1.93E-08	1.93E-08
sn115	1.62E-08	1.67E-08	1.72E-08	1.77E-08	1.83E-08	1.83E-08
pd110	1.41E-08	1.47E-08	1.52E-08	1.58E-08	1.64E-08	1.64E-08
sr 88	1.25E-08	1.28E-08	1.32E-08	1.36E-08	1.40E-08	1.40E-08
mo 96	9.94E-09	1.05E-08	1.12E-08	1.18E-08	1.25E-08	1.25E-08
cd110	7.69E-09	8.29E-09	8.91E-09	9.55E-09	1.02E-08	1.02E-08
br 79	7.70E-09	8.18E-09	8.68E-09	9.19E-09	9.72E-09	9.72E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 80
0 fraction of total absorption rate
powerm .00mw, burnup= 12066.mwd, flux= 9.22E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

se 82	8.52E-09	8.78E-09	9.04E-09	9.31E-09	9.57E-09	9.57E-09
sn126	7.53E-09	7.77E-09	8.01E-09	8.26E-09	8.50E-09	8.50E-09
ag107	5.90E-09	6.32E-09	6.76E-09	7.22E-09	7.69E-09	7.69E-09
se 78	6.61E-09	6.81E-09	7.02E-09	7.23E-09	7.44E-09	7.44E-09
eu154	6.02E-09	7.32E-09	7.55E-09	7.79E-09	8.03E-09	6.70E-09
ba136	5.38E-09	5.65E-09	5.92E-09	6.20E-09	6.48E-09	6.48E-09
xe130	5.14E-09	5.44E-09	5.75E-09	6.07E-09	6.39E-09	6.39E-09
sn124	5.63E-09	5.82E-09	6.00E-09	6.19E-09	6.38E-09	6.38E-09
xe129	4.51E-09	4.80E-09	5.09E-09	5.40E-09	5.71E-09	5.71E-09
sr 90	5.67E-09	5.95E-09	5.95E-09	5.96E-09	5.93E-09	5.61E-09
dy163	4.41E-09	4.63E-09	4.85E-09	5.08E-09	5.32E-09	5.32E-09
kr 82	4.12E-09	4.32E-09	4.54E-09	4.75E-09	4.97E-09	4.97E-09
as 75	3.90E-09	4.02E-09	4.15E-09	4.27E-09	4.39E-09	4.39E-09
in113	3.19E-09	3.29E-09	3.40E-09	3.51E-09	3.61E-09	3.61E-09
te126	2.68E-09	2.85E-09	3.02E-09	3.20E-09	3.38E-09	3.38E-09
sn118	2.28E-09	2.36E-09	2.43E-09	2.51E-09	2.58E-09	2.58E-09
sn122	1.94E-09	2.01E-09	2.07E-09	2.14E-09	2.20E-09	2.20E-09
cd116	1.92E-09	1.99E-09	2.05E-09	2.11E-09	2.17E-09	2.17E-09
sn120	1.44E-09	1.49E-09	1.53E-09	1.58E-09	1.63E-09	1.63E-09
cs137	1.30E-09	1.36E-09	1.36E-09	1.36E-09	1.36E-09	1.29E-09
ge 73	1.10E-09	1.13E-09	1.17E-09	1.20E-09	1.24E-09	1.24E-09
gd160	4.31E-10	4.49E-10	4.67E-10	4.85E-10	5.04E-10	5.04E-10
ho165	3.66E-10	3.86E-10	4.07E-10	4.28E-10	4.50E-10	4.50E-10
ge 76	3.82E-10	3.94E-10	4.06E-10	4.18E-10	4.29E-10	4.29E-10
cs134	3.60E-10	7.27E-10	7.49E-10	7.71E-10	7.93E-10	3.72E-10
dy160	2.51E-10	2.68E-10	2.86E-10	3.05E-10	3.24E-10	3.24E-10
xe128	1.63E-10	1.74E-10	1.84E-10	1.96E-10	2.07E-10	2.07E-10
kr 85	1.76E-10	2.00E-10	2.00E-10	2.00E-10	2.00E-10	1.73E-10
sr 86	8.73E-11	9.23E-11	9.75E-11	1.03E-10	1.08E-10	1.08E-10
te124	8.27E-11	8.64E-11	9.02E-11	9.41E-11	9.80E-11	9.80E-11
sn116	6.28E-11	6.69E-11	7.10E-11	7.53E-11	7.98E-11	7.98E-11
sr 87	5.02E-11	5.19E-11	5.37E-11	5.54E-11	5.72E-11	5.72E-11
nb 94	3.45E-11	3.63E-11	3.81E-11	4.00E-11	4.19E-11	4.19E-11

te122	2.62E-11	2.79E-11	2.96E-11	3.14E-11	3.33E-11	3.33E-11
se 76	2.68E-11	2.82E-11	2.96E-11	3.11E-11	3.27E-11	3.27E-11
ce144	3.60E-11	2.13E-10	2.13E-10	2.13E-10	2.12E-10	2.87E-11
ge 74	2.20E-11	2.27E-11	2.34E-11	2.41E-11	2.48E-11	2.48E-11
er166	1.92E-11	2.02E-11	2.13E-11	2.24E-11	2.35E-11	2.35E-11
ge 72	1.58E-11	1.63E-11	1.68E-11	1.73E-11	1.78E-11	1.78E-11
kr 80	5.13E-12	5.57E-12	6.03E-12	6.52E-12	7.03E-12	7.03E-12
y 90	5.40E-12	5.66E-12	5.66E-12	5.65E-12	5.65E-12	5.34E-12
sb125	3.77E-12	6.27E-12	6.29E-12	6.30E-12	6.32E-12	3.58E-12
ru106	3.47E-12	1.37E-11	1.38E-11	1.38E-11	1.39E-11	3.00E-12
er167	1.10E-12	1.19E-12	1.29E-12	1.39E-12	1.49E-12	1.49E-12
te123	6.83E-13	7.63E-13	8.07E-13	8.74E-13	9.44E-13	9.44E-13
cd108	2.51E-13	2.76E-13	3.04E-13	3.33E-13	3.65E-13	3.65E-13
be 9	4.81E-14	4.96E-14	5.11E-14	5.26E-14	5.41E-14	5.41E-14
li 7	1.96E-14	2.02E-14	2.08E-14	2.14E-14	2.20E-14	2.20E-14
sn114	1.60E-14	1.71E-14	1.82E-14	1.93E-14	2.04E-14	2.04E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 81
0 fraction of total absorption rate
power= .00mw, burnup= 12064.mwd, flux= 9.22E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

te127m	3.13E-14	3.17E-12	3.18E-12	3.19E-12	3.19E-12	1.78E-14
nb 95	4.36E-14	5.43E-11	5.43E-11	5.43E-11	5.42E-11	1.63E-14
sb126	8.66E-15	1.11E-14	1.14E-14	1.17E-14	1.20E-14	9.78E-15
zr 95	2.14E-14	5.86E-11	5.86E-11	5.85E-11	5.85E-11	7.96E-15
y 91	8.73E-15	5.01E-11	5.00E-11	5.00E-11	4.99E-11	2.96E-15
sr 89	4.73E-16	1.07E-11	1.07E-11	1.07E-11	1.06E-11	1.35E-16
ru103	3.42E-16	1.39E-10	1.39E-10	1.39E-10	1.39E-10	6.90E-17
sn123	7.55E-17	3.82E-15	3.82E-15	3.83E-15	3.83E-15	4.64E-17
tb160	3.30E-17	3.80E-14	3.94E-14	4.08E-14	4.23E-14	1.59E-17
ce141	9.75E-17	5.74E-10	5.74E-10	5.74E-10	5.74E-10	1.40E-17
cd109	2.07E-18	6.61E-18	7.04E-18	7.51E-18	7.99E-18	2.33E-18
pm148m	6.71E-18	1.44E-12	1.44E-12	1.44E-12	1.45E-12	1.47E-18
cd115m	1.13E-18	9.73E-14	9.75E-14	9.77E-14	9.79E-14	2.73E-19
sb124	4.49E-19	2.08E-15	2.12E-15	2.16E-15	2.19E-15	1.74E-19
te129m	1.92E-19	6.90E-13	6.90E-13	6.91E-13	6.92E-13	2.73E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 82
power= 1.468E-03mw, burnup=1.2064E+04mwd, flux= 9.22E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d
h 1	6.36E-04	6.56E-04	6.76E-04	6.95E-04	7.15E-04	7.15E-04
h 2	1.89E-06	1.95E-06	2.01E-06	2.07E-06	2.13E-06	2.13E-06
h 3	1.61E-11	1.82E-11	1.84E-11	1.85E-11	1.86E-11	1.64E-11
h 4	.00E+00	2.68E-35	2.70E-35	2.72E-35	2.74E-35	.00E+00
he 3	1.09E-08	1.11E-08	1.14E-08	1.16E-08	1.19E-08	1.19E-08
he 4	1.05E-04	1.09E-04	1.12E-04	1.15E-04	1.19E-04	1.19E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.27E-05	1.31E-05	1.34E-05	1.38E-05	1.42E-05	1.42E-05
ne 21	2.60E-09	2.76E-09	2.92E-09	3.09E-09	3.26E-09	3.26E-09
ne 22	8.33E-08	8.59E-08	8.85E-08	9.11E-08	9.38E-08	9.38E-08
ne 23	2.64E-30	2.64E-15	2.64E-15	2.64E-15	2.64E-15	2.64E-30
na 22	9.16E-12	1.57E-11	1.57E-11	1.57E-11	1.57E-11	8.60E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.58E-24	9.58E-09	9.58E-09	9.58E-09	9.58E-09	9.58E-24
na 24m	1.57E-30	1.57E-15	1.57E-15	1.57E-15	1.57E-15	1.57E-30
na 25	2.86E-39	3.03E-24	3.20E-24	3.38E-24	3.56E-24	3.56E-39
mg 24	8.54E-02	8.79E-02	9.03E-02	9.28E-02	9.53E-02	9.53E-02
mg 25	2.75E-07	2.91E-07	3.08E-07	3.25E-07	3.43E-07	3.43E-07

mg 26	1.89E-06	1.95E-06	2.01E-06	2.07E-06	2.13E-06	2.13E-06
mg 27	7.87E-28	7.88E-13	7.88E-13	7.89E-13	7.89E-13	7.89E-28
mg 28	.00E+00	5.81E-25	5.81E-25	5.82E-25	5.82E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.10E-26	7.10E-11	7.10E-11	7.10E-11	7.10E-11	7.10E-26
al 29	2.27E-37	2.40E-22	2.54E-22	2.69E-22	2.84E-22	2.84E-37
al 30	.00E+00	3.44E-32	3.75E-32	4.08E-32	4.43E-32	.00E+00
si 28	2.48E-01	2.56E-01	2.63E-01	2.70E-01	2.77E-01	2.77E-01
si 29	2.44E-06	2.58E-06	2.74E-06	2.89E-06	3.05E-06	3.05E-06
si 30	2.53E-11	2.77E-11	3.02E-11	3.28E-11	3.56E-11	3.56E-11
si 31	6.56E-39	7.18E-24	7.83E-24	8.52E-24	9.24E-24	9.24E-39
si 32	4.01E-30	4.42E-30	4.83E-30	5.26E-30	5.72E-30	5.67E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		9.21E+07	9.22E+07	9.22E+07	9.22E+07	9.22E-08

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 83
power= 1.46BE-03mw, burnup=1.2064E+04mwd, flux= 9.22E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	1.10E+01	1.16E+01	1.22E+01	1.28E+01	1.34E+01	1.34E+01
pb206	3.63E-02	3.89E-02	4.15E-02	4.42E-02	4.70E-02	4.70E-02
pb207	2.82E-03	2.99E-03	3.17E-03	3.35E-03	3.54E-03	3.54E-03
pb208	1.61E-04	1.71E-04	1.81E-04	1.91E-04	2.02E-04	2.02E-04
pb209	3.16E-10	3.31E-10	3.46E-10	3.61E-10	3.76E-10	3.76E-10
pb210	1.27E-04	1.32E-04	1.36E-04	1.40E-04	1.44E-04	1.44E-04
pb211	2.70E-11	2.77E-11	2.85E-11	2.92E-11	2.99E-11	3.00E-11
pb212	2.70E-11	2.78E-11	2.86E-11	2.94E-11	3.01E-11	3.00E-11
pb214	2.91E-10	3.01E-10	3.11E-10	3.20E-10	3.30E-10	3.30E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	4.53E-03	4.90E-03	5.30E-03	5.71E-03	6.14E-03	6.14E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	7.84E-08	8.10E-08	8.36E-08	8.63E-08	8.89E-08	8.89E-08
bi211	1.60E-12	1.64E-12	1.69E-12	1.73E-12	1.78E-12	1.78E-12
bi212	2.56E-12	2.64E-12	2.71E-12	2.78E-12	2.86E-12	2.85E-12
bi213	7.39E-11	7.73E-11	8.08E-11	8.43E-11	8.78E-11	8.79E-11
bi214	2.16E-10	2.23E-10	2.31E-10	2.38E-10	2.45E-10	2.45E-10
po210	2.15E-06	2.24E-06	2.31E-06	2.38E-06	2.45E-06	2.44E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.77E-17	1.82E-17	1.86E-17	1.91E-17	1.96E-17	1.97E-17
po212	1.35E-22	1.39E-22	1.43E-22	1.46E-22	1.50E-22	1.49E-22
po213	1.11E-19	1.16E-19	1.21E-19	1.27E-19	1.32E-19	1.32E-19
po214	2.97E-17	3.07E-17	3.17E-17	3.27E-17	3.37E-17	3.37E-17
po215	2.22E-17	2.28E-17	2.34E-17	2.40E-17	2.46E-17	2.47E-17
po216	1.02E-16	1.05E-16	1.08E-16	1.11E-16	1.14E-16	1.13E-16
po218	3.37E-11	3.48E-11	3.59E-11	3.71E-11	3.82E-11	3.82E-11
rn218	3.73E-39	1.47E-28	1.51E-28	1.55E-28	1.59E-28	2.00E-40
rn219	4.94E-14	5.07E-14	5.20E-14	5.34E-14	5.47E-14	5.49E-14
rn220	3.92E-14	4.04E-14	4.15E-14	4.26E-14	4.37E-14	4.35E-14
rn222	5.98E-08	6.18E-08	6.38E-08	6.58E-08	6.78E-08	6.78E-08
ra222	4.05E-36	1.59E-25	1.64E-25	1.68E-25	1.72E-25	2.17E-37
ra223	1.23E-08	1.26E-08	1.30E-08	1.33E-08	1.37E-08	1.37E-08
ra224	2.23E-10	2.30E-10	2.36E-10	2.42E-10	2.49E-10	2.47E-10
ra225	3.45E-08	3.62E-08	3.78E-08	3.94E-08	4.11E-08	4.11E-08
ra226	9.14E-03	9.45E-03	9.76E-03	1.01E-02	1.04E-02	1.04E-02
ra228	4.32E-11	4.46E-11	4.60E-11	4.74E-11	4.87E-11	4.87E-11
ac225	2.33E-08	2.44E-08	2.55E-08	2.66E-08	2.78E-08	2.78E-08
ac227	8.55E-06	8.79E-06	9.03E-06	9.26E-06	9.50E-06	9.50E-06
ac228	5.27E-15	5.44E-15	5.61E-15	5.78E-15	5.95E-15	5.95E-15
th226	1.97E-34	7.78E-24	7.99E-24	8.20E-24	8.41E-24	1.06E-35

th227	1.99E-08	2.04E-08	2.10E-08	2.15E-08	2.20E-08	2.21E-08
th228	4.24E-08	4.39E-08	4.51E-08	4.63E-08	4.74E-08	4.71E-08
th229	6.72E-03	7.03E-03	7.35E-03	7.67E-03	7.99E-03	7.99E-03
th230	4.84E-01	4.99E-01	5.13E-01	5.27E-01	5.41E-01	5.41E-01
th231	2.83E-09	3.65E-09	3.67E-09	3.69E-09	3.70E-09	2.81E-09
th232	1.06E-01	1.09E-01	1.12E-01	1.16E-01	1.19E-01	1.19E-01
th233	3.50E-28	3.61E-13	3.72E-13	3.84E-13	3.95E-13	3.95E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.29E-02	1.32E-02	1.36E-02	1.39E-02	1.43E-02	1.43E-02
pa232	7.99E-26	8.21E-11	8.43E-11	8.66E-11	8.88E-11	8.88E-26

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 84

power= 1.468E-03mw, burnup=1.2064E+04mwd, flux= 9.22E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.91E-31	7.54E-21	7.74E-21	7.95E-21	8.16E-21	1.03E-32
u231	6.91E-32	7.11E-17	7.31E-17	7.50E-17	7.70E-17	7.70E-32
u232	1.53E-06	1.60E-06	1.64E-06	1.69E-06	1.73E-06	1.69E-06
u233	2.51E-01	2.58E-01	2.66E-01	2.73E-01	2.80E-01	2.80E-01
u234	9.77E+00	9.79E+00	9.82E+00	9.84E+00	9.86E+00	9.86E+00
u235	6.85E+02	6.84E+02	6.83E+02	6.81E+02	6.80E+02	6.80E+02
u236	1.83E+02	1.83E+02	1.83E+02	1.83E+02	1.84E+02	1.84E+02
u237	1.71E-12	1.17E-06	1.17E-06	1.17E-06	1.17E-06	1.94E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-22
u240	3.73E-37	4.74E-37	5.99E-37	7.51E-37	9.36E-37	9.36E-37
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.67E-13	3.12E-12	3.12E-12	3.12E-12	3.12E-12	7.40E-13
np236m	7.40E-28	7.41E-13	7.41E-13	7.41E-13	7.40E-13	7.41E-28
np236	1.34E-06	1.38E-06	1.41E-06	1.45E-06	1.49E-06	1.49E-06
np237	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01
np238	5.38E-14	5.47E-07	5.47E-07	5.46E-07	5.46E-07	6.21E-14
np239	5.64E-14	1.62E-05	1.62E-05	1.62E-05	1.62E-05	7.97E-14
np240m	3.18E-39	4.05E-39	5.11E-39	6.41E-39	7.98E-39	7.99E-39
np240	4.17E-39	1.19E-15	1.19E-15	1.19E-15	1.19E-15	5.94E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.52E-10	4.05E-10	4.05E-10	4.05E-10	4.05E-10	2.38E-10
pu237	1.43E-18	1.08E-13	1.10E-13	1.12E-13	1.13E-13	3.75E-19
pu238	8.14E-03	8.27E-03	8.27E-03	8.27E-03	8.27E-03	8.12E-03
pu239	2.46E+01	2.51E+01	2.56E+01	2.61E+01	2.65E+01	2.65E+01
pu240	4.16E-01	4.31E-01	4.46E-01	4.61E-01	4.76E-01	4.76E-01
pu241	5.56E-05	6.35E-05	6.58E-05	6.80E-05	7.02E-05	6.30E-05
pu242	1.39E-05	1.50E-05	1.61E-05	1.73E-05	1.85E-05	1.85E-05
pu243	1.87E-29	1.14E-14	1.23E-14	1.32E-14	1.41E-14	1.43E-29
pu244	1.86E-26	2.36E-26	2.95E-26	3.74E-26	4.66E-26	4.66E-26
pu245	.00E+00	3.50E-37	4.42E-37	5.54E-37	6.91E-37	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.75E-34	1.82E-19	1.89E-19	1.96E-19	2.03E-19	2.03E-34
am240	8.02E-32	8.33E-17	8.65E-17	8.96E-17	9.27E-17	9.27E-32
am241	1.75E-03	1.81E-03	1.88E-03	1.95E-03	2.01E-03	2.01E-03
am242m	2.91E-07	3.05E-07	3.16E-07	3.28E-07	3.40E-07	3.36E-07
am242	3.75E-12	2.47E-11	2.56E-11	2.66E-11	2.75E-11	4.33E-12
am243	6.44E-08	7.06E-08	7.71E-08	8.39E-08	9.11E-08	9.11E-08
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.76E-31	1.93E-16	2.11E-16	2.30E-16	2.50E-16	2.50E-31

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     am245   2.54E-40  6.98E-38  8.81E-38  1.10E-37  1.38E-37  4.63E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   9.87E-29  5.27E-22  5.47E-22  5.67E-22  5.87E-22  1.67E-29
     cm242   9.40E-10  4.98E-09  5.18E-09  5.36E-09  5.55E-09  1.02E-09
     cm243   3.79E-14  4.13E-14  4.28E-14  4.44E-14  4.59E-14  4.35E-14
     cm244   2.57E-12  3.04E-12  3.32E-12  3.61E-12  3.92E-12  3.60E-12
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides        page   85
       power= 1.468E-03mw, burnup=1.2064E+04mwd, flux= 9.22E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   3.77E-15  4.24E-15  4.76E-15  5.28E-15  5.87E-15  5.87E-15
     cm246   2.13E-17  2.44E-17  2.79E-17  3.18E-17  3.60E-17  3.60E-17
     cm247   2.92E-21  3.47E-21  4.11E-21  4.84E-21  5.66E-21  5.66E-21
     cm248   3.90E-24  4.80E-24  5.87E-24  7.13E-24  8.62E-24  8.62E-24
     cm249    .00E+00  5.46E-35  6.48E-35  8.12E-35  9.81E-35   .00E+00
     cm250   1.55E-39  1.97E-39  2.48E-39  3.10E-39  3.85E-39  3.85E-39
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux                9.21E+07  9.22E+07  9.22E+07  9.22E+07  9.22E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       34q array has       12 entries.
library information...

          cross-section data taken from position number 10 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
```

```
          *                                                                      *
          *        see information above this box (if present) for later updates *
          *                                                                      *
          ************************************************************************
          *                                                                      *
          ************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/29/1996    date library was produced
0                  1697     total number of nuclides in library
                    489     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7993     number of nonzero off-diagonal matrix elements
0         ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   86
         power=    .00mw, burnup=  13405.mwd, flux= 9.22E+07n/cm**2-sec
0                                                 basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.234425E+06   1.234251E+06   1.234056E+06   1.233841E+06   1.233607E+06   1.233607E+06
     absorptions   1.000585E+06   1.000699E+06   1.000800E+06   1.000889E+06   1.000967E+06   1.000967E+06
     k infinity    1.233703E+00   1.233389E+00   1.233069E+00   1.232746E+00   1.232415E+00   1.232415E+00
0                  initial        ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   9.864043E+05   9.863852E+05   9.863549E+05   9.863136E+05   9.862617E+05   9.862617E+05
     non-actinide
     abs. fracs.   1.417267E-02   1.430368E-02   1.443362E-02   1.456237E-02   1.469141E-02   1.469141E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page   87
8                                  fraction of total absorption rate
         power=    .00mw, burnup=  13405.mwd, flux= 9.22E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.45E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03
     eu151      1.31E-03  1.33E-03  1.35E-03  1.38E-03  1.40E-03  1.40E-03
     nd143      1.17E-03  1.20E-03  1.24E-03  1.27E-03  1.30E-03  1.30E-03
     rh103      5.64E-04  5.80E-04  5.96E-04  6.12E-04  6.27E-04  6.27E-04
     xe131      3.79E-04  3.90E-04  4.00E-04  4.11E-04  4.21E-04  4.21E-04
     cs133      2.94E-04  3.02E-04  3.11E-04  3.19E-04  3.27E-04  3.27E-04
     sm147      2.17E-04  2.23E-04  2.29E-04  2.35E-04  2.40E-04  2.40E-04
     tc 99      2.09E-04  2.14E-04  2.20E-04  2.25E-04  2.31E-04  2.31E-04
     gd155      2.11E-04  2.12E-04  2.13E-04  2.14E-04  2.15E-04  2.15E-04
     nd145      1.66E-04  1.71E-04  1.75E-04  1.80E-04  1.85E-04  1.85E-04
     sm152      1.17E-04  1.21E-04  1.25E-04  1.28E-04  1.32E-04  1.32E-04
     mo 95      1.15E-04  1.19E-04  1.22E-04  1.25E-04  1.28E-04  1.28E-04
     cd113      9.90E-05  9.93E-05  9.96E-05  9.99E-05  1.00E-04  1.00E-04
     sm150      8.31E-05  8.57E-05  8.82E-05  9.08E-05  9.33E-05  9.33E-05
     kr 83      7.14E-05  7.33E-05  7.52E-05  7.71E-05  7.90E-05  7.90E-05
     cs135      6.66E-05  6.85E-05  7.03E-05  7.21E-05  7.40E-05  7.40E-05
     gd157      5.70E-05  5.74E-05  5.78E-05  5.81E-05  5.85E-05  5.85E-05
     ru101      5.18E-05  5.32E-05  5.47E-05  5.61E-05  5.75E-05  5.75E-05
     eu153      4.99E-05  5.13E-05  5.28E-05  5.43E-05  5.58E-05  5.58E-05
     pr141      4.95E-05  5.09E-05  5.22E-05  5.36E-05  5.50E-05  5.50E-05
     la139      4.05E-05  4.16E-05  4.27E-05  4.38E-05  4.49E-05  4.49E-05
     pd105      1.97E-05  2.03E-05  2.09E-05  2.15E-05  2.21E-05  2.21E-05
     ba137      1.95E-05  2.00E-05  2.06E-05  2.11E-05  2.16E-05  2.16E-05
     ag109      1.67E-05  1.74E-05  1.81E-05  1.88E-05  1.95E-05  1.95E-05
     sm151      1.79E-05  1.82E-05  1.83E-05  1.83E-05  1.83E-05  1.83E-05
     zr 93      1.61E-05  1.66E-05  1.70E-05  1.74E-05  1.79E-05  1.79E-05
      i129      1.31E-05  1.34E-05  1.38E-05  1.42E-05  1.45E-05  1.45E-05
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nd144	1.23E-05	1.27E-05	1.30E-05	1.34E-05	1.37E-05	1.37E-05
mo 97	9.20E-06	9.45E-06	9.70E-06	9.96E-06	1.02E-05	1.02E-05
gd152	6.80E-06	7.14E-06	7.49E-06	7.84E-06	8.20E-06	8.20E-06
pd108	4.20E-06	4.35E-06	4.52E-06	4.68E-06	4.84E-06	4.84E-06
zr 91	4.25E-06	4.37E-06	4.49E-06	4.60E-06	4.72E-06	4.72E-06
y 89	4.07E-06	4.18E-06	4.29E-06	4.40E-06	4.51E-06	4.51E-06
ru102	3.81E-06	3.92E-06	4.03E-06	4.14E-06	4.24E-06	4.24E-06
ce142	3.37E-06	3.46E-06	3.55E-06	3.65E-06	3.74E-06	3.74E-06
nd148	3.25E-06	3.34E-06	3.43E-06	3.52E-06	3.61E-06	3.61E-06
nd146	2.73E-06	2.80E-06	2.88E-06	2.95E-06	3.03E-06	3.03E-06
in115	2.37E-06	2.44E-06	2.51E-06	2.58E-06	2.65E-06	2.65E-06
ba138	2.33E-06	2.39E-06	2.45E-06	2.52E-06	2.58E-06	2.58E-06
pd107	2.16E-06	2.24E-06	2.32E-06	2.40E-06	2.48E-06	2.48E-06
ce140	2.18E-06	2.24E-06	2.30E-06	2.36E-06	2.42E-06	2.42E-06
xe132	1.99E-06	2.04E-06	2.10E-06	2.16E-06	2.21E-06	2.21E-06
ru 99	1.23E-06	1.30E-06	1.37E-06	1.44E-06	1.51E-06	1.51E-06
mo 98	1.35E-06	1.38E-06	1.42E-06	1.46E-06	1.50E-06	1.50E-06
mo100	1.31E-06	1.35E-06	1.38E-06	1.42E-06	1.45E-06	1.45E-06
xe134	1.29E-06	1.32E-06	1.36E-06	1.39E-06	1.43E-06	1.43E-06
zr 92	1.03E-06	1.06E-06	1.08E-06	1.11E-06	1.14E-06	1.14E-06
i127	9.36E-07	9.64E-07	9.92E-07	1.02E-06	1.05E-06	1.05E-06
ru104	8.64E-07	8.89E-07	9.14E-07	9.40E-07	9.65E-07	9.65E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 88
0 fraction of total absorption rate
power= .00mw, burnup= 13405.mwd, flux= 9.22E+07n/cm**2-sec
0

	initial ******* d	******* d	******* d	******* d	******* d	******* d
zr 96	8.12E-07	8.35E-07	8.57E-07	8.79E-07	9.02E-07	9.02E-07
xe135	.00E+00	8.44E-07	8.44E-07	8.44E-07	8.45E-07	8.45E-07
nd150	7.31E-07	7.52E-07	7.72E-07	7.93E-07	8.13E-07	8.13E-07
xe136	6.98E-07	7.17E-07	7.36E-07	7.56E-07	7.75E-07	7.75E-07
br 81	5.20E-07	5.34E-07	5.48E-07	5.62E-07	5.77E-07	5.77E-07
cd111	4.99E-07	5.16E-07	5.33E-07	5.51E-07	5.68E-07	5.68E-07
rb 85	5.00E-07	5.14E-07	5.27E-07	5.41E-07	5.54E-07	5.54E-07
zr 94	4.36E-07	4.48E-07	4.60E-07	4.72E-07	4.84E-07	4.84E-07
zr 90	4.01E-07	4.12E-07	4.23E-07	4.34E-07	4.44E-07	4.44E-07
sm154	3.35E-07	3.45E-07	3.55E-07	3.65E-07	3.74E-07	3.74E-07
te130	3.21E-07	3.29E-07	3.38E-07	3.47E-07	3.56E-07	3.56E-07
gd154	2.67E-07	2.82E-07	2.98E-07	3.15E-07	3.31E-07	3.31E-07
rb 87	2.88E-07	2.96E-07	3.04E-07	3.12E-07	3.19E-07	3.19E-07
se 77	2.09E-07	2.14E-07	2.20E-07	2.26E-07	2.32E-07	2.32E-07
pd106	1.94E-07	2.00E-07	2.07E-07	2.13E-07	2.20E-07	2.20E-07
gd156	1.78E-07	1.84E-07	1.91E-07	1.97E-07	2.03E-07	2.03E-07
kr 84	1.37E-07	1.41E-07	1.45E-07	1.48E-07	1.52E-07	1.52E-07
ba135	1.21E-07	1.28E-07	1.34E-07	1.42E-07	1.49E-07	1.49E-07
eu152	1.10E-07	1.26E-07	1.29E-07	1.31E-07	1.33E-07	1.33E-07
sb121	1.09E-07	1.12E-07	1.15E-07	1.18E-07	1.21E-07	1.21E-07
dy161	1.02E-07	1.06E-07	1.10E-07	1.14E-07	1.19E-07	1.19E-07
se 79	1.05E-07	1.08E-07	1.11E-07	1.14E-07	1.17E-07	1.17E-07
sb123	8.78E-08	9.04E-08	9.29E-08	9.55E-08	9.80E-08	9.80E-08
pm147	5.46E-08	9.78E-08	9.77E-08	9.77E-08	9.77E-08	9.77E-08
ru100	7.76E-08	8.19E-08	8.63E-08	9.08E-08	9.55E-08	9.55E-08
kr 86	7.60E-08	7.81E-08	8.02E-08	8.22E-08	8.43E-08	8.43E-08
te128	7.20E-08	7.60E-08	7.61E-08	7.81E-08	8.02E-08	8.02E-08
nd142	5.55E-08	5.86E-08	6.18E-08	6.51E-08	6.85E-08	6.85E-08
eu155	4.78E-08	6.69E-08	6.71E-08	6.73E-08	6.76E-08	6.76E-08
ba134	5.33E-08	5.63E-08	5.94E-08	6.26E-08	6.58E-08	6.58E-08
sm148	4.87E-08	5.15E-08	5.43E-08	5.71E-08	6.01E-08	6.01E-08
se 80	5.00E-08	5.13E-08	5.27E-08	5.41E-08	5.54E-08	5.54E-08
te125	4.80E-08	4.94E-08	5.08E-08	5.23E-08	5.37E-08	5.37E-08

tb159	4.67E-08	4.84E-08	5.00E-08	5.17E-08	5.34E-08	5.34E-08
pd104	3.65E-08	3.86E-08	4.07E-08	4.29E-08	4.51E-08	4.51E-08
gd158	3.74E-08	3.87E-08	4.00E-08	4.14E-08	4.27E-08	4.27E-08
cd112	3.54E-08	3.65E-08	3.77E-08	3.88E-08	3.99E-08	3.99E-08
li 6	2.70E-08	2.77E-08	2.84E-08	2.91E-08	2.98E-08	2.98E-08
sn117	2.57E-08	2.65E-08	2.73E-08	2.80E-08	2.88E-08	2.88E-08
dy164	2.25E-08	2.35E-08	2.44E-08	2.54E-08	2.64E-08	2.64E-08
dy162	2.12E-08	2.21E-08	2.31E-08	2.41E-08	2.50E-08	2.50E-08
cd114	2.13E-08	2.20E-08	2.26E-08	2.33E-08	2.40E-08	2.40E-08
nb 93	1.93E-08	2.04E-08	2.15E-08	2.27E-08	2.38E-08	2.38E-08
sn119	2.00E-08	2.05E-08	2.11E-08	2.17E-08	2.23E-08	2.23E-08
sn115	1.83E-08	1.88E-08	1.93E-08	1.99E-08	2.04E-08	2.04E-08
pd110	1.44E-08	1.70E-08	1.76E-08	1.82E-08	1.88E-08	1.88E-08
sr 88	1.40E-08	1.43E-08	1.47E-08	1.51E-08	1.55E-08	1.55E-08
mo 96	1.25E-08	1.32E-08	1.39E-08	1.46E-08	1.53E-08	1.53E-08
cd110	1.02E-08	1.09E-08	1.17E-08	1.24E-08	1.32E-08	1.32E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 89
0 fraction of total absorption rate
power= .00mw, burnup= 13405.mwd, flux= 9.22E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

br 79	9.72E-09	1.03E-08	1.08E-08	1.14E-08	1.20E-08	1.20E-08
se 82	9.57E-09	9.83E-09	1.01E-08	1.04E-08	1.06E-08	1.06E-08
ag107	7.49E-09	8.18E-09	8.69E-09	9.21E-09	9.75E-09	9.75E-09
sm126	8.50E-09	8.75E-09	8.99E-09	9.24E-09	9.48E-09	9.48E-09
eu154	6.70E-09	8.27E-09	8.52E-09	8.76E-09	9.01E-09	9.01E-09
se 78	7.44E-09	7.64E-09	7.85E-09	8.06E-09	8.27E-09	8.27E-09
xe130	6.39E-09	6.73E-09	7.07E-09	7.42E-09	7.78E-09	7.78E-09
ba136	6.48E-09	6.77E-09	7.07E-09	7.37E-09	7.67E-09	7.67E-09
sn124	6.38E-09	6.56E-09	6.75E-09	6.94E-09	7.13E-09	7.13E-09
xe129	5.71E-09	6.04E-09	6.37E-09	6.71E-09	7.06E-09	7.06E-09
dy163	5.32E-09	5.55E-09	5.79E-09	6.04E-09	6.29E-09	6.29E-09
sr 90	5.61E-09	5.93E-09	5.92E-09	5.92E-09	5.91E-09	5.91E-09
kr 82	4.97E-09	5.20E-09	5.42E-09	5.65E-09	5.89E-09	5.89E-09
as 75	4.39E-09	4.51E-09	4.63E-09	4.75E-09	4.88E-09	4.88E-09
te126	3.38E-09	3.56E-09	3.76E-09	3.95E-09	4.15E-09	4.15E-09
in113	3.61E-09	3.72E-09	3.83E-09	3.94E-09	4.04E-09	4.04E-09
rh105	.00E+00	3.82E-09	3.83E-09	3.84E-09	3.86E-09	3.86E-09
sn118	2.58E-09	2.66E-09	2.73E-09	2.81E-09	2.88E-09	2.88E-09
sn122	2.20E-09	2.26E-09	2.33E-09	2.39E-09	2.46E-09	2.46E-09
cd116	2.17E-09	2.24E-09	2.30E-09	2.36E-09	2.43E-09	2.43E-09
sn120	1.63E-09	1.67E-09	1.72E-09	1.77E-09	1.82E-09	1.82E-09
ge 73	1.24E-09	1.27E-09	1.31E-09	1.34E-09	1.38E-09	1.38E-09
cs137	1.29E-09	1.36E-09	1.36E-09	1.36E-09	1.36E-09	1.36E-09
pr143	.00E+00	9.47E-10	9.46E-10	9.46E-10	9.45E-10	9.45E-10
cs134	3.72E-10	8.15E-10	8.37E-10	8.59E-10	8.81E-10	8.81E-10
xe133	.00E+00	7.30E-10	7.30E-10	7.30E-10	7.30E-10	7.30E-10
gd160	5.04E-10	5.23E-10	5.42E-10	5.61E-10	5.81E-10	5.81E-10
ce141	1.40E-17	5.74E-10	5.73E-10	5.73E-10	5.73E-10	5.73E-10
ho165	4.50E-10	4.72E-10	4.95E-10	5.18E-10	5.42E-10	5.42E-10
ge 74	4.29E-10	4.41E-10	4.53E-10	4.65E-10	4.76E-10	4.76E-10
dy160	3.24E-10	3.44E-10	3.65E-10	3.86E-10	4.08E-10	4.08E-10
pm149	.00E+00	3.56E-10	3.56E-10	3.56E-10	3.56E-10	3.56E-10
nd147	.00E+00	3.34E-10	3.34E-10	3.34E-10	3.34E-10	3.34E-10
xe128	2.07E-10	2.19E-10	2.31E-10	2.44E-10	2.57E-10	2.57E-10
ce144	2.87E-11	2.12E-10	2.12E-10	2.12E-10	2.12E-10	2.12E-10
kr 83	1.73E-10	2.00E-10	2.00E-10	1.99E-10	1.99E-10	1.99E-10
ru103	6.90E-17	1.39E-10	1.39E-10	1.40E-10	1.40E-10	1.40E-10
sr 86	1.08E-10	1.14E-10	1.20E-10	1.26E-10	1.32E-10	1.32E-10
te124	9.80E-11	1.02E-10	1.06E-10	1.10E-10	1.15E-10	1.15E-10

sn116	7.98E-11	8.43E-11	8.90E-11	9.38E-11	9.88E-11	9.88E-11
sr 87	5.72E-11	5.89E-11	6.07E-11	6.25E-11	6.43E-11	6.43E-11
zr 95	7.96E-15	5.85E-11	5.84E-11	5.84E-11	5.84E-11	5.84E-11
nb 95	1.43E-14	5.42E-11	5.42E-11	5.42E-11	5.41E-11	5.41E-11
nb 94	4.19E-11	4.39E-11	4.60E-11	4.81E-11	5.03E-11	5.03E-11
y 91	2.96E-15	4.99E-11	4.99E-11	4.98E-11	4.98E-11	4.98E-11
pm151	.00E+00	4.18E-11	4.19E-11	4.19E-11	4.19E-11	4.19E-11
te122	3.33E-11	3.52E-11	3.71E-11	3.91E-11	4.12E-11	4.12E-11
se 76	3.27E-11	3.42E-11	3.58E-11	3.74E-11	3.91E-11	3.91E-11
er166	2.35E-11	2.46E-11	2.57E-11	2.69E-11	2.81E-11	2.81E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 90
0 fraction of total absorption rate
power= .00mw, burnup= 13405.mwd, flux= 9.22E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d

se 74	2.48E-11	2.53E-11	2.62E-11	2.69E-11	2.76E-11	2.76E-11
se 72	1.78E-11	1.84E-11	1.89E-11	1.94E-11	2.00E-11	2.00E-11
eu156	.00E+00	1.80E-11	1.81E-11	1.82E-11	1.83E-11	1.83E-11
sm153	.00E+00	1.68E-11	1.69E-11	1.69E-11	1.70E-11	1.70E-11
ba140	.00E+00	1.69E-11	1.69E-11	1.69E-11	1.69E-11	1.69E-11
ru106	3.00E-12	1.40E-11	1.41E-11	1.42E-11	1.43E-11	1.43E-11
sr 89	1.35E-16	1.06E-11	1.06E-11	1.06E-11	1.06E-11	1.06E-11
kr 88	7.03E-12	7.57E-12	8.14E-12	8.74E-12	9.37E-12	9.37E-12
kr 87	.00E+00	7.97E-12	7.96E-12	7.96E-12	7.95E-12	7.95E-12
sb125	3.58E-12	6.33E-12	6.35E-12	6.37E-12	6.38E-12	6.38E-12
ce143	.00E+00	6.21E-12	6.20E-12	6.20E-12	6.20E-12	6.20E-12
y 90	5.34E-12	5.64E-12	5.64E-12	5.63E-12	5.63E-12	5.63E-12
la140	.00E+00	5.48E-12	5.47E-12	5.47E-12	5.47E-12	5.47E-12
mo 99	.00E+00	4.73E-12	4.73E-12	4.73E-12	4.73E-12	4.73E-12
te127m	1.78E-14	3.20E-12	3.21E-12	3.22E-12	3.23E-12	3.23E-12
i131	.00E+00	2.49E-12	2.49E-12	2.49E-12	2.49E-12	2.49E-12
er167	1.49E-12	1.60E-12	1.71E-12	1.83E-12	1.95E-12	1.95E-12
pm148m	1.47E-18	1.45E-12	1.46E-12	1.46E-12	1.46E-12	1.46E-12
te123	9.44E-13	1.02E-12	1.10E-12	1.18E-12	1.27E-12	1.27E-12
te129m	2.74E-20	6.92E-13	6.93E-13	6.94E-13	6.94E-13	6.94E-13
cd108	3.65E-13	3.98E-13	4.34E-13	4.72E-13	5.12E-13	5.12E-13
ag111	.00E+00	2.11E-13	2.12E-13	2.14E-13	2.16E-13	2.16E-13
eu157	.00E+00	1.73E-13	1.75E-13	1.76E-13	1.77E-13	1.77E-13
cd115m	2.74E-19	9.81E-14	9.84E-14	9.86E-14	9.88E-14	9.88E-14
cs136	.00E+00	9.04E-14	9.21E-14	9.38E-14	9.55E-14	9.55E-14
be 9	5.41E-14	5.56E-14	5.71E-14	5.86E-14	6.01E-14	6.01E-14
pm148	.00E+00	5.03E-14	5.04E-14	5.04E-14	5.05E-14	5.05E-14
tb160	1.59E-17	4.37E-14	4.52E-14	4.67E-14	4.81E-14	4.81E-14
sn114	2.04E-14	2.16E-14	2.28E-14	2.41E-14	2.54E-14	2.54E-14
li 7	2.20E-14	2.26E-14	2.32E-14	2.38E-14	2.44E-14	2.44E-14
pr142	.00E+00	2.09E-14	2.14E-14	2.20E-14	2.26E-14	2.26E-14
ru105	.00E+00	1.35E-14	1.35E-14	1.36E-14	1.36E-14	1.36E-14
sb126	9.78E-15	1.23E-14	1.26E-14	1.29E-14	1.32E-14	1.32E-14
sn125	.00E+00	1.17E-14	1.17E-14	1.17E-14	1.18E-14	1.18E-14
rb 88	.00E+00	4.48E-15	4.47E-15	4.47E-15	4.47E-15	4.47E-15
i130	.00E+00	3.89E-15	3.99E-15	4.09E-15	4.18E-15	4.18E-15
sn123	4.64E-17	3.83E-15	3.84E-15	3.84E-15	3.84E-15	3.84E-15
i135	.00E+00	3.67E-15	3.67E-15	3.67E-15	3.67E-15	3.67E-15
te132	.00E+00	3.50E-15	3.50E-15	3.50E-15	3.50E-15	3.50E-15
sb124	1.74E-19	2.23E-15	2.27E-15	2.31E-15	2.35E-15	2.35E-15
te134	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	2.07E-15
rb 86	.00E+00	1.28E-15	1.31E-15	1.34E-15	1.37E-15	1.37E-15
in117m	.00E+00	9.41E-16	9.44E-16	9.47E-16	9.50E-16	9.50E-16
dy165	.00E+00	7.31E-16	7.47E-16	7.64E-16	7.80E-16	7.80E-16
in117	.00E+00	2.81E-16	2.82E-16	2.83E-16	2.84E-16	2.84E-16

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     cs134m      .00E+00  1.54E-16  1.58E-16  1.62E-16  1.66E-16  1.66E-16
     cd118       .00E+00  4.96E-17  4.97E-17  4.98E-17  4.99E-17  4.99E-17
     gp 75       .00E+00  3.14E-17  3.14E-17  3.14E-17  3.14E-17  3.14E-17
     in119m      .00E+00  1.22E-17  1.22E-17  1.22E-17  1.22E-17  1.22E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page   91
0                                   fraction of total absorption rate
         power=     .00mw, burnup=  13403.mwd, flux= 9.22E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     cd109     2.33E-18  8.50E-18  9.04E-18  9.41E-18  1.02E-17  1.02E-17
     ag110       .00E+00  8.29E-18  8.62E-18  8.96E-18  9.30E-18  9.30E-18
     in119       .00E+00  9.87E-19  9.96E-19  9.96E-19  9.96E-19  9.96E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page   92
       power= 1.468E-03mw, burnup=1.3405E+04mwd, flux= 9.22E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1    7.15E-04  7.35E-04  7.55E-04  7.75E-04  7.95E-04  7.95E-04
      h  2    2.13E-06  2.19E-06  2.25E-06  2.31E-06  2.37E-06  2.37E-06
      h  3    1.64E-11  1.88E-11  1.89E-11  1.90E-11  1.92E-11  1.92E-11
      h  4     .00E+00  2.76E-35  2.78E-35  2.80E-35  2.82E-35  2.82E-35
     he  3    1.19E-08  1.21E-08  1.23E-08  1.26E-08  1.28E-08  1.28E-08
     he  4    1.19E-04  1.22E-04  1.25E-04  1.29E-04  1.32E-04  1.32E-04
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    1.42E-05  1.46E-05  1.50E-05  1.54E-05  1.58E-05  1.58E-05
     ne 21    3.26E-09  3.43E-09  3.61E-09  3.80E-09  3.99E-09  3.99E-09
     ne 22    9.38E-08  9.64E-08  9.90E-08  1.02E-07  1.04E-07  1.04E-07
     ne 23    2.64E-30  2.65E-15  2.65E-15  2.65E-15  2.65E-15  2.65E-15
     na 22    8.60E-12  1.57E-11  1.57E-11  1.57E-11  1.57E-11  1.57E-11
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    9.58E-24  9.58E-09  9.59E-09  9.59E-09  9.59E-09  9.59E-09
     na 24m   1.57E-30  1.57E-15  1.58E-15  1.58E-15  1.58E-15  1.58E-15
     na 25    3.56E-39  3.75E-24  3.94E-24  4.14E-24  4.34E-24  4.34E-24
     mg 24    9.53E-02  9.78E-02  1.00E-01  1.03E-01  1.05E-01  1.05E-01
     mg 25    3.43E-07  3.61E-07  3.79E-07  3.98E-07  4.17E-07  4.17E-07
     mg 26    2.13E-06  2.19E-06  2.25E-06  2.31E-06  2.37E-06  2.37E-06
     mg 27    7.89E-28  7.90E-13  7.90E-13  7.91E-13  7.91E-13  7.91E-13
     mg 28     .00E+00  5.83E-25  5.83E-25  5.84E-25  5.84E-25  5.84E-25
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    7.10E-26  7.10E-11  7.11E-11  7.11E-11  7.11E-11  7.11E-11
     al 29    2.84E-37  2.99E-22  3.15E-22  3.31E-22  3.48E-22  3.48E-22
     al 30     .00E+00  4.79E-32  5.18E-32  5.59E-32  6.02E-32  6.02E-32
     si 28    2.77E-01  2.85E-01  2.92E-01  2.99E-01  3.06E-01  3.06E-01
     si 29    3.05E-06  3.21E-06  3.38E-06  3.55E-06  3.73E-06  3.73E-06
     si 30    3.56E-11  3.85E-11  4.16E-11  4.49E-11  4.83E-11  4.83E-11
     si 31    9.24E-39  1.00E-23  1.08E-23  1.17E-23  1.26E-23  1.26E-23
     si 32    5.67E-30  6.20E-30  6.71E-30  7.24E-30  7.80E-30  7.80E-30
   totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                 9.22E+07  9.22E+07  9.22E+07  9.23E+07  9.23E-08
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page   93
       power= 1.468E-03mw, burnup=1.3405E+04mwd, flux= 9.22E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     he  4    1.34E+01  1.40E+01  1.46E+01  1.52E+01  1.59E+01  1.59E+01
     pb206    4.70E-02  4.98E-02  5.28E-02  5.58E-02  5.89E-02  5.89E-02
     pb207    3.54E-03  3.73E-03  3.93E-03  4.13E-03  4.33E-03  4.33E-03
     pb208    2.02E-04  2.13E-04  2.24E-04  2.36E-04  2.47E-04  2.47E-04
```

pb209	3.76E-10	3.91E-10	4.07E-10	4.22E-10	4.37E-10	4.37E-10
pb210	1.44E-04	1.49E-04	1.53E-04	1.57E-04	1.61E-04	1.61E-04
pb211	3.00E-11	3.07E-11	3.14E-11	3.21E-11	3.29E-11	3.29E-11
pb212	3.00E-11	3.08E-11	3.16E-11	3.23E-11	3.31E-11	3.31E-11
pb214	3.30E-10	3.40E-10	3.49E-10	3.59E-10	3.69E-10	3.69E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.14E-03	6.59E-03	7.06E-03	7.54E-03	8.04E-03	8.04E-03
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	8.89E-08	9.15E-08	9.41E-08	9.67E-08	9.92E-08	9.92E-08
bi211	1.78E-12	1.82E-12	1.86E-12	1.91E-12	1.95E-12	1.95E-12
bi212	2.84E-12	2.93E-12	3.00E-12	3.07E-12	3.14E-12	3.14E-12
bi213	8.79E-11	9.14E-11	9.49E-11	9.85E-11	1.02E-10	1.02E-10
bi214	2.45E-10	2.52E-10	2.59E-10	2.67E-10	2.74E-10	2.74E-10
po210	2.44E-06	2.53E-06	2.60E-06	2.67E-06	2.74E-06	2.74E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	1.97E-17	2.01E-17	2.06E-17	2.11E-17	2.15E-17	2.15E-17
po212	1.49E-22	1.54E-22	1.57E-22	1.61E-22	1.65E-22	1.65E-22
po213	1.32E-19	1.37E-19	1.43E-19	1.48E-19	1.53E-19	1.53E-19
po214	3.37E-17	3.47E-17	3.57E-17	3.67E-17	3.76E-17	3.76E-17
po215	2.47E-17	2.52E-17	2.58E-17	2.64E-17	2.70E-17	2.70E-17
po216	1.13E-16	1.17E-16	1.20E-16	1.22E-16	1.25E-16	1.25E-16
po218	3.82E-11	3.93E-11	4.04E-11	4.15E-11	4.26E-11	4.26E-11
rn218	2.00E-40	1.43E-28	1.67E-28	1.71E-28	1.75E-28	1.75E-28
rn219	5.49E-14	5.61E-14	5.74E-14	5.88E-14	6.01E-14	6.01E-14
rn220	4.35E-14	4.48E-14	4.59E-14	4.69E-14	4.80E-14	4.80E-14
rn222	6.78E-08	6.98E-08	7.18E-08	7.38E-08	7.57E-08	7.57E-08
ra222	2.17E-37	1.77E-25	1.81E-25	1.85E-25	1.90E-25	1.90E-25
ra223	1.37E-08	1.40E-08	1.43E-08	1.47E-08	1.50E-08	1.50E-08
ra224	2.47E-10	2.55E-10	2.61E-10	2.67E-10	2.73E-10	2.73E-10
ra225	4.11E-08	4.27E-08	4.44E-08	4.61E-08	4.77E-08	4.77E-08
ra226	1.04E-02	1.07E-02	1.10E-02	1.13E-02	1.16E-02	1.16E-02
ra228	4.87E-11	5.01E-11	5.15E-11	5.29E-11	5.43E-11	5.43E-11
ac225	2.78E-08	2.89E-08	3.00E-08	3.11E-08	3.23E-08	3.23E-08
ac227	9.50E-06	9.73E-06	9.96E-06	1.02E-05	1.04E-05	1.04E-05
ac228	5.95E-15	6.12E-15	6.29E-15	6.46E-15	6.63E-15	6.63E-15
th226	1.06E-35	8.63E-24	8.84E-24	9.05E-24	9.26E-24	9.26E-24
th227	2.21E-08	2.26E-08	2.31E-08	2.37E-08	2.42E-08	2.42E-08
th228	4.71E-08	4.86E-08	4.98E-08	5.10E-08	5.21E-08	5.21E-08
th229	7.99E-03	8.31E-03	8.63E-03	8.96E-03	9.28E-03	9.28E-03
th230	5.41E-01	5.55E-01	5.69E-01	5.84E-01	5.97E-01	5.97E-01
th231	2.81E-09	3.72E-09	3.74E-09	3.76E-09	3.78E-09	3.78E-09
th232	1.19E-01	1.23E-01	1.26E-01	1.29E-01	1.33E-01	1.33E-01
th233	3.95E-28	4.06E-13	4.18E-13	4.29E-13	4.41E-13	4.41E-13
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.43E-02	1.46E-02	1.50E-02	1.53E-02	1.57E-02	1.57E-02
pa232	8.88E-26	9.10E-11	9.32E-11	9.54E-11	9.75E-11	9.75E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 94

power= 1.468E-03mw, burnup=1.3405E+04mwd, flux= 9.22E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.03E-32	8.36E-21	8.57E-21	8.77E-21	8.97E-21	8.97E-21
u231	7.70E-32	7.90E-17	8.09E-17	8.29E-17	8.48E-17	8.48E-17
u232	1.69E-06	1.77E-06	1.82E-06	1.86E-06	1.90E-06	1.90E-06
u233	2.80E-01	2.87E-01	2.94E-01	3.01E-01	3.08E-01	3.08E-01

u234	9.86E+00	9.88E+00	9.90E+00	9.92E+00	9.94E+00	9.94E+00
u235	6.80E+02	6.79E+02	6.78E+02	6.77E+02	6.76E+02	6.76E+02
u236	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.85E+02	1.85E+02
u237	1.94E-12	1.17E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-22	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07
u240	9.36E-37	1.16E-36	1.42E-36	1.74E-36	2.12E-36	2.12E-36
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	7.40E-13	3.12E-12	3.12E-12	3.12E-12	3.12E-12	3.12E-12
np236m	7.41E-28	7.41E-13	7.41E-13	7.41E-13	7.41E-13	7.41E-13
np236	1.49E-06	1.53E-06	1.57E-06	1.61E-06	1.64E-06	1.64E-06
np237	4.14E+01	4.13E+01	4.13E+01	4.13E+01	4.13E+01	4.13E+01
np238	6.21E-14	5.46E-07	5.46E-07	5.46E-07	5.46E-07	5.46E-07
np239	7.97E-14	1.62E-05	1.62E-05	1.62E-05	1.62E-05	1.62E-05
np240m	7.99E-39	9.89E-39	1.22E-38	1.49E-38	1.81E-38	1.81E-38
np240	5.94E-39	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.38E-10	4.05E-10	4.05E-10	4.05E-10	4.05E-10	4.05E-10
pu237	3.75E-19	1.15E-13	1.16E-13	1.18E-13	1.19E-13	1.19E-13
pu238	8.12E-03	8.26E-03	8.26E-03	8.26E-03	8.26E-03	8.26E-03
pu239	2.65E+01	2.70E+01	2.74E+01	2.79E+01	2.83E+01	2.83E+01
pu240	4.76E-01	4.91E-01	5.05E-01	5.19E-01	5.33E-01	5.33E-01
pu241	6.30E-05	7.23E-05	7.45E-05	7.66E-05	7.87E-05	7.87E-05
pu242	1.85E-05	1.97E-05	2.10E-05	2.23E-05	2.37E-05	2.37E-05
pu243	1.43E-29	1.51E-14	1.60E-14	1.71E-14	1.81E-14	1.81E-14
pu244	4.66E-26	5.77E-26	7.09E-26	8.67E-26	1.05E-25	1.05E-25
pu245	.00E+00	8.55E-37	1.05E-36	1.29E-36	1.56E-36	1.56E-36
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	2.03E-34	2.09E-19	2.16E-19	2.23E-19	2.29E-19	2.29E-19
am240	9.27E-32	9.57E-17	9.88E-17	1.02E-16	1.05E-16	1.05E-16
am241	2.01E-03	2.08E-03	2.14E-03	2.21E-03	2.27E-03	2.27E-03
am242m	3.36E-07	3.50E-07	3.62E-07	3.73E-07	3.84E-07	3.84E-07
am242	4.33E-12	2.83E-11	2.92E-11	3.01E-11	3.10E-11	3.10E-11
am243	9.11E-08	9.86E-08	1.06E-07	1.15E-07	1.23E-07	1.23E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.50E-31	2.70E-16	2.92E-16	3.15E-16	3.38E-16	3.38E-16
am245	4.63E-40	1.70E-37	2.09E-37	2.56E-37	3.11E-37	3.11E-37
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	1.67E-29	6.06E-22	6.25E-22	6.45E-22	6.64E-22	6.64E-22
cm242	1.02E-09	5.72E-09	5.90E-09	6.08E-09	6.26E-09	6.26E-09
cm243	4.35E-14	4.74E-14	4.89E-14	5.04E-14	5.19E-14	5.19E-14
cm244	3.60E-12	4.24E-12	4.59E-12	4.94E-12	5.31E-12	5.31E-12

1 ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 95

power= 1.468E-03mw, burnup=1.3405E+04mwd, flux= 9.22E+07n/cm**2-sec

0 nuclide concentrations, grem atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
cm245	3.87E-15	6.49E-15	7.15E-15	7.87E-15	8.62E-15	8.62E-15
cm246	3.60E-17	4.86E-17	4.56E-17	5.11E-17	5.70E-17	5.70E-17
cm247	5.66E-21	6.59E-21	7.64E-21	8.82E-21	1.01E-20	1.01E-20
cm248	8.62E-24	1.03E-23	1.24E-23	1.47E-23	1.74E-23	1.74E-23
cm249	.00E+00	1.18E-34	1.41E-34	1.67E-34	1.98E-34	1.98E-34
cm250	3.85E-39	4.76E-39	5.84E-39	7.12E-39	8.64E-39	8.64E-39
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		9.22E+07	9.22E+07	9.22E+07	9.23E+07	9.23E-08

0 1q array has 20 entries.

0 3q array has 1 entries.

0 3q array has 1 entries.

```
0        3q array has      1 entries.
0        4q array has      1 entries.
0       54q array has     12 entries.
library information...

          cross-section data taken from position number 11 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *         made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "pressas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                  fission product yields are from endf/b-v           *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *         see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
          ***********************************************************************
0                   .other identification and sizes of library.
0                    date set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
0
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page   96
        power=    .00mw, burnup=  14299.mwd, flux= 3.99E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     productions  1.269097E+06  1.268572E+06  1.268044E+06  1.267512E+06  1.266977E+06  1.266973E+06
     absorptions  1.026357E+06  1.026214E+06  1.026069E+06  1.025919E+06  1.025763E+06  1.025760E+06
     k infinity   1.236506E+00  1.236167E+00  1.235827E+00  1.235490E+00  1.235155E+00  1.235155E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
```

```
     actinide
     absorptions   1.011393E+06   1.011139E+06   1.010885E+06   1.010629E+06   1.010372E+06   1.010369E+06
     non-actinide
     abs. fracs.   1.457953E-02   1.469040E-02   1.479900E-02   1.490355E-02   1.500481E-02   1.500428E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page   97
0                                   fraction of total absorption rate
         powers     .00mw, burnup=  14299.mwd, flux= 5.99E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d

     sm149      5.31E-03  5.33E-03  5.35E-03  5.37E-03  5.38E-03  5.39E-03
     eu151      1.40E-03  1.42E-03  1.44E-03  1.45E-03  1.47E-03  1.47E-03
     nd143      1.30E-03  1.32E-03  1.34E-03  1.37E-03  1.39E-03  1.39E-03
     rh103      6.26E-04  6.37E-04  6.48E-04  6.59E-04  6.69E-04  6.69E-04
     xe131      4.22E-04  4.29E-04  4.36E-04  4.43E-04  4.50E-04  4.50E-04
     cs133      3.27E-04  3.33E-04  3.38E-04  3.44E-04  3.49E-04  3.49E-04
     sm147      2.41E-04  2.45E-04  2.49E-04  2.53E-04  2.57E-04  2.57E-04
     tc 99      2.31E-04  2.35E-04  2.38E-04  2.42E-04  2.45E-04  2.45E-04
     gd155      2.20E-04  2.20E-04  2.21E-04  2.21E-04  2.21E-04  2.21E-04
     nd145      1.85E-04  1.88E-04  1.91E-04  1.94E-04  1.97E-04  1.97E-04
     sm152      1.33E-04  1.35E-04  1.38E-04  1.40E-04  1.43E-04  1.43E-04
     mo 95      1.28E-04  1.30E-04  1.32E-04  1.35E-04  1.37E-04  1.37E-04
     cd113      1.00E-04  1.01E-04  1.01E-04  1.01E-04  1.01E-04  1.01E-04
     sm150      9.36E-05  9.52E-05  9.69E-05  9.86E-05  1.00E-04  1.00E-04
     kr 83      7.93E-05  8.06E-05  8.19E-05  8.32E-05  8.44E-05  8.44E-05
     cs135      7.41E-05  7.53E-05  7.66E-05  7.78E-05  7.91E-05  7.91E-05
     ru101      5.76E-05  5.86E-05  5.95E-05  6.05E-05  6.15E-05  6.15E-05
     eu153      5.62E-05  5.72E-05  5.82E-05  5.93E-05  6.03E-05  6.03E-05
     gd157      5.86E-05  5.87E-05  5.88E-05  5.89E-05  5.90E-05  5.90E-05
     pr141      5.50E-05  5.60E-05  5.69E-05  5.78E-05  5.87E-05  5.87E-05
     la139      4.50E-05  4.58E-05  4.65E-05  4.73E-05  4.80E-05  4.80E-05
     pd105      2.22E-05  2.26E-05  2.30E-05  2.34E-05  2.38E-05  2.38E-05
     ba137      2.17E-05  2.21E-05  2.24E-05  2.28E-05  2.32E-05  2.32E-05
     ag109      1.95E-05  2.00E-05  2.05E-05  2.09E-05  2.14E-05  2.14E-05
     zr 93      1.79E-05  1.82E-05  1.85E-05  1.88E-05  1.91E-05  1.91E-05
      i129      1.46E-05  1.48E-05  1.51E-05  1.53E-05  1.56E-05  1.56E-05
     nd144      1.38E-05  1.40E-05  1.42E-05  1.45E-05  1.47E-05  1.47E-05
     sm151      1.89E-05  1.27E-05  1.27E-05  1.27E-05  1.27E-05  1.24E-05
     mo 97      1.02E-05  1.04E-05  1.06E-05  1.07E-05  1.09E-05  1.09E-05
     gd152      8.22E-06  8.46E-06  8.71E-06  8.96E-06  9.21E-06  9.21E-06
     pd108      4.85E-06  4.96E-06  5.07E-06  5.18E-06  5.29E-06  5.29E-06
     zr 91      4.72E-06  4.80E-06  4.88E-06  4.96E-06  5.04E-06  5.04E-06
      y 89      4.52E-06  4.59E-06  4.67E-06  4.74E-06  4.82E-06  4.82E-06
     ru102      4.25E-06  4.32E-06  4.39E-06  4.47E-06  4.54E-06  4.54E-06
     ce142      3.75E-06  3.81E-06  3.87E-06  3.93E-06  4.00E-06  4.00E-06
     nd148      3.61E-06  3.67E-06  3.73E-06  3.79E-06  3.85E-06  3.85E-06
     nd146      3.03E-06  3.09E-06  3.14E-06  3.19E-06  3.24E-06  3.24E-06
     in115      2.65E-06  2.70E-06  2.74E-06  2.79E-06  2.83E-06  2.83E-06
     ba138      2.59E-06  2.63E-06  2.67E-06  2.72E-06  2.76E-06  2.76E-06
     pd107      2.48E-06  2.54E-06  2.59E-06  2.64E-06  2.70E-06  2.70E-06
     ce140      2.42E-06  2.46E-06  2.50E-06  2.54E-06  2.59E-06  2.59E-06
     xe132      2.21E-06  2.25E-06  2.29E-06  2.33E-06  2.37E-06  2.37E-06
     ru 99      1.51E-06  1.59E-06  1.67E-06  1.76E-06  1.82E-06  1.82E-06
     mo 98      1.30E-06  1.32E-06  1.35E-06  1.37E-06  1.40E-06  1.40E-06
     mo100      1.46E-06  1.48E-06  1.50E-06  1.53E-06  1.55E-06  1.55E-06
     xe134      1.43E-06  1.46E-06  1.48E-06  1.50E-06  1.53E-06  1.53E-06
     zr 92      1.14E-06  1.16E-06  1.18E-06  1.20E-06  1.22E-06  1.22E-06
      i127      1.05E-06  1.07E-06  1.09E-06  1.11E-06  1.13E-06  1.13E-06
     ru104      9.66E-07  9.83E-07  1.00E-06  1.02E-06  1.03E-06  1.03E-06
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page   98
0                                   fraction of total absorption rate
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```
          power=     .00mw, burnup=  14299.mwd, flux= 5.99E+07n/cm**2-sec
0               initial ******* d ******* d ******* d ******* d

     zr 96      9.02E-07  9.17E-07  9.32E-07  9.47E-07  9.62E-07  9.62E-07
     nd150      8.14E-07  8.28E-07  8.42E-07  8.56E-07  8.70E-07  8.70E-07
     xe136      7.76E-07  7.89E-07  8.02E-07  8.15E-07  8.28E-07  8.28E-07
     cd111      5.69E-07  5.81E-07  5.93E-07  6.05E-07  6.17E-07  6.17E-07
     br 81      5.77E-07  5.87E-07  5.97E-07  6.06E-07  6.16E-07  6.16E-07
     rb 85      5.55E-07  5.64E-07  5.74E-07  5.83E-07  5.92E-07  5.92E-07
     zr 94      4.85E-07  4.93E-07  5.01E-07  5.09E-07  5.17E-07  5.17E-07
     zr 90      4.45E-07  4.53E-07  4.60E-07  4.67E-07  4.75E-07  4.75E-07
     sm154      3.75E-07  3.82E-07  3.88E-07  3.95E-07  4.02E-07  4.02E-07
     te130      3.57E-07  3.63E-07  3.69E-07  3.75E-07  3.81E-07  3.81E-07
     gd154      3.32E-07  3.44E-07  3.55E-07  3.67E-07  3.80E-07  3.80E-07
     rb 87      3.20E-07  3.25E-07  3.30E-07  3.36E-07  3.41E-07  3.41E-07
     se 77      2.32E-07  2.36E-07  2.40E-07  2.44E-07  2.48E-07  2.48E-07
     pd106      2.20E-07  2.24E-07  2.29E-07  2.33E-07  2.37E-07  2.37E-07
     gd156      2.04E-07  2.08E-07  2.12E-07  2.17E-07  2.21E-07  2.21E-07
     ba135      1.49E-07  1.57E-07  1.64E-07  1.72E-07  1.80E-07  1.80E-07
     kr 84      1.52E-07  1.55E-07  1.57E-07  1.60E-07  1.62E-07  1.62E-07
     dy161      1.19E-07  1.22E-07  1.24E-07  1.27E-07  1.30E-07  1.30E-07
     sb121      1.21E-07  1.23E-07  1.26E-07  1.28E-07  1.30E-07  1.30E-07
     se 79      1.17E-07  1.19E-07  1.21E-07  1.23E-07  1.24E-07  1.24E-07
     ru100      9.56E-08  9.88E-08  1.02E-07  1.05E-07  1.09E-07  1.09E-07
     sb123      9.81E-08  9.98E-08  1.02E-07  1.03E-07  1.05E-07  1.05E-07
     kr 86      8.44E-08  8.58E-08  8.72E-08  8.86E-08  9.00E-08  9.00E-08
     te128      8.03E-08  8.17E-08  8.31E-08  8.45E-08  8.59E-08  8.59E-08
     eu152      1.33E-07  9.00E-08  9.10E-08  9.20E-08  9.30E-08  8.06E-08
     nd142      6.86E-08  7.09E-08  7.33E-08  7.57E-08  7.81E-08  7.81E-08
     ba134      6.59E-08  6.81E-08  7.04E-08  7.27E-08  7.50E-08  7.50E-08
     sm148      6.02E-08  6.22E-08  6.43E-08  6.63E-08  6.85E-08  6.85E-08
     se 80      5.56E-08  5.65E-08  5.74E-08  5.83E-08  5.93E-08  5.93E-08
     tb159      5.35E-08  5.46E-08  5.58E-08  5.69E-08  5.81E-08  5.81E-08
     te125      5.38E-08  5.47E-08  5.57E-08  5.67E-08  5.76E-08  5.76E-08
     pd104      4.52E-08  4.67E-08  4.82E-08  4.98E-08  5.14E-08  5.14E-08
     gd158      4.27E-08  4.36E-08  4.45E-08  4.54E-08  4.63E-08  4.63E-08
     cd112      4.00E-08  4.08E-08  4.16E-08  4.23E-08  4.31E-08  4.31E-08
     pm147      9.79E-08  6.53E-08  6.54E-08  6.54E-08  6.54E-08  3.20E-08
     li  6      2.98E-08  3.03E-08  3.08E-08  3.12E-08  3.17E-08  3.17E-08
     sn117      2.89E-08  2.94E-08  2.99E-08  3.05E-08  3.10E-08  3.10E-08
     eu155      6.70E-08  4.45E-08  4.46E-08  4.46E-08  4.47E-08  2.97E-08
     dy164      2.64E-08  2.71E-08  2.77E-08  2.84E-08  2.90E-08  2.90E-08
     nb 93      2.39E-08  2.51E-08  2.63E-08  2.75E-08  2.88E-08  2.88E-08
     dy162      2.31E-08  2.57E-08  2.44E-08  2.71E-08  2.77E-08  2.77E-08
     cd114      2.40E-08  2.45E-08  2.50E-08  2.55E-08  2.59E-08  2.59E-08
     sn119      2.23E-08  2.27E-08  2.31E-08  2.35E-08  2.39E-08  2.39E-08
     sn115      2.04E-08  2.08E-08  2.12E-08  2.15E-08  2.19E-08  2.19E-08
     pd110      1.88E-08  1.92E-08  1.96E-08  2.00E-08  2.04E-08  2.04E-08
     mo 96      1.54E-08  1.59E-08  1.64E-08  1.69E-08  1.74E-08  1.74E-08
     sr 88      1.55E-08  1.58E-08  1.60E-08  1.63E-08  1.65E-08  1.65E-08
     cd110      1.32E-08  1.38E-08  1.43E-08  1.49E-08  1.55E-08  1.55E-08
     br 79      1.20E-08  1.26E-08  1.32E-08  1.38E-08  1.45E-08  1.45E-08
1    sss2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page   99
0                                   fraction of total absorption rate
          power=     .00mw, burnup=  14299.mwd, flux= 5.99E+07n/cm**2-sec
0               initial ******* d ******* d ******* d ******* d

     ag107      9.77E-09  1.03E-08  1.09E-08  1.15E-08  1.21E-08  1.21E-08
     se 82      1.06E-08  1.08E-08  1.10E-08  1.12E-08  1.13E-08  1.13E-08
     sn126      9.50E-09  9.65E-09  9.80E-09  9.95E-09  1.01E-08  1.01E-08
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se 78	8.28E-09	8.42E-09	8.56E-09	8.70E-09	8.84E-09	8.84E-09
xe130	7.80E-09	8.04E-09	8.29E-09	8.55E-09	8.80E-09	8.80E-09
xe129	7.07E-09	7.43E-09	7.80E-09	8.18E-09	8.55E-09	8.56E-09
ba136	7.48E-09	7.89E-09	8.10E-09	8.31E-09	8.53E-09	8.53E-09
sn124	7.13E-09	7.26E-09	7.39E-09	7.52E-09	7.64E-09	7.64E-09
dy163	6.30E-09	6.46E-09	6.63E-09	6.80E-09	6.96E-09	6.96E-09
kr 82	5.90E-09	6.06E-09	6.22E-09	6.38E-09	6.54E-09	6.54E-09
as 75	4.88E-09	4.96E-09	5.05E-09	5.13E-09	5.21E-09	5.21E-09
eu154	8.76E-09	5.96E-09	6.07E-09	6.18E-09	6.29E-09	5.04E-09
te126	4.16E-09	4.36E-09	4.57E-09	4.78E-09	4.99E-09	4.99E-09
in113	4.05E-09	4.12E-09	4.20E-09	4.27E-09	4.34E-09	4.34E-09
sr 90	3.92E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.69E-09
sn118	2.89E-09	2.94E-09	2.99E-09	3.04E-09	3.09E-09	3.09E-09
sn122	2.46E-09	2.50E-09	2.55E-09	2.59E-09	2.64E-09	2.64E-09
cd116	2.43E-09	2.47E-09	2.51E-09	2.56E-09	2.60E-09	2.60E-09
sn120	1.82E-09	1.85E-09	1.88E-09	1.92E-09	1.95E-09	1.95E-09
ge 73	1.38E-09	1.41E-09	1.43E-09	1.43E-09	1.48E-09	1.48E-09
cs137	1.36E-09	9.10E-10	9.10E-10	9.11E-10	9.11E-10	8.55E-10
gd160	5.82E-10	5.95E-10	6.08E-10	6.21E-10	6.34E-10	6.34E-10
ho165	5.43E-10	5.59E-10	5.75E-10	5.91E-10	6.08E-10	6.08E-10
ge 76	4.77E-10	4.85E-10	4.93E-10	5.01E-10	5.09E-10	5.09E-10
dy160	4.08E-10	4.24E-10	4.39E-10	4.55E-10	4.71E-10	4.71E-10
xe128	2.37E-10	2.66E-10	2.75E-10	2.84E-10	2.93E-10	2.93E-10
cs134	8.83E-10	5.98E-10	6.08E-10	6.18E-10	6.28E-10	2.49E-10
sr 86	1.32E-10	1.36E-10	1.40E-10	1.45E-10	1.49E-10	1.49E-10
te124	1.15E-10	1.18E-10	1.21E-10	1.23E-10	1.26E-10	1.26E-10
sn116	9.88E-11	1.02E-10	1.06E-10	1.09E-10	1.13E-10	1.13E-10
kr 85	2.00E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10	1.12E-10
sr 87	6.44E-11	6.57E-11	6.71E-11	6.84E-11	6.97E-11	6.97E-11
nb 94	5.04E-11	5.15E-11	5.28E-11	5.40E-11	5.54E-11	5.54E-11
te122	4.13E-11	4.27E-11	4.41E-11	4.56E-11	4.71E-11	4.71E-11
se 76	3.92E-11	4.03E-11	4.15E-11	4.26E-11	4.38E-11	4.38E-11
er166	2.81E-11	2.89E-11	2.97E-11	3.05E-11	3.13E-11	3.13E-11
ge 74	2.77E-11	2.81E-11	2.86E-11	2.91E-11	2.96E-11	2.96E-11
ge 72	2.00E-11	2.04E-11	2.07E-11	2.11E-11	2.14E-11	2.14E-11
ce144	2.12E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10	1.23E-11
kr 83	9.38E-12	9.82E-12	1.03E-11	1.08E-11	1.13E-11	1.13E-11
y 90	5.64E-12	3.76E-12	3.76E-12	3.76E-12	3.76E-12	3.52E-12
er167	1.95E-12	2.04E-12	2.13E-12	2.22E-12	2.31E-12	2.31E-12
sb125	6.39E-12	4.25E-12	4.25E-12	4.26E-12	4.26E-12	2.12E-12
te123	1.27E-12	1.33E-12	1.39E-12	1.46E-12	1.52E-12	1.52E-12
ru106	1.43E-11	9.45E-12	9.47E-12	9.49E-12	9.50E-12	1.46E-12
cd108	5.12E-13	5.61E-13	5.71E-13	6.02E-13	6.35E-13	6.35E-13
be 9	6.02E-14	6.12E-14	6.22E-14	6.32E-14	6.42E-14	6.42E-14
sn114	2.54E-14	2.63E-14	2.72E-14	2.81E-14	2.91E-14	2.91E-14
li 7	2.45E-14	2.49E-14	2.53E-14	2.57E-14	2.61E-14	2.61E-14

1 sas2h: fer-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 100
0 fraction of total absorption rate
0 powers= .00mw, burnups 14299.mwd, flux= 5.99E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d

sb126	1.32E-14	1.26E-14	1.28E-14	1.29E-14	1.31E-14	1.16E-14
te127m	3.23E-12	2.15E-12	2.15E-12	2.15E-12	2.16E-12	3.73E-15
nb 95	5.42E-11	3.62E-11	3.62E-11	3.62E-11	3.62E-11	1.50E-15
zr 95	5.85E-11	3.90E-11	3.90E-11	3.90E-11	3.90E-11	7.33E-16
y 91	4.99E-11	3.33E-11	3.33E-11	3.33E-11	3.33E-11	2.26E-16
sn123	3.84E-15	2.56E-15	2.56E-15	2.56E-15	2.56E-15	1.17E-17
sr 89	1.06E-11	7.09E-12	7.09E-12	7.09E-12	7.09E-12	7.35E-18
tb160	4.82E-14	3.27E-14	3.34E-14	3.40E-14	3.47E-14	2.27E-18
ru103	1.40E-10	9.32E-11	9.33E-11	9.33E-11	9.34E-11	1.84E-18

cd109	1.02E-17	7.04E-18	7.32E-18	7.42E-18	7.94E-18	1.76E-18
ce141	5.74E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	1.92E-19
pm148m	1.67E-12	6.98E-13	6.99E-13	7.00E-13	7.01E-13	7.75E-20
sb124	2.35E-15	1.58E-15	1.60E-15	1.61E-15	1.63E-15	1.37E-20
cd115m	9.89E-14	6.58E-14	6.59E-14	6.59E-14	6.60E-14	1.37E-20

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ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 101
power= 9.790E-04mw, burnup=1.4299E+04mwd, flux= 5.99E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
h 1	7.95E-04	8.09E-04	8.22E-04	8.35E-04	8.49E-04	8.49E-04
h 2	2.37E-06	2.41E-06	2.45E-06	2.49E-06	2.53E-06	2.53E-06
h 3	1.92E-11	1.28E-11	1.28E-11	1.29E-11	1.30E-11	1.11E-11
h 4	2.82E-35	1.25E-35	1.26E-35	1.27E-35	1.27E-35	.00E+00
he 3	1.28E-08	1.30E-08	1.31E-08	1.32E-08	1.34E-08	1.34E-08
he 4	1.32E-04	1.34E-04	1.36E-04	1.38E-04	1.41E-04	1.41E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.58E-05	1.61E-05	1.64E-05	1.66E-05	1.69E-05	1.69E-05
ne 21	3.99E-09	4.11E-09	4.24E-09	4.38E-09	4.51E-09	4.51E-09
ne 22	1.04E-07	1.06E-07	1.08E-07	1.10E-07	1.11E-07	1.11E-07
ne 23	2.65E-15	1.76E-15	1.76E-15	1.76E-15	1.76E-15	1.76E-30
na 22	1.57E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	5.03E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	9.59E-09	6.39E-09	6.40E-09	6.40E-09	6.40E-09	6.40E-24
na 24m	1.58E-15	1.05E-15	1.05E-15	1.05E-15	1.05E-15	1.05E-30
na 25	4.36E-24	2.98E-24	3.07E-24	3.17E-24	3.27E-24	3.27E-39
mg 24	1.05E-01	1.07E-01	1.09E-01	1.10E-01	1.12E-01	1.12E-01
mg 25	4.17E-07	4.31E-07	4.44E-07	4.57E-07	4.71E-07	4.71E-07
mg 26	2.37E-06	2.41E-06	2.45E-06	2.49E-06	2.53E-06	2.53E-06
mg 27	7.91E-13	5.26E-13	5.26E-13	5.26E-13	5.26E-13	5.26E-28
mg 28	5.86E-25	2.59E-25	2.59E-25	2.59E-25	2.59E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.11E-11	4.74E-11	4.74E-11	4.74E-11	4.75E-11	4.75E-26
al 29	3.48E-22	2.39E-22	2.46E-22	2.54E-22	2.62E-22	2.62E-37
al 30	6.02E-32	4.20E-32	4.40E-32	4.61E-32	4.83E-32	.00E+00
si 28	3.06E-01	3.11E-01	3.16E-01	3.21E-01	3.26E-01	3.26E-01
si 29	3.73E-06	3.85E-06	3.97E-06	4.10E-06	4.22E-06	4.22E-06
si 30	4.83E-11	5.07E-11	5.31E-11	5.56E-11	5.82E-11	5.82E-11
si 31	1.26E-23	8.78E-24	9.21E-24	9.65E-24	1.01E-23	1.01E-38
si 32	7.80E-30	4.02E-30	3.88E-30	4.04E-30	4.23E-30	4.19E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		5.98E+07	5.99E+07	5.99E+07	5.99E+07	5.99E-08

1

ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 102
power= 9.790E-04mw, burnup=1.4299E+04mwd, flux= 5.99E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	1.59E+01	1.65E+01	1.71E+01	1.78E+01	1.84E+01	1.84E+01
pb206	5.89E-02	6.21E-02	6.54E-02	6.87E-02	7.22E-02	7.22E-02
pb207	4.33E-03	4.54E-03	4.75E-03	4.97E-03	5.19E-03	5.19E-03
pb208	2.47E-04	2.56E-04	2.64E-04	2.72E-04	2.81E-04	2.81E-04
pb209	4.37E-10	4.53E-10	4.68E-10	4.83E-10	4.99E-10	4.99E-10
pb210	1.61E-04	1.65E-04	1.70E-04	1.74E-04	1.78E-04	1.78E-04
pb211	3.29E-11	3.35E-11	3.41E-11	3.47E-11	3.53E-11	3.54E-11
pb212	3.31E-11	2.25E-11	2.29E-11	2.33E-11	2.37E-11	2.35E-11
pb214	3.69E-10	3.78E-10	3.88E-10	3.97E-10	4.06E-10	4.07E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	8.04E-03	8.56E-03	9.10E-03	9.65E-03	1.02E-02	1.02E-02

bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	9.92E-08	1.02E-07	1.04E-07	1.07E-07	1.09E-07	1.10E-07
bi211	1.95E-12	1.98E-12	2.02E-12	2.06E-12	2.09E-12	2.10E-12
bi212	3.14E-12	2.13E-12	2.17E-12	2.21E-12	2.25E-12	2.23E-12
bi213	1.02E-10	1.06E-10	1.09E-10	1.13E-10	1.17E-10	1.17E-10
bi214	2.74E-10	2.81E-10	2.88E-10	2.95E-10	3.02E-10	3.02E-10
po210	2.74E-06	2.81E-06	2.88E-06	2.95E-06	3.02E-06	3.00E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.15E-17	2.19E-17	2.23E-17	2.27E-17	2.31E-17	2.32E-17
po212	1.65E-22	1.12E-22	1.14E-22	1.16E-22	1.18E-22	1.17E-22
po213	1.53E-19	1.59E-19	1.64E-19	1.70E-19	1.75E-19	1.75E-19
po214	3.76E-17	3.86E-17	3.96E-17	4.06E-17	4.15E-17	4.15E-17
po215	2.70E-17	2.75E-17	2.80E-17	2.85E-17	2.90E-17	2.91E-17
po216	1.25E-16	8.51E-17	8.66E-17	8.82E-17	8.98E-17	8.91E-17
po218	4.26E-11	4.37E-11	4.48E-11	4.59E-11	4.70E-11	4.70E-11
rn218	1.75E-28	7.90E-29	8.05E-29	8.20E-29	8.35E-29	3.18E-43
rn219	6.01E-14	6.12E-14	6.24E-14	6.35E-14	6.46E-14	6.47E-14
rn220	6.80E-14	3.26E-14	3.32E-14	3.38E-14	3.44E-14	3.42E-14
rn222	7.57E-08	7.77E-08	7.96E-08	8.16E-08	8.35E-08	8.35E-08
ra222	1.90E-25	8.58E-26	8.74E-26	8.90E-26	9.07E-26	3.46E-40
ra223	1.50E-08	1.53E-08	1.56E-08	1.58E-08	1.61E-08	1.61E-08
ra224	2.73E-10	1.86E-10	1.89E-10	1.92E-10	1.96E-10	1.94E-10
ra225	4.77E-08	4.94E-08	5.11E-08	5.28E-08	5.45E-08	5.45E-08
ra226	1.16E-02	1.19E-02	1.22E-02	1.25E-02	1.28E-02	1.28E-02
ra228	5.43E-11	5.57E-11	5.71E-11	5.85E-11	5.99E-11	5.90E-11
ac225	3.23E-08	3.34E-08	3.45E-08	3.57E-08	3.68E-08	3.68E-08
ac227	1.04E-05	1.06E-05	1.08E-05	1.10E-05	1.12E-05	1.12E-05
ac228	6.63E-15	6.80E-15	6.97E-15	7.14E-15	7.31E-15	7.31E-15
th226	9.26E-24	4.19E-24	4.26E-24	4.34E-24	4.42E-24	1.69E-38
th227	2.42E-08	2.47E-08	2.51E-08	2.56E-08	2.60E-08	2.61E-08
th228	5.21E-08	5.54E-08	5.61E-08	5.67E-08	5.74E-08	5.70E-08
th229	9.28E-03	9.61E-03	9.94E-03	1.03E-02	1.06E-02	1.06E-02
th230	5.97E-01	6.11E-01	6.25E-01	6.39E-01	6.53E-01	6.53E-01
th231	3.78E-09	3.46E-09	3.48E-09	3.49E-09	3.50E-09	2.79E-09
th232	1.33E-01	1.36E-01	1.40E-01	1.43E-01	1.46E-01	1.46E-01
th233	4.41E-13	3.01E-13	3.09E-13	3.16E-13	3.24E-13	3.24E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.57E-02	1.60E-02	1.63E-02	1.66E-02	1.69E-02	1.69E-02
pa232	9.75E-11	6.62E-11	6.75E-11	6.87E-11	6.99E-11	7.00E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 103
power= 9.790E-04mw, burnup=1.4299E+04mwd, flux= 5.99E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.43E-06	1.43E-06	1.43E-06	1.42E-06	1.42E-06	1.42E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	8.97E-21	4.06E-21	4.13E-21	4.21E-21	4.29E-21	1.64E-35
u231	8.48E-17	5.77E-17	5.90E-17	6.03E-17	6.16E-17	6.16E-32
u232	1.90E-06	1.29E-06	1.32E-06	1.34E-06	1.36E-06	1.33E-06
u233	3.08E-01	3.15E-01	3.22E-01	3.29E-01	3.36E-01	3.36E-01
u234	9.94E+00	9.95E+00	9.96E+00	9.97E+00	9.98E+00	9.98E+00
u235	6.76E+02	6.75E+02	6.75E+02	6.74E+02	6.74E+02	6.74E+02
u236	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
u237	1.18E-06	7.85E-07	7.86E-07	7.87E-07	7.88E-07	1.38E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	1.12E-07	7.44E-08	7.44E-08	7.44E-08	7.45E-08	7.45E-23
u240	2.12E-36	2.55E-36	3.03E-36	3.56E-36	4.15E-36	4.15E-36

```
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   3.12E-12  2.07E-12  2.08E-12  2.08E-12  2.08E-12  3.58E-13
     np236m  7.41E-13  4.93E-13  4.93E-13  4.93E-13  4.93E-13  4.03E-28
     np236   1.64E-06  1.67E-06  1.69E-06  1.71E-06  1.74E-06  1.74E-06
     np237   4.13E+01  4.13E+01  4.12E+01  4.12E+01  4.12E+01  4.12E+01
     np238   5.46E-07  3.63E-07  3.63E-07  3.63E-07  3.63E-07  3.19E-14
     np239   1.62E-05  1.07E-05  1.08E-05  1.08E-05  1.08E-05  1.18E-13
     np240m  1.81E-38  2.17E-38  2.58E-38  3.04E-38  3.54E-38  3.54E-38
     np240   1.19E-15  5.27E-16  5.27E-16  5.28E-16  5.28E-16  6.16E-39
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   4.05E-10  2.71E-10  2.71E-10  2.71E-10  2.71E-10  1.42E-10
     pu237   1.19E-13  7.29E-14  7.31E-14  7.34E-14  7.37E-14  1.48E-20
     pu238   8.26E-03  5.52E-03  5.50E-03  5.50E-03  5.50E-03  5.38E-03
     pu239   2.83E+01  2.84E+01  2.85E+01  2.86E+01  2.87E+01  2.87E+01
     pu240   5.33E-01  5.30E-01  5.27E-01  5.24E-01  5.22E-01  5.22E-01
     pu241   7.87E-05  5.20E-05  5.17E-05  5.15E-05  5.13E-05  4.49E-05
     pu242   2.37E-05  2.45E-05  2.51E-05  2.57E-05  2.63E-05  2.63E-05
     pu243   1.81E-14  1.25E-14  1.28E-14  1.31E-14  1.34E-14  1.39E-29
     pu244   1.03E-25  1.27E-25  1.51E-25  1.77E-25  2.07E-25  2.07E-25
     pu245   1.56E-36  1.25E-36  1.49E-36  1.75E-36  2.05E-36   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   2.29E-19  1.22E-19  1.10E-19  1.06E-19  1.04E-19  1.04E-34
     am240   1.03E-16  5.59E-17  5.04E-17  4.83E-17  4.74E-17  4.74E-32
     am241   2.27E-03  1.82E-03  1.64E-03  1.57E-03  1.54E-03  1.54E-03
     am242m  3.84E-07  2.24E-07  1.91E-07  1.80E-07  1.75E-07  1.73E-07
     am242   3.10E-11  1.67E-11  1.49E-11  1.42E-11  1.39E-11  2.23E-12
     am243   1.23E-07  1.26E-07  1.29E-07  1.32E-07  1.35E-07  1.35E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   3.38E-16  2.30E-16  2.36E-16  2.41E-16  2.47E-16  2.47E-31
     am245   3.11E-37  2.49E-37  2.96E-37  3.47E-37  4.05E-37  6.27E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   6.64E-22  2.37E-22  2.12E-22  2.03E-22  1.99E-22  1.19E-31
     cm242   6.26E-09  3.37E-09  3.01E-09  2.87E-09  2.81E-09  4.84E-10
     cm243   5.19E-14  1.86E-14  1.66E-14  1.59E-14  1.56E-14  1.46E-14
     cm244   5.31E-12  3.62E-12  3.70E-12  3.79E-12  3.87E-12  3.49E-12
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  104
       power= 9.790E-04mw, burnup=1.4299E+04mwd, flux= 5.99E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
     cm245   8.62E-15  8.72E-15  8.82E-15  8.93E-15  9.04E-15  9.04E-15
     cm246   5.70E-17  5.92E-17  6.14E-17  6.34E-17  6.54E-17  6.54E-17
     cm247   1.01E-20  1.11E-20  1.21E-20  1.31E-20  1.41E-20  1.41E-20
     cm248   1.74E-23  1.94E-23  2.15E-23  2.39E-23  2.64E-23  2.64E-23
     cm249   1.98E-34  1.47E-34  1.63E-34  1.81E-34  2.01E-34   .00E+00
     cm250   8.64E-39  9.29E-39  1.00E-38  1.08E-38  1.17E-38  1.17E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               5.98E+07  5.99E+07  5.99E+07  5.99E+07  5.99E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       34q array has      12 entries.
1library information...

          cross-section data taken from position number 12 of library on unit 33.
```

```
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prosas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  105
        power=    .00mw, burnup=  15192.mwd, flux= 5.99E+07n/cm**2-sec
0                                   basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.268396E+06  1.267856E+06  1.267312E+06  1.266765E+06  1.266216E+06  1.266211E+06
     absorptions  1.026710E+06  1.026550E+06  1.026386E+06  1.026217E+06  1.026046E+06  1.026042E+06
     k infinity   1.235398E+00  1.235065E+00  1.234733E+00  1.234403E+00  1.234073E+00  1.234073E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  1.011309E+06  1.011050E+06  1.010789E+06  1.010527E+06  1.010266E+06  1.010261E+06
     non-actinide
     abs. fracs.  1.500005E-02  1.509903E-02  1.519519E-02  1.528919E-02  1.538122E-02  1.538050E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  106
0                                   fraction of total absorption rate
        power=    .00mw, burnup=  15192.mwd, flux= 5.99E+07n/cm**2-sec
```

```
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.39E-03  5.40E-03  5.41E-03  5.42E-03  5.42E-03  5.42E-03
     eu151      1.47E-03  1.48E-03  1.50E-03  1.51E-03  1.52E-03  1.52E-03
     nd143      1.39E-03  1.41E-03  1.43E-03  1.45E-03  1.47E-03  1.47E-03
     rh103      6.69E-04  6.80E-04  6.90E-04  7.01E-04  7.12E-04  7.12E-04
     xe131      4.50E-04  4.57E-04  4.64E-04  4.71E-04  4.78E-04  4.78E-04
     cs133      3.49E-04  3.55E-04  3.60E-04  3.66E-04  3.71E-04  3.71E-04
     sm147      2.57E-04  2.61E-04  2.65E-04  2.69E-04  2.73E-04  2.73E-04
     tc 99      2.45E-04  2.49E-04  2.52E-04  2.56E-04  2.59E-04  2.59E-04
     gd155      2.21E-04  2.21E-04  2.21E-04  2.21E-04  2.21E-04  2.21E-04
     nd145      1.97E-04  2.00E-04  2.03E-04  2.06E-04  2.09E-04  2.09E-04
     sm152      1.43E-04  1.46E-04  1.48E-04  1.51E-04  1.54E-04  1.54E-04
     mo 95      1.37E-04  1.39E-04  1.41E-04  1.43E-04  1.45E-04  1.45E-04
     sm150      1.00E-04  1.02E-04  1.04E-04  1.05E-04  1.07E-04  1.07E-04
     cd113      1.01E-04  1.01E-04  1.01E-04  1.01E-04  1.01E-04  1.01E-04
     kr 83      8.45E-05  8.58E-05  8.71E-05  8.83E-05  8.96E-05  8.96E-05
     cs135      7.90E-05  8.03E-05  8.15E-05  8.28E-05  8.40E-05  8.40E-05
     ru101      6.15E-05  6.24E-05  6.34E-05  6.44E-05  6.54E-05  6.54E-05
     eu153      6.03E-05  6.13E-05  6.24E-05  6.34E-05  6.44E-05  6.44E-05
     pr141      5.87E-05  5.97E-05  6.06E-05  6.15E-05  6.24E-05  6.24E-05
     gd157      5.90E-05  5.91E-05  5.92E-05  5.93E-05  5.94E-05  5.94E-05
     la139      4.80E-05  4.88E-05  4.95E-05  5.03E-05  5.11E-05  5.11E-05
     pd105      2.38E-05  2.42E-05  2.46E-05  2.50E-05  2.54E-05  2.54E-05
     ba137      2.32E-05  2.35E-05  2.39E-05  2.43E-05  2.46E-05  2.46E-05
     ag109      2.14E-05  2.19E-05  2.24E-05  2.28E-05  2.33E-05  2.33E-05
     zr 93      1.91E-05  1.94E-05  1.97E-05  2.00E-05  2.02E-05  2.02E-05
      i129      1.56E-05  1.58E-05  1.61E-05  1.63E-05  1.66E-05  1.66E-05
     nd144      1.47E-05  1.49E-05  1.52E-05  1.54E-05  1.56E-05  1.56E-05
     sm151      1.24E-05  1.27E-05  1.27E-05  1.28E-05  1.28E-05  1.25E-05
     mo 97      1.09E-05  1.11E-05  1.13E-05  1.14E-05  1.16E-05  1.16E-05
     gd152      9.22E-06  9.47E-06  9.73E-06  9.99E-06  1.03E-05  1.03E-05
     pd108      5.29E-06  5.40E-06  5.51E-06  5.62E-06  5.73E-06  5.73E-06
     zr 91      5.04E-06  5.12E-06  5.19E-06  5.27E-06  5.35E-06  5.35E-06
      y 89      4.82E-06  4.89E-06  4.97E-06  5.04E-06  5.12E-06  5.12E-06
     ru102      4.54E-06  4.61E-06  4.68E-06  4.76E-06  4.83E-06  4.83E-06
     ce142      4.00E-06  4.06E-06  4.12E-06  4.19E-06  4.25E-06  4.25E-06
     nd148      3.85E-06  3.92E-06  3.98E-06  4.04E-06  4.10E-06  4.10E-06
     nd146      3.24E-06  3.29E-06  3.34E-06  3.39E-06  3.44E-06  3.44E-06
     in115      2.83E-06  2.88E-06  2.93E-06  2.97E-06  3.02E-06  3.02E-06
     ba138      2.76E-06  2.81E-06  2.85E-06  2.89E-06  2.94E-06  2.94E-06
     pd107      2.70E-06  2.75E-06  2.81E-06  2.86E-06  2.92E-06  2.92E-06
     ce140      2.59E-06  2.63E-06  2.67E-06  2.71E-06  2.75E-06  2.75E-06
     xe132      2.37E-06  2.40E-06  2.44E-06  2.48E-06  2.52E-06  2.52E-06
     ru 99      1.82E-06  1.90E-06  1.98E-06  2.06E-06  2.15E-06  2.15E-06
     mo 98      1.60E-06  1.62E-06  1.65E-06  1.67E-06  1.70E-06  1.70E-06
     mo100      1.55E-06  1.58E-06  1.60E-06  1.63E-06  1.65E-06  1.65E-06
     xe134      1.53E-06  1.55E-06  1.58E-06  1.60E-06  1.63E-06  1.63E-06
     zr 92      1.22E-06  1.24E-06  1.26E-06  1.27E-06  1.29E-06  1.29E-06
      i127      1.12E-06  1.14E-06  1.16E-06  1.18E-06  1.20E-06  1.20E-06
     ru104      1.03E-06  1.05E-06  1.07E-06  1.09E-06  1.10E-06  1.10E-06
1    sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  107
0                          fraction of total absorption rate
       powers=     .00mw, burnup=  15192.mwd, flux= 3.99E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     zr 96      9.62E-07  9.77E-07  9.92E-07  1.01E-06  1.02E-06  1.02E-06
     nd150      8.70E-07  8.84E-07  8.98E-07  9.12E-07  9.26E-07  9.26E-07
     xe136      8.29E-07  8.42E-07  8.55E-07  8.68E-07  8.81E-07  8.81E-07
     cd111      6.17E-07  6.29E-07  6.41E-07  6.53E-07  6.65E-07  6.65E-07
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br 81	6.16E-07	6.26E-07	6.35E-07	6.45E-07	6.55E-07	6.55E-07
rb 85	5.92E-07	6.01E-07	6.10E-07	6.20E-07	6.29E-07	6.29E-07
zr 94	5.17E-07	5.25E-07	5.33E-07	5.41E-07	5.49E-07	5.49E-07
zr 90	4.75E-07	4.82E-07	4.90E-07	4.97E-07	5.04E-07	5.04E-07
gd154	3.80E-07	3.92E-07	4.05E-07	4.18E-07	4.31E-07	4.31E-07
sm154	4.02E-07	4.09E-07	4.15E-07	4.22E-07	4.29E-07	4.29E-07
te130	3.81E-07	3.87E-07	3.93E-07	3.99E-07	4.06E-07	4.06E-07
rb 87	3.41E-07	3.46E-07	3.52E-07	3.57E-07	3.62E-07	3.62E-07
se 77	2.48E-07	2.52E-07	2.55E-07	2.59E-07	2.63E-07	2.63E-07
pd106	2.37E-07	2.42E-07	2.46E-07	2.50E-07	2.55E-07	2.55E-07
gd156	2.21E-07	2.25E-07	2.30E-07	2.34E-07	2.38E-07	2.38E-07
ba135	1.80E-07	1.88E-07	1.96E-07	2.05E-07	2.13E-07	2.13E-07
kr 84	1.62E-07	1.65E-07	1.67E-07	1.70E-07	1.72E-07	1.72E-07
dy161	1.30E-07	1.33E-07	1.36E-07	1.38E-07	1.41E-07	1.41E-07
sb121	1.30E-07	1.32E-07	1.34E-07	1.36E-07	1.38E-07	1.38E-07
se 79	1.25E-07	1.26E-07	1.28E-07	1.30E-07	1.32E-07	1.32E-07
ru100	1.09E-07	1.12E-07	1.16E-07	1.19E-07	1.23E-07	1.23E-07
sb123	1.05E-07	1.07E-07	1.08E-07	1.10E-07	1.12E-07	1.12E-07
kr 86	9.00E-08	9.14E-08	9.28E-08	9.42E-08	9.56E-08	9.56E-08
te128	8.59E-08	8.73E-08	8.87E-08	9.00E-08	9.14E-08	9.14E-08
nd142	7.81E-08	8.06E-08	8.31E-08	8.57E-08	8.83E-08	8.83E-08
ba134	7.50E-08	7.74E-08	7.98E-08	8.22E-08	8.47E-08	8.47E-08
eu152	8.06E-08	9.39E-08	9.49E-08	9.58E-08	9.68E-08	8.28E-08
sm148	6.85E-08	7.06E-08	7.28E-08	7.51E-08	7.73E-08	7.73E-08
se 80	5.93E-08	6.02E-08	6.11E-08	6.21E-08	6.30E-08	6.30E-08
tb159	5.81E-08	5.92E-08	6.04E-08	6.15E-08	6.27E-08	6.27E-08
te125	5.76E-08	5.86E-08	5.96E-08	6.05E-08	6.15E-08	6.15E-08
pd104	5.14E-08	5.31E-08	5.47E-08	5.64E-08	5.81E-08	5.81E-08
gd158	4.63E-08	4.72E-08	4.81E-08	4.90E-08	4.99E-08	4.99E-08
cd112	4.31E-08	4.39E-08	4.47E-08	4.55E-08	4.62E-08	4.62E-08
nb 93	2.88E-08	3.01E-08	3.14E-08	3.27E-08	3.40E-08	3.40E-08
li 6	3.17E-08	3.22E-08	3.27E-08	3.31E-08	3.36E-08	3.36E-08
sn117	3.10E-08	3.15E-08	3.21E-08	3.26E-08	3.31E-08	3.31E-08
dy164	2.90E-08	2.97E-08	3.03E-08	3.10E-08	3.16E-08	3.16E-08
dy162	2.77E-08	2.84E-08	2.91E-08	2.98E-08	3.04E-08	3.04E-08
pm147	3.20E-08	6.54E-08	6.54E-08	6.54E-08	6.54E-08	2.99E-08
eu155	2.97E-08	4.47E-08	4.48E-08	4.48E-08	4.49E-08	2.88E-08
cd114	2.59E-08	2.64E-08	2.69E-08	2.73E-08	2.78E-08	2.78E-08
sn119	2.39E-08	2.43E-08	2.47E-08	2.51E-08	2.55E-08	2.55E-08
sn115	2.19E-08	2.23E-08	2.26E-08	2.30E-08	2.34E-08	2.34E-08
pd110	2.04E-08	2.08E-08	2.12E-08	2.17E-08	2.21E-08	2.21E-08
mo 96	1.74E-08	1.80E-08	1.85E-08	1.91E-08	1.96E-08	1.96E-08
cd110	1.55E-08	1.61E-08	1.67E-08	1.73E-08	1.80E-08	1.80E-08
sr 88	1.65E-08	1.68E-08	1.70E-08	1.73E-08	1.76E-08	1.76E-08
br 79	1.45E-08	1.51E-08	1.57E-08	1.64E-08	1.71E-08	1.71E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 108
0 fraction of total absorption rate
power= .00mw, burnup= 15192.mwd, flux= 5.99E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

sg107	1.21E-08	1.27E-08	1.33E-08	1.40E-08	1.46E-08	1.46E-08
se 82	1.13E-08	1.15E-08	1.17E-08	1.19E-08	1.20E-08	1.20E-08
sn126	1.01E-08	1.03E-08	1.04E-08	1.06E-08	1.07E-08	1.07E-08
xe129	8.56E-09	8.94E-09	9.33E-09	9.73E-09	1.01E-08	1.01E-08
xe130	8.80E-09	9.07E-09	9.33E-09	9.60E-09	9.87E-09	9.87E-09
ba136	8.53E-09	8.74E-09	8.96E-09	9.19E-09	9.41E-09	9.41E-09
se 78	8.84E-09	8.98E-09	9.12E-09	9.26E-09	9.40E-09	9.40E-09
sn124	7.64E-09	7.77E-09	7.89E-09	8.02E-09	8.15E-09	8.15E-09
dy163	6.96E-09	7.13E-09	7.30E-09	7.47E-09	7.64E-09	7.64E-09
kr 82	6.54E-09	6.70E-09	6.87E-09	7.03E-09	7.20E-09	7.20E-09

te126	4.99E-09	5.21E-09	5.42E-09	5.45E-09	5.87E-09	5.87E-09
as 75	5.21E-09	5.29E-09	5.38E-09	5.46E-09	5.54E-09	5.54E-09
eu154	5.84E-09	6.40E-09	6.51E-09	6.43E-09	6.74E-09	5.29E-09
in113	4.34E-09	4.42E-09	4.49E-09	4.56E-09	4.64E-09	4.64E-09
sr 90	3.69E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.67E-09
sn118	3.09E-09	3.14E-09	3.19E-09	3.24E-09	3.30E-09	3.30E-09
sn122	2.64E-09	2.68E-09	2.72E-09	2.77E-09	2.81E-09	2.81E-09
cd116	2.60E-09	2.64E-09	2.68E-09	2.73E-09	2.77E-09	2.77E-09
sn120	1.95E-09	1.98E-09	2.01E-09	2.04E-09	2.08E-09	2.08E-09
ge 73	1.48E-09	1.50E-09	1.53E-09	1.55E-09	1.57E-09	1.57E-09
cs137	8.35E-10	9.11E-10	9.11E-10	9.11E-10	9.11E-10	8.50E-10
gd160	6.34E-10	6.47E-10	6.60E-10	6.74E-10	6.87E-10	6.87E-10
ho165	6.08E-10	6.25E-10	6.42E-10	6.59E-10	6.76E-10	6.76E-10
ge 76	5.09E-10	5.17E-10	5.25E-10	5.33E-10	5.41E-10	5.41E-10
dy160	4.71E-10	4.87E-10	5.04E-10	5.21E-10	5.38E-10	5.38E-10
xe128	2.93E-10	3.03E-10	3.13E-10	3.22E-10	3.32E-10	3.32E-10
ce134	2.49E-10	6.38E-10	6.48E-10	6.59E-10	6.69E-10	2.44E-10
sr 86	1.49E-10	1.53E-10	1.58E-10	1.62E-10	1.67E-10	1.67E-10
te124	1.26E-10	1.29E-10	1.32E-10	1.36E-10	1.39E-10	1.39E-10
sn116	1.13E-10	1.16E-10	1.20E-10	1.24E-10	1.28E-10	1.28E-10
kr 83	1.12E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10	1.10E-10
sr 87	6.97E-11	7.11E-11	7.24E-11	7.37E-11	7.51E-11	7.51E-11
nb 94	5.53E-11	5.67E-11	5.82E-11	5.97E-11	6.12E-11	6.12E-11
te122	4.71E-11	4.86E-11	5.01E-11	5.17E-11	5.33E-11	5.33E-11
se 76	4.38E-11	4.50E-11	4.63E-11	4.75E-11	4.88E-11	4.88E-11
er166	3.13E-11	3.21E-11	3.29E-11	3.38E-11	3.46E-11	3.46E-11
ge 74	2.96E-11	3.00E-11	3.05E-11	3.10E-11	3.15E-11	3.15E-11
ge 72	2.14E-11	2.18E-11	2.22E-11	2.25E-11	2.29E-11	2.29E-11
kr 80	1.13E-11	1.18E-11	1.23E-11	1.29E-11	1.35E-11	1.35E-11
ce144	1.23E-11	1.42E-10	1.42E-10	1.42E-10	1.42E-10	9.85E-12
y 90	3.52E-12	3.76E-12	3.76E-12	3.76E-12	3.76E-12	3.50E-12
er167	2.31E-12	2.40E-12	2.50E-12	2.59E-12	2.69E-12	2.69E-12
sb125	2.12E-12	4.26E-12	4.27E-12	4.27E-12	4.27E-12	2.00E-12
te123	1.32E-12	1.59E-12	1.66E-12	1.73E-12	1.81E-12	1.81E-12
ru106	1.46E-12	9.51E-12	9.53E-12	9.54E-12	9.56E-12	1.24E-12
cd108	6.35E-13	6.70E-13	7.07E-13	7.45E-13	7.86E-13	7.86E-13
be 9	6.42E-14	6.52E-14	6.62E-14	6.72E-14	6.82E-14	6.82E-14
sn114	2.91E-14	3.00E-14	3.10E-14	3.20E-14	3.30E-14	3.30E-14
li 7	2.61E-14	2.65E-14	2.70E-14	2.74E-14	2.78E-14	2.78E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 109
0 fraction of total absorption rate
power= .00mw, burnup= 15192.mwd, flux= 5.99E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

sb126	1.16E-14	1.33E-14	1.35E-14	1.36E-14	1.38E-14	1.23E-14
te127m	3.75E-15	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.11E-15
nb 95	1.50E-15	3.62E-11	3.62E-11	3.62E-11	3.62E-11	5.59E-16
zr 95	7.33E-16	3.90E-11	3.90E-11	3.90E-11	3.90E-11	2.74E-16
y 91	2.26E-16	3.33E-11	3.33E-11	3.33E-11	3.33E-11	7.69E-17
sn123	1.17E-17	2.56E-15	2.56E-15	2.57E-15	2.57E-15	7.16E-18
sr 89	7.35E-18	7.09E-12	7.09E-12	7.09E-12	7.09E-12	2.11E-18
cd109	1.76E-18	8.27E-18	8.61E-18	8.99E-18	9.36E-18	1.81E-18
tb160	2.28E-18	3.54E-14	3.60E-14	3.67E-14	3.74E-14	1.02E-18
ru103	1.84E-18	9.34E-11	9.35E-11	9.35E-11	9.35E-11	3.70E-19
ce141	1.92E-19	3.83E-10	3.83E-10	3.83E-10	3.84E-10	2.74E-20
pm148m	2.74E-20	7.02E-13	7.03E-13	7.04E-13	7.05E-13	1.37E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 110
power= 9.790E-04mw, burnup=1.5192E+04mwd, flux= 5.99E+07n/cm**2-sec
0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
h 1	8.69E-04	8.62E-04	8.75E-04	8.89E-04	9.02E-04	9.02E-04
h 2	2.53E-06	2.57E-06	2.61E-06	2.65E-06	2.69E-06	2.69E-06
h 3	1.11E-11	1.30E-11	1.31E-11	1.31E-11	1.32E-11	1.11E-11
h 4	.00E+00	1.28E-35	1.28E-35	1.29E-35	1.30E-35	.00E+00
he 3	1.34E-08	1.35E-08	1.37E-08	1.38E-08	1.39E-08	1.39E-08
he 4	1.41E-04	1.43E-04	1.45E-04	1.47E-04	1.50E-04	1.50E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.69E-05	1.72E-05	1.74E-05	1.77E-05	1.80E-05	1.80E-05
ne 21	4.51E-09	4.65E-09	4.78E-09	4.92E-09	5.07E-09	5.07E-09
ne 22	1.11E-07	1.13E-07	1.15E-07	1.17E-07	1.18E-07	1.18E-07
ne 23	1.76E-30	1.76E-15	1.76E-15	1.76E-15	1.77E-15	1.77E-30
na 22	5.03E-12	1.05E-11	1.05E-11	1.05E-11	1.05E-11	4.71E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.40E-24	6.39E-09	6.40E-09	6.40E-09	6.40E-09	6.40E-24
na 24m	1.05E-30	1.05E-15	1.05E-15	1.05E-15	1.05E-15	1.05E-30
na 25	3.27E-39	3.36E-24	3.46E-24	3.56E-24	3.67E-24	3.67E-39
mg 24	1.12E-01	1.14E-01	1.15E-01	1.17E-01	1.19E-01	1.19E-01
mg 25	4.71E-07	4.85E-07	4.99E-07	5.14E-07	5.28E-07	5.28E-07
mg 26	2.53E-06	2.57E-06	2.61E-06	2.65E-06	2.69E-06	2.69E-06
mg 27	5.26E-28	5.26E-13	5.26E-13	5.26E-13	5.27E-13	5.27E-28
mg 28	.00E+00	2.59E-25	2.60E-25	2.60E-25	2.60E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.75E-26	4.74E-11	4.74E-11	4.74E-11	4.75E-11	4.75E-26
al 29	2.62E-37	2.70E-22	2.78E-22	2.86E-22	2.95E-22	2.95E-37
al 30	.00E+00	5.05E-32	5.28E-32	5.52E-32	5.77E-32	.00E+00
si 28	3.26E-01	3.30E-01	3.35E-01	3.40E-01	3.45E-01	3.45E-01
si 29	4.22E-06	4.35E-06	4.48E-06	4.61E-06	4.74E-06	4.74E-06
si 30	5.82E-11	6.09E-11	6.37E-11	6.66E-11	6.95E-11	6.95E-11
si 31	1.01E-38	1.06E-23	1.11E-23	1.16E-23	1.21E-23	1.21E-38
si 32	4.19E-30	4.43E-30	4.64E-30	4.85E-30	5.07E-30	5.01E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		5.99E+07	5.99E+07	5.99E+07	6.00E+07	6.00E-08

0
1

sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 111
power= 9.790E-04mw, burnup=1.5192E+04mwd, flux= 5.99E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	1.84E+01	1.90E+01	1.97E+01	2.03E+01	2.10E+01	2.10E+01
pb206	7.22E-02	7.57E-02	7.93E-02	8.30E-02	8.67E-02	8.67E-02
pb207	5.19E-03	5.42E-03	5.63E-03	5.88E-03	6.11E-03	6.12E-03
pb208	2.81E-04	2.89E-04	2.98E-04	3.07E-04	3.16E-04	3.16E-04
pb209	4.99E-10	5.15E-10	5.30E-10	5.46E-10	5.62E-10	5.62E-10
pb210	1.78E-04	1.82E-04	1.86E-04	1.90E-04	1.94E-04	1.94E-04
pb211	3.54E-11	3.59E-11	3.65E-11	3.71E-11	3.77E-11	3.78E-11
pb212	2.35E-11	2.41E-11	2.46E-11	2.50E-11	2.54E-11	2.51E-11
pb214	4.07E-10	4.16E-10	4.25E-10	4.35E-10	4.44E-10	4.44E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.02E-02	1.08E-02	1.14E-02	1.21E-02	1.27E-02	1.27E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.10E-07	1.12E-07	1.15E-07	1.17E-07	1.20E-07	1.20E-07
bi211	2.10E-12	2.13E-12	2.17E-12	2.20E-12	2.24E-12	2.24E-12
bi212	2.23E-12	2.29E-12	2.33E-12	2.37E-12	2.41E-12	2.38E-12
bi213	1.17E-10	1.20E-10	1.24E-10	1.27E-10	1.31E-10	1.31E-10
bi214	3.02E-10	3.09E-10	3.16E-10	3.23E-10	3.30E-10	3.30E-10
po210	3.00E-06	3.09E-06	3.16E-06	3.23E-06	3.30E-06	3.28E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.32E-17	2.35E-17	2.39E-17	2.43E-17	2.47E-17	2.48E-17

po212	1.17E-22	1.20E-22	1.22E-22	1.24E-22	1.27E-22	1.25E-22
po213	1.75E-19	1.81E-19	1.86E-19	1.92E-19	1.97E-19	1.97E-19
po214	4.15E-17	4.25E-17	4.34E-17	4.44E-17	4.53E-17	4.54E-17
po215	2.91E-17	2.95E-17	3.00E-17	3.05E-17	3.10E-17	3.11E-17
po216	8.91E-17	9.14E-17	9.30E-17	9.45E-17	9.61E-17	9.52E-17
po218	4.70E-11	4.81E-11	4.92E-11	5.03E-11	5.14E-11	5.14E-11
rn218	3.18E-43	8.49E-29	8.64E-29	8.79E-29	8.94E-29	9.95E-44
rn219	6.47E-14	6.57E-14	6.68E-14	6.79E-14	6.90E-14	6.91E-14
rn220	3.42E-14	3.51E-14	3.57E-14	3.63E-14	3.68E-14	3.65E-14
rn222	8.35E-08	8.53E-08	8.74E-08	8.93E-08	9.12E-08	9.12E-08
ra222	3.46E-40	9.22E-26	9.38E-26	9.55E-26	9.71E-26	1.08E-40
ra223	1.61E-08	1.64E-08	1.67E-08	1.69E-08	1.72E-08	1.72E-08
ra224	1.94E-10	1.99E-10	2.03E-10	2.06E-10	2.10E-10	2.08E-10
ra225	5.45E-08	5.62E-08	5.79E-08	5.96E-08	6.13E-08	6.13E-08
ra226	1.28E-02	1.31E-02	1.34E-02	1.36E-02	1.39E-02	1.39E-02
ra228	5.99E-11	6.13E-11	6.27E-11	6.41E-11	6.55E-11	6.55E-11
ac225	3.68E-08	3.80E-08	3.91E-08	4.03E-08	4.14E-08	4.14E-08
ac227	1.12E-05	1.14E-05	1.16E-05	1.18E-05	1.20E-05	1.20E-05
ac228	7.31E-15	7.48E-15	7.65E-15	7.83E-15	8.00E-15	8.00E-15
th226	1.69E-38	4.50E-24	4.58E-24	4.66E-24	4.74E-24	5.25E-39
th227	2.61E-08	2.65E-08	2.69E-08	2.73E-08	2.78E-08	2.78E-08
th228	3.70E-08	3.81E-08	3.87E-08	3.94E-08	4.00E-08	3.96E-08
th229	1.06E-02	1.09E-02	1.13E-02	1.16E-02	1.19E-02	1.19E-02
th230	6.53E-01	6.67E-01	6.80E-01	6.94E-01	7.07E-01	7.08E-01
th231	2.79E-09	3.52E-09	3.53E-09	3.54E-09	3.55E-09	2.78E-09
th232	1.46E-01	1.50E-01	1.53E-01	1.57E-01	1.60E-01	1.60E-01
th233	3.24E-28	3.32E-13	3.40E-13	3.47E-13	3.55E-13	3.55E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.69E-02	1.71E-02	1.74E-02	1.77E-02	1.80E-02	1.80E-02
pa232	7.00E-26	7.12E-11	7.24E-11	7.36E-11	7.48E-11	7.48E-26

1

eas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 112

power= 9.790E-04mw, burnup=1.5192E+04mwd, flux= 5.99E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
pa233	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.64E-35	4.36E-21	4.44E-21	4.51E-21	4.59E-21	5.09E-36
u231	6.16E-32	6.29E-17	6.42E-17	6.55E-17	6.68E-17	6.68E-32
u232	1.33E-06	1.39E-06	1.41E-06	1.44E-06	1.46E-06	1.42E-06
u233	3.36E-01	3.43E-01	3.50E-01	3.57E-01	3.63E-01	3.64E-01
u234	9.98E+00	9.99E+00	1.00E+01	1.00E+01	1.00E+01	1.00E+01
u235	6.74E+02	6.73E+02	6.73E+02	6.72E+02	6.71E+02	6.71E+02
u236	1.85E+02	1.86E+02	1.86E+02	1.86E+02	1.86E+02	1.86E+02
u237	1.38E-12	7.89E-07	7.90E-07	7.91E-07	7.92E-07	1.35E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.45E-23	7.45E-08	7.45E-08	7.45E-08	7.46E-08	7.46E-23
u240	4.15E-36	4.80E-36	5.32E-36	6.31E-36	7.18E-36	7.18E-36
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.98E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	3.05E-13
np236m	4.93E-28	4.92E-13	4.93E-13	4.93E-13	4.93E-13	4.93E-28
np236	1.74E-06	1.76E-06	1.78E-06	1.80E-06	1.83E-06	1.83E-06
np237	4.12E+01	4.12E+01	4.12E+01	4.12E+01	4.11E+01	4.11E+01
np238	3.19E-14	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.11E-14
np239	1.18E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.29E-13
np240m	3.54E-38	4.10E-38	4.71E-38	5.39E-38	6.13E-38	6.13E-38
np240	6.16E-39	5.28E-16	5.29E-16	5.29E-16	5.30E-16	6.95E-39

```
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.42E-10  2.71E-10  2.71E-10  2.71E-10  2.71E-10  1.35E-10
     pu237   1.48E-20  7.39E-14  7.41E-14  7.43E-14  7.46E-14  3.70E-21
     pu238   5.38E-03  5.50E-03  5.50E-03  5.50E-03  5.50E-03  5.37E-03
     pu239   2.87E+01  2.88E+01  2.89E+01  2.90E+01  2.91E+01  2.91E+01
     pu240   5.22E-01  5.20E-01  5.18E-01  5.16E-01  5.15E-01  5.15E-01
     pu241   4.49E-05  5.10E-05  5.09E-05  5.08E-05  5.07E-05  4.38E-05
     pu242   2.63E-05  2.69E-05  2.75E-05  2.81E-05  2.87E-05  2.87E-05
     pu243   1.39E-29  1.37E-14  1.40E-14  1.43E-14  1.46E-14  1.53E-29
     pu244   2.07E-25  2.39E-25  2.75E-25  3.14E-25  3.58E-25  3.58E-25
     pu245    .00E+00  2.37E-36  2.73E-36  3.12E-36  3.55E-36   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.04E-34  1.02E-19  1.02E-19  1.02E-19  1.01E-19  1.01E-34
     am240   4.74E-32  4.68E-17  4.66E-17  4.65E-17  4.64E-17  4.64E-32
     am241   1.54E-03  1.52E-03  1.52E-03  1.51E-03  1.51E-03  1.51E-03
     am242m  1.73E-07  1.72E-07  1.72E-07  1.71E-07  1.71E-07  1.68E-07
     am242   2.23E-12  1.38E-11  1.37E-11  1.37E-11  1.36E-11  2.17E-12
     am243   1.35E-07  1.38E-07  1.41E-07  1.44E-07  1.47E-07  1.47E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   2.47E-31  2.52E-16  2.58E-16  2.63E-16  2.69E-16  2.69E-31
     am245   6.27E-40  4.69E-37  5.39E-37  6.16E-37  7.01E-37  7.61E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.19E-31  1.96E-22  1.95E-22  1.95E-22  1.95E-22  1.70E-32
     cm242   4.84E-10  2.78E-09  2.77E-09  2.76E-09  2.75E-09  4.61E-10
     cm243   1.46E-14  1.54E-14  1.53E-14  1.53E-14  1.53E-14  1.42E-14
     cm244   3.49E-12  3.96E-12  4.05E-12  4.14E-12  4.23E-12  3.77E-12
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  113
       power= 9.790E-04mw, burnup=1.5192E+04mwd, flux= 5.99E+07n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   9.04E-15  9.16E-15  9.28E-15  9.42E-15  9.56E-15  9.56E-15
     cm246   6.54E-17  6.73E-17  6.91E-17  7.09E-17  7.27E-17  7.26E-17
     cm247   1.41E-20  1.52E-20  1.63E-20  1.74E-20  1.86E-20  1.86E-20
     cm248   2.64E-23  2.92E-23  3.21E-23  3.53E-23  3.87E-23  3.87E-23
     cm249    .00E+00  2.22E-34  2.44E-34  2.68E-34  2.94E-34   .00E+00
     cm250   1.17E-38  1.28E-38  1.39E-38  1.51E-38  1.65E-38  1.65E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               5.99E+07  5.99E+07  5.99E+07  6.00E+07  6.00E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number 13 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
```

```
        *scale-system control module sas2 library*
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *              prelim lwr origen-s binary working library--id = 1143  *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *        data from the light element, actinide, and fission product libraries *
        *          decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *       neutron flux spectrum factors and cross sections were produced from *
        *      the "presas2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                  fission product yields are from endf/b-v           *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *        see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/29/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  114
        power=    .00mw, burnup=  16086.mwd, flux= 6.00E+07n/cm**2-sec
0                                        basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.267559E+06  1.267004E+06  1.266447E+06  1.265886E+06  1.265323E+06  1.265318E+06
     absorptions   1.026885E+06  1.026718E+06  1.026532E+06  1.026352E+06  1.026170E+06  1.026165E+06
     k infinity    1.234373E+00  1.234043E+00  1.233714E+00  1.233384E+00  1.233054E+00  1.233054E+00
0                   initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   1.011094E+06  1.010828E+06  1.010561E+06  1.010293E+06  1.010023E+06  1.010020E+06
     non-actinide
     abs. frncs.   1.537752E-02  1.546884E-02  1.555836E-02  1.564735E-02  1.573461E-02  1.573408E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  115
0                                   fraction of total absorption rate
        power=    .00mw, burnup=  16086.mwd, flux= 6.00E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.42E-03  5.43E-03  5.43E-03  5.43E-03  5.44E-03  5.44E-03
     eu151      1.52E-03  1.54E-03  1.55E-03  1.56E-03  1.58E-03  1.58E-03
     nd143      1.47E-03  1.49E-03  1.51E-03  1.54E-03  1.56E-03  1.56E-03
     rh103      7.12E-04  7.22E-04  7.33E-04  7.44E-04  7.54E-04  7.54E-04
     xe131      4.78E-04  4.85E-04  4.92E-04  4.99E-04  5.06E-04  5.06E-04
     cs133      3.71E-04  3.77E-04  3.82E-04  3.88E-04  3.93E-04  3.93E-04
     sm147      2.73E-04  2.77E-04  2.81E-04  2.85E-04  2.89E-04  2.89E-04
```

tc 99	2.39E-04	2.63E-04	2.66E-04	2.70E-04	2.73E-04	2.73E-04
gd155	2.21E-04	2.21E-04	2.22E-04	2.22E-04	2.22E-04	2.22E-04
nd145	2.09E-04	2.12E-04	2.15E-04	2.19E-04	2.22E-04	2.22E-04
sm152	1.54E-04	1.56E-04	1.59E-04	1.62E-04	1.64E-04	1.64E-04
mo 95	1.45E-04	1.47E-04	1.50E-04	1.52E-04	1.54E-04	1.54E-04
sm150	1.07E-04	1.09E-04	1.11E-04	1.12E-04	1.14E-04	1.14E-04
cd113	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04
kr 83	8.97E-05	9.10E-05	9.22E-05	9.35E-05	9.48E-05	9.48E-05
cs135	8.40E-05	8.52E-05	8.65E-05	8.77E-05	8.90E-05	8.90E-05
ru101	6.53E-05	6.63E-05	6.73E-05	6.82E-05	6.92E-05	6.92E-05
eu153	6.44E-05	6.55E-05	6.65E-05	6.76E-05	6.86E-05	6.86E-05
pr141	6.24E-05	6.34E-05	6.43E-05	6.52E-05	6.61E-05	6.61E-05
gd157	5.94E-05	5.95E-05	5.96E-05	5.96E-05	5.97E-05	5.97E-05
la139	5.11E-05	5.18E-05	5.26E-05	5.33E-05	5.41E-05	5.41E-05
pd105	2.54E-05	2.58E-05	2.63E-05	2.67E-05	2.71E-05	2.71E-05
ba137	2.46E-05	2.50E-05	2.54E-05	2.57E-05	2.61E-05	2.61E-05
ag109	2.33E-05	2.38E-05	2.43E-05	2.48E-05	2.52E-05	2.52E-05
zr 93	2.02E-05	2.05E-05	2.08E-05	2.11E-05	2.14E-05	2.14E-05
i129	1.66E-05	1.68E-05	1.71E-05	1.73E-05	1.76E-05	1.76E-05
nd144	1.56E-05	1.59E-05	1.61E-05	1.64E-05	1.66E-05	1.66E-05
sm151	1.25E-05	1.28E-05	1.28E-05	1.28E-05	1.28E-05	1.25E-05
mo 97	1.16E-05	1.18E-05	1.19E-05	1.21E-05	1.23E-05	1.23E-05
gd152	1.03E-05	1.05E-05	1.08E-05	1.11E-05	1.13E-05	1.13E-05
pd108	5.73E-06	5.84E-06	5.96E-06	6.07E-06	6.18E-06	6.18E-06
zr 91	5.35E-06	5.43E-06	5.51E-06	5.59E-06	5.66E-06	5.66E-06
y 89	5.12E-06	5.19E-06	5.27E-06	5.34E-06	5.42E-06	5.42E-06
ru102	4.83E-06	4.90E-06	4.98E-06	5.05E-06	5.12E-06	5.12E-06
ce142	4.25E-06	4.31E-06	4.38E-06	4.44E-06	4.50E-06	4.50E-06
nd148	4.10E-06	4.16E-06	4.22E-06	4.28E-06	4.34E-06	4.34E-06
nd146	3.45E-06	3.50E-06	3.55E-06	3.60E-06	3.65E-06	3.65E-06
in115	3.02E-06	3.06E-06	3.11E-06	3.16E-06	3.20E-06	3.20E-06
pd107	2.92E-06	2.97E-06	3.03E-06	3.08E-06	3.14E-06	3.14E-06
ba138	2.94E-06	2.98E-06	3.02E-06	3.07E-06	3.11E-06	3.11E-06
ce140	2.75E-06	2.79E-06	2.83E-06	2.87E-06	2.91E-06	2.91E-06
xe132	2.52E-06	2.56E-06	2.59E-06	2.63E-06	2.67E-06	2.67E-06
ru 99	2.15E-06	2.23E-06	2.32E-06	2.40E-06	2.49E-06	2.49E-06
mo 98	1.70E-06	1.72E-06	1.75E-06	1.77E-06	1.80E-06	1.80E-06
mo100	1.65E-06	1.68E-06	1.70E-06	1.73E-06	1.75E-06	1.75E-06
xe134	1.63E-06	1.65E-06	1.67E-06	1.70E-06	1.72E-06	1.72E-06
zr 92	1.29E-06	1.31E-06	1.33E-06	1.35E-06	1.37E-06	1.37E-06
i127	1.20E-06	1.22E-06	1.24E-06	1.26E-06	1.28E-06	1.28E-06
ru104	1.10E-06	1.12E-06	1.14E-06	1.16E-06	1.17E-06	1.17E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 116

0 fraction of total absorption rate

0 power= .00mw, burnup= 16036.mwd, flux= 6.00E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d

zr 96	1.02E-06	1.04E-06	1.05E-06	1.07E-06	1.08E-06	1.08E-06
nd150	9.25E-07	9.39E-07	9.53E-07	9.67E-07	9.81E-07	9.81E-07
xe136	8.81E-07	8.94E-07	9.07E-07	9.21E-07	9.34E-07	9.34E-07
cd111	6.65E-07	6.77E-07	6.89E-07	7.01E-07	7.13E-07	7.13E-07
br 81	6.55E-07	6.64E-07	6.74E-07	6.84E-07	6.94E-07	6.94E-07
rb 85	6.29E-07	6.38E-07	6.47E-07	6.56E-07	6.66E-07	6.66E-07
zr 94	5.49E-07	5.57E-07	5.65E-07	5.73E-07	5.82E-07	5.82E-07
zr 90	5.04E-07	5.12E-07	5.19E-07	5.27E-07	5.34E-07	5.34E-07
gd154	4.31E-07	4.44E-07	4.58E-07	4.72E-07	4.85E-07	4.86E-07
sm154	4.29E-07	4.36E-07	4.43E-07	4.49E-07	4.56E-07	4.56E-07
te130	4.06E-07	4.12E-07	4.18E-07	4.24E-07	4.30E-07	4.30E-07
rb 87	3.62E-07	3.67E-07	3.73E-07	3.78E-07	3.83E-07	3.83E-07
se 77	2.63E-07	2.67E-07	2.71E-07	2.75E-07	2.79E-07	2.79E-07

pd106	2.55E-07	2.59E-07	2.44E-07	2.68E-07	2.73E-07	2.73E-07
gd156	2.38E-07	2.43E-07	2.47E-07	2.51E-07	2.56E-07	2.56E-07
ba135	2.13E-07	2.22E-07	2.30E-07	2.39E-07	2.48E-07	2.48E-07
kr 84	1.72E-07	1.75E-07	1.77E-07	1.80E-07	1.83E-07	1.83E-07
dy161	1.41E-07	1.44E-07	1.47E-07	1.50E-07	1.53E-07	1.53E-07
sb121	1.38E-07	1.40E-07	1.43E-07	1.45E-07	1.47E-07	1.47E-07
se 79	1.32E-07	1.34E-07	1.36E-07	1.38E-07	1.39E-07	1.39E-07
ru100	1.23E-07	1.26E-07	1.30E-07	1.34E-07	1.37E-07	1.37E-07
sb123	1.12E-07	1.14E-07	1.15E-07	1.17E-07	1.19E-07	1.19E-07
kr 86	9.56E-08	9.70E-08	9.84E-08	9.98E-08	1.01E-07	1.01E-07
nd142	8.83E-08	9.09E-08	9.36E-08	9.63E-08	9.91E-08	9.91E-08
te128	9.14E-08	9.28E-08	9.42E-08	9.56E-08	9.70E-08	9.70E-08
ba134	8.47E-08	8.73E-08	8.98E-08	9.24E-08	9.51E-08	9.51E-08
sm148	7.73E-08	7.96E-08	8.19E-08	8.43E-08	8.67E-08	8.67E-08
eu152	8.28E-08	9.77E-08	9.86E-08	9.95E-08	1.00E-07	8.48E-08
tb159	6.27E-08	6.39E-08	6.50E-08	6.62E-08	6.74E-08	6.74E-08
se 80	6.30E-08	6.40E-08	6.49E-08	6.58E-08	6.68E-08	6.68E-08
te125	6.15E-08	6.25E-08	6.35E-08	6.44E-08	6.54E-08	6.54E-08
pd104	5.81E-08	5.99E-08	6.16E-08	6.34E-08	6.53E-08	6.53E-08
gd158	4.99E-08	5.09E-08	5.18E-08	5.27E-08	5.36E-08	5.36E-08
cd112	4.62E-08	4.70E-08	4.78E-08	4.86E-08	4.94E-08	4.94E-08
nb 93	3.40E-08	3.54E-08	3.68E-08	3.82E-08	3.96E-08	3.96E-08
li 6	3.36E-08	3.41E-08	3.45E-08	3.50E-08	3.54E-08	3.54E-08
sn117	3.32E-08	3.37E-08	3.42E-08	3.48E-08	3.53E-08	3.53E-08
dy164	3.17E-08	3.23E-08	3.30E-08	3.36E-08	3.43E-08	3.43E-08
dy162	3.04E-08	3.11E-08	3.18E-08	3.25E-08	3.32E-08	3.32E-08
cd114	2.78E-08	2.83E-08	2.87E-08	2.92E-08	2.97E-08	2.97E-08
pm147	2.99E-08	6.54E-08	6.54E-08	6.54E-08	6.54E-08	2.80E-08
eu155	2.88E-08	4.49E-08	4.49E-08	4.50E-08	4.50E-08	2.78E-08
sn119	2.55E-08	2.59E-08	2.63E-08	2.67E-08	2.71E-08	2.71E-08
sn115	2.34E-08	2.37E-08	2.41E-08	2.45E-08	2.48E-08	2.48E-08
pd110	2.21E-08	2.25E-08	2.29E-08	2.33E-08	2.37E-08	2.37E-08
mo 96	1.96E-08	2.02E-08	2.08E-08	2.14E-08	2.20E-08	2.20E-08
cd110	1.80E-08	1.86E-08	1.93E-08	2.00E-08	2.07E-08	2.07E-08
br 79	1.71E-08	1.78E-08	1.84E-08	1.91E-08	1.98E-08	1.98E-08
sr 88	1.74E-08	1.78E-08	1.81E-08	1.83E-08	1.86E-08	1.86E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 117
0 fraction of total absorption rate
0 power= .00mw, burnup= 16086.mwd, flux= 6.00E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

as107	1.46E-08	1.53E-08	1.59E-08	1.66E-08	1.73E-08	1.73E-08
se 82	1.20E-08	1.22E-08	1.24E-08	1.26E-08	1.28E-08	1.28E-08
xe129	1.01E-08	1.05E-08	1.10E-08	1.14E-08	1.18E-08	1.18E-08
sn126	1.07E-08	1.09E-08	1.10E-08	1.11E-08	1.13E-08	1.13E-08
xe130	9.87E-09	1.02E-08	1.04E-08	1.07E-08	1.10E-08	1.10E-08
ba136	9.41E-09	9.63E-09	9.86E-09	1.01E-08	1.03E-08	1.03E-08
se 78	9.40E-09	9.55E-09	9.69E-09	9.83E-09	9.97E-09	9.97E-09
sn124	8.15E-09	8.27E-09	8.40E-09	8.53E-09	8.66E-09	8.66E-09
dy163	7.64E-09	7.82E-09	7.99E-09	8.16E-09	8.34E-09	8.34E-09
kr 82	7.20E-09	7.37E-09	7.54E-09	7.71E-09	7.88E-09	7.88E-09
te126	5.87E-09	6.10E-09	6.33E-09	6.56E-09	6.80E-09	6.80E-09
as 75	5.54E-09	5.62E-09	5.71E-09	5.79E-09	5.87E-09	5.87E-09
eu154	5.29E-09	6.85E-09	6.96E-09	7.07E-09	7.19E-09	5.53E-09
in113	4.64E-09	4.71E-09	4.78E-09	4.86E-09	4.93E-09	4.93E-09
sr 90	3.67E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.65E-09
sn118	3.29E-09	3.35E-09	3.40E-09	3.45E-09	3.50E-09	3.50E-09
sn122	2.81E-09	2.86E-09	2.90E-09	2.94E-09	2.99E-09	2.99E-09
cd116	2.77E-09	2.81E-09	2.86E-09	2.90E-09	2.94E-09	2.94E-09
sn120	2.08E-09	2.11E-09	2.14E-09	2.17E-09	2.21E-09	2.21E-09

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     ge 73      1.57E-09  1.60E-09  1.42E-09  1.65E-09  1.67E-09  1.67E-09
     cs137      8.50E-10  9.11E-10  9.11E-10  9.12E-10  9.12E-10  8.46E-10
     ho165      6.76E-10  6.94E-10  7.11E-10  7.29E-10  7.47E-10  7.47E-10
     gd160      6.87E-10  7.00E-10  7.13E-10  7.27E-10  7.40E-10  7.40E-10
     dy160      5.38E-10  5.55E-10  5.73E-10  5.91E-10  6.10E-10  6.10E-10
     se 76      5.41E-10  5.49E-10  5.57E-10  5.65E-10  5.73E-10  5.73E-10
     xe128      3.32E-10  3.43E-10  3.53E-10  3.63E-10  3.76E-10  3.76E-10
     cs134      2.44E-10  6.79E-10  6.89E-10  6.99E-10  7.09E-10  2.38E-10
     sr 86      1.67E-10  1.72E-10  1.76E-10  1.81E-10  1.86E-10  1.86E-10
     te124      1.39E-10  1.42E-10  1.45E-10  1.48E-10  1.51E-10  1.51E-10
     sn116      1.28E-10  1.31E-10  1.35E-10  1.39E-10  1.43E-10  1.43E-10
     kr 85      1.10E-10  1.33E-10  1.33E-10  1.33E-10  1.33E-10  1.08E-10
     sr 87      7.51E-11  7.65E-11  7.78E-11  7.92E-11  8.06E-11  8.06E-11
     nb 94      6.12E-11  6.28E-11  6.45E-11  6.62E-11  6.79E-11  6.79E-11
     te122      5.33E-11  5.49E-11  5.65E-11  5.82E-11  5.99E-11  5.99E-11
     se 76      4.88E-11  5.00E-11  5.13E-11  5.26E-11  5.40E-11  5.40E-11
     er166      3.46E-11  3.54E-11  3.62E-11  3.71E-11  3.79E-11  3.79E-11
     ge 74      3.15E-11  3.20E-11  3.24E-11  3.29E-11  3.34E-11  3.34E-11
     ge 72      2.29E-11  2.33E-11  2.36E-11  2.40E-11  2.44E-11  2.44E-11
     kr 80      1.35E-11  1.41E-11  1.48E-11  1.54E-11  1.61E-11  1.61E-11
     ce144      9.85E-12  1.42E-10  1.42E-10  1.42E-10  1.42E-10  7.88E-12
      y 90      3.50E-12  3.76E-12  3.76E-12  3.76E-12  3.76E-12  3.47E-12
     er167      2.69E-12  2.80E-12  2.90E-12  3.01E-12  3.12E-12  3.12E-12
     te123      1.81E-12  1.88E-12  1.96E-12  2.04E-12  2.13E-12  2.13E-12
     sb125      2.00E-12  4.28E-12  4.28E-12  4.28E-12  4.29E-12  1.88E-12
     ru106      1.24E-12  9.57E-12  9.58E-12  9.60E-12  9.61E-12  1.05E-12
     cd108      7.86E-13  8.28E-13  8.72E-13  9.18E-13  9.66E-13  9.66E-13
     be  9      6.82E-14  6.92E-14  7.02E-14  7.12E-14  7.22E-14  7.22E-14
     sn114      3.30E-14  3.40E-14  3.50E-14  3.61E-14  3.72E-14  3.72E-14
     li  7      2.78E-14  2.82E-14  2.86E-14  2.90E-14  2.94E-14  2.94E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  118
0                          fraction of total absorption rate
         power=     .00mw, burnup=  16086.mwd, flux= 6.00E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.23E-14  1.40E-14  1.42E-14  1.43E-14  1.45E-14  1.30E-14
     te127m     2.11E-15  2.17E-12  2.17E-12  2.17E-12  2.17E-12  1.18E-15
     nb 95      5.89E-16  3.62E-11  3.62E-11  3.62E-11  3.62E-11  2.07E-16
     zr 95      2.74E-16  3.90E-11  3.90E-11  3.90E-11  3.90E-11  1.01E-16
      y 91      7.69E-17  3.33E-11  3.33E-11  3.33E-11  3.33E-11  2.59E-17
     sn123      7.15E-18  2.57E-15  2.57E-15  2.57E-15  2.57E-15  4.37E-18
     cd109      1.81E-18  9.77E-18  1.02E-17  1.06E-17  1.11E-17  1.06E-18
     sr 89      2.11E-18  7.09E-12  7.09E-12  7.09E-12  7.09E-12  6.03E-19
     tb160      1.03E-18  3.81E-14  3.87E-14  3.94E-14  4.01E-14  4.52E-19
     ru103      3.70E-19  9.36E-11  9.36E-11  9.37E-11  9.37E-11  6.85E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  119
       power= 9.790E-04mw, burnup=1.6086E+04mwd, flux= 6.00E+07n/cm**2-sec
0                                        nuclide concentrations, gram atoms
                                         basis = single reactor assembly
            charge ******* d ******* d ******* d ******* d ******* d
      h  1  9.02E-04  9.15E-04  9.29E-04  9.42E-04  9.55E-04  9.55E-04
      h  2  2.69E-06  2.73E-06  2.77E-06  2.81E-06  2.85E-06  2.85E-06
      h  3  1.11E-11  1.32E-11  1.33E-11  1.33E-11  1.34E-11  1.11E-11
      h  4   .00E+00  1.30E-35  1.31E-35  1.31E-35  1.32E-35   .00E+00
     he  3  1.39E-08  1.41E-08  1.42E-08  1.43E-08  1.45E-08  1.45E-08
     he  4  1.50E-04  1.52E-04  1.54E-04  1.56E-04  1.58E-04  1.58E-04
     he  6   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20  1.80E-05  1.82E-05  1.85E-05  1.88E-05  1.90E-05  1.90E-05
     ne 21  5.07E-09  5.21E-09  5.36E-09  5.51E-09  5.66E-09  5.66E-09
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ne 22	1.18E-07	1.20E-07	1.22E-07	1.24E-07	1.25E-07	1.25E-07
ne 23	1.77E-30	1.76E-15	1.77E-15	1.77E-15	1.77E-15	1.77E-30
na 22	4.71E-12	1.05E-11	1.05E-11	1.05E-11	1.05E-11	4.41E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.40E-24	6.39E-09	6.40E-09	6.40E-09	6.40E-09	6.40E-24
na 24m	1.05E-30	1.05E-15	1.05E-15	1.05E-15	1.05E-15	1.05E-30
na 25	3.47E-39	3.77E-24	3.87E-24	3.98E-24	4.09E-24	4.09E-39
mg 24	1.19E-01	1.20E-01	1.22E-01	1.23E-01	1.25E-01	1.25E-01
mg 25	5.28E-07	5.43E-07	5.58E-07	5.73E-07	5.89E-07	5.89E-07
mg 26	2.69E-06	2.73E-06	2.77E-06	2.81E-06	2.85E-06	2.85E-06
mg 27	5.27E-28	5.26E-13	5.27E-13	5.27E-13	5.27E-13	5.27E-28
mg 28	.00E+00	2.60E-25	2.60E-25	2.61E-25	2.61E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.75E-26	4.74E-11	4.74E-11	4.74E-11	4.75E-11	4.75E-26
al 29	2.95E-37	3.03E-22	3.12E-22	3.21E-22	3.30E-22	3.30E-37
al 30	.00E+00	6.02E-32	6.28E-32	6.55E-32	6.82E-32	.00E+00
si 28	3.45E-01	3.50E-01	3.55E-01	3.59E-01	3.64E-01	3.64E-01
si 29	4.74E-06	4.88E-06	5.02E-06	5.16E-06	5.30E-06	5.30E-06
si 30	6.95E-11	7.25E-11	7.56E-11	7.88E-11	8.21E-11	8.21E-11
si 31	1.21E-38	1.26E-23	1.32E-23	1.37E-23	1.43E-23	1.43E-38
si 32	5.01E-30	5.30E-30	5.54E-30	5.78E-30	6.03E-30	5.95E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		5.99E+07	5.99E+07	6.00E+07	6.00E+07	6.00E-08

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ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 120
power= 9.790E-04mw, burnup=1.6086E+04mwd, flux= 6.00E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	2.10E+01	2.16E+01	2.23E+01	2.29E+01	2.36E+01	2.36E+01
pb206	8.67E-02	9.06E-02	9.45E-02	9.85E-02	1.03E-01	1.03E-01
pb207	6.12E-03	6.35E-03	6.60E-03	6.85E-03	7.10E-03	7.10E-03
pb208	3.16E-04	3.25E-04	3.35E-04	3.44E-04	3.54E-04	3.54E-04
pb209	5.62E-10	5.77E-10	5.93E-10	6.09E-10	6.24E-10	6.24E-10
pb210	1.94E-04	1.98E-04	2.02E-04	2.06E-04	2.10E-04	2.10E-04
pb211	3.78E-11	3.83E-11	3.89E-11	3.95E-11	4.01E-11	4.01E-11
pb212	2.51E-11	2.58E-11	2.62E-11	2.66E-11	2.70E-11	2.67E-11
pb214	4.44E-10	4.53E-10	4.62E-10	4.72E-10	4.81E-10	4.81E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.27E-02	1.34E-02	1.41E-02	1.48E-02	1.55E-02	1.55E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.20E-07	1.22E-07	1.25E-07	1.27E-07	1.29E-07	1.30E-07
bi211	2.24E-12	2.27E-12	2.31E-12	2.34E-12	2.37E-12	2.38E-12
bi212	2.38E-12	2.45E-12	2.49E-12	2.52E-12	2.56E-12	2.53E-12
bi213	1.31E-10	1.35E-10	1.38E-10	1.42E-10	1.46E-10	1.46E-10
bi214	3.30E-10	3.37E-10	3.43E-10	3.50E-10	3.57E-10	3.57E-10
po210	3.28E-06	3.37E-06	3.44E-06	3.51E-06	3.57E-06	3.55E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.48E-17	2.51E-17	2.55E-17	2.59E-17	2.62E-17	2.63E-17
po212	1.25E-22	1.29E-22	1.31E-22	1.33E-22	1.35E-22	1.33E-22
po213	1.97E-19	2.03E-19	2.08E-19	2.14E-19	2.19E-19	2.19E-19
po214	4.54E-17	4.63E-17	4.72E-17	4.82E-17	4.91E-17	4.91E-17
po215	3.11E-17	3.15E-17	3.20E-17	3.24E-17	3.29E-17	3.30E-17
po216	9.52E-17	9.76E-17	9.92E-17	1.01E-16	1.02E-16	1.01E-16
po218	5.14E-11	5.24E-11	5.35E-11	5.46E-11	5.56E-11	5.56E-11
rn218	9.95E-44	9.08E-29	9.23E-29	9.37E-29	9.52E-29	9.25E-44
rn219	6.91E-14	7.01E-14	7.11E-14	7.22E-14	7.32E-14	7.34E-14
rn220	3.65E-14	3.74E-14	3.80E-14	3.86E-14	3.92E-14	3.87E-14
rn222	9.12E-08	9.31E-08	9.50E-08	9.69E-08	9.88E-08	9.88E-08
ra222	1.08E-40	9.86E-26	1.00E-25	1.02E-25	1.03E-25	1.01E-40

ra223	1.72E-08	1.75E-08	1.77E-08	1.80E-08	1.83E-08	1.83E-08
ra224	2.08E-10	2.13E-10	2.16E-10	2.20E-10	2.23E-10	2.20E-10
ra225	6.13E-08	6.31E-08	6.48E-08	6.65E-08	6.82E-08	6.82E-08
ra226	1.39E-02	1.42E-02	1.45E-02	1.48E-02	1.51E-02	1.51E-02
ra228	6.55E-11	6.69E-11	6.84E-11	6.98E-11	7.12E-11	7.12E-11
ac225	4.14E-08	4.26E-08	4.38E-08	4.49E-08	4.61E-08	4.61E-08
ac227	1.20E-05	1.22E-05	1.23E-05	1.25E-05	1.27E-05	1.27E-05
ac228	8.00E-15	8.17E-15	8.34E-15	8.51E-15	8.69E-15	8.69E-15
th226	5.25E-39	4.81E-24	4.89E-24	4.97E-24	5.04E-24	6.92E-39
th227	2.78E-08	2.82E-08	2.86E-08	2.91E-08	2.95E-08	2.96E-08
th228	3.96E-08	4.07E-08	4.13E-08	4.19E-08	4.26E-08	4.20E-08
th229	1.19E-02	1.23E-02	1.26E-02	1.29E-02	1.33E-02	1.33E-02
th230	7.08E-01	7.21E-01	7.34E-01	7.48E-01	7.61E-01	7.61E-01
th231	2.78E-09	3.57E-09	3.58E-09	3.59E-09	3.61E-09	2.77E-09
th232	1.60E-01	1.64E-01	1.67E-01	1.71E-01	1.74E-01	1.74E-01
th233	3.55E-28	3.63E-13	3.71E-13	3.79E-13	3.86E-13	3.87E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.80E-02	1.83E-02	1.86E-02	1.88E-02	1.91E-02	1.91E-02
pa232	7.48E-26	7.60E-11	7.72E-11	7.84E-11	7.96E-11	7.96E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 121
power= 9.790E-04mw, burnup=1.6086E+04mwd, flux= 6.80E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.08E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.09E-36	4.66E-21	4.74E-21	4.81E-21	4.89E-21	4.77E-36
u231	6.68E-32	6.80E-17	6.93E-17	7.05E-17	7.18E-17	7.18E-32
u232	1.42E-06	1.48E-06	1.51E-06	1.53E-06	1.55E-06	1.50E-06
u233	3.64E-01	3.70E-01	3.77E-01	3.84E-01	3.91E-01	3.91E-01
u234	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.01E+01	1.01E+01
u235	6.71E+02	6.71E+02	6.70E+02	6.70E+02	6.69E+02	6.69E+02
u236	1.86E+02	1.86E+02	1.86E+02	1.87E+02	1.87E+02	1.87E+02
u237	1.35E-12	7.92E-07	7.93E-07	7.94E-07	7.95E-07	1.33E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.46E-23	7.46E-08	7.46E-08	7.46E-08	7.47E-08	7.47E-23
u240	7.18E-36	8.13E-36	9.17E-36	1.03E-35	1.15E-35	1.15E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.05E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	2.60E-13
np236m	4.93E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.93E-28
np236	1.83E-06	1.85E-06	1.87E-06	1.89E-06	1.91E-06	1.91E-06
np237	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01
np238	3.11E-14	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.09E-14
np239	1.29E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.40E-13
np240m	6.13E-38	6.94E-38	7.83E-38	8.79E-38	9.84E-38	9.84E-38
np240	6.95E-39	5.30E-16	5.30E-16	5.31E-16	5.31E-16	7.90E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.35E-10	2.71E-10	2.71E-10	2.71E-10	2.71E-10	1.27E-10
pu237	3.70E-21	7.48E-14	7.50E-14	7.52E-14	7.54E-14	9.16E-22
pu238	5.37E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.36E-03
pu239	2.91E+01	2.92E+01	2.93E+01	2.94E+01	2.95E+01	2.95E+01
pu240	5.15E-01	5.14E-01	5.13E-01	5.12E-01	5.12E-01	5.11E-01
pu241	4.38E-05	5.05E-05	5.05E-05	5.04E-05	5.04E-05	4.30E-05
pu242	2.87E-05	2.92E-05	2.98E-05	3.04E-05	3.09E-05	3.09E-05
pu243	1.53E-29	1.49E-14	1.52E-14	1.55E-14	1.58E-14	1.66E-29
pu244	3.58E-25	4.05E-25	4.57E-25	5.13E-25	5.74E-25	5.74E-25
pu245	.00E+00	4.02E-36	4.53E-36	5.10E-36	5.70E-36	.00E+00

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     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.01E-34  1.01E-19  1.01E-19  1.01E-19  1.01E-19  1.01E-34
     am240   4.44E-32  4.61E-17  4.61E-17  4.61E-17  4.61E-17  4.61E-32
     am241   1.51E-03  1.50E-03  1.50E-03  1.50E-03  1.50E-03  1.49E-03
     am242m  1.68E-07  1.70E-07  1.70E-07  1.70E-07  1.70E-07  1.67E-07
     am242   2.17E-12  1.36E-11  1.36E-11  1.36E-11  1.36E-11  2.15E-12
     am243   1.47E-07  1.50E-07  1.53E-07  1.57E-07  1.60E-07  1.60E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   2.69E-31  2.75E-16  2.81E-16  2.87E-16  2.93E-16  2.93E-31
     am245   7.61E-40  7.94E-37  8.95E-37  1.01E-36  1.13E-36  8.80E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.70E-32  1.94E-22  1.94E-22  1.94E-22  1.94E-22  2.43E-33
     cm242   4.61E-10  2.74E-09  2.74E-09  2.74E-09  2.74E-09  4.50E-10
     cm243   1.42E-14  1.52E-14  1.52E-14  1.52E-14  1.52E-14  1.40E-14
     cm244   3.77E-12  4.31E-12  4.41E-12  4.50E-12  4.60E-12  4.06E-12
1
     sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  122
       power= 9.790E-04mw, burnup=1.6086E+04mwd, flux= 6.00E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   9.56E-15  9.70E-15  9.86E-15  1.00E-14  1.02E-14  1.02E-14
     cm246   7.26E-17  7.44E-17  7.61E-17  7.78E-17  7.94E-17  7.94E-17
     cm247   1.86E-20  1.98E-20  2.10E-20  2.22E-20  2.35E-20  2.35E-20
     cm248   3.87E-23  4.23E-23  4.61E-23  5.02E-23  5.45E-23  5.45E-23
     cm249    .00E+00  3.21E-34  3.51E-34  3.82E-34  4.15E-34   .00E+00
     cm250   1.65E-38  1.80E-38  1.97E-38  2.14E-38  2.34E-38  2.34E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               5.99E+07  5.99E+07  6.00E+07  6.00E+07  6.00E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

          cross-section data taken from position number 14 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
```

```
          *                                                                      *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                      *
          *                  fission product yields are from endf/b-v            *
          *                                                                      *
          *             photon libraries use an 18-energy-group structure        *
          *            the photon data are from the master photon data base,     *
          *             produced to include bremsstrahlung from uo2 matrix       *
          *                                                                      *
          *       see information above this box (if present) for later updates  *
          *                                                                      *
          ************************************************************************
0         *                                                                      *
          ************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on bxw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  123
         power=    .00mw, burnup=  16980.mwd, flux= 6.00E+07n/cm**2-sec
0                                                   basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.266238E+06   1.265670E+06   1.265100E+06   1.264527E+06   1.263952E+06   1.263946E+06
     absorptions   1.026683E+06   1.026498E+06   1.026311E+06   1.026122E+06   1.025931E+06   1.025927E+06
     k infinity    1.233329E+00   1.232998E+00   1.232667E+00   1.232337E+00   1.232003E+00   1.232004E+00
0                   initial        ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   1.010530E+06   1.010258E+06   1.009985E+06   1.009711E+06   1.009436E+06   1.009433E+06
     non-actinide
     abs. fracs.   1.373360E-02   1.382122E-02   1.390741E-02   1.399288E-02   1.407811E-02   1.407752E-02
1    sas2h: far-field crit based on bxw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products     page  124
0                                   fraction of total absorption rate
         power=    .00mw, burnup=  16980.mwd, flux= 6.00E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03
     nd143      1.56E-03  1.58E-03  1.60E-03  1.62E-03  1.64E-03  1.64E-03
     eu151      1.58E-03  1.59E-03  1.60E-03  1.62E-03  1.43E-03  1.43E-03
     rh103      7.54E-04  7.65E-04  7.76E-04  7.86E-04  7.97E-04  7.97E-04
     xe131      5.06E-04  5.13E-04  5.20E-04  5.27E-04  5.34E-04  5.34E-04
     cs133      3.93E-04  3.98E-04  4.04E-04  4.09E-04  4.15E-04  4.15E-04
     sm147      2.89E-04  2.93E-04  2.97E-04  3.01E-04  3.05E-04  3.05E-04
     tc 99      2.73E-04  2.76E-04  2.80E-04  2.83E-04  2.87E-04  2.87E-04
     nd145      2.22E-04  2.25E-04  2.28E-04  2.31E-04  2.34E-04  2.34E-04
     gd155      2.22E-04  2.22E-04  2.22E-04  2.22E-04  2.22E-04  2.22E-04
     sm152      1.64E-04  1.67E-04  1.70E-04  1.72E-04  1.75E-04  1.75E-04
     mo 95      1.54E-04  1.56E-04  1.58E-04  1.60E-04  1.62E-04  1.62E-04
     sm150      1.14E-04  1.16E-04  1.17E-04  1.19E-04  1.21E-04  1.21E-04
     cd113      1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04
     kr 83      9.49E-05  9.61E-05  9.74E-05  9.87E-05  1.00E-04  1.00E-04
     cs135      8.90E-05  9.02E-05  9.14E-05  9.27E-05  9.39E-05  9.39E-05
     ru101      6.92E-05  7.02E-05  7.11E-05  7.21E-05  7.31E-05  7.31E-05
     eu153      6.86E-05  6.97E-05  7.07E-05  7.18E-05  7.29E-05  7.29E-05
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pr141	6.62E-05	6.71E-05	6.80E-05	6.89E-05	6.99E-05	6.99E-05
gd157	5.97E-05	5.98E-05	5.99E-05	5.99E-05	6.00E-05	6.00E-05
la139	5.41E-05	5.49E-05	5.56E-05	5.64E-05	5.71E-05	5.71E-05
pd105	2.71E-05	2.75E-05	2.79E-05	2.83E-05	2.87E-05	2.87E-05
ba137	2.61E-05	2.65E-05	2.68E-05	2.72E-05	2.76E-05	2.76E-05
ag109	2.52E-05	2.57E-05	2.62E-05	2.67E-05	2.72E-05	2.72E-05
zr 93	2.14E-05	2.17E-05	2.20E-05	2.23E-05	2.26E-05	2.26E-05
i129	1.76E-05	1.78E-05	1.81E-05	1.84E-05	1.86E-05	1.86E-05
nd144	1.66E-05	1.68E-05	1.71E-05	1.73E-05	1.76E-05	1.76E-05
mo 97	1.23E-05	1.25E-05	1.26E-05	1.28E-05	1.30E-05	1.30E-05
sm151	1.25E-05	1.28E-05	1.29E-05	1.29E-05	1.29E-05	1.25E-05
gd152	1.13E-05	1.16E-05	1.19E-05	1.22E-05	1.25E-05	1.25E-05
pd108	6.18E-06	6.29E-06	6.41E-06	6.52E-06	6.63E-06	6.63E-06
zr 91	5.66E-06	5.74E-06	5.82E-06	5.90E-06	5.98E-06	5.98E-06
y 89	5.42E-06	5.49E-06	5.57E-06	5.64E-06	5.72E-06	5.72E-06
ru102	5.12E-06	5.20E-06	5.27E-06	5.34E-06	5.41E-06	5.41E-06
ce142	4.50E-06	4.57E-06	4.63E-06	4.69E-06	4.76E-06	4.76E-06
nd148	4.34E-06	4.40E-06	4.46E-06	4.53E-06	4.59E-06	4.59E-06
nd146	3.65E-06	3.70E-06	3.75E-06	3.81E-06	3.86E-06	3.86E-06
in115	3.20E-06	3.25E-06	3.29E-06	3.34E-06	3.39E-06	3.39E-06
pd107	3.14E-06	3.19E-06	3.25E-06	3.31E-06	3.36E-06	3.36E-06
ba138	3.11E-06	3.16E-06	3.20E-06	3.24E-06	3.29E-06	3.29E-06
ce140	2.91E-06	2.95E-06	3.00E-06	3.04E-06	3.08E-06	3.08E-06
ru 99	2.49E-06	2.58E-06	2.67E-06	2.76E-06	2.86E-06	2.86E-06
xe132	2.67E-06	2.71E-06	2.75E-06	2.78E-06	2.82E-06	2.82E-06
mo 98	1.80E-06	1.82E-06	1.85E-06	1.87E-06	1.90E-06	1.90E-06
ma100	1.75E-06	1.77E-06	1.80E-06	1.82E-06	1.85E-06	1.85E-06
xe134	1.72E-06	1.75E-06	1.77E-06	1.80E-06	1.82E-06	1.82E-06
zr 92	1.37E-06	1.39E-06	1.41E-06	1.43E-06	1.45E-06	1.45E-06
i127	1.28E-06	1.30E-06	1.32E-06	1.33E-06	1.35E-06	1.35E-06
ru104	1.17E-06	1.19E-06	1.21E-06	1.22E-06	1.24E-06	1.24E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 125

0 fraction of total absorption rate

0 power= .00mw, burnup= 16980.mwd, flux= 6.00E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d
zr 96	1.08E-06	1.10E-06	1.11E-06	1.13E-06	1.14E-06	1.14E-06
nd150	9.81E-07	9.95E-07	1.01E-06	1.02E-06	1.04E-06	1.04E-06
xe136	9.34E-07	9.47E-07	9.60E-07	9.73E-07	9.86E-07	9.86E-07
cd111	7.14E-07	7.26E-07	7.38E-07	7.50E-07	7.62E-07	7.62E-07
br 81	6.94E-07	7.03E-07	7.13E-07	7.23E-07	7.32E-07	7.32E-07
rb 85	6.66E-07	6.75E-07	6.84E-07	6.93E-07	7.02E-07	7.02E-07
zr 94	5.81E-07	5.89E-07	5.98E-07	6.06E-07	6.14E-07	6.14E-07
zr 90	5.34E-07	5.41E-07	5.49E-07	5.56E-07	5.64E-07	5.64E-07
gd154	4.86E-07	5.00E-07	5.14E-07	5.29E-07	5.44E-07	5.44E-07
sm154	4.56E-07	4.63E-07	4.70E-07	4.77E-07	4.83E-07	4.83E-07
te130	4.30E-07	4.36E-07	4.42E-07	4.48E-07	4.55E-07	4.55E-07
rb 87	3.83E-07	3.89E-07	3.94E-07	3.99E-07	4.04E-07	4.04E-07
se 77	2.79E-07	2.83E-07	2.87E-07	2.91E-07	2.95E-07	2.95E-07
pd106	2.72E-07	2.77E-07	2.81E-07	2.86E-07	2.90E-07	2.90E-07
ba135	2.48E-07	2.57E-07	2.66E-07	2.76E-07	2.85E-07	2.85E-07
gd156	2.56E-07	2.60E-07	2.64E-07	2.69E-07	2.73E-07	2.73E-07
kr 84	1.82E-07	1.85E-07	1.88E-07	1.90E-07	1.93E-07	1.93E-07
dy161	1.53E-07	1.55E-07	1.58E-07	1.61E-07	1.64E-07	1.64E-07
sb121	1.47E-07	1.49E-07	1.51E-07	1.53E-07	1.56E-07	1.56E-07
ru100	1.37E-07	1.41E-07	1.45E-07	1.49E-07	1.53E-07	1.53E-07
se 79	1.39E-07	1.41E-07	1.43E-07	1.45E-07	1.47E-07	1.47E-07
sb123	1.19E-07	1.21E-07	1.22E-07	1.24E-07	1.26E-07	1.26E-07
nd142	9.91E-08	1.02E-07	1.05E-07	1.08E-07	1.11E-07	1.11E-07
kr 86	1.01E-07	1.03E-07	1.04E-07	1.05E-07	1.07E-07	1.07E-07

ba134	9.51E-08	9.78E-08	1.00E-07	1.03E-07	1.06E-07	1.06E-07
te128	9.70E-08	9.84E-08	9.98E-08	1.01E-07	1.03E-07	1.03E-07
sm148	8.67E-08	8.92E-08	9.16E-08	9.41E-08	9.67E-08	9.67E-08
eu152	8.48E-08	1.01E-07	1.02E-07	1.03E-07	1.04E-07	8.66E-08
pd104	6.52E-08	6.71E-08	6.90E-08	7.09E-08	7.28E-08	7.28E-08
tb159	6.74E-08	6.85E-08	6.97E-08	7.09E-08	7.21E-08	7.21E-08
se 80	6.68E-08	6.77E-08	6.87E-08	6.96E-08	7.05E-08	7.05E-08
te125	6.54E-08	6.64E-08	6.74E-08	6.83E-08	6.93E-08	6.93E-08
gd158	5.36E-08	5.45E-08	5.54E-08	5.63E-08	5.73E-08	5.73E-08
cd112	4.94E-08	5.02E-08	5.10E-08	5.18E-08	5.26E-08	5.26E-08
nb 93	3.96E-08	4.10E-08	4.25E-08	4.40E-08	4.54E-08	4.55E-08
sn117	3.53E-08	3.58E-08	3.64E-08	3.69E-08	3.75E-08	3.75E-08
li 6	3.55E-08	3.59E-08	3.64E-08	3.68E-08	3.73E-08	3.73E-08
dy164	3.43E-08	3.49E-08	3.56E-08	3.62E-08	3.69E-08	3.69E-08
dy162	3.32E-08	3.39E-08	3.46E-08	3.53E-08	3.60E-08	3.60E-08
cd114	2.97E-08	3.02E-08	3.06E-08	3.11E-08	3.16E-08	3.16E-08
sn119	2.71E-08	2.75E-08	2.79E-08	2.83E-08	2.87E-08	2.87E-08
eu155	2.78E-08	4.51E-08	4.51E-08	4.51E-08	4.52E-08	2.69E-08
sn115	2.48E-08	2.52E-08	2.56E-08	2.59E-08	2.63E-08	2.63E-08
pm147	2.80E-08	6.54E-08	6.54E-08	6.54E-08	6.54E-08	2.62E-08
pd110	2.37E-08	2.41E-08	2.45E-08	2.50E-08	2.54E-08	2.54E-08
mo 96	2.20E-08	2.26E-08	2.32E-08	2.38E-08	2.44E-08	2.44E-08
cd110	2.07E-08	2.14E-08	2.21E-08	2.28E-08	2.36E-08	2.36E-08
br 79	1.98E-08	2.06E-08	2.13E-08	2.20E-08	2.28E-08	2.28E-08
ag107	1.73E-08	1.80E-08	1.88E-08	1.95E-08	2.02E-08	2.02E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 126

0 fraction of total absorption rate

0 powers .00mw, burnup= 16980.mwd, flux= 6.00E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
sr 88	1.86E-08	1.89E-08	1.91E-08	1.94E-08	1.96E-08	1.96E-08
xe129	1.18E-08	1.23E-08	1.27E-08	1.31E-08	1.36E-08	1.36E-08
se 82	1.28E-08	1.29E-08	1.31E-08	1.33E-08	1.35E-08	1.35E-08
xe130	1.10E-08	1.13E-08	1.16E-08	1.19E-08	1.22E-08	1.22E-08
sn126	1.13E-08	1.14E-08	1.16E-08	1.17E-08	1.19E-08	1.19E-08
ba136	1.03E-08	1.06E-08	1.08E-08	1.10E-08	1.13E-08	1.13E-08
se 78	9.97E-09	1.01E-08	1.03E-08	1.04E-08	1.05E-08	1.05E-08
sn124	8.66E-09	8.78E-09	8.91E-09	9.04E-09	9.17E-09	9.17E-09
dy163	8.34E-09	8.51E-09	8.69E-09	8.87E-09	9.04E-09	9.04E-09
kr 82	7.88E-09	8.03E-09	8.23E-09	8.40E-09	8.58E-09	8.58E-09
te126	6.80E-09	7.04E-09	7.28E-09	7.53E-09	7.78E-09	7.78E-09
se 75	5.87E-09	5.95E-09	6.04E-09	6.12E-09	6.20E-09	6.20E-09
eu154	5.53E-09	7.30E-09	7.42E-09	7.53E-09	7.65E-09	5.76E-09
in113	4.93E-09	5.01E-09	5.08E-09	5.15E-09	5.23E-09	5.23E-09
sn118	3.50E-09	3.55E-09	3.60E-09	3.65E-09	3.71E-09	3.71E-09
sr 90	3.63E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.63E-09
sn122	2.99E-09	3.03E-09	3.08E-09	3.12E-09	3.17E-09	3.17E-09
cd116	2.94E-09	2.98E-09	3.03E-09	3.07E-09	3.11E-09	3.11E-09
sn120	2.21E-09	2.26E-09	2.27E-09	2.30E-09	2.34E-09	2.34E-09
ge 73	1.67E-09	1.69E-09	1.72E-09	1.74E-09	1.77E-09	1.77E-09
cs137	8.46E-10	9.12E-10	9.12E-10	9.12E-10	9.12E-10	8.41E-10
ho165	7.47E-10	7.65E-10	7.83E-10	8.02E-10	8.20E-10	8.20E-10
gd160	7.40E-10	7.54E-10	7.67E-10	7.81E-10	7.94E-10	7.94E-10
dy160	6.10E-10	6.29E-10	6.48E-10	6.67E-10	6.87E-10	6.87E-10
ge 76	5.73E-10	5.81E-10	5.89E-10	5.97E-10	6.05E-10	6.05E-10
xe128	3.74E-10	3.85E-10	3.96E-10	4.07E-10	4.18E-10	4.18E-10
cs134	2.38E-10	7.19E-10	7.30E-10	7.40E-10	7.50E-10	2.31E-10
sr 86	1.86E-10	1.91E-10	1.96E-10	2.01E-10	2.06E-10	2.06E-10
te124	1.51E-10	1.55E-10	1.58E-10	1.61E-10	1.65E-10	1.65E-10
sn116	1.43E-10	1.47E-10	1.52E-10	1.56E-10	1.60E-10	1.60E-10

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     kr 85      1.08E-10  1.33E-10  1.33E-10  1.33E-10  1.33E-10  1.06E-10
     sr 87      8.06E-11  8.20E-11  8.34E-11  8.48E-11  8.62E-11  8.62E-11
     nb 94      6.79E-11  6.97E-11  7.16E-11  7.36E-11  7.55E-11  7.55E-11
     te122      5.99E-11  6.16E-11  6.34E-11  6.52E-11  6.70E-11  6.70E-11
     se 76      5.40E-11  5.53E-11  5.67E-11  5.80E-11  5.94E-11  5.94E-11
     er166      3.79E-11  3.88E-11  3.96E-11  4.05E-11  4.13E-11  4.13E-11
     ge 74      3.34E-11  3.39E-11  3.44E-11  3.48E-11  3.53E-11  3.53E-11
     ge 72      2.44E-11  2.47E-11  2.51E-11  2.55E-11  2.58E-11  2.58E-11
     kr 80      1.61E-11  1.68E-11  1.75E-11  1.83E-11  1.91E-11  1.91E-11
     ce144      7.88E-12  1.42E-10  1.42E-10  1.42E-10  1.42E-10  6.32E-12
     er167      3.12E-12  3.23E-12  3.34E-12  3.46E-12  3.58E-12  3.58E-12
      y 90      3.48E-12  3.76E-12  3.76E-12  3.76E-12  3.76E-12  3.45E-12
     te123      2.13E-12  2.21E-12  2.30E-12  2.39E-12  2.48E-12  2.48E-12
     sb125      1.88E-12  4.29E-12  4.29E-12  4.29E-12  4.30E-12  1.77E-12
     cd108      9.66E-13  1.02E-12  1.07E-12  1.12E-12  1.18E-12  1.18E-12
     ru106      1.05E-12  9.62E-12  9.64E-12  9.65E-12  9.66E-12  8.90E-13
     be  9      7.22E-14  7.32E-14  7.42E-14  7.52E-14  7.63E-14  7.63E-14
     sn114      3.72E-14  3.83E-14  3.94E-14  4.05E-14  4.16E-14  4.16E-14
     li  7      2.95E-14  2.99E-14  3.03E-14  3.07E-14  3.11E-14  3.11E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  127
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  16980.mwd, flux= 6.00E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.30E-14  1.47E-14  1.48E-14  1.50E-14  1.52E-14  1.37E-14
     te127m     1.18E-15  2.17E-12  2.17E-12  2.18E-12  2.18E-12  6.64E-16
     nb 95      2.07E-16  3.62E-11  3.62E-11  3.62E-11  3.62E-11  7.73E-17
     zr 95      1.01E-16  3.90E-11  3.90E-11  3.90E-11  3.90E-11  3.78E-17
      y 91      2.59E-17  3.33E-11  3.33E-11  3.33E-11  3.33E-11  8.82E-18
     sn123      4.38E-18  2.57E-15  2.57E-15  2.57E-15  2.57E-15  2.68E-18
     cd109      1.86E-18  1.15E-17  1.20E-17  1.25E-17  1.31E-17  1.92E-18
     tb160      4.52E-19  4.08E-14  4.15E-14  4.22E-14  4.29E-14  2.05E-19
     sr 89      6.02E-19  7.09E-12  7.09E-12  7.09E-12  7.09E-12  1.78E-19
     ru103      6.84E-20  9.38E-11  9.38E-11  9.38E-11  9.39E-11  1.37E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  128
       power= 9.790E-04mw, burnup=1.6980E+04mwd, flux= 6.00E+07n/cm**2-sec
0                                     nuclide concentrations, gram atoms
                                      basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1   9.55E-04  9.69E-04  9.82E-04  9.95E-04  1.01E-03  1.01E-03
      h  2   2.85E-06  2.89E-06  2.93E-06  2.97E-06  3.01E-06  3.01E-06
      h  3   1.11E-11  1.34E-11  1.35E-11  1.35E-11  1.36E-11  1.11E-11
      h  4    .00E+00  1.32E-35  1.33E-35  1.33E-35  1.34E-35   .00E+00
     he  3   1.45E-08  1.46E-08  1.47E-08  1.49E-08  1.50E-08  1.50E-08
     he  4   1.58E-04  1.61E-04  1.63E-04  1.65E-04  1.67E-04  1.67E-04
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   1.90E-05  1.93E-05  1.96E-05  1.98E-05  2.01E-05  2.01E-05
     ne 21   5.66E-09  5.81E-09  5.96E-09  6.12E-09  6.28E-09  6.28E-09
     ne 22   1.25E-07  1.27E-07  1.29E-07  1.31E-07  1.32E-07  1.32E-07
     ne 23   1.77E-30  1.77E-15  1.77E-15  1.77E-15  1.77E-15  1.77E-30
     na 22   4.41E-12  1.05E-11  1.05E-11  1.05E-11  1.05E-11  4.13E-12
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   6.40E-24  6.40E-09  6.40E-09  6.41E-09  6.41E-09  6.41E-24
     na 24m  1.05E-30  1.05E-15  1.05E-15  1.05E-15  1.05E-15  1.05E-30
     na 25   4.09E-39  4.20E-24  4.31E-24  4.42E-24  4.54E-24  4.54E-39
     mg 24   1.25E-01  1.27E-01  1.28E-01  1.30E-01  1.32E-01  1.32E-01
     mg 25   5.89E-07  6.05E-07  6.20E-07  6.37E-07  6.53E-07  6.53E-07
     mg 26   2.85E-06  2.89E-06  2.93E-06  2.97E-06  3.01E-06  3.01E-06
     mg 27   5.27E-28  5.27E-13  5.27E-13  5.27E-13  5.28E-13  5.28E-28
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mg 28	.00E+00	2.61E-25	2.61E-25	2.61E-25	2.62E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.75E-26	4.74E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-26
al 29	3.30E-37	3.38E-22	3.47E-22	3.57E-22	3.66E-22	3.66E-37
al 30	.00E+00	7.10E-32	7.39E-32	7.69E-32	8.00E-32	.00E+00
si 28	3.64E-01	3.69E-01	3.74E-01	3.79E-01	3.84E-01	3.84E-01
si 29	5.30E-06	5.44E-06	5.59E-06	5.73E-06	5.88E-06	5.88E-06
si 30	8.21E-11	8.55E-11	8.90E-11	9.25E-11	9.62E-11	9.62E-11
si 31	1.43E-38	1.49E-23	1.55E-23	1.61E-23	1.68E-23	1.68E-38
si 32	5.95E-30	6.27E-30	6.54E-30	6.81E-30	7.09E-30	6.99E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		6.00E+07	6.00E+07	6.00E+07	6.01E+07	6.01E-08

1

sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 129
power= 9.790E-04mw, burnup=1.6980E+04mwd, flux= 6.00E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	2.36E+01	2.42E+01	2.49E+01	2.56E+01	2.62E+01	2.62E+01
pb206	1.03E-01	1.07E-01	1.11E-01	1.15E-01	1.20E-01	1.20E-01
pb207	7.10E-03	7.35E-03	7.61E-03	7.87E-03	8.14E-03	8.14E-03
pb208	3.54E-04	3.63E-04	3.73E-04	3.83E-04	3.93E-04	3.94E-04
pb209	6.24E-10	6.40E-10	6.56E-10	6.71E-10	6.87E-10	6.87E-10
pb210	2.10E-04	2.14E-04	2.18E-04	2.22E-04	2.26E-04	2.26E-04
pb211	4.01E-11	4.06E-11	4.12E-11	4.18E-11	4.23E-11	4.24E-11
pb212	2.67E-11	2.74E-11	2.78E-11	2.82E-11	2.86E-11	2.82E-11
pb214	4.81E-10	4.90E-10	4.99E-10	5.08E-10	5.17E-10	5.17E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.55E-02	1.62E-02	1.70E-02	1.78E-02	1.85E-02	1.85E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.30E-07	1.32E-07	1.34E-07	1.37E-07	1.39E-07	1.39E-07
bi211	2.38E-12	2.41E-12	2.44E-12	2.48E-12	2.51E-12	2.51E-12
bi212	2.53E-12	2.60E-12	2.64E-12	2.67E-12	2.71E-12	2.68E-12
bi213	1.46E-10	1.49E-10	1.53E-10	1.57E-10	1.60E-10	1.60E-10
bi214	3.57E-10	3.64E-10	3.70E-10	3.77E-10	3.84E-10	3.84E-10
po210	3.55E-06	3.64E-06	3.71E-06	3.78E-06	3.84E-06	3.82E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.63E-17	2.66E-17	2.70E-17	2.74E-17	2.77E-17	2.78E-17
po212	1.33E-22	1.37E-22	1.39E-22	1.41E-22	1.42E-22	1.41E-22
po213	2.19E-19	2.25E-19	2.30E-19	2.36E-19	2.41E-19	2.41E-19
po214	4.91E-17	5.00E-17	5.10E-17	5.19E-17	5.28E-17	5.28E-17
po215	3.30E-17	3.34E-17	3.39E-17	3.43E-17	3.48E-17	3.49E-17
po216	1.01E-16	1.04E-16	1.05E-16	1.07E-16	1.08E-16	1.07E-16
po218	5.56E-11	5.67E-11	5.77E-11	5.88E-11	5.98E-11	5.98E-11
rn218	9.25E-44	9.66E-29	9.80E-29	9.94E-29	1.01E-28	9.81E-44
rn219	7.34E-14	7.43E-14	7.53E-14	7.64E-14	7.74E-14	7.75E-14
rn220	3.87E-14	3.98E-14	4.04E-14	4.09E-14	4.15E-14	4.09E-14
rn222	9.88E-08	1.01E-07	1.03E-07	1.04E-07	1.06E-07	1.06E-07
ra222	1.01E-40	1.05E-25	1.06E-25	1.08E-25	1.10E-25	1.06E-40
ra223	1.83E-08	1.85E-08	1.88E-08	1.91E-08	1.93E-08	1.93E-08
ra224	2.20E-10	2.26E-10	2.30E-10	2.33E-10	2.36E-10	2.33E-10
ra225	6.82E-08	6.99E-08	7.16E-08	7.33E-08	7.51E-08	7.51E-08
ra226	1.51E-02	1.54E-02	1.57E-02	1.59E-02	1.62E-02	1.62E-02
ra228	7.12E-11	7.26E-11	7.40E-11	7.54E-11	7.68E-11	7.68E-11
ac225	4.61E-08	4.72E-08	4.84E-08	4.95E-08	5.07E-08	5.07E-08
ac227	1.27E-05	1.29E-05	1.31E-05	1.32E-05	1.34E-05	1.34E-05
ac228	8.69E-15	8.86E-15	9.03E-15	9.21E-15	9.38E-15	9.38E-15
th226	4.92E-39	5.11E-24	5.19E-24	5.27E-24	5.34E-24	5.17E-39
th227	2.96E-08	2.99E-08	3.03E-08	3.08E-08	3.12E-08	3.12E-08
th228	4.20E-08	4.32E-08	4.38E-08	4.44E-08	4.51E-08	4.44E-08

th229	1.33E-02	1.36E-02	1.39E-02	1.43E-02	1.46E-02	1.46E-02
th230	7.61E-01	7.74E-01	7.87E-01	8.00E-01	8.13E-01	8.14E-01
th231	2.77E-09	3.62E-09	3.63E-09	3.64E-09	3.66E-09	2.76E-09
th232	1.74E-01	1.77E-01	1.81E-01	1.84E-01	1.88E-01	1.88E-01
th233	3.87E-28	3.94E-13	4.02E-13	4.10E-13	4.18E-13	4.18E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	1.91E-02	1.94E-02	1.97E-02	1.99E-02	2.02E-02	2.02E-02
pa232	7.96E-26	8.08E-11	8.20E-11	8.31E-11	8.43E-11	8.43E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 130

power= 9.790E-04mw, burnup=1.6980E+04mwd, flux= 6.00E+07n/cm**2-sec

0

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.08E-12	8.08E-12	8.08E-12	8.08E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	4.77E-36	4.96E-21	5.03E-21	5.11E-21	5.18E-21	5.01E-36
u231	7.18E-32	7.30E-17	7.43E-17	7.55E-17	7.68E-17	7.68E-32
u232	1.50E-06	1.58E-06	1.60E-06	1.62E-06	1.64E-06	1.59E-06
u233	3.91E-01	3.97E-01	4.04E-01	4.11E-01	4.17E-01	4.17E-01
u234	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
u235	6.69E+02	6.69E+02	6.68E+02	6.68E+02	6.67E+02	6.67E+02
u236	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.88E+02	1.88E+02
u237	1.33E-12	7.96E-07	7.97E-07	7.98E-07	7.99E-07	1.31E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.47E-23	7.47E-08	7.47E-08	7.47E-08	7.48E-08	7.48E-23
u240	1.15E-35	1.29E-35	1.43E-35	1.59E-35	1.75E-35	1.75E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np233	2.60E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	2.21E-13
np236m	4.93E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.92E-28
np236	1.91E-06	1.94E-06	1.96E-06	1.98E-06	2.00E-06	2.00E-06
np237	4.11E+01	4.11E+01	4.11E+01	4.10E+01	4.10E+01	4.10E+01
np238	3.09E-14	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.08E-14
np239	1.40E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.51E-13
np240m	9.84E-38	1.10E-37	1.22E-37	1.35E-37	1.50E-37	1.50E-37
np240	7.90E-39	5.31E-16	5.32E-16	5.32E-16	5.33E-16	9.01E-39
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.27E-10	2.71E-10	2.71E-10	2.71E-10	2.71E-10	1.20E-10
pu237	9.16E-22	7.56E-14	7.58E-14	7.60E-14	7.63E-14	2.29E-22
pu238	5.36E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.35E-03
pu239	2.95E+01	2.96E+01	2.97E+01	2.98E+01	2.98E+01	2.98E+01
pu240	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.10E-01
pu241	4.30E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	4.25E-05
pu242	3.09E-05	3.15E-05	3.21E-05	3.26E-05	3.32E-05	3.32E-05
pu243	1.66E-29	1.61E-14	1.66E-14	1.67E-14	1.70E-14	1.80E-29
pu244	5.74E-25	6.41E-25	7.12E-25	7.90E-25	8.73E-25	8.74E-25
pu245	.00E+00	6.37E-36	7.09E-36	7.86E-36	8.70E-36	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.01E-34	1.00E-19	1.01E-19	1.01E-19	1.01E-19	1.01E-34
am240	4.61E-32	4.59E-17	4.60E-17	4.60E-17	4.61E-17	4.60E-32
am241	1.49E-03	1.49E-03	1.49E-03	1.49E-03	1.49E-03	1.49E-03
am242m	1.67E-07	1.69E-07	1.69E-07	1.69E-07	1.69E-07	1.67E-07
am242	2.15E-12	1.35E-11	1.35E-11	1.35E-11	1.35E-11	2.18E-12
am243	1.60E-07	1.63E-07	1.66E-07	1.70E-07	1.73E-07	1.73E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.93E-31	2.99E-16	3.05E-16	3.11E-16	3.17E-16	3.17E-31
am245	8.80E-40	1.26E-36	1.40E-36	1.55E-36	1.71E-36	9.85E-40
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

```
     cm241   2.43E-33  1.93E-22  1.93E-22  1.94E-22  1.94E-22  3.55E-34
     cm242   4.50E-10  2.73E-09  2.73E-09  2.73E-09  2.74E-09  4.45E-10
     cm243   1.40E-14  1.51E-14  1.52E-14  1.52E-14  1.52E-14  1.40E-14
     cm244   4.06E-12  4.69E-12  4.79E-12  4.89E-12  4.99E-12  4.36E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  131
       power= 9.790E-04mw, burnup=1.6980E+04mwd, flux= 6.00E+07n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.02E-14  1.04E-14  1.05E-14  1.07E-14  1.09E-14  1.09E-14
     cm246   7.94E-17  8.11E-17  8.28E-17  8.45E-17  8.62E-17  8.62E-17
     cm247   2.35E-20  2.48E-20  2.61E-20  2.75E-20  2.89E-20  2.89E-20
     cm248   5.45E-23  5.90E-23  6.38E-23  6.88E-23  7.41E-23  7.41E-23
     cm249    .00E+00  4.49E-34  4.86E-34  5.24E-34  5.65E-34   .00E+00
     cm250   2.34E-38  2.55E-38  2.78E-38  3.02E-38  3.29E-38  3.29E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.00E+07  6.00E+07  6.00E+07  6.01E+07  6.01E+08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 15 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *                photon libraries use an 18-energy-group structure    *
          *               the photon data are from the master photon data base, *
          *                produced to include bremsstrahlung from uo2 matrix   *
          *                                                                     *
          *        see information above this box (if present) for later updates *
```

```
         *                                                                      *
         ************************************************************************
         *                                                                      *
         ************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/29/1996    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7993    number of nonzero off-diagonal matrix elements
0        ************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  132
        power=    .00mw, burnup=  17874.mwd, flux= 6.01E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial       ******* d       ******* d       ******* d       *******.d       ******* d
     productions   1.264834E+06   1.264255E+06   1.263673E+06   1.263090E+06   1.262504E+06   1.262498E+06
     absorptions   1.026414E+06   1.026221E+06   1.026026E+06   1.025829E+06   1.025631E+06   1.025627E+06
     k infinity    1.232285E+00   1.231952E+00   1.231620E+00   1.231287E+00   1.230953E+00   1.230952E+00
0                   initial       ******* d       ******* d       ******* d       ******* d       ******* d
     actinide
     absorptions   1.009912E+06   1.009635E+06   1.009357E+06   1.009077E+06   1.008797E+06   1.008793E+06
     non-actinide
     abs. fracs.   1.607716E-02   1.616246E-02   1.624632E-02   1.633036E-02   1.641381E-02   1.641315E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  133
0                                  fraction of total absorption rate
        power=    .00mw, burnup=  17874.mwd, flux= 6.01E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03
     nd143      1.66E-03  1.66E-03  1.68E-03  1.71E-03  1.73E-03  1.73E-03
     eu151      1.63E-03  1.64E-03  1.65E-03  1.67E-03  1.68E-03  1.68E-03
     rh103      7.97E-04  8.08E-04  8.18E-04  8.29E-04  8.40E-04  8.40E-04
     xe131      5.34E-04  5.41E-04  5.48E-04  5.55E-04  5.62E-04  5.62E-04
     cs133      4.15E-04  4.20E-04  4.26E-04  4.31E-04  4.37E-04  4.37E-04
     sm147      3.05E-04  3.09E-04  3.13E-04  3.17E-04  3.21E-04  3.21E-04
     tc 99      2.87E-04  2.90E-04  2.94E-04  2.97E-04  3.00E-04  3.00E-04
     nd145      2.34E-04  2.37E-04  2.40E-04  2.43E-04  2.46E-04  2.46E-04
     gd155      2.23E-04  2.23E-04  2.23E-04  2.23E-04  2.23E-04  2.23E-04
     sm152      1.75E-04  1.78E-04  1.81E-04  1.83E-04  1.86E-04  1.86E-04
     mo 95      1.62E-04  1.64E-04  1.67E-04  1.69E-04  1.71E-04  1.71E-04
     sm150      1.21E-04  1.23E-04  1.24E-04  1.26E-04  1.28E-04  1.28E-04
     kr 83      1.00E-04  1.01E-04  1.03E-04  1.04E-04  1.05E-04  1.05E-04
     cd113      1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04
     cs135      9.39E-05  9.52E-05  9.64E-05  9.77E-05  9.89E-05  9.89E-05
     eu153      7.29E-05  7.39E-05  7.50E-05  7.61E-05  7.71E-05  7.71E-05
     ru101      7.31E-05  7.40E-05  7.50E-05  7.60E-05  7.70E-05  7.70E-05
     pr141      6.99E-05  7.08E-05  7.17E-05  7.27E-05  7.36E-05  7.36E-05
     gd157      6.00E-05  6.01E-05  6.02E-05  6.02E-05  6.03E-05  6.03E-05
     la139      5.71E-05  5.79E-05  5.87E-05  5.94E-05  6.02E-05  6.02E-05
     pd105      2.87E-05  2.92E-05  2.96E-05  3.00E-05  3.04E-05  3.04E-05
     ag109      2.72E-05  2.77E-05  2.82E-05  2.87E-05  2.92E-05  2.92E-05
     ba137      2.76E-05  2.80E-05  2.83E-05  2.87E-05  2.91E-05  2.91E-05
     zr 93      2.26E-05  2.29E-05  2.32E-05  2.35E-05  2.38E-05  2.38E-05
      i129      1.86E-05  1.89E-05  1.91E-05  1.94E-05  1.96E-05  1.96E-05
     nd144      1.76E-05  1.78E-05  1.80E-05  1.83E-05  1.85E-05  1.85E-05
     mo 97      1.30E-05  1.32E-05  1.33E-05  1.35E-05  1.37E-05  1.37E-05
     gd152      1.25E-05  1.27E-05  1.30E-05  1.33E-05  1.36E-05  1.36E-05
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sm151	1.26E-05	1.29E-05	1.29E-05	1.29E-05	1.29E-05	1.26E-05
pd108	6.63E-06	6.75E-06	6.86E-06	6.98E-06	7.09E-06	7.09E-06
zr 91	5.98E-06	6.06E-06	6.14E-06	6.22E-06	6.29E-06	6.29E-06
y 89	5.72E-06	5.79E-06	5.87E-06	5.94E-06	6.02E-06	6.02E-06
ru102	5.42E-06	5.49E-06	5.56E-06	5.63E-06	5.71E-06	5.71E-06
ce142	4.76E-06	4.82E-06	4.88E-06	4.95E-06	5.01E-06	5.01E-06
nd148	4.59E-06	4.65E-06	4.71E-06	4.77E-06	4.83E-06	4.83E-06
nd146	3.86E-06	3.91E-06	3.96E-06	4.01E-06	4.07E-06	4.07E-06
pd107	3.36E-06	3.42E-06	3.47E-06	3.53E-06	3.59E-06	3.59E-06
in115	3.39E-06	3.43E-06	3.48E-06	3.53E-06	3.57E-06	3.57E-06
ba138	3.29E-06	3.33E-06	3.38E-06	3.42E-06	3.46E-06	3.46E-06
ce140	3.08E-06	3.12E-06	3.16E-06	3.20E-06	3.24E-06	3.24E-06
ru 99	2.86E-06	2.95E-06	3.04E-06	3.14E-06	3.24E-06	3.24E-06
xe132	2.82E-06	2.86E-06	2.90E-06	2.94E-06	2.98E-06	2.98E-06
mo 98	1.90E-06	1.92E-06	1.95E-06	1.97E-06	2.00E-06	2.00E-06
mo100	1.85E-06	1.87E-06	1.90E-06	1.92E-06	1.95E-06	1.95E-06
xe134	1.82E-06	1.84E-06	1.87E-06	1.89E-06	1.92E-06	1.92E-06
zr 92	1.45E-06	1.47E-06	1.48E-06	1.50E-06	1.52E-06	1.52E-06
i127	1.35E-06	1.37E-06	1.39E-06	1.41E-06	1.43E-06	1.43E-06
ru104	1.24E-06	1.26E-06	1.28E-06	1.29E-06	1.31E-06	1.31E-06

1 sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 134
0 fraction of total absorption rate
power= .00mw, burnup= 17874.mwd, flux= 6.81E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.14E-06	1.16E-06	1.17E-06	1.19E-06	1.20E-06	1.20E-06
nd150	1.04E-06	1.05E-06	1.07E-06	1.08E-06	1.09E-06	1.09E-06
xe136	9.87E-07	1.00E-06	1.01E-06	1.03E-06	1.04E-06	1.04E-06
cd111	7.63E-07	7.75E-07	7.87E-07	7.99E-07	8.12E-07	8.12E-07
br 81	7.32E-07	7.42E-07	7.52E-07	7.62E-07	7.71E-07	7.71E-07
rb 85	7.02E-07	7.12E-07	7.21E-07	7.30E-07	7.39E-07	7.39E-07
zr 94	6.14E-07	6.22E-07	6.30E-07	6.38E-07	6.46E-07	6.46E-07
gd154	5.44E-07	5.59E-07	5.74E-07	5.90E-07	6.06E-07	6.06E-07
zr 90	5.64E-07	5.71E-07	5.78E-07	5.86E-07	5.93E-07	5.93E-07
sm154	4.83E-07	4.90E-07	4.97E-07	5.04E-07	5.11E-07	5.11E-07
te130	4.55E-07	4.61E-07	4.67E-07	4.73E-07	4.79E-07	4.79E-07
rb 87	4.04E-07	4.10E-07	4.15E-07	4.20E-07	4.26E-07	4.26E-07
ba135	2.85E-07	2.95E-07	3.04E-07	3.14E-07	3.24E-07	3.24E-07
se 77	2.95E-07	2.99E-07	3.02E-07	3.06E-07	3.10E-07	3.10E-07
pd106	2.90E-07	2.95E-07	2.99E-07	3.04E-07	3.08E-07	3.08E-07
gd156	2.73E-07	2.78E-07	2.82E-07	2.86E-07	2.91E-07	2.91E-07
kr 84	1.93E-07	1.95E-07	1.98E-07	2.00E-07	2.03E-07	2.03E-07
dy161	1.64E-07	1.67E-07	1.70E-07	1.73E-07	1.76E-07	1.76E-07
ru100	1.53E-07	1.57E-07	1.61E-07	1.65E-07	1.69E-07	1.69E-07
sb121	1.56E-07	1.58E-07	1.60E-07	1.62E-07	1.64E-07	1.64E-07
se 79	1.47E-07	1.49E-07	1.51E-07	1.52E-07	1.54E-07	1.54E-07
sb123	1.26E-07	1.27E-07	1.29E-07	1.31E-07	1.33E-07	1.33E-07
nd142	1.11E-07	1.14E-07	1.17E-07	1.20E-07	1.23E-07	1.23E-07
ba134	1.06E-07	1.09E-07	1.12E-07	1.15E-07	1.18E-07	1.18E-07
kr 86	1.07E-07	1.08E-07	1.10E-07	1.11E-07	1.13E-07	1.13E-07
te128	1.03E-07	1.04E-07	1.05E-07	1.07E-07	1.08E-07	1.08E-07
sm148	9.67E-08	9.93E-08	1.02E-07	1.05E-07	1.07E-07	1.07E-07
eu152	8.66E-08	1.05E-07	1.06E-07	1.06E-07	1.07E-07	8.82E-08
pd104	7.28E-08	7.47E-08	7.67E-08	7.87E-08	8.08E-08	8.08E-08
tb159	7.21E-08	7.33E-08	7.45E-08	7.56E-08	7.68E-08	7.68E-08
se 80	7.06E-08	7.15E-08	7.24E-08	7.34E-08	7.43E-08	7.43E-08
te125	6.93E-08	7.03E-08	7.13E-08	7.23E-08	7.33E-08	7.33E-08
gd158	5.73E-08	5.82E-08	5.91E-08	6.00E-08	6.10E-08	6.10E-08
cd112	5.26E-08	5.34E-08	5.41E-08	5.49E-08	5.57E-08	5.57E-08
nb 93	4.55E-08	4.70E-08	4.85E-08	5.01E-08	5.16E-08	5.17E-08

sn117	3.75E-08	3.80E-08	3.88E-08	3.91E-08	3.96E-08	3.96E-08
dy164	3.69E-08	3.76E-08	3.82E-08	3.89E-08	3.95E-08	3.95E-08
li 6	3.73E-08	3.78E-08	3.82E-08	3.87E-08	3.91E-08	3.91E-08
dy162	3.60E-08	3.67E-08	3.75E-08	3.82E-08	3.89E-08	3.89E-08
cd114	3.16E-08	3.21E-08	3.25E-08	3.30E-08	3.35E-08	3.35E-08
sn119	2.87E-08	2.91E-08	2.95E-08	2.99E-08	3.03E-08	3.03E-08
sn115	2.63E-08	2.67E-08	2.70E-08	2.74E-08	2.78E-08	2.78E-08
pd110	2.54E-08	2.58E-08	2.62E-08	2.66E-08	2.71E-08	2.71E-08
mo 96	2.44E-08	2.51E-08	2.57E-08	2.64E-08	2.71E-08	2.71E-08
cd118	2.36E-08	2.43E-08	2.51E-08	2.59E-08	2.67E-08	2.67E-08
eu155	2.69E-08	4.52E-08	4.53E-08	4.53E-08	4.53E-08	2.60E-08
br 79	2.28E-08	2.35E-08	2.43E-08	2.51E-08	2.58E-08	2.58E-08
pm147	2.62E-08	6.54E-08	6.54E-08	6.54E-08	6.54E-08	2.65E-08
ag107	2.03E-08	2.10E-08	2.18E-08	2.26E-08	2.34E-08	2.34E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 135
0 fraction of total absorption rate
power= .00mw, burnup= 17874.mwd, flux= 6.01E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

sr 88	1.96E-08	1.99E-08	2.01E-08	2.04E-08	2.07E-08	2.07E-08
xe129	1.36E-08	1.41E-08	1.45E-08	1.50E-08	1.55E-08	1.55E-08
se 82	1.35E-08	1.37E-08	1.38E-08	1.40E-08	1.42E-08	1.42E-08
xe130	1.22E-08	1.25E-08	1.28E-08	1.31E-08	1.35E-08	1.35E-08
sn126	1.19E-08	1.20E-08	1.22E-08	1.23E-08	1.25E-08	1.25E-08
ba136	1.13E-08	1.15E-08	1.18E-08	1.20E-08	1.23E-08	1.23E-08
se 78	1.05E-08	1.07E-08	1.08E-08	1.10E-08	1.11E-08	1.11E-08
dy163	9.84E-09	9.22E-09	9.40E-09	9.58E-09	9.76E-09	9.76E-09
sn124	9.17E-09	9.30E-09	9.43E-09	9.55E-09	9.68E-09	9.68E-09
kr 82	8.58E-09	8.76E-09	8.93E-09	9.11E-09	9.29E-09	9.29E-09
te126	7.78E-09	8.03E-09	8.29E-09	8.55E-09	8.81E-09	8.81E-09
as 75	6.20E-09	6.28E-09	6.37E-09	6.45E-09	6.53E-09	6.53E-09
eu154	5.76E-09	7.76E-09	7.88E-09	7.99E-09	8.11E-09	5.99E-09
in113	5.23E-09	5.30E-09	5.38E-09	5.45E-09	5.53E-09	5.53E-09
sn118	3.70E-09	3.76E-09	3.81E-09	3.86E-09	3.91E-09	3.91E-09
sr 90	3.63E-09	3.96E-09	3.96E-09	3.96E-09	3.96E-09	3.61E-09
sn122	3.17E-09	3.21E-09	3.26E-09	3.30E-09	3.34E-09	3.34E-09
cd116	3.11E-09	3.16E-09	3.20E-09	3.24E-09	3.29E-09	3.29E-09
sn120	2.34E-09	2.37E-09	2.40E-09	2.43E-09	2.47E-09	2.47E-09
ge 73	1.77E-09	1.79E-09	1.81E-09	1.84E-09	1.86E-09	1.86E-09
ho165	8.20E-10	8.39E-10	8.58E-10	8.77E-10	8.96E-10	8.96E-10
gd160	7.94E-10	8.08E-10	8.22E-10	8.35E-10	8.49E-10	8.49E-10
cs137	8.41E-10	9.12E-10	9.13E-10	9.13E-10	9.13E-10	8.37E-10
dy160	6.87E-10	7.07E-10	7.28E-10	7.48E-10	7.69E-10	7.70E-10
se 76	6.05E-10	6.13E-10	6.21E-10	6.29E-10	6.37E-10	6.37E-10
xe128	4.18E-10	4.30E-10	4.41E-10	4.53E-10	4.65E-10	4.65E-10
sr 86	2.06E-10	2.11E-10	2.17E-10	2.22E-10	2.27E-10	2.27E-10
cs134	2.31E-10	7.60E-10	7.70E-10	7.81E-10	7.91E-10	2.24E-10
te124	1.65E-10	1.68E-10	1.71E-10	1.75E-10	1.78E-10	1.78E-10
sn116	1.60E-10	1.64E-10	1.69E-10	1.73E-10	1.78E-10	1.78E-10
kr 85	1.06E-10	1.33E-10	1.33E-10	1.33E-10	1.33E-10	1.05E-10
sr 87	8.62E-11	8.76E-11	8.90E-11	9.05E-11	9.19E-11	9.19E-11
nb 94	7.55E-11	7.76E-11	7.97E-11	8.18E-11	8.41E-11	8.41E-11
te122	6.69E-11	6.88E-11	7.06E-11	7.25E-11	7.44E-11	7.44E-11
se 76	5.94E-11	6.08E-11	6.22E-11	6.37E-11	6.51E-11	6.51E-11
er166	4.13E-11	4.22E-11	4.31E-11	4.39E-11	4.48E-11	4.48E-11
ge 74	3.53E-11	3.58E-11	3.63E-11	3.68E-11	3.73E-11	3.73E-11
ge 72	2.58E-11	2.62E-11	2.66E-11	2.69E-11	2.73E-11	2.73E-11
kr 80	1.91E-11	1.99E-11	2.07E-11	2.16E-11	2.25E-11	2.25E-11
ce144	6.32E-12	1.42E-10	1.42E-10	1.42E-10	1.42E-10	5.05E-12
er167	3.58E-12	3.70E-12	3.82E-12	3.95E-12	4.07E-12	4.07E-12

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     y 90     3.45E-12  3.77E-12  3.77E-12  3.77E-12  3.77E-12  3.43E-12
    te123     2.48E-12  2.58E-12  2.68E-12  2.78E-12  2.88E-12  2.88E-12
    sb125     1.77E-12  4.30E-12  4.30E-12  4.31E-12  4.31E-12  1.67E-12
    cd108     1.18E-12  1.24E-12  1.30E-12  1.36E-12  1.42E-12  1.42E-12
    ru106     8.89E-13  9.67E-12  9.69E-12  9.70E-12  9.71E-12  7.52E-13
    be  9     7.62E-14  7.72E-14  7.83E-14  7.93E-14  8.03E-14  8.03E-14
    sn114     4.16E-14  4.28E-14  4.39E-14  4.51E-14  4.63E-14  4.63E-14
    li  7     3.11E-14  3.15E-14  3.20E-14  3.24E-14  3.28E-14  3.28E-14
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  136
0                    fraction of total absorption rate
        power=     .00mw, burnup=  17874.mwd, flux= 6.01E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

    sb126     1.37E-14  1.54E-14  1.55E-14  1.57E-14  1.59E-14  1.43E-14
    te127m    6.44E-16  2.18E-12  2.18E-12  2.18E-12  2.18E-12  3.70E-16
    nb 95     7.73E-17  3.62E-11  3.62E-11  3.62E-11  3.62E-11  2.84E-17
    zr 95     3.78E-17  3.90E-11  3.90E-11  3.90E-11  3.90E-11  1.39E-17
     y 91     8.83E-18  3.33E-11  3.33E-11  3.33E-11  3.33E-11  2.96E-18
    cd109     1.93E-18  1.36E-17  1.42E-17  1.48E-17  1.54E-17  1.97E-18
    sn123     2.69E-18  2.57E-15  2.57E-15  2.57E-15  2.57E-15  1.64E-18
    tb160     2.05E-19  4.36E-14  4.42E-14  4.49E-14  4.56E-14  9.58E-20
    sr 89     1.78E-19  7.09E-12  7.09E-12  7.09E-12  7.09E-12  5.67E-20
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  137
      power= 9.790E-04mw, burnup=1.7874E+04mwd, flux= 6.01E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
             charge ******* d ******* d ******* d ******* d ******* d
     h  1   1.01E-03  1.02E-03  1.04E-03  1.05E-03  1.06E-03  1.06E-03
     h  2   3.01E-06  3.05E-06  3.09E-06  3.13E-06  3.17E-06  3.17E-06
     h  3   1.11E-11  1.36E-11  1.37E-11  1.37E-11  1.38E-11  1.11E-11
     h  4    .00E+00  1.35E-35  1.35E-35  1.36E-35  1.36E-35   .00E+00
    he  3   1.50E-08  1.51E-08  1.52E-08  1.53E-08  1.55E-08  1.55E-08
    he  4   1.67E-04  1.70E-04  1.72E-04  1.74E-04  1.76E-04  1.76E-04
    he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20   2.01E-05  2.04E-05  2.06E-05  2.09E-05  2.12E-05  2.12E-05
    ne 21   6.28E-09  6.44E-09  6.60E-09  6.77E-09  6.93E-09  6.93E-09
    ne 22   1.32E-07  1.34E-07  1.36E-07  1.38E-07  1.39E-07  1.39E-07
    ne 23   1.77E-30  1.77E-15  1.77E-15  1.77E-15  1.77E-15  1.77E-30
    na 22   4.13E-12  1.05E-11  1.05E-11  1.05E-11  1.05E-11  3.87E-12
    na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24   6.41E-24  6.41E-09  6.41E-09  6.41E-09  6.42E-09  6.42E-24
    na 24m  1.05E-30  1.05E-15  1.05E-15  1.05E-15  1.05E-15  1.05E-30
    na 25   4.54E-39  4.65E-24  4.77E-24  4.89E-24  5.01E-24  5.01E-39
    mg 24   1.32E-01  1.33E-01  1.35E-01  1.37E-01  1.38E-01  1.38E-01
    mg 25   6.53E-07  6.69E-07  6.86E-07  7.03E-07  7.20E-07  7.20E-07
    mg 26   3.01E-06  3.05E-06  3.09E-06  3.13E-06  3.17E-06  3.17E-06
    mg 27   5.28E-28  5.28E-13  5.28E-13  5.28E-13  5.28E-13  5.29E-28
    mg 28    .00E+00  2.62E-25  2.62E-25  2.62E-25  2.62E-25   .00E+00
    al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
    al 28   4.75E-26  4.75E-11  4.75E-11  4.75E-11  4.76E-11  4.76E-26
    al 29   3.66E-37  3.75E-22  3.85E-22  3.95E-22  4.05E-22  4.05E-37
    al 30    .00E+00  8.31E-32  8.63E-32  8.97E-32  9.31E-32   .00E+00
    si 28   3.84E-01  3.88E-01  3.93E-01  3.98E-01  4.03E-01  4.03E-01
    si 29   5.88E-06  6.03E-06  6.19E-06  6.34E-06  6.50E-06  6.50E-06
    si 30   9.62E-11  9.99E-11  1.04E-10  1.08E-10  1.12E-10  1.12E-10
    si 31   1.68E-38  1.74E-23  1.81E-23  1.88E-23  1.95E-23  1.96E-38
    si 32   6.99E-30  7.37E-30  7.67E-30  7.97E-30  8.28E-30  8.16E-30
  totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0   flux              6.01E+07  6.01E+07  6.01E+07  6.01E+07  6.02E-08
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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 138
power= 9.790E-04mw, burnup=1.7874E+04mwd, flux= 6.01E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	2.62E+01	2.69E+01	2.76E+01	2.82E+01	2.89E+01	2.89E+01
pb206	1.20E-01	1.24E-01	1.29E-01	1.33E-01	1.38E-01	1.38E-01
pb207	8.14E-03	8.41E-03	8.68E-03	8.96E-03	9.24E-03	9.24E-03
pb208	3.94E-04	4.04E-04	4.14E-04	4.25E-04	4.36E-04	4.36E-04
pb209	6.87E-10	7.03E-10	7.18E-10	7.34E-10	7.50E-10	7.50E-10
pb210	2.26E-04	2.30E-04	2.34E-04	2.38E-04	2.42E-04	2.42E-04
pb211	4.24E-11	4.29E-11	4.34E-11	4.40E-11	4.45E-11	4.46E-11
pb212	2.82E-11	2.90E-11	2.94E-11	2.98E-11	3.01E-11	2.97E-11
pb214	5.17E-10	5.26E-10	5.35E-10	5.43E-10	5.52E-10	5.52E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	1.85E-02	1.94E-02	2.02E-02	2.10E-02	2.19E-02	2.19E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.39E-07	1.42E-07	1.44E-07	1.46E-07	1.49E-07	1.49E-07
bi211	2.51E-12	2.54E-12	2.58E-12	2.61E-12	2.64E-12	2.65E-12
bi212	2.68E-12	2.75E-12	2.79E-12	2.82E-12	2.86E-12	2.81E-12
bi213	1.60E-10	1.64E-10	1.68E-10	1.71E-10	1.75E-10	1.75E-10
bi214	3.84E-10	3.90E-10	3.97E-10	4.03E-10	4.10E-10	4.10E-10
po210	3.82E-06	3.91E-06	3.98E-06	4.04E-06	4.11E-06	4.09E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.78E-17	2.81E-17	2.85E-17	2.88E-17	2.92E-17	2.92E-17
po212	1.41E-22	1.44E-22	1.46E-22	1.48E-22	1.50E-22	1.48E-22
po213	2.41E-19	2.47E-19	2.52E-19	2.58E-19	2.63E-19	2.63E-19
po214	5.28E-17	5.37E-17	5.46E-17	5.55E-17	5.64E-17	5.64E-17
po215	3.49E-17	3.52E-17	3.57E-17	3.62E-17	3.66E-17	3.67E-17
po216	1.07E-16	1.10E-16	1.11E-16	1.13E-16	1.14E-16	1.12E-16
po218	5.98E-11	6.08E-11	6.18E-11	6.29E-11	6.39E-11	6.39E-11
rn218	9.81E-44	1.02E-28	1.04E-28	1.05E-28	1.06E-28	1.02E-43
rn219	7.75E-14	7.84E-14	7.94E-14	8.04E-14	8.14E-14	8.16E-14
rn220	4.09E-14	4.21E-14	4.26E-14	4.32E-14	4.37E-14	4.31E-14
rn222	1.06E-07	1.08E-07	1.10E-07	1.12E-07	1.13E-07	1.13E-07
ra222	1.06E-40	1.11E-25	1.13E-25	1.14E-25	1.16E-25	1.11E-40
ra223	1.93E-08	1.96E-08	1.98E-08	2.01E-08	2.03E-08	2.04E-08
ra224	2.33E-10	2.39E-10	2.42E-10	2.46E-10	2.49E-10	2.45E-10
ra225	7.51E-08	7.68E-08	7.85E-08	8.02E-08	8.19E-08	8.19E-08
ra226	1.62E-02	1.65E-02	1.68E-02	1.71E-02	1.73E-02	1.73E-02
ra228	7.68E-11	7.83E-11	7.97E-11	8.11E-11	8.25E-11	8.25E-11
ac225	5.07E-08	5.19E-08	5.30E-08	5.42E-08	5.53E-08	5.53E-08
ac227	1.34E-05	1.36E-05	1.38E-05	1.40E-05	1.41E-05	1.41E-05
ac228	9.38E-15	9.55E-15	9.73E-15	9.90E-15	1.01E-14	1.01E-14
th226	5.17E-39	5.41E-24	5.49E-24	5.56E-24	5.64E-24	5.44E-39
th227	3.12E-08	3.16E-08	3.20E-08	3.24E-08	3.28E-08	3.29E-08
th228	4.44E-08	4.57E-08	4.63E-08	4.69E-08	4.75E-08	4.67E-08
th229	1.46E-02	1.49E-02	1.53E-02	1.56E-02	1.59E-02	1.59E-02
th230	8.14E-01	8.26E-01	8.39E-01	8.52E-01	8.65E-01	8.65E-01
th231	2.76E-09	3.67E-09	3.68E-09	3.69E-09	3.71E-09	2.75E-09
th232	1.88E-01	1.91E-01	1.95E-01	1.98E-01	2.02E-01	2.02E-01
th233	4.18E-28	4.26E-13	4.34E-13	4.42E-13	4.50E-13	4.50E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.02E-02	2.05E-02	2.07E-02	2.10E-02	2.12E-02	2.12E-02
pa232	8.43E-26	8.54E-11	8.66E-11	8.77E-11	8.88E-11	8.89E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 139
power= 9.790E-04mw, burnup=1.7874E+04mwd, flux= 6.01E+07n/cm**2-sec
0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06	1.42E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.01E-36	5.25E-21	5.32E-21	5.39E-21	5.47E-21	5.27E-36
u231	7.68E-32	7.80E-17	7.92E-17	8.05E-17	8.17E-17	8.17E-32
u232	1.59E-06	1.67E-06	1.69E-06	1.71E-06	1.73E-06	1.67E-06
u233	4.17E-01	4.24E-01	4.31E-01	4.37E-01	4.44E-01	4.44E-01
u234	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
u235	6.67E+02	6.67E+02	6.66E+02	6.66E+02	6.65E+02	6.65E+02
u236	1.88E+02	1.88E+02	1.88E+02	1.88E+02	1.88E+02	1.88E+02
u237	1.31E-12	7.99E-07	8.00E-07	8.01E-07	8.03E-07	1.30E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.48E-23	7.47E-08	7.48E-08	7.48E-08	7.48E-08	7.49E-23
u240	1.75E-35	1.93E-35	2.13E-35	2.34E-35	2.56E-35	2.56E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.21E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	1.88E-13
np236m	4.92E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.92E-28
np236	2.00E-06	2.02E-06	2.04E-06	2.07E-06	2.09E-06	2.09E-06
np237	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01
np238	3.08E-14	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.09E-14
np239	1.51E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.63E-13
np240m	1.50E-37	1.65E-37	1.82E-37	1.99E-37	2.18E-37	2.18E-37
np240	9.01E-39	5.33E-16	5.34E-16	5.34E-16	5.35E-16	1.03E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.20E-10	2.71E-10	2.71E-10	2.72E-10	2.72E-10	1.14E-10
pu237	2.29E-22	7.64E-14	7.66E-14	7.68E-14	7.70E-14	5.59E-23
pu238	5.35E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.34E-03
pu239	2.98E+01	2.99E+01	3.00E+01	3.01E+01	3.01E+01	3.01E+01
pu240	5.10E-01	5.11E-01	5.11E-01	5.11E-01	5.11E-01	5.11E-01
pu241	4.25E-05	5.03E-05	5.04E-05	5.04E-05	5.05E-05	4.21E-05
pu242	3.32E-05	3.38E-05	3.43E-05	3.49E-05	3.55E-05	3.55E-05
pu243	1.80E-29	1.73E-14	1.76E-14	1.79E-14	1.82E-14	1.94E-29
pu244	8.74E-25	9.64E-25	1.06E-24	1.16E-24	1.27E-24	1.27E-24
pu245	.00E+00	9.60E-36	1.06E-35	1.16E-35	1.27E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.01E-34	1.00E-19	1.01E-19	1.01E-19	1.01E-19	1.01E-34
am240	4.60E-32	4.59E-17	4.60E-17	4.61E-17	4.62E-17	4.62E-32
am241	1.49E-03	1.49E-03	1.49E-03	1.49E-03	1.50E-03	1.49E-03
am242m	1.67E-07	1.69E-07	1.69E-07	1.70E-07	1.70E-07	1.67E-07
am242	2.15E-12	1.35E-11	1.35E-11	1.36E-11	1.36E-11	2.15E-12
am243	1.73E-07	1.76E-07	1.80E-07	1.83E-07	1.87E-07	1.87E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	3.17E-31	3.23E-16	3.30E-16	3.36E-16	3.43E-16	3.43E-31
am245	9.85E-40	1.89E-36	2.08E-36	2.29E-36	2.50E-36	1.86E-39
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	3.55E-34	1.93E-22	1.94E-22	1.94E-22	1.95E-22	5.06E-35
cm242	4.45E-10	2.73E-09	2.74E-09	2.74E-09	2.74E-09	4.43E-10
cm243	1.40E-14	1.52E-14	1.52E-14	1.52E-14	1.53E-14	1.39E-14
cm244	4.36E-12	5.08E-12	5.18E-12	5.28E-12	5.39E-12	4.67E-12

1 sas2h: far-field crit based on bzu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 140
power= 9.790E-04mw, burnup=1.7874E+04mwd, flux= 6.01E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
cm245	1.09E-14	1.11E-14	1.13E-14	1.15E-14	1.17E-14	1.17E-14
cm246	8.62E-17	8.79E-17	8.97E-17	9.14E-17	9.32E-17	9.32E-17

```
     cm247   2.89E-20  3.03E-20  3.17E-20  3.32E-20  3.47E-20  3.47E-20
     cm248   7.41E-23  7.97E-23  8.55E-23  9.16E-23  9.79E-23  9.79E-23
     cm249    .00E+00  6.07E-34  6.52E-34  6.99E-34  7.48E-34   .00E+00
     cm250   3.29E-38  3.57E-38  3.88E-38  4.20E-38  4.55E-38  4.55E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.01E+07  6.01E+07  6.01E+07  6.01E+07  6.02E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       34q array has      12 entries.
library information...

         cross-section data taken from position number 16 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143           *
         *          made from modified card-image origen-s libraries of scale 4.2     *
         *      data from the light element, actinide, and fission product libraries  *
         *        decay data, including gamma and total energy, are from endf/b-vi    *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from   *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/29/1996    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7993    number of nonzero off-diagonal matrix elements
```

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0        ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                  page  141
        power=    .00mw, burnup=  18768.mwd, flux= 6.02E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d       ******* d       ******* d       ******* d       ******* d
     productions  1.263344E+06   1.262756E+06   1.262165E+06   1.261571E+06   1.260976E+06   1.260969E+06
     absorptions  1.026080E+06   1.025880E+06   1.025679E+06   1.025476E+06   1.025272E+06   1.025267E+06
     k infinity   1.231235E+00   1.230900E+00   1.230565E+00   1.230230E+00   1.229894E+00   1.229893E+00
0                 initial        ******* d       ******* d       ******* d       ******* d       ******* d
     actinide
     absorptions  1.009239E+06   1.008957E+06   1.008673E+06   1.008389E+06   1.008104E+06   1.008100E+06
     non-actinide
     abs. fracs.  1.641309E-02   1.649696E-02   1.657957E-02   1.666236E-02   1.674503E-02   1.674443E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products      page  142
0                                   fraction of total absorption rate
        power=    .00mw, burnup=  18768.mwd, flux= 6.02E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149       5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03
     nd143       1.73E-03  1.75E-03  1.77E-03  1.79E-03  1.81E-03  1.81E-03
     eu151       1.68E-03  1.69E-03  1.70E-03  1.71E-03  1.72E-03  1.72E-03
     rh103       8.40E-04  8.50E-04  8.61E-04  8.72E-04  8.82E-04  8.82E-04
     xe131       5.62E-04  5.69E-04  5.76E-04  5.83E-04  5.90E-04  5.90E-04
     cs133       4.37E-04  4.42E-04  4.48E-04  4.53E-04  4.59E-04  4.59E-04
     sm147       3.20E-04  3.24E-04  3.28E-04  3.32E-04  3.36E-04  3.36E-04
     tc 99       3.00E-04  3.04E-04  3.07E-04  3.11E-04  3.14E-04  3.14E-04
     nd145       2.46E-04  2.49E-04  2.52E-04  2.55E-04  2.59E-04  2.59E-04
     gd155       2.23E-04  2.23E-04  2.23E-04  2.23E-04  2.23E-04  2.24E-04
     sm152       1.86E-04  1.89E-04  1.92E-04  1.94E-04  1.97E-04  1.97E-04
     mo 95       1.71E-04  1.73E-04  1.75E-04  1.77E-04  1.79E-04  1.79E-04
     sm150       1.28E-04  1.29E-04  1.31E-04  1.33E-04  1.35E-04  1.35E-04
     kr 83       1.05E-04  1.07E-04  1.08E-04  1.09E-04  1.10E-04  1.10E-04
     cs135       9.89E-05  1.00E-04  1.01E-04  1.03E-04  1.04E-04  1.04E-04
     cd113       1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.03E-04  1.03E-04
     eu153       7.71E-05  7.82E-05  7.93E-05  8.04E-05  8.15E-05  8.15E-05
     ru101       7.69E-05  7.79E-05  7.89E-05  7.99E-05  8.08E-05  8.08E-05
     pr141       7.36E-05  7.45E-05  7.55E-05  7.64E-05  7.73E-05  7.73E-05
     la139       6.02E-05  6.10E-05  6.17E-05  6.25E-05  6.32E-05  6.32E-05
     gd157       6.03E-05  6.04E-05  6.04E-05  6.05E-05  6.06E-05  6.06E-05
     pd105       3.04E-05  3.08E-05  3.12E-05  3.17E-05  3.21E-05  3.21E-05
     ag109       2.91E-05  2.96E-05  3.01E-05  3.06E-05  3.11E-05  3.11E-05
     ba137       2.91E-05  2.94E-05  2.98E-05  3.02E-05  3.06E-05  3.06E-05
     zr 93       2.37E-05  2.40E-05  2.43E-05  2.46E-05  2.49E-05  2.49E-05
      i129       1.96E-05  1.99E-05  2.01E-05  2.04E-05  2.07E-05  2.07E-05
     nd144       1.85E-05  1.88E-05  1.90E-05  1.92E-05  1.95E-05  1.95E-05
     gd152       1.36E-05  1.39E-05  1.42E-05  1.45E-05  1.48E-05  1.48E-05
     mo 97       1.37E-05  1.38E-05  1.40E-05  1.42E-05  1.44E-05  1.44E-05
     sm151       1.26E-05  1.30E-05  1.30E-05  1.30E-05  1.30E-05  1.26E-05
     pd108       7.09E-06  7.20E-06  7.32E-06  7.44E-06  7.55E-06  7.55E-06
     zr 91       6.29E-06  6.37E-06  6.45E-06  6.53E-06  6.61E-06  6.61E-06
      y 89       6.02E-06  6.09E-06  6.17E-06  6.24E-06  6.32E-06  6.32E-06
     ru102       5.71E-06  5.78E-06  5.86E-06  5.93E-06  6.00E-06  6.00E-06
     ce142       5.01E-06  5.08E-06  5.14E-06  5.20E-06  5.27E-06  5.27E-06
     nd148       4.83E-06  4.89E-06  4.95E-06  5.02E-06  5.08E-06  5.08E-06
     nd146       4.07E-06  4.12E-06  4.17E-06  4.22E-06  4.27E-06  4.27E-06
     pd107       3.59E-06  3.64E-06  3.70E-06  3.76E-06  3.81E-06  3.81E-06
     in115       3.57E-06  3.62E-06  3.66E-06  3.71E-06  3.76E-06  3.76E-06
     ba138       3.46E-06  3.51E-06  3.55E-06  3.60E-06  3.64E-06  3.64E-06
     ru 99       3.24E-06  3.33E-06  3.43E-06  3.53E-06  3.64E-06  3.64E-06
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     ce140     3.24E-06  3.28E-06  3.33E-06  3.37E-06  3.41E-06  3.41E-06
     xe132     2.98E-06  3.01E-06  3.05E-06  3.09E-06  3.13E-06  3.13E-06
     mo 98     2.00E-06  2.02E-06  2.05E-06  2.08E-06  2.10E-06  2.10E-06
     mo100     1.95E-06  1.97E-06  2.00E-06  2.02E-06  2.05E-06  2.05E-06
     xe134     1.92E-06  1.94E-06  1.97E-06  1.99E-06  2.02E-06  2.02E-06
     zr 92     1.52E-06  1.54E-06  1.56E-06  1.58E-06  1.60E-06  1.60E-06
      I127     1.43E-06  1.45E-06  1.47E-06  1.49E-06  1.51E-06  1.51E-06
     ru104     1.31E-06  1.33E-06  1.35E-06  1.36E-06  1.38E-06  1.38E-06
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page  143
0                                  fraction of total absorption rate
         powers     .00mw, burnup=  18768.mwd, flux= 6.82E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d
     zr 96     1.20E-06  1.22E-06  1.23E-06  1.25E-06  1.26E-06  1.26E-06
     nd150     1.09E-06  1.11E-06  1.12E-06  1.14E-06  1.15E-06  1.15E-06
     xe136     1.04E-06  1.05E-06  1.07E-06  1.08E-06  1.09E-06  1.09E-06
     cd111     8.12E-07  8.24E-07  8.37E-07  8.49E-07  8.61E-07  8.61E-07
     br 81     7.71E-07  7.81E-07  7.91E-07  8.01E-07  8.10E-07  8.10E-07
     rb 85     7.39E-07  7.49E-07  7.58E-07  7.67E-07  7.76E-07  7.76E-07
     zr 94     6.46E-07  6.54E-07  6.62E-07  6.70E-07  6.79E-07  6.79E-07
     gd154     6.06E-07  6.22E-07  6.38E-07  6.55E-07  6.71E-07  6.71E-07
     zr 90     5.93E-07  6.01E-07  6.08E-07  6.16E-07  6.23E-07  6.23E-07
     sm154     5.11E-07  5.18E-07  5.25E-07  5.31E-07  5.38E-07  5.38E-07
     te130     4.79E-07  4.85E-07  4.91E-07  4.98E-07  5.04E-07  5.04E-07
     rb 87     4.26E-07  4.31E-07  4.36E-07  4.42E-07  4.47E-07  4.47E-07
     ba135     3.24E-07  3.34E-07  3.44E-07  3.55E-07  3.65E-07  3.65E-07
     pd106     3.08E-07  3.13E-07  3.17E-07  3.22E-07  3.26E-07  3.26E-07
     se 77     3.10E-07  3.14E-07  3.18E-07  3.22E-07  3.26E-07  3.26E-07
     gd156     2.91E-07  2.95E-07  3.00E-07  3.04E-07  3.09E-07  3.09E-07
     kr 84     2.03E-07  2.05E-07  2.08E-07  2.11E-07  2.13E-07  2.13E-07
     dy161     1.76E-07  1.79E-07  1.81E-07  1.84E-07  1.87E-07  1.87E-07
     ru100     1.69E-07  1.73E-07  1.78E-07  1.82E-07  1.86E-07  1.86E-07
     sb121     1.64E-07  1.66E-07  1.68E-07  1.71E-07  1.73E-07  1.73E-07
     se 79     1.54E-07  1.56E-07  1.58E-07  1.60E-07  1.62E-07  1.62E-07
     sb123     1.33E-07  1.34E-07  1.36E-07  1.38E-07  1.40E-07  1.40E-07
     nd142     1.23E-07  1.26E-07  1.29E-07  1.32E-07  1.35E-07  1.35E-07
     ba134     1.18E-07  1.21E-07  1.24E-07  1.27E-07  1.30E-07  1.30E-07
     sm148     1.07E-07  1.10E-07  1.13E-07  1.15E-07  1.18E-07  1.18E-07
     kr 86     1.13E-07  1.14E-07  1.15E-07  1.17E-07  1.18E-07  1.18E-07
     te128     1.08E-07  1.10E-07  1.11E-07  1.13E-07  1.14E-07  1.14E-07
     eu152     8.82E-08  1.08E-07  1.09E-07  1.18E-07  1.10E-07  8.96E-08
     pd104     8.07E-08  8.28E-08  8.49E-08  8.70E-08  8.92E-08  8.92E-08
     tb159     7.48E-08  7.80E-08  7.92E-08  8.04E-08  8.16E-08  8.16E-08
     se 80     7.43E-08  7.53E-08  7.62E-08  7.71E-08  7.81E-08  7.81E-08
     te125     7.33E-08  7.42E-08  7.52E-08  7.62E-08  7.72E-08  7.72E-08
     gd158     6.10E-08  6.19E-08  6.28E-08  6.38E-08  6.47E-08  6.47E-08
     cd112     5.58E-08  5.65E-08  5.74E-08  5.82E-08  5.90E-08  5.90E-08
     nb 93     5.17E-08  5.33E-08  5.49E-08  5.65E-08  5.82E-08  5.82E-08
     dy164     3.95E-08  4.02E-08  4.08E-08  4.15E-08  4.21E-08  4.21E-08
     sn117     3.96E-08  4.02E-08  4.07E-08  4.13E-08  4.18E-08  4.18E-08
     dy162     3.89E-08  3.96E-08  4.04E-08  4.11E-08  4.18E-08  4.18E-08
     li  6     3.91E-08  3.96E-08  4.01E-08  4.05E-08  4.10E-08  4.10E-08
     cd114     3.35E-08  3.40E-08  3.45E-08  3.49E-08  3.54E-08  3.54E-08
     sn119     3.04E-08  3.08E-08  3.12E-08  3.16E-08  3.20E-08  3.20E-08
     cd110     2.67E-08  2.75E-08  2.84E-08  2.92E-08  3.01E-08  3.01E-08
     mo 96     2.71E-08  2.77E-08  2.84E-08  2.91E-08  2.98E-08  2.98E-08
     sn115     2.78E-08  2.81E-08  2.85E-08  2.89E-08  2.93E-08  2.93E-08
     br 79     2.58E-08  2.66E-08  2.74E-08  2.83E-08  2.91E-08  2.91E-08
     pd110     2.70E-08  2.75E-08  2.79E-08  2.83E-08  2.87E-08  2.87E-08
     ag107     2.34E-08  2.42E-08  2.50E-08  2.58E-08  2.67E-08  2.67E-08
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     eu155      2.60E-08  4.54E-08  4.54E-08  4.54E-08  4.55E-08  2.51E-08
     pm147      2.45E-08  6.54E-08  6.54E-08  6.54E-08  6.55E-08  2.30E-08
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  144
0                                   fraction of total absorption rate
          powers     .00mw, burnup=  18768.mwd, flux= 6.02E+07n/cm**2-sec
0              initial *******d ******* d ******* d ******* d ******* d

     sr 88      2.07E-08  2.09E-08  2.12E-08  2.14E-08  2.17E-08  2.17E-08
     xe129      1.55E-08  1.60E-08  1.65E-08  1.70E-08  1.75E-08  1.75E-08
     se 82      1.42E-08  1.44E-08  1.45E-08  1.47E-08  1.49E-08  1.49E-08
     xe130      1.35E-08  1.38E-08  1.41E-08  1.44E-08  1.48E-08  1.48E-08
     ba136      1.23E-08  1.25E-08  1.28E-08  1.30E-08  1.33E-08  1.33E-08
     sn126      1.25E-08  1.26E-08  1.27E-08  1.29E-08  1.30E-08  1.30E-08
     se 78      1.11E-08  1.12E-08  1.14E-08  1.15E-08  1.17E-08  1.17E-08
     dy163      9.76E-09  9.94E-09  1.01E-08  1.03E-08  1.05E-08  1.05E-08
     sn124      9.68E-09  9.81E-09  9.94E-09  1.01E-08  1.02E-08  1.02E-08
     kr 82      9.30E-09  9.48E-09  9.66E-09  9.84E-09  1.00E-08  1.00E-08
     te126      8.81E-09  9.07E-09  9.34E-09  9.61E-09  9.88E-09  9.88E-09
     as 75      6.53E-09  6.62E-09  6.70E-09  6.78E-09  6.87E-09  6.87E-09
     eu154      5.99E-09  6.22E-09  6.34E-09  6.46E-09  6.58E-09  6.21E-09
     in113      5.53E-09  5.60E-09  5.68E-09  5.75E-09  5.83E-09  5.83E-09
     sn118      3.91E-09  3.96E-09  4.01E-09  4.07E-09  4.12E-09  4.12E-09
     sr 90      3.61E-09  3.96E-09  3.96E-09  3.96E-09  3.96E-09  3.59E-09
     sn122      3.35E-09  3.39E-09  3.43E-09  3.48E-09  3.52E-09  3.52E-09
     cd116      3.29E-09  3.33E-09  3.37E-09  3.42E-09  3.46E-09  3.46E-09
     sn120      2.47E-09  2.50E-09  2.53E-09  2.57E-09  2.60E-09  2.60E-09
     ge 73      1.86E-09  1.89E-09  1.91E-09  1.94E-09  1.96E-09  1.96E-09
     ho165      8.97E-10  9.16E-10  9.36E-10  9.55E-10  9.75E-10  9.75E-10
     gd160      8.49E-10  8.63E-10  8.76E-10  8.90E-10  9.04E-10  9.04E-10
     dy160      7.69E-10  7.91E-10  8.13E-10  8.35E-10  8.57E-10  8.57E-10
     cs137      8.37E-10  9.13E-10  9.13E-10  9.13E-10  9.14E-10  8.33E-10
     ge 76      6.37E-10  6.45E-10  6.53E-10  6.61E-10  6.69E-10  6.69E-10
     xe128      4.65E-10  4.77E-10  4.89E-10  5.02E-10  5.14E-10  5.14E-10
     sr 86      2.27E-10  2.33E-10  2.38E-10  2.44E-10  2.50E-10  2.50E-10
     cs134      2.24E-10  8.01E-10  8.12E-10  8.22E-10  8.32E-10  2.17E-10
     sn116      1.78E-10  1.82E-10  1.87E-10  1.92E-10  1.97E-10  1.97E-10
     te124      1.78E-10  1.82E-10  1.85E-10  1.89E-10  1.92E-10  1.92E-10
     kr 85      1.05E-10  1.33E-10  1.33E-10  1.33E-10  1.33E-10  1.03E-10
     sr 87      9.19E-11  9.35E-11  9.48E-11  9.62E-11  9.77E-11  9.77E-11
     nb 94      8.48E-11  8.63E-11  8.86E-11  9.10E-11  9.35E-11  9.35E-11
     te122      7.46E-11  7.63E-11  7.83E-11  8.03E-11  8.23E-11  8.23E-11
     se 76      6.52E-11  6.66E-11  6.81E-11  6.96E-11  7.11E-11  7.11E-11
     er166      4.48E-11  4.57E-11  4.66E-11  4.75E-11  4.83E-11  4.83E-11
     ge 74      3.73E-11  3.77E-11  3.82E-11  3.87E-11  3.92E-11  3.92E-11
     ge 72      2.73E-11  2.77E-11  2.80E-11  2.84E-11  2.88E-11  2.88E-11
     kr 80      2.25E-11  2.34E-11  2.44E-11  2.53E-11  2.63E-11  2.63E-11
     er167      4.07E-12  4.20E-12  4.34E-12  4.47E-12  4.61E-12  4.61E-12
     ce144      5.05E-12  1.42E-10  1.42E-10  1.42E-10  1.42E-10  4.05E-12
      y 90      3.43E-12  3.77E-12  3.77E-12  3.77E-12  3.77E-12  3.41E-12
     te123      2.88E-12  2.98E-12  3.09E-12  3.20E-12  3.32E-12  3.32E-12
     cd108      1.43E-12  1.49E-12  1.56E-12  1.63E-12  1.71E-12  1.71E-12
     sb125      1.67E-12  4.31E-12  4.31E-12  4.32E-12  4.32E-12  1.57E-12
     ru106      7.52E-13  9.72E-12  9.73E-12  9.73E-12  9.76E-12  6.38E-13
     be 9       8.02E-14  8.13E-14  8.23E-14  8.33E-14  8.43E-14  8.43E-14
     sn114      4.63E-14  4.76E-14  4.88E-14  5.01E-14  5.13E-14  5.13E-14
     li 7       3.28E-14  3.32E-14  3.36E-14  3.40E-14  3.45E-14  3.45E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  145
0                                   fraction of total absorption rate
          powers     .00mw, burnup=  18768.mwd, flux= 6.02E+07n/cm**2-sec
0              initial *******d ******* d ******* d ******* d ******* d
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sb126	1.43E-14	1.40E-14	1.42E-14	1.44E-14	1.45E-14	1.50E-14
te127m	3.70E-16	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.08E-16
nb 95	2.84E-17	3.62E-11	3.62E-11	3.62E-11	3.62E-11	1.06E-17
zr 95	1.39E-17	3.90E-11	3.90E-11	3.90E-11	3.90E-11	5.18E-18
cd109	1.97E-18	1.60E-17	1.67E-17	1.74E-17	1.81E-17	2.02E-18
sn123	1.44E-18	2.57E-15	2.57E-15	2.57E-15	2.57E-15	1.01E-18
y 91	2.95E-18	3.33E-11	3.33E-11	3.33E-11	3.33E-11	9.98E-19
tb160	9.56E-20	4.63E-14	4.70E-14	4.78E-14	4.85E-14	4.10E-20
sr 89	5.44E-20	7.10E-12	7.10E-12	7.10E-12	7.10E-12	1.37E-20

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 146
power= 9.790E-04mw, burnup=1.8768E+04mwd, flux= 6.02E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	1.06E-03	1.08E-03	1.09E-03	1.10E-03	1.12E-03	1.12E-03
h 2	3.17E-06	3.21E-06	3.25E-06	3.29E-06	3.33E-06	3.33E-06
h 3	1.11E-11	1.38E-11	1.38E-11	1.39E-11	1.39E-11	1.11E-11
h 4	.00E+00	1.37E-35	1.37E-35	1.38E-35	1.38E-35	.00E+00
he 3	1.55E-08	1.56E-08	1.57E-08	1.58E-08	1.59E-08	1.59E-08
he 4	1.76E-04	1.78E-04	1.81E-04	1.83E-04	1.85E-04	1.85E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	2.12E-05	2.14E-05	2.17E-05	2.20E-05	2.22E-05	2.22E-05
ne 21	6.93E-09	7.10E-09	7.27E-09	7.45E-09	7.62E-09	7.62E-09
ne 22	1.39E-07	1.41E-07	1.43E-07	1.45E-07	1.46E-07	1.46E-07
ne 23	1.77E-30	1.77E-15	1.77E-15	1.77E-15	1.77E-15	1.77E-30
na 22	3.87E-12	1.05E-11	1.05E-11	1.05E-11	1.05E-11	3.62E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.42E-24	6.41E-09	6.42E-09	6.42E-09	6.42E-09	6.42E-24
na 24m	1.05E-30	1.05E-15	1.05E-15	1.05E-15	1.06E-15	1.06E-30
na 25	5.01E-39	5.13E-24	5.25E-24	5.38E-24	5.51E-24	5.51E-39
mg 24	1.38E-01	1.40E-01	1.42E-01	1.43E-01	1.45E-01	1.45E-01
mg 25	7.20E-07	7.37E-07	7.55E-07	7.73E-07	7.91E-07	7.91E-07
mg 26	3.17E-06	3.21E-06	3.25E-06	3.29E-06	3.33E-06	3.33E-06
mg 27	5.29E-28	5.28E-13	5.29E-13	5.29E-13	5.29E-13	5.29E-28
mg 28	.00E+00	2.63E-25	2.63E-25	2.63E-25	2.63E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.76E-26	4.75E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-26
al 29	4.05E-37	4.15E-22	4.25E-22	4.35E-22	4.46E-22	4.46E-37
al 30	.00E+00	9.65E-32	1.00E-31	1.04E-31	1.08E-31	.00E+00
si 28	4.03E-01	4.08E-01	4.13E-01	4.17E-01	4.22E-01	4.22E-01
si 29	6.50E-06	6.66E-06	6.82E-06	6.98E-06	7.15E-06	7.15E-06
si 30	1.12E-10	1.16E-10	1.20E-10	1.25E-10	1.29E-10	1.29E-10
si 31	1.96E-38	2.03E-23	2.10E-23	2.18E-23	2.26E-23	2.26E-38
si 32	8.16E-30	8.59E-30	8.93E-30	9.26E-30	9.61E-30	9.45E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		6.01E+07	6.02E+07	6.02E+07	6.02E+07	6.02E-08

0

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 147
power= 9.790E-04mw, burnup=1.8768E+04mwd, flux= 6.02E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	2.89E+01	2.96E+01	3.03E+01	3.10E+01	3.16E+01	3.16E+01
pb206	1.38E-01	1.43E-01	1.48E-01	1.52E-01	1.57E-01	1.57E-01
pb207	9.24E-03	9.52E-03	9.81E-03	1.01E-02	1.04E-02	1.04E-02
pb208	4.36E-04	4.46E-04	4.57E-04	4.69E-04	4.80E-04	4.80E-04
pb209	7.50E-10	7.65E-10	7.81E-10	7.96E-10	8.12E-10	8.12E-10
pb210	2.42E-04	2.45E-04	2.49E-04	2.53E-04	2.57E-04	2.57E-04

pb211	4.46E-11	4.51E-11	4.56E-11	4.62E-11	4.67E-11	4.68E-11
pb212	2.97E-11	3.05E-11	3.09E-11	3.13E-11	3.17E-11	3.11E-11
pb214	5.32E-10	5.61E-10	5.70E-10	5.78E-10	5.87E-10	5.87E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.19E-02	2.28E-02	2.37E-02	2.46E-02	2.56E-02	2.56E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.49E-07	1.51E-07	1.53E-07	1.56E-07	1.58E-07	1.58E-07
bi211	2.65E-12	2.67E-12	2.70E-12	2.74E-12	2.77E-12	2.77E-12
bi212	2.81E-12	2.89E-12	2.93E-12	2.97E-12	3.00E-12	2.95E-12
bi213	1.75E-10	1.79E-10	1.82E-10	1.86E-10	1.90E-10	1.90E-10
bi214	4.10E-10	4.17E-10	4.23E-10	4.29E-10	4.36E-10	4.36E-10
po210	4.09E-06	4.17E-06	4.24E-06	4.30E-06	4.36E-06	4.37E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	2.92E-17	2.95E-17	2.99E-17	3.02E-17	3.06E-17	3.06E-17
po212	1.48E-22	1.52E-22	1.54E-22	1.56E-22	1.58E-22	1.55E-22
po213	2.63E-19	2.69E-19	2.74E-19	2.80E-19	2.85E-19	2.85E-19
po214	5.64E-17	5.73E-17	5.82E-17	5.91E-17	6.00E-17	6.00E-17
po215	3.67E-17	3.70E-17	3.75E-17	3.79E-17	3.84E-17	3.84E-17
po216	1.12E-16	1.14E-16	1.17E-16	1.18E-16	1.20E-16	1.18E-16
po218	6.39E-11	6.49E-11	6.59E-11	6.69E-11	6.79E-11	6.79E-11
rn218	1.02E-43	1.08E-28	1.09E-28	1.11E-28	1.12E-28	1.08E-43
rn219	8.16E-14	8.24E-14	8.34E-14	8.44E-14	8.54E-14	8.55E-14
rn220	4.31E-14	4.43E-14	4.49E-14	4.54E-14	4.59E-14	4.52E-14
rn222	1.13E-07	1.15E-07	1.17E-07	1.19E-07	1.21E-07	1.21E-07
ra222	1.11E-40	1.17E-25	1.19E-25	1.20E-25	1.22E-25	1.17E-40
ra223	2.04E-08	2.06E-08	2.08E-08	2.11E-08	2.13E-08	2.13E-08
ra224	2.45E-10	2.52E-10	2.55E-10	2.58E-10	2.61E-10	2.57E-10
ra225	8.19E-08	8.36E-08	8.53E-08	8.70E-08	8.87E-08	8.87E-08
ra226	1.73E-02	1.76E-02	1.79E-02	1.82E-02	1.84E-02	1.84E-02
ra228	8.25E-11	8.40E-11	8.54E-11	8.68E-11	8.82E-11	8.82E-11
ac225	5.53E-08	5.65E-08	5.76E-08	5.88E-08	5.99E-08	5.99E-08
ac227	1.41E-05	1.43E-05	1.45E-05	1.46E-05	1.48E-05	1.48E-05
ac228	1.01E-14	1.02E-14	1.04E-14	1.06E-14	1.08E-14	1.08E-14
th226	5.44E-39	5.71E-24	5.78E-24	5.86E-24	5.93E-24	5.70E-39
th227	3.29E-08	3.32E-08	3.36E-08	3.40E-08	3.44E-08	3.44E-08
th228	4.67E-08	4.81E-08	4.87E-08	4.93E-08	4.99E-08	4.90E-08
th229	1.59E-02	1.63E-02	1.66E-02	1.69E-02	1.72E-02	1.72E-02
th230	8.65E-01	8.78E-01	8.90E-01	9.03E-01	9.16E-01	9.16E-01
th231	2.73E-09	3.72E-09	3.73E-09	3.74E-09	3.75E-09	2.74E-09
th232	2.02E-01	2.05E-01	2.09E-01	2.12E-01	2.16E-01	2.16E-01
th233	4.50E-28	4.58E-13	4.66E-13	4.74E-13	4.82E-13	4.82E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.12E-02	2.15E-02	2.18E-02	2.20E-02	2.23E-02	2.23E-02
pa232	8.89E-26	9.00E-11	9.11E-11	9.22E-11	9.33E-11	9.33E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 , actinides page 148
power= 9.790E-04mw, burnup=1.8768E+04mwd, flux= 6.02E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
pa233	1.42E-06	1.42E-06	1.41E-06	1.41E-06	1.41E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.27E-36	5.53E-21	5.60E-21	5.68E-21	5.75E-21	5.53E-36
u231	8.17E-32	8.29E-17	8.41E-17	8.53E-17	8.65E-17	8.66E-32
u232	1.67E-06	1.75E-06	1.78E-06	1.80E-06	1.82E-06	1.75E-06
u233	4.44E-01	4.50E-01	4.57E-01	4.63E-01	4.69E-01	4.69E-01
u234	1.01E+01	1.01E+01	1.01E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.65E+02	6.65E+02	6.64E+02	6.64E+02	6.63E+02	6.63E+02

u236	1.88E+02	1.88E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02
u237	1.30E-12	8.03E-07	8.06E-07	8.05E-07	8.06E-07	1.29E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.49E-23	7.48E-08	7.49E-08	7.49E-08	7.49E-08	7.50E-23
u240	2.56E-35	2.80E-35	3.05E-35	3.32E-35	3.61E-35	3.61E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.88E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	1.60E-13
np236m	4.92E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.92E-28
np236	2.09E-06	2.11E-06	2.13E-06	2.15E-06	2.17E-06	2.17E-06
np237	4.10E+01	4.09E+01	4.09E+01	4.09E+01	4.09E+01	4.09E+01
np238	3.09E-14	3.63E-07	3.63E-07	3.63E-07	3.64E-07	3.10E-14
np239	1.63E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.76E-13
np240m	2.18E-37	2.39E-37	2.60E-37	2.83E-37	3.08E-37	3.08E-37
np240	1.03E-38	5.35E-16	5.35E-16	5.36E-16	5.36E-16	1.19E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.14E-10	2.71E-10	2.72E-10	2.72E-10	2.72E-10	1.07E-10
pu237	5.59E-23	7.71E-14	7.73E-14	7.75E-14	7.77E-14	1.40E-23
pu238	5.34E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.33E-03
pu239	3.01E+01	3.02E+01	3.03E+01	3.04E+01	3.04E+01	3.04E+01
pu240	5.11E-01	5.12E-01	5.12E-01	5.13E-01	5.13E-01	5.13E-01
pu241	4.21E-05	5.05E-05	5.06E-05	5.06E-05	5.07E-05	4.18E-05
pu242	3.55E-05	3.60E-05	3.66E-05	3.71E-05	3.77E-05	3.77E-05
pu243	1.94E-29	1.84E-14	1.87E-14	1.90E-14	1.93E-14	2.08E-29
pu244	1.27E-24	1.39E-24	1.52E-24	1.65E-24	1.80E-24	1.80E-24
pu245	.00E+00	1.39E-35	1.52E-35	1.65E-35	1.80E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.81E-34	1.01E-19	1.01E-19	1.01E-19	1.02E-19	1.02E-34
am240	4.62E-32	4.61E-17	4.62E-17	4.64E-17	4.65E-17	4.65E-32
am241	1.49E-03	1.49E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03
am242m	1.67E-07	1.70E-07	1.70E-07	1.71E-07	1.71E-07	1.68E-07
am242	2.15E-12	1.36E-11	1.36E-11	1.36E-11	1.37E-11	2.16E-12
am243	1.87E-07	1.90E-07	1.94E-07	1.97E-07	2.01E-07	2.01E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	3.43E-31	3.49E-16	3.56E-16	3.62E-16	3.69E-16	3.69E-31
am245	1.06E-39	2.74E-36	2.99E-36	3.25E-36	3.54E-36	1.13E-39
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	5.06E-35	1.94E-22	1.95E-22	1.96E-22	1.96E-22	7.47E-36
cm242	4.43E-10	2.74E-09	2.75E-09	2.76E-09	2.76E-09	4.43E-10
cm243	1.39E-14	1.53E-14	1.53E-14	1.54E-14	1.54E-14	1.40E-14
cm244	4.67E-12	5.48E-12	5.59E-12	5.69E-12	5.80E-12	4.97E-12

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 149

power= 9.790E-04mw, burnup=1.876BE+04mwd, flux= 6.02E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
cm245	1.17E-14	1.19E-14	1.22E-14	1.24E-14	1.26E-14	1.26E-14
cm246	9.32E-17	9.50E-17	9.69E-17	9.88E-17	1.01E-16	1.01E-16
cm247	3.47E-20	3.62E-20	3.77E-20	3.93E-20	4.09E-20	4.09E-20
cm248	9.79E-23	1.05E-22	1.12E-22	1.19E-22	1.26E-22	1.26E-22
cm249	.00E+00	7.98E-34	8.52E-34	9.07E-34	9.65E-34	.00E+00
cm250	4.55E-38	4.92E-38	5.31E-38	5.73E-38	6.18E-38	6.18E-38
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
0 flux		6.01E+07	6.02E+07	6.02E+07	6.02E+07	6.02E-08

0 1q array has 20 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 3q array has 1 entries.
0 4q array has 1 entries.

```
0       54q array has     12 entries.
1library information...

          cross-section data taken from position number 17 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***************************************************************************
          *                                                                         *
          *            prelim lwr origen-s binary working library--id = 1143        *
          *          made from modified card-image origen-s libraries of scale 4.2  *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                         *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "prepsas2" case updating all nuclides on the scale "burnup" library *
          *                                                                         *
          *                   fission product yields are from endf/b-v              *
          *                                                                         *
          *              photon libraries use an 18-energy-group structure          *
          *             the photon data are from the master photon data base,       *
          *              produced to include bremsstrahlung from uo2 matrix         *
          *                                                                         *
          *        see information above this box (if present) for later updates    *
          *                                                                         *
          ***************************************************************************
          *                                                                         *
0         ***************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ***************************************************************************
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 48% h2o/ 8% uo2                                    page  150
       power=    .00mw, burnup=  19662.mwd, flux= 6.03E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.261778E+06  1.261179E+06  1.260578E+06  1.259975E+06  1.259371E+06  1.259364E+06
     absorptions  1.025688E+06  1.025683E+06  1.025275E+06  1.025067E+06  1.024858E+06  1.024853E+06
     k infinity   1.230177E+00  1.229839E+00  1.229502E+00  1.229164E+00  1.228825E+00  1.228824E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  1.008513E+06  1.008226E+06  1.007939E+06  1.007650E+06  1.007360E+06  1.007356E+06
```

```
     non-actinide
     abs. fracs.   1.674420E-02   1.682734E-02   1.690948E-02   1.699156E-02   1.707327E-02   1.707256E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  151
0                                   fraction of total absorption rate
         power=     .00mw, burnup=  19662.mwd, flux= 6.03E+07n/cm**2-sec
0              initial *******d ******* d ******* d ******* d ******* d

     sm149     5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03  5.44E-03
     nd143     1.81E-03  1.83E-03  1.85E-03  1.88E-03  1.90E-03  1.90E-03
     eu151     1.72E-03  1.74E-03  1.75E-03  1.76E-03  1.77E-03  1.77E-03
     rh103     8.82E-04  8.93E-04  9.04E-04  9.14E-04  9.25E-04  9.25E-04
     xe131     5.90E-04  5.97E-04  6.04E-04  6.11E-04  6.18E-04  6.18E-04
     cs133     4.38E-04  4.44E-04  4.70E-04  4.75E-04  4.81E-04  4.81E-04
     sm147     3.36E-04  3.40E-04  3.44E-04  3.48E-04  3.52E-04  3.52E-04
     tc 99     3.14E-04  3.17E-04  3.21E-04  3.24E-04  3.27E-04  3.27E-04
     nd145     2.59E-04  2.62E-04  2.65E-04  2.68E-04  2.71E-04  2.71E-04
     gd155     2.24E-04  2.24E-04  2.24E-04  2.24E-04  2.24E-04  2.24E-04
     sm152     1.97E-04  2.00E-04  2.03E-04  2.06E-04  2.08E-04  2.08E-04
     mo 95     1.79E-04  1.82E-04  1.84E-04  1.86E-04  1.88E-04  1.88E-04
     sm150     1.35E-04  1.36E-04  1.38E-04  1.40E-04  1.42E-04  1.42E-04
     kr 83     1.10E-04  1.12E-04  1.13E-04  1.14E-04  1.16E-04  1.16E-04
     cs135     1.04E-04  1.05E-04  1.06E-04  1.08E-04  1.09E-04  1.09E-04
     cd113     1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04
     eu153     8.14E-05  8.25E-05  8.36E-05  8.47E-05  8.58E-05  8.58E-05
     ru101     8.08E-05  8.18E-05  8.28E-05  8.37E-05  8.47E-05  8.47E-05
     pr141     7.73E-05  7.83E-05  7.92E-05  8.01E-05  8.11E-05  8.11E-05
     la139     6.33E-05  6.40E-05  6.48E-05  6.53E-05  6.63E-05  6.63E-05
     gd157     6.06E-05  6.06E-05  6.07E-05  6.07E-05  6.08E-05  6.08E-05
     pd105     3.21E-05  3.25E-05  3.29E-05  3.33E-05  3.38E-05  3.38E-05
     ag109     3.11E-05  3.16E-05  3.21E-05  3.26E-05  3.31E-05  3.31E-05
     ba137     3.06E-05  3.09E-05  3.13E-05  3.17E-05  3.21E-05  3.21E-05
     zr 93     2.49E-05  2.52E-05  2.55E-05  2.58E-05  2.61E-05  2.61E-05
      i129     2.07E-05  2.09E-05  2.12E-05  2.14E-05  2.17E-05  2.17E-05
     nd144     1.95E-05  1.97E-05  2.00E-05  2.02E-05  2.05E-05  2.05E-05
     gd152     1.48E-05  1.51E-05  1.54E-05  1.57E-05  1.60E-05  1.60E-05
     mo 97     1.44E-05  1.45E-05  1.47E-05  1.49E-05  1.51E-05  1.51E-05
     sm151     1.26E-05  1.30E-05  1.30E-05  1.31E-05  1.31E-05  1.26E-05
     pd108     7.55E-06  7.67E-06  7.78E-06  7.90E-06  8.02E-06  8.02E-06
     zr 91     6.61E-06  6.69E-06  6.77E-06  6.85E-06  6.93E-06  6.93E-06
      y 89     6.32E-06  6.40E-06  6.47E-06  6.55E-06  6.62E-06  6.62E-06
     ru102     6.00E-06  6.08E-06  6.15E-06  6.22E-06  6.30E-06  6.30E-06
     ce142     5.27E-06  5.33E-06  5.39E-06  5.46E-06  5.52E-06  5.52E-06
     nd148     5.08E-06  5.14E-06  5.20E-06  5.26E-06  5.32E-06  5.32E-06
     nd146     4.28E-06  4.33E-06  4.38E-06  4.43E-06  4.48E-06  4.48E-06
     ru 99     3.64E-06  3.76E-06  3.84E-06  3.95E-06  4.05E-06  4.05E-06
     pd107     3.81E-06  3.87E-06  3.93E-06  3.98E-06  4.04E-06  4.04E-06
     in115     3.76E-06  3.80E-06  3.85E-06  3.90E-06  3.94E-06  3.94E-06
     ba138     3.64E-06  3.68E-06  3.73E-06  3.77E-06  3.82E-06  3.82E-06
     ce140     3.41E-06  3.45E-06  3.49E-06  3.53E-06  3.57E-06  3.57E-06
     xe132     3.13E-06  3.17E-06  3.21E-06  3.25E-06  3.28E-06  3.28E-06
     mo 98     2.10E-06  2.13E-06  2.15E-06  2.18E-06  2.20E-06  2.20E-06
     mo100     2.05E-06  2.07E-06  2.10E-06  2.12E-06  2.15E-06  2.15E-06
     xe134     2.02E-06  2.04E-06  2.06E-06  2.09E-06  2.11E-06  2.11E-06
     zr 92     1.60E-06  1.62E-06  1.64E-06  1.66E-06  1.68E-06  1.68E-06
      i127     1.51E-06  1.53E-06  1.55E-06  1.57E-06  1.59E-06  1.59E-06
     ru104     1.38E-06  1.40E-06  1.42E-06  1.43E-06  1.45E-06  1.45E-06
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products        page  152
0                                   fraction of total absorption rate
         power=     .00mw, burnup=  19662.mwd, flux= 6.03E+07n/cm**2-sec
0              initial *******d ******* d ******* d ******* d ******* d
```

zr 96	1.26E-06	1.28E-06	1.29E-06	1.31E-06	1.32E-06	1.32E-06
nd150	1.15E-06	1.16E-06	1.18E-06	1.19E-06	1.21E-06	1.21E-06
xe136	1.09E-06	1.11E-06	1.12E-06	1.13E-06	1.15E-06	1.15E-06
cd111	8.62E-07	8.74E-07	8.86E-07	8.99E-07	9.11E-07	9.11E-07
br 81	8.10E-07	8.20E-07	8.30E-07	8.40E-07	8.49E-07	8.49E-07
rb 85	7.76E-07	7.86E-07	7.95E-07	8.04E-07	8.13E-07	8.13E-07
gd154	6.72E-07	6.88E-07	7.06E-07	7.23E-07	7.41E-07	7.41E-07
zr 94	6.78E-07	6.87E-07	6.95E-07	7.03E-07	7.11E-07	7.11E-07
zr 90	6.23E-07	6.31E-07	6.38E-07	6.45E-07	6.53E-07	6.53E-07
sm154	5.38E-07	5.45E-07	5.52E-07	5.59E-07	5.66E-07	5.66E-07
te130	5.04E-07	5.10E-07	5.16E-07	5.22E-07	5.28E-07	5.28E-07
rb 87	4.47E-07	4.52E-07	4.57E-07	4.63E-07	4.68E-07	4.68E-07
ba135	3.65E-07	3.76E-07	3.87E-07	3.97E-07	4.08E-07	4.08E-07
pd106	3.26E-07	3.31E-07	3.35E-07	3.40E-07	3.44E-07	3.44E-07
se 77	3.26E-07	3.30E-07	3.34E-07	3.38E-07	3.42E-07	3.42E-07
gd156	3.08E-07	3.13E-07	3.17E-07	3.22E-07	3.26E-07	3.26E-07
kr 84	2.13E-07	2.16E-07	2.18E-07	2.21E-07	2.23E-07	2.23E-07
ru100	1.86E-07	1.91E-07	1.95E-07	2.00E-07	2.04E-07	2.04E-07
dy161	1.87E-07	1.90E-07	1.93E-07	1.96E-07	1.99E-07	1.99E-07
sb121	1.73E-07	1.75E-07	1.77E-07	1.79E-07	1.81E-07	1.81E-07
se 79	1.62E-07	1.64E-07	1.65E-07	1.67E-07	1.69E-07	1.69E-07
nd142	1.36E-07	1.39E-07	1.42E-07	1.46E-07	1.49E-07	1.49E-07
sb123	1.40E-07	1.41E-07	1.43E-07	1.45E-07	1.47E-07	1.47E-07
ba134	1.30E-07	1.33E-07	1.36E-07	1.39E-07	1.43E-07	1.43E-07
sm148	1.18E-07	1.21E-07	1.24E-07	1.27E-07	1.30E-07	1.30E-07
kr 86	1.18E-07	1.20E-07	1.21E-07	1.22E-07	1.24E-07	1.24E-07
te128	1.14E-07	1.15E-07	1.17E-07	1.18E-07	1.20E-07	1.20E-07
pd104	8.92E-08	9.13E-08	9.35E-08	9.58E-08	9.80E-08	9.80E-08
eu152	8.97E-08	1.11E-07	1.12E-07	1.13E-07	1.13E-07	9.09E-08
tb159	8.16E-08	8.28E-08	8.40E-08	8.53E-08	8.65E-08	8.65E-08
se 80	7.81E-08	7.90E-08	8.00E-08	8.09E-08	8.19E-08	8.19E-08
te125	7.72E-08	7.82E-08	7.92E-08	8.02E-08	8.12E-08	8.12E-08
gd158	6.47E-08	6.56E-08	6.66E-08	6.75E-08	6.85E-08	6.85E-08
nb 93	5.82E-08	5.98E-08	6.15E-08	6.33E-08	6.50E-08	6.50E-08
cd112	5.90E-08	5.98E-08	6.06E-08	6.14E-08	6.22E-08	6.22E-08
dy162	4.18E-08	4.26E-08	4.33E-08	4.41E-08	4.48E-08	4.48E-08
dy164	4.21E-08	4.28E-08	4.35E-08	4.41E-08	4.48E-08	4.48E-08
sn117	4.18E-08	4.24E-08	4.29E-08	4.35E-08	4.40E-08	4.40E-08
li 6	4.10E-08	4.14E-08	4.19E-08	4.23E-08	4.28E-08	4.28E-08
cd114	3.54E-08	3.59E-08	3.64E-08	3.69E-08	3.73E-08	3.73E-08
cd110	3.01E-08	3.10E-08	3.19E-08	3.28E-08	3.37E-08	3.37E-08
sn119	3.20E-08	3.24E-08	3.28E-08	3.32E-08	3.36E-08	3.36E-08
mo 96	2.98E-08	3.05E-08	3.12E-08	3.20E-08	3.27E-08	3.27E-08
br 79	2.91E-08	2.99E-08	3.07E-08	3.16E-08	3.25E-08	3.25E-08
sn115	2.93E-08	2.96E-08	3.00E-08	3.04E-08	3.07E-08	3.07E-08
pd110	2.87E-08	2.92E-08	2.96E-08	3.00E-08	3.05E-08	3.05E-08
ag107	2.67E-08	2.76E-08	2.84E-08	2.93E-08	3.02E-08	3.02E-08
eu155	2.51E-08	4.55E-08	4.55E-08	4.56E-08	4.56E-08	2.43E-08
sr 88	2.17E-08	2.20E-08	2.22E-08	2.25E-08	2.27E-08	2.27E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 153

0 fraction of total absorption rate

0 powers= .00mw, burnup= 19662.mwd, flux= 4.03E+07n/cm**2-sec

	initial	******* d	******* d	******* d	******* d	******* d
pm147	2.30E-08	6.54E-08	6.55E-08	6.55E-08	6.55E-08	2.15E-08
xe129	1.75E-08	1.80E-08	1.85E-08	1.90E-08	1.96E-08	1.96E-08
xe130	1.48E-08	1.51E-08	1.55E-08	1.58E-08	1.62E-08	1.62E-08
se 82	1.49E-08	1.51E-08	1.53E-08	1.54E-08	1.56E-08	1.56E-08
ba136	1.33E-08	1.36E-08	1.38E-08	1.41E-08	1.44E-08	1.44E-08

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     sn126      1.30E-08  1.32E-08  1.33E-08  1.35E-08  1.36E-08  1.36E-08
     se 78      1.17E-08  1.18E-08  1.20E-08  1.21E-08  1.22E-08  1.22E-08
     dy163      1.05E-08  1.07E-08  1.09E-08  1.10E-08  1.12E-08  1.12E-08
     te126      9.88E-09  1.02E-08  1.04E-08  1.07E-08  1.10E-08  1.10E-08
     kr 82      1.00E-08  1.02E-08  1.04E-08  1.06E-08  1.08E-08  1.08E-08
     sn124      1.02E-08  1.03E-08  1.05E-08  1.06E-08  1.07E-08  1.07E-08
     sr 75      6.87E-09  6.95E-09  7.03E-09  7.12E-09  7.20E-09  7.20E-09
     eu154      4.21E-09  8.70E-09  8.81E-09  8.93E-09  9.05E-09  4.42E-09
     in113      5.83E-09  5.90E-09  5.98E-09  6.05E-09  6.13E-09  6.13E-09
     sn118      4.12E-09  4.17E-09  4.22E-09  4.27E-09  4.33E-09  4.33E-09
     sn122      3.52E-09  3.57E-09  3.61E-09  3.66E-09  3.70E-09  3.70E-09
     cd116      3.46E-09  3.50E-09  3.55E-09  3.59E-09  3.63E-09  3.63E-09
     sr 90      3.59E-09  3.96E-09  3.96E-09  3.96E-09  3.96E-09  3.56E-09
     sn120      2.60E-09  2.63E-09  2.66E-09  2.70E-09  2.73E-09  2.73E-09
     ge 73      1.96E-09  1.99E-09  2.01E-09  2.03E-09  2.06E-09  2.06E-09
     ho165      9.75E-10  9.95E-10  1.02E-09  1.04E-09  1.06E-09  1.06E-09
     gd160      9.04E-10  9.18E-10  9.32E-10  9.46E-10  9.60E-10  9.60E-10
     dy160      8.57E-10  8.80E-10  9.03E-10  9.26E-10  9.50E-10  9.50E-10
     cs137      8.33E-10  9.14E-10  9.14E-10  9.14E-10  9.14E-10  8.29E-10
     ge 76      6.69E-10  6.77E-10  6.85E-10  6.93E-10  7.01E-10  7.01E-10
     xe128      5.14E-10  5.27E-10  5.40E-10  5.53E-10  5.66E-10  5.66E-10
     sr 86      2.50E-10  2.55E-10  2.61E-10  2.67E-10  2.73E-10  2.73E-10
     sn116      1.96E-10  2.01E-10  2.06E-10  2.11E-10  2.16E-10  2.16E-10
     cs134      2.17E-10  8.42E-10  8.53E-10  8.63E-10  8.74E-10  2.09E-10
     te124      1.92E-10  1.96E-10  2.00E-10  2.03E-10  2.07E-10  2.07E-10
     nb 94      9.35E-11  9.60E-11  9.85E-11  1.01E-10  1.04E-10  1.04E-10
     sr 87      9.77E-11  9.91E-11  1.01E-10  1.02E-10  1.04E-10  1.04E-10
     kr 85      1.03E-10  1.33E-10  1.34E-10  1.34E-10  1.34E-10  1.01E-10
     te122      8.23E-11  8.43E-11  8.64E-11  8.85E-11  9.06E-11  9.06E-11
     se 76      7.12E-11  7.27E-11  7.42E-11  7.58E-11  7.74E-11  7.74E-11
     er166      4.84E-11  4.93E-11  5.02E-11  5.11E-11  5.20E-11  5.20E-11
     ge 74      3.92E-11  3.97E-11  4.02E-11  4.07E-11  4.11E-11  4.11E-11
     kr 80      2.63E-11  2.74E-11  2.84E-11  2.95E-11  3.06E-11  3.06E-11
     ge 72      2.88E-11  2.92E-11  2.95E-11  2.99E-11  3.03E-11  3.03E-11
     er167      4.61E-12  4.75E-12  4.89E-12  5.03E-12  5.18E-12  5.18E-12
     te123      3.32E-12  3.43E-12  3.55E-12  3.67E-12  3.80E-12  3.80E-12
      y 90      3.41E-12  3.77E-12  3.77E-12  3.77E-12  3.77E-12  3.39E-12
     ce144      4.05E-12  1.42E-10  1.42E-10  1.42E-10  1.42E-10  3.23E-12
     cd108      1.71E-12  1.79E-12  1.87E-12  1.95E-12  2.03E-12  2.03E-12
     sb125      1.57E-12  4.32E-12  4.33E-12  4.33E-12  4.33E-12  1.47E-12
     ru106      6.38E-13  9.77E-12  9.78E-12  9.79E-12  9.80E-12  5.39E-13
     be  9      8.43E-14  8.53E-14  8.63E-14  8.73E-14  8.84E-14  8.84E-14
     sn114      5.14E-14  5.26E-14  5.39E-14  5.53E-14  5.66E-14  5.66E-14
     li  7      3.45E-14  3.49E-14  3.53E-14  3.57E-14  3.61E-14  3.61E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  154
0                                fraction of total absorption rate
         power=    .00mw, burnup=  19662.mwd, flux= 6.03E+07n/cm**2-sec
0            initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.50E-14  1.67E-14  1.69E-14  1.70E-14  1.72E-14  1.56E-14
     te127m     2.08E-16  2.19E-12  2.19E-12  2.20E-12  2.20E-12  1.16E-16
     nb 95      1.06E-17  3.62E-11  3.62E-11  3.62E-11  3.62E-11  3.69E-18
     cd109      2.02E-18  1.88E-17  1.96E-17  2.03E-17  2.11E-17  2.06E-18
     zr 95      5.19E-18  3.90E-11  3.90E-11  3.90E-11  3.90E-11  1.90E-18
     sn123      1.01E-18  2.57E-15  2.58E-15  2.58E-15  2.58E-15  6.15E-19
      y 91      1.01E-18  3.34E-11  3.34E-11  3.34E-11  3.34E-11  3.41E-19
     tb160      4.09E-20  4.92E-14  4.99E-14  5.06E-14  5.13E-14  1.37E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  155
       power= 9.790E-04mw, burnup=1.9662E+04mwd, flux= 6.03E+07n/cm**2-sec
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0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
h 1	1.12E-03	1.13E-03	1.14E-03	1.16E-03	1.17E-03	1.17E-03
h 2	3.33E-06	3.37E-06	3.41E-06	3.45E-06	3.50E-06	3.50E-06
h 3	1.11E-11	1.40E-11	1.40E-11	1.41E-11	1.41E-11	1.11E-11
h 4	.00E+00	1.39E-35	1.39E-35	1.40E-35	1.40E-35	.00E+00
he 3	1.59E-08	1.60E-08	1.61E-08	1.62E-08	1.63E-08	1.64E-08
he 4	1.85E-04	1.87E-04	1.90E-04	1.92E-04	1.94E-04	1.94E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	2.22E-05	2.25E-05	2.28E-05	2.30E-05	2.33E-05	2.33E-05
ne 21	7.62E-09	7.80E-09	7.98E-09	8.16E-09	8.34E-09	8.34E-09
ne 22	1.46E-07	1.48E-07	1.50E-07	1.52E-07	1.53E-07	1.54E-07
ne 23	1.77E-30	1.77E-15	1.77E-15	1.78E-15	1.78E-15	1.78E-30
ne 22	3.62E-12	1.05E-11	1.05E-11	1.05E-11	1.05E-11	3.39E-12
ne 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
ne 24	6.42E-24	6.42E-09	6.42E-09	6.43E-09	6.43E-09	6.43E-24
ne 24m	1.06E-30	1.06E-15	1.06E-15	1.06E-15	1.06E-15	1.06E-30
na 25	5.51E-39	5.63E-24	5.76E-24	5.90E-24	6.03E-24	6.03E-39
mg 24	1.45E-01	1.47E-01	1.48E-01	1.50E-01	1.52E-01	1.52E-01
mg 25	7.91E-07	8.09E-07	8.27E-07	8.46E-07	8.65E-07	8.65E-07
mg 26	3.33E-06	3.37E-06	3.41E-06	3.45E-06	3.49E-06	3.49E-06
mg 27	5.29E-28	5.29E-13	5.29E-13	5.29E-13	5.30E-13	5.30E-28
mg 28	.00E+00	2.63E-25	2.64E-25	2.64E-25	2.64E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.76E-26	4.76E-11	4.76E-11	4.76E-11	4.77E-11	4.77E-26
al 29	4.46E-37	4.56E-22	4.67E-22	4.78E-22	4.89E-22	4.89E-37
al 30	.00E+00	1.11E-31	1.15E-31	1.19E-31	1.24E-31	.00E+00
si 28	4.22E-01	4.27E-01	4.32E-01	4.37E-01	4.42E-01	4.42E-01
si 29	7.15E-06	7.31E-06	7.48E-06	7.65E-06	7.83E-06	7.83E-06
si 30	1.29E-10	1.34E-10	1.38E-10	1.43E-10	1.48E-10	1.48E-10
si 31	2.26E-38	2.34E-23	2.43E-23	2.51E-23	2.60E-23	2.60E-38
si 32	9.45E-30	9.95E-30	1.03E-29	1.07E-29	1.11E-29	1.09E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		6.02E+07	6.02E+07	6.03E+07	6.03E+07	6.03E-08

0
1

ses2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 156
power= 9.790E-04mw, burnup=1.9662E+04mwd, flux= 6.03E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	3.16E+01	3.23E+01	3.30E+01	3.37E+01	3.44E+01	3.44E+01
pb206	1.57E-01	1.63E-01	1.68E-01	1.73E-01	1.78E-01	1.78E-01
pb207	1.04E-02	1.07E-02	1.10E-02	1.13E-02	1.16E-02	1.16E-02
pb208	4.80E-04	4.91E-04	5.03E-04	5.15E-04	5.26E-04	5.26E-04
pb209	8.12E-10	8.27E-10	8.43E-10	8.58E-10	8.73E-10	8.73E-10
pb210	2.57E-04	2.61E-04	2.64E-04	2.68E-04	2.72E-04	2.72E-04
pb211	4.68E-11	4.72E-11	4.77E-11	4.83E-11	4.88E-11	4.89E-11
pb212	3.11E-11	3.20E-11	3.24E-11	3.28E-11	3.31E-11	3.25E-11
pb214	5.87E-10	5.96E-10	6.04E-10	6.13E-10	6.21E-10	6.21E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.56E-02	2.65E-02	2.75E-02	2.85E-02	2.95E-02	2.95E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.58E-07	1.60E-07	1.63E-07	1.65E-07	1.67E-07	1.67E-07
bi211	2.77E-12	2.80E-12	2.83E-12	2.86E-12	2.89E-12	2.90E-12
bi212	2.95E-12	3.04E-12	3.07E-12	3.11E-12	3.14E-12	3.08E-12
bi213	1.90E-10	1.93E-10	1.97E-10	2.00E-10	2.04E-10	2.04E-10
bi214	4.36E-10	4.42E-10	4.49E-10	4.55E-10	4.61E-10	4.61E-10
po210	4.37E-06	4.43E-06	4.49E-06	4.56E-06	4.62E-06	4.62E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

po211	3.06E-17	3.09E-17	3.13E-17	3.16E-17	3.20E-17	3.20E-17
po212	1.55E-22	1.60E-22	1.61E-22	1.63E-22	1.65E-22	1.62E-22
po213	2.85E-19	2.90E-19	2.96E-19	3.01E-19	3.07E-19	3.07E-19
po214	6.00E-17	6.08E-17	6.17E-17	6.26E-17	6.34E-17	6.35E-17
po215	3.84E-17	3.88E-17	3.92E-17	3.97E-17	4.01E-17	4.02E-17
po216	1.18E-16	1.21E-16	1.23E-16	1.24E-16	1.25E-16	1.23E-16
po218	6.79E-11	6.89E-11	6.99E-11	7.09E-11	7.19E-11	7.19E-11
rn218	1.08E-43	1.13E-28	1.15E-28	1.16E-28	1.17E-28	1.12E-43
rn219	8.55E-14	8.63E-14	8.73E-14	8.82E-14	8.92E-14	8.94E-14
rn220	4.52E-14	4.65E-14	4.70E-14	4.76E-14	4.81E-14	4.72E-14
rn222	1.21E-07	1.22E-07	1.24E-07	1.26E-07	1.28E-07	1.28E-07
ra222	1.17E-40	1.23E-25	1.24E-25	1.26E-25	1.27E-25	1.22E-40
ra223	2.13E-08	2.15E-08	2.18E-08	2.20E-08	2.22E-08	2.23E-08
ra224	2.57E-10	2.64E-10	2.67E-10	2.71E-10	2.74E-10	2.68E-10
ra225	8.87E-08	9.04E-08	9.20E-08	9.37E-08	9.54E-08	9.54E-08
ra226	1.84E-02	1.87E-02	1.90E-02	1.92E-02	1.95E-02	1.95E-02
ra228	8.82E-11	8.97E-11	9.11E-11	9.25E-11	9.40E-11	9.40E-11
ac225	5.99E-08	6.10E-08	6.22E-08	6.33E-08	6.44E-08	6.45E-08
ac227	1.48E-05	1.50E-05	1.51E-05	1.53E-05	1.55E-05	1.55E-05
ac228	1.08E-14	1.09E-14	1.11E-14	1.13E-14	1.15E-14	1.15E-14
th226	5.70E-39	6.00E-24	6.07E-24	6.14E-24	6.21E-24	5.96E-39
th227	3.44E-08	3.48E-08	3.52E-08	3.55E-08	3.59E-08	3.60E-08
th228	4.90E-08	5.05E-08	5.11E-08	5.16E-08	5.22E-08	5.12E-08
th229	1.72E-02	1.76E-02	1.79E-02	1.82E-02	1.86E-02	1.86E-02
th230	9.16E-01	9.28E-01	9.41E-01	9.53E-01	9.65E-01	9.65E-01
th231	2.74E-09	3.77E-09	3.78E-09	3.79E-09	3.80E-09	2.73E-09
th232	2.16E-01	2.19E-01	2.23E-01	2.26E-01	2.30E-01	2.30E-01
th233	4.82E-28	4.90E-13	4.98E-13	5.06E-13	5.14E-13	5.14E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.23E-02	2.25E-02	2.28E-02	2.30E-02	2.33E-02	2.33E-02
pa232	9.33E-26	9.44E-11	9.55E-11	9.66E-11	9.77E-11	9.77E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 157
power= 9.790E-04mw, burnup=1.9662E+04mwd, flux= 6.03E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.53E-36	5.81E-21	5.88E-21	5.95E-21	6.02E-21	5.78E-36
u231	8.66E-32	8.77E-17	8.89E-17	9.01E-17	9.13E-17	9.13E-32
u232	1.75E-06	1.84E-06	1.86E-06	1.88E-06	1.90E-06	1.83E-06
u233	4.69E-01	4.76E-01	4.82E-01	4.88E-01	4.95E-01	4.95E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.63E+02	6.63E+02	6.62E+02	6.61E+02	6.61E+02	6.61E+02
u236	1.89E+02	1.89E+02	1.89E+02	1.90E+02	1.90E+02	1.90E+02
u237	1.29E-12	8.06E-07	8.08E-07	8.09E-07	8.10E-07	1.28E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.50E-23	7.49E-08	7.50E-08	7.50E-08	7.50E-08	7.51E-23
u240	3.61E-35	3.92E-35	4.24E-35	4.58E-35	4.95E-35	4.95E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.60E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	1.36E-13
np236m	4.92E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.92E-28
np236	2.17E-06	2.19E-06	2.21E-06	2.23E-06	2.25E-06	2.25E-06
np237	4.09E+01	4.09E+01	4.09E+01	4.09E+01	4.08E+01	4.08E+01
np238	3.10E-14	3.63E-07	3.64E-07	3.64E-07	3.64E-07	3.12E-14
np239	1.76E-13	1.08E-05	1.08E-05	1.08E-05	1.08E-05	1.88E-13
np240m	3.08E-37	3.34E-37	3.62E-37	3.91E-37	4.22E-37	4.23E-37

```
     np240   1.19E-38  5.36E-16  5.37E-16  5.37E-16  5.38E-16  1.37E-38
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   1.07E-10  2.72E-10  2.72E-10  2.72E-10  2.72E-10  1.02E-10
     pu237   1.40E-23  7.78E-14  7.80E-14  7.82E-14  7.84E-14  3.41E-24
     pu238   5.33E-03  5.50E-03  5.50E-03  5.50E-03  5.50E-03  5.32E-03
     pu239   3.04E+01  3.05E+01  3.06E+01  3.06E+01  3.07E+01  3.07E+01
     pu240   5.13E-01  5.14E-01  5.15E-01  5.15E-01  5.16E-01  5.16E-01
     pu241   4.18E-05  5.08E-05  5.09E-05  5.10E-05  5.11E-05  4.16E-05
     pu242   3.77E-05  3.83E-05  3.88E-05  3.94E-05  4.00E-05  4.00E-05
     pu243   2.08E-29  1.96E-14  1.99E-14  2.02E-14  2.05E-14  2.22E-29
     pu244   1.80E-24  1.95E-24  2.11E-24  2.28E-24  2.46E-24  2.47E-24
     pu245    .00E+00  1.95E-35  2.11E-35  2.29E-35  2.47E-35   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.02E-34  1.01E-19  1.02E-19  1.02E-19  1.02E-19  1.02E-34
     am240   4.65E-32  4.64E-17  4.66E-17  4.67E-17  4.68E-17  4.68E-32
     am241   1.50E-03  1.50E-03  1.50E-03  1.51E-03  1.51E-03  1.51E-03
     am242m  1.68E-07  1.71E-07  1.71E-07  1.72E-07  1.72E-07  1.69E-07
     am242   2.16E-12  1.37E-11  1.37E-11  1.38E-11  1.38E-11  2.18E-12
     am243   2.01E-07  2.04E-07  2.08E-07  2.11E-07  2.15E-07  2.15E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   3.69E-31  3.75E-16  3.82E-16  3.89E-16  3.96E-16  3.96E-31
     am245   1.13E-39  3.84E-36  4.16E-36  4.50E-36  4.85E-36  1.16E-39
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   7.47E-36  1.96E-22  1.97E-22  1.97E-22  1.98E-22  1.10E-36
     cm242   4.43E-10  2.76E-09  2.77E-09  2.78E-09  2.78E-09  4.44E-10
     cm243   1.40E-14  1.54E-14  1.54E-14  1.55E-14  1.55E-14  1.40E-14
     cm244   4.97E-12  5.90E-12  6.00E-12  6.11E-12  6.22E-12  5.28E-12
1
     sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  158
       power= 9.790E-04mw, burnup=1.9662E+04mwd, flux= 6.03E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.26E-14  1.28E-14  1.31E-14  1.33E-14  1.36E-14  1.36E-14
     cm246   1.01E-16  1.03E-16  1.05E-16  1.07E-16  1.09E-16  1.09E-16
     cm247   4.09E-20  4.26E-20  4.43E-20  4.60E-20  4.77E-20  4.77E-20
     cm248   1.26E-22  1.34E-22  1.42E-22  1.51E-22  1.60E-22  1.60E-22
     cm249    .00E+00  1.03E-33  1.09E-33  1.15E-33  1.22E-33   .00E+00
     cm250   6.18E-38  6.65E-38  7.14E-38  7.67E-38  8.22E-38  8.22E-38
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.02E+07  6.02E+07  6.03E+07  6.03E+07  6.03E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number 18 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
        pass   0
        "scale-system control module sas2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *            prelim lwr origen-s binary working library--id = 1143    *
        *          made from modified card-image origen-s libraries of scale 4.2 *
        *       data from the light element, actinide, and fission product libraries *
        *         decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *       neutron flux spectrum factors and cross sections were produced from *
        *      the "presas2" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                   fission product yields are from endf/b-v          *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *     see information above this box (if present) for later updates   *
        *                                                                     *
        ***********************************************************************
        *                                                                     *
0       ***********************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                 1697    total number of nuclides in library
                   689    number of light-element nuclides
                   129    number of actinide nuclides
                   879    number of fission product nuclides
0                 7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  159
       power=    .00mw, burnup=  20536.mwd, flux= 6.03E+07n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     productions  1.260138E+06  1.259530E+06  1.258921E+06  1.258311E+06  1.257699E+06  1.257691E+06
     absorptions  1.025244E+06  1.025033E+06  1.024821E+06  1.024607E+06  1.024393E+06  1.024388E+06
     k infinity   1.229110E+00  1.228770E+00  1.228431E+00  1.228091E+00  1.227750E+00  1.227749E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions  1.007740E+06  1.007449E+06  1.007157E+06  1.006864E+06  1.006570E+06  1.006566E+06
     non-actinide
     abs. fracs.  1.707274E-02  1.715469E-02  1.723617E-02  1.731735E-02  1.739866E-02  1.739806E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page  160
0                                  fraction of total absorption rate
       power=    .00mw, burnup=  20536.mwd, flux= 6.03E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sm149     5.44E-03  5.44E-03  5.44E-03  5.43E-03  5.43E-03  5.43E-03
     nd143     1.90E-03  1.92E-03  1.94E-03  1.96E-03  1.98E-03  1.98E-03
     eu151     1.77E-03  1.78E-03  1.79E-03  1.80E-03  1.81E-03  1.81E-03
     rh103     9.25E-04  9.36E-04  9.46E-04  9.57E-04  9.68E-04  9.68E-04
     xe131     6.18E-04  6.25E-04  6.32E-04  6.39E-04  6.46E-04  6.46E-04
     cs133     4.80E-04  4.86E-04  4.91E-04  4.97E-04  5.02E-04  5.02E-04
```

sm147	3.52E-04	3.56E-04	3.60E-04	3.64E-04	3.68E-04	3.68E-04
tc 99	3.27E-04	3.31E-04	3.34E-04	3.37E-04	3.41E-04	3.41E-04
nd145	2.71E-04	2.74E-04	2.77E-04	2.80E-04	2.83E-04	2.83E-04
gd155	2.24E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04	2.24E-04
sm152	2.08E-04	2.11E-04	2.14E-04	2.17E-04	2.20E-04	2.20E-04
mo 95	1.88E-04	1.90E-04	1.92E-04	1.94E-04	1.97E-04	1.97E-04
sm150	1.42E-04	1.43E-04	1.45E-04	1.47E-04	1.49E-04	1.49E-04
kr 83	1.16E-04	1.17E-04	1.18E-04	1.19E-04	1.21E-04	1.21E-04
cs133	1.09E-04	1.10E-04	1.11E-04	1.13E-04	1.14E-04	1.14E-04
cd113	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
eu153	8.58E-05	8.69E-05	8.80E-05	8.91E-05	9.02E-05	9.02E-05
ru101	8.47E-05	8.57E-05	8.66E-05	8.76E-05	8.86E-05	8.86E-05
pr141	8.11E-05	8.20E-05	8.29E-05	8.39E-05	8.48E-05	8.48E-05
la139	6.63E-05	6.71E-05	6.78E-05	6.86E-05	6.94E-05	6.94E-05
gd157	6.08E-05	6.09E-05	6.09E-05	6.10E-05	6.10E-05	6.10E-05
pd105	3.37E-05	3.42E-05	3.46E-05	3.50E-05	3.54E-05	3.54E-05
ag109	3.31E-05	3.36E-05	3.41E-05	3.46E-05	3.51E-05	3.51E-05
ba137	3.21E-05	3.24E-05	3.28E-05	3.32E-05	3.35E-05	3.35E-05
zr 93	2.61E-05	2.64E-05	2.67E-05	2.70E-05	2.73E-05	2.73E-05
i129	2.17E-05	2.19E-05	2.22E-05	2.24E-05	2.27E-05	2.27E-05
nd144	2.05E-05	2.07E-05	2.09E-05	2.12E-05	2.14E-05	2.14E-05
gd152	1.60E-05	1.64E-05	1.67E-05	1.70E-05	1.73E-05	1.73E-05
mo 97	1.51E-05	1.52E-05	1.54E-05	1.56E-05	1.58E-05	1.58E-05
sm151	1.27E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.27E-05
pd108	8.01E-06	8.13E-06	8.25E-06	8.37E-06	8.49E-06	8.49E-06
zr 91	6.93E-06	7.01E-06	7.08E-06	7.16E-06	7.24E-06	7.24E-06
y 89	6.62E-06	6.70E-06	6.77E-06	6.85E-06	6.92E-06	6.92E-06
ru102	6.30E-06	6.37E-06	6.45E-06	6.52E-06	6.59E-06	6.59E-06
ce142	5.52E-06	5.59E-06	5.65E-06	5.71E-06	5.78E-06	5.78E-06
nd148	5.32E-06	5.38E-06	5.45E-06	5.51E-06	5.57E-06	5.57E-06
nd146	4.48E-06	4.54E-06	4.59E-06	4.64E-06	4.69E-06	4.69E-06
ru 99	4.05E-06	4.16E-06	4.27E-06	4.38E-06	4.49E-06	4.49E-06
pd107	4.04E-06	4.10E-06	4.16E-06	4.21E-06	4.27E-06	4.27E-06
in115	3.94E-06	3.99E-06	4.03E-06	4.08E-06	4.13E-06	4.13E-06
ba138	3.82E-06	3.86E-06	3.91E-06	3.95E-06	3.99E-06	3.99E-06
ce140	3.57E-06	3.62E-06	3.66E-06	3.70E-06	3.74E-06	3.74E-06
xe132	3.28E-06	3.32E-06	3.36E-06	3.40E-06	3.44E-06	3.44E-06
mo 98	2.20E-06	2.23E-06	2.25E-06	2.28E-06	2.30E-06	2.30E-06
mo100	2.15E-06	2.17E-06	2.19E-06	2.22E-06	2.24E-06	2.24E-06
xe134	2.11E-06	2.14E-06	2.16E-06	2.19E-06	2.21E-06	2.21E-06
zr 92	1.68E-06	1.70E-06	1.71E-06	1.73E-06	1.75E-06	1.75E-06
i127	1.58E-06	1.60E-06	1.62E-06	1.64E-06	1.66E-06	1.66E-06
ru104	1.45E-06	1.47E-06	1.49E-06	1.50E-06	1.52E-06	1.52E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 161
0 fraction of total absorption rate
power= .00mw, burnup= 20536.mwd, flux= 6.03E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.32E-06	1.34E-06	1.35E-06	1.37E-06	1.38E-06	1.38E-06
nd150	1.21E-06	1.22E-06	1.23E-06	1.25E-06	1.26E-06	1.26E-06
xe136	1.15E-06	1.16E-06	1.17E-06	1.19E-06	1.20E-06	1.20E-06
cd111	9.12E-07	9.24E-07	9.37E-07	9.49E-07	9.62E-07	9.62E-07
br 81	8.49E-07	8.59E-07	8.69E-07	8.79E-07	8.88E-07	8.88E-07
rb 85	8.13E-07	8.23E-07	8.32E-07	8.41E-07	8.50E-07	8.50E-07
gd154	7.41E-07	7.59E-07	7.77E-07	7.95E-07	8.14E-07	8.14E-07
zr 94	7.11E-07	7.19E-07	7.27E-07	7.35E-07	7.43E-07	7.43E-07
zr 90	6.53E-07	6.60E-07	6.68E-07	6.75E-07	6.83E-07	6.83E-07
sm154	5.66E-07	5.73E-07	5.80E-07	5.87E-07	5.94E-07	5.94E-07
te130	5.29E-07	5.35E-07	5.41E-07	5.47E-07	5.53E-07	5.53E-07
rb 87	4.68E-07	4.73E-07	4.79E-07	4.84E-07	4.89E-07	4.89E-07

ba135	4.08E-07	4.19E-07	4.31E-07	4.42E-07	4.54E-07	4.54E-07
pd106	3.44E-07	3.49E-07	3.53E-07	3.58E-07	3.62E-07	3.62E-07
se 77	3.42E-07	3.46E-07	3.50E-07	3.54E-07	3.58E-07	3.58E-07
gd156	3.26E-07	3.31E-07	3.35E-07	3.40E-07	3.44E-07	3.44E-07
kr 84	2.23E-07	2.26E-07	2.28E-07	2.31E-07	2.34E-07	2.34E-07
ru100	2.04E-07	2.09E-07	2.14E-07	2.18E-07	2.23E-07	2.23E-07
dy161	1.99E-07	2.02E-07	2.05E-07	2.08E-07	2.11E-07	2.11E-07
sb121	1.81E-07	1.84E-07	1.86E-07	1.88E-07	1.90E-07	1.90E-07
se 79	1.69E-07	1.71E-07	1.73E-07	1.75E-07	1.76E-07	1.76E-07
nd142	1.49E-07	1.52E-07	1.56E-07	1.59E-07	1.63E-07	1.63E-07
ba134	1.43E-07	1.46E-07	1.49E-07	1.53E-07	1.56E-07	1.56E-07
sb123	1.47E-07	1.48E-07	1.50E-07	1.52E-07	1.54E-07	1.54E-07
sm148	1.30E-07	1.33E-07	1.36E-07	1.39E-07	1.42E-07	1.42E-07
kr 86	1.24E-07	1.25E-07	1.27E-07	1.28E-07	1.29E-07	1.29E-07
te128	1.20E-07	1.21E-07	1.22E-07	1.24E-07	1.25E-07	1.25E-07
pd104	9.80E-08	1.00E-07	1.03E-07	1.05E-07	1.07E-07	1.07E-07
eu152	9.09E-08	1.14E-07	1.15E-07	1.16E-07	1.16E-07	9.20E-08
tb159	8.65E-08	8.77E-08	8.89E-08	9.01E-08	9.13E-08	9.13E-08
se 80	8.19E-08	8.28E-08	8.38E-08	8.47E-08	8.57E-08	8.57E-08
te125	8.12E-08	8.21E-08	8.31E-08	8.41E-08	8.51E-08	8.51E-08
gd158	6.85E-08	6.94E-08	7.03E-08	7.13E-08	7.22E-08	7.22E-08
nb 93	6.50E-08	6.68E-08	6.85E-08	7.03E-08	7.22E-08	7.22E-08
cd112	6.22E-08	6.30E-08	6.38E-08	6.46E-08	6.54E-08	6.54E-08
dy162	4.68E-08	4.56E-08	4.63E-08	4.71E-08	4.78E-08	4.78E-08
dy164	4.68E-08	4.54E-08	4.61E-08	4.67E-08	4.74E-08	4.74E-08
sn117	4.40E-08	4.46E-08	4.51E-08	4.57E-08	4.62E-08	4.62E-08
li 6	4.28E-08	4.32E-08	4.37E-08	4.41E-08	4.46E-08	4.46E-08
cd114	3.73E-08	3.78E-08	3.83E-08	3.88E-08	3.93E-08	3.93E-08
cd110	3.37E-08	3.46E-08	3.56E-08	3.65E-08	3.75E-08	3.75E-08
br 79	3.25E-08	3.33E-08	3.42E-08	3.51E-08	3.60E-08	3.60E-08
mo 96	3.27E-08	3.34E-08	3.42E-08	3.49E-08	3.57E-08	3.57E-08
sn119	3.36E-08	3.40E-08	3.44E-08	3.48E-08	3.52E-08	3.52E-08
ag107	3.02E-08	3.12E-08	3.21E-08	3.30E-08	3.40E-08	3.40E-08
sn115	3.08E-08	3.11E-08	3.15E-08	3.19E-08	3.22E-08	3.22E-08
pd110	3.04E-08	3.09E-08	3.13E-08	3.17E-08	3.22E-08	3.22E-08
sr 88	2.27E-08	2.30E-08	2.33E-08	2.35E-08	2.38E-08	2.38E-08
eu155	2.43E-08	4.56E-08	4.57E-08	4.57E-08	4.58E-08	2.35E-08

1 ses2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 162
0 fraction of total absorption rate
power= .00mw, burnup= 20556.mwd, flux= 6.03E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

xe129	1.96E-08	2.01E-08	2.06E-08	2.12E-08	2.18E-08	2.18E-08
pm147	2.15E-08	6.55E-08	6.55E-08	6.55E-08	6.55E-08	2.01E-08
xe130	1.62E-08	1.65E-08	1.69E-08	1.72E-08	1.76E-08	1.76E-08
se 82	1.56E-08	1.58E-08	1.60E-08	1.62E-08	1.63E-08	1.63E-08
ba136	1.44E-08	1.46E-08	1.49E-08	1.52E-08	1.55E-08	1.55E-08
sn126	1.36E-08	1.37E-08	1.39E-08	1.40E-08	1.42E-08	1.42E-08
se 78	1.22E-08	1.24E-08	1.25E-08	1.27E-08	1.28E-08	1.28E-08
te126	1.10E-08	1.13E-08	1.16E-08	1.19E-08	1.22E-08	1.22E-08
dy163	1.12E-08	1.14E-08	1.16E-08	1.18E-08	1.20E-08	1.20E-08
kr 82	1.08E-08	1.10E-08	1.12E-08	1.14E-08	1.16E-08	1.16E-08
sn124	1.07E-08	1.08E-08	1.10E-08	1.11E-08	1.12E-08	1.12E-08
as 75	7.20E-09	7.28E-09	7.37E-09	7.45E-09	7.53E-09	7.53E-09
eu154	6.42E-09	9.17E-09	9.29E-09	9.42E-09	9.54E-09	6.63E-09
in113	6.13E-09	6.20E-09	6.28E-09	6.35E-09	6.43E-09	6.43E-09
sn118	4.52E-09	4.38E-09	4.43E-09	4.48E-09	4.53E-09	4.53E-09
sn122	3.70E-09	3.75E-09	3.79E-09	3.84E-09	3.88E-09	3.88E-09
cd116	3.63E-09	3.68E-09	3.72E-09	3.76E-09	3.81E-09	3.81E-09
sr 90	3.57E-09	3.96E-09	3.96E-09	3.96E-09	3.96E-09	3.54E-09

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     sn120      2.73E-09  2.76E-09  2.80E-09  2.83E-09  2.86E-09  2.86E-09
     ge 73      2.06E-09  2.08E-09  2.11E-09  2.13E-09  2.16E-09  2.16E-09
     ho165      1.06E-09  1.08E-09  1.10E-09  1.12E-09  1.14E-09  1.14E-09
     dy160      9.50E-10  9.74E-10  9.98E-10  1.02E-09  1.05E-09  1.05E-09
     gd160      9.60E-10  9.74E-10  9.88E-10  1.00E-09  1.02E-09  1.02E-09
     cs137      8.28E-10  9.14E-10  9.15E-10  9.15E-10  9.15E-10  8.24E-10
     ge 76      7.01E-10  7.09E-10  7.17E-10  7.26E-10  7.34E-10  7.34E-10
     xe128      5.67E-10  5.80E-10  5.94E-10  6.07E-10  6.21E-10  6.21E-10
     sr 86      2.73E-10  2.79E-10  2.85E-10  2.91E-10  2.97E-10  2.98E-10
     sn116      2.16E-10  2.21E-10  2.26E-10  2.32E-10  2.37E-10  2.37E-10
     te124      2.07E-10  2.11E-10  2.15E-10  2.18E-10  2.22E-10  2.22E-10
     cs134      2.09E-10  8.84E-10  8.94E-10  9.05E-10  9.15E-10  2.01E-10
     nb 94      1.04E-10  1.07E-10  1.09E-10  1.12E-10  1.15E-10  1.15E-10
     sr 87      1.04E-10  1.05E-10  1.07E-10  1.08E-10  1.10E-10  1.10E-10
     kr 83      1.01E-10  1.34E-10  1.34E-10  1.34E-10  1.34E-10  9.98E-11
     te122      9.06E-11  9.27E-11  9.49E-11  9.71E-11  9.93E-11  9.93E-11
     se 76      7.74E-11  7.90E-11  8.07E-11  8.23E-11  8.40E-11  8.40E-11
     er166      5.20E-11  5.29E-11  5.38E-11  5.47E-11  5.56E-11  5.56E-11
     ge 74      4.12E-11  4.16E-11  4.21E-11  4.26E-11  4.31E-11  4.31E-11
     kr 80      3.06E-11  3.18E-11  3.29E-11  3.41E-11  3.54E-11  3.54E-11
     ge 72      3.03E-11  3.06E-11  3.10E-11  3.14E-11  3.18E-11  3.18E-11
     er167      5.18E-12  5.33E-12  5.48E-12  5.63E-12  5.79E-12  5.79E-12
     te123      3.80E-12  3.93E-12  4.06E-12  4.19E-12  4.32E-12  4.32E-12
      y 90      3.40E-12  3.77E-12  3.77E-12  3.77E-12  3.77E-12  3.38E-12
     ce144      3.23E-12  1.42E-10  1.42E-10  1.42E-10  1.42E-10  2.59E-12
     cd108      2.03E-12  2.12E-12  2.21E-12  2.30E-12  2.40E-12  2.40E-12
     sb125      1.47E-12  4.33E-12  4.34E-12  4.34E-12  4.34E-12  1.39E-12
     ru106      5.39E-13  9.81E-12  9.82E-12  9.83E-12  9.85E-12  4.57E-13
     be  9      8.83E-14  8.93E-14  9.03E-14  9.14E-14  9.24E-14  9.24E-14
     sn114      5.66E-14  5.80E-14  5.94E-14  6.08E-14  6.22E-14  6.22E-14
     li  7      3.62E-14  3.66E-14  3.70E-14  3.74E-14  3.78E-14  3.78E-14
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  163
0                                   fraction of total absorption rate
         power=     .00mw, burnup=  20556.mwd, flux= 6.03E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.56E-14  1.74E-14  1.75E-14  1.77E-14  1.78E-14  1.63E-14
     te127m     1.16E-16  2.20E-12  2.20E-12  2.20E-12  2.20E-12  6.50E-17
     cd109      2.06E-18  2.20E-17  2.28E-17  2.37E-17  2.46E-17  2.09E-18
     nb 95      3.90E-18  3.63E-11  3.63E-11  3.63E-11  3.63E-11  1.46E-18
     zr 95      1.91E-18  3.90E-11  3.90E-11  3.90E-11  3.90E-11  7.10E-19
     sn123      6.13E-19  2.58E-15  2.58E-15  2.58E-15  2.58E-15  3.82E-19
      y 91      3.41E-19  3.34E-11  3.34E-11  3.34E-11  3.34E-11  1.09E-19
     tb160      1.36E-20  5.20E-14  5.27E-14  5.35E-14  5.42E-14  1.36E-20
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  164
       power= 9.790E-04mw, burnup=2.0556E+04mwd, flux= 6.03E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
            charge ******* d ******* d ******* d ******* d ******* d
      h  1  1.17E-03  1.18E-03  1.20E-03  1.21E-03  1.22E-03  1.22E-03
      h  2  3.50E-06  3.54E-06  3.58E-06  3.62E-06  3.66E-06  3.66E-06
      h  3  1.11E-11  1.42E-11  1.42E-11  1.42E-11  1.43E-11  1.11E-11
      h  4   .00E+00  1.41E-35  1.41E-35  1.42E-35  1.42E-35   .00E+00
     he  3  1.64E-08  1.65E-08  1.66E-08  1.67E-08  1.68E-08  1.68E-08
     he  4  1.94E-04  1.96E-04  1.98E-04  2.01E-04  2.03E-04  2.03E-04
     he  6   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20  2.33E-05  2.36E-05  2.38E-05  2.41E-05  2.44E-05  2.44E-05
     ne 21  8.34E-09  8.53E-09  8.72E-09  8.91E-09  9.10E-09  9.10E-09
     ne 22  1.54E-07  1.55E-07  1.57E-07  1.59E-07  1.61E-07  1.61E-07
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na 23	1.78E-30	1.78E-15	1.78E-15	1.78E-15	1.78E-15	1.78E-30
na 22	3.39E-12	1.05E-11	1.05E-11	1.05E-11	1.06E-11	3.18E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.43E-24	6.43E-09	6.43E-09	6.44E-09	6.44E-09	6.44E-24
na 24m	1.06E-30	1.06E-15	1.06E-15	1.06E-15	1.06E-15	1.06E-30
na 25	6.03E-39	6.16E-24	6.30E-24	6.44E-24	6.58E-24	6.58E-39
mg 24	1.52E-01	1.53E-01	1.55E-01	1.57E-01	1.58E-01	1.58E-01
mg 25	8.65E-07	8.84E-07	9.03E-07	9.23E-07	9.42E-07	9.42E-07
mg 26	3.49E-06	3.53E-06	3.57E-06	3.61E-06	3.65E-06	3.65E-06
mg 27	5.30E-28	5.29E-13	5.30E-13	5.30E-13	5.30E-13	5.30E-28
mg 28	.00E+00	2.64E-25	2.65E-25	2.65E-25	2.65E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.77E-26	4.77E-11	4.77E-11	4.77E-11	4.77E-11	4.77E-26
al 29	4.89E-37	4.99E-22	5.11E-22	5.22E-22	5.34E-22	5.34E-37
al 30	.00E+00	1.28E-31	1.32E-31	1.36E-31	1.41E-31	.00E+00
si 28	4.42E-01	4.46E-01	4.51E-01	4.56E-01	4.61E-01	4.61E-01
si 29	7.83E-06	8.00E-06	8.18E-06	8.36E-06	8.54E-06	8.54E-06
si 30	1.48E-10	1.53E-10	1.58E-10	1.63E-10	1.69E-10	1.69E-10
si 31	2.60E-38	2.69E-23	2.78E-23	2.87E-23	2.97E-23	2.97E-38
si 32	1.09E-29	1.14E-29	1.19E-29	1.23E-29	1.27E-29	1.25E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		6.03E+07	6.03E+07	6.04E+07	6.04E+07	6.04E-08

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 165

power= 9.790E-04mw, burnup=2.0556E+04mwd, flux= 6.03E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	3.44E+01	3.51E+01	3.58E+01	3.65E+01	3.71E+01	3.72E+01
pb206	1.78E-01	1.84E-01	1.89E-01	1.94E-01	2.00E-01	2.00E-01
pb207	1.16E-02	1.19E-02	1.22E-02	1.25E-02	1.29E-02	1.29E-02
pb208	5.26E-04	5.38E-04	5.50E-04	5.63E-04	5.75E-04	5.75E-04
pb209	8.73E-10	8.89E-10	9.04E-10	9.19E-10	9.34E-10	9.34E-10
pb210	2.72E-04	2.75E-04	2.79E-04	2.83E-04	2.86E-04	2.86E-04
pb211	4.89E-11	4.93E-11	4.98E-11	5.03E-11	5.08E-11	5.09E-11
pb212	3.25E-11	3.35E-11	3.39E-11	3.42E-11	3.46E-11	3.59E-11
pb214	6.21E-10	6.30E-10	6.38E-10	6.46E-10	6.55E-10	6.55E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	2.95E-02	3.05E-02	3.16E-02	3.26E-02	3.37E-02	3.37E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.67E-07	1.70E-07	1.72E-07	1.74E-07	1.76E-07	1.76E-07
bi211	2.90E-12	2.92E-12	2.95E-12	2.98E-12	3.01E-12	3.02E-12
bi212	3.08E-12	3.18E-12	3.21E-12	3.25E-12	3.28E-12	3.21E-12
bi213	2.04E-10	2.08E-10	2.11E-10	2.15E-10	2.18E-10	2.18E-10
bi214	4.61E-10	4.67E-10	4.74E-10	4.80E-10	4.86E-10	4.86E-10
po210	4.62E-06	4.68E-06	4.74E-06	4.81E-06	4.87E-06	4.87E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.20E-17	3.23E-17	3.26E-17	3.30E-17	3.33E-17	3.34E-17
po212	1.62E-22	1.67E-22	1.69E-22	1.71E-22	1.72E-22	1.69E-22
po213	3.07E-19	3.12E-19	3.17E-19	3.23E-19	3.28E-19	3.28E-19
po214	6.35E-17	6.43E-17	6.52E-17	6.60E-17	6.69E-17	6.69E-17
po215	4.02E-17	4.05E-17	4.09E-17	4.14E-17	4.18E-17	4.18E-17
po216	1.23E-16	1.27E-16	1.28E-16	1.30E-16	1.31E-16	1.28E-16
po218	7.19E-11	7.28E-11	7.38E-11	7.48E-11	7.57E-11	7.57E-11
rn218	1.12E-43	1.19E-28	1.20E-28	1.21E-28	1.23E-28	1.18E-43
rn219	8.94E-14	9.01E-14	9.11E-14	9.20E-14	9.29E-14	9.31E-14
rn220	4.72E-14	4.86E-14	4.92E-14	4.97E-14	5.02E-14	4.91E-14
rn222	1.28E-07	1.29E-07	1.31E-07	1.33E-07	1.35E-07	1.35E-07
ra222	1.22E-40	1.29E-25	1.30E-25	1.32E-25	1.33E-25	1.27E-40
ra223	2.23E-08	2.25E-08	2.27E-08	2.29E-08	2.32E-08	2.32E-08

ra224	2.68E-10	2.77E-10	2.80E-10	2.83E-10	2.86E-10	2.79E-10
ra225	9.54E-08	9.71E-08	9.87E-08	1.00E-07	1.02E-07	1.02E-07
ra226	1.95E-02	1.98E-02	2.00E-02	2.03E-02	2.06E-02	2.06E-02
ra228	9.40E-11	9.54E-11	9.69E-11	9.83E-11	9.97E-11	9.97E-11
ac225	6.45E-08	6.56E-08	6.67E-08	6.78E-08	6.89E-08	6.89E-08
ac227	1.55E-05	1.56E-05	1.58E-05	1.60E-05	1.61E-05	1.61E-05
ac228	1.15E-14	1.16E-14	1.18E-14	1.20E-14	1.22E-14	1.22E-14
th226	5.96E-39	6.28E-24	6.35E-24	6.42E-24	6.49E-24	6.21E-39
th227	3.60E-08	3.63E-08	3.67E-08	3.70E-08	3.74E-08	3.75E-08
th228	5.12E-08	5.28E-08	5.34E-08	5.39E-08	5.45E-08	5.33E-08
th229	1.86E-02	1.89E-02	1.92E-02	1.95E-02	1.98E-02	1.98E-02
th230	9.65E-01	9.78E-01	9.90E-01	1.00E+00	1.01E+00	1.01E+00
th231	2.73E-09	3.81E-09	3.82E-09	3.84E-09	3.85E-09	2.73E-09
th232	2.30E-01	2.33E-01	2.37E-01	2.40E-01	2.44E-01	2.44E-01
th233	5.14E-28	5.22E-13	5.30E-13	5.38E-13	5.46E-13	5.46E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.33E-02	2.35E-02	2.38E-02	2.40E-02	2.42E-02	2.42E-02
pa232	9.77E-26	9.88E-11	9.98E-11	1.01E-10	1.02E-10	1.02E-25

1

sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 166
power= 9.790E-04mw, burnup=2.0556E+04mwd, flux= 6.03E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.78E-36	6.09E-21	6.15E-21	6.22E-21	6.29E-21	6.02E-36
u231	9.13E-32	9.24E-17	9.36E-17	9.48E-17	9.60E-17	9.60E-32
u232	1.83E-06	1.93E-06	1.95E-06	1.97E-06	1.99E-06	1.90E-06
u233	4.95E-01	5.01E-01	5.07E-01	5.13E-01	5.19E-01	5.19E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.61E+02	6.60E+02	6.60E+02	6.59E+02	6.59E+02	6.59E+02
u236	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02
u237	1.28E-12	8.10E-07	8.11E-07	8.12E-07	8.14E-07	1.28E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.51E-23	7.50E-08	7.51E-08	7.51E-08	7.51E-08	7.52E-23
u240	4.95E-35	5.34E-35	5.74E-35	6.17E-35	6.63E-35	6.63E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.36E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	1.16E-13
np236m	4.92E-28	4.92E-13	4.92E-13	4.92E-13	4.92E-13	4.92E-28
np236	2.25E-06	2.28E-06	2.30E-06	2.32E-06	2.34E-06	2.34E-06
np237	4.08E+01	4.08E+01	4.08E+01	4.08E+01	4.08E+01	4.08E+01
np238	3.12E-14	3.64E-07	3.64E-07	3.64E-07	3.64E-07	3.15E-14
np239	1.88E-13	1.08E-05	1.09E-05	1.09E-05	1.09E-05	2.01E-13
np240m	4.23E-37	4.55E-37	4.90E-37	5.27E-37	5.65E-37	5.66E-37
np240	1.37E-38	5.38E-16	5.39E-16	5.39E-16	5.40E-16	1.58E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.02E-10	2.72E-10	2.72E-10	2.72E-10	2.72E-10	9.62E-11
pu237	3.41E-26	7.85E-14	7.87E-14	7.88E-14	7.90E-14	8.49E-25
pu238	5.32E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.31E-03
pu239	3.07E+01	3.08E+01	3.08E+01	3.09E+01	3.10E+01	3.10E+01
pu240	5.16E-01	5.17E-01	5.18E-01	5.19E-01	5.20E-01	5.19E-01
pu241	4.16E-05	5.11E-05	5.12E-05	5.14E-05	5.15E-05	4.16E-05
pu242	4.00E-05	4.05E-05	4.11E-05	4.16E-05	4.22E-05	4.22E-05
pu243	2.22E-29	2.08E-14	2.11E-14	2.14E-14	2.17E-14	2.36E-29
pu244	2.47E-24	2.66E-24	2.86E-24	3.07E-24	3.30E-24	3.30E-24
pu245	.00E+00	2.66E-35	2.87E-35	3.08E-35	3.31E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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     am239   1.02E-34  1.02E-19  1.03E-19  1.03E-19  1.03E-19  1.03E-34
     am240   4.68E-32  4.68E-17  4.69E-17  4.71E-17  4.72E-17  4.72E-32
     am241   1.51E-03  1.51E-03  1.52E-03  1.52E-03  1.52E-03  1.52E-03
     am242m  1.69E-07  1.72E-07  1.73E-07  1.73E-07  1.74E-07  1.70E-07
     am242   2.18E-12  1.38E-11  1.38E-11  1.39E-11  1.39E-11  2.20E-12
     am243   2.15E-07  2.18E-07  2.22E-07  2.26E-07  2.29E-07  2.29E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   3.96E-31  4.02E-16  4.09E-16  4.16E-16  4.23E-16  4.23E-31
     am245   1.16E-39  5.24E-36  5.44E-36  6.06E-36  6.51E-36  1.19E-39
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.10E-36  1.98E-22  1.99E-22  2.00E-22  2.00E-22  1.91E-37
     cm242   4.44E-10  2.78E-09  2.79E-09  2.80E-09  2.81E-09  4.46E-10
     cm243   1.40E-14  1.55E-14  1.56E-14  1.57E-14  1.57E-14  1.41E-14
     cm244   5.28E-12  4.32E-12  4.42E-12  6.53E-12  6.64E-12  5.59E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  167
       power= 9.790E-04mw, burnup=2.0556E+04mwd, flux= 6.03E+07n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.36E-14  1.38E-14  1.41E-14  1.43E-14  1.46E-14  1.46E-14
     cm246   1.09E-16  1.11E-16  1.13E-16  1.15E-16  1.17E-16  1.17E-16
     cm247   4.77E-20  4.95E-20  5.13E-20  5.31E-20  5.50E-20  5.50E-20
     cm248   1.60E-22  1.69E-22  1.78E-22  1.88E-22  1.98E-22  1.98E-22
     cm249    .00E+00  1.29E-33  1.36E-33  1.44E-33  1.52E-33   .00E+00
     cm250   8.22E-38  8.81E-38  9.42E-38  1.01E-37  1.08E-37  1.08E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.03E+07  6.03E+07  6.04E+07  6.04E+07  6.04E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

          cross-section data taken from position number 19 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ****************************************************************************
          *                                                                          *
          *            prelim lwr origen-s binary working library--id = 1143         *
          *          made from modified card-image origen-s libraries of scale 4.2   *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                          *
```

```
          *      neutron flux spectrum factors and cross sections were produced from      *
          *     the "presas2" case updating all nuclides on the scale "burnup" library    *
          *                                                                               *
          *                  fission product yields are from endf/b-v                     *
          *                                                                               *
          *              photon libraries use an 18-energy-group structure                *
          *             the photon data are from the master photon data base,             *
          *              produced to include bremsstrahlung from uo2 matrix               *
          *                                                                               *
          *        see information above this box (if present) for later updates          *
          *                                                                               *
          *********************************************************************************
          *                                                                               *
          *********************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  ft33f001
0               8/29/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0          ***********************************************************************
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  168
         power=    .00mw, burnup=  21450.mwd, flux= 6.04E+07n/cm**2-sec
0                                                basis =
0     (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                   initial      ******* d      ******* d      ******* d      ******* d      ******* d
      productions   1.258714E+06  1.258098E+06  1.257482E+06  1.256863E+06  1.256244E+06  1.256236E+06
      absorptions   1.024958E+06  1.024742E+06  1.024325E+06  1.024306E+06  1.024087E+06  1.024082E+06
      k infinity    1.228064E+00  1.227722E+00  1.227381E+00  1.227039E+00  1.226696E+00  1.226695E+00
0                   initial      ******* d      ******* d      ******* d      ******* d      ******* d
      actinide
      absorptions   1.007127E+06  1.006832E+06  1.006536E+06  1.006239E+06  1.005941E+06  1.005936E+06
      non-actinide
      abs. fracs.   1.739621E-02  1.747781E-02  1.755846E-02  1.763892E-02  1.771957E-02  1.771897E-02
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  169
0                                  fraction of total absorption rate
         power=    .00mw, burnup=  21450.mwd, flux= 6.04E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

      sm149      5.43E-03  5.43E-03  5.43E-03  5.43E-03  5.43E-03  5.43E-03
      nd143      1.98E-03  2.00E-03  2.02E-03  2.05E-03  2.07E-03  2.07E-03
      eu151      1.81E-03  1.82E-03  1.83E-03  1.84E-03  1.85E-03  1.85E-03
      rh103      9.67E-04  9.78E-04  9.89E-04  1.00E-03  1.01E-03  1.01E-03
      xe131      6.46E-04  6.53E-04  6.60E-04  6.67E-04  6.74E-04  6.74E-04
      cs133      5.02E-04  5.08E-04  5.13E-04  5.19E-04  5.24E-04  5.24E-04
      sm147      3.68E-04  3.72E-04  3.76E-04  3.80E-04  3.84E-04  3.84E-04
      tc 99      3.41E-04  3.44E-04  3.47E-04  3.51E-04  3.54E-04  3.54E-04
      nd145      2.83E-04  2.86E-04  2.89E-04  2.93E-04  2.96E-04  2.96E-04
      sm152      2.20E-04  2.22E-04  2.25E-04  2.28E-04  2.31E-04  2.31E-04
      gd155      2.25E-04  2.25E-04  2.25E-04  2.25E-04  2.25E-04  2.25E-04
      mo 95      1.97E-04  1.99E-04  2.01E-04  2.03E-04  2.05E-04  2.05E-04
      sm150      1.49E-04  1.50E-04  1.52E-04  1.54E-04  1.55E-04  1.55E-04
      kr 83      1.21E-04  1.22E-04  1.23E-04  1.25E-04  1.26E-04  1.26E-04
      cs135      1.14E-04  1.15E-04  1.16E-04  1.18E-04  1.19E-04  1.19E-04
      cd113      1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04
      eu153      9.02E-05  9.13E-05  9.24E-05  9.36E-05  9.47E-05  9.47E-05
      ru101      8.86E-05  8.95E-05  9.05E-05  9.15E-05  9.25E-05  9.25E-05
      pr141      8.48E-05  8.58E-05  8.67E-05  8.76E-05  8.86E-05  8.86E-05
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la139	6.94E-05	7.02E-05	7.09E-05	7.17E-05	7.25E-05	7.25E-05
gd157	6.11E-05	6.11E-05	6.11E-05	6.12E-05	6.12E-05	6.12E-05
ag109	3.51E-05	3.36E-05	3.61E-05	3.66E-05	3.71E-05	3.71E-05
pd105	3.54E-05	3.59E-05	3.63E-05	3.67E-05	3.71E-05	3.71E-05
ba137	3.36E-05	3.39E-05	3.43E-05	3.47E-05	3.50E-05	3.51E-05
zr 93	2.73E-05	2.76E-05	2.78E-05	2.81E-05	2.84E-05	2.84E-05
i129	2.27E-05	2.30E-05	2.32E-05	2.35E-05	2.37E-05	2.37E-05
nd144	2.14E-05	2.17E-05	2.19E-05	2.22E-05	2.24E-05	2.24E-05
gd152	1.73E-05	1.76E-05	1.79E-05	1.83E-05	1.86E-05	1.86E-05
mo 97	1.58E-05	1.59E-05	1.61E-05	1.63E-05	1.65E-05	1.65E-05
sm151	1.27E-05	1.31E-05	1.32E-05	1.32E-05	1.32E-05	1.27E-05
pd108	8.48E-06	8.60E-06	8.72E-06	8.84E-06	8.96E-06	8.96E-06
zr 91	7.24E-06	7.32E-06	7.40E-06	7.48E-06	7.56E-06	7.56E-06
y 89	6.93E-06	7.00E-06	7.08E-06	7.15E-06	7.23E-06	7.23E-06
ru102	6.40E-06	6.67E-06	6.74E-06	6.82E-06	6.89E-06	6.89E-06
ce142	5.78E-06	5.84E-06	5.91E-06	5.97E-06	6.03E-06	6.03E-06
nd148	5.57E-06	5.63E-06	5.69E-06	5.75E-06	5.82E-06	5.82E-06
ru 99	4.49E-06	4.60E-06	4.71E-06	4.82E-06	4.94E-06	4.94E-06
nd146	4.69E-06	4.75E-06	4.80E-06	4.85E-06	4.90E-06	4.90E-06
pd107	4.27E-06	4.33E-06	4.39E-06	4.45E-06	4.51E-06	4.51E-06
in115	4.13E-06	4.17E-06	4.22E-06	4.27E-06	4.31E-06	4.31E-06
ba138	4.00E-06	4.04E-06	4.08E-06	4.13E-06	4.17E-06	4.17E-06
ce140	3.74E-06	3.78E-06	3.82E-06	3.86E-06	3.91E-06	3.91E-06
xe132	3.44E-06	3.48E-06	3.52E-06	3.56E-06	3.59E-06	3.59E-06
mo 98	2.30E-06	2.33E-06	2.35E-06	2.38E-06	2.40E-06	2.40E-06
mo100	2.24E-06	2.27E-06	2.29E-06	2.32E-06	2.34E-06	2.34E-06
xe134	2.21E-06	2.24E-06	2.26E-06	2.29E-06	2.31E-06	2.31E-06
zr 92	1.75E-06	1.77E-06	1.79E-06	1.81E-06	1.83E-06	1.83E-06
i127	1.66E-06	1.68E-06	1.70E-06	1.72E-06	1.74E-06	1.74E-06
ru104	1.52E-06	1.54E-06	1.56E-06	1.57E-06	1.59E-06	1.59E-06

1 sas2h: far-field crit based on bzw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 170
0 fraction of total absorption rate
0 power= .00mw, burnup= 21450.mwd, flux= 6.04E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.38E-06	1.40E-06	1.41E-06	1.43E-06	1.44E-06	1.44E-06
nd150	1.26E-06	1.28E-06	1.29E-06	1.30E-06	1.32E-06	1.32E-06
xe136	1.20E-06	1.21E-06	1.23E-06	1.24E-06	1.25E-06	1.25E-06
cd111	9.62E-07	9.75E-07	9.87E-07	1.00E-06	1.01E-06	1.01E-06
br 81	8.88E-07	8.98E-07	9.08E-07	9.18E-07	9.28E-07	9.28E-07
gd154	8.14E-07	8.33E-07	8.52E-07	8.71E-07	8.91E-07	8.91E-07
rb 85	8.50E-07	8.60E-07	8.69E-07	8.78E-07	8.88E-07	8.88E-07
zr 94	7.43E-07	7.51E-07	7.60E-07	7.68E-07	7.76E-07	7.76E-07
zr 90	6.83E-07	6.90E-07	6.98E-07	7.05E-07	7.13E-07	7.13E-07
sm154	5.94E-07	6.01E-07	6.08E-07	6.14E-07	6.21E-07	6.21E-07
te130	5.53E-07	5.60E-07	5.66E-07	5.72E-07	5.78E-07	5.78E-07
rb 87	4.89E-07	4.95E-07	5.00E-07	5.05E-07	5.11E-07	5.11E-07
ba135	4.54E-07	4.65E-07	4.77E-07	4.89E-07	5.01E-07	5.01E-07
pd106	3.62E-07	3.67E-07	3.72E-07	3.76E-07	3.81E-07	3.81E-07
se 77	3.58E-07	3.62E-07	3.66E-07	3.69E-07	3.73E-07	3.73E-07
gd156	3.44E-07	3.49E-07	3.53E-07	3.58E-07	3.62E-07	3.62E-07
kr 84	2.33E-07	2.36E-07	2.39E-07	2.41E-07	2.44E-07	2.44E-07
ru100	2.23E-07	2.28E-07	2.33E-07	2.38E-07	2.43E-07	2.43E-07
dy161	2.11E-07	2.14E-07	2.17E-07	2.20E-07	2.22E-07	2.22E-07
sb121	1.90E-07	1.92E-07	1.95E-07	1.97E-07	1.99E-07	1.99E-07
se 79	1.76E-07	1.78E-07	1.80E-07	1.82E-07	1.84E-07	1.84E-07
nd142	1.63E-07	1.67E-07	1.70E-07	1.74E-07	1.78E-07	1.78E-07
ba134	1.56E-07	1.60E-07	1.63E-07	1.67E-07	1.70E-07	1.70E-07
sb123	1.54E-07	1.55E-07	1.57E-07	1.59E-07	1.61E-07	1.61E-07
sm148	1.42E-07	1.45E-07	1.48E-07	1.52E-07	1.55E-07	1.55E-07

kr 86	1.30E-07	1.31E-07	1.32E-07	1.34E-07	1.35E-07	1.35E-07
te128	1.25E-07	1.27E-07	1.28E-07	1.30E-07	1.31E-07	1.31E-07
pd104	1.07E-07	1.10E-07	1.12E-07	1.15E-07	1.17E-07	1.17E-07
tb159	9.13E-08	9.25E-08	9.38E-08	9.50E-08	9.62E-08	9.62E-08
eu152	9.20E-08	1.17E-07	1.18E-07	1.18E-07	1.19E-07	9.30E-08
se 80	8.57E-08	8.66E-08	8.76E-08	8.85E-08	8.95E-08	8.95E-08
te125	8.31E-08	8.61E-08	8.71E-08	8.81E-08	8.91E-08	8.91E-08
nb 93	7.22E-08	7.40E-08	7.59E-08	7.77E-08	7.96E-08	7.96E-08
gd158	7.22E-08	7.32E-08	7.41E-08	7.51E-08	7.60E-08	7.60E-08
cd112	6.54E-08	6.63E-08	6.71E-08	6.79E-08	6.87E-08	6.87E-08
dy162	4.78E-08	4.86E-08	4.94E-08	5.01E-08	5.09E-08	5.09E-08
dy164	4.74E-08	4.80E-08	4.87E-08	4.93E-08	5.00E-08	5.00E-08
sn117	4.62E-08	4.68E-08	4.73E-08	4.79E-08	4.84E-08	4.84E-08
li 6	4.46E-08	4.50E-08	4.55E-08	4.59E-08	4.64E-08	4.64E-08
cd110	3.75E-08	3.85E-08	3.95E-08	4.05E-08	4.16E-08	4.16E-08
cd114	3.93E-08	3.97E-08	4.02E-08	4.07E-08	4.12E-08	4.12E-08
br 79	3.60E-08	3.69E-08	3.78E-08	3.87E-08	3.97E-08	3.97E-08
mo 96	3.57E-08	3.65E-08	3.73E-08	3.81E-08	3.89E-08	3.89E-08
ag107	3.40E-08	3.50E-08	3.59E-08	3.69E-08	3.79E-08	3.79E-08
sn119	3.52E-08	3.57E-08	3.61E-08	3.65E-08	3.69E-08	3.69E-08
pd110	3.22E-08	3.26E-08	3.30E-08	3.35E-08	3.39E-08	3.39E-08
sn115	3.23E-08	3.26E-08	3.30E-08	3.34E-08	3.37E-08	3.37E-08
sr 88	2.38E-08	2.40E-08	2.43E-08	2.46E-08	2.48E-08	2.48E-08
xe129	2.18E-08	2.23E-08	2.29E-08	2.35E-08	2.40E-08	2.40E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 171
0 fraction of total absorption rate
0 power= .00mw, burnup= 21450.mwd, flux= 6.04E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d
eu155	2.35E-08	4.58E-08	4.58E-08	4.59E-08	2.27E-08
xe130	1.74E-08	1.80E-08	1.84E-08	1.87E-08	1.91E-08
pm147	2.01E-08	6.55E-08	6.55E-08	6.55E-08	1.89E-08
se 82	1.63E-08	1.63E-08	1.67E-08	1.69E-08	1.71E-08
ba136	1.55E-08	1.58E-08	1.60E-08	1.63E-08	1.66E-08
sn126	1.42E-08	1.43E-08	1.44E-08	1.46E-08	1.47E-08
te126	1.22E-08	1.25E-08	1.28E-08	1.31E-08	1.34E-08
se 78	1.28E-08	1.30E-08	1.31E-08	1.32E-08	1.34E-08
dy163	1.20E-08	1.22E-08	1.24E-08	1.26E-08	1.28E-08
kr 82	1.16E-08	1.18E-08	1.19E-08	1.21E-08	1.23E-08
sn124	1.12E-08	1.14E-08	1.15E-08	1.16E-08	1.17E-08
as 75	7.53E-09	7.62E-09	7.70E-09	7.78E-09	7.87E-09
eu154	6.63E-09	9.66E-09	9.78E-09	9.90E-09	1.00E-08
in113	6.63E-09	6.50E-09	6.58E-09	6.65E-09	6.73E-09
sn118	4.53E-09	4.58E-09	4.64E-09	4.69E-09	4.74E-09
sn122	3.88E-09	3.93E-09	3.97E-09	4.02E-09	4.06E-09
cd116	3.81E-09	3.85E-09	3.89E-09	3.94E-09	3.98E-09
sr 90	3.55E-09	3.96E-09	3.96E-09	3.96E-09	3.53E-09
sn120	2.86E-09	2.89E-09	2.93E-09	2.96E-09	2.99E-09
ge 73	2.16E-09	2.18E-09	2.21E-09	2.23E-09	2.25E-09
ho165	1.14E-09	1.16E-09	1.18E-09	1.21E-09	1.23E-09
dy160	1.05E-09	1.07E-09	1.10E-09	1.12E-09	1.15E-09
gd160	1.02E-09	1.03E-09	1.04E-09	1.06E-09	1.07E-09
cs137	8.24E-10	9.15E-10	9.15E-10	9.15E-10	8.20E-10
ge 76	7.34E-10	7.42E-10	7.50E-10	7.58E-10	7.66E-10
xe128	6.21E-10	6.36E-10	6.50E-10	6.64E-10	6.79E-10
sr 86	2.98E-10	3.04E-10	3.10E-10	3.17E-10	3.23E-10
sn116	2.37E-10	2.42E-10	2.47E-10	2.53E-10	2.58E-10
te124	2.22E-10	2.26E-10	2.30E-10	2.34E-10	2.38E-10
cs134	2.01E-10	9.25E-10	9.36E-10	9.47E-10	9.57E-10
nb 94	1.15E-10	1.18E-10	1.21E-10	1.24E-10	1.27E-10

sr 87	1.10E-10	1.11E-10	1.13E-10	1.14E-10	1.16E-10	1.16E-10
te122	9.93E-11	1.02E-10	1.04E-10	1.06E-10	1.08E-10	1.08E-10
kr 85	9.99E-11	1.34E-10	1.34E-10	1.34E-10	1.34E-10	9.83E-11
se 76	8.40E-11	8.57E-11	8.73E-11	8.90E-11	9.08E-11	9.08E-11
er166	5.37E-11	5.66E-11	5.75E-11	5.85E-11	5.94E-11	5.94E-11
ge 74	4.31E-11	4.36E-11	4.41E-11	4.46E-11	4.51E-11	4.51E-11
kr 80	3.54E-11	3.67E-11	3.80E-11	3.93E-11	4.07E-11	4.07E-11
ge 72	3.18E-11	3.21E-11	3.25E-11	3.29E-11	3.33E-11	3.33E-11
er167	5.79E-12	5.95E-12	6.11E-12	6.27E-12	6.44E-12	6.44E-12
te123	4.32E-12	4.46E-12	4.61E-12	4.75E-12	4.90E-12	4.90E-12
y 90	3.38E-12	3.77E-12	3.77E-12	3.77E-12	3.77E-12	3.36E-12
cd108	2.40E-12	2.50E-12	2.60E-12	2.70E-12	2.81E-12	2.81E-12
ce144	2.59E-12	1.42E-10	1.42E-10	1.42E-10	1.42E-10	2.09E-12
sb125	1.39E-12	4.34E-12	4.35E-12	4.35E-12	4.35E-12	1.31E-12
ru106	4.57E-13	9.85E-12	9.86E-12	9.87E-12	9.89E-12	3.88E-13
be 9	9.23E-14	9.34E-14	9.44E-14	9.54E-14	9.64E-14	9.64E-14
sn114	6.22E-14	6.36E-14	6.51E-14	6.65E-14	6.80E-14	6.80E-14
li 7	3.78E-14	3.83E-14	3.87E-14	3.91E-14	3.95E-14	3.95E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 172
0 fraction of total absorption rate
power= .00mw, burnup= 21450.mwd, flux= 6.04E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

sb126	1.63E-14	1.80E-14	1.82E-14	1.83E-14	1.85E-14	1.69E-14
te127m	6.51E-17	2.21E-12	2.21E-12	2.21E-12	2.21E-12	3.69E-17
cd109	2.08E-18	2.55E-17	2.65E-17	2.75E-17	2.85E-17	2.11E-18
nb 95	1.46E-18	3.63E-11	3.63E-11	3.63E-11	3.63E-11	5.59E-19
zr 95	7.08E-19	3.90E-11	3.90E-11	3.90E-11	3.91E-11	2.73E-19
sn123	3.81E-19	2.58E-15	2.58E-15	2.58E-15	2.58E-15	2.32E-19
y 91	1.09E-19	3.34E-11	3.34E-11	3.34E-11	3.34E-11	4.09E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 173
power= 9.790E-04mw, burnup=2.1450E+04mwd, flux= 6.04E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	1.22E-03	1.24E-03	1.25E-03	1.26E-03	1.28E-03	1.28E-03
h 2	3.66E-06	3.70E-06	3.74E-06	3.78E-06	3.82E-06	3.82E-06
h 3	1.11E-11	1.43E-11	1.44E-11	1.44E-11	1.44E-11	1.11E-11
h 6	.00E+00	1.43E-35	1.43E-35	1.44E-35	1.44E-35	.00E+00
he 3	1.68E-08	1.69E-08	1.70E-08	1.71E-08	1.72E-08	1.72E-08
he 4	2.03E-04	2.05E-04	2.07E-04	2.10E-04	2.12E-04	2.12E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	2.44E-05	2.46E-05	2.49E-05	2.52E-05	2.54E-05	2.54E-05
ne 21	9.10E-09	9.29E-09	9.49E-09	9.68E-09	9.88E-09	9.88E-09
ne 22	1.61E-07	1.62E-07	1.64E-07	1.66E-07	1.68E-07	1.68E-07
ne 23	1.78E-30	1.78E-15	1.78E-15	1.78E-15	1.78E-15	1.78E-30
na 22	3.18E-12	1.05E-11	1.06E-11	1.06E-11	1.06E-11	2.98E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.44E-24	6.43E-09	6.44E-09	6.44E-09	6.44E-09	6.44E-24
na 24m	1.06E-30	1.06E-15	1.06E-15	1.06E-15	1.06E-15	1.06E-30
na 25	6.58E-39	6.71E-24	6.86E-24	7.00E-24	7.15E-24	7.15E-39
mg 24	1.58E-01	1.60E-01	1.62E-01	1.63E-01	1.65E-01	1.65E-01
mg 25	9.42E-07	9.62E-07	9.82E-07	1.00E-06	1.02E-06	1.02E-06
mg 26	3.65E-06	3.69E-06	3.73E-06	3.77E-06	3.81E-06	3.81E-06
mg 27	5.30E-28	5.30E-13	5.30E-13	5.31E-13	5.31E-13	5.31E-28
mg 28	.00E+00	2.65E-25	2.65E-25	2.66E-25	2.66E-25	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.77E-26	4.77E-11	4.77E-11	4.77E-11	4.77E-11	4.78E-26
al 29	5.34E-37	5.45E-22	5.57E-22	5.69E-22	5.81E-22	5.81E-37

si 30	.00E+00	1.45E-31	1.50E-31	1.55E-31	1.60E-31	.00E+00
si 28	4.61E-01	4.66E-01	4.71E-01	4.76E-01	4.80E-01	4.80E-01
si 29	8.54E-06	8.72E-06	8.91E-06	9.09E-06	9.28E-06	9.28E-06
si 30	1.69E-10	1.74E-10	1.80E-10	1.86E-10	1.91E-10	1.91E-10
si 31	2.97E-38	3.07E-23	3.17E-23	3.27E-23	3.38E-23	3.38E-38
si 32	1.25E-29	1.31E-29	1.36E-29	1.40E-29	1.45E-29	1.42E-29
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		6.04E+07	6.04E+07	6.04E+07	6.05E+07	6.05E-08

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sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 174
power= 9.790E-04mw, burnup=2.1450E+04mwd, flux= 6.04E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	3.72E+01	3.78E+01	3.85E+01	3.92E+01	3.99E+01	4.00E+01
pb206	2.00E-01	2.06E-01	2.11E-01	2.17E-01	2.23E-01	2.23E-01
pb207	1.29E-02	1.32E-02	1.35E-02	1.38E-02	1.42E-02	1.42E-02
pb208	5.75E-04	5.87E-04	6.00E-04	6.13E-04	6.26E-04	6.26E-04
pb209	9.34E-10	9.49E-10	9.65E-10	9.80E-10	9.94E-10	9.95E-10
pb210	2.86E-04	2.90E-04	2.94E-04	2.97E-04	3.01E-04	3.01E-04
pb211	5.09E-11	5.13E-11	5.18E-11	5.23E-11	5.28E-11	5.29E-11
pb212	3.39E-11	3.49E-11	3.53E-11	3.57E-11	3.60E-11	3.52E-11
pb214	6.55E-10	6.63E-10	6.71E-10	6.79E-10	6.87E-10	6.88E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	3.37E-02	3.48E-02	3.59E-02	3.71E-02	3.82E-02	3.82E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.76E-07	1.79E-07	1.81E-07	1.83E-07	1.85E-07	1.85E-07
bi211	3.02E-12	3.04E-12	3.07E-12	3.10E-12	3.13E-12	3.14E-12
bi212	3.21E-12	3.31E-12	3.35E-12	3.38E-12	3.42E-12	3.34E-12
bi213	2.18E-10	2.22E-10	2.25E-10	2.29E-10	2.32E-10	2.32E-10
bi214	4.86E-10	4.92E-10	4.98E-10	5.04E-10	5.10E-10	5.11E-10
po210	4.87E-06	4.93E-06	4.99E-06	5.05E-06	5.11E-06	5.12E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.34E-17	3.36E-17	3.39E-17	3.43E-17	3.46E-17	3.47E-17
po212	1.69E-22	1.74E-22	1.76E-22	1.78E-22	1.79E-22	1.75E-22
po213	3.28E-19	3.33E-19	3.39E-19	3.44E-19	3.49E-19	3.49E-19
po214	6.69E-17	6.77E-17	6.86E-17	6.94E-17	7.02E-17	7.02E-17
po215	4.18E-17	4.22E-17	4.26E-17	4.30E-17	4.34E-17	4.35E-17
po216	1.28E-16	1.32E-16	1.34E-16	1.35E-16	1.36E-16	1.33E-16
po218	7.57E-11	7.67E-11	7.76E-11	7.86E-11	7.95E-11	7.95E-11
rn218	1.18E-43	1.24E-28	1.25E-28	1.26E-28	1.28E-28	1.22E-43
rn219	9.31E-14	9.38E-14	9.47E-14	9.56E-14	9.65E-14	9.67E-14
rn220	4.91E-14	5.07E-14	5.12E-14	5.18E-14	5.23E-14	5.11E-14
rn222	1.35E-07	1.36E-07	1.38E-07	1.40E-07	1.41E-07	1.41E-07
ra222	1.27E-40	1.34E-25	1.36E-25	1.37E-25	1.39E-25	1.32E-40
ra223	2.32E-08	2.34E-08	2.36E-08	2.39E-08	2.41E-08	2.41E-08
ra224	2.79E-10	2.83E-10	2.91E-10	2.94E-10	2.97E-10	2.90E-10
ra225	1.02E-07	1.04E-07	1.05E-07	1.07E-07	1.09E-07	1.09E-07
ra226	2.06E-02	2.08E-02	2.11E-02	2.13E-02	2.16E-02	2.16E-02
ra228	9.97E-11	1.01E-10	1.03E-10	1.04E-10	1.06E-10	1.06E-10
ac225	6.89E-08	7.01E-08	7.12E-08	7.23E-08	7.34E-08	7.34E-08
ac227	1.61E-05	1.63E-05	1.64E-05	1.66E-05	1.67E-05	1.67E-05
ac228	1.22E-14	1.23E-14	1.25E-14	1.27E-14	1.29E-14	1.29E-14
th226	6.21E-39	6.56E-24	6.63E-24	6.70E-24	6.77E-24	6.46E-39
th227	3.75E-08	3.78E-08	3.82E-08	3.85E-08	3.89E-08	3.90E-08
th228	5.33E-08	5.51E-08	5.56E-08	5.62E-08	5.68E-08	5.54E-08
th229	1.98E-02	2.02E-02	2.05E-02	2.08E-02	2.11E-02	2.11E-02
th230	1.01E+00	1.03E+00	1.04E+00	1.05E+00	1.06E+00	1.06E+00
th231	2.73E-09	3.86E-09	3.87E-09	3.88E-09	3.89E-09	2.72E-09
th232	2.44E-01	2.47E-01	2.51E-01	2.54E-01	2.58E-01	2.58E-01

th233	5.46E-28	5.54E-13	5.62E-13	5.71E-13	5.79E-13	5.79E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.42E-02	2.45E-02	2.47E-02	2.50E-02	2.52E-02	2.52E-02
pa232	1.02E-25	1.03E-10	1.04E-10	1.05E-10	1.06E-10	1.06E-25

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sas2h: far-field crit based on bzu 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 175

power= 9.790E-04mw, burnup=2.1450E+04mwd, flux= 6.84E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.02E-36	6.35E-21	6.42E-21	6.49E-21	6.56E-21	6.26E-36
u231	9.60E-32	9.70E-17	9.82E-17	9.94E-17	1.01E-16	1.01E-31
u232	1.90E-06	2.01E-06	2.03E-06	2.05E-06	2.07E-06	1.97E-06
u233	5.19E-01	5.26E-01	5.32E-01	5.38E-01	5.44E-01	5.44E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.59E+02	6.58E+02	6.58E+02	6.57E+02	6.57E+02	6.57E+02
u236	1.90E+02	1.91E+02	1.91E+02	1.91E+02	1.91E+02	1.91E+02
u237	1.28E-12	8.14E-07	8.15E-07	8.16E-07	8.17E-07	1.27E-12
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.52E-23	7.51E-08	7.52E-08	7.52E-08	7.52E-08	7.53E-23
u240	6.63E-35	7.11E-35	7.61E-35	8.16E-35	8.69E-35	8.70E-35
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.16E-13	2.07E-12	2.07E-12	2.07E-12	2.07E-12	9.94E-14
np236m	4.92E-28	4.91E-13	4.91E-13	4.92E-13	4.92E-13	4.92E-28
np236	2.34E-06	2.36E-06	2.38E-06	2.40E-06	2.42E-06	2.42E-06
np237	4.08E+01	4.08E+01	4.08E+01	4.07E+01	4.07E+01	4.07E+01
np238	3.15E-14	3.44E-07	3.44E-07	3.44E-07	3.44E-07	3.18E-14
np239	2.01E-13	1.09E-05	1.09E-05	1.09E-05	1.09E-05	2.13E-13
np240m	5.66E-37	6.06E-37	6.49E-37	6.94E-37	7.42E-37	7.42E-37
np240	1.58E-38	5.40E-16	5.40E-16	5.41E-16	5.41E-16	1.83E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	9.62E-11	2.72E-10	2.72E-10	2.72E-10	2.72E-10	9.11E-11
pu237	8.49E-25	7.91E-14	7.93E-14	7.94E-14	7.96E-14	2.17E-25
pu238	5.31E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	5.30E-03
pu239	3.10E+01	3.10E+01	3.11E+01	3.11E+01	3.12E+01	3.12E+01
pu240	5.19E-01	5.20E-01	5.21E-01	5.22E-01	5.24E-01	5.23E-01
pu241	4.14E-05	5.15E-05	5.17E-05	5.18E-05	5.19E-05	4.13E-05
pu242	4.22E-05	4.28E-05	4.33E-05	4.39E-05	4.45E-05	4.45E-05
pu243	2.36E-29	2.20E-14	2.23E-14	2.26E-14	2.29E-14	2.51E-29
pu244	3.30E-24	3.54E-24	3.79E-24	4.05E-24	4.33E-24	4.33E-24
pu245	.00E+00	3.56E-35	3.81E-35	4.08E-35	4.36E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.03E-34	1.03E-19	1.04E-19	1.04E-19	1.04E-19	1.04E-34
am240	4.72E-32	4.72E-17	4.74E-17	4.75E-17	4.77E-17	4.77E-32
am241	1.52E-03	1.52E-03	1.53E-03	1.53E-03	1.54E-03	1.54E-03
am242m	1.70E-07	1.74E-07	1.75E-07	1.75E-07	1.76E-07	1.72E-07
am242	2.20E-12	1.39E-11	1.40E-11	1.40E-11	1.41E-11	2.22E-12
am243	2.29E-07	2.33E-07	2.37E-07	2.40E-07	2.44E-07	2.44E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	4.23E-31	4.29E-16	4.36E-16	4.43E-16	4.50E-16	4.50E-31
am245	1.19E-39	6.99E-36	7.48E-36	8.01E-36	8.56E-36	1.21E-39
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	1.91E-37	2.00E-22	2.01E-22	2.02E-22	2.02E-22	5.83E-38
cm242	4.46E-10	2.81E-09	2.82E-09	2.83E-09	2.84E-09	4.49E-10
cm243	1.41E-14	1.57E-14	1.58E-14	1.58E-14	1.59E-14	1.42E-14
cm244	5.59E-12	6.74E-12	6.85E-12	6.96E-12	7.08E-12	5.90E-12

```
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  176
       power= 9.790E-04mw, burnup=2.1450E+04mwd,  flux= 6.04E+07n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.46E-14  1.48E-14  1.51E-14  1.54E-14  1.56E-14  1.56E-14
     cm246   1.17E-16  1.19E-16  1.22E-16  1.24E-16  1.26E-16  1.26E-16
     cm247   5.50E-20  5.69E-20  5.89E-20  6.08E-20  6.29E-20  6.29E-20
     cm248   1.88E-22  2.09E-22  2.19E-22  2.31E-22  2.42E-22  2.42E-22
     cm249    .00E+00  1.60E-33  1.68E-33  1.77E-33  1.86E-33   .00E+00
     cm250   1.08E-37  1.15E-37  1.22E-37  1.30E-37  1.38E-37  1.38E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.04E+07  6.04E+07  6.04E+07  6.05E+07  6.05E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 20 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *          made from modified card-image origen-s libraries of scale 4.2     *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
```

```
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                     1697     total number of nuclides in library
                       689     number of light-element nuclides
                       129     number of actinide nuclides
                       879     number of fission product nuclides
0                     7993     number of nonzero off-diagonal matrix elements
0        ********************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  177
      power=    .00mw, burnup=  22344.mwd, flux= 6.05E+07n/cm**2-sec
0                                                  basis =
0   (note, k-infinities, &lad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
    productions   1.256850E+06  1.256228E+06  1.255605E+06  1.254980E+06  1.254355E+06  1.254355E+06
    absorptions   1.024347E+06  1.024127E+06  1.023905E+06  1.023683E+06  1.023460E+06  1.023460E+06
    k infinity    1.226977E+00  1.226633E+00  1.226290E+00  1.225946E+00  1.225602E+00  1.225602E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
    actinide
    absorptions   1.006195E+06  1.005896E+06  1.005597E+06  1.005296E+06  1.004996E+06  1.004996E+06
    non-actinide
    abs. fracs.   1.772010E-02  1.780099E-02  1.788104E-02  1.796150E-02  1.804131E-02  1.804131E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  178
0                                  fraction of total absorption rate
      power=    .00mw, burnup=  22344.mwd, flux= 6.05E+07n/cm**2-sec
0               initial ******* d ******* d ******* d ******* d ******* d
```

sm149	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.42E-03	5.42E-03
nd143	2.07E-03	2.09E-03	2.11E-03	2.13E-03	2.15E-03	2.15E-03
eu151	1.85E-03	1.86E-03	1.87E-03	1.88E-03	1.89E-03	1.89E-03
rh103	1.01E-03	1.02E-03	1.03E-03	1.04E-03	1.05E-03	1.05E-03
xe131	6.74E-04	6.81E-04	6.88E-04	6.95E-04	7.02E-04	7.02E-04
cs133	5.24E-04	5.30E-04	5.35E-04	5.41E-04	5.46E-04	5.46E-04
sm147	3.84E-04	3.88E-04	3.92E-04	3.96E-04	4.00E-04	4.00E-04
tc 99	3.54E-04	3.57E-04	3.60E-04	3.64E-04	3.67E-04	3.67E-04
nd145	2.96E-04	2.99E-04	3.02E-04	3.05E-04	3.08E-04	3.08E-04
sm152	2.31E-04	2.34E-04	2.37E-04	2.39E-04	2.42E-04	2.42E-04
gd155	2.25E-04	2.25E-04	2.25E-04	2.25E-04	2.25E-04	2.25E-04
mo 95	2.05E-04	2.07E-04	2.09E-04	2.12E-04	2.14E-04	2.14E-04
sm150	1.55E-04	1.57E-04	1.59E-04	1.61E-04	1.62E-04	1.62E-04
kr 83	1.26E-04	1.27E-04	1.29E-04	1.30E-04	1.31E-04	1.31E-04
cs135	1.19E-04	1.20E-04	1.21E-04	1.23E-04	1.24E-04	1.24E-04
cd113	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
eu153	9.47E-05	9.58E-05	9.69E-05	9.80E-05	9.92E-05	9.92E-05
ru101	9.24E-05	9.34E-05	9.44E-05	9.54E-05	9.64E-05	9.64E-05
pr141	8.86E-05	8.95E-05	9.05E-05	9.16E-05	9.23E-05	9.23E-05
la139	7.25E-05	7.32E-05	7.40E-05	7.48E-05	7.55E-05	7.55E-05
gd157	6.13E-05	6.13E-05	6.14E-05	6.14E-05	6.14E-05	6.14E-05
ag109	3.71E-05	3.76E-05	3.82E-05	3.87E-05	3.92E-05	3.92E-05
pd105	3.71E-05	3.75E-05	3.80E-05	3.84E-05	3.88E-05	3.88E-05
ba137	3.51E-05	3.54E-05	3.58E-05	3.62E-05	3.66E-05	3.66E-05
zr 93	2.84E-05	2.87E-05	2.90E-05	2.93E-05	2.96E-05	2.96E-05
i129	2.37E-05	2.40E-05	2.43E-05	2.45E-05	2.48E-05	2.48E-05
nd144	2.24E-05	2.27E-05	2.29E-05	2.32E-05	2.34E-05	2.34E-05
gd152	1.86E-05	1.89E-05	1.93E-05	1.96E-05	1.99E-05	1.99E-05
mo 97	1.65E-05	1.66E-05	1.68E-05	1.70E-05	1.72E-05	1.72E-05
sm151	1.27E-05	1.32E-05	1.32E-05	1.32E-05	1.33E-05	1.33E-05
pd108	8.95E-06	9.07E-06	9.19E-06	9.31E-06	9.43E-06	9.43E-06
zr 91	7.56E-06	7.64E-06	7.72E-06	7.80E-06	7.88E-06	7.88E-06
y 89	7.23E-06	7.30E-06	7.38E-06	7.46E-06	7.53E-06	7.53E-06

ru102	6.89E-06	6.97E-06	7.04E-06	7.11E-06	7.19E-06	7.19E-06
ce142	6.04E-06	6.10E-06	6.16E-06	6.23E-06	6.29E-06	6.29E-06
nd148	5.82E-06	5.88E-06	5.94E-06	6.00E-06	6.06E-06	6.06E-06
ru 99	4.94E-06	5.05E-06	5.17E-06	5.29E-06	5.41E-06	5.41E-06
nd146	4.90E-06	4.96E-06	5.01E-06	5.06E-06	5.11E-06	5.11E-06
pd107	4.51E-06	4.56E-06	4.62E-06	4.68E-06	4.74E-06	4.74E-06
in115	4.31E-06	4.36E-06	4.41E-06	4.45E-06	4.50E-06	4.50E-06
ba138	4.17E-06	4.22E-06	4.26E-06	4.31E-06	4.35E-06	4.35E-06
ce140	3.91E-06	3.95E-06	3.99E-06	4.03E-06	4.07E-06	4.07E-06
xe132	3.59E-06	3.63E-06	3.67E-06	3.71E-06	3.75E-06	3.75E-06
mo 98	2.40E-06	2.43E-06	2.45E-06	2.48E-06	2.51E-06	2.51E-06
mo100	2.34E-06	2.37E-06	2.39E-06	2.42E-06	2.44E-06	2.44E-06
xe134	2.31E-06	2.33E-06	2.36E-06	2.38E-06	2.41E-06	2.41E-06
zr 92	1.83E-06	1.85E-06	1.87E-06	1.89E-06	1.91E-06	1.91E-06
i127	1.74E-06	1.76E-06	1.78E-06	1.80E-06	1.82E-06	1.82E-06
ru104	1.59E-06	1.61E-06	1.63E-06	1.64E-06	1.66E-06	1.66E-06

1 sas2h: far-field crit based on b2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 179
0 fraction of total absorption rate
power= .00mw, burnup= 22344.mwd, flux= 6.05E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.46E-06	1.46E-06	1.47E-06	1.49E-06	1.50E-06	1.50E-06
nd150	1.32E-06	1.33E-06	1.35E-06	1.36E-06	1.37E-06	1.37E-06
xe136	1.25E-06	1.27E-06	1.28E-06	1.29E-06	1.31E-06	1.31E-06
cd111	1.01E-06	1.03E-06	1.04E-06	1.05E-06	1.06E-06	1.06E-06
gd154	8.91E-07	9.11E-07	9.31E-07	9.51E-07	9.72E-07	9.72E-07
br 81	9.27E-07	9.37E-07	9.47E-07	9.57E-07	9.67E-07	9.67E-07
rb 85	8.87E-07	8.97E-07	9.06E-07	9.15E-07	9.25E-07	9.25E-07
zr 94	7.76E-07	7.84E-07	7.92E-07	8.00E-07	8.09E-07	8.09E-07
zr 90	7.13E-07	7.20E-07	7.28E-07	7.35E-07	7.42E-07	7.42E-07
sm154	6.21E-07	6.28E-07	6.35E-07	6.42E-07	6.49E-07	6.49E-07
te130	5.78E-07	5.85E-07	5.91E-07	5.97E-07	6.03E-07	6.03E-07
xe135	.00E+00	5.67E-07	5.67E-07	5.67E-07	5.68E-07	5.68E-07
ba135	5.01E-07	5.13E-07	5.25E-07	5.38E-07	5.50E-07	5.50E-07
rb 87	5.11E-07	5.14E-07	5.21E-07	5.27E-07	5.32E-07	5.32E-07
pd106	3.81E-07	3.85E-07	3.90E-07	3.95E-07	3.99E-07	3.99E-07
se 77	3.74E-07	3.77E-07	3.81E-07	3.85E-07	3.89E-07	3.89E-07
gd156	3.62E-07	3.67E-07	3.71E-07	3.76E-07	3.80E-07	3.80E-07
ru100	2.43E-07	2.48E-07	2.53E-07	2.58E-07	2.63E-07	2.63E-07
kr 84	2.44E-07	2.46E-07	2.49E-07	2.51E-07	2.54E-07	2.54E-07
dy161	2.23E-07	2.25E-07	2.28E-07	2.31E-07	2.34E-07	2.34E-07
sb121	1.99E-07	2.01E-07	2.03E-07	2.05E-07	2.08E-07	2.08E-07
nd142	1.78E-07	1.82E-07	1.86E-07	1.90E-07	1.93E-07	1.93E-07
se 79	1.84E-07	1.86E-07	1.87E-07	1.89E-07	1.91E-07	1.91E-07
ba134	1.70E-07	1.74E-07	1.77E-07	1.81E-07	1.85E-07	1.85E-07
sm148	1.55E-07	1.58E-07	1.62E-07	1.65E-07	1.68E-07	1.68E-07
sb123	1.61E-07	1.62E-07	1.64E-07	1.66E-07	1.68E-07	1.68E-07
kr 86	1.35E-07	1.37E-07	1.38E-07	1.39E-07	1.41E-07	1.41E-07
te128	1.31E-07	1.32E-07	1.34E-07	1.35E-07	1.37E-07	1.37E-07
pd104	1.17E-07	1.19E-07	1.22E-07	1.25E-07	1.27E-07	1.27E-07
eu152	9.31E-08	1.20E-07	1.20E-07	1.21E-07	1.22E-07	1.22E-07
tb159	9.62E-08	9.75E-08	9.87E-08	9.99E-08	1.01E-07	1.01E-07
se 80	8.95E-08	9.05E-08	9.14E-08	9.24E-08	9.33E-08	9.33E-08
te125	8.91E-08	9.01E-08	9.11E-08	9.21E-08	9.31E-08	9.31E-08
nb 93	7.97E-08	8.16E-08	8.35E-08	8.55E-08	8.74E-08	8.74E-08
gd158	7.60E-08	7.70E-08	7.79E-08	7.89E-08	7.99E-08	7.99E-08
cd112	6.87E-08	6.95E-08	7.04E-08	7.12E-08	7.20E-08	7.20E-08
pm147	1.89E-08	6.55E-08	6.55E-08	6.55E-08	6.56E-08	6.56E-08
dy162	5.09E-08	5.17E-08	5.25E-08	5.33E-08	5.40E-08	5.40E-08
dy164	5.00E-08	5.06E-08	5.13E-08	5.19E-08	5.26E-08	5.26E-08

sn117	4.85E-08	4.90E-08	4.96E-08	5.01E-08	5.07E-08	5.07E-08
li 6	4.64E-08	4.68E-08	4.73E-08	4.77E-08	4.82E-08	4.82E-08
eu155	2.27E-08	4.59E-08	4.60E-08	4.60E-08	4.60E-08	4.60E-08
cd110	4.16E-08	4.26E-08	4.37E-08	4.48E-08	4.59E-08	4.59E-08
br 79	3.97E-08	4.06E-08	4.16E-08	4.25E-08	4.35E-08	4.35E-08
cd114	4.12E-08	4.17E-08	4.22E-08	4.27E-08	4.31E-08	4.31E-08
mo 96	3.89E-08	3.97E-08	4.05E-08	4.13E-08	4.22E-08	4.22E-08
ag107	3.80E-08	3.90E-08	4.00E-08	4.11E-08	4.21E-08	4.21E-08
sn119	3.69E-08	3.73E-08	3.77E-08	3.81E-08	3.85E-08	3.85E-08
pd110	3.39E-08	3.43E-08	3.48E-08	3.52E-08	3.56E-08	3.56E-08

1 sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 | fission products page 180
0 fraction of total absorption rate
0 power= .00mw, burnup= 22344.mwd, flux= 4.05E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

sn115	3.38E-08	3.41E-08	3.45E-08	3.49E-08	3.52E-08	3.52E-08
xe129	2.41E-08	2.46E-08	2.52E-08	2.58E-08	2.64E-08	2.64E-08
sr 88	2.48E-08	2.51E-08	2.53E-08	2.56E-08	2.59E-08	2.59E-08
xe130	1.91E-08	1.95E-08	1.99E-08	2.03E-08	2.07E-08	2.07E-08
ba136	1.66E-08	1.69E-08	1.72E-08	1.75E-08	1.78E-08	1.78E-08
se 82	1.71E-08	1.72E-08	1.74E-08	1.76E-08	1.78E-08	1.78E-08
sn126	1.47E-08	1.49E-08	1.50E-08	1.51E-08	1.53E-08	1.53E-08
te126	1.34E-08	1.37E-08	1.40E-08	1.43E-08	1.47E-08	1.47E-08
se 78	1.34E-08	1.35E-08	1.37E-08	1.38E-08	1.40E-08	1.40E-08
dy163	1.28E-08	1.29E-08	1.31E-08	1.33E-08	1.35E-08	1.35E-08
kr 82	1.23E-08	1.25E-08	1.27E-08	1.30E-08	1.32E-08	1.32E-08
sn124	1.17E-08	1.19E-08	1.20E-08	1.21E-08	1.23E-08	1.23E-08
eu154	6.84E-09	1.02E-08	1.03E-08	1.04E-08	1.05E-08	1.05E-08
as 75	7.87E-09	7.95E-09	8.04E-09	8.12E-09	8.20E-09	8.20E-09
in113	6.73E-09	6.81E-09	6.88E-09	6.96E-09	7.03E-09	7.03E-09
sn118	4.74E-09	4.79E-09	4.84E-09	4.90E-09	4.95E-09	4.95E-09
sn122	4.06E-09	4.11E-09	4.16E-09	4.20E-09	4.25E-09	4.25E-09
cd116	3.98E-09	4.02E-09	4.07E-09	4.11E-09	4.16E-09	4.16E-09
sr 90	3.53E-09	3.96E-09	3.96E-09	3.96E-09	3.96E-09	3.96E-09
sn120	2.99E-09	3.03E-09	3.06E-09	3.09E-09	3.13E-09	3.13E-09
rh105	.00E+00	2.66E-09	2.66E-09	2.66E-09	2.66E-09	2.66E-09
ge 73	2.25E-09	2.28E-09	2.30E-09	2.33E-09	2.35E-09	2.35E-09
ho165	1.23E-09	1.25E-09	1.27E-09	1.29E-09	1.32E-09	1.32E-09
dy160	1.15E-09	1.18E-09	1.20E-09	1.23E-09	1.26E-09	1.26E-09
gd160	1.07E-09	1.09E-09	1.10E-09	1.11E-09	1.13E-09	1.13E-09
cs134	1.94E-10	9.67E-10	9.78E-10	9.89E-10	9.99E-10	9.99E-10
cs137	8.20E-10	9.16E-10	9.16E-10	9.16E-10	9.16E-10	9.16E-10
ge 76	7.66E-10	7.74E-10	7.82E-10	7.90E-10	7.98E-10	7.98E-10
xe128	6.79E-10	6.94E-10	7.09E-10	7.24E-10	7.39E-10	7.39E-10
pr143	.00E+00	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10
xe133	.00E+00	4.92E-10	4.92E-10	4.92E-10	4.92E-10	4.92E-10
ce141	.00E+00	3.86E-10	3.86E-10	3.86E-10	3.86E-10	3.86E-10
sr 86	3.23E-10	3.30E-10	3.36E-10	3.43E-10	3.50E-10	3.50E-10
sn116	2.58E-10	2.66E-10	2.70E-10	2.75E-10	2.81E-10	2.81E-10
te124	2.38E-10	2.42E-10	2.46E-10	2.50E-10	2.54E-10	2.54E-10
pm149	.00E+00	2.40E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10
nd147	.00E+00	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10
ce144	2.09E-12	1.42E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10
nb 94	1.27E-10	1.30E-10	1.34E-10	1.37E-10	1.40E-10	1.40E-10
kr 85	9.83E-11	1.34E-10	1.34E-10	1.34E-10	1.34E-10	1.34E-10
sr 87	1.16E-10	1.17E-10	1.19E-10	1.20E-10	1.22E-10	1.22E-10
te122	1.08E-10	1.11E-10	1.13E-10	1.16E-10	1.18E-10	1.18E-10
se 76	9.08E-11	9.25E-11	9.43E-11	9.61E-11	9.79E-11	9.79E-11
ru103	.00E+00	9.48E-11	9.48E-11	9.48E-11	9.49E-11	9.49E-11
er166	3.94E-11	6.04E-11	6.13E-11	6.23E-11	6.32E-11	6.32E-11

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     ge 74     4.91E-11  4.56E-11  4.60E-11  4.65E-11  4.70E-11  4.70E-11
     kr 80     4.07E-11  4.21E-11  4.35E-11  4.50E-11  4.65E-11  4.65E-11
     zr 95     2.72E-19  3.90E-11  3.91E-11  3.91E-11  3.91E-11  3.91E-11
     nb 95     5.58E-19  3.63E-11  3.63E-11  3.63E-11  3.63E-11  3.63E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  181
0                                  fraction of total absorption rate
          power=     .00mw, burnup= 22344.mwd, flux= 6.05E+07n/cm**2-sec
0               initial ******* d ******* d ******* d ******* d ******* d

     ge 72     3.33E-11  3.37E-11  3.40E-11  3.44E-11  3.48E-11  3.48E-11
      y 91     4.88E-20  3.34E-11  3.34E-11  3.34E-11  3.34E-11  3.34E-11
     pm151      .00E+00  2.84E-11  2.84E-11  2.84E-11  2.84E-11  2.84E-11
     sm153      .00E+00  1.27E-11  1.27E-11  1.27E-11  1.28E-11  1.28E-11
     eu156      .00E+00  1.27E-11  1.27E-11  1.28E-11  1.28E-11  1.28E-11
     ba140      .00E+00  1.14E-11  1.14E-11  1.14E-11  1.14E-11  1.14E-11
     ru106     3.88E-13  9.89E-12  9.90E-12  9.91E-12  9.92E-12  9.92E-12
     er167     6.44E-12  6.61E-12  6.78E-12  6.95E-12  7.13E-12  7.13E-12
     sr 89      .00E+00  7.11E-12  7.11E-12  7.11E-12  7.11E-12  7.11E-12
     te123     4.90E-12  5.05E-12  5.21E-12  5.36E-12  5.53E-12  5.53E-12
     kr 87      .00E+00  5.34E-12  5.34E-12  5.34E-12  5.34E-12  5.34E-12
     sb125     1.31E-12  4.35E-12  4.36E-12  4.36E-12  4.36E-12  4.36E-12
     ce143      .00E+00  4.16E-12  4.16E-12  4.16E-12  4.16E-12  4.16E-12
      y 90     3.36E-12  3.77E-12  3.78E-12  3.78E-12  3.78E-12  3.78E-12
     la140      .00E+00  3.67E-12  3.67E-12  3.67E-12  3.67E-12  3.67E-12
     cd108     2.81E-12  2.92E-12  3.03E-12  3.15E-12  3.27E-12  3.27E-12
     mo 99      .00E+00  3.18E-12  3.18E-12  3.18E-12  3.18E-12  3.18E-12
     te127m    3.69E-17  2.21E-12  2.21E-12  2.21E-12  2.22E-12  2.22E-12
      i131      .00E+00  1.68E-12  1.68E-12  1.68E-12  1.68E-12  1.68E-12
     pm148m     .00E+00  7.28E-13  7.29E-13  7.30E-13  7.31E-13  7.31E-13
     te129m     .00E+00  4.71E-13  4.71E-13  4.71E-13  4.71E-13  4.71E-13
     ag111      .00E+00  1.51E-13  1.52E-13  1.52E-13  1.52E-13  1.52E-13
     eu157      .00E+00  1.24E-13  1.24E-13  1.24E-13  1.24E-13  1.24E-13
     be  9     9.44E-14  9.74E-14  9.84E-14  9.94E-14  1.00E-13  1.00E-13
     cs136      .00E+00  8.90E-14  8.97E-14  9.05E-14  9.12E-14  9.12E-14
     sn114     6.80E-14  6.95E-14  7.11E-14  7.26E-14  7.42E-14  7.42E-14
     cd115m     .00E+00  6.74E-14  6.75E-14  6.75E-14  6.76E-14  6.76E-14
     tb160      .00E+00  5.78E-14  5.86E-14  5.93E-14  6.00E-14  6.00E-14
     li  7     3.95E-14  3.99E-14  4.04E-14  4.08E-14  4.12E-14  4.12E-14
     pr142      .00E+00  2.49E-14  2.52E-14  2.54E-14  2.57E-14  2.57E-14
     pm148      .00E+00  2.37E-14  2.37E-14  2.38E-14  2.38E-14  2.38E-14
     sb126     1.69E-14  1.87E-14  1.88E-14  1.90E-14  1.91E-14  1.91E-14
     ru105      .00E+00  9.33E-15  9.34E-15  9.35E-15  9.36E-15  9.36E-15
     sn125      .00E+00  7.97E-15  7.97E-15  7.98E-15  7.98E-15  7.98E-15
      i130      .00E+00  4.38E-15  4.43E-15  4.47E-15  4.52E-15  4.52E-15
     rb 88      .00E+00  3.00E-15  3.00E-15  3.00E-15  3.00E-15  3.00E-15
     sn123     2.31E-19  2.58E-15  2.58E-15  2.58E-15  2.58E-15  2.58E-15
      i135      .00E+00  2.47E-15  2.47E-15  2.48E-15  2.48E-15  2.48E-15
     te132      .00E+00  2.36E-15  2.36E-15  2.36E-15  2.36E-15  2.36E-15
     sb124      .00E+00  2.19E-15  2.20E-15  2.22E-15  2.24E-15  2.24E-15
     rb 86      .00E+00  1.45E-15  1.47E-15  1.48E-15  1.50E-15  1.50E-15
     te134      .00E+00  1.39E-15  1.39E-15  1.39E-15  1.39E-15  1.39E-15
     dy165      .00E+00  7.14E-16  7.20E-16  7.25E-16  7.30E-16  7.30E-16
     in117m     .00E+00  6.54E-16  6.55E-16  6.55E-16  6.56E-16  6.56E-16
     in117      .00E+00  1.96E-16  1.96E-16  1.96E-16  1.96E-16  1.96E-16
     cs134m     .00E+00  1.83E-16  1.85E-16  1.87E-16  1.89E-16  1.89E-16
     cd118      .00E+00  3.41E-17  3.41E-17  3.41E-17  3.42E-17  3.42E-17
     cd109     2.12E-18  2.95E-17  3.06E-17  3.17E-17  3.28E-17  3.28E-17
     ge 75      .00E+00  2.12E-17  2.13E-17  2.13E-17  2.13E-17  2.13E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  182
0                                  fraction of total absorption rate
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        power=     .00mw, burnup=  22344.mwd, flux= 6.05E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d

    ag110       .00E+00  1.22E-17  1.23E-17  1.25E-17  1.27E-17  1.27E-17
    in119m      .00E+00  8.34E-18  8.34E-18  8.35E-18  8.36E-18  8.36E-18
    in119       .00E+00  6.81E-19  6.81E-19  6.81E-19  6.81E-19  6.81E-19
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page  183
      power= 9.790E-04mw, burnup=2.2344E+04mwd, flux= 6.05E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     h  1    1.28E-03  1.29E-03  1.30E-03  1.32E-03  1.33E-03  1.33E-03
     h  2    3.82E-06  3.86E-06  3.90E-06  3.94E-06  3.98E-06  3.98E-06
     h  3    1.11E-11  1.45E-11  1.45E-11  1.46E-11  1.46E-11  1.46E-11
     h  4     .00E+00  1.45E-35  1.45E-35  1.46E-35  1.46E-35  1.46E-35
    he  3    1.72E-08  1.73E-08  1.73E-08  1.74E-08  1.75E-08  1.75E-08
    he  4    2.12E-04  2.14E-04  2.16E-04  2.19E-04  2.21E-04  2.21E-04
    he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20    2.54E-05  2.57E-05  2.60E-05  2.63E-05  2.65E-05  2.65E-05
    ne 21    9.88E-09  1.01E-08  1.03E-08  1.05E-08  1.07E-08  1.07E-08
    ne 22    1.68E-07  1.69E-07  1.71E-07  1.73E-07  1.75E-07  1.75E-07
    ne 23    1.78E-30  1.78E-15  1.78E-15  1.78E-15  1.78E-15  1.78E-15
    na 22    2.98E-12  1.06E-11  1.06E-11  1.06E-11  1.06E-11  1.06E-11
    na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24    6.44E-24  6.44E-09  6.44E-09  6.45E-09  6.45E-09  6.45E-09
    na 24m   1.06E-30  1.06E-15  1.06E-15  1.06E-15  1.06E-15  1.06E-15
    na 25    7.15E-39  7.29E-24  7.44E-24  7.59E-24  7.75E-24  7.75E-24
    mg 24    1.65E-01  1.67E-01  1.68E-01  1.70E-01  1.72E-01  1.72E-01
    mg 25    1.02E-06  1.04E-06  1.06E-06  1.09E-06  1.11E-06  1.11E-06
    mg 26    3.81E-06  3.85E-06  3.89E-06  3.93E-06  3.97E-06  3.97E-06
    mg 27    5.31E-28  5.31E-13  5.31E-13  5.31E-13  5.31E-13  5.31E-13
    mg 28     .00E+00  2.66E-25  2.66E-25  2.67E-25  2.67E-25  2.67E-25
    al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
    al 28    4.78E-26  4.77E-11  4.78E-11  4.78E-11  4.78E-11  4.78E-11
    al 29    5.81E-37  5.93E-22  6.05E-22  6.17E-22  6.30E-22  6.30E-22
    al 30     .00E+00  1.65E-31  1.70E-31  1.75E-31  1.81E-31  1.81E-31
    si 28    4.80E-01  4.85E-01  4.90E-01  4.95E-01  5.00E-01  5.00E-01
    si 29    9.28E-06  9.47E-06  9.67E-06  9.86E-06  1.01E-05  1.01E-05
    si 30    1.91E-10  1.97E-10  2.04E-10  2.10E-10  2.16E-10  2.16E-10
    si 31    3.38E-38  3.48E-23  3.59E-23  3.70E-23  3.82E-23  3.82E-23
    si 32    1.42E-29  1.49E-29  1.54E-29  1.59E-29  1.64E-29  1.64E-29
  totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                6.05E+07  6.05E+07  6.05E+07  6.06E+07  6.06E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page  184
      power= 9.790E-04mw, burnup=2.2344E+04mwd, flux= 6.05E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
    he  4    4.00E+01  4.07E+01  4.14E+01  4.21E+01  4.28E+01  4.28E+01
    pb206    2.23E-01  2.29E-01  2.35E-01  2.41E-01  2.47E-01  2.47E-01
    pb207    1.42E-02  1.45E-02  1.48E-02  1.52E-02  1.55E-02  1.55E-02
    pb208    6.26E-04  6.39E-04  6.52E-04  6.65E-04  6.78E-04  6.78E-04
    pb209    9.95E-10  1.01E-09  1.02E-09  1.04E-09  1.05E-09  1.05E-09
    pb210    3.01E-04  3.04E-04  3.08E-04  3.11E-04  3.15E-04  3.15E-04
    pb211    5.29E-11  5.33E-11  5.38E-11  5.43E-11  5.47E-11  5.47E-11
    pb212    3.52E-11  3.64E-11  3.67E-11  3.71E-11  3.74E-11  3.74E-11
    pb214    6.88E-10  6.96E-10  7.04E-10  7.12E-10  7.20E-10  7.20E-10
    bi208     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
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bi209	3.82E-02	3.94E-02	4.06E-02	4.18E-02	4.30E-02	4.30E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.85E-07	1.87E-07	1.90E-07	1.92E-07	1.94E-07	1.94E-07
bi211	3.14E-12	3.16E-12	3.19E-12	3.22E-12	3.25E-12	3.25E-12
bi212	3.34E-12	3.45E-12	3.48E-12	3.52E-12	3.55E-12	3.55E-12
bi213	2.32E-10	2.36E-10	2.39E-10	2.43E-10	2.46E-10	2.46E-10
bi214	5.11E-10	5.17E-10	5.23E-10	5.28E-10	5.34E-10	5.34E-10
po210	5.12E-06	5.17E-06	5.23E-06	5.29E-06	5.35E-06	5.35E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.47E-17	3.49E-17	3.52E-17	3.55E-17	3.59E-17	3.59E-17
po212	1.75E-22	1.81E-22	1.83E-22	1.85E-22	1.86E-22	1.86E-22
po213	3.69E-19	3.54E-19	3.60E-19	3.65E-19	3.70E-19	3.70E-19
po214	7.02E-17	7.11E-17	7.19E-17	7.27E-17	7.35E-17	7.35E-17
po215	4.35E-17	4.38E-17	4.42E-17	4.46E-17	4.50E-17	4.50E-17
po216	1.33E-16	1.38E-16	1.39E-16	1.40E-16	1.42E-16	1.42E-16
po218	7.95E-11	8.05E-11	8.14E-11	8.23E-11	8.33E-11	8.33E-11
rn218	1.22E-43	1.29E-28	1.30E-28	1.32E-28	1.33E-28	1.33E-28
rn219	9.67E-14	9.74E-14	9.83E-14	9.92E-14	1.00E-13	1.00E-13
rn220	5.11E-16	5.28E-14	5.33E-14	5.38E-14	5.43E-14	5.43E-14
rn222	1.41E-07	1.43E-07	1.45E-07	1.46E-07	1.48E-07	1.48E-07
ra222	1.32E-40	1.40E-25	1.41E-25	1.43E-25	1.44E-25	1.44E-25
ra223	2.41E-08	2.43E-08	2.45E-08	2.47E-08	2.50E-08	2.50E-08
ra224	2.90E-10	3.00E-10	3.03E-10	3.06E-10	3.09E-10	3.09E-10
ra225	1.09E-07	1.10E-07	1.12E-07	1.14E-07	1.15E-07	1.15E-07
ra226	2.16E-02	2.18E-02	2.21E-02	2.24E-02	2.26E-02	2.26E-02
ra228	1.06E-10	1.07E-10	1.08E-10	1.10E-10	1.11E-10	1.11E-10
ac225	7.34E-08	7.45E-08	7.56E-08	7.67E-08	7.78E-08	7.78E-08
ac227	1.67E-05	1.69E-05	1.71E-05	1.72E-05	1.74E-05	1.74E-05
ac228	1.29E-14	1.31E-14	1.32E-14	1.34E-14	1.36E-14	1.36E-14
th226	6.46E-39	6.83E-24	6.90E-24	6.97E-24	7.04E-24	7.04E-24
th227	3.90E-08	3.92E-08	3.96E-08	4.00E-08	4.03E-08	4.03E-08
th228	5.54E-08	5.73E-08	5.79E-08	5.84E-08	5.90E-08	5.90E-08
th229	2.11E-02	2.14E-02	2.18E-02	2.21E-02	2.24E-02	2.24E-02
th230	1.06E+00	1.07E+00	1.09E+00	1.10E+00	1.11E+00	1.11E+00
th231	2.72E-09	3.91E-09	3.92E-09	3.93E-09	3.94E-09	3.94E-09
th232	2.58E-01	2.61E-01	2.65E-01	2.69E-01	2.72E-01	2.72E-01
th233	5.79E-28	5.87E-13	5.95E-13	6.04E-13	6.12E-13	6.12E-13
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.52E-02	2.54E-02	2.57E-02	2.59E-02	2.61E-02	2.61E-02
pa232	1.06E-25	1.07E-10	1.08E-10	1.09E-10	1.10E-10	1.10E-10

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 185

power= 9.790E-04mw, burnup=2.2344E+04mwd, flux= 6.05E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.26E-36	6.62E-21	6.69E-21	6.75E-21	6.82E-21	6.82E-21
u231	1.01E-31	1.02E-16	1.03E-16	1.04E-16	1.05E-16	1.05E-16
u232	1.97E-06	2.09E-06	2.11E-06	2.13E-06	2.15E-06	2.15E-06
u233	5.44E-01	5.50E-01	5.56E-01	5.62E-01	5.68E-01	5.68E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.57E+02	6.56E+02	6.56E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.91E+02	1.91E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02
u237	1.27E-12	8.17E-07	8.19E-07	8.20E-07	8.21E-07	8.21E-07
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.53E-23	7.52E-08	7.53E-08	7.53E-08	7.53E-08	7.53E-08

```
      u240   8.70E-35  9.28E-35  9.89E-35  1.05E-34  1.12E-34  1.12E-34
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   9.94E-14  2.07E-12  2.07E-12  2.07E-12  2.07E-12  2.07E-12
    np236m   4.92E-28  4.91E-13  4.91E-13  4.91E-13  4.91E-13  4.91E-13
     np236   2.42E-06  2.44E-06  2.46E-06  2.48E-06  2.50E-06  2.50E-06
     np237   4.07E+01  4.07E+01  4.07E+01  4.07E+01  4.07E+01  4.07E+01
     np238   3.18E-14  3.44E-07  3.44E-07  3.44E-07  3.44E-07  3.44E-07
     np239   2.13E-13  1.09E-05  1.09E-05  1.09E-05  1.09E-05  1.09E-05
    np240m   7.42E-37  7.92E-37  8.44E-37  8.99E-37  9.56E-37  9.56E-37
     np240   1.83E-38  5.42E-16  5.42E-16  5.43E-16  5.43E-16  5.43E-16
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   9.11E-11  2.72E-10  2.72E-10  2.72E-10  2.72E-10  2.72E-10
     pu237   2.17E-25  7.97E-14  7.99E-14  8.00E-14  8.02E-14  8.02E-14
     pu238   5.30E-03  5.50E-03  5.50E-03  5.51E-03  5.51E-03  5.51E-03
     pu239   3.12E+01  3.12E+01  3.13E+01  3.13E+01  3.14E+01  3.14E+01
     pu240   5.23E-01  5.24E-01  5.25E-01  5.26E-01  5.28E-01  5.28E-01
     pu241   4.13E-05  5.20E-05  5.21E-05  5.23E-05  5.24E-05  5.24E-05
     pu242   4.45E-05  4.51E-05  4.56E-05  4.62E-05  4.68E-05  4.68E-05
     pu243   2.51E-29  2.32E-14  2.35E-14  2.38E-14  2.41E-14  2.41E-14
     pu244   4.33E-24  4.62E-24  4.93E-24  5.26E-24  5.58E-24  5.58E-24
     pu245    .00E+00  4.65E-35  4.96E-35  5.29E-35  5.63E-35  5.63E-35
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.04E-34  1.04E-19  1.03E-19  1.05E-19  1.05E-19  1.05E-19
     am240   4.77E-32  4.76E-17  4.79E-17  4.80E-17  4.82E-17  4.82E-17
     am241   1.54E-03  1.53E-03  1.54E-03  1.55E-03  1.55E-03  1.55E-03
    am242m   1.72E-07  1.75E-07  1.76E-07  1.77E-07  1.78E-07  1.78E-07
     am242   2.22E-12  1.40E-11  1.41E-11  1.42E-11  1.42E-11  1.42E-11
     am243   2.44E-07  2.48E-07  2.51E-07  2.55E-07  2.59E-07  2.59E-07
    am244m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   4.50E-31  4.57E-16  4.64E-16  4.71E-16  4.79E-16  4.79E-16
     am245   1.21E-39  9.14E-36  9.74E-36  1.04E-35  1.10E-35  1.10E-35
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.83E-38  2.02E-22  2.03E-22  2.04E-22  2.05E-22  2.05E-22
     cm242   4.49E-10  2.84E-09  2.85E-09  2.86E-09  2.87E-09  2.87E-09
     cm243   1.42E-14  1.59E-14  1.60E-14  1.60E-14  1.61E-14  1.61E-14
     cm244   5.90E-12  7.18E-12  7.29E-12  7.40E-12  7.52E-12  7.52E-12
1
     ses2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  186
       power= 9.790E-04mw, burnup=2.2344E+04mwd  flux= 6.05E+07n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.56E-14  1.59E-14  1.62E-14  1.64E-14  1.67E-14  1.67E-14
     cm246   1.26E-16  1.29E-16  1.31E-16  1.33E-16  1.36E-16  1.36E-16
     cm247   6.29E-20  6.49E-20  6.70E-20  6.92E-20  7.13E-20  7.13E-20
     cm248   2.42E-22  2.54E-22  2.67E-22  2.80E-22  2.93E-22  2.93E-22
     cm249    .00E+00  1.93E-33  2.05E-33  2.15E-33  2.25E-33  2.25E-33
     cm250   1.38E-37  1.47E-37  1.56E-37  1.65E-37  1.75E-37  1.75E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               6.05E+07  6.05E+07  6.05E+07  6.06E+07  6.06E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 21 of library on unit 33.
```

```
        pass   1
        pass   0
        *scale-system control module sas2 library*
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        *scale-system control module sas2 library*
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ************************************************************************
        *                                                                      *
        *            prelim lwr origen-s binary working library--id = 1143     *
        *         made from modified card-image origen-s libraries of scale 4.2 *
        *      data from the light element, actinide, and fission product libraries *
        *        decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                      *
        *      neutron flux spectrum factors and cross sections were produced from *
        *     the "prepsas2" case updating all nuclides on the scale "burnup" library *
        *                                                                      *
        *                  fission product yields are from endf/b-v            *
        *                                                                      *
        *              photon libraries use an 18-energy-group structure       *
        *             the photon data are from the master photon data base,    *
        *              produced to include bremsstrahlung from uo2 matrix      *
        *                                                                      *
        *        see information above this box (if present) for later updates *
        *                                                                      *
        ************************************************************************
        *                                                                      *
0       ************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                 1697      total number of nuclides in library
                   689      number of light-element nuclides
                   129      number of actinide nuclides
                   879      number of fission product nuclides
0                 7993      number of nonzero off-diagonal matrix elements
0       ************************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  187
       power=    .00mw, burnup=  22791.mwd, flux= 2.94E+07n/cm**2-sec
0                                                  basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
    productions   1.292597E+06  1.291740E+06  1.290894E+06  1.290058E+06  1.289232E+06  1.289224E+06
    absorptions   1.050823E+06  1.050404E+06  1.049996E+06  1.049592E+06  1.049194E+06  1.049188E+06
    k infinity    1.230081E+00  1.229756E+00  1.229428E+00  1.229104E+00  1.228783E+00  1.228782E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
    actinide
    absorptions   1.031996E+06  1.031525E+06  1.031063E+06  1.030608E+06  1.030158E+06  1.030153E+06
    non-actinide
    abs. fracs.   1.791602E-02  1.797271E-02  1.803118E-02  1.808763E-02  1.814312E-02  1.814258E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  188
0                                  fraction of total absorption rate
```

```
0          power=    .00mw, burnup=  22791.mwd, flux= 2.94E+07n/cm**2-sec
                initial *******d *******d *******d *******d *******d
```

sm149	5.27E-03	5.28E-03	5.30E-03	5.31E-03	5.32E-03	5.32E-03
nd143	2.16E-03	2.17E-03	2.18E-03	2.19E-03	2.20E-03	2.20E-03
eu151	1.89E-03	1.90E-03	1.91E-03	1.91E-03	1.91E-03	1.92E-03
rh103	1.05E-03	1.06E-03	1.06E-03	1.07E-03	1.07E-03	1.07E-03
xe131	7.03E-04	7.06E-04	7.10E-04	7.14E-04	7.18E-04	7.18E-04
cs133	5.47E-04	5.50E-04	5.53E-04	5.56E-04	5.59E-04	5.59E-04
sm147	4.01E-04	4.03E-04	4.05E-04	4.07E-04	4.09E-04	4.09E-04
tc 99	3.68E-04	3.69E-04	3.70E-04	3.72E-04	3.73E-04	3.73E-04
nd145	3.09E-04	3.10E-04	3.12E-04	3.13E-04	3.15E-04	3.15E-04
sm152	2.43E-04	2.44E-04	2.46E-04	2.47E-04	2.49E-04	2.49E-04
gd155	2.31E-04	2.31E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04
mo 95	2.14E-04	2.15E-04	2.16E-04	2.17E-04	2.19E-04	2.19E-04
sm150	1.63E-04	1.64E-04	1.65E-04	1.66E-04	1.66E-04	1.66E-04
kr 83	1.32E-04	1.32E-04	1.33E-04	1.34E-04	1.34E-04	1.34E-04
cs135	1.24E-04	1.25E-04	1.25E-04	1.26E-04	1.27E-04	1.27E-04
cd113	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
eu153	9.98E-05	1.00E-04	1.01E-04	1.02E-04	1.02E-04	1.02E-04
ru101	9.65E-05	9.70E-05	9.75E-05	9.80E-05	9.86E-05	9.86E-05
pr141	9.25E-05	9.30E-05	9.35E-05	9.40E-05	9.45E-05	9.45E-05
la139	7.57E-05	7.61E-05	7.65E-05	7.69E-05	7.73E-05	7.73E-05
gd157	6.16E-05	6.15E-05	6.15E-05	6.14E-05	6.13E-05	6.13E-05
ag109	3.92E-05	3.95E-05	3.98E-05	4.00E-05	4.03E-05	4.03E-05
pd105	3.89E-05	3.91E-05	3.93E-05	3.95E-05	3.98E-05	3.98E-05
ba137	3.66E-05	3.68E-05	3.70E-05	3.72E-05	3.74E-05	3.74E-05
zr 93	2.96E-05	2.98E-05	2.99E-05	3.01E-05	3.02E-05	3.02E-05
i129	2.48E-05	2.50E-05	2.51E-05	2.52E-05	2.54E-05	2.54E-05
nd144	2.35E-05	2.36E-05	2.37E-05	2.38E-05	2.40E-05	2.40E-05
gd152	2.00E-05	2.01E-05	2.03E-05	2.05E-05	2.07E-05	2.07E-05
mo 97	1.72E-05	1.73E-05	1.74E-05	1.75E-05	1.76E-05	1.76E-05
pd108	9.44E-06	9.50E-06	9.56E-06	9.62E-06	9.68E-06	9.68E-06
zr 91	7.89E-06	7.93E-06	7.98E-06	8.02E-06	8.06E-06	8.06E-06
y 89	7.55E-06	7.59E-06	7.63E-06	7.67E-06	7.71E-06	7.71E-06
ru102	7.20E-06	7.24E-06	7.28E-06	7.32E-06	7.36E-06	7.36E-06
sm151	1.37E-05	6.92E-06	6.87E-06	6.87E-06	6.87E-06	6.60E-06
ce142	6.31E-06	6.34E-06	6.37E-06	6.41E-06	6.44E-06	6.44E-06
nd148	6.07E-06	6.11E-06	6.14E-06	6.17E-06	6.21E-06	6.21E-06
ru 99	5.41E-06	5.54E-06	5.66E-06	5.78E-06	5.90E-06	5.90E-06
nd146	5.12E-06	5.15E-06	5.18E-06	5.21E-06	5.24E-06	5.24E-06
pd107	4.75E-06	4.78E-06	4.81E-06	4.84E-06	4.87E-06	4.87E-06
in115	4.50E-06	4.53E-06	4.55E-06	4.58E-06	4.60E-06	4.60E-06
ba138	4.36E-06	4.38E-06	4.41E-06	4.43E-06	4.45E-06	4.45E-06
ce140	4.08E-06	4.10E-06	4.13E-06	4.15E-06	4.17E-06	4.17E-06
xe132	3.75E-06	3.78E-06	3.80E-06	3.82E-06	3.84E-06	3.84E-06
mo 98	2.51E-06	2.52E-06	2.53E-06	2.55E-06	2.56E-06	2.56E-06
mo100	2.45E-06	2.46E-06	2.47E-06	2.49E-06	2.50E-06	2.50E-06
xe134	2.41E-06	2.43E-06	2.44E-06	2.45E-06	2.47E-06	2.47E-06
zr 92	1.91E-06	1.92E-06	1.93E-06	1.94E-06	1.95E-06	1.95E-06
i127	1.82E-06	1.83E-06	1.84E-06	1.85E-06	1.86E-06	1.86E-06
ru104	1.66E-06	1.67E-06	1.68E-06	1.69E-06	1.70E-06	1.70E-06

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1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  189
0                                   fraction of total absorption rate
0          power=    .00mw, burnup=  22791.mwd, flux= 2.94E+07n/cm**2-sec
                initial *******d *******d *******d *******d *******d
```

zr 96	1.50E-06	1.51E-06	1.52E-06	1.52E-06	1.53E-06	1.53E-06
nd150	1.38E-06	1.38E-06	1.39E-06	1.40E-06	1.41E-06	1.41E-06
xe136	1.31E-06	1.32E-06	1.32E-06	1.33E-06	1.34E-06	1.34E-06

cd111	1.07E-06	1.07E-06	1.08E-06	1.09E-06	1.09E-06	1.09E-06
gd154	9.74E-07	9.85E-07	9.95E-07	1.01E-06	1.02E-06	1.02E-06
br 81	9.68E-07	9.73E-07	9.78E-07	9.84E-07	9.89E-07	9.89E-07
rb 85	9.26E-07	9.31E-07	9.36E-07	9.41E-07	9.46E-07	9.46E-07
zr 94	8.09E-07	8.14E-07	8.18E-07	8.22E-07	8.27E-07	8.27E-07
zr 90	7.44E-07	7.48E-07	7.52E-07	7.56E-07	7.60E-07	7.60E-07
sm154	6.50E-07	6.54E-07	6.58E-07	6.61E-07	6.65E-07	6.65E-07
te130	6.04E-07	6.08E-07	6.11E-07	6.14E-07	6.17E-07	6.17E-07
ba135	5.51E-07	5.64E-07	5.76E-07	5.89E-07	6.02E-07	6.02E-07
rb 87	5.33E-07	5.36E-07	5.38E-07	5.41E-07	5.44E-07	5.44E-07
pd106	4.00E-07	4.02E-07	4.04E-07	4.07E-07	4.09E-07	4.09E-07
se 77	3.90E-07	3.92E-07	3.94E-07	3.96E-07	3.99E-07	3.99E-07
gd156	3.80E-07	3.83E-07	3.85E-07	3.88E-07	3.90E-07	3.90E-07
ru100	2.64E-07	2.66E-07	2.69E-07	2.72E-07	2.74E-07	2.74E-07
kr 84	2.54E-07	2.56E-07	2.57E-07	2.58E-07	2.60E-07	2.60E-07
dy161	2.35E-07	2.36E-07	2.38E-07	2.39E-07	2.41E-07	2.41E-07
sb121	2.08E-07	2.09E-07	2.10E-07	2.11E-07	2.12E-07	2.12E-07
nd142	1.94E-07	1.96E-07	1.98E-07	2.00E-07	2.02E-07	2.02E-07
se 79	1.92E-07	1.92E-07	1.93E-07	1.94E-07	1.95E-07	1.95E-07
ba134	1.85E-07	1.87E-07	1.89E-07	1.91E-07	1.93E-07	1.93E-07
sm148	1.68E-07	1.70E-07	1.72E-07	1.74E-07	1.76E-07	1.76E-07
sb123	1.68E-07	1.69E-07	1.70E-07	1.71E-07	1.72E-07	1.72E-07
kr 86	1.41E-07	1.42E-07	1.43E-07	1.43E-07	1.44E-07	1.44E-07
te128	1.37E-07	1.38E-07	1.38E-07	1.39E-07	1.40E-07	1.40E-07
pd104	1.27E-07	1.29E-07	1.30E-07	1.31E-07	1.33E-07	1.33E-07
tb159	1.01E-07	1.02E-07	1.03E-07	1.03E-07	1.04E-07	1.04E-07
nb 93	8.76E-08	8.96E-08	9.16E-08	9.36E-08	9.57E-08	9.57E-08
se 80	9.35E-08	9.40E-08	9.45E-08	9.50E-08	9.55E-08	9.55E-08
te125	9.32E-08	9.38E-08	9.43E-08	9.48E-08	9.53E-08	9.53E-08
gd158	8.00E-08	8.05E-08	8.10E-08	8.15E-08	8.20E-08	8.20E-08
cd112	7.21E-08	7.26E-08	7.30E-08	7.34E-08	7.38E-08	7.38E-08
dy162	5.41E-08	5.45E-08	5.49E-08	5.53E-08	5.57E-08	5.57E-08
dy164	5.27E-08	5.30E-08	5.34E-08	5.37E-08	5.40E-08	5.40E-08
sn117	5.08E-08	5.11E-08	5.13E-08	5.16E-08	5.19E-08	5.19E-08
li 6	4.83E-08	4.85E-08	4.87E-08	4.90E-08	4.92E-08	4.92E-08
cd110	4.60E-08	4.65E-08	4.71E-08	4.77E-08	4.83E-08	4.83E-08
br 79	4.36E-08	4.46E-08	4.56E-08	4.66E-08	4.76E-08	4.76E-08
eu152	1.22E-07	6.12E-08	6.14E-08	6.16E-08	6.18E-08	4.70E-08
ag107	4.22E-08	4.33E-08	4.44E-08	4.55E-08	4.66E-08	4.66E-08
cd114	4.32E-08	4.34E-08	4.37E-08	4.39E-08	4.42E-08	4.42E-08
mo 96	4.22E-08	4.27E-08	4.31E-08	4.35E-08	4.40E-08	4.40E-08
sn119	3.86E-08	3.88E-08	3.90E-08	3.93E-08	3.95E-08	3.95E-08
pd110	3.57E-08	3.59E-08	3.61E-08	3.63E-08	3.66E-08	3.66E-08
sn115	3.53E-08	3.55E-08	3.57E-08	3.59E-08	3.61E-08	3.61E-08
xe129	2.63E-08	2.71E-08	2.77E-08	2.83E-08	2.90E-08	2.90E-08
sr 88	2.59E-08	2.60E-08	2.62E-08	2.63E-08	2.65E-08	2.65E-08

1 sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 190

0 fraction of total absorption rate

0 power= .00mw, burnup= 22791.mwd/t flux= 2.94E+07n/cm**2-sec

	Initial	d	d	d	d
xe130	2.07E-08	2.09E-08	2.11E-08	2.14E-08	2.16E-08	2.16E-08
ba136	1.78E-08	1.80E-08	1.81E-08	1.83E-08	1.84E-08	1.84E-08
se 82	1.78E-08	1.79E-08	1.80E-08	1.81E-08	1.82E-08	1.82E-08
te126	1.47E-08	1.50E-08	1.53E-08	1.56E-08	1.60E-08	1.60E-08
sn126	1.53E-08	1.53E-08	1.54E-08	1.54E-08	1.55E-08	1.55E-08
se 78	1.40E-08	1.41E-08	1.41E-08	1.42E-08	1.43E-08	1.43E-08
dy163	1.36E-08	1.37E-08	1.38E-08	1.38E-08	1.39E-08	1.39E-08
kr 82	1.32E-08	1.33E-08	1.34E-08	1.35E-08	1.36E-08	1.36E-08
sn124	1.23E-08	1.23E-08	1.24E-08	1.25E-08	1.26E-08	1.26E-08

eu155	4.57E-08	2.27E-08	2.27E-08	2.26E-08	2.26E-08	1.04E-08
as 75	8.21E-09	8.26E-09	8.30E-09	8.35E-09	8.39E-09	8.39E-09
pm147	6.57E-08	3.28E-08	3.29E-08	3.29E-08	3.29E-08	8.30E-09
in113	7.84E-09	7.08E-09	7.12E-09	7.16E-09	7.20E-09	7.20E-09
sn118	4.95E-09	4.98E-09	5.01E-09	5.03E-09	5.06E-09	5.06E-09
sn122	4.25E-09	4.28E-09	4.30E-09	4.33E-09	4.33E-09	4.35E-09
cd116	4.16E-09	4.18E-09	4.20E-09	4.23E-09	4.23E-09	4.25E-09
eu154	1.02E-08	3.15E-09	5.19E-09	5.22E-09	5.25E-09	3.44E-09
sn120	3.13E-09	3.15E-09	3.17E-09	3.18E-09	3.20E-09	3.20E-09
ge 73	2.36E-09	2.37E-09	2.38E-09	2.40E-09	2.41E-09	2.41E-09
sr 90	3.97E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.75E-09
ho165	1.32E-09	1.33E-09	1.34E-09	1.35E-09	1.37E-09	1.37E-09
dy160	1.26E-09	1.28E-09	1.29E-09	1.30E-09	1.32E-09	1.32E-09
gd160	1.13E-09	1.14E-09	1.15E-09	1.15E-09	1.16E-09	1.16E-09
ge 76	8.00E-10	8.04E-10	8.08E-10	8.12E-10	8.17E-10	8.17E-10
xe128	7.41E-10	7.49E-10	7.57E-10	7.65E-10	7.73E-10	7.73E-10
ce137	9.17E-10	4.58E-10	4.59E-10	4.59E-10	4.59E-10	4.06E-10
sr 86	3.50E-10	3.54E-10	3.57E-10	3.61E-10	3.64E-10	3.64E-10
sn116	2.81E-10	2.84E-10	2.87E-10	2.90E-10	2.93E-10	2.93E-10
te124	2.55E-10	2.57E-10	2.59E-10	2.61E-10	2.63E-10	2.63E-10
nb 94	1.41E-10	1.41E-10	1.41E-10	1.42E-10	1.42E-10	1.42E-10
sr 87	1.22E-10	1.23E-10	1.24E-10	1.25E-10	1.26E-10	1.26E-10
te122	1.16E-10	1.19E-10	1.21E-10	1.22E-10	1.23E-10	1.23E-10
se 76	9.81E-11	9.90E-11	1.00E-10	1.01E-10	1.02E-10	1.02E-10
cs134	1.00E-09	5.02E-10	5.05E-10	5.08E-10	5.11E-10	8.73E-11
er166	6.33E-11	6.38E-11	6.43E-11	6.48E-11	6.53E-11	6.53E-11
kr 80	4.66E-11	4.73E-11	4.81E-11	4.89E-11	4.98E-11	4.98E-11
ge 74	4.71E-11	4.74E-11	4.76E-11	4.79E-11	4.81E-11	4.81E-11
kr 85	1.34E-10	6.71E-11	6.71E-11	6.72E-11	6.72E-11	4.79E-11
se 72	3.48E-11	3.50E-11	3.52E-11	3.54E-11	3.56E-11	3.56E-11
er167	7.14E-12	7.23E-12	7.33E-12	7.42E-12	7.51E-12	7.51E-12
te123	5.53E-12	5.62E-12	5.70E-12	5.79E-12	5.87E-12	5.87E-12
cd108	3.27E-12	3.33E-12	3.40E-12	3.46E-12	3.53E-12	3.53E-12
y 90	3.78E-12	1.89E-12	1.90E-12	1.90E-12	1.90E-12	1.67E-12
ce144	1.43E-10	7.13E-11	7.13E-11	7.14E-11	7.14E-11	6.71E-13
sb125	4.37E-12	2.17E-12	2.17E-12	2.17E-12	2.17E-12	5.72E-13
ru106	9.93E-12	4.91E-12	4.90E-12	4.88E-12	4.87E-12	1.36E-13
be 9	1.00E-13	1.01E-13	1.02E-13	1.02E-13	1.03E-13	1.03E-13
sn114	7.43E-14	7.51E-14	7.59E-14	7.67E-14	7.76E-14	7.76E-14
li 7	4.13E-14	4.15E-14	4.17E-14	4.20E-14	4.22E-14	4.22E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 191
0 fraction of total absorption rate
power= .00mw, burnup= 22791.mwd, flux= 2.94E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

sb126	1.92E-14	1.84E-14	1.84E-14	1.83E-14	1.83E-14	1.77E-14
te127m	2.22E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	5.72E-18
cd109	3.29E-17	1.67E-17	1.70E-17	1.73E-17	1.76E-17	9.85E-19
sn123	2.58E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	5.47E-20
nb 95	3.64E-11	1.82E-11	1.82E-11	1.82E-11	1.82E-11	2.73E-20
zr 95	3.91E-11	1.96E-11	1.96E-11	1.96E-11	1.96E-11	2.73E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 192
power= 4.890E-04mw, burnup=2.2791E+04mwd, flux= 2.94E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d	******* d
h 1	1.33E-03	1.34E-03	1.34E-03	1.33E-03	1.36E-03	1.36E-03
h 2	3.98E-06	4.00E-06	4.02E-06	4.04E-06	4.06E-06	4.06E-06
h 3	1.46E-11	7.28E-12	7.29E-12	7.30E-12	7.31E-12	5.44E-12

h 4	1.46E-35	3.63E-36	3.64E-36	3.65E-36	3.66E-36	.00E+00
he 3	1.75E-08	1.76E-08	1.76E-08	1.77E-08	1.77E-08	1.77E-08
he 4	2.21E-04	2.22E-04	2.23E-04	2.24E-04	2.25E-04	2.25E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	2.65E-05	2.67E-05	2.68E-05	2.69E-05	2.71E-05	2.71E-05
ne 21	1.07E-08	1.08E-08	1.09E-08	1.10E-08	1.11E-08	1.11E-08
ne 22	1.75E-07	1.76E-07	1.76E-07	1.77E-07	1.78E-07	1.78E-07
ne 23	1.78E-15	8.86E-16	8.86E-16	8.87E-16	8.87E-16	8.87E-31
na 22	1.06E-11	5.26E-12	5.26E-12	5.26E-12	5.27E-12	1.30E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	6.45E-09	3.22E-09	3.22E-09	3.23E-09	3.23E-09	3.23E-24
na 24m	1.06E-15	5.29E-16	5.30E-16	5.30E-16	5.30E-16	5.31E-31
na 25	7.75E-24	3.89E-24	3.93E-24	3.97E-24	4.01E-24	4.01E-39
mg 24	1.72E-01	1.73E-01	1.73E-01	1.74E-01	1.75E-01	1.75E-01
mg 25	1.11E-06	1.12E-06	1.13E-06	1.14E-06	1.15E-06	1.15E-06
mg 26	3.97E-06	3.99E-06	4.01E-06	4.03E-06	4.05E-06	4.05E-06
mg 27	5.31E-13	2.64E-13	2.64E-13	2.64E-13	2.65E-13	2.65E-28
mg 28	2.87E-25	6.62E-26	6.62E-26	6.63E-26	6.64E-26	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.78E-11	2.39E-11	2.39E-11	2.39E-11	2.39E-11	2.39E-26
al 29	6.30E-22	3.17E-22	3.20E-22	3.23E-22	3.27E-22	3.27E-37
al 30	1.81E-31	9.14E-32	9.28E-32	9.42E-32	9.56E-32	.00E+00
si 28	5.00E-01	5.02E-01	5.05E-01	5.07E-01	5.10E-01	5.10E-01
si 29	1.01E-05	1.02E-05	1.03E-05	1.04E-05	1.05E-05	1.05E-05
si 30	2.16E-10	2.19E-10	2.23E-10	2.26E-10	2.29E-10	2.29E-10
si 31	3.82E-23	1.93E-23	1.96E-23	1.99E-23	2.02E-23	2.02E-38
si 32	1.64E-29	5.16E-30	4.31E-30	4.31E-30	4.37E-30	4.28E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.94E+07	2.94E+07	2.94E+07	2.94E+07	2.94E-08

sas2h: fer-field crit based on b&v 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 193

power= 4.890E-04mw, burnup=2.2791E+04mwd, flux= 2.94E+07n/cm**2-sec

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
he 4	4.28E+01	4.35E+01	4.42E+01	4.48E+01	4.55E+01	4.55E+01
pb206	2.47E-01	2.53E-01	2.60E-01	2.66E-01	2.72E-01	2.72E-01
pb207	1.55E-02	1.59E-02	1.62E-02	1.66E-02	1.69E-02	1.69E-02
pb208	6.78E-04	6.86E-04	6.93E-04	7.00E-04	7.06E-04	7.06E-04
pb209	1.05E-09	1.07E-09	1.08E-09	1.10E-09	1.11E-09	1.11E-09
pb210	3.15E-04	3.18E-04	3.22E-04	3.25E-04	3.29E-04	3.29E-04
pb211	5.47E-11	5.50E-11	5.53E-11	5.56E-11	5.59E-11	5.60E-11
pb212	3.74E-11	1.88E-11	1.89E-11	1.90E-11	1.91E-11	1.86E-11
pb214	7.20E-10	7.28E-10	7.36E-10	7.44E-10	7.51E-10	7.52E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	4.30E-02	4.43E-02	4.55E-02	4.68E-02	4.81E-02	4.81E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	1.94E-07	1.96E-07	1.98E-07	2.00E-07	2.02E-07	2.02E-07
bi211	3.23E-12	3.26E-12	3.28E-12	3.30E-12	3.32E-12	3.32E-12
bi212	3.55E-12	1.79E-12	1.79E-12	1.80E-12	1.81E-12	1.76E-12
bi213	2.46E-10	2.50E-10	2.53E-10	2.56E-10	2.60E-10	2.60E-10
bi214	5.34E-10	5.40E-10	5.46E-10	5.52E-10	5.58E-10	5.58E-10
po210	5.35E-06	5.41E-06	5.47E-06	5.53E-06	5.59E-06	5.59E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.59E-17	3.61E-17	3.63E-17	3.64E-17	3.66E-17	3.67E-17
po212	1.86E-22	9.38E-23	9.42E-23	9.47E-23	9.53E-23	9.27E-23
po213	3.70E-19	3.75E-19	3.80E-19	3.86E-19	3.91E-19	3.91E-19
po214	7.35E-17	7.43E-17	7.52E-17	7.60E-17	7.68E-17	7.68E-17
po215	4.50E-17	4.52E-17	4.55E-17	4.57E-17	4.60E-17	4.60E-17
po216	1.42E-16	7.13E-17	7.15E-17	7.20E-17	7.24E-17	7.04E-17

po218	8.33E-11	8.42E-11	8.51E-11	8.60E-11	8.69E-11	8.69E-11
rn218	1.33E-28	3.32E-29	3.34E-29	3.36E-29	3.38E-29	3.22E-44
rn219	1.00E-13	1.01E-13	1.01E-13	1.02E-13	1.02E-13	1.02E-13
rn220	5.43E-14	2.73E-14	2.74E-14	2.76E-14	2.78E-14	2.70E-14
rn222	1.48E-07	1.50E-07	1.51E-07	1.53E-07	1.54E-07	1.54E-07
ra222	1.44E-25	3.61E-26	3.63E-26	3.65E-26	3.67E-26	3.49E-41
ra223	2.50E-08	2.51E-08	2.52E-08	2.54E-08	2.55E-08	2.56E-08
ra224	3.09E-10	1.55E-10	1.56E-10	1.57E-10	1.58E-10	1.54E-10
ra225	1.15E-07	1.17E-07	1.18E-07	1.20E-07	1.22E-07	1.22E-07
ra226	2.26E-02	2.29E-02	2.31E-02	2.34E-02	2.36E-02	2.36E-02
ra228	1.11E-10	1.13E-10	1.16E-10	1.16E-10	1.17E-10	1.17E-10
ac225	7.78E-08	7.89E-08	7.99E-08	8.10E-08	8.21E-08	8.21E-08
ac227	1.74E-05	1.75E-05	1.76E-05	1.76E-05	1.77E-05	1.77E-05
ac228	1.36E-14	1.38E-14	1.39E-14	1.41E-14	1.43E-14	1.43E-14
th226	7.04E-24	1.76E-24	1.77E-24	1.78E-24	1.79E-24	1.70E-39
th227	4.03E-08	4.05E-08	4.07E-08	4.10E-08	4.12E-08	4.13E-08
th228	5.90E-08	2.97E-08	2.98E-08	3.00E-08	3.01E-08	2.93E-08
th229	2.24E-02	2.27E-02	2.30E-02	2.33E-02	2.36E-02	2.36E-02
th230	1.11E+00	1.12E+00	1.13E+00	1.14E+00	1.15E+00	1.15E+00
th231	3.94E-09	3.33E-09	3.34E-09	3.34E-09	3.35E-09	2.71E-09
th232	2.72E-01	2.76E-01	2.79E-01	2.83E-01	2.86E-01	2.86E-01
th233	6.12E-13	3.09E-13	3.13E-13	3.17E-13	3.22E-13	3.22E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.61E-02	2.63E-02	2.64E-02	2.65E-02	2.67E-02	2.67E-02
pa232	1.10E-10	5.53E-11	5.57E-11	5.60E-11	5.63E-11	5.63E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 194
power= 4.890E-04mw, burnup=2.2791E+04mwd, flux= 2.94E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.41E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.82E-21	1.71E-21	1.71E-21	1.73E-21	1.74E-21	1.65E-36
u231	1.05E-16	5.28E-17	5.35E-17	5.41E-17	5.47E-17	5.47E-32
u232	2.15E-06	1.08E-06	1.09E-06	1.09E-06	1.10E-06	1.04E-06
u233	5.68E-01	5.74E-01	5.80E-01	5.86E-01	5.93E-01	5.93E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02
u237	8.21E-07	4.09E-07	4.09E-07	4.09E-07	4.10E-07	5.51E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	7.53E-08	3.73E-08	3.74E-08	3.74E-08	3.74E-08	3.74E-23
u240	1.12E-34	1.19E-34	1.26E-34	1.33E-34	1.41E-34	1.41E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.07E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	3.59E-14
np236m	4.91E-13	2.44E-13	2.45E-13	2.45E-13	2.45E-13	2.45E-28
np236	2.50E-06	2.50E-06	2.51E-06	2.51E-06	2.52E-06	2.52E-06
np237	4.07E+01	4.07E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01
np238	3.64E-07	1.81E-07	1.81E-07	1.81E-07	1.82E-07	7.53E-15
np239	1.09E-05	5.40E-06	5.40E-06	5.40E-06	5.41E-06	2.08E-13
np240m	9.56E-37	1.02E-36	1.08E-36	1.14E-36	1.20E-36	1.20E-36
np240	5.43E-16	1.34E-16	1.34E-16	1.35E-16	1.35E-16	1.75E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.72E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	4.35E-11
pu237	8.02E-14	3.63E-14	3.61E-14	3.58E-14	3.56E-14	9.83E-27
pu238	5.51E-03	2.76E-03	2.75E-03	2.75E-03	2.75E-03	2.64E-03
pu239	3.14E+01	3.11E+01	3.09E+01	3.06E+01	3.04E+01	3.04E+01

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     pu240   5.28E-01  5.11E-01  4.95E-01  4.79E-01  4.65E-01  4.65E-01
     pu241   5.24E-05  2.52E-05  2.43E-05  2.37E-05  2.30E-05  1.79E-05
     pu242   4.68E-05  4.70E-05  4.71E-05  4.72E-05  4.73E-05  4.73E-05
     pu243   2.41E-14  1.21E-14  1.21E-14  1.21E-14  1.22E-14  1.48E-29
     pu244   5.58E-24  5.92E-24  6.28E-24  6.64E-24  7.01E-24  7.01E-24
     pu245   5.63E-35  2.98E-35  3.16E-35  3.35E-35  3.53E-35   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.05E-19  3.58E-20  2.89E-20  2.59E-20  2.44E-20  2.44E-35
     am240   4.82E-17  1.64E-17  1.32E-17  1.19E-17  1.11E-17  1.11E-32
     am241   1.55E-03  1.06E-03  8.55E-04  7.65E-04  7.19E-04  7.18E-04
     am242m  1.78E-07  7.19E-08  5.21E-08  4.51E-08  4.18E-08  4.07E-08
     am242   1.42E-11  4.95E-12  3.92E-12  3.50E-12  3.28E-12  3.26E-15
     am243   2.59E-07  2.53E-07  2.48E-07  2.43E-07  2.38E-07  2.38E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   4.79E-16  2.33E-16  2.28E-16  2.24E-16  2.19E-16  2.19E-31
     am245   1.10E-35  5.85E-36  6.20E-36  6.56E-36  6.93E-36  5.37E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   2.05E-22  3.55E-23  2.82E-23  2.51E-23  2.36E-23  5.79E-39
     cm242   2.87E-09  1.00E-09  7.92E-10  7.06E-10  6.62E-10  1.06E-10
     cm243   1.61E-14  2.80E-15  2.22E-15  1.98E-15  1.86E-15  1.63E-15
     cm244   7.52E-12  3.66E-12  3.58E-12  3.51E-12  3.44E-12  2.82E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  195
       power= 4.890E-04mw, burnup=2.2791E+04mwd, flux= 2.94E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.67E-14  1.62E-14  1.56E-14  1.51E-14  1.46E-14  1.46E-14
     cm246   1.36E-16  1.31E-16  1.26E-16  1.22E-16  1.17E-16  1.17E-16
     cm247   7.13E-20  7.24E-20  7.35E-20  7.44E-20  7.54E-20  7.54E-20
     cm248   2.93E-22  2.99E-22  3.06E-22  3.13E-22  3.19E-22  3.19E-22
     cm249   2.25E-33  1.15E-33  1.17E-33  1.20E-33  1.22E-33   .00E+00
     cm250   1.73E-37  1.74E-37  1.74E-37  1.73E-37  1.73E-37  1.73E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.94E+07  2.94E+07  2.94E+07  2.94E+07  2.94E+08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 22 of library on unit 33.

          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
```

```
          ***********************************************************************
          *                                                                     *
          *              prelim lwr origen-s binary working library--id = 1143  *
          *            made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
          *        see information above this box (if present) for later updates *
          *                                                                     *
          ***********************************************************************
          *                                                                     *
0         ***********************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/29/1996    date library was produced
0                    1697     total number of nuclides in library
                      689     number of light-element nuclides
                      129     number of actinide nuclides
                      879     number of fission product nuclides
0                    7993     number of nonzero off-diagonal matrix elements
0         ***********************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  196
        power=    .00mw, burnup=  23237.mwd, flux= 2.94E+07n/cm**2-sec
0                                                basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                     initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions   1.291305E+06   1.290486E+06   1.289677E+06   1.288876E+06   1.288085E+06   1.288077E+06
     absorptions   1.050426E+06   1.050032E+06   1.049643E+06   1.049258E+06   1.048878E+06   1.048872E+06
     k infinity    1.229316E+00   1.228997E+00   1.228682E+00   1.228370E+00   1.228061E+00   1.228059E+00
0                     initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions   1.031377E+06   1.030934E+06   1.030496E+06   1.030064E+06   1.029638E+06   1.029633E+06
     non-actinide
     abs. fracs.   1.813418E-02   1.818848E-02   1.824141E-02   1.829273E-02   1.834309E-02   1.834273E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products      page  197
0                                 fraction of total absorption rate
        power=    .00mw, burnup=  23237.mwd, flux= 2.94E+07n/cm**2-sec
0                 initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.33E-03  5.34E-03  5.35E-03  5.35E-03  5.36E-03  5.36E-03
     nd143      2.20E-03  2.21E-03  2.22E-03  2.24E-03  2.25E-03  2.25E-03
     eu151      1.92E-03  1.92E-03  1.93E-03  1.93E-03  1.94E-03  1.94E-03
     rh103      1.07E-03  1.08E-03  1.08E-03  1.09E-03  1.10E-03  1.10E-03
     xe131      7.17E-04  7.21E-04  7.25E-04  7.28E-04  7.32E-04  7.32E-04
     cs133      5.59E-04  5.62E-04  5.65E-04  5.67E-04  5.70E-04  5.70E-04
     sm147      4.09E-04  4.11E-04  4.13E-04  4.16E-04  4.18E-04  4.18E-04
     tc 99      3.73E-04  3.74E-04  3.76E-04  3.77E-04  3.78E-04  3.78E-04
     nd145      3.15E-04  3.17E-04  3.18E-04  3.20E-04  3.22E-04  3.22E-04
     sm152      2.49E-04  2.50E-04  2.52E-04  2.53E-04  2.55E-04  2.55E-04
     gd155      2.30E-04  2.30E-04  2.30E-04  2.29E-04  2.29E-04  2.29E-04
     mo 95      2.19E-04  2.20E-04  2.21E-04  2.22E-04  2.23E-04  2.23E-04
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sm150	1.66E-04	1.67E-04	1.68E-04	1.69E-04	1.70E-04	1.70E-04
kr 83	1.34E-04	1.35E-04	1.36E-04	1.36E-04	1.37E-04	1.37E-04
cs135	1.27E-04	1.27E-04	1.28E-04	1.29E-04	1.29E-04	1.29E-04
eu153	1.02E-04	1.03E-04	1.03E-04	1.04E-04	1.05E-04	1.05E-04
cd113	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
ru101	9.85E-05	9.90E-05	9.95E-05	1.00E-04	1.01E-04	1.01E-04
pr141	9.45E-05	9.50E-05	9.55E-05	9.60E-05	9.65E-05	9.65E-05
la139	7.73E-05	7.77E-05	7.82E-05	7.86E-05	7.90E-05	7.90E-05
gd157	6.13E-05	6.12E-05	6.11E-05	6.09E-05	6.08E-05	6.08E-05
ag109	4.03E-05	4.05E-05	4.08E-05	4.10E-05	4.13E-05	4.13E-05
pd105	3.98E-05	4.00E-05	4.02E-05	4.04E-05	4.06E-05	4.06E-05
ba137	3.75E-05	3.77E-05	3.79E-05	3.80E-05	3.82E-05	3.82E-05
zr 93	3.02E-05	3.04E-05	3.05E-05	3.07E-05	3.08E-05	3.08E-05
i129	2.54E-05	2.55E-05	2.56E-05	2.58E-05	2.59E-05	2.59E-05
nd144	2.40E-05	2.41E-05	2.43E-05	2.44E-05	2.45E-05	2.45E-05
gd152	2.07E-05	2.08E-05	2.10E-05	2.12E-05	2.14E-05	2.14E-05
mo 97	1.76E-05	1.77E-05	1.77E-05	1.78E-05	1.79E-05	1.79E-05
pd108	9.68E-06	9.76E-06	9.80E-06	9.86E-06	9.92E-06	9.92E-06
zr 91	8.06E-06	8.10E-06	8.15E-06	8.19E-06	8.23E-06	8.23E-06
y 89	7.71E-06	7.75E-06	7.79E-06	7.83E-06	7.87E-06	7.87E-06
ru102	7.36E-06	7.40E-06	7.44E-06	7.48E-06	7.52E-06	7.52E-06
sm151	6.60E-06	6.85E-06	6.88E-06	6.88E-06	6.89E-06	6.60E-06
ce142	6.45E-06	6.48E-06	6.51E-06	6.55E-06	6.58E-06	6.58E-06
ru 99	5.90E-06	6.02E-06	6.15E-06	6.27E-06	6.39E-06	6.40E-06
nd148	6.21E-06	6.24E-06	6.27E-06	6.30E-06	6.34E-06	6.34E-06
nd146	5.24E-06	5.27E-06	5.29E-06	5.32E-06	5.35E-06	5.35E-06
pd107	4.87E-06	4.90E-06	4.93E-06	4.96E-06	4.99E-06	4.99E-06
in115	4.60E-06	4.63E-06	4.65E-06	4.67E-06	4.70E-06	4.70E-06
ba138	4.46E-06	4.48E-06	4.50E-06	4.53E-06	4.55E-06	4.55E-06
ce140	4.17E-06	4.19E-06	4.22E-06	4.24E-06	4.26E-06	4.26E-06
xe132	3.84E-06	3.86E-06	3.88E-06	3.90E-06	3.92E-06	3.92E-06
mo 98	2.56E-06	2.57E-06	2.59E-06	2.60E-06	2.61E-06	2.61E-06
mo100	2.50E-06	2.51E-06	2.52E-06	2.54E-06	2.55E-06	2.55E-06
xe134	2.47E-06	2.48E-06	2.49E-06	2.51E-06	2.52E-06	2.52E-06
zr 92	1.95E-06	1.96E-06	1.97E-06	1.98E-06	1.99E-06	1.99E-06
i127	1.86E-06	1.87E-06	1.88E-06	1.89E-06	1.90E-06	1.90E-06
ru104	1.70E-06	1.71E-06	1.72E-06	1.73E-06	1.74E-06	1.74E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 198
0 fraction of total absorption rate
power= .00mw, burnup= 23237.mwd, flux= 2.94E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.53E-06	1.54E-06	1.55E-06	1.56E-06	1.56E-06	1.56E-06
nd150	1.41E-06	1.41E-06	1.42E-06	1.43E-06	1.44E-06	1.44E-06
xe136	1.34E-06	1.34E-06	1.35E-06	1.36E-06	1.37E-06	1.37E-06
cd111	1.09E-06	1.10E-06	1.11E-06	1.11E-06	1.12E-06	1.12E-06
gd154	1.02E-06	1.03E-06	1.04E-06	1.05E-06	1.06E-06	1.06E-06
br 81	9.89E-07	9.94E-07	9.99E-07	1.00E-06	1.01E-06	1.01E-06
rb 85	9.46E-07	9.51E-07	9.55E-07	9.60E-07	9.65E-07	9.65E-07
zr 94	8.26E-07	8.30E-07	8.35E-07	8.39E-07	8.43E-07	8.43E-07
zr 90	7.60E-07	7.64E-07	7.68E-07	7.72E-07	7.76E-07	7.76E-07
sm154	6.65E-07	6.69E-07	6.73E-07	6.76E-07	6.80E-07	6.80E-07
ba135	6.02E-07	6.15E-07	6.28E-07	6.41E-07	6.55E-07	6.55E-07
te130	6.18E-07	6.21E-07	6.24E-07	6.28E-07	6.31E-07	6.31E-07
rb 87	5.44E-07	5.47E-07	5.50E-07	5.52E-07	5.55E-07	5.55E-07
pd106	4.09E-07	4.11E-07	4.14E-07	4.16E-07	4.18E-07	4.18E-07
se 77	3.99E-07	4.01E-07	4.03E-07	4.03E-07	4.07E-07	4.07E-07
gd156	3.90E-07	3.92E-07	3.94E-07	3.97E-07	3.99E-07	3.99E-07
ru100	2.75E-07	2.77E-07	2.80E-07	2.83E-07	2.86E-07	2.86E-07
kr 84	2.60E-07	2.61E-07	2.62E-07	2.64E-07	2.65E-07	2.65E-07

dy161	2.41E-07	2.42E-07	2.44E-07	2.45E-07	2.47E-07	2.47E-07
sb121	2.12E-07	2.14E-07	2.15E-07	2.16E-07	2.17E-07	2.17E-07
nd142	2.02E-07	2.04E-07	2.06E-07	2.08E-07	2.11E-07	2.11E-07
ba134	1.93E-07	1.95E-07	1.97E-07	1.99E-07	2.01E-07	2.01E-07
se 79	1.95E-07	1.96E-07	1.97E-07	1.97E-07	1.98E-07	1.98E-07
sm148	1.76E-07	1.77E-07	1.79E-07	1.81E-07	1.83E-07	1.83E-07
sb123	1.72E-07	1.73E-07	1.73E-07	1.74E-07	1.75E-07	1.75E-07
kr 86	1.44E-07	1.45E-07	1.46E-07	1.46E-07	1.47E-07	1.47E-07
te128	1.40E-07	1.41E-07	1.41E-07	1.42E-07	1.43E-07	1.43E-07
pd104	1.33E-07	1.34E-07	1.35E-07	1.37E-07	1.38E-07	1.38E-07
tb159	1.04E-07	1.04E-07	1.05E-07	1.06E-07	1.06E-07	1.06E-07
nb 93	9.57E-08	9.78E-08	9.98E-08	1.02E-07	1.04E-07	1.04E-07
se 80	9.56E-08	9.61E-08	9.66E-08	9.71E-08	9.76E-08	9.76E-08
te125	9.53E-08	9.59E-08	9.64E-08	9.69E-08	9.74E-08	9.74E-08
sd158	8.19E-08	8.24E-08	8.29E-08	8.34E-08	8.39E-08	8.39E-08
cd112	7.38E-08	7.43E-08	7.47E-08	7.51E-08	7.55E-08	7.55E-08
dy162	5.57E-08	5.61E-08	5.65E-08	5.69E-08	5.73E-08	5.73E-08
dy164	5.40E-08	5.43E-08	5.47E-08	5.50E-08	5.53E-08	5.53E-08
sn117	5.19E-08	5.22E-08	5.25E-08	5.28E-08	5.31E-08	5.31E-08
br 79	4.76E-08	4.86E-08	4.96E-08	5.06E-08	5.16E-08	5.16E-08
ag107	4.66E-08	4.77E-08	4.88E-08	4.99E-08	5.11E-08	5.11E-08
cd110	4.83E-08	4.89E-08	4.95E-08	5.00E-08	5.06E-08	5.06E-08
li 6	4.92E-08	4.95E-08	4.97E-08	4.99E-08	5.02E-08	5.02E-08
eu152	4.70E-08	6.20E-08	6.22E-08	6.24E-08	6.26E-08	4.70E-08
mo 96	4.40E-08	4.44E-08	4.49E-08	6.53E-08	4.58E-08	4.58E-08
cd114	4.42E-08	4.44E-08	4.47E-08	4.49E-08	4.52E-08	4.52E-08
sn119	3.95E-08	3.97E-08	3.99E-08	4.01E-08	4.03E-08	4.03E-08
pd110	3.65E-08	3.68E-08	3.70E-08	3.72E-08	3.74E-08	3.74E-08
sn115	3.61E-08	3.63E-08	3.65E-08	3.67E-08	3.69E-08	3.69E-08
xe129	2.90E-08	2.96E-08	3.02E-08	3.09E-08	3.15E-08	3.15E-08
sr 88	2.65E-08	2.66E-08	2.67E-08	2.69E-08	2.70E-08	2.70E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% hzo/ 8% uo2 fission products page 199
0 fraction of total absorption rate
power= .00mw, burnup= 23237.mwd, flux= 2.94E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

xe130	2.16E-08	2.18E-08	2.20E-08	2.22E-08	2.24E-08	2.24E-08
ba136	1.84E-08	1.86E-08	1.88E-08	1.89E-08	1.91E-08	1.91E-08
se 82	1.82E-08	1.83E-08	1.84E-08	1.85E-08	1.86E-08	1.86E-08
te126	1.60E-08	1.63E-08	1.66E-08	1.69E-08	1.73E-08	1.73E-08
sn126	1.55E-08	1.55E-08	1.55E-08	1.56E-08	1.56E-08	1.56E-08
se 78	1.43E-08	1.44E-08	1.44E-08	1.45E-08	1.46E-08	1.46E-08
dy163	1.39E-08	1.40E-08	1.41E-08	1.42E-08	1.43E-08	1.43E-08
kr 82	1.36E-08	1.37E-08	1.38E-08	1.39E-08	1.40E-08	1.40E-08
sn124	1.25E-08	1.26E-08	1.27E-08	1.27E-08	1.28E-08	1.28E-08
eu155	1.04E-08	2.26E-08	2.25E-08	2.25E-08	2.25E-08	9.95E-09
as 75	8.39E-09	8.44E-09	8.48E-09	8.52E-09	8.57E-09	8.57E-09
pm147	8.30E-09	3.29E-08	3.29E-08	3.29E-08	3.29E-08	7.77E-09
in113	7.20E-09	7.24E-09	7.28E-09	7.32E-09	7.36E-09	7.36E-09
sn118	5.06E-09	5.08E-09	5.11E-09	5.14E-09	5.17E-09	5.17E-09
sn122	4.35E-09	4.37E-09	4.40E-09	4.42E-09	4.44E-09	4.44E-09
cd116	4.25E-09	4.27E-09	4.29E-09	4.32E-09	4.34E-09	4.34E-09
eu154	3.44E-09	5.29E-09	5.32E-09	5.35E-09	5.39E-09	3.45E-09
sn120	3.20E-09	3.22E-09	3.24E-09	3.25E-09	3.27E-09	3.27E-09
ge 73	2.41E-09	2.42E-09	2.44E-09	2.45E-09	2.46E-09	2.46E-09
sr 90	1.75E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	1.75E-09
ho165	1.37E-09	1.38E-09	1.39E-09	1.40E-09	1.41E-09	1.41E-09
dy160	1.32E-09	1.33E-09	1.35E-09	1.36E-09	1.38E-09	1.38E-09
gd160	1.16E-09	1.17E-09	1.17E-09	1.18E-09	1.19E-09	1.19E-09
ge 76	6.17E-10	6.21E-10	6.25E-10	6.30E-10	6.34E-10	6.34E-10

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     xe128      7.73E-10  7.81E-10  7.89E-10  7.97E-10  8.06E-10  8.06E-10
     cs137      4.06E-10  4.59E-10  4.59E-10  4.59E-10  4.60E-10  4.05E-10
     sr 86      3.65E-10  3.68E-10  3.72E-10  3.75E-10  3.79E-10  3.79E-10
     sn116      2.93E-10  2.96E-10  2.99E-10  3.02E-10  3.05E-10  3.05E-10
     te124      2.63E-10  2.66E-10  2.68E-10  2.70E-10  2.72E-10  2.72E-10
     nb 94      1.42E-10  1.43E-10  1.43E-10  1.44E-10  1.44E-10  1.44E-10
     sr 87      1.26E-10  1.27E-10  1.28E-10  1.29E-10  1.31E-10  1.31E-10
     te122      1.23E-10  1.24E-10  1.26E-10  1.27E-10  1.28E-10  1.28E-10
     se 76      1.02E-10  1.03E-10  1.04E-10  1.05E-10  1.06E-10  1.06E-10
     cs134      5.74E-11  5.13E-10  5.16E-10  5.19E-10  5.22E-10  8.20E-11
     er166      6.53E-11  6.58E-11  6.63E-11  6.68E-11  6.72E-11  6.72E-11
     kr 80      4.98E-11  5.06E-11  5.15E-11  5.24E-11  5.33E-11  5.33E-11
     ge 74      4.82E-11  4.84E-11  4.87E-11  4.89E-11  4.92E-11  4.92E-11
     kr 85      4.79E-11  4.73E-11  4.73E-11  4.74E-11  4.74E-11  4.72E-11
     ge 72      3.57E-11  3.59E-11  3.60E-11  3.62E-11  3.64E-11  3.64E-11
     er167      7.51E-12  7.61E-12  7.70E-12  7.80E-12  7.89E-12  7.89E-12
     te123      5.87E-12  5.94E-12  6.05E-12  6.14E-12  6.22E-12  6.22E-12
     cd108      3.53E-12  3.60E-12  3.67E-12  3.74E-12  3.81E-12  3.81E-12
      y 90      1.67E-12  1.90E-12  1.90E-12  1.90E-12  1.91E-12  1.66E-12
     ce144      6.71E-13  7.15E-11  7.15E-11  7.15E-11  7.16E-11  5.37E-13
     sb125      5.72E-13  2.16E-12  2.16E-12  2.16E-12  2.16E-12  5.35E-13
     ru106      1.36E-13  4.86E-12  4.85E-12  4.83E-12  4.82E-12  1.13E-13
     be  9      1.02E-13  1.03E-13  1.04E-13  1.04E-13  1.05E-13  1.05E-13
     sn114      7.76E-14  7.84E-14  7.93E-14  8.01E-14  8.09E-14  8.09E-14
     li  7      4.22E-14  4.24E-14  4.27E-14  4.29E-14  4.31E-14  4.31E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  200
0                                   fraction of total absorption rate
          power=    .00mw, burnup=  23237.mwd, flux= 2.94E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.77E-14  1.86E-14  1.86E-14  1.86E-14  1.87E-14  1.79E-14
     te127m     5.73E-18  1.10E-12  1.10E-12  1.10E-12  1.10E-12  3.17E-18
     cd109      9.83E-19  1.79E-17  1.83E-17  1.86E-17  1.89E-17  9.30E-19
     sn123      5.46E-20  1.29E-15  1.29E-15  1.29E-15  1.29E-15  2.73E-20
     nb 95      2.73E-20  1.82E-11  1.82E-11  1.82E-11  1.82E-11  2.73E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  201
       power= 4.890E-04mw, burnup=2.5237E+04mwd, flux= 2.94E+07n/cm**2-sec
0                                   nuclide concentrations, gram atoms
                                    basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1    1.36E-03  1.36E-03  1.37E-03  1.38E-03  1.38E-03  1.38E-03
      h  2    4.06E-06  4.08E-06  4.10E-06  4.12E-06  4.14E-06  4.14E-06
      h  3    5.44E-12  7.31E-12  7.32E-12  7.33E-12  7.34E-12  5.39E-12
      h  4     .00E+00  3.66E-36  3.67E-36  3.67E-36  3.68E-36   .00E+00
     he  3    1.77E-08  1.78E-08  1.78E-08  1.79E-08  1.79E-08  1.79E-08
     he  4    2.25E-04  2.26E-04  2.27E-04  2.29E-04  2.30E-04  2.30E-04
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    2.71E-05  2.72E-05  2.73E-05  2.75E-05  2.76E-05  2.76E-05
     ne 21    1.11E-08  1.12E-08  1.13E-08  1.14E-08  1.16E-08  1.16E-08
     ne 22    1.78E-07  1.79E-07  1.80E-07  1.81E-07  1.82E-07  1.82E-07
     ne 23    8.87E-31  8.85E-16  8.85E-16  8.85E-16  8.86E-16  8.86E-31
     na 22    1.30E-12  5.25E-12  5.25E-12  5.26E-12  5.26E-12  1.21E-12
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    3.23E-24  3.22E-09  3.22E-09  3.22E-09  3.22E-09  3.22E-24
     na 24m   5.31E-31  5.28E-16  5.29E-16  5.29E-16  5.29E-16  5.29E-31
     na 25    4.01E-39  4.05E-24  4.09E-24  4.13E-24  4.17E-24  4.17E-39
     mg 24    1.75E-01  1.76E-01  1.77E-01  1.78E-01  1.78E-01  1.78E-01
     mg 25    1.15E-06  1.16E-06  1.17E-06  1.18E-06  1.20E-06  1.20E-06
     mg 26    4.05E-06  4.07E-06  4.09E-06  4.11E-06  4.13E-06  4.13E-06
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mg 27	2.65E-28	2.64E-13	2.64E-13	2.64E-13	2.64E-13	2.64E-28
mg 28	.00E+00	6.62E-26	6.63E-26	6.64E-26	6.65E-26	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.39E-26	2.38E-11	2.38E-11	2.39E-11	2.39E-11	2.39E-26
al 29	3.27E-37	3.29E-22	3.33E-22	3.36E-22	3.39E-22	3.39E-37
al 30	.00E+00	9.69E-32	9.84E-32	9.98E-32	1.01E-31	.00E+00
si 28	5.10E-01	5.12E-01	5.14E-01	5.17E-01	5.19E-01	5.19E-01
si 29	1.05E-05	1.06E-05	1.07E-05	1.08E-05	1.09E-05	1.09E-05
si 30	2.29E-10	2.33E-10	2.36E-10	2.39E-10	2.43E-10	2.43E-10
si 31	2.02E-38	2.05E-23	2.09E-23	2.12E-23	2.15E-23	2.15E-38
si 32	4.28E-30	4.43E-30	4.51E-30	4.58E-30	4.65E-30	4.55E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		2.94E+07	2.94E+07	2.94E+07	2.94E+07	2.94E-08

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 202

power= 4.890E-04mw, burnup=2.3237E+04mwd, flux= 2.94E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
he 4	4.55E+01	4.62E+01	4.69E+01	4.75E+01	4.82E+01	4.82E+01
pb206	2.72E-01	2.79E-01	2.85E-01	2.92E-01	2.99E-01	2.99E-01
pb207	1.69E-02	1.73E-02	1.76E-02	1.80E-02	1.83E-02	1.84E-02
pb208	7.06E-04	7.13E-04	7.20E-04	7.27E-04	7.34E-04	7.34E-04
pb209	1.11E-09	1.13E-09	1.14E-09	1.16E-09	1.17E-09	1.17E-09
pb210	3.29E-04	3.32E-04	3.36E-04	3.39E-04	3.42E-04	3.42E-04
pb211	5.60E-11	5.62E-11	5.65E-11	5.68E-11	5.71E-11	5.72E-11
pb212	1.86E-11	1.92E-11	1.93E-11	1.94E-11	1.96E-11	1.90E-11
pb214	7.52E-10	7.59E-10	7.67E-10	7.75E-10	7.83E-10	7.83E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	4.81E-02	4.94E-02	5.07E-02	5.21E-02	5.34E-02	5.34E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.02E-07	2.04E-07	2.07E-07	2.09E-07	2.11E-07	2.11E-07
bi211	3.32E-12	3.33E-12	3.35E-12	3.37E-12	3.38E-12	3.39E-12
bi212	1.76E-12	1.82E-12	1.83E-12	1.84E-12	1.86E-12	1.80E-12
bi213	2.60E-10	2.63E-10	2.67E-10	2.70E-10	2.74E-10	2.74E-10
bi214	5.58E-10	5.64E-10	5.70E-10	5.75E-10	5.81E-10	5.81E-10
po210	5.59E-06	5.65E-06	5.70E-06	5.76E-06	5.82E-06	5.82E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.67E-17	3.68E-17	3.70E-17	3.72E-17	3.74E-17	3.75E-17
po212	9.27E-23	9.58E-23	9.64E-23	9.69E-23	9.75E-23	9.46E-23
po213	3.91E-19	3.96E-19	4.01E-19	4.06E-19	4.11E-19	4.11E-19
po214	7.68E-17	7.76E-17	7.84E-17	7.92E-17	7.99E-17	8.00E-17
po215	4.60E-17	4.62E-17	4.64E-17	4.67E-17	4.69E-17	4.70E-17
po216	7.04E-17	7.28E-17	7.32E-17	7.36E-17	7.40E-17	7.18E-17
po218	8.69E-11	8.79E-11	8.88E-11	8.96E-11	9.05E-11	9.05E-11
rn218	3.22E-44	3.40E-29	3.42E-29	3.44E-29	3.46E-29	3.22E-44
rn219	1.02E-13	1.03E-13	1.03E-13	1.04E-13	1.04E-13	1.05E-13
rn220	2.70E-14	2.79E-14	2.81E-14	2.82E-14	2.84E-14	2.76E-14
rn222	1.54E-07	1.56E-07	1.58E-07	1.59E-07	1.61E-07	1.61E-07
ra222	3.49E-41	3.69E-26	3.71E-26	3.73E-26	3.76E-26	3.56E-41
ra223	2.56E-08	2.56E-08	2.58E-08	2.59E-08	2.60E-08	2.61E-08
ra224	1.54E-10	1.59E-10	1.60E-10	1.61E-10	1.61E-10	1.57E-10
ra225	1.22E-07	1.23E-07	1.25E-07	1.26E-07	1.28E-07	1.28E-07
ra226	2.36E-02	2.38E-02	2.41E-02	2.43E-02	2.46E-02	2.46E-02
ra228	1.17E-10	1.19E-10	1.20E-10	1.21E-10	1.23E-10	1.23E-10
ac225	8.21E-08	8.32E-08	8.43E-08	8.54E-08	8.65E-08	8.65E-08
ac227	1.77E-05	1.78E-05	1.79E-05	1.80E-05	1.81E-05	1.81E-05
ac228	1.43E-14	1.45E-14	1.47E-14	1.48E-14	1.50E-14	1.50E-14
th226	1.70E-39	1.80E-24	1.81E-24	1.82E-24	1.83E-24	1.74E-39
th227	4.13E-08	4.14E-08	4.16E-08	4.18E-08	4.20E-08	4.21E-08

th228	2.93E-08	3.03E-08	3.05E-08	3.07E-08	3.08E-08	2.99E-08
th229	2.36E-02	2.40E-02	2.43E-02	2.46E-02	2.49E-02	2.49E-02
th230	1.15E+00	1.17E+00	1.18E+00	1.19E+00	1.20E+00	1.20E+00
th231	2.71E-09	3.36E-09	3.36E-09	3.37E-09	3.38E-09	2.71E-09
th232	2.86E-01	2.90E-01	2.93E-01	2.97E-01	3.01E-01	3.01E-01
th233	3.22E-28	3.26E-13	3.30E-13	3.34E-13	3.38E-13	3.38E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.67E-02	2.68E-02	2.70E-02	2.71E-02	2.72E-02	2.72E-02
pa232	5.63E-26	5.66E-11	5.70E-11	5.73E-11	5.76E-11	5.76E-26

1 ess2h: for-field crit based on h2w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2 . actinides page 203
power= 4.890E-04mw, burnup=2.5237E+04mwd, flux= 2.94E+07n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.65E-36	1.76E-21	1.75E-21	1.77E-21	1.78E-21	1.68E-36
u231	5.47E-32	5.52E-17	5.58E-17	5.64E-17	5.69E-17	5.70E-32
u232	1.04E-06	1.10E-06	1.11E-06	1.12E-06	1.12E-06	1.06E-06
u233	5.93E-01	5.99E-01	6.05E-01	6.11E-01	6.17E-01	6.17E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.92E+02	1.92E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02
u237	5.51E-13	4.10E-07	4.10E-07	4.11E-07	4.11E-07	4.87E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.74E-23	3.74E-08	3.74E-08	3.74E-08	3.75E-08	3.75E-23
u240	1.41E-34	1.48E-34	1.56E-34	1.64E-34	1.72E-34	1.72E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.59E-14	1.03E-12	1.03E-12	1.03E-12	1.03E-12	3.05E-14
np236m	2.45E-28	2.44E-13	2.44E-13	2.44E-13	2.44E-13	2.44E-28
np236	2.52E-06	2.52E-06	2.53E-06	2.53E-06	2.54E-06	2.54E-06
np237	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01
np238	7.53E-15	1.81E-07	1.82E-07	1.82E-07	1.82E-07	6.53E-15
np239	2.08E-13	5.40E-06	5.41E-06	5.41E-06	5.41E-06	1.93E-13
np240m	1.20E-36	1.27E-36	1.33E-36	1.40E-36	1.47E-36	1.47E-36
np240	1.75E-38	1.35E-16	1.35E-16	1.35E-16	1.35E-16	1.99E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	4.35E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	4.13E-11
pu237	5.83E-27	3.53E-14	3.51E-14	3.48E-14	3.46E-14	1.40E-27
pu238	2.64E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.63E-03
pu239	3.04E+01	3.02E+01	2.99E+01	2.97E+01	2.95E+01	2.95E+01
pu240	4.65E-01	4.52E-01	4.39E-01	4.27E-01	4.16E-01	4.15E-01
pu241	1.79E-05	2.23E-05	2.17E-05	2.12E-05	2.06E-05	1.58E-05
pu242	4.73E-05	4.74E-05	4.75E-05	4.75E-05	4.76E-05	4.76E-05
pu243	1.48E-29	1.22E-14	1.22E-14	1.22E-14	1.22E-14	1.50E-29
pu244	7.01E-24	7.59E-24	7.78E-24	8.17E-24	8.57E-24	8.57E-24
pu245	.00E+00	3.73E-35	3.92E-35	4.13E-35	4.33E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	2.44E-35	2.32E-20	2.25E-20	2.19E-20	2.13E-20	2.13E-35
am240	1.11E-32	1.06E-17	1.03E-17	1.00E-17	9.74E-18	9.73E-33
am241	7.18E-04	6.87E-04	6.65E-04	6.46E-04	6.29E-04	6.28E-04
am242m	4.07E-08	3.96E-08	3.84E-08	3.73E-08	3.62E-08	3.53E-08
am242	5.26E-13	3.13E-12	3.03E-12	2.95E-12	2.87E-12	4.55E-13
am243	2.38E-07	2.33E-07	2.29E-07	2.25E-07	2.21E-07	2.21E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.19E-31	2.15E-16	2.11E-16	2.08E-16	2.04E-16	2.04E-31
am245	5.37E-40	7.31E-36	7.70E-36	8.09E-36	8.49E-36	4.77E-40

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     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.79E-39  2.24E-23  2.18E-23  2.12E-23  2.06E-23  5.74E-39
     cm242   1.06E-10  6.32E-10  6.12E-10  5.95E-10  5.79E-10  9.20E-11
     cm243   1.63E-15  1.77E-15  1.72E-15  1.67E-15  1.63E-15  1.42E-15
     cm244   2.82E-12  3.38E-12  3.32E-12  3.26E-12  3.21E-12  2.60E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  204
       power= 4.890E-04mw, burnup=2.3237E+04mwd, flux= 2.94E+07n/cm**2-sec
0                                                nuclide concentrations, gram atoms
                                                 basis = single reactor assembly
              charge ******* g ******* g ******* g ******* g ******* g
     cm245   1.46E-14  1.41E-14  1.36E-14  1.31E-14  1.27E-14  1.27E-14
     cm246   1.17E-16  1.13E-16  1.09E-16  1.05E-16  1.02E-16  1.01E-16
     cm247   7.54E-20  7.63E-20  7.72E-20  7.81E-20  7.89E-20  7.89E-20
     cm248   3.19E-22  3.26E-22  3.33E-22  3.40E-22  3.48E-22  3.48E-22
     cm249    .00E+00  1.25E-33  1.28E-33  1.31E-33  1.33E-33   .00E+00
     cm250   1.73E-37  1.72E-37  1.72E-37  1.72E-37  1.72E-37  1.72E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.94E+07  2.94E+07  2.94E+07  2.94E+07  2.94E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
1library information...

          cross-section data taken from position number 23 of library on unit 33.

          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim iwr origen-s binary working library--id = 1143    *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *       neutron flux spectrum factors and cross sections were produced from *
          *      the "prepsas2" case updating all nuclides on the scale "burnup" library *
          *                                                                     *
          *                   fission product yields are from endf/b-v          *
          *                                                                     *
          *              photon libraries use an 18-energy-group structure      *
          *             the photon data are from the master photon data base,   *
          *              produced to include bremsstrahlung from uo2 matrix     *
          *                                                                     *
```

```
         *        see information above this box (if present) for later updates        *
         *                                                                             *
         ***************************************************************************
         *                                                                             *
         ***************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                  1697     total number of nuclides in library
                    489     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7993     number of nonzero off-diagonal matrix elements
0        ***************************************************************************
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  205
        power=    .00mw, burnup=  23684.mwd, flux= 2.95E+07n/cm**2-sec
0                                                   basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.288924E+06  1.288140E+06  1.287363E+06  1.286599E+06  1.285841E+06  1.285832E+06
     absorptions  1.049175E+06  1.048500E+06  1.048429E+06  1.048062E+06  1.047700E+06  1.047695E+06
     k infinity   1.228512E+00  1.228204E+00  1.227900E+00  1.227597E+00  1.227298E+00  1.227296E+00
0                 initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  1.029930E+06  1.029509E+06  1.029093E+06  1.028683E+06  1.028278E+06  1.028273E+06
     non-actinide
     abs. fracs.  1.834297E-02  1.839298E-02  1.844198E-02  1.849020E-02  1.853782E-02  1.853758E-02
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  206
0                                   fraction of total absorption rate
        power=    .00mw, burnup=  23684.mwd, flux= 2.95E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

     sm149     5.36E-03  5.37E-03  5.38E-03  5.38E-03  5.39E-03  5.39E-03
     nd143     2.25E-03  2.26E-03  2.27E-03  2.28E-03  2.29E-03  2.29E-03
     eu151     1.94E-03  1.94E-03  1.95E-03  1.95E-03  1.95E-03  1.95E-03
     rh103     1.10E-03  1.10E-03  1.11E-03  1.11E-03  1.12E-03  1.12E-03
     xe131     7.32E-04  7.35E-04  7.39E-04  7.43E-04  7.46E-04  7.46E-04
     cs133     5.70E-04  5.73E-04  5.76E-04  5.79E-04  5.82E-04  5.82E-04
     sm147     4.17E-04  4.20E-04  4.22E-04  4.24E-04  4.26E-04  4.26E-04
     tc 99     3.78E-04  3.79E-04  3.81E-04  3.82E-04  3.84E-04  3.84E-04
     nd145     3.22E-04  3.23E-04  3.25E-04  3.26E-04  3.28E-04  3.28E-04
     sm152     2.55E-04  2.56E-04  2.58E-04  2.59E-04  2.61E-04  2.61E-04
     gd155     2.29E-04  2.29E-04  2.29E-04  2.29E-04  2.28E-04  2.28E-04
     mo 95     2.23E-04  2.24E-04  2.25E-04  2.26E-04  2.28E-04  2.28E-04
     sm150     1.70E-04  1.71E-04  1.72E-04  1.73E-04  1.74E-04  1.74E-04
     kr 83     1.37E-04  1.38E-04  1.39E-04  1.39E-04  1.40E-04  1.40E-04
     cs135     1.29E-04  1.30E-04  1.30E-04  1.31E-04  1.32E-04  1.32E-04
     eu153     1.05E-04  1.05E-04  1.06E-04  1.06E-04  1.07E-04  1.07E-04
     cd113     1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04
     ru101     1.00E-04  1.01E-04  1.02E-04  1.02E-04  1.03E-04  1.03E-04
     pr141     9.65E-05  9.70E-05  9.75E-05  9.80E-05  9.85E-05  9.85E-05
     la139     7.90E-05  7.94E-05  7.98E-05  8.02E-05  8.06E-05  8.06E-05
     gd157     6.08E-05  6.07E-05  6.05E-05  6.04E-05  6.02E-05  6.02E-05
     ag109     4.13E-05  4.15E-05  4.18E-05  4.20E-05  4.23E-05  4.23E-05
     pd105     4.06E-05  4.09E-05  4.11E-05  4.13E-05  4.15E-05  4.15E-05
     ba137     3.83E-05  3.85E-05  3.87E-05  3.89E-05  3.91E-05  3.91E-05
     zr 93     3.08E-05  3.10E-05  3.11E-05  3.13E-05  3.14E-05  3.14E-05
      i129     2.59E-05  2.61E-05  2.62E-05  2.63E-05  2.65E-05  2.65E-05
     nd144     2.45E-05  2.47E-05  2.48E-05  2.49E-05  2.50E-05  2.50E-05
     gd152     2.14E-05  2.16E-05  2.17E-05  2.19E-05  2.21E-05  2.21E-05
```

```
     mo 97      1.79E-05  1.80E-05  1.81E-05  1.82E-05  1.83E-05  1.83E-05
     pd108      9.91E-06  9.97E-06  1.00E-05  1.01E-05  1.01E-05  1.01E-05
     zr 91      8.23E-06  8.27E-06  8.32E-06  8.36E-06  8.40E-06  8.40E-06
      y 89      7.87E-06  7.91E-06  7.95E-06  7.99E-06  8.03E-06  8.03E-06
     ru102      7.52E-06  7.56E-06  7.60E-06  7.64E-06  7.68E-06  7.68E-06
     ru 99      6.39E-06  6.52E-06  6.64E-06  6.77E-06  6.90E-06  6.90E-06
     ce142      6.58E-06  6.62E-06  6.65E-06  6.69E-06  6.72E-06  6.72E-06
     sm151      6.60E-06  6.89E-06  6.90E-06  6.90E-06  6.90E-06  6.60E-06
     nd148      6.34E-06  6.37E-06  6.40E-06  6.44E-06  6.47E-06  6.47E-06
     nd146      5.35E-06  5.38E-06  5.41E-06  5.43E-06  5.46E-06  5.46E-06
     pd107      4.99E-06  5.02E-06  5.05E-06  5.07E-06  5.10E-06  5.10E-06
     in115      4.70E-06  4.72E-06  4.75E-06  4.77E-06  4.80E-06  4.80E-06
     ba138      4.35E-06  4.58E-06  4.60E-06  4.62E-06  4.65E-06  4.65E-06
     ce140      4.26E-06  4.28E-06  4.31E-06  4.33E-06  4.35E-06  4.35E-06
     xe132      3.92E-06  3.94E-06  3.96E-06  3.98E-06  4.00E-06  4.00E-06
     mo 98      2.41E-06  2.42E-06  2.44E-06  2.45E-06  2.47E-06  2.47E-06
     mo100      2.35E-06  2.56E-06  2.58E-06  2.59E-06  2.60E-06  2.60E-06
     xe134      2.52E-06  2.53E-06  2.55E-06  2.56E-06  2.57E-06  2.57E-06
     zr 92      1.99E-06  2.00E-06  2.01E-06  2.02E-06  2.03E-06  2.03E-06
      i127      1.90E-06  1.91E-06  1.92E-06  1.93E-06  1.94E-06  1.94E-06
     ru104      1.74E-06  1.75E-06  1.76E-06  1.77E-06  1.78E-06  1.78E-06
1    sas2h: far-field crit based on b4w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page  207
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  23684.mwd, flux= 2.95E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d

     zr 96      1.56E-06  1.57E-06  1.58E-06  1.59E-06  1.59E-06  1.59E-06
     nd150      1.44E-06  1.44E-06  1.45E-06  1.46E-06  1.47E-06  1.47E-06
     xe136      1.37E-06  1.37E-06  1.38E-06  1.39E-06  1.39E-06  1.39E-06
     cd111      1.12E-06  1.13E-06  1.13E-06  1.14E-06  1.15E-06  1.15E-06
     gd154      1.06E-06  1.07E-06  1.08E-06  1.10E-06  1.11E-06  1.11E-06
     br 81      1.01E-06  1.01E-06  1.02E-06  1.02E-06  1.03E-06  1.03E-06
     rb 85      9.65E-07  9.70E-07  9.75E-07  9.80E-07  9.85E-07  9.85E-07
     zr 94      8.43E-07  8.47E-07  8.52E-07  8.56E-07  8.60E-07  8.60E-07
     zr 90      7.76E-07  7.80E-07  7.84E-07  7.88E-07  7.92E-07  7.92E-07
     ba135      6.55E-07  6.68E-07  6.81E-07  6.95E-07  7.08E-07  7.08E-07
     sm154      6.80E-07  6.84E-07  6.87E-07  6.91E-07  6.94E-07  6.94E-07
     te130      6.31E-07  6.34E-07  6.38E-07  6.41E-07  6.44E-07  6.44E-07
     rb 87      5.35E-07  5.58E-07  5.61E-07  5.64E-07  5.67E-07  5.67E-07
     pd106      4.18E-07  4.21E-07  4.23E-07  4.25E-07  4.28E-07  4.28E-07
     se 77      4.07E-07  4.09E-07  4.11E-07  4.14E-07  4.16E-07  4.16E-07
     gd156      3.99E-07  4.01E-07  4.04E-07  4.06E-07  4.08E-07  4.08E-07
     ru100      2.86E-07  2.88E-07  2.91E-07  2.94E-07  2.97E-07  2.97E-07
     kr 84      2.63E-07  2.66E-07  2.68E-07  2.69E-07  2.70E-07  2.70E-07
     dy161      2.47E-07  2.48E-07  2.50E-07  2.51E-07  2.53E-07  2.53E-07
     sb121      2.17E-07  2.18E-07  2.19E-07  2.20E-07  2.22E-07  2.22E-07
     nd142      2.11E-07  2.13E-07  2.15E-07  2.17E-07  2.19E-07  2.19E-07
     ba134      2.01E-07  2.03E-07  2.05E-07  2.07E-07  2.09E-07  2.09E-07
     se 79      1.98E-07  1.99E-07  2.00E-07  2.01E-07  2.02E-07  2.02E-07
     sm148      1.83E-07  1.85E-07  1.87E-07  1.88E-07  1.90E-07  1.90E-07
     sb123      1.75E-07  1.76E-07  1.77E-07  1.78E-07  1.79E-07  1.79E-07
     kr 86      1.47E-07  1.48E-07  1.49E-07  1.50E-07  1.50E-07  1.50E-07
     te128      1.43E-07  1.44E-07  1.44E-07  1.45E-07  1.46E-07  1.46E-07
     pd104      1.38E-07  1.39E-07  1.41E-07  1.42E-07  1.44E-07  1.44E-07
     nb 93      1.04E-07  1.06E-07  1.08E-07  1.10E-07  1.12E-07  1.12E-07
     tb159      1.06E-07  1.07E-07  1.08E-07  1.08E-07  1.09E-07  1.09E-07
     se 80      9.76E-08  9.81E-08  9.86E-08  9.91E-08  9.96E-08  9.96E-08
     te125      9.74E-08  9.79E-08  9.85E-08  9.90E-08  9.95E-08  9.95E-08
     pd105      8.39E-08  8.44E-08  8.49E-08  8.54E-08  8.59E-08  8.59E-08
     cd112      7.56E-08  7.60E-08  7.64E-08  7.68E-08  7.72E-08  7.72E-08
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dy162	5.73E-08	5.77E-08	5.81E-08	5.85E-08	5.89E-08	5.89E-08
dy164	5.53E-08	5.56E-08	5.59E-08	5.62E-08	5.65E-08	5.65E-08
br 79	5.16E-08	5.27E-08	5.37E-08	5.47E-08	5.58E-08	5.58E-08
ag107	5.11E-08	5.22E-08	5.34E-08	5.45E-08	5.57E-08	5.57E-08
sn117	5.31E-08	5.34E-08	5.37E-08	5.40E-08	5.42E-08	5.42E-08
cd110	5.07E-08	5.13E-08	5.19E-08	5.25E-08	5.31E-08	5.31E-08
lf 6	5.02E-08	5.04E-08	5.07E-08	5.09E-08	5.11E-08	5.11E-08
mo 96	4.58E-08	4.62E-08	4.67E-08	4.71E-08	4.76E-08	4.76E-08
eu152	4.70E-08	6.28E-08	6.30E-08	6.31E-08	6.33E-08	4.69E-08
cd114	4.51E-08	4.54E-08	4.57E-08	4.59E-08	4.62E-08	4.62E-08
sn119	4.04E-08	4.06E-08	4.08E-08	4.10E-08	4.12E-08	4.12E-08
pd110	3.74E-08	3.76E-08	3.79E-08	3.81E-08	3.83E-08	3.83E-08
sn115	3.69E-08	3.71E-08	3.73E-08	3.75E-08	3.77E-08	3.77E-08
xe129	3.15E-08	3.22E-08	3.28E-08	3.35E-08	3.41E-08	3.41E-08
sr 88	2.70E-08	2.72E-08	2.73E-08	2.74E-08	2.76E-08	2.76E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 208
0 fraction of total absorption rate
power= .00mw, burnup= 23684.mwd, flux= 2.95E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

xe130	2.24E-08	2.26E-08	2.29E-08	2.31E-08	2.33E-08	2.33E-08
ba136	1.91E-08	1.92E-08	1.94E-08	1.95E-08	1.97E-08	1.97E-08
se 82	1.86E-08	1.87E-08	1.88E-08	1.89E-08	1.90E-08	1.90E-08
te124	1.73E-08	1.76E-08	1.79E-08	1.82E-08	1.86E-08	1.86E-08
sn126	1.56E-08	1.57E-08	1.57E-08	1.57E-08	1.58E-08	1.58E-08
se 78	1.46E-08	1.47E-08	1.47E-08	1.48E-08	1.49E-08	1.49E-08
dy163	1.43E-08	1.44E-08	1.45E-08	1.46E-08	1.47E-08	1.47E-08
kr 82	1.40E-08	1.41E-08	1.42E-08	1.43E-08	1.44E-08	1.44E-08
sn124	1.28E-08	1.29E-08	1.29E-08	1.30E-08	1.31E-08	1.31E-08
eu155	9.95E-09	2.25E-08	2.24E-08	2.24E-08	2.24E-08	9.56E-09
as 75	8.57E-09	8.61E-09	8.66E-09	8.70E-09	8.75E-09	8.75E-09
in113	7.36E-09	7.40E-09	7.44E-09	7.48E-09	7.52E-09	7.52E-09
pm147	7.77E-09	3.29E-08	3.29E-08	3.30E-08	3.30E-08	7.30E-09
sn118	5.16E-09	5.19E-09	5.22E-09	5.25E-09	5.27E-09	5.27E-09
sn122	4.45E-09	4.47E-09	4.49E-09	4.52E-09	4.54E-09	4.54E-09
cd116	4.34E-09	4.36E-09	4.38E-09	4.41E-09	4.43E-09	4.43E-09
eu154	3.46E-09	5.42E-09	5.45E-09	5.49E-09	5.52E-09	3.67E-09
sn120	3.27E-09	3.29E-09	3.30E-09	3.32E-09	3.34E-09	3.34E-09
ge 73	2.46E-09	2.48E-09	2.49E-09	2.50E-09	2.51E-09	2.51E-09
sr 90	1.75E-09	2.00E-09	2.00E-09	2.01E-09	2.01E-09	1.74E-09
ho165	1.41E-09	1.42E-09	1.44E-09	1.45E-09	1.46E-09	1.46E-09
dy160	1.38E-09	1.39E-09	1.41E-09	1.42E-09	1.44E-09	1.44E-09
gd160	1.19E-09	1.20E-09	1.20E-09	1.21E-09	1.22E-09	1.22E-09
ge 76	8.34E-10	8.38E-10	8.43E-10	8.47E-10	8.51E-10	8.51E-10
xe128	8.06E-10	8.14E-10	8.22E-10	8.31E-10	8.39E-10	8.39E-10
cs137	4.05E-10	4.60E-10	4.60E-10	4.60E-10	4.60E-10	4.03E-10
sr 86	3.79E-10	3.83E-10	3.86E-10	3.90E-10	3.94E-10	3.94E-10
sn116	3.05E-10	3.08E-10	3.11E-10	3.14E-10	3.18E-10	3.18E-10
te124	2.72E-10	2.74E-10	2.76E-10	2.79E-10	2.81E-10	2.81E-10
nb 94	1.44E-10	1.45E-10	1.46E-10	1.47E-10	1.48E-10	1.48E-10
sr 87	1.31E-10	1.32E-10	1.33E-10	1.34E-10	1.35E-10	1.35E-10
te122	1.28E-10	1.30E-10	1.31E-10	1.32E-10	1.34E-10	1.34E-10
se 76	1.06E-10	1.07E-10	1.08E-10	1.09E-10	1.10E-10	1.10E-10
cs134	8.20E-11	5.25E-10	5.28E-10	5.31E-10	5.34E-10	7.72E-11
er166	6.73E-11	6.77E-11	6.82E-11	6.87E-11	6.91E-11	6.91E-11
kr 80	5.33E-11	5.42E-11	5.52E-11	5.61E-11	5.71E-11	5.71E-11
ge 74	4.92E-11	4.95E-11	4.97E-11	5.00E-11	5.03E-11	5.03E-11
kr 85	4.72E-11	6.75E-11	6.75E-11	6.76E-11	6.76E-11	4.66E-11
ge 72	3.65E-11	3.67E-11	3.68E-11	3.70E-11	3.72E-11	3.72E-11
er167	7.89E-12	7.99E-12	8.09E-12	8.18E-12	8.28E-12	8.28E-12

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     te123     6.22E-12  6.32E-12  6.41E-12  6.50E-12  6.59E-12  6.59E-12
     cd108     3.81E-12  3.89E-12  3.96E-12  4.04E-12  4.12E-12  4.12E-12
      y 90     1.66E-12  1.91E-12  1.91E-12  1.91E-12  1.91E-12  1.66E-12
     sb125     5.35E-13  2.16E-12  2.16E-12  2.15E-12  2.15E-12  5.01E-13
     ce144     5.37E-13  7.16E-11  7.17E-11  7.17E-11  7.17E-11  4.33E-13
     be  9     1.05E-13  1.05E-13  1.06E-13  1.06E-13  1.07E-13  1.07E-13
     ru106     1.13E-13  4.81E-12  4.80E-12  4.79E-12  4.78E-12  9.50E-14
     sn114     8.10E-14  8.18E-14  8.27E-14  8.35E-14  8.44E-14  8.44E-14
     li  7     4.31E-14  4.34E-14  4.36E-14  4.38E-14  4.40E-14  4.40E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  209
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  23684.mwd, flux= 2.95E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126     1.79E-14  1.87E-14  1.88E-14  1.88E-14  1.88E-14  1.81E-14
     te127m    3.17E-18  1.10E-12  1.10E-12  1.10E-12  1.09E-12  1.78E-18
     cd109     9.28E-19  1.93E-17  1.96E-17  2.00E-17  2.04E-17  8.75E-19
     sn123     2.73E-20  1.29E-15  1.29E-15  1.29E-15  1.29E-15  2.73E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  210
       power= 4.890E-04mw, burnup=2.3684E+04mwd, flux= 2.95E+07n/cm**2-sec
0                                     nuclide concentrations, gram atoms
                                      basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1   1.38E-03  1.39E-03  1.40E-03  1.40E-03  1.41E-03  1.41E-03
      h  2   4.14E-06  4.16E-06  4.18E-06  4.20E-06  4.22E-06  4.22E-06
      h  3   5.39E-12  7.35E-12  7.36E-12  7.37E-12  7.38E-12  5.34E-12
      h  4    .00E+00  3.68E-36  3.69E-36  3.70E-36  3.71E-36   .00E+00
     he  3   1.79E-08  1.79E-08  1.80E-08  1.80E-08  1.81E-08  1.81E-08
     he  4   2.30E-04  2.31E-04  2.32E-04  2.33E-04  2.34E-04  2.34E-04
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   2.76E-05  2.77E-05  2.79E-05  2.80E-05  2.81E-05  2.81E-05
     ne 21   1.16E-08  1.17E-08  1.18E-08  1.19E-08  1.20E-08  1.20E-08
     ne 22   1.82E-07  1.83E-07  1.84E-07  1.84E-07  1.85E-07  1.85E-07
     ne 23   8.86E-31  8.85E-16  8.85E-16  8.86E-16  8.86E-16  8.86E-31
     na 22   1.21E-12  5.25E-12  5.25E-12  5.26E-12  5.26E-12  1.14E-12
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   3.22E-24  3.22E-09  3.22E-09  3.22E-09  3.22E-09  3.22E-24
     na 24m  5.29E-31  5.29E-16  5.29E-16  5.29E-16  5.30E-16  5.30E-31
     na 25   4.17E-39  4.20E-24  4.24E-24  4.29E-24  4.33E-24  4.33E-39
     mg 24   1.78E-01  1.79E-01  1.80E-01  1.81E-01  1.82E-01  1.82E-01
     mg 25   1.20E-06  1.21E-06  1.22E-06  1.23E-06  1.24E-06  1.24E-06
     mg 26   4.13E-06  4.15E-06  4.17E-06  4.19E-06  4.21E-06  4.21E-06
     mg 27   2.64E-28  2.64E-13  2.64E-13  2.64E-13  2.64E-13  2.64E-28
     mg 28    .00E+00  6.64E-26  6.65E-26  6.66E-26  6.66E-26   .00E+00
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.39E-26  2.39E-11  2.39E-11  2.39E-11  2.39E-11  2.39E-26
     al 29   3.39E-37  3.42E-22  3.46E-22  3.49E-22  3.53E-22  3.53E-37
     al 30    .00E+00  1.03E-31  1.04E-31  1.06E-31  1.07E-31   .00E+00
     si 28   5.19E-01  5.22E-01  5.24E-01  5.27E-01  5.29E-01  5.29E-01
     si 29   1.09E-05  1.10E-05  1.11E-05  1.12E-05  1.13E-05  1.13E-05
     si 30   2.43E-10  2.46E-10  2.50E-10  2.53E-10  2.57E-10  2.57E-10
     si 31   2.15E-38  2.18E-23  2.21E-23  2.25E-23  2.28E-23  2.28E-38
     si 32   4.55E-30  4.72E-30  4.80E-30  4.87E-30  4.95E-30  4.83E-30
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0  flux                2.94E+07  2.94E+07  2.95E+07  2.95E+07  2.95E-08
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  211
       power= 4.890E-04mw, burnup=2.3684E+04mwd, flux= 2.95E+07n/cm**2-sec
0                                     nuclide concentrations, gram atoms
```

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	4.82E+01	4.88E+01	4.95E+01	5.01E+01	5.08E+01	5.08E+01
pb206	2.99E-01	3.05E-01	3.12E-01	3.19E-01	3.26E-01	3.26E-01
pb207	1.84E-02	1.87E-02	1.91E-02	1.94E-02	1.98E-02	1.98E-02
pb208	7.34E-04	7.41E-04	7.48E-04	7.55E-04	7.63E-04	7.63E-04
pb209	1.17E-09	1.19E-09	1.20E-09	1.22E-09	1.23E-09	1.23E-09
pb210	3.42E-04	3.46E-04	3.49E-04	3.52E-04	3.56E-04	3.56E-04
pb211	5.72E-11	5.76E-11	5.76E-11	5.79E-11	5.82E-11	5.83E-11
pb212	1.90E-11	1.97E-11	1.98E-11	1.99E-11	2.00E-11	1.94E-11
pb214	7.83E-10	7.90E-10	7.98E-10	8.06E-10	8.13E-10	8.13E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.34E-02	5.48E-02	5.62E-02	5.76E-02	5.91E-02	5.91E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.11E-07	2.13E-07	2.15E-07	2.17E-07	2.19E-07	2.19E-07
bi211	5.39E-12	5.40E-12	5.42E-12	5.43E-12	5.45E-12	5.46E-12
bi212	1.80E-12	1.87E-12	1.88E-12	1.89E-12	1.90E-12	1.84E-12
bi213	2.74E-10	2.77E-10	2.81E-10	2.84E-10	2.87E-10	2.87E-10
bi214	5.81E-10	5.87E-10	5.92E-10	5.98E-10	6.04E-10	6.04E-10
po210	5.82E-06	5.88E-06	5.93E-06	5.99E-06	6.05E-06	6.05E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.75E-17	3.76E-17	3.78E-17	3.79E-17	3.81E-17	3.82E-17
po212	9.46E-23	9.80E-23	9.85E-23	9.91E-23	9.96E-23	9.44E-23
po213	4.11E-19	4.17E-19	4.22E-19	4.27E-19	4.32E-19	4.32E-19
po214	8.00E-17	8.07E-17	8.15E-17	8.23E-17	8.31E-17	8.31E-17
po215	4.70E-17	4.71E-17	4.74E-17	4.76E-17	4.78E-17	4.79E-17
po216	7.18E-17	7.44E-17	7.49E-17	7.53E-17	7.57E-17	7.53E-17
po218	9.05E-11	9.14E-11	9.23E-11	9.52E-11	9.41E-11	9.41E-11
rn218	3.22E-44	3.47E-29	3.50E-29	3.52E-29	3.54E-29	3.36E-44
rn219	1.05E-13	1.05E-13	1.05E-13	1.06E-13	1.06E-13	1.07E-13
rn220	2.76E-14	2.85E-14	2.87E-14	2.89E-14	2.90E-14	2.81E-14
rn222	1.61E-07	1.62E-07	1.64E-07	1.66E-07	1.67E-07	1.67E-07
ra222	3.56E-41	3.77E-26	3.79E-26	3.82E-26	3.84E-26	3.63E-41
ra223	2.61E-08	2.62E-08	2.63E-08	2.64E-08	2.65E-08	2.62E-08
ra224	1.57E-10	1.62E-10	1.63E-10	1.64E-10	1.65E-10	1.60E-10
ra225	1.28E-07	1.30E-07	1.31E-07	1.33E-07	1.34E-07	1.34E-07
ra226	2.46E-02	2.48E-02	2.51E-02	2.53E-02	2.55E-02	2.55E-02
ra228	1.23E-10	1.24E-10	1.26E-10	1.27E-10	1.29E-10	1.29E-10
ac225	8.65E-08	8.75E-08	8.86E-08	8.97E-08	9.08E-08	9.08E-08
ac227	1.81E-05	1.82E-05	1.83E-05	1.84E-05	1.85E-05	1.85E-05
ac228	1.50E-14	1.52E-14	1.54E-14	1.55E-14	1.57E-14	1.57E-14
th226	1.74E-39	1.84E-24	1.85E-24	1.86E-24	1.87E-24	1.77E-39
th227	4.21E-08	4.22E-08	4.24E-08	4.26E-08	4.28E-08	4.29E-08
th228	2.99E-08	3.10E-08	3.12E-08	3.13E-08	3.15E-08	3.05E-08
th229	2.49E-02	2.52E-02	2.55E-02	2.58E-02	2.61E-02	2.61E-02
th230	1.20E+00	1.21E+00	1.22E+00	1.23E+00	1.24E+00	1.24E+00
th231	2.71E-09	3.38E-09	3.39E-09	3.39E-09	3.40E-09	2.71E-09
th232	3.01E-01	3.04E-01	3.08E-01	3.11E-01	3.15E-01	3.15E-01
th233	3.38E-28	3.42E-13	3.47E-13	3.51E-13	3.55E-13	3.55E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.72E-02	2.74E-02	2.75E-02	2.76E-02	2.78E-02	2.78E-02
pa232	5.76E-26	5.79E-11	5.82E-11	5.85E-11	5.88E-11	5.89E-26

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ass2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 212
power= 4.890E-04mw, burnup=2.3684E+04mwd, flux= 2.95E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11

pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.68E-36	1.78E-21	1.79E-21	1.81E-21	1.82E-21	1.72E-36
u231	5.70E-32	5.74E-17	5.80E-17	5.86E-17	5.92E-17	5.92E-32
u232	1.06E-06	1.13E-06	1.14E-06	1.14E-06	1.15E-06	1.08E-06
u233	6.17E-01	6.24E-01	6.30E-01	6.36E-01	6.42E-01	6.42E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.93E+02
u237	4.87E-13	4.11E-07	4.11E-07	4.12E-07	4.12E-07	4.36E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.75E-23	3.74E-08	3.75E-08	3.75E-08	3.75E-08	3.75E-23
u240	1.72E-34	1.80E-34	1.89E-34	1.97E-34	2.06E-34	2.06E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.05E-14	1.03E-12	1.03E-12	1.03E-12	1.03E-12	2.60E-14
np236m	2.44E-28	2.44E-13	2.44E-13	2.44E-13	2.44E-13	2.44E-28
np236	2.54E-06	2.54E-06	2.55E-06	2.55E-06	2.56E-06	2.56E-06
np237	4.06E+01	4.06E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01
np238	6.53E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	5.89E-15
np239	1.93E-13	5.41E-06	5.41E-06	5.42E-06	5.42E-06	1.82E-13
np240m	1.47E-36	1.54E-36	1.61E-36	1.68E-36	1.76E-36	1.76E-36
np240	1.99E-38	1.35E-16	1.35E-16	1.35E-16	1.36E-16	2.27E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	4.13E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.92E-11
pu237	1.40E-27	3.43E-14	3.41E-14	3.39E-14	3.37E-14	3.70E-28
pu238	2.63E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.63E-03
pu239	2.95E+01	2.93E+01	2.91E+01	2.89E+01	2.86E+01	2.86E+01
pu240	4.15E-01	4.05E-01	3.95E-01	3.85E-01	3.76E-01	3.76E-01
pu241	1.58E-05	2.01E-05	1.96E-05	1.91E-05	1.87E-05	1.41E-05
pu242	4.76E-05	4.77E-05	4.77E-05	4.78E-05	4.78E-05	4.78E-05
pu243	1.50E-29	1.23E-14	1.23E-14	1.23E-14	1.23E-14	1.52E-29
pu244	8.57E-24	8.98E-24	9.40E-24	9.83E-24	1.03E-23	1.03E-23
pu245	.00E+00	4.54E-35	4.76E-35	4.98E-35	5.20E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	2.13E-35	2.06E-20	2.02E-20	1.97E-20	1.92E-20	1.92E-35
am240	9.73E-33	9.43E-18	9.22E-18	9.00E-18	8.79E-18	8.79E-33
am241	6.28E-04	6.10E-04	5.95E-04	5.81E-04	5.68E-04	5.67E-04
am242m	3.53E-08	3.51E-08	3.43E-08	3.35E-08	3.27E-08	3.18E-08
am242	4.55E-13	2.78E-12	2.72E-12	2.65E-12	2.59E-12	4.11E-13
am243	2.21E-07	2.18E-07	2.14E-07	2.11E-07	2.08E-07	2.08E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	2.04E-31	2.01E-16	1.98E-16	1.95E-16	1.92E-16	1.92E-31
am245	4.77E-40	8.91E-36	9.33E-36	9.76E-36	1.02E-35	4.18E-40
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	5.74E-39	1.99E-23	1.95E-23	1.91E-23	1.86E-23	5.73E-39
cm242	9.20E-11	5.61E-10	5.49E-10	5.36E-10	5.24E-10	8.30E-11
cm243	1.42E-15	1.58E-15	1.54E-15	1.51E-15	1.47E-15	1.28E-15
cm244	2.60E-12	3.15E-12	3.11E-12	3.06E-12	3.02E-12	2.43E-12

1

ses2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 213
power= 4.890E-04mw, burnup=2.3684E+04mwd flux= 2.95E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* g	******* d	******* g	******* d	******* g	******* d
cm245	1.27E-14	1.23E-14	1.19E-14	1.15E-14	1.12E-14	1.12E-14
cm246	1.01E-16	9.79E-17	9.48E-17	9.13E-17	8.81E-17	8.81E-17
cm247	7.89E-20	7.97E-20	8.05E-20	8.12E-20	8.19E-20	8.19E-20
cm248	3.48E-22	3.55E-22	3.62E-22	3.69E-22	3.77E-22	3.77E-22
cm249	.00E+00	1.36E-33	1.39E-33	1.42E-33	1.45E-33	.00E+00
cm250	1.72E-37	1.72E-37	1.72E-37	1.72E-37	1.72E-37	1.72E-37

```
     cm251     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals     3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.94E+07  2.94E+07  2.95E+07  2.95E+07  2.95E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

         cross-section data taken from position number 24 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *              prelim lwr origen-s binary working library--id = 1143         *
         *           made from modified card-image origen-s libraries of scale 4.2    *
         *        data from the light element, actinide, and fission product libraries *
         *          decay data, including gamma and total energy, are from endf/b-vi  *
         *                                                                            *
         *       neutron flux spectrum factors and cross sections were produced from  *
         *      the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                    fission product yields are from endf/b-v                *
         *                                                                            *
         *               photon libraries use an 18-energy-group structure            *
         *              the photon data are from the master photon data base,         *
         *               produced to include bremsstrahlung from uo2 matrix           *
         *                                                                            *
         *          see information above this box (if present) for later updates     *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
       power=    .00mw, burnup=  24130.mwd, flux= 2.95E+07n/cm**2-sec
0                                          basis =
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```
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.286968E+06   1.286217E+06   1.285473E+06   1.284738E+06   1.284011E+06   1.284001E+06
     absorptions  1.048220E+06   1.047862E+06   1.047508E+06   1.047158E+06   1.046813E+06   1.046807E+06
     k infinity   1.227765E+00   1.227468E+00   1.227173E+00   1.226880E+00   1.226590E+00   1.226588E+00
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  1.028791E+06   1.028390E+06   1.027995E+06   1.027604E+06   1.027218E+06   1.027212E+06
     non-actinide
     abs. fracs.  1.833535E-02   1.838240E-02   1.862854E-02   1.867402E-02   1.871920E-02   1.871884E-02
1    sas2h: far-field crit based on b&w 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                fission products          page  215
0                                fraction of total absorption rate
         power=     .00mw, burnup=  26130.mwd, flux= 2.95E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sm149     5.39E-03  5.40E-03  5.40E-03  5.40E-03  5.41E-03  5.41E-03
     nd143     2.29E-03  2.30E-03  2.32E-03  2.33E-03  2.34E-03  2.34E-03
     eu151     1.96E-03  1.96E-03  1.96E-03  1.97E-03  1.97E-03  1.97E-03
     rh103     1.12E-03  1.12E-03  1.13E-03  1.13E-03  1.14E-03  1.14E-03
     xe131     7.46E-04  7.50E-04  7.54E-04  7.57E-04  7.61E-04  7.61E-04
     cs133     5.82E-04  5.84E-04  5.87E-04  5.90E-04  5.93E-04  5.93E-04
     sm147     4.26E-04  4.28E-04  4.30E-04  4.32E-04  4.34E-04  4.34E-04
     tc 99     3.83E-04  3.85E-04  3.86E-04  3.87E-04  3.89E-04  3.89E-04
     nd145     3.28E-04  3.30E-04  3.31E-04  3.33E-04  3.35E-04  3.35E-04
     sm152     2.60E-04  2.62E-04  2.63E-04  2.65E-04  2.66E-04  2.66E-04
     mo 95     2.28E-04  2.29E-04  2.30E-04  2.31E-04  2.32E-04  2.32E-04
     gd155     2.28E-04  2.28E-04  2.28E-04  2.28E-04  2.27E-04  2.27E-04
     sm150     1.74E-04  1.75E-04  1.75E-04  1.76E-04  1.77E-04  1.77E-04
     kr 83     1.40E-04  1.41E-04  1.41E-04  1.42E-04  1.43E-04  1.43E-04
     cs135     1.32E-04  1.32E-04  1.33E-04  1.34E-04  1.34E-04  1.34E-04
     eu153     1.07E-04  1.08E-04  1.08E-04  1.09E-04  1.09E-04  1.09E-04
     ru101     1.02E-04  1.03E-04  1.03E-04  1.04E-04  1.05E-04  1.05E-04
     cd113     1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04  1.03E-04
     pr141     9.85E-05  9.90E-05  9.95E-05  1.00E-04  1.01E-04  1.01E-04
     la139     8.06E-05  8.10E-05  8.14E-05  8.19E-05  8.23E-05  8.23E-05
     gd157     6.02E-05  6.01E-05  5.99E-05  5.98E-05  5.96E-05  5.96E-05
     ag109     4.22E-05  4.25E-05  4.27E-05  4.30E-05  4.32E-05  4.32E-05
     pd105     4.15E-05  4.17E-05  4.19E-05  4.22E-05  4.24E-05  4.24E-05
     ba137     3.91E-05  3.93E-05  3.95E-05  3.97E-05  3.99E-05  3.99E-05
     zr 93     3.14E-05  3.16E-05  3.17E-05  3.19E-05  3.20E-05  3.20E-05
      i129     2.65E-05  2.66E-05  2.68E-05  2.69E-05  2.70E-05  2.70E-05
     nd144     2.51E-05  2.52E-05  2.53E-05  2.55E-05  2.56E-05  2.56E-05
     gd152     2.21E-05  2.23E-05  2.25E-05  2.26E-05  2.28E-05  2.28E-05
     mo 97     1.83E-05  1.84E-05  1.85E-05  1.86E-05  1.87E-05  1.87E-05
     pd108     1.01E-05  1.02E-05  1.03E-05  1.03E-05  1.04E-05  1.04E-05
     zr 91     8.40E-06  8.44E-06  8.49E-06  8.53E-06  8.57E-06  8.57E-06
      y 89     8.04E-06  8.08E-06  8.12E-06  8.16E-06  8.20E-06  8.20E-06
     ru102     7.68E-06  7.72E-06  7.76E-06  7.80E-06  7.84E-06  7.84E-06
     ru 99     6.90E-06  7.02E-06  7.15E-06  7.28E-06  7.40E-06  7.40E-06
     ce142     6.72E-06  6.76E-06  6.79E-06  6.82E-06  6.86E-06  6.86E-06
     sm151     6.61E-06  6.91E-06  6.91E-06  6.91E-06  6.92E-06  6.60E-06
     nd148     6.47E-06  6.50E-06  6.53E-06  6.57E-06  6.60E-06  6.60E-06
     nd146     5.46E-06  5.49E-06  5.52E-06  5.55E-06  5.58E-06  5.58E-06
     pd107     5.10E-06  5.13E-06  5.16E-06  5.19E-06  5.22E-06  5.22E-06
     in115     4.80E-06  4.82E-06  4.84E-06  4.87E-06  4.89E-06  4.89E-06
     ba138     4.65E-06  4.67E-06  4.70E-06  4.72E-06  4.74E-06  4.74E-06
     ce140     4.35E-06  4.37E-06  4.40E-06  4.42E-06  4.44E-06  4.44E-06
     xe132     4.00E-06  4.02E-06  4.04E-06  4.06E-06  4.08E-06  4.08E-06
     mo 98     2.66E-06  2.68E-06  2.69E-06  2.70E-06  2.72E-06  2.72E-06
     mo100     2.60E-06  2.62E-06  2.63E-06  2.64E-06  2.66E-06  2.66E-06
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xe134	2.57E-06	2.59E-06	2.60E-06	2.61E-06	2.62E-06	2.62E-06
zr 92	2.04E-06	2.05E-06	2.06E-06	2.07E-06	2.08E-06	2.08E-06
i127	1.94E-06	1.95E-06	1.96E-06	1.97E-06	1.98E-06	1.98E-06
ru104	1.77E-06	1.78E-06	1.79E-06	1.80E-06	1.81E-06	1.81E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 216
0 fraction of total absorption rate

0 power= .00mw, burnup= 24130.mwd, flux= 2.95E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.59E-06	1.60E-06	1.61E-06	1.62E-06	1.62E-06	1.62E-06
nd150	1.47E-06	1.47E-06	1.48E-06	1.49E-06	1.50E-06	1.50E-06
xe136	1.39E-06	1.40E-06	1.41E-06	1.42E-06	1.42E-06	1.42E-06
cd111	1.15E-06	1.15E-06	1.16E-06	1.16E-06	1.17E-06	1.17E-06
gd154	1.11E-06	1.12E-06	1.13E-06	1.14E-06	1.15E-06	1.15E-06
br 81	1.03E-06	1.04E-06	1.04E-06	1.05E-06	1.05E-06	1.05E-06
rb 85	9.85E-07	9.90E-07	9.95E-07	1.00E-06	1.00E-06	1.00E-06
zr 94	8.60E-07	8.64E-07	8.69E-07	8.73E-07	8.77E-07	8.77E-07
zr 90	7.92E-07	7.96E-07	8.00E-07	8.04E-07	8.08E-07	8.08E-07
ba135	7.08E-07	7.22E-07	7.35E-07	7.49E-07	7.63E-07	7.63E-07
sm154	6.95E-07	6.98E-07	7.02E-07	7.06E-07	7.09E-07	7.09E-07
te130	6.45E-07	6.48E-07	6.51E-07	6.54E-07	6.58E-07	6.58E-07
rb 87	5.66E-07	5.69E-07	5.72E-07	5.75E-07	5.78E-07	5.78E-07
pd106	4.28E-07	4.30E-07	4.32E-07	4.35E-07	4.37E-07	4.37E-07
se 77	4.16E-07	4.18E-07	4.20E-07	4.22E-07	4.24E-07	4.24E-07
gd156	4.08E-07	4.10E-07	4.13E-07	4.15E-07	4.18E-07	4.18E-07
ru100	2.97E-07	3.00E-07	3.03E-07	3.05E-07	3.08E-07	3.08E-07
kr 84	2.70E-07	2.72E-07	2.73E-07	2.74E-07	2.76E-07	2.76E-07
dy161	2.53E-07	2.54E-07	2.56E-07	2.57E-07	2.58E-07	2.58E-07
nd142	2.19E-07	2.22E-07	2.24E-07	2.26E-07	2.28E-07	2.28E-07
sb121	2.21E-07	2.23E-07	2.24E-07	2.25E-07	2.26E-07	2.26E-07
ba134	2.09E-07	2.11E-07	2.13E-07	2.15E-07	2.18E-07	2.18E-07
se 79	2.02E-07	2.03E-07	2.03E-07	2.04E-07	2.05E-07	2.05E-07
sm148	1.90E-07	1.92E-07	1.94E-07	1.96E-07	1.98E-07	1.98E-07
sb123	1.79E-07	1.80E-07	1.81E-07	1.82E-07	1.83E-07	1.83E-07
kr 86	1.50E-07	1.51E-07	1.52E-07	1.53E-07	1.53E-07	1.53E-07
pd104	1.43E-07	1.45E-07	1.46E-07	1.48E-07	1.49E-07	1.49E-07
te128	1.46E-07	1.47E-07	1.47E-07	1.48E-07	1.49E-07	1.49E-07
nb 93	1.12E-07	1.15E-07	1.17E-07	1.19E-07	1.21E-07	1.21E-07
tb159	1.09E-07	1.09E-07	1.10E-07	1.11E-07	1.11E-07	1.11E-07
se 80	9.97E-08	1.00E-07	1.01E-07	1.01E-07	1.02E-07	1.02E-07
te125	9.95E-08	1.00E-07	1.01E-07	1.01E-07	1.02E-07	1.02E-07
gd158	8.58E-08	8.63E-08	8.68E-08	8.73E-08	8.78E-08	8.78E-08
cd112	7.73E-08	7.77E-08	7.81E-08	7.85E-08	7.89E-08	7.89E-08
dy162	5.89E-08	5.93E-08	5.96E-08	6.00E-08	6.04E-08	6.04E-08
ag107	5.57E-08	5.69E-08	5.80E-08	5.92E-08	6.04E-08	6.04E-08
br 79	5.58E-08	5.68E-08	5.79E-08	5.89E-08	6.00E-08	6.00E-08
dy164	5.65E-08	5.68E-08	5.71E-08	5.74E-08	5.77E-08	5.77E-08
cd110	5.31E-08	5.37E-08	5.43E-08	5.49E-08	5.56E-08	5.56E-08
sn117	5.43E-08	5.45E-08	5.48E-08	5.51E-08	5.54E-08	5.54E-08
li 6	5.11E-08	5.14E-08	5.16E-08	5.18E-08	5.21E-08	5.21E-08
mo 96	4.76E-08	4.80E-08	4.85E-08	4.90E-08	4.94E-08	4.94E-08
cd114	4.61E-08	4.64E-08	4.66E-08	4.69E-08	4.72E-08	4.72E-08
eu152	4.70E-08	4.35E-08	4.37E-08	4.39E-08	4.41E-08	4.69E-08
sn119	4.12E-08	4.15E-08	4.17E-08	4.19E-08	4.21E-08	4.21E-08
pd110	3.83E-08	3.85E-08	3.87E-08	3.89E-08	3.91E-08	3.91E-08
sn115	3.77E-08	3.79E-08	3.81E-08	3.83E-08	3.85E-08	3.85E-08
xe129	3.41E-08	3.48E-08	3.55E-08	3.61E-08	3.68E-08	3.68E-08
sr 88	2.76E-08	2.77E-08	2.79E-08	2.80E-08	2.81E-08	2.81E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 217
0 fraction of total absorption rate

```
0          power=     .00mw, burnup=  24130.mwd, flux= 2.95E+07n/cm**2-sec
                 initial ******* d ******* d ******* d ******* d
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xe130	2.33E-08	2.35E-08	2.37E-08	2.40E-08	2.42E-08	2.42E-08
ba136	1.97E-08	1.99E-08	2.00E-08	2.02E-08	2.03E-08	2.03E-08
te126	1.86E-08	1.89E-08	1.92E-08	1.96E-08	1.99E-08	1.99E-08
se 82	1.90E-08	1.91E-08	1.92E-08	1.93E-08	1.94E-08	1.94E-08
sn126	1.58E-08	1.58E-08	1.58E-08	1.59E-08	1.59E-08	1.59E-08
se 78	1.49E-08	1.50E-08	1.50E-08	1.51E-08	1.52E-08	1.52E-08
dy163	1.47E-08	1.48E-08	1.49E-08	1.50E-08	1.51E-08	1.51E-08
kr 82	1.44E-08	1.45E-08	1.46E-08	1.47E-08	1.49E-08	1.49E-08
sn124	1.31E-08	1.31E-08	1.32E-08	1.33E-08	1.33E-08	1.33E-08
eu155	9.55E-09	2.24E-08	2.24E-08	2.23E-08	2.23E-08	9.17E-09
as 75	8.75E-09	8.79E-09	8.83E-09	8.88E-09	8.92E-09	8.92E-09
in113	7.52E-09	7.56E-09	7.60E-09	7.64E-09	7.68E-09	7.68E-09
pm147	7.29E-09	3.30E-08	3.30E-08	3.30E-08	3.30E-08	6.83E-09
sn118	5.27E-09	5.30E-09	5.32E-09	5.35E-09	5.38E-09	5.38E-09
sn122	4.54E-09	4.57E-09	4.59E-09	4.61E-09	4.64E-09	4.64E-09
cd116	4.43E-09	4.45E-09	4.47E-09	4.50E-09	4.52E-09	4.52E-09
eu154	3.47E-09	5.36E-09	5.59E-09	5.62E-09	5.66E-09	3.48E-09
sn120	3.34E-09	3.36E-09	3.37E-09	3.39E-09	3.41E-09	3.41E-09
se 73	2.51E-09	2.53E-09	2.54E-09	2.55E-09	2.57E-09	2.57E-09
sr 90	1.74E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	1.74E-09
ho165	1.46E-09	1.47E-09	1.48E-09	1.49E-09	1.51E-09	1.51E-09
dy160	1.44E-09	1.45E-09	1.47E-09	1.48E-09	1.50E-09	1.50E-09
gd160	1.22E-09	1.22E-09	1.23E-09	1.24E-09	1.25E-09	1.25E-09
xe128	8.40E-10	8.48E-10	8.56E-10	8.65E-10	8.74E-10	8.74E-10
ge 76	8.51E-10	8.56E-10	8.60E-10	8.64E-10	8.68E-10	8.68E-10
sr 86	3.94E-10	3.98E-10	4.01E-10	4.05E-10	4.09E-10	4.09E-10
cs137	4.03E-10	4.60E-10	4.60E-10	4.60E-10	4.61E-10	4.01E-10
sn116	3.17E-10	3.20E-10	3.24E-10	3.27E-10	3.30E-10	3.30E-10
te124	2.81E-10	2.83E-10	2.85E-10	2.88E-10	2.90E-10	2.90E-10
nb 94	1.48E-10	1.48E-10	1.49E-10	1.50E-10	1.52E-10	1.52E-10
sr 87	1.35E-10	1.36E-10	1.37E-10	1.38E-10	1.39E-10	1.39E-10
te122	1.34E-10	1.35E-10	1.36E-10	1.38E-10	1.39E-10	1.39E-10
se 76	1.10E-10	1.11E-10	1.12E-10	1.13E-10	1.14E-10	1.14E-10
cs134	7.72E-11	5.36E-10	5.39E-10	5.42E-10	5.45E-10	7.24E-11
er166	6.92E-11	6.96E-11	7.01E-11	7.05E-11	7.10E-11	7.10E-11
kr 80	5.71E-11	5.81E-11	5.91E-11	6.01E-11	6.12E-11	6.12E-11
ge 74	5.03E-11	5.05E-11	5.08E-11	5.11E-11	5.13E-11	5.13E-11
kr 83	4.66E-11	6.77E-11	6.77E-11	6.78E-11	6.78E-11	4.60E-11
ge 72	3.73E-11	3.75E-11	3.76E-11	3.78E-11	3.80E-11	3.80E-11
er167	8.28E-12	8.38E-12	8.48E-12	8.58E-12	8.68E-12	8.68E-12
te123	6.59E-12	6.69E-12	6.78E-12	6.88E-12	6.97E-12	6.97E-12
cd108	4.12E-12	4.21E-12	4.29E-12	4.37E-12	4.46E-12	4.46E-12
y 90	1.66E-12	1.91E-12	1.91E-12	1.92E-12	1.92E-12	1.65E-12
sb125	5.01E-13	2.15E-12	2.15E-12	2.15E-12	2.15E-12	4.69E-13
ce144	4.33E-13	7.18E-11	7.18E-11	7.19E-11	7.19E-11	3.46E-13
be 9	1.07E-13	1.07E-13	1.08E-13	1.08E-13	1.09E-13	1.09E-13
sn114	8.44E-14	8.53E-14	8.62E-14	8.70E-14	8.79E-14	8.79E-14
ru106	9.49E-14	4.77E-12	4.76E-12	4.75E-12	4.74E-12	7.92E-14
li 7	4.40E-14	4.43E-14	4.45E-14	4.47E-14	4.49E-14	4.49E-14

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1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  218
0                                  fraction of total absorption rate
0          power=     .00mw, burnup=  24130.mwd, flux= 2.95E+07n/cm**2-sec
                 initial ******* d ******* d ******* d ******* d
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sb126	1.81E-14	1.89E-14	1.89E-14	1.89E-14	1.90E-14	1.82E-14
te127m	1.80E-18	1.09E-12	1.09E-12	1.09E-12	1.09E-12	9.84E-19
cd109	8.73E-19	2.08E-17	2.12E-17	2.16E-17	2.20E-17	8.20E-19

1
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 219
power= 4.890E-04mw, burnup=2.4130E+04mwd, flux= 2.95E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
h 1	1.41E-03	1.42E-03	1.42E-03	1.43E-03	1.44E-03	1.44E-03
h 2	4.22E-06	4.24E-06	4.26E-06	4.28E-06	4.30E-06	4.30E-06
h 3	5.34E-12	7.38E-12	7.39E-12	7.40E-12	7.42E-12	5.29E-12
h 4	.00E+00	3.71E-36	3.72E-36	3.73E-36	3.73E-36	.00E+00
he 3	1.81E-08	1.81E-08	1.81E-08	1.82E-08	1.82E-08	1.82E-08
he 4	2.34E-04	2.35E-04	2.36E-04	2.37E-04	2.39E-04	2.39E-04
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	2.81E-05	2.83E-05	2.84E-05	2.85E-05	2.87E-05	2.87E-05
ne 21	1.20E-08	1.21E-08	1.22E-08	1.23E-08	1.24E-08	1.24E-08
ne 22	1.85E-07	1.86E-07	1.87E-07	1.88E-07	1.89E-07	1.89E-07
ne 23	8.86E-31	8.85E-16	8.85E-16	8.86E-16	8.86E-16	8.86E-31
na 22	1.14E-12	5.25E-12	5.25E-12	5.26E-12	5.26E-12	1.06E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.22E-24	3.22E-09	3.22E-09	3.22E-09	3.22E-09	3.22E-24
na 24m	5.30E-31	5.29E-16	5.29E-16	5.29E-16	5.30E-16	5.30E-31
na 25	4.33E-39	4.36E-24	4.41E-24	4.45E-24	4.49E-24	4.49E-39
mg 24	1.82E-01	1.83E-01	1.83E-01	1.84E-01	1.85E-01	1.85E-01
mg 25	1.24E-06	1.25E-06	1.26E-06	1.28E-06	1.29E-06	1.29E-06
mg 26	4.21E-06	4.23E-06	4.25E-06	4.27E-06	4.29E-06	4.29E-06
mg 27	2.64E-28	2.64E-13	2.64E-13	2.64E-13	2.64E-13	2.64E-28
mg 28	.00E+00	6.66E-26	6.67E-26	6.67E-26	6.68E-26	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.39E-26	2.39E-11	2.39E-11	2.39E-11	2.39E-11	2.39E-26
al 29	3.53E-37	3.55E-22	3.59E-22	3.62E-22	3.66E-22	3.66E-37
al 30	.00E+00	1.09E-31	1.10E-31	1.12E-31	1.14E-31	.00E+00
si 28	5.29E-01	5.31E-01	5.34E-01	5.36E-01	5.39E-01	5.39E-01
si 29	1.13E-05	1.14E-05	1.15E-05	1.16E-05	1.17E-05	1.17E-05
si 30	2.57E-10	2.61E-10	2.64E-10	2.68E-10	2.72E-10	2.72E-10
si 31	2.28E-38	2.31E-23	2.35E-23	2.38E-23	2.42E-23	2.42E-38
si 32	4.83E-30	5.01E-30	5.10E-30	5.18E-30	5.25E-30	5.13E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		2.95E+07	2.95E+07	2.95E+07	2.95E+07	2.95E-08

1
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 220
power= 4.890E-04mw, burnup=2.4130E+04mwd, flux= 2.95E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	5.08E+01	5.14E+01	5.21E+01	5.27E+01	5.33E+01	5.33E+01
pb206	3.26E-01	3.33E-01	3.40E-01	3.47E-01	3.54E-01	3.54E-01
pb207	1.98E-02	2.02E-02	2.05E-02	2.09E-02	2.13E-02	2.13E-02
pb208	7.63E-04	7.70E-04	7.77E-04	7.84E-04	7.91E-04	7.92E-04
pb209	1.23E-09	1.24E-09	1.26E-09	1.27E-09	1.29E-09	1.29E-09
pb210	3.56E-04	3.59E-04	3.62E-04	3.66E-04	3.69E-04	3.69E-04
pb211	5.83E-11	5.85E-11	5.87E-11	5.90E-11	5.93E-11	5.94E-11
pb212	1.94E-11	2.01E-11	2.02E-11	2.03E-11	2.04E-11	1.97E-11
pb214	8.13E-10	8.21E-10	8.28E-10	8.35E-10	8.43E-10	8.43E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.91E-02	6.05E-02	6.20E-02	6.35E-02	6.49E-02	6.50E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.19E-07	2.21E-07	2.23E-07	2.25E-07	2.27E-07	2.27E-07
bi211	3.46E-12	3.47E-12	3.48E-12	3.50E-12	3.51E-12	3.52E-12
bi212	1.84E-12	1.91E-12	1.92E-12	1.93E-12	1.93E-12	1.87E-12
bi213	2.87E-10	2.91E-10	2.94E-10	2.98E-10	3.01E-10	3.01E-10

bi214	6.04E-10	6.09E-10	6.15E-10	6.20E-10	6.26E-10	6.26E-10
po210	6.05E-06	6.10E-06	6.16E-06	6.21E-06	6.27E-06	6.27E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.82E-17	3.83E-17	3.85E-17	3.87E-17	3.88E-17	3.89E-17
po212	9.64E-23	1.00E-22	1.01E-22	1.01E-22	1.02E-22	9.82E-23
po213	4.32E-19	4.37E-19	4.42E-19	4.47E-19	4.52E-19	4.52E-19
po214	8.31E-17	8.38E-17	8.46E-17	8.53E-17	8.61E-17	8.61E-17
po215	4.79E-17	4.81E-17	4.83E-17	4.85E-17	4.87E-17	4.88E-17
po216	7.33E-17	7.60E-17	7.64E-17	7.68E-17	7.72E-17	7.46E-17
po218	9.41E-11	9.49E-11	9.58E-11	9.67E-11	9.75E-11	9.75E-11
rn218	3.36E-44	3.55E-29	3.57E-29	3.59E-29	3.61E-29	3.36E-44
rn219	1.07E-13	1.07E-13	1.07E-13	1.08E-13	1.08E-13	1.09E-13
rn220	2.81E-14	2.92E-14	2.93E-14	2.95E-14	2.96E-14	2.86E-14
rn222	1.67E-07	1.69E-07	1.70E-07	1.72E-07	1.73E-07	1.73E-07
ra222	3.63E-41	3.85E-26	3.88E-26	3.90E-26	3.92E-26	3.70E-41
ra223	2.66E-08	2.67E-08	2.68E-08	2.69E-08	2.70E-08	2.71E-08
ra224	1.60E-10	1.66E-10	1.67E-10	1.68E-10	1.68E-10	1.63E-10
ra225	1.34E-07	1.36E-07	1.38E-07	1.39E-07	1.41E-07	1.41E-07
ra226	2.55E-02	2.58E-02	2.60E-02	2.62E-02	2.65E-02	2.65E-02
ra228	1.29E-10	1.30E-10	1.32E-10	1.33E-10	1.35E-10	1.35E-10
ac225	9.08E-08	9.19E-08	9.29E-08	9.40E-08	9.51E-08	9.51E-08
ac227	1.85E-05	1.85E-05	1.86E-05	1.87E-05	1.88E-05	1.88E-05
ac228	1.57E-14	1.59E-14	1.61E-14	1.63E-14	1.64E-14	1.64E-14
th226	1.77E-39	1.88E-24	1.89E-24	1.90E-24	1.91E-24	1.80E-39
th227	4.29E-08	4.30E-08	4.32E-08	4.34E-08	4.36E-08	4.37E-08
th228	3.05E-08	3.17E-08	3.18E-08	3.20E-08	3.22E-08	3.10E-08
th229	2.61E-02	2.64E-02	2.67E-02	2.71E-02	2.74E-02	2.74E-02
th230	1.24E+00	1.25E+00	1.27E+00	1.28E+00	1.29E+00	1.29E+00
th231	2.71E-09	3.41E-09	3.41E-09	3.42E-09	3.42E-09	2.71E-09
th232	3.15E-01	3.18E-01	3.22E-01	3.26E-01	3.29E-01	3.29E-01
th233	3.35E-28	3.59E-13	3.63E-13	3.68E-13	3.72E-13	3.72E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.76E-02	2.79E-02	2.80E-02	2.82E-02	2.83E-02	2.83E-02
pa232	5.89E-26	5.92E-11	5.95E-11	5.98E-11	6.01E-11	6.01E-26

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 221
power= 4.690E-04mw, burnup=2.4130E+04mwd, flux= 2.95E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.72E-36	1.82E-21	1.83E-21	1.84E-21	1.85E-21	1.75E-36
u231	5.92E-32	5.97E-17	6.03E-17	6.09E-17	6.14E-17	6.15E-32
u232	1.08E-06	1.15E-06	1.16E-06	1.17E-06	1.17E-06	1.10E-06
u233	6.42E-01	6.48E-01	6.54E-01	6.60E-01	6.66E-01	6.66E-01
u234	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.93E+02	1.93E+02	1.93E+02	1.93E+02	1.94E+02	1.94E+02
u237	4.36E-15	4.12E-07	4.12E-07	4.13E-07	4.13E-07	3.95E-15
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.75E-23	3.75E-08	3.75E-08	3.75E-08	3.75E-08	3.75E-23
u240	2.06E-34	2.15E-34	2.24E-34	2.34E-34	2.43E-34	2.43E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.40E-14	1.03E-12	1.03E-12	1.03E-12	1.03E-12	2.21E-14
np236m	2.44E-28	2.44E-13	2.44E-13	2.44E-13	2.44E-13	2.44E-28
np236	2.56E-06	2.56E-06	2.57E-06	2.57E-06	2.58E-06	2.58E-06
np237	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01

```
     np238   5.89E-15  1.82E-07  1.82E-07  1.82E-07  1.82E-07  5.38E-15
     np239   1.82E-13  5.42E-06  5.42E-06  5.42E-06  5.42E-06  1.73E-13
     np240m  1.76E-36  1.84E-36  1.91E-36  1.99E-36  2.07E-36  2.07E-36
     np240   2.27E-38  1.35E-16  1.36E-16  1.36E-16  1.36E-16  2.57E-38
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   3.92E-11  1.38E-10  1.38E-10  1.38E-10  1.38E-10  3.73E-11
     pu237   3.70E-28  3.35E-14  3.33E-14  3.31E-14  3.29E-14  1.12E-28
     pu238   2.63E-03  2.75E-03  2.75E-03  2.75E-03  2.75E-03  2.62E-03
     pu239   2.86E+01  2.84E+01  2.82E+01  2.81E+01  2.79E+01  2.79E+01
     pu240   3.76E-01  3.67E-01  3.59E-01  3.52E-01  3.44E-01  3.44E-01
     pu241   1.41E-05  1.82E-05  1.78E-05  1.75E-05  1.71E-05  1.28E-05
     pu242   4.78E-05  4.79E-05  4.79E-05  4.80E-05  4.80E-05  4.80E-05
     pu243   1.52E-29  1.23E-14  1.23E-14  1.24E-14  1.24E-14  1.54E-29
     pu244   1.03E-23  1.07E-23  1.12E-23  1.16E-23  1.21E-23  1.21E-23
     pu245    .00E+00  5.43E-35  5.66E-35  5.90E-35  6.14E-35   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.92E-35  1.87E-20  1.83E-20  1.79E-20  1.76E-20  1.76E-35
     am240   8.79E-33  8.54E-18  8.37E-18  8.20E-18  8.04E-18  8.03E-33
     am241   5.67E-04  5.52E-04  5.41E-04  5.30E-04  5.19E-04  5.18E-04
     am242m  3.18E-08  3.18E-08  3.12E-08  3.06E-08  3.00E-08  2.91E-08
     am242   4.11E-13  2.32E-12  2.47E-12  2.42E-12  2.37E-12  3.75E-13
     am243   2.08E-07  2.05E-07  2.03E-07  2.01E-07  1.98E-07  1.98E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.92E-31  1.90E-16  1.87E-16  1.85E-16  1.83E-16  1.83E-31
     am245   4.18E-40  1.06E-35  1.11E-35  1.16E-35  1.20E-35  3.73E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   5.73E-39  1.81E-23  1.77E-23  1.74E-23  1.71E-23  1.26E-43
     cm242   8.30E-11  5.09E-10  4.99E-10  4.89E-10  4.79E-10  7.58E-11
     cm243   1.28E-15  1.43E-15  1.40E-15  1.38E-15  1.35E-15  1.17E-15
     cm244   2.43E-12  2.98E-12  2.95E-12  2.91E-12  2.88E-12  2.29E-12
1
     sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page  222
       power= 4.890E-04mw, burnup=2.4130E+04mwd, flux= 2.95E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
     cm245   1.12E-14  1.08E-14  1.05E-14  1.02E-14  9.86E-15  9.85E-15
     cm246   8.81E-17  8.50E-17  8.22E-17  7.94E-17  7.67E-17  7.67E-17
     cm247   8.19E-20  8.26E-20  8.33E-20  8.39E-20  8.45E-20  8.45E-20
     cm248   3.77E-22  3.84E-22  3.92E-22  3.99E-22  4.07E-22  4.07E-22
     cm249    .00E+00  1.48E-33  1.51E-33  1.54E-33  1.57E-33   .00E+00
     cm250   1.72E-37  1.73E-37  1.73E-37  1.74E-37  1.74E-37  1.74E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.95E+07  2.95E+07  2.95E+07  2.95E+07  2.95E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 25 of library on unit 33.

          pass   1
          pass   0
          'scale-system control module sas2 library'
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
```

```
          pass n applies mid time densities of nth library interval
        first library updated was...
        pass   1
        pass   0
        "scale-system control module sas2 library"
        used a time-dependent neutron spectrum, for each of the above passes
          pass 0 applies start-up fuel densities
          pass n applies mid time densities of nth library interval
        first library updated was...
        ***********************************************************************
        *                                                                     *
        *              prelim lwr origen-s binary working library--id = 1143  *
        *           made from modified card-image origen-s libraries of scale 4.2 *
        *        data from the light element, actinide, and fission product libraries *
        *          decay data, including gamma and total energy, are from endf/b-vi *
        *                                                                     *
        *        neutron flux spectrum factors and cross sections were produced from *
        *      the "pressz" case updating all nuclides on the scale "burnup" library *
        *                                                                     *
        *                    fission product yields are from endf/b-v         *
        *                                                                     *
        *              photon libraries use an 18-energy-group structure      *
        *             the photon data are from the master photon data base,   *
        *              produced to include bremsstrahlung from uo2 matrix     *
        *                                                                     *
        *         see information above this box (if present) for later updates *
        *                                                                     *
        ***********************************************************************
0       *                                                                     *
        ***********************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                 1697    total number of nuclides in library
                   689    number of light-element nuclides
                   129    number of actinide nuclides
                   879    number of fission product nuclides
0                 7993    number of nonzero off-diagonal matrix elements
0       ***********************************************************************
0
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  223
        power=    .00mw, burnup=  24577.mwd, flux= 2.95E+07n/cm**2-sec
0                                          basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     productions  1.284710E+06  1.283989E+06  1.283275E+06  1.282569E+06  1.281870E+06  1.281861E+06
     absorptions  1.047033E+06  1.046691E+06  1.046354E+06  1.046020E+06  1.045690E+06  1.045685E+06
     k infinity   1.227001E+00  1.226712E+00  1.226426E+00  1.226142E+00  1.225860E+00  1.225858E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
     actinide
     absorptions  1.027433E+06  1.027051E+06  1.026673E+06  1.026300E+06  1.025931E+06  1.025926E+06
     non-actinide
     abs. fracs.  1.871938E-02  1.876446E-02  1.880848E-02  1.885235E-02  1.889551E-02  1.889545E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  224
0                                 fraction of total absorption rate
        power=    .00mw, burnup=  24577.mwd, flux= 2.95E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

     sm149     5.41E-03  5.41E-03  5.41E-03  5.41E-03  5.42E-03  5.42E-03
     nd143     2.34E-03  2.35E-03  2.36E-03  2.37E-03  2.38E-03  2.38E-03
     eu151     1.97E-03  1.98E-03  1.98E-03  1.99E-03  1.99E-03  1.99E-03
```

rh103	1.14E-03	1.15E-03	1.15E-03	1.16E-03	1.16E-03	1.16E-03
xe131	7.61E-04	7.64E-04	7.68E-04	7.72E-04	7.75E-04	7.75E-04
cs133	5.93E-04	5.96E-04	5.99E-04	6.02E-04	6.05E-04	6.05E-04
sm147	4.34E-04	4.36E-04	4.38E-04	4.40E-04	4.42E-04	4.42E-04
tc 99	3.88E-04	3.90E-04	3.91E-04	3.92E-04	3.94E-04	3.94E-04
nd145	3.35E-04	3.36E-04	3.38E-04	3.40E-04	3.41E-04	3.41E-04
sm152	2.66E-04	2.68E-04	2.69E-04	2.71E-04	2.72E-04	2.72E-04
mo 95	2.32E-04	2.33E-04	2.34E-04	2.35E-04	2.37E-04	2.37E-04
gd155	2.27E-04	2.27E-04	2.27E-04	2.26E-04	2.26E-04	2.26E-04
sm150	1.77E-04	1.78E-04	1.79E-04	1.80E-04	1.81E-04	1.81E-04
kr 83	1.43E-04	1.43E-04	1.44E-04	1.45E-04	1.45E-04	1.45E-04
cs135	1.34E-04	1.35E-04	1.36E-04	1.36E-04	1.37E-04	1.37E-04
eu153	1.09E-04	1.10E-04	1.11E-04	1.11E-04	1.12E-04	1.12E-04
ru101	1.04E-04	1.05E-04	1.05E-04	1.06E-04	1.07E-04	1.07E-04
cd113	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04	1.03E-04
pr141	1.01E-04	1.01E-04	1.02E-04	1.02E-04	1.03E-04	1.03E-04
la139	8.23E-05	8.27E-05	8.31E-05	8.35E-05	8.39E-05	8.39E-05
gd157	5.96E-05	5.95E-05	5.93E-05	5.92E-05	5.90E-05	5.90E-05
ag109	4.32E-05	4.34E-05	4.37E-05	4.39E-05	4.42E-05	4.42E-05
pd105	4.24E-05	4.26E-05	4.28E-05	4.30E-05	4.32E-05	4.32E-05
ba137	3.99E-05	4.01E-05	4.03E-05	4.05E-05	4.07E-05	4.07E-05
zr 93	3.20E-05	3.21E-05	3.23E-05	3.24E-05	3.26E-05	3.26E-05
i129	2.70E-05	2.72E-05	2.73E-05	2.74E-05	2.76E-05	2.76E-05
nd144	2.56E-05	2.57E-05	2.59E-05	2.60E-05	2.61E-05	2.61E-05
gd152	2.28E-05	2.30E-05	2.32E-05	2.34E-05	2.36E-05	2.36E-05
mo 97	1.87E-05	1.88E-05	1.89E-05	1.90E-05	1.91E-05	1.91E-05
pd108	1.04E-05	1.04E-05	1.05E-05	1.05E-05	1.06E-05	1.06E-05
zr 91	8.57E-06	8.61E-06	8.66E-06	8.70E-06	8.74E-06	8.74E-06
y 89	8.20E-06	8.24E-06	8.28E-06	8.32E-06	8.36E-06	8.36E-06
ru102	7.84E-06	7.88E-06	7.92E-06	7.96E-06	7.99E-06	7.99E-06
ru 99	7.40E-06	7.53E-06	7.66E-06	7.79E-06	7.92E-06	7.92E-06
ce142	6.86E-06	6.90E-06	6.93E-06	6.96E-06	7.00E-06	7.00E-06
nd148	6.60E-06	6.63E-06	6.67E-06	6.70E-06	6.73E-06	6.73E-06
sm151	6.61E-06	6.92E-06	6.93E-06	6.93E-06	6.93E-06	6.61E-06
nd146	5.58E-06	5.61E-06	5.63E-06	5.66E-06	5.69E-06	5.69E-06
pd107	5.22E-06	5.25E-06	5.28E-06	5.30E-06	5.33E-06	5.33E-06
in115	4.89E-06	4.92E-06	4.94E-06	4.96E-06	4.99E-06	4.99E-06
ba138	4.74E-06	4.77E-06	4.79E-06	4.81E-06	4.84E-06	4.84E-06
ce140	4.44E-06	4.46E-06	4.49E-06	4.51E-06	4.53E-06	4.53E-06
xe132	4.08E-06	4.10E-06	4.12E-06	4.14E-06	4.16E-06	4.16E-06
mo 98	2.72E-06	2.73E-06	2.74E-06	2.76E-06	2.77E-06	2.77E-06
mo100	2.66E-06	2.67E-06	2.68E-06	2.69E-06	2.71E-06	2.71E-06
xe134	2.62E-06	2.64E-06	2.65E-06	2.66E-06	2.68E-06	2.68E-06
xr 92	2.08E-06	2.09E-06	2.10E-06	2.11E-06	2.12E-06	2.12E-06
i127	1.98E-06	1.99E-06	2.00E-06	2.01E-06	2.02E-06	2.02E-06
ru104	1.81E-06	1.82E-06	1.83E-06	1.84E-06	1.85E-06	1.85E-06

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 225

0 fraction of total absorption rate

0 power= .00mw, burnup= 24577.mwd, flux= 2.95E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d

zr 96	1.62E-06	1.63E-06	1.64E-06	1.65E-06	1.65E-06	1.65E-06
nd150	1.50E-06	1.50E-06	1.51E-06	1.52E-06	1.53E-06	1.53E-06
xe136	1.42E-06	1.43E-06	1.44E-06	1.44E-06	1.45E-06	1.45E-06
gd154	1.15E-06	1.17E-06	1.18E-06	1.19E-06	1.20E-06	1.20E-06
cd111	1.17E-06	1.18E-06	1.18E-06	1.19E-06	1.20E-06	1.20E-06
br 81	1.05E-06	1.06E-06	1.06E-06	1.07E-06	1.07E-06	1.07E-06
rb 85	1.00E-06	1.01E-06	1.01E-06	1.02E-06	1.02E-06	1.02E-06
zr 94	8.77E-07	8.81E-07	8.86E-07	8.90E-07	8.94E-07	8.94E-07
zr 90	8.08E-07	8.12E-07	8.16E-07	8.20E-07	8.24E-07	8.24E-07

ba135	7.63E-07	7.77E-07	7.91E-07	8.04E-07	8.18E-07	8.19E-07
sm154	7.09E-07	7.13E-07	7.16E-07	7.20E-07	7.24E-07	7.24E-07
te130	6.58E-07	6.61E-07	6.64E-07	6.68E-07	6.71E-07	6.71E-07
rb 87	5.78E-07	5.81E-07	5.83E-07	5.86E-07	5.89E-07	5.89E-07
pd106	4.37E-07	4.39E-07	4.41E-07	4.44E-07	4.46E-07	4.46E-07
se 77	4.24E-07	4.26E-07	4.29E-07	4.31E-07	4.33E-07	4.33E-07
gd156	4.17E-07	4.20E-07	4.22E-07	4.24E-07	4.27E-07	4.27E-07
ru100	3.08E-07	3.11E-07	3.14E-07	3.17E-07	3.20E-07	3.20E-07
kr 84	2.76E-07	2.77E-07	2.78E-07	2.80E-07	2.81E-07	2.81E-07
dy161	2.58E-07	2.60E-07	2.61E-07	2.63E-07	2.64E-07	2.64E-07
nd142	2.28E-07	2.30E-07	2.33E-07	2.35E-07	2.37E-07	2.37E-07
sb121	2.26E-07	2.27E-07	2.28E-07	2.29E-07	2.31E-07	2.31E-07
ba134	2.18E-07	2.20E-07	2.22E-07	2.24E-07	2.26E-07	2.26E-07
se 79	2.05E-07	2.06E-07	2.07E-07	2.08E-07	2.08E-07	2.08E-07
sm148	1.98E-07	2.00E-07	2.02E-07	2.04E-07	2.05E-07	2.05E-07
sb123	1.83E-07	1.83E-07	1.84E-07	1.85E-07	1.86E-07	1.86E-07
kr 86	1.53E-07	1.54E-07	1.55E-07	1.56E-07	1.56E-07	1.56E-07
pd104	1.49E-07	1.51E-07	1.52E-07	1.53E-07	1.55E-07	1.55E-07
te128	1.49E-07	1.50E-07	1.50E-07	1.51E-07	1.52E-07	1.52E-07
nb 93	1.21E-07	1.23E-07	1.25E-07	1.28E-07	1.30E-07	1.30E-07
tb159	1.11E-07	1.12E-07	1.12E-07	1.13E-07	1.14E-07	1.14E-07
se 80	1.02E-07	1.02E-07	1.03E-07	1.03E-07	1.04E-07	1.04E-07
te125	1.02E-07	1.02E-07	1.03E-07	1.03E-07	1.04E-07	1.04E-07
gd158	8.78E-08	8.83E-08	8.87E-08	8.92E-08	8.97E-08	8.97E-08
cd112	7.89E-08	7.94E-08	7.98E-08	8.02E-08	8.06E-08	8.06E-08
ag107	6.04E-08	6.16E-08	6.28E-08	6.40E-08	6.52E-08	6.52E-08
br 79	6.00E-08	6.10E-08	6.21E-08	6.32E-08	6.42E-08	6.42E-08
dy162	6.04E-08	6.08E-08	6.12E-08	6.14E-08	6.19E-08	6.19E-08
dy164	5.77E-08	5.80E-08	5.83E-08	5.86E-08	5.88E-08	5.88E-08
cd110	5.56E-08	5.62E-08	5.68E-08	5.75E-08	5.81E-08	5.81E-08
sn117	5.54E-08	5.57E-08	5.60E-08	5.63E-08	5.65E-08	5.65E-08
li 6	5.21E-08	5.23E-08	5.25E-08	5.28E-08	5.30E-08	5.30E-08
mo 96	4.94E-08	4.99E-08	5.04E-08	5.09E-08	5.13E-08	5.13E-08
cd114	4.71E-08	4.74E-08	4.76E-08	4.79E-08	4.81E-08	4.81E-08
eu152	4.69E-08	6.43E-08	6.44E-08	6.46E-08	6.48E-08	4.68E-08
sn119	4.21E-08	4.23E-08	4.25E-08	4.28E-08	4.30E-08	4.30E-08
pd110	3.91E-08	3.93E-08	3.96E-08	3.98E-08	4.00E-08	4.00E-08
xe129	3.68E-08	3.75E-08	3.82E-08	3.88E-08	3.95E-08	3.95E-08
sn115	3.85E-08	3.87E-08	3.89E-08	3.91E-08	3.93E-08	3.93E-08
sr 88	2.81E-08	2.83E-08	2.84E-08	2.86E-08	2.87E-08	2.87E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 226
0 fraction of total absorption rate
power= .00mw, burnup= 24577.mwd, flux= 2.95E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

xe130	2.42E-08	2.44E-08	2.46E-08	2.49E-08	2.51E-08	2.51E-08
te126	1.99E-08	2.02E-08	2.06E-08	2.09E-08	2.12E-08	2.12E-08
ba136	2.03E-08	2.05E-08	2.07E-08	2.08E-08	2.10E-08	2.10E-08
se 82	1.94E-08	1.95E-08	1.96E-08	1.97E-08	1.98E-08	1.98E-08
sn126	1.59E-08	1.59E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08
se 78	1.52E-08	1.53E-08	1.54E-08	1.54E-08	1.55E-08	1.55E-08
dy163	1.51E-08	1.52E-08	1.53E-08	1.54E-08	1.55E-08	1.55E-08
kr 82	1.49E-08	1.50E-08	1.51E-08	1.52E-08	1.53E-08	1.53E-08
sn124	1.33E-08	1.34E-08	1.35E-08	1.35E-08	1.36E-08	1.36E-08
se 75	8.92E-09	8.97E-09	9.01E-09	9.06E-09	9.10E-09	9.10E-09
eu155	9.17E-09	2.23E-08	2.23E-08	2.22E-08	2.22E-08	8.80E-09
in113	7.68E-09	7.71E-09	7.75E-09	7.79E-09	7.83E-09	7.83E-09
pm147	6.83E-09	3.30E-08	3.30E-08	3.30E-08	3.30E-08	6.40E-09
sn118	5.37E-09	5.40E-09	5.43E-09	5.46E-09	5.48E-09	5.48E-09
sn122	4.64E-09	4.66E-09	4.68E-09	4.71E-09	4.73E-09	4.73E-09

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     cd116     4.52E-09  4.54E-09  4.56E-09  4.59E-09  4.61E-09  4.61E-09
     eu154     3.49E-09  3.69E-09  3.72E-09  3.76E-09  3.79E-09  3.80E-09
     sn120     3.41E-09  3.43E-09  3.44E-09  3.46E-09  3.48E-09  3.48E-09
     ge 73     2.57E-09  2.58E-09  2.59E-09  2.61E-09  2.62E-09  2.62E-09
     sr 90     1.74E-09  2.01E-09  2.02E-09  2.02E-09  2.02E-09  1.73E-09
     dy160     1.50E-09  1.51E-09  1.53E-09  1.55E-09  1.56E-09  1.56E-09
     ho165     1.51E-09  1.52E-09  1.53E-09  1.54E-09  1.55E-09  1.55E-09
     gd160     1.25E-09  1.25E-09  1.26E-09  1.27E-09  1.27E-09  1.27E-09
     xe128     8.74E-10  8.83E-10  8.91E-10  9.00E-10  9.09E-10  9.09E-10
     ge 76     8.68E-10  8.73E-10  8.77E-10  8.81E-10  8.86E-10  8.86E-10
     sr 86     4.09E-10  4.13E-10  4.17E-10  4.20E-10  4.24E-10  4.24E-10
     cs137     4.01E-10  4.61E-10  4.61E-10  4.61E-10  4.61E-10  3.09E-10
     sn116     3.30E-10  3.33E-10  3.36E-10  3.40E-10  3.43E-10  3.43E-10
     te124     2.90E-10  2.92E-10  2.94E-10  2.97E-10  2.99E-10  2.99E-10
     nb 94     1.51E-10  1.53E-10  1.54E-10  1.55E-10  1.56E-10  1.56E-10
     te122     1.39E-10  1.40E-10  1.42E-10  1.43E-10  1.45E-10  1.45E-10
     sr 87     1.39E-10  1.40E-10  1.41E-10  1.43E-10  1.44E-10  1.44E-10
     se 76     1.14E-10  1.15E-10  1.16E-10  1.17E-10  1.18E-10  1.18E-10
     er166     7.10E-11  7.15E-11  7.19E-11  7.24E-11  7.29E-11  7.29E-11
     cs134     7.24E-11  5.48E-10  5.51E-10  5.54E-10  5.57E-10  6.79E-11
     kr 80     6.12E-11  6.23E-11  6.33E-11  6.44E-11  6.56E-11  6.56E-11
     ge 74     5.13E-11  5.16E-11  5.18E-11  5.21E-11  5.24E-11  5.24E-11
     kr 85     4.60E-11  6.79E-11  6.79E-11  6.79E-11  6.80E-11  4.44E-11
     ge 72     3.81E-11  3.82E-11  3.84E-11  3.86E-11  3.88E-11  3.88E-11
     er167     8.68E-12  8.78E-12  8.88E-12  8.98E-12  9.09E-12  9.09E-12
     te123     6.97E-12  7.07E-12  7.17E-12  7.27E-12  7.37E-12  7.37E-12
     cd108     4.46E-12  4.55E-12  4.64E-12  4.73E-12  4.83E-12  4.83E-12
      y 90     1.65E-12  1.92E-12  1.92E-12  1.92E-12  1.92E-12  1.65E-12
     sb125     4.69E-13  2.15E-12  2.14E-12  2.14E-12  2.14E-12  4.58E-13
     ce144     3.46E-13  7.19E-11  7.20E-11  7.20E-11  7.20E-11  2.77E-13
     be  9     1.09E-13  1.09E-13  1.10E-13  1.10E-13  1.11E-13  1.11E-13
     sn114     8.80E-14  8.88E-14  8.97E-14  9.06E-14  9.15E-14  9.15E-14
     ru106     7.92E-14  4.73E-12  4.72E-12  4.71E-12  4.70E-12  6.62E-14
     li  7     4.50E-14  4.52E-14  4.54E-14  4.56E-14  4.58E-14  4.58E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  227
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  24577.mwd, flux= 2.95E+07n/cm**2-sec
0            initial ******* d ******* d ******* d ******* d ******* d

     sb126     1.82E-14  1.90E-14  1.91E-14  1.91E-14  1.91E-14  1.84E-14
     cd109     8.18E-19  2.24E-17  2.28E-17  2.33E-17  2.37E-17  7.65E-19
     te127m    9.82E-19  1.09E-12  1.09E-12  1.09E-12  1.09E-12  5.46E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  228
       power= 4.890E-04mw, burnup=2.4577E+04mwd, flux= 2.95E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1   1.46E-03  1.46E-03  1.45E-03  1.46E-03  1.46E-03  1.46E-03
      h  2   4.30E-06  4.32E-06  4.34E-06  4.36E-06  4.38E-06  4.38E-06
      h  3   5.29E-12  7.42E-12  7.43E-12  7.44E-12  7.45E-12  5.24E-12
      h  4    .00E+00  3.74E-36  3.75E-36  3.75E-36  3.76E-36   .00E+00
     he  3   1.82E-08  1.83E-08  1.83E-08  1.83E-08  1.84E-08  1.84E-08
     he  4   2.39E-04  2.40E-04  2.41E-04  2.42E-04  2.43E-04  2.43E-04
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   2.87E-05  2.88E-05  2.89E-05  2.91E-05  2.92E-05  2.92E-05
     ne 21   1.24E-08  1.26E-08  1.27E-08  1.28E-08  1.29E-08  1.29E-08
     ne 22   1.89E-07  1.90E-07  1.91E-07  1.91E-07  1.92E-07  1.92E-07
     ne 23   8.86E-31  8.85E-16  8.86E-16  8.86E-16  8.87E-16  8.87E-31
     na 22   1.06E-12  5.25E-12  5.25E-12  5.26E-12  5.26E-12  9.93E-13
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na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.22E-24	3.22E-09	3.22E-09	3.22E-09	3.23E-09	3.23E-24
na 24m	5.30E-31	5.29E-16	5.30E-16	5.30E-16	5.30E-16	5.30E-31
na 25	4.49E-39	4.53E-24	4.57E-24	4.61E-24	4.66E-24	4.66E-39
mg 24	1.83E-01	1.86E-01	1.87E-01	1.88E-01	1.88E-01	1.88E-01
mg 25	1.29E-06	1.30E-06	1.31E-06	1.32E-06	1.33E-06	1.33E-06
mg 26	4.29E-06	4.31E-06	4.33E-06	4.35E-06	4.37E-06	4.37E-06
mg 27	2.64E-28	2.64E-13	2.64E-13	2.64E-13	2.64E-13	2.64E-28
mg 28	.00E+00	6.68E-26	6.68E-26	6.69E-26	6.70E-26	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.39E-26	2.39E-11	2.39E-11	2.39E-11	2.39E-11	2.39E-26
al 29	3.66E-37	3.69E-22	3.73E-22	3.76E-22	3.80E-22	3.80E-37
al 30	.00E+00	1.15E-31	1.17E-31	1.18E-31	1.20E-31	.00E+00
si 28	5.39E-01	5.41E-01	5.44E-01	5.46E-01	5.48E-01	5.48E-01
si 29	1.17E-05	1.18E-05	1.19E-05	1.20E-05	1.21E-05	1.21E-05
si 30	2.72E-10	2.76E-10	2.79E-10	2.83E-10	2.87E-10	2.87E-10
si 31	2.42E-38	2.45E-23	2.49E-23	2.52E-23	2.56E-23	2.56E-38
si 32	5.13E-30	5.32E-30	5.41E-30	5.49E-30	5.58E-30	5.44E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.95E+07	2.95E+07	2.95E+07	2.96E+07	2.96E-08

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 229
power= 4.890E-04mw, burnup=2.4577E+04mwd, flux= 2.95E+07n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d	******* d
he 4	5.33E+01	5.39E+01	5.46E+01	5.52E+01	5.58E+01	5.58E+01
pb206	3.54E-01	3.62E-01	3.69E-01	3.76E-01	3.84E-01	3.84E-01
pb207	2.13E-02	2.17E-02	2.20E-02	2.24E-02	2.28E-02	2.28E-02
pb208	7.92E-04	7.99E-04	8.06E-04	8.14E-04	8.21E-04	8.21E-04
pb209	1.29E-09	1.30E-09	1.32E-09	1.33E-09	1.35E-09	1.35E-09
pb210	3.69E-04	3.72E-04	3.75E-04	3.78E-04	3.81E-04	3.81E-04
pb211	5.94E-11	5.96E-11	5.98E-11	6.01E-11	6.03E-11	6.05E-11
pb212	1.97E-11	2.05E-11	2.06E-11	2.07E-11	2.08E-11	2.01E-11
pb214	8.43E-10	8.50E-10	8.57E-10	8.65E-10	8.72E-10	8.72E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.50E-02	6.65E-02	6.80E-02	6.96E-02	7.11E-02	7.11E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.27E-07	2.29E-07	2.31E-07	2.33E-07	2.35E-07	2.35E-07
bi211	3.52E-12	3.53E-12	3.55E-12	3.56E-12	3.58E-12	3.58E-12
bi212	1.87E-12	1.94E-12	1.95E-12	1.96E-12	1.97E-12	1.90E-12
bi213	3.01E-10	3.04E-10	3.08E-10	3.11E-10	3.14E-10	3.14E-10
bi214	6.26E-10	6.31E-10	6.37E-10	6.42E-10	6.47E-10	6.47E-10
po210	6.27E-06	6.32E-06	6.38E-06	6.43E-06	6.48E-06	6.49E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.89E-17	3.90E-17	3.92E-17	3.94E-17	3.95E-17	3.96E-17
po212	9.82E-23	1.02E-22	1.03E-22	1.03E-22	1.04E-22	1.00E-22
po213	4.52E-19	4.57E-19	4.62E-19	4.68E-19	4.73E-19	4.73E-19
po214	8.61E-17	8.68E-17	8.76E-17	8.83E-17	8.90E-17	8.91E-17
po215	4.88E-17	4.89E-17	4.92E-17	4.94E-17	4.96E-17	4.97E-17
po216	7.46E-17	7.76E-17	7.80E-17	7.84E-17	7.88E-17	7.59E-17
po218	9.75E-11	9.84E-11	9.92E-11	1.00E-10	1.01E-10	1.01E-10
rn218	3.36E-44	3.43E-29	3.45E-29	3.47E-29	3.48E-29	3.50E-44
rn219	1.09E-13	1.09E-13	1.09E-13	1.10E-13	1.10E-13	1.11E-13
rn220	2.86E-14	2.98E-14	2.99E-14	3.01E-14	3.02E-14	2.91E-14
rn222	1.73E-07	1.75E-07	1.76E-07	1.78E-07	1.79E-07	1.79E-07
ra222	3.70E-41	3.94E-26	3.96E-26	3.98E-26	4.00E-26	3.76E-41
ra223	2.71E-08	2.72E-08	2.73E-08	2.74E-08	2.75E-08	2.76E-08
ra224	1.43E-10	1.69E-10	1.70E-10	1.71E-10	1.72E-10	1.66E-10
ra225	1.41E-07	1.42E-07	1.44E-07	1.45E-07	1.47E-07	1.47E-07

ra226	2.65E-02	2.67E-02	2.69E-02	2.72E-02	2.74E-02	2.74E-02
ra228	1.35E-10	1.36E-10	1.38E-10	1.39E-10	1.41E-10	1.41E-10
ac225	9.51E-08	9.61E-08	9.72E-08	9.82E-08	9.93E-08	9.93E-08
ac227	1.88E-05	1.89E-05	1.90E-05	1.91E-05	1.91E-05	1.91E-05
ac228	1.64E-14	1.66E-14	1.68E-14	1.70E-14	1.72E-14	1.72E-14
th226	1.80E-39	1.92E-24	1.93E-24	1.94E-24	1.95E-24	1.84E-39
th227	4.37E-08	4.38E-08	4.40E-08	4.42E-08	4.44E-08	4.45E-08
th228	3.10E-08	3.23E-08	3.25E-08	3.26E-08	3.28E-08	3.16E-08
th229	2.74E-02	2.77E-02	2.80E-02	2.83E-02	2.86E-02	2.86E-02
th230	1.29E+00	1.30E+00	1.31E+00	1.32E+00	1.33E+00	1.33E+00
th231	2.71E-09	3.63E-09	3.44E-09	3.44E-09	3.45E-09	2.71E-09
th232	3.29E-01	3.33E-01	3.36E-01	3.40E-01	3.44E-01	3.44E-01
th233	3.72E-28	3.76E-13	3.80E-13	3.84E-13	3.89E-13	3.89E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.83E-02	2.84E-02	2.85E-02	2.87E-02	2.88E-02	2.88E-02
pa232	6.01E-26	6.04E-11	6.07E-11	6.10E-11	6.13E-11	6.13E-26

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aas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 230
power= 4.890E-04mw, burnup=2.4577E+04mwd, flux= 2.95E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.75E-36	1.86E-21	1.87E-21	1.88E-21	1.89E-21	1.78E-36
u231	6.15E-32	6.19E-17	6.25E-17	6.31E-17	6.37E-17	6.37E-32
u232	1.10E-06	1.18E-06	1.18E-06	1.19E-06	1.19E-06	1.12E-06
u233	6.66E-01	6.72E-01	6.77E-01	6.83E-01	6.89E-01	6.89E-01
u234	1.03E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02
u237	3.95E-13	4.13E-07	4.13E-07	4.14E-07	4.14E-07	3.61E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.75E-23	3.75E-08	3.75E-08	3.76E-08	3.76E-08	3.76E-23
u240	2.43E-34	2.53E-34	2.63E-34	2.73E-34	2.83E-34	2.83E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.21E-14	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.88E-14
np236m	2.44E-28	2.43E-13	2.44E-13	2.44E-13	2.44E-13	2.44E-28
np236	2.58E-06	2.58E-06	2.58E-06	2.59E-06	2.59E-06	2.59E-06
np237	4.05E+01	4.05E+01	4.05E+01	4.04E+01	4.04E+01	4.04E+01
np238	5.38E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	4.97E-15
np239	1.73E-13	5.42E-06	5.43E-06	5.43E-06	5.43E-06	1.67E-13
np240m	2.07E-36	2.16E-36	2.24E-36	2.33E-36	2.41E-36	2.41E-36
np240	2.57E-38	1.36E-16	1.36E-16	1.36E-16	1.36E-16	2.90E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	3.73E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.54E-11
pu237	1.12E-28	3.27E-14	3.25E-14	3.23E-14	3.21E-14	5.07E-29
pu238	2.62E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.62E-03
pu239	2.79E+01	2.77E+01	2.75E+01	2.73E+01	2.71E+01	2.71E+01
pu240	3.44E-01	3.37E-01	3.31E-01	3.25E-01	3.19E-01	3.19E-01
pu241	1.28E-05	1.68E-05	1.64E-05	1.61E-05	1.59E-05	1.17E-05
pu242	4.80E-05	4.80E-05	4.81E-05	4.81E-05	4.82E-05	4.82E-05
pu243	1.54E-29	1.24E-14	1.24E-14	1.24E-14	1.24E-14	1.55E-29
pu244	1.21E-23	1.26E-23	1.31E-23	1.36E-23	1.41E-23	1.41E-23
pu245	.00E+00	6.39E-35	6.65E-35	6.90E-35	7.16E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.76E-35	1.71E-20	1.68E-20	1.65E-20	1.63E-20	1.62E-35
am240	8.03E-33	7.83E-18	7.70E-18	7.56E-18	7.43E-18	7.42E-33

```
     am241   5.18E-04  5.06E-04  4.97E-04  4.88E-04  4.80E-04  4.79E-04
     am242m  2.91E-08  2.92E-08  2.87E-08  2.82E-08  2.77E-08  2.69E-08
     am242   3.75E-13  2.32E-12  2.28E-12  2.24E-12  2.20E-12  3.47E-13
     am243   1.98E-07  1.96E-07  1.94E-07  1.92E-07  1.90E-07  1.90E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.83E-31  1.81E-16  1.79E-16  1.78E-16  1.76E-16  1.76E-31
     am245   3.73E-40  1.25E-35  1.30E-35  1.35E-35  1.40E-35  3.28E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241   1.26E-43  1.66E-23  1.63E-23  1.61E-23  1.58E-23  1.68E-44
     cm242   7.58E-11  4.68E-10  4.60E-10  4.52E-10  4.44E-10  7.00E-11
     cm243   1.17E-15  1.32E-15  1.29E-15  1.27E-15  1.25E-15  1.07E-15
     cm244   2.29E-12  2.85E-12  2.82E-12  2.79E-12  2.77E-12  2.18E-12
1
     sas2h: fer-field crit based on h2w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  231
       power= 4.890E-04mw, burnup=2.4577E+04mwd, flux= 2.95E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                 charge ******* d ******* d ******* d ******* d ******* d
     cm245   9.85E-15  9.57E-15  9.29E-15  9.03E-15  8.78E-15  8.77E-15
     cm246   7.67E-17  7.41E-17  7.17E-17  6.93E-17  6.71E-17  6.70E-17
     cm247   8.45E-20  8.51E-20  8.57E-20  8.62E-20  8.68E-20  8.68E-20
     cm248   4.07E-22  4.15E-22  4.23E-22  4.30E-22  4.38E-22  4.38E-22
     cm249    .00E+00  1.59E-33  1.63E-33  1.66E-33  1.69E-33   .00E+00
     cm250   1.74E-37  1.75E-37  1.76E-37  1.77E-37  1.78E-37  1.78E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.95E+07  2.95E+07  2.95E+07  2.96E+07  2.96E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
library information...

          cross-section data taken from position number 26 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *              prelim lwr origen-s binary working library--id = 1143  *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *        data from the light element, actinide, and fission product libraries *
          *          decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                     *
          *        neutron flux spectrum factors and cross sections were produced from *
          *       the "presas2" case updating all nuclides on the scale "burnup" library *
```

```
         *                                                                      *
         *                 fission product yields are from endf/b-v             *
         *                                                                      *
         *            photon libraries use an 18-energy-group structure         *
         *           the photon data are from the master photon data base,      *
         *            produced to include bremsstrahlung from uo2 matrix        *
         *                                                                      *
         *       see information above this box (if present) for later updates  *
         *                                                                      *
         ************************************************************************
         *                                                                      *
         ************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996     date library was produced
0                 1697       total number of nuclides in library
                   689       number of light-element nuclides
                   129       number of actinide nuclides
                   879       number of fission product nuclides
0                 7993       number of nonzero off-diagonal matrix elements
0        ************************************************************************
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  232
       power=    .00mw, burnup=  25023.mwd, flux= 2.96E+07n/cm**2-sec
0                                                basis =
0   (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
    productions   1.282571E+06  1.281878E+06  1.281192E+06  1.280512E+06  1.279839E+06  1.279830E+06
    absorptions   1.045925E+06  1.045599E+06  1.045277E+06  1.044958E+06  1.044643E+06  1.044637E+06
    k infinity    1.226255E+00  1.225974E+00  1.225696E+00  1.225420E+00  1.225146E+00  1.225143E+00
0                 initial      ******* d     ******* d     ******* d     ******* d     ******* d
    actinide
    absorptions   1.026161E+06  1.025796E+06  1.025433E+06  1.025078E+06  1.024725E+06  1.024719E+06
    non-actinide
    abs. fracs.   1.889569E-02  1.893938E-02  1.898199E-02  1.902443E-02  1.906663E-02  1.906627E-02
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products     page  233
0                                 fraction of total absorption rate
       power=    .00mw, burnup=  25023.mwd, flux= 2.96E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

    sm149      5.42E-03  5.42E-03  5.42E-03  5.42E-03  5.42E-03  5.42E-03
    nd143      2.38E-03  2.40E-03  2.41E-03  2.42E-03  2.43E-03  2.43E-03
    eu151      1.99E-03  2.00E-03  2.00E-03  2.00E-03  2.01E-03  2.01E-03
    rh103      1.16E-03  1.17E-03  1.17E-03  1.18E-03  1.18E-03  1.18E-03
    xe131      7.75E-04  7.79E-04  7.82E-04  7.86E-04  7.90E-04  7.90E-04
    cs133      6.04E-04  6.07E-04  6.10E-04  6.13E-04  6.16E-04  6.16E-04
    sm147      4.42E-04  4.44E-04  4.46E-04  4.49E-04  4.51E-04  4.51E-04
    tc 99      3.94E-04  3.95E-04  3.96E-04  3.97E-04  3.99E-04  3.99E-04
    nd145      3.41E-04  3.43E-04  3.44E-04  3.46E-04  3.48E-04  3.48E-04
    sm152      2.72E-04  2.74E-04  2.75E-04  2.77E-04  2.78E-04  2.78E-04
    mo 95      2.37E-04  2.38E-04  2.39E-04  2.40E-04  2.41E-04  2.41E-04
    gd155      2.24E-04  2.24E-04  2.24E-04  2.25E-04  2.25E-04  2.25E-04
    sm150      1.81E-04  1.82E-04  1.83E-04  1.84E-04  1.85E-04  1.85E-04
    kr 83      1.46E-04  1.46E-04  1.47E-04  1.48E-04  1.48E-04  1.48E-04
    cs135      1.37E-04  1.37E-04  1.38E-04  1.39E-04  1.39E-04  1.39E-04
    eu153      1.12E-04  1.12E-04  1.13E-04  1.14E-04  1.14E-04  1.14E-04
    ru101      1.06E-04  1.07E-04  1.07E-04  1.08E-04  1.09E-04  1.09E-04
    pr141      1.03E-04  1.03E-04  1.04E-04  1.04E-04  1.05E-04  1.05E-04
    cd113      1.03E-04  1.03E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04
    la139      8.39E-05  8.43E-05  8.47E-05  8.51E-05  8.56E-05  8.56E-05
    gd157      5.90E-05  5.89E-05  5.87E-05  5.86E-05  5.84E-05  5.84E-05
```

ag109	4.41E-05	4.44E-05	4.46E-05	4.48E-05	4.51E-05	4.51E-05
pd105	4.32E-05	4.34E-05	4.37E-05	4.39E-05	4.41E-05	4.41E-05
ba137	4.07E-05	4.09E-05	4.11E-05	4.13E-05	4.15E-05	4.15E-05
zr 93	3.26E-05	3.27E-05	3.29E-05	3.30E-05	3.32E-05	3.32E-05
i129	2.76E-05	2.77E-05	2.78E-05	2.80E-05	2.81E-05	2.81E-05
nd144	2.61E-05	2.63E-05	2.64E-05	2.65E-05	2.67E-05	2.67E-05
gd152	2.36E-05	2.37E-05	2.39E-05	2.41E-05	2.43E-05	2.43E-05
mo 97	1.91E-05	1.91E-05	1.92E-05	1.93E-05	1.94E-05	1.94E-05
pd108	1.06E-05	1.06E-05	1.07E-05	1.08E-05	1.08E-05	1.08E-05
zr 91	8.74E-06	8.79E-06	8.83E-06	8.87E-06	8.91E-06	8.91E-06
y 89	8.36E-06	8.40E-06	8.45E-06	8.49E-06	8.53E-06	8.53E-06
ru 99	7.92E-06	8.05E-06	8.18E-06	8.31E-06	8.44E-06	8.44E-06
ru102	8.00E-06	8.04E-06	8.08E-06	8.11E-06	8.15E-06	8.15E-06
ce142	7.00E-06	7.03E-06	7.07E-06	7.10E-06	7.14E-06	7.14E-06
nd148	6.73E-06	6.76E-06	6.80E-06	6.83E-06	6.86E-06	6.86E-06
sm151	6.41E-06	6.94E-06	6.94E-06	6.94E-06	6.95E-06	6.61E-06
nd146	5.69E-06	5.72E-06	5.75E-06	5.77E-06	5.80E-06	5.80E-06
pd107	5.33E-06	5.36E-06	5.39E-06	5.42E-06	5.44E-06	5.44E-06
in115	4.99E-06	5.01E-06	5.03E-06	5.06E-06	5.08E-06	5.08E-06
ba138	4.84E-06	4.86E-06	4.89E-06	4.91E-06	4.93E-06	4.93E-06
ce140	4.53E-06	4.55E-06	4.58E-06	4.60E-06	4.62E-06	4.62E-06
xe132	4.16E-06	4.18E-06	4.21E-06	4.23E-06	4.25E-06	4.25E-06
mo 98	2.77E-06	2.78E-06	2.80E-06	2.81E-06	2.82E-06	2.82E-06
mo100	2.71E-06	2.72E-06	2.73E-06	2.75E-06	2.76E-06	2.76E-06
xe134	2.68E-06	2.69E-06	2.70E-06	2.72E-06	2.73E-06	2.73E-06
zr 92	2.12E-06	2.13E-06	2.14E-06	2.15E-06	2.16E-06	2.16E-06
i127	2.02E-06	2.03E-06	2.04E-06	2.05E-06	2.06E-06	2.06E-06
ru104	1.85E-06	1.86E-06	1.87E-06	1.88E-06	1.88E-06	1.88E-06

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 234
0 fraction of total absorption rate
0 power= .00mw, burnup= 25023.mwd, flux= 2.96E+07n/cm**2-sec
initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.65E-06	1.66E-06	1.67E-06	1.68E-06	1.69E-06	1.69E-06
nd150	1.53E-06	1.53E-06	1.54E-06	1.55E-06	1.56E-06	1.56E-06
xe136	1.45E-06	1.46E-06	1.47E-06	1.47E-06	1.48E-06	1.48E-06
gd154	1.20E-06	1.21E-06	1.23E-06	1.24E-06	1.25E-06	1.25E-06
cd111	1.20E-06	1.20E-06	1.21E-06	1.22E-06	1.22E-06	1.22E-06
br 81	1.07E-06	1.08E-06	1.08E-06	1.09E-06	1.09E-06	1.09E-06
rb 85	1.02E-06	1.03E-06	1.03E-06	1.04E-06	1.04E-06	1.04E-06
zr 94	8.94E-07	8.98E-07	9.03E-07	9.07E-07	9.11E-07	9.11E-07
ba135	8.19E-07	8.33E-07	8.47E-07	8.61E-07	8.75E-07	8.75E-07
zr 90	8.24E-07	8.28E-07	8.32E-07	8.36E-07	8.40E-07	8.40E-07
sm154	7.24E-07	7.27E-07	7.31E-07	7.35E-07	7.38E-07	7.38E-07
te130	6.71E-07	6.75E-07	6.78E-07	6.81E-07	6.84E-07	6.84E-07
rb 87	5.89E-07	5.92E-07	5.95E-07	5.98E-07	6.00E-07	6.00E-07
pd106	4.46E-07	4.48E-07	4.50E-07	4.53E-07	4.55E-07	4.55E-07
se 77	4.33E-07	4.35E-07	4.37E-07	4.39E-07	4.41E-07	4.41E-07
gd156	4.26E-07	4.29E-07	4.31E-07	4.33E-07	4.36E-07	4.36E-07
ru100	3.20E-07	3.23E-07	3.26E-07	3.29E-07	3.32E-07	3.32E-07
kr 84	2.81E-07	2.82E-07	2.84E-07	2.85E-07	2.86E-07	2.86E-07
dy161	2.64E-07	2.65E-07	2.67E-07	2.68E-07	2.69E-07	2.69E-07
nd142	2.37E-07	2.40E-07	2.42E-07	2.44E-07	2.46E-07	2.46E-07
sb121	2.30E-07	2.32E-07	2.33E-07	2.34E-07	2.35E-07	2.35E-07
ba134	2.26E-07	2.28E-07	2.30E-07	2.32E-07	2.35E-07	2.35E-07
sm148	2.05E-07	2.07E-07	2.09E-07	2.11E-07	2.13E-07	2.13E-07
se 79	2.09E-07	2.09E-07	2.10E-07	2.11E-07	2.12E-07	2.12E-07
sb123	1.86E-07	1.87E-07	1.88E-07	1.89E-07	1.90E-07	1.90E-07
pd104	1.55E-07	1.56E-07	1.58E-07	1.59E-07	1.61E-07	1.61E-07
kr 86	1.56E-07	1.57E-07	1.58E-07	1.59E-07	1.59E-07	1.59E-07

te128	1.52E-07	1.53E-07	1.53E-07	1.54E-07	1.55E-07	1.55E-07
nb 93	1.30E-07	1.32E-07	1.34E-07	1.37E-07	1.39E-07	1.39E-07
tb159	1.14E-07	1.14E-07	1.15E-07	1.15E-07	1.16E-07	1.16E-07
se 80	1.04E-07	1.04E-07	1.05E-07	1.05E-07	1.06E-07	1.06E-07
te125	1.04E-07	1.04E-07	1.05E-07	1.05E-07	1.06E-07	1.06E-07
gd158	8.97E-08	9.02E-08	9.06E-08	9.11E-08	9.16E-08	9.16E-08
cd112	8.06E-08	8.10E-08	8.14E-08	8.18E-08	8.23E-08	8.23E-08
ag107	6.52E-08	6.65E-08	6.77E-08	6.89E-08	7.01E-08	7.02E-08
br 79	6.42E-08	6.53E-08	6.64E-08	6.75E-08	6.86E-08	6.86E-08
dy162	6.19E-08	6.23E-08	6.27E-08	6.31E-08	6.34E-08	6.34E-08
cd110	5.81E-08	5.88E-08	5.94E-08	6.01E-08	6.07E-08	6.07E-08
dy164	5.89E-08	5.91E-08	5.94E-08	5.97E-08	5.99E-08	5.99E-08
sn117	5.66E-08	5.68E-08	5.71E-08	5.74E-08	5.77E-08	5.77E-08
li 6	5.30E-08	5.33E-08	5.35E-08	5.37E-08	5.39E-08	5.39E-08
mo 96	5.13E-08	5.18E-08	5.23E-08	5.28E-08	5.33E-08	5.33E-08
cd114	4.81E-08	4.84E-08	4.86E-08	4.89E-08	4.91E-08	4.91E-08
eu152	4.68E-08	6.50E-08	6.51E-08	6.53E-08	6.55E-08	4.67E-08
sn119	4.30E-08	4.32E-08	4.34E-08	4.36E-08	4.38E-08	4.38E-08
xe129	3.95E-08	4.02E-08	4.09E-08	4.16E-08	4.23E-08	4.23E-08
pd110	4.00E-08	4.02E-08	4.04E-08	4.06E-08	4.08E-08	4.08E-08
sn115	3.93E-08	3.95E-08	3.97E-08	3.99E-08	4.01E-08	4.01E-08
sr 88	2.87E-08	2.88E-08	2.90E-08	2.91E-08	2.93E-08	2.93E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 235
0 fraction of total absorption rate
0 power= .00mw, burnup= 25023.mwd, flux= 2.96E+07n/cm**2-sec

	Initial	******* d	******* d	******* d	******* d	******* d
xe130	2.51E-08	2.53E-08	2.56E-08	2.58E-08	2.60E-08	2.60E-08
te126	2.12E-08	2.16E-08	2.19E-08	2.22E-08	2.26E-08	2.26E-08
ba136	2.10E-08	2.11E-08	2.13E-08	2.15E-08	2.16E-08	2.16E-08
se 82	1.98E-08	1.99E-08	2.00E-08	2.00E-08	2.01E-08	2.01E-08
sn126	1.61E-08	1.61E-08	1.61E-08	1.61E-08	1.62E-08	1.62E-08
dy163	1.55E-08	1.56E-08	1.57E-08	1.57E-08	1.58E-08	1.58E-08
se 78	1.55E-08	1.56E-08	1.57E-08	1.57E-08	1.58E-08	1.58E-08
kr 82	1.53E-08	1.54E-08	1.55E-08	1.56E-08	1.57E-08	1.57E-08
sn124	1.36E-08	1.37E-08	1.37E-08	1.38E-08	1.39E-08	1.39E-08
as 75	9.10E-09	9.14E-09	9.19E-09	9.23E-09	9.28E-09	9.28E-09
eu155	8.80E-09	2.22E-08	2.22E-08	2.22E-08	2.22E-08	8.45E-09
in113	7.83E-09	7.87E-09	7.91E-09	7.95E-09	7.99E-09	7.99E-09
pm147	6.39E-09	3.30E-08	3.31E-08	3.31E-08	3.31E-08	6.00E-09
sn118	5.48E-09	5.51E-09	5.53E-09	5.56E-09	5.59E-09	5.59E-09
sn122	4.73E-09	4.76E-09	4.78E-09	4.80E-09	4.83E-09	4.83E-09
cd116	4.61E-09	4.63E-09	4.65E-09	4.67E-09	4.70E-09	4.70E-09
sn120	3.48E-09	3.49E-09	3.51E-09	3.53E-09	3.55E-09	3.55E-09
eu154	3.50E-09	5.83E-09	5.86E-09	5.89E-09	5.93E-09	3.51E-09
ge 73	2.62E-09	2.63E-09	2.64E-09	2.66E-09	2.67E-09	2.67E-09
sr 90	1.73E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	1.72E-09
dy160	1.56E-09	1.58E-09	1.59E-09	1.61E-09	1.63E-09	1.63E-09
ho165	1.55E-09	1.56E-09	1.57E-09	1.59E-09	1.60E-09	1.60E-09
gd160	1.27E-09	1.28E-09	1.29E-09	1.29E-09	1.30E-09	1.30E-09
xe128	9.09E-10	9.18E-10	9.27E-10	9.35E-10	9.44E-10	9.44E-10
ge 76	8.86E-10	8.90E-10	8.94E-10	8.99E-10	9.03E-10	9.03E-10
sr 86	4.24E-10	4.28E-10	4.32E-10	4.36E-10	4.40E-10	4.40E-10
cs137	3.99E-10	4.61E-10	4.61E-10	4.61E-10	4.62E-10	3.97E-10
sn116	3.43E-10	3.46E-10	3.49E-10	3.53E-10	3.56E-10	3.56E-10
te124	2.99E-10	3.01E-10	3.04E-10	3.06E-10	3.08E-10	3.08E-10
nb 94	1.56E-10	1.58E-10	1.59E-10	1.60E-10	1.62E-10	1.62E-10
te122	1.44E-10	1.46E-10	1.47E-10	1.49E-10	1.50E-10	1.50E-10
sr 87	1.44E-10	1.45E-10	1.46E-10	1.47E-10	1.48E-10	1.48E-10
se 76	1.18E-10	1.19E-10	1.20E-10	1.21E-10	1.22E-10	1.22E-10

```
     er166      7.29E-11  7.33E-11  7.38E-11  7.42E-11  7.47E-11  7.47E-11
     kr 80      6.56E-11  6.67E-11  6.79E-11  6.91E-11  7.03E-11  7.03E-11
     cs134      6.79E-11  5.59E-10  5.62E-10  5.65E-10  5.68E-10  6.37E-11
     ge 74      5.24E-11  5.26E-11  5.29E-11  5.31E-11  5.34E-11  5.34E-11
     kr 85      4.54E-11  6.80E-11  6.81E-11  6.81E-11  6.81E-11  4.47E-11
     ge 72      3.88E-11  3.90E-11  3.92E-11  3.94E-11  3.96E-11  3.96E-11
     er167      9.09E-12  9.19E-12  9.30E-12  9.40E-12  9.50E-12  9.50E-12
     te123      7.37E-12  7.47E-12  7.57E-12  7.67E-12  7.78E-12  7.78E-12
     cd108      4.83E-12  4.92E-12  5.02E-12  5.12E-12  5.22E-12  5.22E-12
      y 90      1.65E-12  1.92E-12  1.93E-12  1.93E-12  1.93E-12  1.64E-12
     sb125      4.38E-13  2.14E-12  2.14E-12  2.14E-12  2.14E-12  4.11E-13
     ce144      2.77E-13  7.21E-11  7.21E-11  7.21E-11  7.22E-11  2.22E-13
     be  9      1.11E-13  1.11E-13  1.12E-13  1.12E-13  1.13E-13  1.13E-13
     sn114      9.15E-14  9.24E-14  9.34E-14  9.43E-14  9.52E-14  9.52E-14
     ru106      6.61E-14  6.69E-12  6.68E-12  6.68E-12  6.67E-12  5.56E-14
     li  7      6.59E-14  6.61E-14  6.63E-14  6.65E-14  6.68E-14  6.68E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page 236
0                                  fraction of total absorption rate
        power=     .00mw, burnup=  25023.mwd, flux= 2.96E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.84E-14  1.92E-14  1.92E-14  1.92E-14  1.93E-14  1.83E-14
     cd109      7.64E-19  2.42E-17  2.47E-17  2.51E-17  2.56E-17  7.37E-19
     te127m     5.45E-19  1.09E-12  1.09E-12  1.09E-12  1.09E-12  3.00E-19
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page 237
       power= 4.890E-04mw, burnup=2.5023E+04mwd, flux= 2.96E+07n/cm**2-sec
0                                     nuclide concentrations, gram atoms
                                      basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1    1.46E-03  1.47E-03  1.48E-03  1.48E-03  1.49E-03  1.49E-03
      h  2    4.38E-06  4.40E-06  4.42E-06  4.44E-06  4.46E-06  4.46E-06
      h  3    5.24E-12  7.45E-12  7.47E-12  7.48E-12  7.49E-12  5.19E-12
      h  4     .00E+00  3.76E-36  3.77E-36  3.78E-36  3.79E-36   .00E+00
     he  3    1.84E-08  1.84E-08  1.85E-08  1.85E-08  1.85E-08  1.85E-08
     he  4    2.43E-04  2.44E-04  2.45E-04  2.46E-04  2.47E-04  2.47E-04
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    2.92E-05  2.93E-05  2.95E-05  2.96E-05  2.97E-05  2.97E-05
     ne 21    1.29E-08  1.30E-08  1.31E-08  1.32E-08  1.34E-08  1.34E-08
     ne 22    1.92E-07  1.93E-07  1.94E-07  1.95E-07  1.96E-07  1.96E-07
     ne 23    8.87E-31  8.86E-16  8.86E-16  8.86E-16  8.87E-16  8.87E-31
     na 22    9.93E-13  5.25E-12  5.26E-12  5.26E-12  5.26E-12  9.29E-13
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    3.23E-24  3.22E-09  3.23E-09  3.23E-09  3.23E-09  3.23E-24
     na 24m   5.30E-31  5.30E-16  5.30E-16  5.30E-16  5.30E-16  5.31E-31
     na 25    4.66E-39  4.70E-24  4.74E-24  4.78E-24  4.83E-24  4.83E-39
     mg 24    1.88E-01  1.89E-01  1.90E-01  1.91E-01  1.92E-01  1.92E-01
     mg 25    1.33E-06  1.35E-06  1.36E-06  1.37E-06  1.38E-06  1.38E-06
     mg 26    4.37E-06  4.39E-06  4.41E-06  4.43E-06  4.45E-06  4.45E-06
     mg 27    2.64E-28  2.64E-13  2.64E-13  2.64E-13  2.65E-13  2.65E-28
     mg 28     .00E+00  4.69E-26  4.70E-26  4.71E-26  4.71E-26   .00E+00
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    2.39E-26  2.39E-11  2.39E-11  2.39E-11  2.39E-11  2.39E-26
     al 29    3.80E-37  3.83E-22  3.86E-22  3.90E-22  3.94E-22  3.94E-37
     al 30     .00E+00  1.21E-31  1.23E-31  1.25E-31  1.27E-31   .00E+00
     si 28    5.48E-01  5.51E-01  5.53E-01  5.56E-01  5.58E-01  5.58E-01
     si 29    1.21E-05  1.23E-05  1.24E-05  1.25E-05  1.26E-05  1.26E-05
     si 30    2.87E-10  2.91E-10  2.95E-10  2.99E-10  3.03E-10  3.03E-10
     si 31    2.56E-38  2.59E-23  2.63E-23  2.67E-23  2.70E-23  2.71E-38
     si 32    5.44E-30  5.65E-30  5.74E-30  5.82E-30  5.91E-30  5.76E-30
```

totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.96E+07	2.96E+07	2.96E+07	2.96E+07	2.96E-08

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 238

power= 4.890E-04mw, burnup=2.5023E+04mwd, flux= 2.96E+07n/cm**2-sec

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	5.58E+01	5.64E+01	5.70E+01	5.76E+01	5.82E+01	5.82E+01
pb206	3.84E-01	3.91E-01	3.99E-01	4.06E-01	4.14E-01	4.14E-01
pb207	2.28E-02	2.32E-02	2.36E-02	2.40E-02	2.43E-02	2.43E-02
pb208	8.21E-04	8.28E-04	8.36E-04	8.44E-04	8.51E-04	8.51E-04
pb209	1.35E-09	1.36E-09	1.37E-09	1.39E-09	1.40E-09	1.40E-09
pb210	3.81E-04	3.85E-04	3.88E-04	3.91E-04	3.94E-04	3.94E-04
pb211	6.05E-11	6.06E-11	6.09E-11	6.11E-11	6.14E-11	6.13E-11
pb212	2.01E-11	2.09E-11	2.10E-11	2.11E-11	2.12E-11	2.06E-11
pb214	8.72E-10	8.79E-10	8.86E-10	8.93E-10	9.00E-10	9.00E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	7.11E-02	7.27E-02	7.43E-02	7.59E-02	7.75E-02	7.76E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.35E-07	2.37E-07	2.39E-07	2.40E-07	2.42E-07	2.42E-07
bi211	3.38E-12	3.59E-12	3.61E-12	3.62E-12	3.64E-12	3.65E-12
bi212	1.90E-12	1.98E-12	1.99E-12	2.00E-12	2.01E-12	1.93E-12
bi213	3.14E-10	3.18E-10	3.21E-10	3.24E-10	3.28E-10	3.28E-10
bi214	6.47E-10	6.53E-10	6.58E-10	6.63E-10	6.68E-10	6.68E-10
po210	6.49E-06	6.54E-06	6.59E-06	6.64E-06	6.69E-06	6.70E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	3.96E-17	3.97E-17	3.99E-17	4.00E-17	4.02E-17	4.03E-17
po212	1.00E-22	1.04E-22	1.05E-22	1.05E-22	1.06E-22	1.02E-22
po213	4.73E-19	4.78E-19	4.83E-19	4.88E-19	4.93E-19	4.93E-19
po214	8.91E-17	8.98E-17	9.05E-17	9.12E-17	9.19E-17	9.19E-17
po215	4.97E-17	4.98E-17	5.00E-17	5.02E-17	5.04E-17	5.05E-17
po216	7.59E-17	7.91E-17	7.95E-17	7.99E-17	8.03E-17	7.72E-17
po218	1.01E-10	1.02E-10	1.02E-10	1.03E-10	1.04E-10	1.04E-10
rn218	3.50E-44	3.70E-29	3.72E-29	3.74E-29	3.76E-29	3.50E-44
rn219	1.11E-13	1.11E-13	1.11E-13	1.12E-13	1.12E-13	1.12E-13
rn220	2.91E-14	3.03E-14	3.05E-14	3.06E-14	3.08E-14	2.96E-14
rn222	1.79E-07	1.81E-07	1.82E-07	1.84E-07	1.85E-07	1.85E-07
ra222	3.76E-41	4.02E-26	4.04E-26	4.06E-26	4.08E-26	3.83E-41
ra223	2.76E-08	2.76E-08	2.78E-08	2.79E-08	2.80E-08	2.80E-08
ra224	1.66E-10	1.73E-10	1.73E-10	1.74E-10	1.75E-10	1.68E-10
ra225	1.47E-07	1.49E-07	1.50E-07	1.52E-07	1.53E-07	1.53E-07
ra226	2.74E-02	2.76E-02	2.78E-02	2.80E-02	2.83E-02	2.83E-02
ra228	1.41E-10	1.42E-10	1.43E-10	1.45E-10	1.46E-10	1.46E-10
ac225	9.93E-08	1.00E-07	1.01E-07	1.02E-07	1.04E-07	1.04E-07
ac227	1.91E-05	1.92E-05	1.93E-05	1.94E-05	1.95E-05	1.95E-05
ac228	1.72E-14	1.73E-14	1.75E-14	1.77E-14	1.79E-14	1.79E-14
th226	1.84E-39	1.96E-24	1.97E-24	1.98E-24	1.99E-24	1.87E-39
th227	4.45E-08	4.46E-08	4.48E-08	4.50E-08	4.52E-08	4.53E-08
th228	3.16E-08	3.29E-08	3.31E-08	3.33E-08	3.34E-08	3.21E-08
th229	2.86E-02	2.89E-02	2.92E-02	2.95E-02	2.98E-02	2.98E-02
th230	1.33E+00	1.34E+00	1.35E+00	1.36E+00	1.37E+00	1.37E+00
th231	2.71E-09	3.45E-09	3.46E-09	3.47E-09	3.47E-09	2.71E-09
th232	3.44E-01	3.47E-01	3.51E-01	3.54E-01	3.58E-01	3.58E-01
th233	3.89E-28	3.93E-13	3.97E-13	4.01E-13	4.06E-13	4.06E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.88E-02	2.89E-02	2.90E-02	2.92E-02	2.93E-02	2.93E-02
pa232	6.13E-26	6.16E-11	6.19E-11	6.21E-11	6.24E-11	6.25E-26

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 239

power= 4.890E-04mw, burnup=2.5023E+04mwd, flux= 2.96E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06	1.40E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	6.07E-12	6.07E-12	6.07E-12	6.07E-12	6.07E-12	6.07E-12
pa233	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.78E-36	1.90E-21	1.91E-21	1.92E-21	1.93E-21	1.81E-36
u231	6.37E-32	6.41E-17	6.47E-17	6.53E-17	6.58E-17	6.58E-32
u232	1.12E-06	1.20E-06	1.21E-06	1.21E-06	1.22E-06	1.14E-06
u233	6.89E-01	6.95E-01	7.01E-01	7.07E-01	7.12E-01	7.12E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
u236	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02
u237	3.61E-13	4.14E-07	4.14E-07	4.15E-07	4.15E-07	3.34E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.76E-23	3.76E-08	3.76E-08	3.76E-08	3.76E-08	3.76E-23
u240	2.83E-34	2.93E-34	3.04E-34	3.15E-34	3.25E-34	3.26E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.88E-14	1.02E-12	1.02E-12	1.02E-12	1.02E-12	1.60E-14
np236m	2.44E-28	2.43E-13	2.43E-13	2.43E-13	2.43E-13	2.43E-28
np236	2.59E-06	2.60E-06	2.60E-06	2.61E-06	2.61E-06	2.61E-06
np237	4.04E+01	4.04E+01	4.04E+01	4.04E+01	4.04E+01	4.04E+01
np238	4.97E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	4.64E-15
np239	1.67E-13	5.43E-06	5.43E-06	5.43E-06	5.44E-06	1.61E-13
np240m	2.41E-36	2.50E-36	2.59E-36	2.68E-36	2.78E-36	2.78E-36
np240	2.90E-38	1.36E-16	1.36E-16	1.37E-16	1.37E-16	3.26E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	3.54E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.37E-11
pu237	5.07E-29	3.19E-14	3.18E-14	3.16E-14	3.14E-14	3.58E-29
pu238	2.62E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.62E-03
pu239	2.71E+01	2.70E+01	2.68E+01	2.66E+01	2.65E+01	2.65E+01
pu240	3.19E-01	3.13E-01	3.08E-01	3.03E-01	2.98E-01	2.98E-01
pu241	1.17E-05	1.56E-05	1.53E-05	1.51E-05	1.48E-05	1.08E-05
pu242	4.82E-05	4.82E-05	4.82E-05	4.83E-05	4.83E-05	4.83E-05
pu243	1.55E-29	1.24E-14	1.24E-14	1.25E-14	1.25E-14	1.56E-29
pu244	1.41E-23	1.46E-23	1.51E-23	1.57E-23	1.62E-23	1.62E-23
pu245	.00E+00	7.43E-35	7.70E-35	7.98E-35	8.26E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.62E-35	1.39E-20	1.56E-20	1.54E-20	1.52E-20	1.52E-35
am240	7.42E-33	7.26E-18	7.15E-18	7.04E-18	6.94E-18	6.93E-33
am241	4.79E-04	4.49E-04	4.42E-04	4.35E-04	4.48E-04	4.47E-04
am242m	2.69E-08	2.70E-08	2.67E-08	2.63E-08	2.59E-08	2.51E-08
am242	3.47E-13	2.15E-12	2.12E-12	2.09E-12	2.05E-12	3.23E-13
am243	1.90E-07	1.89E-07	1.87E-07	1.86E-07	1.84E-07	1.84E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.76E-31	1.75E-16	1.73E-16	1.72E-16	1.71E-16	1.71E-31
am245	3.28E-40	1.46E-35	1.51E-35	1.56E-35	1.62E-35	2.98E-40
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	1.68E-44	1.54E-23	1.52E-23	1.50E-23	1.48E-23	.00E+00
cm242	7.00E-11	4.34E-10	4.28E-10	4.21E-10	4.15E-10	6.53E-11
cm243	1.07E-15	1.22E-15	1.21E-15	1.19E-15	1.17E-15	1.00E-15
cm244	2.18E-12	2.74E-12	2.72E-12	2.70E-12	2.68E-12	2.09E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 240

power= 4.890E-04mw, burnup=2.5023E+04mwd, flux= 2.96E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

charge ******* d ******* d ******* d ******* d ******* d

```
     cm245   8.77E-15  8.53E-15  8.30E-15  8.09E-15  7.88E-15  7.67E-15
     cm246   6.70E-17  6.49E-17  6.28E-17  6.09E-17  5.90E-17  5.69E-17
     cm247   8.68E-20  8.73E-20  8.78E-20  8.83E-20  8.87E-20  8.87E-20
     cm248   4.38E-22  4.46E-22  4.54E-22  4.62E-22  4.70E-22  4.70E-22
     cm249    .00E+00  1.72E-33  1.75E-33  1.78E-33  1.81E-33   .00E+00
     cm250   1.78E-37  1.79E-37  1.80E-37  1.81E-37  1.82E-37  1.82E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.96E+07  2.96E+07  2.96E+07  2.96E+07  2.96E+08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number 27 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *          made from modified card-image origen-s libraries of scale 4.2     *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                    fission product yields are from endf/b-v                *
          *                                                                            *
          *                 photon libraries use an 18-energy-group structure          *
          *               the photon data are from the master photon data base,        *
          *                produced to include bremsstrahlung from uo2 matrix          *
          *                                                                            *
          *         see information above this box (if present) for later updates      *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  ft33f001
0                8/29/1996    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
```

```
                    879    number of fission product nuclides
                   7993    number of nonzero off-diagonal matrix elements
0
0      ****************************************************************************
1      sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  241
          power=    .00mw, burnup=  25470.mwd, flux= 2.96E+07n/cm**2-sec
0                                                   basis =
0      (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
       productions   1.280524E+06   1.279857E+06   1.279196E+06   1.278541E+06   1.277893E+06   1.277883E+06
       absorptions   1.044879E+06   1.044367E+06   1.044258E+06   1.043953E+06   1.043652E+06   1.043644E+06
       k infinity    1.225524E+00   1.225251E+00   1.224980E+00   1.224711E+00   1.224444E+00   1.224442E+00
0                 initial        ******* d      ******* d      ******* d      ******* d      ******* d
       actinide
       absorptions   1.024956E+06   1.024606E+06   1.024260E+06   1.023918E+06   1.023578E+06   1.023573E+06
       non-actinide
       abs. fracs.   1.906675E-02   1.910883E-02   1.915073E-02   1.919210E-02   1.923358E-02   1.923329E-02
1      sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  fission products   page  242
0                                   fraction of total absorption rate
          power=    .00mw, burnup=  25470.mwd, flux= 2.96E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

       sm149     5.42E-03  5.42E-03  5.42E-03  5.42E-03  5.42E-03  5.42E-03
       nd143     2.43E-03  2.44E-03  2.45E-03  2.46E-03  2.47E-03  2.47E-03
       eu151     2.01E-03  2.01E-03  2.02E-03  2.02E-03  2.02E-03  2.03E-03
       rh103     1.18E-03  1.19E-03  1.19E-03  1.20E-03  1.21E-03  1.21E-03
       xe131     7.89E-04  7.93E-04  7.97E-04  8.00E-04  8.04E-04  8.04E-04
       cs133     6.16E-04  6.19E-04  6.22E-04  6.24E-04  6.27E-04  6.27E-04
       sm147     4.50E-04  4.53E-04  4.55E-04  4.57E-04  4.59E-04  4.59E-04
       tc 99     3.99E-04  4.00E-04  4.01E-04  4.02E-04  4.04E-04  4.04E-04
       nd145     3.48E-04  3.49E-04  3.51E-04  3.53E-04  3.54E-04  3.54E-04
       sm152     2.78E-04  2.80E-04  2.81E-04  2.83E-04  2.84E-04  2.84E-04
       mo 95     2.41E-04  2.42E-04  2.43E-04  2.44E-04  2.46E-04  2.46E-04
       gd155     2.25E-04  2.25E-04  2.25E-04  2.24E-04  2.24E-04  2.24E-04
       sm150     1.85E-04  1.86E-04  1.86E-04  1.87E-04  1.88E-04  1.88E-04
       kr 83     1.48E-04  1.49E-04  1.50E-04  1.50E-04  1.51E-04  1.51E-04
       cs135     1.39E-04  1.40E-04  1.41E-04  1.41E-04  1.42E-04  1.42E-04
       eu153     1.14E-04  1.15E-04  1.15E-04  1.16E-04  1.17E-04  1.17E-04
       ru101     1.08E-04  1.09E-04  1.09E-04  1.10E-04  1.11E-04  1.11E-04
       pr141     1.05E-04  1.05E-04  1.06E-04  1.06E-04  1.07E-04  1.07E-04
       cd113     1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04  1.02E-04
       la139     8.56E-05  8.60E-05  8.64E-05  8.68E-05  8.72E-05  8.72E-05
       gd157     5.85E-05  5.83E-05  5.82E-05  5.80E-05  5.79E-05  5.79E-05
       ag109     4.51E-05  4.53E-05  4.55E-05  4.58E-05  4.60E-05  4.60E-05
       pd105     4.41E-05  4.43E-05  4.45E-05  4.47E-05  4.49E-05  4.49E-05
       ba137     4.15E-05  4.17E-05  4.19E-05  4.21E-05  4.23E-05  4.23E-05
       zr 93     3.32E-05  3.33E-05  3.35E-05  3.36E-05  3.38E-05  3.38E-05
        i129     2.81E-05  2.83E-05  2.84E-05  2.85E-05  2.87E-05  2.87E-05
       nd144     2.67E-05  2.68E-05  2.69E-05  2.71E-05  2.72E-05  2.72E-05
       gd152     2.43E-05  2.45E-05  2.47E-05  2.49E-05  2.50E-05  2.50E-05
       mo 97     1.94E-05  1.95E-05  1.96E-05  1.97E-05  1.98E-05  1.98E-05
       pd108     1.08E-05  1.09E-05  1.09E-05  1.10E-05  1.10E-05  1.10E-05
       zr 91     8.91E-06  8.96E-06  9.00E-06  9.04E-06  9.08E-06  9.08E-06
       ru 99     8.44E-06  8.57E-06  8.70E-06  8.84E-06  8.97E-06  8.97E-06
        y 89     8.53E-06  8.57E-06  8.61E-06  8.65E-06  8.69E-06  8.69E-06
       ru102     8.16E-06  8.19E-06  8.23E-06  8.27E-06  8.31E-06  8.31E-06
       ce142     7.14E-06  7.17E-06  7.21E-06  7.24E-06  7.27E-06  7.27E-06
       nd148     6.86E-06  6.90E-06  6.93E-06  6.96E-06  6.99E-06  6.99E-06
       sm151     6.61E-06  6.95E-06  6.96E-06  6.96E-06  6.96E-06  6.61E-06
       nd146     5.80E-06  5.83E-06  5.86E-06  5.89E-06  5.92E-06  5.92E-06
       pd107     5.45E-06  5.47E-06  5.50E-06  5.53E-06  5.56E-06  5.56E-06
```

in115	5.08E-06	5.10E-06	5.13E-06	5.15E-06	5.18E-06	5.18E-06
ba138	4.94E-06	4.96E-06	4.98E-06	5.01E-06	5.03E-06	5.03E-06
ce140	4.62E-06	4.64E-06	4.67E-06	4.69E-06	4.71E-06	4.71E-06
xe132	4.25E-06	4.27E-06	4.29E-06	4.31E-06	4.33E-06	4.33E-06
mo 98	2.82E-06	2.83E-06	2.85E-06	2.86E-06	2.87E-06	2.87E-06
mo100	2.76E-06	2.77E-06	2.79E-06	2.80E-06	2.81E-06	2.81E-06
xe134	2.73E-06	2.74E-06	2.76E-06	2.77E-06	2.78E-06	2.78E-06
zr 92	2.16E-06	2.17E-06	2.18E-06	2.19E-06	2.20E-06	2.20E-06
i127	2.06E-06	2.07E-06	2.08E-06	2.09E-06	2.10E-06	2.10E-06
ru104	1.88E-06	1.89E-06	1.90E-06	1.91E-06	1.92E-06	1.92E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 60% h2o/ 8% uo2 fission products page 243
0 fraction of total absorption rate
0 powers .00mw, burnups 25470.mwd, fluxs 2.96E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
zr 96	1.68E-06	1.69E-06	1.70E-06	1.71E-06	1.72E-06	1.72E-06
nd150	1.56E-06	1.56E-06	1.57E-06	1.58E-06	1.59E-06	1.59E-06
xe136	1.48E-06	1.49E-06	1.49E-06	1.50E-06	1.51E-06	1.51E-06
gd154	1.25E-06	1.26E-06	1.28E-06	1.29E-06	1.30E-06	1.30E-06
cd111	1.22E-06	1.23E-06	1.23E-06	1.24E-06	1.25E-06	1.25E-06
br 81	1.09E-06	1.10E-06	1.10E-06	1.11E-06	1.11E-06	1.11E-06
rb 85	1.04E-06	1.05E-06	1.05E-06	1.06E-06	1.06E-06	1.06E-06
ba135	8.75E-07	8.90E-07	9.04E-07	9.18E-07	9.33E-07	9.33E-07
zr 94	9.11E-07	9.15E-07	9.20E-07	9.24E-07	9.28E-07	9.28E-07
zr 90	8.40E-07	8.44E-07	8.48E-07	8.52E-07	8.56E-07	8.56E-07
sm154	7.38E-07	7.42E-07	7.45E-07	7.49E-07	7.53E-07	7.53E-07
te130	6.85E-07	6.88E-07	6.91E-07	6.94E-07	6.98E-07	6.98E-07
rb 87	6.00E-07	6.03E-07	6.06E-07	6.09E-07	6.12E-07	6.12E-07
pd106	4.55E-07	4.57E-07	4.59E-07	4.62E-07	4.64E-07	4.64E-07
se 77	4.41E-07	4.44E-07	4.46E-07	4.48E-07	4.50E-07	4.50E-07
gd156	4.35E-07	4.38E-07	4.40E-07	4.42E-07	4.45E-07	4.45E-07
ru100	3.32E-07	3.33E-07	3.38E-07	3.41E-07	3.44E-07	3.44E-07
kr 84	2.86E-07	2.88E-07	2.89E-07	2.90E-07	2.92E-07	2.92E-07
dy161	2.70E-07	2.71E-07	2.72E-07	2.73E-07	2.75E-07	2.75E-07
nd142	2.47E-07	2.49E-07	2.51E-07	2.54E-07	2.56E-07	2.56E-07
ba134	2.35E-07	2.37E-07	2.39E-07	2.41E-07	2.43E-07	2.44E-07
sb121	2.35E-07	2.36E-07	2.37E-07	2.38E-07	2.39E-07	2.39E-07
sm148	2.13E-07	2.15E-07	2.17E-07	2.19E-07	2.21E-07	2.21E-07
se 79	2.12E-07	2.13E-07	2.14E-07	2.14E-07	2.15E-07	2.15E-07
sb123	1.90E-07	1.91E-07	1.92E-07	1.93E-07	1.93E-07	1.93E-07
pd104	1.61E-07	1.62E-07	1.64E-07	1.65E-07	1.67E-07	1.67E-07
kr 86	1.60E-07	1.60E-07	1.61E-07	1.62E-07	1.63E-07	1.63E-07
te128	1.55E-07	1.55E-07	1.56E-07	1.57E-07	1.58E-07	1.58E-07
nb 93	1.39E-07	1.41E-07	1.43E-07	1.44E-07	1.46E-07	1.46E-07
tb159	1.16E-07	1.17E-07	1.17E-07	1.18E-07	1.18E-07	1.18E-07
se 80	1.06E-07	1.06E-07	1.07E-07	1.07E-07	1.08E-07	1.08E-07
te125	1.06E-07	1.06E-07	1.07E-07	1.07E-07	1.08E-07	1.08E-07
gd158	9.16E-08	9.21E-08	9.25E-08	9.30E-08	9.35E-08	9.35E-08
cd112	8.23E-08	8.27E-08	8.31E-08	8.35E-08	8.39E-08	8.39E-08
ag107	7.02E-08	7.14E-08	7.27E-08	7.39E-08	7.52E-08	7.52E-08
br 79	6.86E-08	6.97E-08	7.08E-08	7.19E-08	7.30E-08	7.30E-08
dy162	6.34E-08	6.38E-08	6.42E-08	6.46E-08	6.49E-08	6.49E-08
cd110	6.07E-08	6.14E-08	6.20E-08	6.27E-08	6.34E-08	6.34E-08
dy164	6.00E-08	6.02E-08	6.05E-08	6.07E-08	6.10E-08	6.10E-08
sn117	5.77E-08	5.80E-08	5.83E-08	5.85E-08	5.88E-08	5.88E-08
mo 96	5.33E-08	5.38E-08	5.42E-08	5.47E-08	5.52E-08	5.52E-08
li 6	5.40E-08	5.42E-08	5.44E-08	5.47E-08	5.49E-08	5.49E-08
cd114	4.91E-08	4.93E-08	4.96E-08	4.98E-08	5.01E-08	5.01E-08
eu152	4.67E-08	6.56E-08	6.58E-08	6.60E-08	6.61E-08	6.65E-08
xe129	4.23E-08	4.30E-08	4.37E-08	4.44E-08	4.51E-08	4.51E-08

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     sn119     4.38E-08  4.41E-08  4.43E-08  4.45E-08  4.47E-08  4.47E-08
     pd110     4.08E-08  4.10E-08  4.12E-08  4.14E-08  4.16E-08  4.16E-08
     sn115     4.01E-08  4.03E-08  4.05E-08  4.07E-08  4.09E-08  4.09E-08
     sr 88     2.93E-08  2.94E-08  2.95E-08  2.97E-08  2.98E-08  2.98E-08
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  244
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  25470.mwd, flux= 2.96E+07n/cm**2-sec
0              initial *******d ******* d ******* d ******* d ******* d

     xe130     2.60E-08  2.63E-08  2.65E-08  2.67E-08  2.70E-08  2.70E-08
     te126     2.26E-08  2.29E-08  2.33E-08  2.36E-08  2.39E-08  2.39E-08
     ba136     2.16E-08  2.18E-08  2.20E-08  2.21E-08  2.23E-08  2.23E-08
     se 82     2.02E-08  2.02E-08  2.03E-08  2.04E-08  2.05E-08  2.05E-08
     sn126     1.62E-08  1.62E-08  1.62E-08  1.63E-08  1.63E-08  1.63E-08
     dy163     1.58E-08  1.59E-08  1.60E-08  1.61E-08  1.62E-08  1.62E-08
     se 78     1.58E-08  1.59E-08  1.60E-08  1.60E-08  1.61E-08  1.61E-08
     kr 82     1.57E-08  1.58E-08  1.59E-08  1.60E-08  1.61E-08  1.61E-08
     sn124     1.39E-08  1.39E-08  1.40E-08  1.41E-08  1.41E-08  1.41E-08
     se 75     9.28E-09  9.32E-09  9.37E-09  9.41E-09  9.45E-09  9.45E-09
     in113     7.99E-09  8.03E-09  8.07E-09  8.10E-09  8.14E-09  8.14E-09
     eu155     8.45E-09  2.21E-08  2.21E-08  2.21E-08  2.21E-08  8.12E-09
     sn118     5.39E-09  5.61E-09  5.64E-09  5.67E-09  5.69E-09  5.69E-09
     pm147     5.99E-09  5.31E-08  5.31E-08  5.31E-08  5.31E-08  5.62E-09
     sn122     4.83E-09  4.85E-09  4.87E-09  4.90E-09  4.92E-09  4.92E-09
     cd116     4.70E-09  4.72E-09  4.74E-09  4.76E-09  4.79E-09  4.79E-09
     sn120     3.55E-09  3.56E-09  3.58E-09  3.60E-09  3.61E-09  3.61E-09
     eu154     5.51E-09  5.96E-09  5.99E-09  6.03E-09  6.06E-09  5.51E-09
     se 73     2.67E-09  2.68E-09  2.70E-09  2.71E-09  2.72E-09  2.72E-09
     sr 90     1.72E-09  2.03E-09  2.03E-09  2.03E-09  2.03E-09  1.72E-09
     dy160     1.63E-09  1.64E-09  1.66E-09  1.67E-09  1.69E-09  1.69E-09
     ho165     1.60E-09  1.61E-09  1.62E-09  1.63E-09  1.64E-09  1.64E-09
     gd160     1.30E-09  1.31E-09  1.31E-09  1.32E-09  1.33E-09  1.33E-09
     xe128     9.45E-10  9.54E-10  9.63E-10  9.72E-10  9.81E-10  9.81E-10
     se 76     9.03E-10  9.07E-10  9.12E-10  9.16E-10  9.20E-10  9.20E-10
     sr 86     4.40E-10  4.44E-10  4.48E-10  4.52E-10  4.56E-10  4.56E-10
     cs137     3.97E-10  4.62E-10  4.62E-10  4.62E-10  4.62E-10  3.95E-10
     sn116     3.56E-10  3.59E-10  3.63E-10  3.66E-10  3.69E-10  3.69E-10
     te124     3.08E-10  3.11E-10  3.13E-10  3.15E-10  3.17E-10  3.17E-10
     nb 94     1.62E-10  1.63E-10  1.65E-10  1.66E-10  1.68E-10  1.68E-10
     te122     1.50E-10  1.52E-10  1.53E-10  1.54E-10  1.56E-10  1.56E-10
     sr 87     1.48E-10  1.49E-10  1.50E-10  1.52E-10  1.53E-10  1.53E-10
     se 76     1.22E-10  1.23E-10  1.24E-10  1.25E-10  1.26E-10  1.26E-10
     er166     7.47E-11  7.51E-11  7.56E-11  7.60E-11  7.65E-11  7.65E-11
     kr 80     7.03E-11  7.15E-11  7.27E-11  7.40E-11  7.53E-11  7.53E-11
     cs134     6.38E-11  5.71E-10  5.74E-10  5.77E-10  5.80E-10  5.98E-11
     ge 74     5.34E-11  5.37E-11  5.39E-11  5.42E-11  5.45E-11  5.45E-11
     kr 85     4.47E-11  6.82E-11  6.82E-11  6.83E-11  6.83E-11  4.41E-11
     se 72     3.96E-11  3.98E-11  4.00E-11  4.02E-11  4.04E-11  4.04E-11
     er167     9.51E-12  9.61E-12  9.72E-12  9.82E-12  9.93E-12  9.93E-12
     te123     7.78E-12  7.88E-12  7.99E-12  8.10E-12  8.20E-12  8.20E-12
     cd108     5.22E-12  5.33E-12  5.43E-12  5.54E-12  5.64E-12  5.64E-12
      y 90     1.64E-12  1.93E-12  1.93E-12  1.93E-12  1.93E-12  1.64E-12
     sb125     4.10E-13  2.14E-12  2.13E-12  2.13E-12  2.13E-12  3.85E-13
     ce144     2.22E-13  7.22E-11  7.22E-11  7.23E-11  7.23E-11  1.79E-13
     be  9     1.13E-13  1.13E-13  1.14E-13  1.14E-13  1.15E-13  1.15E-13
     sn114     9.52E-14  9.61E-14  9.71E-14  9.80E-14  9.89E-14  9.89E-14
     li  7     4.68E-14  4.70E-14  4.72E-14  4.74E-14  4.77E-14  4.77E-14
     ru106     5.54E-14  4.66E-12  4.65E-12  4.64E-12  4.64E-12  4.65E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  245
0                                  fraction of total absorption rate
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        power=     .00mw, burnup=  25470.mwd, flux= 2.96E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d ******* d

    sb126     1.85E-14  1.93E-14  1.93E-14  1.94E-14  1.94E-14  1.87E-14
    cd109     7.36E-19  2.61E-17  2.66E-17  2.72E-17  2.76E-17  6.82E-19
    te127m    3.00E-19  1.09E-12  1.09E-12  1.09E-12  1.09E-12  1.64E-19
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page  246
      power= 4.890E-04mw, burnup=2.5470E+04mwd, flux= 2.96E+07n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     h  1    1.49E-03  1.50E-03  1.50E-03  1.51E-03  1.52E-03  1.52E-03
     h  2    4.46E-06  4.48E-06  4.50E-06  4.52E-06  4.54E-06  4.54E-06
     h  3    5.19E-12  7.49E-12  7.50E-12  7.51E-12  7.52E-12  5.14E-12
     h  4     .00E+00  3.79E-36  3.80E-36  3.80E-36  3.81E-36   .00E+00
    he  3    1.85E-08  1.86E-08  1.86E-08  1.86E-08  1.87E-08  1.87E-08
    he  4    2.47E-04  2.49E-04  2.50E-04  2.51E-04  2.52E-04  2.52E-04
    he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
    ne 20    2.97E-05  2.99E-05  3.00E-05  3.01E-05  3.03E-05  3.03E-05
    ne 21    1.34E-08  1.35E-08  1.36E-08  1.37E-08  1.38E-08  1.38E-08
    ne 22    1.96E-07  1.97E-07  1.98E-07  1.98E-07  1.99E-07  1.99E-07
    ne 23    8.87E-31  8.86E-16  8.86E-16  8.87E-16  8.87E-16  8.87E-31
    na 22    9.29E-13  5.25E-12  5.26E-12  5.26E-12  5.26E-12  8.69E-13
    na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
    na 24    3.23E-24  3.23E-09  3.23E-09  3.23E-09  3.23E-09  3.23E-24
    na 24m   5.31E-31  5.30E-16  5.30E-16  5.31E-16  5.31E-16  5.31E-31
    na 25    4.83E-39  4.87E-24  4.91E-24  4.96E-24  5.00E-24  5.00E-39
    mg 24    1.92E-01  1.93E-01  1.93E-01  1.94E-01  1.95E-01  1.95E-01
    mg 25    1.38E-06  1.39E-06  1.41E-06  1.42E-06  1.43E-06  1.43E-06
    mg 26    4.45E-06  4.47E-06  4.49E-06  4.51E-06  4.53E-06  4.53E-06
    mg 27    2.65E-28  2.64E-13  2.64E-13  2.64E-13  2.65E-13  2.65E-28
    mg 28     .00E+00  6.71E-26  6.72E-26  6.72E-26  6.73E-26   .00E+00
    al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
    al 28    2.39E-26  2.39E-11  2.39E-11  2.39E-11  2.39E-11  2.40E-26
    al 29    3.94E-37  3.97E-22  4.01E-22  4.04E-22  4.08E-22  4.08E-37
    al 30     .00E+00  1.28E-31  1.30E-31  1.32E-31  1.34E-31   .00E+00
    si 28    5.58E-01  5.61E-01  5.63E-01  5.65E-01  5.68E-01  5.68E-01
    si 29    1.26E-05  1.27E-05  1.28E-05  1.29E-05  1.30E-05  1.30E-05
    si 30    3.03E-10  3.07E-10  3.11E-10  3.15E-10  3.20E-10  3.20E-10
    si 31    2.71E-38  2.74E-23  2.78E-23  2.82E-23  2.86E-23  2.86E-38
    si 32    5.76E-30  5.98E-30  6.08E-30  6.17E-30  6.26E-30  6.09E-30
  totals     5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0   flux               2.96E+07  2.96E+07  2.96E+07  2.96E+07  2.96E-08
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                actinides             page  247
      power= 4.890E-04mw, burnup=2.5470E+04mwd, flux= 2.96E+07n/cm**2-sec
0                                                 nuclide concentrations, gram atoms
                                                  basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
    he  4    5.82E+01  5.88E+01  5.94E+01  6.00E+01  6.06E+01  6.06E+01
    pb206    4.14E-01  4.22E-01  4.30E-01  4.37E-01  4.45E-01  4.45E-01
    pb207    2.43E-02  2.47E-02  2.51E-02  2.55E-02  2.59E-02  2.59E-02
    pb208    8.51E-04  8.59E-04  8.66E-04  8.74E-04  8.82E-04  8.82E-04
    pb209    1.40E-09  1.42E-09  1.43E-09  1.44E-09  1.46E-09  1.46E-09
    pb210    3.94E-04  3.97E-04  4.00E-04  4.03E-04  4.06E-04  4.06E-04
    pb211    6.15E-11  6.16E-11  6.19E-11  6.21E-11  6.24E-11  6.25E-11
    pb212    2.04E-11  2.13E-11  2.14E-11  2.15E-11  2.16E-11  2.07E-11
    pb214    9.00E-10  9.07E-10  9.14E-10  9.21E-10  9.27E-10  9.28E-10
    bi208     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
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bi209	7.76E-02	7.92E-02	8.09E-02	8.26E-02	8.42E-02	8.43E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.42E-07	2.44E-07	2.46E-07	2.48E-07	2.50E-07	2.50E-07
bi211	3.65E-12	3.65E-12	3.67E-12	3.68E-12	3.70E-12	3.71E-12
bi212	1.93E-12	2.02E-12	2.03E-12	2.04E-12	2.05E-12	1.97E-12
bi213	3.28E-10	3.31E-10	3.34E-10	3.37E-10	3.41E-10	3.41E-10
bi214	6.68E-10	6.73E-10	6.79E-10	6.84E-10	6.89E-10	6.89E-10
po210	6.70E-06	6.74E-06	6.80E-06	6.85E-06	6.90E-06	6.90E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.03E-17	4.04E-17	4.05E-17	4.07E-17	4.09E-17	4.09E-17
po212	1.02E-22	1.06E-22	1.07E-22	1.07E-22	1.08E-22	1.03E-22
po213	4.93E-19	4.98E-19	5.02E-19	5.07E-19	5.12E-19	5.12E-19
po214	9.19E-17	9.26E-17	9.34E-17	9.41E-17	9.47E-17	9.48E-17
po215	5.05E-17	5.07E-17	5.09E-17	5.11E-17	5.13E-17	5.14E-17
po216	7.72E-17	8.06E-17	8.10E-17	8.14E-17	8.17E-17	7.84E-17
po218	1.04E-10	1.05E-10	1.06E-10	1.07E-10	1.07E-10	1.07E-10
rn218	3.50E-44	3.77E-29	3.79E-29	3.81E-29	3.83E-29	3.64E-46
rn219	1.12E-13	1.13E-13	1.13E-13	1.14E-13	1.14E-13	1.14E-13
rn220	2.96E-14	3.09E-14	3.11E-14	3.12E-14	3.13E-14	3.01E-14
rn222	1.85E-07	1.86E-07	1.88E-07	1.89E-07	1.91E-07	1.91E-07
ra222	3.83E-41	4.09E-26	4.11E-26	4.14E-26	4.16E-26	3.89E-41
ra223	2.80E-08	2.81E-08	2.82E-08	2.83E-08	2.85E-08	2.85E-08
ra224	1.68E-10	1.76E-10	1.77E-10	1.77E-10	1.78E-10	1.71E-10
ra225	1.53E-07	1.55E-07	1.56E-07	1.58E-07	1.59E-07	1.59E-07
ra226	2.83E-02	2.85E-02	2.87E-02	2.89E-02	2.91E-02	2.91E-02
ra228	1.46E-10	1.48E-10	1.49E-10	1.51E-10	1.52E-10	1.52E-10
ac225	1.04E-07	1.05E-07	1.06E-07	1.07E-07	1.08E-07	1.08E-07
ac227	1.95E-05	1.96E-05	1.96E-05	1.97E-05	1.98E-05	1.98E-05
ac228	1.79E-14	1.81E-14	1.82E-14	1.84E-14	1.86E-14	1.86E-14
th226	1.87E-39	2.00E-24	2.01E-24	2.02E-24	2.03E-24	1.90E-39
th227	4.53E-08	4.54E-08	4.56E-08	4.58E-08	4.59E-08	4.60E-08
th228	3.21E-08	3.36E-08	3.37E-08	3.39E-08	3.40E-08	3.26E-08
th229	2.98E-02	3.01E-02	3.04E-02	3.07E-02	3.10E-02	3.10E-02
th230	1.37E+00	1.38E+00	1.39E+00	1.40E+00	1.41E+00	1.41E+00
th231	2.71E-09	3.48E-09	3.48E-09	3.49E-09	3.49E-09	2.71E-09
th232	3.58E-01	3.62E-01	3.65E-01	3.69E-01	3.72E-01	3.72E-01
th233	4.06E-28	4.10E-13	4.14E-13	4.18E-13	4.23E-13	4.23E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.93E-02	2.94E-02	2.95E-02	2.96E-02	2.98E-02	2.98E-02
pa232	6.25E-26	6.27E-11	6.30E-11	6.33E-11	6.36E-11	6.36E-26

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sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 248
power= 4.890E-04mw, burnup=2.5470E+04mwd, flux= 2.96E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.40E-06	1.40E-06	1.40E-06	1.39E-06	1.39E-06	1.39E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.81E-36	1.94E-21	1.95E-21	1.96E-21	1.97E-21	1.84E-36
u231	6.58E-32	6.63E-17	6.69E-17	6.74E-17	6.80E-17	6.80E-32
u232	1.14E-06	1.22E-06	1.23E-06	1.23E-06	1.24E-06	1.16E-06
u233	7.12E-01	7.18E-01	7.24E-01	7.30E-01	7.35E-01	7.35E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.55E+02	6.55E+02	6.54E+02	6.54E+02	6.54E+02	6.54E+02
u236	1.94E+02	1.94E+02	1.94E+02	1.95E+02	1.95E+02	1.95E+02
u237	3.34E-13	4.15E-07	4.15E-07	4.16E-07	4.16E-07	3.11E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.76E-23	3.76E-08	3.76E-08	3.76E-08	3.77E-08	3.77E-23

u240	3.26E-34	3.37E-34	3.48E-34	3.60E-34	3.71E-34	3.71E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.60E-14	1.02E-12	1.02E-12	1.02E-12	1.02E-12	1.36E-14
np236m	2.43E-28	2.43E-13	2.43E-13	2.43E-13	2.43E-13	2.43E-28
np236	2.61E-06	2.62E-06	2.62E-06	2.63E-06	2.63E-06	2.63E-06
np237	4.04E+01	4.04E+01	4.04E+01	4.03E+01	4.03E+01	4.03E+01
np238	4.44E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	4.36E-15
np239	1.61E-13	5.43E-06	5.44E-06	5.44E-06	5.44E-06	1.57E-13
np240m	2.78E-36	2.87E-36	2.97E-36	3.07E-36	3.17E-36	3.17E-36
np240	3.26E-38	1.37E-16	1.37E-16	1.37E-16	1.37E-16	3.66E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	3.37E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.22E-11
pu237	3.58E-29	3.12E-14	3.11E-14	3.09E-14	3.08E-14	3.17E-29
pu238	2.42E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.61E-03
pu239	2.65E+01	2.63E+01	2.62E+01	2.60E+01	2.59E+01	2.59E+01
pu240	2.98E-01	2.93E-01	2.89E-01	2.85E-01	2.81E-01	2.81E-01
pu241	1.08E-05	1.46E-05	1.44E-05	1.42E-05	1.40E-05	1.01E-05
pu242	4.83E-05	4.83E-05	4.83E-05	4.84E-05	4.84E-05	4.84E-05
pu243	1.56E-29	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.57E-29
pu244	1.62E-23	1.68E-23	1.73E-23	1.79E-23	1.85E-23	1.85E-23
pu245	.00E+00	8.55E-35	8.84E-35	9.14E-35	9.44E-35	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.52E-35	1.48E-20	1.47E-20	1.45E-20	1.43E-20	1.43E-35
am240	6.93E-33	6.79E-18	6.71E-18	6.62E-18	6.53E-18	6.52E-33
am241	4.47E-04	4.39E-04	4.33E-04	4.27E-04	4.21E-04	4.21E-04
am242m	2.51E-08	2.53E-08	2.50E-08	2.47E-08	2.44E-08	2.36E-08
am242	3.23E-13	2.01E-12	1.99E-12	1.96E-12	1.94E-12	3.04E-13
am243	1.84E-07	1.83E-07	1.82E-07	1.81E-07	1.80E-07	1.80E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.71E-31	1.70E-16	1.69E-16	1.68E-16	1.67E-16	1.67E-31
am245	2.98E-40	1.68E-35	1.73E-35	1.79E-35	1.85E-35	2.54E-40
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	.00E+00	1.45E-23	1.43E-23	1.41E-23	1.39E-23	.00E+00
cm242	6.53E-11	4.06E-10	4.02E-10	3.96E-10	3.91E-10	6.15E-11
cm243	1.00E-15	1.15E-15	1.13E-15	1.12E-15	1.11E-15	9.38E-16
cm244	2.09E-12	2.66E-12	2.65E-12	2.63E-12	2.62E-12	2.02E-12

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sss2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 249

power= 4.890E-04mw, burnup=2.5470E+04mwd, flux= 2.96E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

charge	******* d	******* d	******* d	******* d	******* d
cm245	7.87E-15	7.67E-15	7.48E-15	7.30E-15	7.13E-15	7.13E-15
cm246	5.89E-17	5.71E-17	5.54E-17	5.37E-17	5.21E-17	5.21E-17
cm247	8.87E-20	8.92E-20	8.96E-20	9.01E-20	9.05E-20	9.05E-20
cm248	4.70E-22	4.78E-22	4.86E-22	4.94E-22	5.02E-22	5.02E-22
cm249	.00E+00	1.84E-33	1.87E-33	1.91E-33	1.94E-33	.00E+00
cm250	1.82E-37	1.84E-37	1.85E-37	1.87E-37	1.88E-37	1.88E-37
cm251	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.96E+07	2.96E+07	2.96E+07	2.96E+07	2.96E-08

```
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...
```

cross-section data taken from position number 28 of library on unit 33.

```
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          "scale-system control module sas2 library"
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  ft33f001
0                 8/29/1996    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7993    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  250
         power=    .00mw, burnup=  25916.mwd, flux= 2.96E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                  initial      ******* d      ******* d      ******* d      ******* d      ******* d
     productions  1.278555E+06  1.277911E+06  1.277274E+06  1.276642E+06  1.276016E+06  1.276007E+06
     absorptions  1.043883E+06  1.043584E+06  1.043289E+06  1.042996E+06  1.042707E+06  1.042701E+06
     k infinity   1.224807E+00  1.224541E+00  1.224276E+00  1.224014E+00  1.223754E+00  1.223751E+00
0                  initial      ******* d      ******* d      ******* d      ******* d      ******* d
     actinide
     absorptions  1.023805E+06  1.023469E+06  1.023136E+06  1.022807E+06  1.022481E+06  1.022475E+06
     non-actinide
     abs. fracs.  1.923376E-02  1.927501E-02  1.931602E-02  1.935685E-02  1.939768E-02  1.939726E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products    page  251
0                                  fraction of total absorption rate
```

```
          power=     .00mw, burnup=  25916.mwd, flux= 2.96E+07n/cm**2-sec
0                 initial *******d *******d *******d *******d
```

sm149	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03
nd143	2.47E-03	2.49E-03	2.50E-03	2.51E-03	2.52E-03	2.52E-03
eu151	2.03E-03	2.03E-03	2.03E-03	2.04E-03	2.04E-03	2.04E-03
rh103	1.21E-03	1.21E-03	1.22E-03	1.22E-03	1.23E-03	1.23E-03
xe131	8.04E-04	8.07E-04	8.11E-04	8.15E-04	8.18E-04	8.18E-04
cs133	6.27E-04	6.30E-04	6.33E-04	6.36E-04	6.39E-04	6.39E-04
sm147	4.59E-04	4.61E-04	4.63E-04	4.65E-04	4.67E-04	4.67E-04
tc 99	4.04E-04	4.05E-04	4.06E-04	4.07E-04	4.09E-04	4.09E-04
nd145	3.54E-04	3.56E-04	3.57E-04	3.59E-04	3.61E-04	3.61E-04
sm152	2.84E-04	2.86E-04	2.87E-04	2.89E-04	2.90E-04	2.90E-04
mo 95	2.46E-04	2.47E-04	2.48E-04	2.49E-04	2.50E-04	2.50E-04
gd155	2.24E-04	2.24E-04	2.24E-04	2.23E-04	2.23E-04	2.23E-04
sm150	1.88E-04	1.89E-04	1.90E-04	1.91E-04	1.92E-04	1.92E-04
kr 83	1.51E-04	1.52E-04	1.52E-04	1.53E-04	1.54E-04	1.54E-04
cs135	1.42E-04	1.43E-04	1.43E-04	1.44E-04	1.44E-04	1.44E-04
eu153	1.17E-04	1.17E-04	1.18E-04	1.18E-04	1.19E-04	1.19E-04
ru101	1.10E-04	1.11E-04	1.11E-04	1.12E-04	1.12E-04	1.12E-04
pr141	1.07E-04	1.07E-04	1.08E-04	1.08E-04	1.09E-04	1.09E-04
cd113	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04
la139	8.72E-05	8.76E-05	8.80E-05	8.84E-05	8.88E-05	8.88E-05
gd157	5.79E-05	5.78E-05	5.77E-05	5.75E-05	5.74E-05	5.74E-05
ag109	4.60E-05	4.62E-05	4.64E-05	4.66E-05	4.69E-05	4.69E-05
pd105	4.49E-05	4.51E-05	4.54E-05	4.56E-05	4.58E-05	4.58E-05
ba137	4.23E-05	4.25E-05	4.27E-05	4.29E-05	4.31E-05	4.31E-05
zr 93	3.38E-05	3.39E-05	3.41E-05	3.42E-05	3.44E-05	3.44E-05
i129	2.87E-05	2.88E-05	2.89E-05	2.91E-05	2.92E-05	2.92E-05
nd144	2.72E-05	2.73E-05	2.75E-05	2.76E-05	2.77E-05	2.77E-05
gd152	2.51E-05	2.52E-05	2.54E-05	2.56E-05	2.58E-05	2.58E-05
mo 97	1.98E-05	1.99E-05	2.00E-05	2.01E-05	2.02E-05	2.02E-05
pd108	1.10E-05	1.11E-05	1.11E-05	1.12E-05	1.12E-05	1.12E-05
ru 99	8.97E-06	9.10E-06	9.24E-06	9.37E-06	9.50E-06	9.51E-06
zr 91	9.08E-06	9.13E-06	9.17E-06	9.21E-06	9.25E-06	9.25E-06
y 89	8.69E-06	8.73E-06	8.77E-06	8.81E-06	8.85E-06	8.85E-06
ru102	8.31E-06	8.35E-06	8.39E-06	8.43E-06	8.47E-06	8.47E-06
ce142	7.28E-06	7.31E-06	7.34E-06	7.38E-06	7.41E-06	7.41E-06
nd148	6.99E-06	7.03E-06	7.06E-06	7.09E-06	7.13E-06	7.13E-06
sm151	6.61E-06	6.97E-06	6.97E-06	6.98E-06	6.98E-06	6.61E-06
nd146	5.92E-06	5.96E-06	5.97E-06	6.00E-06	6.03E-06	6.03E-06
pd107	5.56E-06	5.58E-06	5.61E-06	5.64E-06	5.67E-06	5.67E-06
in115	5.18E-06	5.20E-06	5.22E-06	5.25E-06	5.27E-06	5.27E-06
ba138	5.03E-06	5.06E-06	5.08E-06	5.10E-06	5.13E-06	5.13E-06
ce140	4.71E-06	4.73E-06	4.76E-06	4.78E-06	4.80E-06	4.80E-06
xe132	4.33E-06	4.35E-06	4.37E-06	4.39E-06	4.41E-06	4.41E-06
mo 98	2.87E-06	2.89E-06	2.90E-06	2.91E-06	2.93E-06	2.93E-06
mo100	2.81E-06	2.82E-06	2.84E-06	2.85E-06	2.86E-06	2.86E-06
xe134	2.78E-06	2.80E-06	2.81E-06	2.82E-06	2.84E-06	2.84E-06
zr 92	2.20E-06	2.21E-06	2.22E-06	2.23E-06	2.24E-06	2.24E-06
i127	2.10E-06	2.11E-06	2.12E-06	2.13E-06	2.14E-06	2.14E-06
ru104	1.92E-06	1.93E-06	1.94E-06	1.95E-06	1.96E-06	1.96E-06

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1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  252
0                                  fraction of total absorption rate
          power=     .00mw, burnup=  25916.mwd, flux= 2.96E+07n/cm**2-sec
0                 initial *******d *******d *******d *******d
```

zr 96	1.71E-06	1.72E-06	1.73E-06	1.74E-06	1.75E-06	1.75E-06
nd150	1.59E-06	1.59E-06	1.60E-06	1.61E-06	1.61E-06	1.61E-06
xe136	1.51E-06	1.52E-06	1.52E-06	1.53E-06	1.54E-06	1.54E-06

gd154	1.30E-06	1.31E-06	1.33E-06	1.34E-06	1.35E-06	1.35E-06
cd111	1.25E-06	1.25E-06	1.26E-06	1.27E-06	1.27E-06	1.27E-06
br 81	1.11E-06	1.12E-06	1.12E-06	1.13E-06	1.13E-06	1.13E-06
rb 85	1.06E-06	1.07E-06	1.07E-06	1.08E-06	1.08E-06	1.08E-06
ba135	9.33E-07	9.48E-07	9.62E-07	9.77E-07	9.92E-07	9.92E-07
zr 94	9.28E-07	9.32E-07	9.37E-07	9.41E-07	9.45E-07	9.45E-07
zr 90	8.57E-07	8.61E-07	8.64E-07	8.68E-07	8.72E-07	8.72E-07
sm154	7.53E-07	7.56E-07	7.60E-07	7.63E-07	7.67E-07	7.67E-07
te130	6.98E-07	7.01E-07	7.04E-07	7.08E-07	7.11E-07	7.11E-07
rb 87	6.12E-07	6.15E-07	6.17E-07	6.20E-07	6.23E-07	6.23E-07
pd106	4.64E-07	4.66E-07	4.68E-07	4.71E-07	4.73E-07	4.73E-07
se 77	4.50E-07	4.52E-07	4.54E-07	4.56E-07	4.58E-07	4.58E-07
gd156	4.44E-07	4.47E-07	4.49E-07	4.51E-07	4.54E-07	4.54E-07
ru100	3.44E-07	3.47E-07	3.50E-07	3.53E-07	3.56E-07	3.56E-07
kr 84	2.92E-07	2.93E-07	2.94E-07	2.96E-07	2.97E-07	2.97E-07
dy161	2.75E-07	2.76E-07	2.77E-07	2.79E-07	2.80E-07	2.80E-07
nd142	2.56E-07	2.58E-07	2.61E-07	2.63E-07	2.66E-07	2.66E-07
ba134	2.44E-07	2.46E-07	2.48E-07	2.50E-07	2.52E-07	2.53E-07
sb121	2.39E-07	2.41E-07	2.42E-07	2.43E-07	2.44E-07	2.44E-07
sm148	2.21E-07	2.23E-07	2.25E-07	2.27E-07	2.29E-07	2.29E-07
se 79	2.15E-07	2.16E-07	2.17E-07	2.18E-07	2.18E-07	2.18E-07
sb123	1.93E-07	1.94E-07	1.95E-07	1.96E-07	1.97E-07	1.97E-07
pd104	1.67E-07	1.68E-07	1.70E-07	1.71E-07	1.73E-07	1.73E-07
kr 86	1.63E-07	1.63E-07	1.64E-07	1.65E-07	1.66E-07	1.66E-07
te128	1.58E-07	1.58E-07	1.59E-07	1.60E-07	1.61E-07	1.61E-07
nb 93	1.48E-07	1.50E-07	1.53E-07	1.55E-07	1.57E-07	1.57E-07
tb159	1.18E-07	1.19E-07	1.20E-07	1.20E-07	1.21E-07	1.21E-07
se 80	1.08E-07	1.08E-07	1.09E-07	1.09E-07	1.10E-07	1.10E-07
te125	1.08E-07	1.08E-07	1.09E-07	1.09E-07	1.10E-07	1.10E-07
gd158	9.35E-08	9.39E-08	9.44E-08	9.49E-08	9.53E-08	9.53E-08
cd112	8.39E-08	8.43E-08	8.47E-08	8.51E-08	8.55E-08	8.55E-08
ag107	7.52E-08	7.65E-08	7.78E-08	7.90E-08	8.03E-08	8.03E-08
br 79	7.30E-08	7.41E-08	7.52E-08	7.63E-08	7.74E-08	7.75E-08
dy162	6.49E-08	6.53E-08	6.57E-08	6.60E-08	6.64E-08	6.64E-08
cd110	6.34E-08	6.41E-08	6.47E-08	6.54E-08	6.61E-08	6.61E-08
dy164	6.10E-08	6.13E-08	6.15E-08	6.18E-08	6.20E-08	6.20E-08
sn117	5.88E-08	5.91E-08	5.94E-08	5.97E-08	6.00E-08	6.00E-08
mo 96	5.52E-08	5.57E-08	5.62E-08	5.67E-08	5.72E-08	5.72E-08
li 6	5.49E-08	5.51E-08	5.54E-08	5.56E-08	5.58E-08	5.58E-08
cd114	5.01E-08	5.03E-08	5.06E-08	5.08E-08	5.11E-08	5.11E-08
xe129	4.51E-08	4.58E-08	4.66E-08	4.73E-08	4.80E-08	4.80E-08
eu152	4.65E-08	4.63E-08	4.65E-08	4.66E-08	4.68E-08	4.64E-08
sn119	4.47E-08	4.49E-08	4.51E-08	4.53E-08	4.56E-08	4.56E-08
pd110	4.16E-08	4.18E-08	4.20E-08	4.22E-08	4.24E-08	4.24E-08
sn115	4.09E-08	4.11E-08	4.13E-08	4.15E-08	4.17E-08	4.17E-08
sr 88	2.98E-08	3.00E-08	3.01E-08	3.02E-08	3.04E-08	3.04E-08

1 sas2h: far-field crit based on b&w 15x15, 3.90wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 253

0 fraction of total absorption rate

0 power= .00mw, burnup= 25916.mwd, flux= 2.96E+07n/cm**2-sec

	initial ******* d	******* d	******* d	******* d	******* d	******* d
xe130	2.70E-08	2.72E-08	2.74E-08	2.77E-08	2.79E-08	2.79E-08
te126	2.39E-08	2.43E-08	2.46E-08	2.50E-08	2.53E-08	2.53E-08
ba136	2.23E-08	2.25E-08	2.26E-08	2.28E-08	2.30E-08	2.30E-08
se 82	2.05E-08	2.06E-08	2.07E-08	2.08E-08	2.09E-08	2.09E-08
dy163	1.62E-08	1.63E-08	1.64E-08	1.65E-08	1.66E-08	1.66E-08
kr 82	1.61E-08	1.62E-08	1.63E-08	1.64E-08	1.65E-08	1.65E-08
sn126	1.63E-08	1.63E-08	1.64E-08	1.64E-08	1.64E-08	1.64E-08
se 78	1.61E-08	1.62E-08	1.63E-08	1.63E-08	1.64E-08	1.64E-08
sn124	1.41E-08	1.42E-08	1.43E-08	1.43E-08	1.44E-08	1.44E-08

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     as 75      9.45E-09  9.50E-09  9.54E-09  9.59E-09  9.63E-09  9.63E-09
     in113      8.14E-09  8.18E-09  8.22E-09  8.26E-09  8.30E-09  8.30E-09
     au155      8.12E-09  2.21E-08  2.21E-08  2.20E-08  2.20E-08  7.80E-09
     sn118      5.69E-09  5.72E-09  5.74E-09  5.77E-09  5.80E-09  5.80E-09
     pm147      5.62E-09  3.31E-08  3.31E-08  3.31E-08  3.31E-08  5.26E-09
     sn122      4.92E-09  4.94E-09  4.97E-09  4.99E-09  5.01E-09  5.01E-09
     cd114      4.78E-09  4.81E-09  4.83E-09  4.85E-09  4.87E-09  4.87E-09
     sn120      3.61E-09  3.63E-09  3.65E-09  3.67E-09  3.68E-09  3.68E-09
     au154      3.52E-09  6.10E-09  6.15E-09  6.17E-09  6.20E-09  3.52E-09
     ge 73      2.72E-09  2.74E-09  2.75E-09  2.76E-09  2.77E-09  2.77E-09
     dy160      1.69E-09  1.71E-09  1.72E-09  1.74E-09  1.76E-09  1.76E-09
     sr 90      1.72E-09  2.03E-09  2.03E-09  2.03E-09  2.03E-09  1.71E-09
     ho165      1.64E-09  1.66E-09  1.67E-09  1.68E-09  1.69E-09  1.69E-09
     gd160      1.33E-09  1.33E-09  1.34E-09  1.35E-09  1.35E-09  1.35E-09
     xe128      9.81E-10  9.90E-10  9.99E-10  1.01E-09  1.02E-09  1.02E-09
     ge 76      9.20E-10  9.24E-10  9.29E-10  9.33E-10  9.37E-10  9.37E-10
     sr 86      4.56E-10  4.60E-10  4.64E-10  4.68E-10  4.72E-10  4.72E-10
     cs137      3.95E-10  4.62E-10  4.62E-10  4.62E-10  4.63E-10  3.93E-10
     sn116      3.69E-10  3.73E-10  3.76E-10  3.80E-10  3.83E-10  3.83E-10
     te124      3.18E-10  3.20E-10  3.22E-10  3.24E-10  3.27E-10  3.27E-10
     nb 94      1.68E-10  1.70E-10  1.71E-10  1.73E-10  1.75E-10  1.75E-10
     te122      1.56E-10  1.57E-10  1.59E-10  1.60E-10  1.62E-10  1.62E-10
     sr 87      1.53E-10  1.54E-10  1.55E-10  1.56E-10  1.57E-10  1.57E-10
     ge 76      1.26E-10  1.27E-10  1.28E-10  1.29E-10  1.30E-10  1.30E-10
     kr 80      7.53E-11  7.66E-11  7.79E-11  7.92E-11  8.06E-11  8.06E-11
     er166      7.65E-11  7.69E-11  7.74E-11  7.78E-11  7.83E-11  7.83E-11
     cs134      5.98E-11  5.83E-10  5.85E-10  5.88E-10  5.91E-10  5.60E-11
     ge 74      5.45E-11  5.47E-11  5.50E-11  5.52E-11  5.55E-11  5.55E-11
     kr 85      4.41E-11  6.83E-11  6.84E-11  6.84E-11  6.84E-11  4.35E-11
     ge 72      4.04E-11  4.06E-11  4.08E-11  4.10E-11  4.12E-11  4.12E-11
     er167      9.93E-12  1.00E-11  1.01E-11  1.03E-11  1.04E-11  1.04E-11
     te123      8.20E-12  8.31E-12  8.42E-12  8.53E-12  8.65E-12  8.65E-12
     cd108      5.45E-12  5.76E-12  5.87E-12  5.98E-12  6.10E-12  6.10E-12
      y 90      1.44E-12  1.93E-12  1.94E-12  1.94E-12  1.94E-12  1.63E-12
     sb125      3.85E-13  2.13E-12  2.13E-12  2.13E-12  2.13E-12  3.60E-13
     ce144      1.79E-13  7.23E-11  7.24E-11  7.24E-11  7.24E-11  1.43E-13
     be  9      1.15E-13  1.15E-13  1.16E-13  1.16E-13  1.17E-13  1.17E-13
     sn114      9.90E-14  9.99E-14  1.01E-13  1.02E-13  1.03E-13  1.03E-13
     li  7      4.77E-14  4.79E-14  4.81E-14  4.84E-14  4.86E-14  4.86E-14
     ru106      4.64E-14  4.63E-12  4.62E-12  4.61E-12  4.61E-12  3.88E-14
1    sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  254
0                                  fraction of total absorption rate
       power=     .00mw, burnup=  25916.mwd, flux= 2.96E+07n/cm**2-sec
0            initial ******* d ******* d ******* d ******* d ******* d

     sb126      1.87E-14  1.94E-14  1.95E-14  1.95E-14  1.95E-14  1.88E-14
     cd109      6.81E-19  2.82E-17  2.87E-17  2.93E-17  2.99E-17  6.55E-19
     te127m     1.64E-19  1.08E-12  1.08E-12  1.08E-12  1.08E-12  8.19E-20
1    sas2h: far-field crit based on bzw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements            page  255
      power= 4.890E-04mw, burnup=2.5916E+04mwd, flux= 2.96E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d ******* d
      h  1    1.52E-03  1.52E-03  1.53E-03  1.54E-03  1.54E-03  1.54E-03
      h  2    4.54E-06  4.56E-06  4.58E-06  4.60E-06  4.62E-06  4.62E-06
      h  3    5.14E-12  7.52E-12  7.53E-12  7.54E-12  7.55E-12  5.09E-12
      h  4     .00E+00  3.81E-36  3.82E-36  3.83E-36  3.83E-36   .00E+00
     he  3    1.87E-08  1.87E-08  1.88E-08  1.88E-08  1.88E-08  1.88E-08
     he  4    2.52E-04  2.53E-04  2.54E-04  2.55E-04  2.56E-04  2.56E-04
```

he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.03E-05	3.04E-05	3.05E-05	3.07E-05	3.08E-05	3.08E-05
ne 21	1.38E-08	1.39E-08	1.41E-08	1.42E-08	1.43E-08	1.43E-08
ne 22	1.99E-07	2.00E-07	2.01E-07	2.02E-07	2.03E-07	2.03E-07
ne 23	8.87E-31	8.86E-16	8.87E-16	8.87E-16	8.87E-16	8.87E-31
na 22	8.69E-13	5.26E-12	5.26E-12	5.26E-12	5.26E-12	8.13E-13
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.23E-24	3.23E-09	3.23E-09	3.23E-09	3.23E-09	3.23E-24
na 24m	5.31E-31	5.31E-16	5.31E-16	5.31E-16	5.31E-16	5.31E-31
na 25	5.00E-39	5.04E-24	5.09E-24	5.13E-24	5.18E-24	5.18E-39
mg 24	1.95E-01	1.96E-01	1.97E-01	1.98E-01	1.98E-01	1.98E-01
mg 25	1.43E-06	1.44E-06	1.46E-06	1.47E-06	1.48E-06	1.48E-06
mg 26	4.53E-06	4.55E-06	4.57E-06	4.59E-06	4.61E-06	4.61E-06
mg 27	2.65E-28	2.64E-13	2.64E-13	2.65E-13	2.65E-13	2.65E-28
mg 28	.00E+00	6.73E-26	6.73E-26	6.74E-26	6.74E-26	.00E+00
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.40E-26	2.39E-11	2.39E-11	2.40E-11	2.40E-11	2.40E-26
al 29	4.08E-37	4.11E-22	4.15E-22	4.19E-22	4.23E-22	4.23E-37
al 30	.00E+00	1.35E-31	1.37E-31	1.39E-31	1.41E-31	.00E+00
si 28	5.68E-01	5.70E-01	5.73E-01	5.75E-01	5.78E-01	5.78E-01
si 29	1.30E-05	1.32E-05	1.33E-05	1.34E-05	1.35E-05	1.35E-05
si 30	3.20E-10	3.24E-10	3.28E-10	3.32E-10	3.37E-10	3.37E-10
si 31	2.86E-38	2.90E-23	2.94E-23	2.98E-23	3.02E-23	3.02E-38
si 32	6.09E-30	6.33E-30	6.44E-30	6.53E-30	6.62E-30	6.63E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
0 flux		2.96E+07	2.96E+07	2.97E+07	2.97E+07	2.97E-08

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 256

power= 4.890E-04mw, burnup=2.5916E+04mwd, flux= 2.96E+07n/cm**2-sec

0 nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	6.06E+01	6.12E+01	6.18E+01	6.24E+01	6.30E+01	6.30E+01
pb206	4.45E-01	4.53E-01	4.61E-01	4.70E-01	4.78E-01	4.78E-01
pb207	2.59E-02	2.63E-02	2.67E-02	2.71E-02	2.75E-02	2.75E-02
pb208	8.82E-04	8.90E-04	8.97E-04	9.05E-04	9.13E-04	9.13E-04
pb209	1.46E-09	1.47E-09	1.49E-09	1.50E-09	1.51E-09	1.51E-09
pb210	4.06E-04	4.09E-04	4.12E-04	4.15E-04	4.18E-04	4.18E-04
pb211	6.25E-11	6.26E-11	6.29E-11	6.31E-11	6.34E-11	6.35E-11
pb212	2.07E-11	2.17E-11	2.18E-11	2.19E-11	2.20E-11	2.10E-11
pb214	9.28E-10	9.34E-10	9.41E-10	9.48E-10	9.54E-10	9.54E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	8.43E-02	8.60E-02	8.77E-02	8.94E-02	9.12E-02	9.12E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.50E-07	2.52E-07	2.53E-07	2.55E-07	2.57E-07	2.57E-07
bi211	3.71E-12	3.71E-12	3.73E-12	3.74E-12	3.76E-12	3.76E-12
bi212	1.97E-12	2.06E-12	2.07E-12	2.08E-12	2.08E-12	2.00E-12
bi213	3.41E-10	3.44E-10	3.47E-10	3.51E-10	3.54E-10	3.54E-10
bi214	6.89E-10	6.94E-10	6.99E-10	7.04E-10	7.09E-10	7.09E-10
po210	6.90E-06	6.95E-06	7.00E-06	7.05E-06	7.10E-06	7.10E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.09E-17	4.10E-17	4.12E-17	4.14E-17	4.15E-17	4.16E-17
po212	1.03E-22	1.08E-22	1.09E-22	1.09E-22	1.10E-22	1.05E-22
po213	5.12E-19	5.17E-19	5.22E-19	5.27E-19	5.32E-19	5.32E-19
po214	9.48E-17	9.54E-17	9.61E-17	9.68E-17	9.75E-17	9.75E-17
po215	5.14E-17	5.15E-17	5.17E-17	5.19E-17	5.21E-17	5.22E-17
po216	7.84E-17	8.21E-17	8.25E-17	8.28E-17	8.32E-17	7.96E-17
po218	1.07E-10	1.08E-10	1.09E-10	1.10E-10	1.10E-10	1.10E-10
rn218	3.64E-44	3.84E-29	3.86E-29	3.88E-29	3.90E-29	3.64E-44
rn219	1.14E-13	1.15E-13	1.15E-13	1.15E-13	1.16E-13	1.16E-13

rn220	3.01E-14	3.15E-14	3.16E-14	3.18E-14	3.19E-14	3.05E-14
rn222	1.91E-07	1.92E-07	1.93E-07	1.95E-07	1.96E-07	1.96E-07
ra222	3.89E-41	4.17E-26	4.19E-26	4.21E-26	4.23E-26	3.95E-41
ra223	2.85E-08	2.86E-08	2.87E-08	2.88E-08	2.89E-08	2.90E-08
ra224	1.71E-10	1.79E-10	1.80E-10	1.81E-10	1.81E-10	1.74E-10
ra225	1.59E-07	1.61E-07	1.62E-07	1.64E-07	1.65E-07	1.65E-07
ra226	2.91E-02	2.93E-02	2.96E-02	2.98E-02	3.00E-02	3.00E-02
ra228	1.52E-10	1.54E-10	1.55E-10	1.57E-10	1.58E-10	1.58E-10
ac225	1.08E-07	1.09E-07	1.10E-07	1.11E-07	1.12E-07	1.12E-07
ac227	1.98E-05	1.99E-05	1.99E-05	2.00E-05	2.01E-05	2.01E-05
ac228	1.86E-14	1.88E-14	1.90E-14	1.91E-14	1.93E-14	1.93E-14
th226	1.90E-39	2.03E-24	2.04E-24	2.05E-24	2.06E-24	1.93E-39
th227	4.60E-08	4.61E-08	4.63E-08	4.65E-08	4.67E-08	4.67E-08
th228	3.26E-08	3.42E-08	3.43E-08	3.45E-08	3.46E-08	3.31E-08
th229	3.10E-02	3.13E-02	3.16E-02	3.19E-02	3.22E-02	3.22E-02
th230	1.41E+00	1.42E+00	1.43E+00	1.44E+00	1.45E+00	1.45E+00
th231	2.71E-09	3.50E-09	3.50E-09	3.51E-09	3.51E-09	2.71E-09
th232	3.72E-01	3.76E-01	3.80E-01	3.83E-01	3.87E-01	3.87E-01
th233	4.23E-28	6.27E-13	4.31E-13	4.35E-13	4.40E-13	4.40E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	2.98E-02	2.99E-02	3.00E-02	3.01E-02	3.02E-02	3.02E-02
pa232	6.36E-26	6.39E-11	6.41E-11	6.44E-11	6.47E-11	6.47E-26

1 sas2h: fsr-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 257

0 power= 4.890E-04mw, burnup=2.5916E+04mwd, flux= 2.96E+07n/cm**2-sec

nuclide concentrations, gram atoms

basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
pa233	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.84E-36	1.97E-21	1.98E-21	1.99E-21	2.00E-21	1.87E-36
u231	6.80E-32	6.84E-17	6.90E-17	6.95E-17	7.01E-17	7.01E-32
u232	1.16E-06	1.25E-06	1.25E-06	1.26E-06	1.26E-06	1.18E-06
u233	7.35E-01	7.41E-01	7.47E-01	7.52E-01	7.58E-01	7.58E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.54E+02	6.54E+02	6.54E+02	6.54E+02	6.54E+02	6.54E+02
u236	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02
u237	3.11E-13	4.16E-07	4.16E-07	4.17E-07	4.17E-07	2.92E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.77E-23	3.76E-08	3.77E-08	3.77E-08	3.77E-08	3.77E-23
u240	3.71E-34	3.83E-34	3.95E-34	4.08E-34	4.20E-34	4.20E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.36E-14	1.02E-12	1.02E-12	1.02E-12	1.02E-12	1.16E-14
np236m	2.43E-28	2.43E-13	2.43E-13	2.43E-13	2.43E-13	2.43E-28
np236	2.63E-06	2.64E-06	2.64E-06	2.64E-06	2.65E-06	2.65E-06
np237	4.03E+01	4.03E+01	4.03E+01	4.03E+01	4.03E+01	4.03E+01
np238	4.36E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	4.14E-15
np239	1.57E-13	5.44E-06	5.44E-06	5.44E-06	5.45E-06	1.54E-13
np240m	3.17E-36	3.27E-36	3.37E-36	3.48E-36	3.58E-36	3.59E-36
np240	3.66E-38	1.37E-16	1.37E-16	1.37E-16	1.37E-16	4.08E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	3.22E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	3.06E-11
pu237	3.17E-29	3.06E-14	3.05E-14	3.03E-14	3.02E-14	3.03E-29
pu238	2.61E-03	2.75E-03	2.75E-03	2.75E-03	2.76E-03	2.61E-03
pu239	2.59E+01	2.57E+01	2.56E+01	2.54E+01	2.53E+01	2.53E+01
pu240	2.81E-01	2.77E-01	2.73E-01	2.70E-01	2.67E-01	2.66E-01
pu241	1.01E-05	1.38E-05	1.36E-05	1.35E-05	1.33E-05	9.48E-06
pu242	4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.85E-05	4.85E-05

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     pu243   1.57E-29  1.25E-14  1.25E-14  1.25E-14  1.25E-14  1.58E-29
     pu244   1.85E-23  1.91E-23  1.97E-23  2.03E-23  2.09E-23  2.09E-23
     pu245    .00E+00  9.75E-35  1.01E-34  1.04E-34  1.07E-34   .00E+00
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.43E-35  1.40E-20  1.39E-20  1.37E-20  1.36E-20  1.35E-35
     am240   6.52E-33  6.41E-18  6.34E-18  6.27E-18  6.20E-18  6.19E-33
     am241   4.21E-04  4.14E-04  4.09E-04  4.05E-04  4.00E-04  3.99E-04
     am242m  2.36E-08  2.39E-08  2.37E-08  2.34E-08  2.32E-08  2.24E-08
     am242   3.04E-13  1.90E-12  1.88E-12  1.86E-12  1.84E-12  2.89E-13
     am243   1.80E-07  1.79E-07  1.78E-07  1.77E-07  1.76E-07  1.76E-07
     am244m   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.67E-31  1.66E-16  1.65E-16  1.64E-16  1.64E-16  1.63E-31
     am245   2.54E-40  1.91E-35  1.97E-35  2.03E-35  2.10E-35  2.24E-40
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241    .00E+00  1.37E-23  1.35E-23  1.34E-23  1.32E-23   .00E+00
     cm242   6.15E-11  3.84E-10  3.80E-10  3.76E-10  3.72E-10  5.83E-11
     cm243   9.38E-16  1.89E-15  1.87E-15  1.86E-15  1.85E-15  8.87E-16
     cm244   2.02E-12  2.60E-12  2.59E-12  2.58E-12  2.57E-12  1.96E-12
1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  258
       power= 4.890E-04mw, burnup=2.5916E+04mwd, flux= 2.96E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                     basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   7.13E-15  6.96E-15  6.80E-15  6.66E-15  6.51E-15  6.51E-15
     cm246   5.21E-17  5.06E-17  4.91E-17  4.77E-17  4.64E-17  4.63E-17
     cm247   9.05E-20  9.09E-20  9.12E-20  9.16E-20  9.20E-20  9.20E-20
     cm248   5.02E-22  5.11E-22  5.19E-22  5.27E-22  5.35E-22  5.35E-22
     cm249    .00E+00  1.97E-33  2.00E-33  2.03E-33  2.07E-33   .00E+00
     cm250   1.88E-37  1.90E-37  1.91E-37  1.93E-37  1.95E-37  1.95E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.96E+07  2.96E+07  2.97E+07  2.97E+07  2.97E-08
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       34q array has      12 entries.
1library information...

          cross-section data taken from position number 29 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          /pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ***********************************************************************
          *                                                                     *
          *            prelim lwr origen-s binary working library--id = 1143    *
```

```
          *        made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                             *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                             *
          *                   fission product yields are from endf/b-v                  *
          *                                                                             *
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix             *
          *                                                                             *
          *        see information above this box (if present) for later updates        *
          *                                                                             *
          *******************************************************************************
          *                                                                             *
          *******************************************************************************
0                .other identification and sizes of library.
0                 data set name:  ft33f001
0              8/29/1996    date library was produced
0                   1697    total number of nuclides in library
                     689    number of light-element nuclides
                     129    number of actinide nuclides
                     879    number of fission product nuclides
0                   7993    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  259
       power=    .00mw, burnup=  26363.mwd, flux= 2.97E+07n/cm**2-sec
0                                                  basis =
0    (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                 initial        ******* d       ******* d       ******* d       ******* d       ******* d
     productions  1.276652E+06   1.276031E+06   1.275415E+06   1.274805E+06   1.274199E+06   1.274190E+06
     absorptions  1.042930E+06   1.042643E+06   1.042360E+06   1.042079E+06   1.041801E+06   1.041793E+06
     k infinity   1.224102E+00   1.223842E+00   1.223584E+00   1.223328E+00   1.223074E+00   1.223072E+00
0                  initial        ******* d       ******* d       ******* d       ******* d       ******* d
     actinide
     absorptions  1.022700E+06   1.022376E+06   1.022056E+06   1.021739E+06   1.021425E+06   1.021419E+06
     non-actinide
     abs. fracs.  1.939762E-02   1.943815E-02   1.947886E-02   1.951891E-02   1.955897E-02   1.955867E-02
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products     page  260
0                                  fraction of total absorption rate
       power=    .00mw, burnup=  26363.mwd, flux= 2.97E+07n/cm**2-sec
0                initial ******* d ******* d ******* d ******* d ******* d

     sm149      5.43E-03  5.43E-03  5.43E-03  5.43E-03  5.43E-03  5.43E-03
     nd143      2.52E-03  2.53E-03  2.54E-03  2.55E-03  2.56E-03  2.56E-03
     eu151      2.04E-03  2.05E-03  2.05E-03  2.05E-03  2.06E-03  2.06E-03
     rh103      1.23E-03  1.23E-03  1.24E-03  1.24E-03  1.25E-03  1.25E-03
     xe131      8.18E-04  8.22E-04  8.25E-04  8.29E-04  8.33E-04  8.33E-04
     cs133      6.38E-04  6.41E-04  6.44E-04  6.47E-04  6.50E-04  6.50E-04
     sm147      4.67E-04  4.69E-04  4.71E-04  4.73E-04  4.75E-04  4.75E-04
     tc 99      4.09E-04  4.10E-04  4.11E-04  4.12E-04  4.14E-04  4.14E-04
     nd145      3.61E-04  3.62E-04  3.64E-04  3.66E-04  3.67E-04  3.67E-04
     sm152      2.90E-04  2.92E-04  2.93E-04  2.95E-04  2.96E-04  2.96E-04
     mo 95      2.50E-04  2.51E-04  2.52E-04  2.53E-04  2.55E-04  2.55E-04
     gd155      2.23E-04  2.23E-04  2.22E-04  2.22E-04  2.22E-04  2.22E-04
     sm150      1.92E-04  1.93E-04  1.94E-04  1.95E-04  1.96E-04  1.96E-04
     kr 83      1.54E-04  1.55E-04  1.55E-04  1.56E-04  1.57E-04  1.57E-04
     cs135      1.44E-04  1.45E-04  1.46E-04  1.46E-04  1.47E-04  1.47E-04
```

eu153	1.19E-04	1.20E-04	1.20E-04	1.21E-04	1.21E-04	1.21E-04
ru101	1.12E-04	1.13E-04	1.13E-04	1.14E-04	1.14E-04	1.14E-04
pr141	1.09E-04	1.09E-04	1.10E-04	1.10E-04	1.11E-04	1.11E-04
cd113	1.02E-04	1.02E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
la139	8.89E-05	8.93E-05	8.97E-05	9.01E-05	9.05E-05	9.05E-05
gd157	5.74E-05	5.73E-05	5.72E-05	5.71E-05	5.69E-05	5.69E-05
ag109	4.69E-05	4.71E-05	4.73E-05	4.75E-05	4.77E-05	4.77E-05
pd105	4.58E-05	4.60E-05	4.62E-05	4.64E-05	4.66E-05	4.66E-05
ba137	4.31E-05	4.33E-05	4.35E-05	4.37E-05	4.39E-05	4.39E-05
zr 93	3.44E-05	3.45E-05	3.47E-05	3.48E-05	3.50E-05	3.50E-05
i129	2.92E-05	2.94E-05	2.95E-05	2.96E-05	2.98E-05	2.98E-05
nd144	2.77E-05	2.79E-05	2.80E-05	2.81E-05	2.83E-05	2.83E-05
gd152	2.58E-05	2.60E-05	2.62E-05	2.64E-05	2.66E-05	2.66E-05
mo 97	2.02E-05	2.03E-05	2.04E-05	2.04E-05	2.05E-05	2.05E-05
pd108	1.12E-05	1.13E-05	1.14E-05	1.14E-05	1.15E-05	1.15E-05
ru 99	9.50E-06	9.64E-06	9.77E-06	9.91E-06	1.00E-05	1.00E-05
zr 91	9.25E-06	9.30E-06	9.34E-06	9.38E-06	9.42E-06	9.42E-06
y 89	8.86E-06	8.90E-06	8.94E-06	8.98E-06	9.02E-06	9.02E-06
ru102	8.47E-06	8.51E-06	8.55E-06	8.59E-06	8.63E-06	8.63E-06
ce142	7.42E-06	7.45E-06	7.48E-06	7.52E-06	7.55E-06	7.55E-06
nd148	7.13E-06	7.16E-06	7.19E-06	7.22E-06	7.26E-06	7.26E-06
sm151	6.62E-06	6.98E-06	6.99E-06	6.99E-06	6.99E-06	6.61E-06
nd146	6.03E-06	6.06E-06	6.09E-06	6.11E-06	6.14E-06	6.14E-06
pd107	5.67E-06	5.69E-06	5.72E-06	5.75E-06	5.77E-06	5.77E-06
in115	5.27E-06	5.29E-06	5.32E-06	5.34E-06	5.36E-06	5.36E-06
ba138	5.13E-06	5.15E-06	5.17E-06	5.20E-06	5.22E-06	5.22E-06
ce140	4.80E-06	4.82E-06	4.85E-06	4.87E-06	4.89E-06	4.89E-06
xe132	4.41E-06	4.43E-06	4.45E-06	4.47E-06	4.49E-06	4.49E-06
mo 98	2.93E-06	2.94E-06	2.95E-06	2.97E-06	2.98E-06	2.98E-06
mo100	2.86E-06	2.88E-06	2.89E-06	2.90E-06	2.92E-06	2.92E-06
xe134	2.84E-06	2.85E-06	2.86E-06	2.87E-06	2.89E-06	2.89E-06
zr 92	2.24E-06	2.25E-06	2.26E-06	2.27E-06	2.28E-06	2.28E-06
i127	2.14E-06	2.15E-06	2.16E-06	2.17E-06	2.18E-06	2.18E-06
ru104	1.96E-06	1.97E-06	1.97E-06	1.98E-06	1.99E-06	1.99E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 261
0 fraction of total absorption rate
power= .00mw, burnup= 26363.mwd, flux= 2.97E+07n/cm**2-sec
0 initial ******* d ******* d ******* d ******* d ******* d

zr 96	1.74E-06	1.75E-06	1.76E-06	1.77E-06	1.78E-06	1.78E-06
nd150	1.61E-06	1.62E-06	1.63E-06	1.64E-06	1.64E-06	1.64E-06
xe136	1.54E-06	1.54E-06	1.55E-06	1.56E-06	1.57E-06	1.57E-06
gd154	1.35E-06	1.37E-06	1.38E-06	1.39E-06	1.40E-06	1.40E-06
cd111	1.27E-06	1.28E-06	1.28E-06	1.29E-06	1.30E-06	1.30E-06
br 81	1.13E-06	1.14E-06	1.14E-06	1.15E-06	1.15E-06	1.15E-06
rb 85	1.08E-06	1.09E-06	1.09E-06	1.10E-06	1.10E-06	1.10E-06
ba135	9.92E-07	1.01E-06	1.02E-06	1.04E-06	1.05E-06	1.05E-06
zr 94	9.45E-07	9.49E-07	9.54E-07	9.58E-07	9.62E-07	9.62E-07
zr 90	8.73E-07	8.77E-07	8.81E-07	8.85E-07	8.89E-07	8.89E-07
sm154	7.67E-07	7.71E-07	7.74E-07	7.78E-07	7.81E-07	7.81E-07
te130	7.11E-07	7.14E-07	7.18E-07	7.21E-07	7.24E-07	7.24E-07
rb 87	6.23E-07	6.26E-07	6.29E-07	6.32E-07	6.34E-07	6.34E-07
pd106	4.73E-07	4.75E-07	4.77E-07	4.79E-07	4.82E-07	4.82E-07
se 77	4.59E-07	4.61E-07	4.63E-07	4.65E-07	4.67E-07	4.67E-07
gd156	4.53E-07	4.56E-07	4.58E-07	4.60E-07	4.63E-07	4.63E-07
ru100	3.56E-07	3.59E-07	3.62E-07	3.65E-07	3.68E-07	3.68E-07
kr 84	2.97E-07	2.98E-07	3.00E-07	3.01E-07	3.03E-07	3.03E-07
dy161	2.80E-07	2.81E-07	2.83E-07	2.84E-07	2.85E-07	2.85E-07
nd142	2.66E-07	2.68E-07	2.70E-07	2.73E-07	2.75E-07	2.75E-07
ba134	2.53E-07	2.55E-07	2.57E-07	2.59E-07	2.62E-07	2.62E-07

sb121	2.44E-07	2.45E-07	2.46E-07	2.47E-07	2.48E-07	2.48E-07
sm148	2.29E-07	2.32E-07	2.34E-07	2.36E-07	2.38E-07	2.38E-07
se 79	2.19E-07	2.19E-07	2.20E-07	2.21E-07	2.22E-07	2.22E-07
sb123	1.97E-07	1.98E-07	1.99E-07	2.00E-07	2.01E-07	2.01E-07
pd104	1.73E-07	1.74E-07	1.76E-07	1.78E-07	1.79E-07	1.79E-07
kr 86	1.66E-07	1.66E-07	1.67E-07	1.68E-07	1.69E-07	1.69E-07
nb 93	1.57E-07	1.60E-07	1.62E-07	1.64E-07	1.67E-07	1.67E-07
te128	1.61E-07	1.61E-07	1.62E-07	1.63E-07	1.64E-07	1.64E-07
tb159	1.21E-07	1.21E-07	1.22E-07	1.22E-07	1.23E-07	1.23E-07
se 80	1.10E-07	1.10E-07	1.11E-07	1.11E-07	1.12E-07	1.12E-07
te125	1.10E-07	1.10E-07	1.11E-07	1.11E-07	1.12E-07	1.12E-07
gd158	9.53E-08	9.58E-08	9.63E-08	9.67E-08	9.72E-08	9.72E-08
cd112	8.56E-08	8.60E-08	8.64E-08	8.68E-08	8.72E-08	8.72E-08
ag107	8.04E-08	8.16E-08	8.29E-08	8.42E-08	8.56E-08	8.56E-08
br 79	7.75E-08	7.86E-08	7.97E-08	8.08E-08	8.20E-08	8.20E-08
cd110	6.61E-08	6.68E-08	6.75E-08	6.82E-08	6.89E-08	6.89E-08
dy162	6.64E-08	6.68E-08	6.71E-08	6.75E-08	6.79E-08	6.79E-08
dy164	6.20E-08	6.23E-08	6.25E-08	6.28E-08	6.30E-08	6.30E-08
sn117	6.00E-08	6.02E-08	6.05E-08	6.08E-08	6.11E-08	6.11E-08
mo 96	5.72E-08	5.77E-08	5.83E-08	5.88E-08	5.93E-08	5.93E-08
li 6	5.58E-08	5.61E-08	5.63E-08	5.65E-08	5.67E-08	5.67E-08
cd114	5.10E-08	5.13E-08	5.15E-08	5.18E-08	5.20E-08	5.20E-08
xe129	4.80E-08	4.87E-08	4.95E-08	5.02E-08	5.09E-08	5.09E-08
sn119	4.56E-08	4.58E-08	4.60E-08	4.62E-08	4.64E-08	4.64E-08
eu152	4.64E-08	6.69E-08	6.71E-08	4.72E-08	4.74E-08	4.62E-08
pd110	4.24E-08	4.26E-08	4.28E-08	4.30E-08	4.32E-08	4.32E-08
sn115	4.17E-08	4.19E-08	4.21E-08	4.23E-08	4.25E-08	4.25E-08
sr 88	3.04E-08	3.05E-08	3.07E-08	3.08E-08	3.09E-08	3.09E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 262

0 fraction of total absorption rate

0 power= .00mw, burnup= 26363.mwd, flux= 2.97E+07n/cm**2-sec

	initial *******d	******* d	******* d	******* d	******* d
xe130	2.79E-08	2.82E-08	2.84E-08	2.86E-08	2.89E-08
te126	2.53E-08	2.57E-08	2.60E-08	2.63E-08	2.67E-08
ba136	2.30E-08	2.31E-08	2.33E-08	2.35E-08	2.36E-08
se 82	2.09E-08	2.10E-08	2.11E-08	2.12E-08	2.13E-08
kr 82	1.65E-08	1.66E-08	1.67E-08	1.68E-08	1.69E-08
dy163	1.66E-08	1.66E-08	1.67E-08	1.68E-08	1.69E-08
se 78	1.64E-08	1.65E-08	1.66E-08	1.66E-08	1.67E-08
sn126	1.64E-08	1.65E-08	1.65E-08	1.65E-08	1.66E-08
sn124	1.44E-08	1.45E-08	1.45E-08	1.46E-08	1.47E-08
as 75	9.63E-09	9.68E-09	9.72E-09	9.76E-09	9.81E-09
in113	8.30E-09	8.34E-09	8.37E-09	8.41E-09	8.45E-09
eu155	7.80E-09	2.20E-08	2.20E-08	2.20E-08	7.50E-09
sn118	5.79E-09	5.82E-09	5.85E-09	5.87E-09	5.90E-09
sn122	5.02E-09	5.04E-09	5.06E-09	5.08E-09	5.11E-09
cd116	4.87E-09	4.90E-09	4.92E-09	4.94E-09	4.96E-09
pm147	5.26E-09	3.31E-08	3.32E-08	3.32E-08	4.93E-09
sn120	3.68E-09	3.70E-09	3.72E-09	3.73E-09	3.75E-09
eu154	3.52E-09	6.23E-09	6.27E-09	6.30E-09	6.34E-09
ge 73	2.77E-09	2.79E-09	2.80E-09	2.81E-09	2.83E-09
dy160	1.76E-09	1.77E-09	1.79E-09	1.81E-09	1.82E-09
ho165	1.69E-09	1.70E-09	1.71E-09	1.73E-09	1.74E-09
sr 90	1.71E-09	2.04E-09	2.04E-09	2.04E-09	1.70E-09
gd160	1.35E-09	1.36E-09	1.37E-09	1.37E-09	1.38E-09
xe128	1.02E-09	1.03E-09	1.04E-09	1.05E-09	1.06E-09
ge 76	9.37E-10	9.42E-10	9.46E-10	9.50E-10	9.55E-10
sr 86	4.72E-10	4.76E-10	4.80E-10	4.85E-10	4.89E-10
sn116	3.83E-10	3.86E-10	3.90E-10	3.93E-10	3.97E-10

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     cs137     3.93E-10  4.63E-10  4.63E-10  4.63E-10  4.63E-10  3.91E-10
     te124     3.27E-10  3.29E-10  3.32E-10  3.34E-10  3.36E-10  3.36E-10
     nb 94     1.75E-10  1.77E-10  1.78E-10  1.80E-10  1.82E-10  1.82E-10
     te122     1.62E-10  1.63E-10  1.65E-10  1.66E-10  1.68E-10  1.68E-10
     sr 87     1.57E-10  1.58E-10  1.59E-10  1.61E-10  1.62E-10  1.62E-10
     se 76     1.31E-10  1.32E-10  1.33E-10  1.34E-10  1.35E-10  1.35E-10
     kr 80     8.06E-11  8.20E-11  8.34E-11  8.48E-11  8.62E-11  8.62E-11
     er166     7.83E-11  7.87E-11  7.91E-11  7.96E-11  8.00E-11  8.00E-11
     ge 74     5.55E-11  5.58E-11  5.60E-11  5.63E-11  5.65E-11  5.65E-11
     cs134     5.60E-11  5.94E-10  5.97E-10  6.00E-10  6.03E-10  5.25E-11
     kr 85     4.35E-11  4.85E-11  4.85E-11  4.86E-11  4.86E-11  4.29E-11
     ge 72     4.12E-11  4.14E-11  4.16E-11  4.18E-11  4.20E-11  4.20E-11
     er167     1.04E-11  1.05E-11  1.06E-11  1.07E-11  1.08E-11  1.08E-11
     te123     8.63E-12  8.76E-12  8.87E-12  8.99E-12  9.10E-12  9.10E-12
     cd108     6.10E-12  6.22E-12  6.34E-12  6.46E-12  6.58E-12  6.58E-12
      y 90     1.63E-12  1.94E-12  1.94E-12  1.94E-12  1.94E-12  1.62E-12
     sb125     3.60E-13  2.13E-12  2.13E-12  2.13E-12  2.13E-12  3.37E-13
     be  9     1.17E-13  1.17E-13  1.18E-13  1.18E-13  1.19E-13  1.19E-13
     ce144     1.63E-13  7.25E-11  7.25E-11  7.25E-11  7.25E-11  1.15E-13
     sn114     1.03E-13  1.04E-13  1.05E-13  1.06E-13  1.07E-13  1.07E-13
     li  7     4.86E-14  4.88E-14  4.90E-14  4.93E-14  4.95E-14  4.95E-14
     ru106     3.88E-14  4.60E-12  4.59E-12  4.59E-12  4.58E-12  3.26E-14
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products        page  263
0                                  fraction of total absorption rate
         power=      .00mw, burnup=  26363.mwd, flux= 2.97E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d ******* d

     sb126     1.88E-14  1.96E-14  1.96E-14  1.96E-14  1.97E-14  1.89E-14
     cd109     6.54E-19  3.04E-17  3.10E-17  3.16E-17  3.22E-17  6.00E-19
     te127m    8.17E-20  1.08E-12  1.08E-12  1.08E-12  1.08E-12  5.46E-20
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  264
       power= 4.890E-04mw, burnup=2.6363E+04mwd, flux= 2.97E+07n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
      h  1    1.54E-03  1.55E-03  1.56E-03  1.56E-03  1.57E-03  1.57E-03
      h  2    4.62E-06  4.64E-06  4.66E-06  4.68E-06  4.70E-06  4.70E-06
      h  3    5.09E-12  7.56E-12  7.57E-12  7.58E-12  7.59E-12  5.04E-12
      h  4     .00E+00  3.84E-36  3.84E-36  3.85E-36  3.86E-36   .00E+00
     he  3    1.88E-08  1.89E-08  1.89E-08  1.89E-08  1.90E-08  1.90E-08
     he  4    2.56E-04  2.57E-04  2.59E-04  2.60E-04  2.61E-04  2.61E-04
     he  6     .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20    3.08E-05  3.09E-05  3.11E-05  3.12E-05  3.13E-05  3.13E-05
     ne 21    1.43E-08  1.44E-08  1.46E-08  1.47E-08  1.48E-08  1.48E-08
     ne 22    2.03E-07  2.04E-07  2.05E-07  2.06E-07  2.06E-07  2.06E-07
     ne 23    8.87E-31  8.86E-16  8.87E-16  8.87E-16  8.88E-16  8.88E-31
     na 22    8.13E-13  5.26E-12  5.26E-12  5.26E-12  5.26E-12  7.61E-13
     na 23    7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24    3.23E-24  3.23E-09  3.23E-09  3.23E-09  3.24E-09  3.24E-24
     na 24m   5.31E-31  5.31E-16  5.31E-16  5.31E-16  5.32E-16  5.32E-31
     na 25    5.18E-39  5.22E-24  5.26E-24  5.31E-24  5.36E-24  5.36E-39
     mg 24    1.98E-01  1.99E-01  2.00E-01  2.01E-01  2.02E-01  2.02E-01
     mg 25    1.48E-06  1.49E-06  1.51E-06  1.52E-06  1.53E-06  1.53E-06
     mg 26    4.61E-06  4.63E-06  4.65E-06  4.67E-06  4.69E-06  4.69E-06
     mg 27    2.63E-28  2.64E-13  2.65E-13  2.65E-13  2.65E-13  2.65E-28
     mg 28     .00E+00  6.74E-26  6.75E-26  6.75E-26  6.76E-26   .00E+00
     al 27    4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28    2.40E-26  2.40E-11  2.40E-11  2.40E-11  2.40E-11  2.40E-26
     al 29    4.23E-37  4.26E-22  4.30E-22  4.34E-22  4.38E-22  4.38E-37
```

al 30	.00E+00	1.43E-31	1.45E-31	1.46E-31	1.48E-31	.00E+00
si 28	5.78E-01	5.80E-01	5.83E-01	5.85E-01	5.87E-01	5.87E-01
si 29	1.35E-05	1.36E-05	1.37E-05	1.38E-05	1.40E-05	1.40E-05
si 30	3.37E-10	3.41E-10	3.46E-10	3.50E-10	3.55E-10	3.55E-10
si 31	3.02E-38	3.06E-23	3.10E-23	3.14E-23	3.18E-23	3.18E-38
si 32	6.43E-30	6.70E-30	6.81E-30	6.90E-30	7.00E-30	6.79E-30
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.97E+07	2.97E+07	2.97E+07	2.97E+07	2.97E-08

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 265
power= 4.890E-04mw, burnup=2.636E+04mwd flux= 2.97E+07n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d	******* d
he 4	6.30E+01	6.36E+01	6.42E+01	6.47E+01	6.53E+01	6.53E+01
pb206	4.78E-01	4.86E-01	4.94E-01	5.02E-01	5.11E-01	5.11E-01
pb207	2.75E-02	2.79E-02	2.83E-02	2.87E-02	2.91E-02	2.91E-02
pb208	9.13E-04	9.21E-04	9.29E-04	9.37E-04	9.45E-04	9.45E-04
pb209	1.51E-09	1.53E-09	1.54E-09	1.56E-09	1.57E-09	1.57E-09
pb210	4.18E-04	4.20E-04	4.23E-04	4.26E-04	4.29E-04	4.29E-04
pb211	6.35E-11	6.36E-11	6.39E-11	6.41E-11	6.43E-11	6.44E-11
pb212	2.10E-11	2.21E-11	2.22E-11	2.22E-11	2.23E-11	2.13E-11
pb214	9.54E-10	9.61E-10	9.68E-10	9.74E-10	9.81E-10	9.81E-10
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	9.12E-02	9.30E-02	9.48E-02	9.66E-02	9.84E-02	9.85E-02
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.57E-07	2.59E-07	2.61E-07	2.62E-07	2.64E-07	2.64E-07
bi211	3.76E-12	3.77E-12	3.79E-12	3.80E-12	3.81E-12	3.82E-12
bi212	2.00E-12	2.09E-12	2.10E-12	2.11E-12	2.12E-12	2.02E-12
bi213	3.54E-10	3.57E-10	3.60E-10	3.63E-10	3.67E-10	3.67E-10
bi214	7.09E-10	7.14E-10	7.18E-10	7.23E-10	7.28E-10	7.28E-10
po210	7.10E-06	7.15E-06	7.19E-06	7.24E-06	7.29E-06	7.29E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.16E-17	4.17E-17	4.18E-17	4.20E-17	4.21E-17	4.22E-17
po212	1.05E-22	1.10E-22	1.10E-22	1.11E-22	1.11E-22	1.06E-22
po213	5.32E-19	5.37E-19	5.41E-19	5.46E-19	5.51E-19	5.51E-19
po214	9.75E-17	9.82E-17	9.88E-17	9.95E-17	1.00E-16	1.00E-16
po215	5.22E-17	5.23E-17	5.25E-17	5.27E-17	5.29E-17	5.30E-17
po216	7.96E-17	8.35E-17	8.39E-17	8.42E-17	8.46E-17	8.08E-17
po218	1.10E-10	1.11E-10	1.12E-10	1.13E-10	1.13E-10	1.13E-10
rn218	3.64E-44	3.91E-29	3.93E-29	3.95E-29	3.96E-29	3.64E-44
rn219	1.16E-13	1.16E-13	1.17E-13	1.17E-13	1.18E-13	1.18E-13
rn220	3.05E-14	3.20E-14	3.22E-14	3.23E-14	3.24E-14	3.10E-14
rn222	1.96E-07	1.97E-07	1.99E-07	2.00E-07	2.02E-07	2.02E-07
ra222	3.95E-41	4.24E-26	4.26E-26	4.28E-26	4.30E-26	4.01E-41
ra223	2.90E-08	2.90E-08	2.91E-08	2.92E-08	2.93E-08	2.94E-08
ra224	1.74E-10	1.82E-10	1.83E-10	1.84E-10	1.84E-10	1.74E-10
ra225	1.65E-07	1.67E-07	1.68E-07	1.70E-07	1.71E-07	1.71E-07
ra226	3.00E-02	3.02E-02	3.04E-02	3.06E-02	3.08E-02	3.08E-02
ra228	1.58E-10	1.60E-10	1.61E-10	1.63E-10	1.64E-10	1.64E-10
ac225	1.12E-07	1.13E-07	1.14E-07	1.15E-07	1.16E-07	1.16E-07
ac227	2.01E-05	2.02E-05	2.03E-05	2.03E-05	2.04E-05	2.04E-05
ac228	1.93E-14	1.95E-14	1.97E-14	1.99E-14	2.00E-14	2.00E-14
th226	1.93E-39	2.07E-24	2.08E-24	2.09E-24	2.10E-24	1.96E-39
th227	4.67E-08	4.68E-08	4.70E-08	4.72E-08	4.74E-08	4.74E-08
th228	3.31E-08	3.48E-08	3.49E-08	3.51E-08	3.52E-08	3.36E-08
th229	3.22E-02	3.25E-02	3.28E-02	3.30E-02	3.33E-02	3.33E-02
th230	1.45E+00	1.46E+00	1.47E+00	1.48E+00	1.49E+00	1.49E+00
th231	2.71E-09	3.52E-09	3.52E-09	3.53E-09	3.53E-09	2.70E-09
th232	3.87E-01	3.90E-01	3.94E-01	3.98E-01	4.01E-01	4.01E-01

th233	4.40E-28	4.44E-13	4.48E-13	4.52E-13	4.57E-13	4.57E-28
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	3.02E-02	3.03E-02	3.05E-02	3.06E-02	3.07E-02	3.07E-02
pa232	4.47E-26	4.50E-11	4.52E-11	4.55E-11	4.58E-11	4.58E-26

1

sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 266
power= 4.890E-04mw, burnup=2.6363E+04mwd, flux= 2.97E+07n/cm**2-sec

0

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	******* d	******* d	******* d	******* d	******* d
pa233	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.87E-36	2.01E-21	2.02E-21	2.03E-21	2.04E-21	1.90E-36
u231	7.01E-32	7.05E-17	7.11E-17	7.16E-17	7.22E-17	7.22E-32
u232	1.18E-06	1.27E-06	1.27E-06	1.28E-06	1.28E-06	1.19E-06
u233	7.58E-01	7.63E-01	7.69E-01	7.74E-01	7.80E-01	7.80E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.54E+02	6.54E+02	6.54E+02	6.54E+02	6.54E+02	6.54E+02
u236	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02
u237	2.92E-13	4.17E-07	4.17E-07	4.18E-07	4.18E-07	2.76E-13
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
u239	3.77E-23	3.77E-08	3.77E-08	3.77E-08	3.77E-08	3.77E-23
u240	4.20E-34	4.33E-34	4.46E-34	4.59E-34	4.72E-34	4.72E-34
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.16E-14	1.02E-12	1.02E-12	1.02E-12	1.02E-12	9.88E-15
np236m	2.43E-28	2.43E-13	2.43E-13	2.43E-13	2.43E-13	2.43E-28
np236	2.65E-06	2.65E-06	2.66E-06	2.66E-06	2.67E-06	2.67E-06
np237	4.03E+01	4.03E+01	4.03E+01	4.03E+01	4.02E+01	4.02E+01
np238	4.14E-15	1.82E-07	1.82E-07	1.82E-07	1.82E-07	3.95E-15
np239	1.54E-13	5.45E-06	5.45E-06	5.45E-06	5.49E-06	1.52E-13
np240m	3.59E-36	3.69E-36	3.80E-36	3.92E-36	4.03E-36	4.03E-36
np240	4.08E-38	1.37E-16	1.37E-16	1.38E-16	1.38E-16	4.53E-38
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	3.06E-11	1.38E-10	1.38E-10	1.38E-10	1.38E-10	2.92E-11
pu237	3.03E-29	3.00E-14	2.99E-14	2.98E-14	2.97E-14	2.95E-29
pu238	2.61E-03	2.75E-03	2.76E-03	2.76E-03	2.76E-03	2.60E-03
pu239	2.53E+01	2.52E+01	2.50E+01	2.49E+01	2.48E+01	2.48E+01
pu240	2.66E-01	2.63E-01	2.60E-01	2.57E-01	2.55E-01	2.55E-01
pu241	9.48E-06	1.31E-05	1.30E-05	1.29E-05	1.27E-05	8.96E-06
pu242	4.85E-05	4.85E-05	4.85E-05	4.85E-05	4.85E-05	4.85E-05
pu243	1.58E-29	1.25E-14	1.25E-14	1.25E-14	1.26E-14	1.59E-29
pu244	2.09E-23	2.16E-23	2.22E-23	2.28E-23	2.35E-23	2.35E-23
pu245	.00E+00	1.10E-34	1.14E-34	1.17E-34	1.21E-34	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.35E-35	1.33E-20	1.32E-20	1.31E-20	1.30E-20	1.29E-35
am240	6.19E-33	6.09E-18	6.04E-18	5.98E-18	5.92E-18	5.91E-33
am241	3.99E-04	3.93E-04	3.90E-04	3.86E-04	3.82E-04	3.81E-04
am242m	2.24E-08	2.27E-08	2.26E-08	2.24E-08	2.21E-08	2.14E-08
am242	2.89E-13	1.81E-12	1.79E-12	1.78E-12	1.76E-12	2.76E-13
am243	1.76E-07	1.75E-07	1.75E-07	1.74E-07	1.73E-07	1.73E-07
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.63E-31	1.63E-16	1.62E-16	1.62E-16	1.61E-16	1.61E-31
am245	2.24E-40	2.16E-35	2.23E-35	2.29E-35	2.36E-35	1.94E-40
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm241	.00E+00	1.30E-23	1.29E-23	1.28E-23	1.27E-23	.00E+00
cm242	5.83E-11	3.63E-10	3.62E-10	3.59E-10	3.55E-10	5.57E-11
cm243	8.87E-16	1.03E-15	1.03E-15	1.02E-15	1.01E-15	8.44E-16
cm244	1.96E-12	2.56E-12	2.55E-12	2.54E-12	2.53E-12	1.92E-12

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1
     sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides        page  267
       power= 4.890E-04mw, burnup=2.6363E+04mwd, flux= 2.97E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d ******* d
     cm245   6.51E-15  6.37E-15  6.24E-15  6.12E-15  6.00E-15  6.00E-15
     cm246   4.63E-17  4.51E-17  4.39E-17  4.27E-17  4.16E-17  4.15E-17
     cm247   9.20E-20  9.23E-20  9.27E-20  9.30E-20  9.33E-20  9.33E-20
     cm248   5.35E-22  5.44E-22  5.52E-22  5.60E-22  5.69E-22  5.69E-22
     cm249    .00E+00  2.10E-33  2.13E-33  2.16E-33  2.20E-33   .00E+00
     cm250   1.95E-37  1.97E-37  1.99E-37  2.01E-37  2.03E-37  2.03E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux               2.97E+07  2.97E+07  2.97E+07  2.97E+07  2.97E-08
0        1q array has       20 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        3q array has        1 entries.
0        4q array has        1 entries.
0       54q array has       12 entries.
library information...

          cross-section data taken from position number  1 of library on unit 15.

          pass
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ************************************************************************
          *                                                                      *
          *            prelim lwr origen-s binary working library--id = 1143     *
          *          made from modified card-image origen-s libraries of scale 4.2 *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi *
          *                                                                      *
          *      neutron flux spectrum factors and cross sections were produced from *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                      *
          *                   fission product yields are from endf/b-v           *
          *                                                                      *
          *              photon libraries use an 18-energy-group structure       *
          *             the photon data are from the master photon data base,    *
          *              produced to include bremsstrahlung from uo2 matrix      *
          *                                                                      *
          *        see information above this box (if present) for later updates *
          *                                                                      *
          ************************************************************************
          *                                                                      *
```

```
0          ***********************************************************************
0                    .other identification and sizes of library.
0                     data set name:  ft15f001
0                  8/29/1996    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7993    number of nonzero off-diagonal matrix elements
0          ***********************************************************************
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                                    page  268
         power=    .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0                                          basis =
0     (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0                    initial     ******* d     ******* d     ******* d     ******* d
      productions   1.274810E+06  1.274209E+06  1.273613E+06  1.273022E+06  1.272436E+06
      absorptions   1.042014E+06  1.041759E+06  1.041467E+06  1.041197E+06  1.040930E+06
      k infinity    1.223409E+00  1.223155E+00  1.222903E+00  1.222653E+00  1.222404E+00
0                    initial     ******* d     ******* d     ******* d     ******* d
      actinide
      absorptions   1.021634E+06  1.021322E+06  1.021013E+06  1.020707E+06  1.020404E+06
      non-actinide
      abs. fracs.   1.955879E-02  1.959932E-02  1.963931E-02  1.967925E-02  1.971906E-02
1     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                 fission products     page  269
0                                  fraction of total absorption rate
         power=    .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0              initial ******* d ******* d ******* d ******* d
```

sm149	5.43E-03	5.43E-03	5.43E-03	5.42E-03	5.42E-03
nd143	2.56E-03	2.58E-03	2.59E-03	2.60E-03	2.61E-03
eu151	2.06E-03	2.06E-03	2.06E-03	2.07E-03	2.07E-03
rh103	1.25E-03	1.25E-03	1.26E-03	1.26E-03	1.27E-03
xe131	8.32E-04	8.36E-04	8.40E-04	8.43E-04	8.47E-04
cs133	6.50E-04	6.53E-04	6.56E-04	6.59E-04	6.61E-04
sm147	4.75E-04	4.77E-04	4.79E-04	4.81E-04	4.83E-04
tc 99	4.13E-04	4.15E-04	4.16E-04	4.17E-04	4.18E-04
nd145	3.67E-04	3.69E-04	3.70E-04	3.72E-04	3.74E-04
sm152	2.96E-04	2.97E-04	2.99E-04	3.00E-04	3.02E-04
mo 95	2.55E-04	2.56E-04	2.57E-04	2.58E-04	2.59E-04
gd155	2.22E-04	2.22E-04	2.21E-04	2.21E-04	2.21E-04
sm150	1.96E-04	1.96E-04	1.97E-04	1.98E-04	1.99E-04
kr 83	1.57E-04	1.57E-04	1.58E-04	1.59E-04	1.59E-04
cs135	1.47E-04	1.48E-04	1.48E-04	1.49E-04	1.50E-04
eu153	1.21E-04	1.22E-04	1.23E-04	1.23E-04	1.24E-04
ru101	1.14E-04	1.15E-04	1.15E-04	1.16E-04	1.16E-04
pr141	1.11E-04	1.11E-04	1.12E-04	1.12E-04	1.13E-04
cd113	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
la139	9.05E-05	9.09E-05	9.13E-05	9.17E-05	9.21E-05
gd157	5.70E-05	5.68E-05	5.67E-05	5.66E-05	5.65E-05
ag109	4.77E-05	4.80E-05	4.82E-05	4.84E-05	4.86E-05
pd105	4.66E-05	4.68E-05	4.71E-05	4.73E-05	4.75E-05
ba137	4.39E-05	4.41E-05	4.43E-05	4.45E-05	4.47E-05
zr 93	3.49E-05	3.51E-05	3.52E-05	3.54E-05	3.55E-05
i129	2.98E-05	2.99E-05	3.00E-05	3.02E-05	3.03E-05
nd144	2.83E-05	2.84E-05	2.85E-05	2.87E-05	2.88E-05
gd152	2.66E-05	2.68E-05	2.69E-05	2.71E-05	2.73E-05
mo 97	2.05E-05	2.06E-05	2.07E-05	2.08E-05	2.09E-05
pd108	1.15E-05	1.15E-05	1.16E-05	1.16E-05	1.17E-05
ru 99	1.00E-05	1.02E-05	1.03E-05	1.05E-05	1.06E-05
zr 91	9.43E-06	9.47E-06	9.51E-06	9.55E-06	9.59E-06

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     y 89      9.02E-06  9.06E-06  9.10E-06  9.14E-06  9.18E-06
    ru102      8.63E-06  8.67E-06  8.71E-06  8.75E-06  8.79E-06
    ce142      7.55E-06  7.59E-06  7.62E-06  7.66E-06  7.69E-06
    nd148      7.26E-06  7.29E-06  7.32E-06  7.36E-06  7.39E-06
    sm151      6.62E-06  7.00E-06  7.00E-06  7.01E-06  7.01E-06
    nd146      6.14E-06  6.17E-06  6.20E-06  6.23E-06  6.26E-06
    pd107      5.78E-06  5.80E-06  5.83E-06  5.86E-06  5.88E-06
    in115      5.36E-06  5.39E-06  5.41E-06  5.43E-06  5.46E-06
    ba138      5.22E-06  5.25E-06  5.27E-06  5.29E-06  5.32E-06
    ce140      4.89E-06  4.91E-06  4.94E-06  4.96E-06  4.98E-06
    xe132      4.49E-06  4.51E-06  4.53E-06  4.55E-06  4.57E-06
    mo 98      2.98E-06  2.99E-06  3.00E-06  3.02E-06  3.03E-06
    mo100      2.92E-06  2.93E-06  2.94E-06  2.96E-06  2.97E-06
    xe134      2.89E-06  2.90E-06  2.91E-06  2.93E-06  2.94E-06
    zr 92      2.28E-06  2.29E-06  2.30E-06  2.32E-06  2.33E-06
     i127      2.18E-06  2.19E-06  2.20E-06  2.21E-06  2.22E-06
    ru104      1.99E-06  2.00E-06  2.01E-06  2.02E-06  2.03E-06
1   sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  270
0                          fraction of total absorption rate
        power=     .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0             initial *******d *******d *******d *******d

    zr 96      1.78E-06  1.78E-06  1.79E-06  1.80E-06  1.81E-06
    nd150      1.64E-06  1.65E-06  1.66E-06  1.67E-06  1.67E-06
    xe136      1.57E-06  1.57E-06  1.58E-06  1.59E-06  1.59E-06
    gd154      1.40E-06  1.42E-06  1.43E-06  1.44E-06  1.46E-06
    cd111      1.30E-06  1.30E-06  1.31E-06  1.31E-06  1.32E-06
    br 81      1.15E-06  1.16E-06  1.16E-06  1.17E-06  1.17E-06
    rb 85      1.10E-06  1.11E-06  1.11E-06  1.12E-06  1.12E-06
    ba135      1.05E-06  1.07E-06  1.08E-06  1.10E-06  1.11E-06
    zr 94      9.62E-07  9.66E-07  9.71E-07  9.75E-07  9.79E-07
    zr 90      8.89E-07  8.93E-07  8.97E-07  9.01E-07  9.05E-07
    sm154      7.82E-07  7.85E-07  7.89E-07  7.92E-07  7.96E-07
    te130      7.25E-07  7.28E-07  7.31E-07  7.34E-07  7.38E-07
    rb 87      6.34E-07  6.37E-07  6.40E-07  6.43E-07  6.46E-07
    pd106      4.82E-07  4.84E-07  4.86E-07  4.88E-07  4.90E-07
    se 77      4.67E-07  4.69E-07  4.71E-07  4.73E-07  4.75E-07
    gd156      4.62E-07  4.65E-07  4.67E-07  4.69E-07  4.72E-07
    ru100      3.68E-07  3.71E-07  3.74E-07  3.77E-07  3.80E-07
    kr 84      3.03E-07  3.04E-07  3.05E-07  3.07E-07  3.08E-07
    dy161      2.85E-07  2.87E-07  2.88E-07  2.89E-07  2.90E-07
    xe135      2.86E-22  2.86E-07  2.86E-07  2.86E-07  2.86E-07
    nd142      2.75E-07  2.78E-07  2.80E-07  2.83E-07  2.85E-07
    ba134      2.62E-07  2.64E-07  2.66E-07  2.69E-07  2.71E-07
    sb121      2.48E-07  2.49E-07  2.51E-07  2.52E-07  2.53E-07
    sm148      2.38E-07  2.40E-07  2.42E-07  2.44E-07  2.46E-07
    se 79      2.22E-07  2.23E-07  2.23E-07  2.24E-07  2.25E-07
    sb123      2.01E-07  2.02E-07  2.02E-07  2.03E-07  2.04E-07
    pd104      1.79E-07  1.81E-07  1.82E-07  1.84E-07  1.85E-07
    nb 93      1.67E-07  1.69E-07  1.72E-07  1.74E-07  1.76E-07
    kr 86      1.69E-07  1.70E-07  1.70E-07  1.71E-07  1.72E-07
    te128      1.64E-07  1.64E-07  1.65E-07  1.66E-07  1.67E-07
    tb159      1.23E-07  1.24E-07  1.24E-07  1.25E-07  1.25E-07
    se 80      1.12E-07  1.12E-07  1.13E-07  1.13E-07  1.14E-07
    te125      1.12E-07  1.12E-07  1.13E-07  1.13E-07  1.14E-07
    gd158      9.72E-08  9.76E-08  9.81E-08  9.86E-08  9.90E-08
    ag107      8.56E-08  8.69E-08  8.82E-08  8.96E-08  9.09E-08
    cd112      8.72E-08  8.76E-08  8.80E-08  8.84E-08  8.88E-08
    br 79      8.20E-08  8.31E-08  8.43E-08  8.54E-08  8.66E-08
    cd110      6.89E-08  6.96E-08  7.03E-08  7.10E-08  7.17E-08
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     dy162     6.79E-08  6.82E-08  6.86E-08  6.89E-08  6.93E-08
     eu152     4.62E-08  4.76E-08  4.77E-08  4.78E-08  4.80E-08
     dy164     6.30E-08  6.33E-08  6.35E-08  6.37E-08  6.40E-08
     sn117     6.11E-08  6.14E-08  6.16E-08  6.19E-08  6.22E-08
     mo 96     5.93E-08  5.98E-08  6.03E-08  6.08E-08  6.14E-08
     li  6     5.67E-08  5.70E-08  5.72E-08  5.74E-08  5.76E-08
     xe129     5.10E-08  5.17E-08  5.26E-08  5.32E-08  5.39E-08
     cd114     5.20E-08  5.23E-08  5.25E-08  5.28E-08  5.30E-08
     sn119     4.64E-08  4.66E-08  4.69E-08  4.71E-08  4.73E-08
     pd110     4.32E-08  4.34E-08  4.36E-08  4.38E-08  4.40E-08
     sn115     4.25E-08  4.27E-08  4.29E-08  4.30E-08  4.32E-08
1    sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          fission products          page  271
0                                  fraction of total absorption rate
          power=     .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0                initial *******d ******* d ******* d ******* d

     pm147     4.93E-09  5.32E-08  5.32E-08  5.32E-08  5.32E-08
     sr 88     3.09E-08  3.11E-08  3.12E-08  3.14E-08  3.15E-08
     xe130     2.89E-08  2.91E-08  2.94E-08  2.96E-08  2.99E-08
     te126     2.67E-08  2.70E-08  2.74E-08  2.77E-08  2.81E-08
     ba136     2.36E-08  2.38E-08  2.40E-08  2.41E-08  2.43E-08
     eu155     7.50E-09  2.20E-08  2.19E-08  2.19E-08  2.19E-08
     se 82     2.13E-08  2.14E-08  2.15E-08  2.16E-08  2.17E-08
     kr 82     1.69E-08  1.70E-08  1.71E-08  1.72E-08  1.73E-08
     dy163     1.69E-08  1.70E-08  1.71E-08  1.72E-08  1.73E-08
     se 78     1.67E-08  1.68E-08  1.69E-08  1.69E-08  1.70E-08
     sn126     1.66E-08  1.66E-08  1.66E-08  1.66E-08  1.67E-08
     sn124     1.46E-08  1.47E-08  1.48E-08  1.48E-08  1.49E-08
     as 75     9.81E-09  9.85E-09  9.90E-09  9.94E-09  9.98E-09
     in113     8.45E-09  8.49E-09  8.53E-09  8.57E-09  8.61E-09
     eu154     3.53E-09  6.37E-09  6.40E-09  6.44E-09  6.47E-09
     sn118     5.90E-09  5.93E-09  5.95E-09  5.98E-09  6.01E-09
     sn122     5.11E-09  5.13E-09  5.16E-09  5.18E-09  5.20E-09
     cd116     4.96E-09  4.98E-09  5.01E-09  5.03E-09  5.05E-09
     sn128     3.75E-09  3.77E-09  3.79E-09  3.80E-09  3.82E-09
     ge 73     2.83E-09  2.84E-09  2.85E-09  2.87E-09  2.88E-09
     sr 90     1.70E-09  2.04E-09  2.04E-09  2.04E-09  2.04E-09
     dy160     1.82E-09  1.84E-09  1.86E-09  1.88E-09  1.89E-09
     ho165     1.74E-09  1.75E-09  1.76E-09  1.77E-09  1.79E-09
     gd160     1.38E-09  1.39E-09  1.39E-09  1.40E-09  1.41E-09
     rh105     1.28E-24  1.28E-09  1.28E-09  1.28E-09  1.28E-09
     xe128     1.06E-09  1.07E-09  1.08E-09  1.08E-09  1.09E-09
     ge 76     9.55E-10  9.59E-10  9.63E-10  9.67E-10  9.72E-10
     cs134     5.25E-11  6.06E-10  6.09E-10  6.11E-10  6.14E-10
     sr 86     4.89E-10  4.93E-10  4.97E-10  5.01E-10  5.06E-10
     cs137     3.91E-10  4.63E-10  4.63E-10  4.63E-10  4.63E-10
     sn116     3.97E-10  4.00E-10  4.04E-10  4.07E-10  4.11E-10
     te124     3.36E-10  3.39E-10  3.41E-10  3.44E-10  3.46E-10
     pr143     3.24E-25  3.24E-10  3.24E-10  3.24E-10  3.24E-10
     xe133     2.50E-25  2.50E-10  2.50E-10  2.50E-10  2.50E-10
     ce141     1.97E-25  1.97E-10  1.97E-10  1.97E-10  1.97E-10
     nb 94     1.82E-10  1.84E-10  1.86E-10  1.88E-10  1.90E-10
     te122     1.68E-10  1.69E-10  1.71E-10  1.72E-10  1.74E-10
     sr 87     1.62E-10  1.63E-10  1.64E-10  1.65E-10  1.66E-10
     se 76     1.35E-10  1.36E-10  1.37E-10  1.38E-10  1.39E-10
     pm149     1.22E-25  1.22E-10  1.22E-10  1.22E-10  1.22E-10
     nd147     1.13E-25  1.13E-10  1.13E-10  1.13E-10  1.13E-10
     kr 80     8.62E-11  8.77E-11  8.92E-11  9.07E-11  9.22E-11
     er166     8.00E-11  8.05E-11  8.09E-11  8.13E-11  8.18E-11
     ce144     1.15E-13  7.26E-11  7.26E-11  7.26E-11  7.26E-11
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     kr 85      4.29E-11  4.86E-11  6.87E-11  6.87E-11  6.87E-11
     sr 74      5.66E-11  5.68E-11  5.71E-11  5.73E-11  5.76E-11
     ru103      4.72E-26  4.72E-11  4.72E-11  4.72E-11  4.72E-11
     sr 72      4.20E-11  4.22E-11  4.24E-11  4.26E-11  4.28E-11
     zr 95      6.72E-24  1.98E-11  1.98E-11  1.98E-11  1.98E-11
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page  272
0                                  fraction of total absorption rate
         power=     .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0                initial *******d *******d *******d *******d

     nb 95      1.38E-23  1.85E-11  1.85E-11  1.85E-11  1.85E-11
      y 91      4.10E-25  1.72E-11  1.72E-11  1.72E-11  1.72E-11
     pm151      1.43E-26  1.43E-11  1.43E-11  1.43E-11  1.43E-11
     er167      1.08E-11  1.09E-11  1.10E-11  1.11E-11  1.13E-11
     te123      9.10E-12  9.22E-12  9.34E-12  9.46E-12  9.58E-12
     cd108      6.59E-12  6.71E-12  6.84E-12  6.97E-12  7.10E-12
     sm153      6.70E-27  6.70E-12  6.71E-12  6.72E-12  6.73E-12
     eu156      6.00E-27  5.99E-12  5.99E-12  5.98E-12  5.97E-12
     ba140      5.79E-27  5.79E-12  5.79E-12  5.79E-12  5.79E-12
     ru106      3.26E-14  4.57E-12  4.57E-12  4.56E-12  4.56E-12
     sr 89      4.25E-27  3.66E-12  3.66E-12  3.66E-12  3.67E-12
     kr 87      2.75E-27  2.75E-12  2.75E-12  2.75E-12  2.75E-12
     ce143      2.12E-27  2.12E-12  2.12E-12  2.12E-12  2.13E-12
     sb125      3.37E-13  2.12E-12  2.12E-12  2.12E-12  2.12E-12
      y 90      1.42E-12  1.94E-12  1.94E-12  1.95E-12  1.95E-12
     la140      1.86E-27  1.86E-12  1.86E-12  1.86E-12  1.86E-12
     mo 99      1.61E-27  1.61E-12  1.61E-12  1.61E-12  1.61E-12
     te127m     5.33E-20  1.08E-12  1.08E-12  1.08E-12  1.08E-12
      i131      8.47E-28  8.47E-13  8.47E-13  8.47E-13  8.47E-13
     te129m     2.35E-28  2.35E-13  2.35E-13  2.35E-13  2.35E-13
     pm148m     8.86E-29  2.11E-13  2.11E-13  2.11E-13  2.11E-13
     be  9      1.19E-13  1.19E-13  1.20E-13  1.21E-13  1.21E-13
     sn114      1.07E-13  1.08E-13  1.09E-13  1.10E-13  1.11E-13
     ag111      6.85E-29  6.83E-14  6.82E-14  6.81E-14  6.80E-14
     eu157      5.73E-29  5.72E-14  5.72E-14  5.71E-14  5.70E-14
     cs136      5.04E-29  5.05E-14  5.07E-14  5.08E-14  5.10E-14
     li  7      4.95E-14  4.97E-14  5.00E-14  5.02E-14  5.04E-14
     tb160      3.33E-25  3.67E-14  3.69E-14  3.71E-14  3.72E-14
     cd115m     3.33E-29  3.32E-14  3.32E-14  3.32E-14  3.32E-14
     sb126      1.89E-14  1.97E-14  1.97E-14  1.98E-14  1.98E-14
     pr142      1.56E-29  1.57E-14  1.58E-14  1.58E-14  1.59E-14
     pm148      1.81E-30  6.40E-15  6.40E-15  6.40E-15  6.40E-15
     ru105      4.47E-30  4.47E-15  4.47E-15  4.46E-15  4.46E-15
     sn125      3.93E-30  3.93E-15  3.93E-15  3.93E-15  3.93E-15
      i130      2.66E-30  2.67E-15  2.68E-15  2.69E-15  2.70E-15
     rb 88      1.54E-30  1.54E-15  1.55E-15  1.55E-15  1.55E-15
     sn123      8.46E-22  1.28E-15  1.28E-15  1.28E-15  1.28E-15
     sb124      7.03E-29  1.26E-15  1.27E-15  1.27E-15  1.28E-15
      i135      1.26E-30  1.26E-15  1.26E-15  1.26E-15  1.26E-15
     te132      1.19E-30  1.19E-15  1.19E-15  1.20E-15  1.20E-15
     rb 86      8.94E-31  8.98E-16  9.02E-16  9.06E-16  9.10E-16
     te134      7.12E-31  7.12E-16  7.12E-16  7.12E-16  7.13E-16
     dy165      3.69E-31  3.69E-16  3.70E-16  3.70E-16  3.70E-16
     in117m     3.18E-31  3.18E-16  3.18E-16  3.17E-16  3.17E-16
     cs134m     1.14E-31  1.15E-16  1.15E-16  1.16E-16  1.16E-16
     in117      9.49E-32  9.48E-17  9.48E-17  9.47E-17  9.47E-17
     cd109      6.06E-19  3.28E-17  3.34E-17  3.40E-17  3.47E-17
     cd118      1.69E-32  1.69E-17  1.69E-17  1.69E-17  1.68E-17
     se 75      1.08E-32  1.08E-17  1.08E-17  1.08E-17  1.08E-17
1    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2              fission products          page  273
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```
0                                   fraction of total absorption rate
        power=     .00mw, burnup=  26809.mwd, flux= 2.97E+07n/cm**2-sec
0             initial ******* d ******* d ******* d ******* d

     ag110     2.70E-24  7.90E-18  7.94E-18  7.98E-18  8.02E-18
     in119m    4.14E-33  4.14E-18  4.14E-18  4.14E-18  4.14E-18
     in119     3.27E-34  3.36E-19  3.36E-19  3.36E-19  3.36E-19
     in120      .00E+00  5.34E-23  5.34E-23  5.34E-23  5.34E-23
     in120m     .00E+00  8.03E-24  8.04E-24  8.03E-24  8.02E-24
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          light elements          page  274
       power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d
      h  1   1.57E-03  1.58E-03  1.58E-03  1.59E-03  1.60E-03
      h  2   4.70E-06  4.72E-06  4.74E-06  4.76E-06  4.78E-06
      h  3   5.04E-12  7.59E-12  7.60E-12  7.61E-12  7.62E-12
      h  4    .00E+00  3.86E-36  3.87E-36  3.87E-36  3.88E-36
     he  3   1.90E-08  1.90E-08  1.90E-08  1.91E-08  1.91E-08
     he  4   2.61E-04  2.62E-04  2.63E-04  2.64E-04  2.65E-04
     he  6    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ne 20   3.13E-05  3.15E-05  3.16E-05  3.17E-05  3.19E-05
     ne 21   1.48E-08  1.49E-08  1.50E-08  1.52E-08  1.53E-08
     ne 22   2.06E-07  2.07E-07  2.08E-07  2.09E-07  2.10E-07
     ne 23   8.88E-31  8.87E-16  8.87E-16  8.87E-16  8.88E-16
     na 22   7.61E-13  5.26E-12  5.26E-12  5.26E-12  5.26E-12
     na 23   7.53E+03  7.53E+03  7.53E+03  7.53E+03  7.53E+03
     na 24   3.24E-24  3.23E-09  3.24E-09  3.24E-09  3.24E-09
     na 24m  5.32E-31  5.31E-16  5.32E-16  5.32E-16  5.32E-16
     na 25   5.36E-39  5.40E-24  5.45E-24  5.49E-24  5.54E-24
     mg 24   2.02E-01  2.03E-01  2.04E-01  2.04E-01  2.05E-01
     mg 25   1.53E-06  1.54E-06  1.56E-06  1.57E-06  1.58E-06
     mg 26   4.69E-06  4.71E-06  4.73E-06  4.75E-06  4.77E-06
     mg 27   2.65E-28  2.65E-13  2.65E-13  2.65E-13  2.65E-13
     mg 28    .00E+00  6.76E-26  6.76E-26  6.77E-26  6.77E-26
     al 27   4.99E+04  4.99E+04  4.99E+04  4.99E+04  4.99E+04
     al 28   2.40E-26  2.40E-11  2.40E-11  2.40E-11  2.40E-11
     al 29   4.38E-37  4.41E-22  4.45E-22  4.49E-22  4.53E-22
     al 30    .00E+00  1.50E-31  1.52E-31  1.54E-31  1.56E-31
     si 28   5.87E-01  5.90E-01  5.92E-01  5.95E-01  5.97E-01
     si 29   1.40E-05  1.41E-05  1.42E-05  1.43E-05  1.44E-05
     si 30   3.55E-10  3.59E-10  3.64E-10  3.68E-10  3.73E-10
     si 31   3.18E-38  3.23E-23  3.27E-23  3.31E-23  3.35E-23
     si 32   6.79E-30  7.08E-30  7.19E-30  7.29E-30  7.39E-30
   totals    5.75E+04  5.75E+04  5.75E+04  5.75E+04  5.75E+04
0    flux               2.97E+07  2.97E+07  2.97E+07  2.97E+07
1
     sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2          actinides               page  275
       power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = single reactor assembly
              charge ******* d ******* d ******* d ******* d
     he  4   6.53E+01  6.59E+01  6.65E+01  6.70E+01  6.76E+01
     pb206   5.11E-01  5.19E-01  5.28E-01  5.36E-01  5.45E-01
     pb207   2.91E-02  2.95E-02  2.99E-02  3.03E-02  3.08E-02
     pb208   9.45E-04  9.53E-04  9.61E-04  9.69E-04  9.77E-04
     pb209   1.57E-09  1.58E-09  1.60E-09  1.61E-09  1.62E-09
     pb210   4.29E-04  4.32E-04  4.35E-04  4.37E-04  4.40E-04
     pb211   6.44E-11  6.46E-11  6.48E-11  6.50E-11  6.53E-11
```

pb212	2.13E-11	2.24E-11	2.25E-11	2.26E-11	2.27E-11
pb214	9.81E-10	9.87E-10	9.93E-10	1.00E-09	1.01E-09
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	9.85E-02	1.00E-01	1.02E-01	1.04E-01	1.06E-01
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	2.64E-07	2.66E-07	2.68E-07	2.69E-07	2.71E-07
bi211	3.82E-12	3.83E-12	3.84E-12	3.85E-12	3.87E-12
bi212	2.02E-12	2.13E-12	2.14E-12	2.14E-12	2.15E-12
bi213	3.67E-10	3.70E-10	3.73E-10	3.76E-10	3.79E-10
bi214	7.28E-10	7.33E-10	7.38E-10	7.42E-10	7.47E-10
po210	7.29E-06	7.34E-06	7.39E-06	7.43E-06	7.48E-06
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	4.22E-17	4.23E-17	4.24E-17	4.26E-17	4.27E-17
po212	1.06E-22	1.12E-22	1.12E-22	1.13E-22	1.13E-22
po213	5.51E-19	5.56E-19	5.61E-19	5.65E-19	5.70E-19
po214	1.00E-16	1.01E-16	1.01E-16	1.02E-16	1.03E-16
po215	5.30E-17	5.31E-17	5.32E-17	5.34E-17	5.36E-17
po216	8.08E-17	8.49E-17	8.53E-17	8.56E-17	8.59E-17
po218	1.13E-10	1.14E-10	1.15E-10	1.16E-10	1.16E-10
rn218	3.64E-44	3.98E-29	3.99E-29	4.01E-29	4.03E-29
rn219	1.18E-13	1.18E-13	1.18E-13	1.19E-13	1.19E-13
rn220	3.10E-14	3.26E-14	3.27E-14	3.28E-14	3.30E-14
rn222	2.02E-07	2.03E-07	2.04E-07	2.05E-07	2.07E-07
ra222	4.01E-41	4.32E-26	4.34E-26	4.36E-26	4.38E-26
ra223	2.94E-08	2.94E-08	2.96E-08	2.97E-08	2.98E-08
ra224	1.76E-10	1.85E-10	1.86E-10	1.87E-10	1.87E-10
ra225	1.71E-07	1.73E-07	1.74E-07	1.76E-07	1.77E-07
ra226	3.08E-02	3.10E-02	3.12E-02	3.14E-02	3.16E-02
ra228	1.64E-10	1.66E-10	1.67E-10	1.69E-10	1.70E-10
ac225	1.16E-07	1.17E-07	1.18E-07	1.19E-07	1.20E-07
ac227	2.04E-05	2.05E-05	2.06E-05	2.06E-05	2.07E-05
ac228	2.00E-14	2.02E-14	2.04E-14	2.06E-14	2.08E-14
th226	1.96E-39	2.11E-24	2.12E-24	2.13E-24	2.13E-24
th227	4.74E-08	4.75E-08	4.77E-08	4.79E-08	4.80E-08
th228	3.36E-08	3.54E-08	3.55E-08	3.56E-08	3.58E-08
th229	3.33E-02	3.36E-02	3.39E-02	3.42E-02	3.45E-02
th230	1.49E+00	1.50E+00	1.50E+00	1.51E+00	1.52E+00
th231	2.70E-09	3.54E-09	3.54E-09	3.55E-09	3.55E-09
th232	4.01E-01	4.05E-01	4.08E-01	4.12E-01	4.16E-01
th233	4.57E-28	4.61E-13	4.65E-13	4.70E-13	4.74E-13
th234	5.36E-07	5.36E-07	5.36E-07	5.36E-07	5.36E-07
pa231	3.07E-02	3.08E-02	3.09E-02	3.10E-02	3.11E-02
pa232	6.58E-26	6.61E-11	6.63E-11	6.66E-11	6.68E-11

1 sas2h: fer-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 276
power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = single reactor assembly

	charge ******* d	******* d	******* d	******* d	******* d
pa233	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.07E-12	8.07E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.90E-36	2.04E-21	2.05E-21	2.06E-21	2.07E-21
u231	7.22E-32	7.26E-17	7.32E-17	7.37E-17	7.42E-17
u232	1.19E-06	1.29E-06	1.29E-06	1.30E-06	1.30E-06
u233	7.80E-01	7.85E-01	7.91E-01	7.96E-01	8.02E-01
u234	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.02E+01
u235	6.54E+02	6.54E+02	6.54E+02	6.53E+02	6.53E+02
u236	1.95E+02	1.95E+02	1.96E+02	1.96E+02	1.96E+02

```
      u237   2.76E-13  4.18E-07  4.18E-07  4.19E-07  4.19E-07
      u238   5.63E+04  3.63E+04  3.63E+04  3.63E+04  3.63E+04
      u239   3.77E-23  3.77E-08  3.77E-08  3.77E-08  3.78E-08
      u240   4.72E-34  4.86E-34  4.99E-34  5.13E-34  5.27E-34
      u241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     np235   9.88E-15  1.02E-12  1.02E-12  1.02E-12  1.02E-12
    np236m   2.43E-28  2.42E-13  2.42E-13  2.42E-13  2.43E-13
     np236   2.67E-06  2.67E-06  2.67E-06  2.68E-06  2.68E-06
     np237   4.02E+01  4.02E+01  4.02E+01  4.02E+01  4.02E+01
     np238   3.95E-15  1.82E-07  1.82E-07  1.82E-07  1.82E-07
     np239   1.32E-13  5.45E-06  5.45E-06  5.46E-06  5.46E-06
    np240m   4.03E-36  4.14E-36  4.26E-36  4.38E-36  4.50E-36
     np240   4.53E-38  1.38E-16  1.38E-16  1.38E-16  1.38E-16
     np241    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pu236   2.92E-11  1.37E-10  1.38E-10  1.38E-10  1.38E-10
     pu237   2.95E-29  2.95E-16  2.94E-16  2.93E-16  2.92E-16
     pu238   2.60E-03  2.75E-03  2.76E-03  2.76E-03  2.76E-03
     pu239   2.48E+01  2.47E+01  2.45E+01  2.44E+01  2.43E+01
     pu240   2.55E+01  2.52E+01  2.49E+01  2.47E+01  2.45E+01
     pu241   8.96E-06  1.26E-05  1.25E-05  1.23E-05  1.22E-05
     pu242   4.85E-05  4.85E-05  4.85E-05  4.86E-05  4.86E-05
     pu243   1.59E-29  1.26E-14  1.26E-14  1.26E-14  1.26E-14
     pu244   2.35E-23  2.42E-23  2.49E-23  2.56E-23  2.63E-23
     pu245    .00E+00  1.24E-34  1.28E-34  1.31E-34  1.35E-34
     pu246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am239   1.29E-35  1.27E-20  1.27E-20  1.25E-20  1.24E-20
     am240   5.91E-33  5.83E-18  5.79E-18  5.74E-18  5.69E-18
     am241   3.81E-04  3.76E-04  3.73E-04  3.70E-04  3.67E-04
    am242m   2.14E-08  2.17E-08  2.16E-08  2.15E-08  2.13E-08
     am242   2.76E-13  1.73E-12  1.72E-12  1.71E-12  1.69E-12
     am243   1.73E-07  1.73E-07  1.72E-07  1.72E-07  1.71E-07
    am244m    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     am244   1.61E-31  1.60E-16  1.60E-16  1.60E-16  1.59E-16
     am245   1.94E-40  2.43E-35  2.50E-35  2.57E-35  2.64E-35
     am246    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     cm241    .00E+00  1.25E-23  1.24E-23  1.23E-23  1.22E-23
     cm242   5.57E-11  3.50E-10  3.47E-10  3.45E-10  3.42E-10
     cm243   8.64E-16  9.91E-16  9.85E-16  9.77E-16  9.69E-16
     cm244   1.92E-12  2.52E-12  2.51E-12  2.51E-12  2.50E-12
1
    sas2h: far-field crit based on bzw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                    actinides          page  277
      power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                                  nuclide concentrations, gram atoms
                                                   basis = single reactor assembly
                charge ******* d ******* d ******* d ******* d
     cm245   6.00E-15  5.89E-15  5.78E-15  5.68E-15  5.58E-15
     cm246   4.15E-17  4.05E-17  3.95E-17  3.85E-17  3.76E-17
     cm247   9.33E-20  9.36E-20  9.39E-20  9.42E-20  9.45E-20
     cm248   5.69E-22  5.77E-22  5.86E-22  5.94E-22  6.02E-22
     cm249    .00E+00  2.23E-33  2.26E-33  2.30E-33  2.33E-33
     cm250   2.03E-37  2.05E-37  2.07E-37  2.09E-37  2.11E-37
     cm251    .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
   totals    3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
0    flux              2.97E+07  2.97E+07  2.97E+07  2.97E+07
0  .results on logical unit no. 71, position  1, for time step  4, subcase31, (run position 1, case position 1)
   title: sas2h: far-field crit based on bzw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2
1
    sas2h: far-field crit based on bzw 15x15, 3.80wt%, 20gwd/mtu 40% h2o/ 8% uo2                    light elements     page  278
 decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                                  nuclide concentrations, grams
```

```
                                                basis =single reactor assembly
              initial******* d ******* d ******* d ******* d ******* d ******* d
     h  1    1.60E-03  1.60E-03  1.60E-03  1.60E-03  1.60E-03  1.60E-03  1.60E-03
     h  2    9.57E-06  9.57E-06  9.57E-06  9.57E-06  9.57E-06  9.57E-06  9.57E-06
    he  4    1.06E-03  1.06E-03  1.06E-03  1.06E-03  1.06E-03  1.06E-03  1.06E-03
    ne 20    6.37E-04  6.37E-04  6.37E-04  6.37E-04  6.37E-04  6.37E-04  6.37E-04
    ne 22    4.62E-06  4.62E-06  4.62E-06  4.62E-06  4.62E-06  4.62E-06  4.62E-06
    na 23    1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05  1.73E+05
    mg 24    4.92E+00  4.92E+00  4.92E+00  4.92E+00  4.92E+00  4.92E+00  4.92E+00
    mg 25    3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05
    mg 26    1.24E-04  1.24E-04  1.24E-04  1.24E-04  1.24E-04  1.24E-04  1.24E-04
    al 27    1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06  1.35E+06
    si 28    1.67E+01  1.67E+01  1.67E+01  1.67E+01  1.67E+01  1.67E+01  1.67E+01
    si 29    4.19E-04  4.19E-04  4.19E-04  4.19E-04  4.19E-04  4.19E-04  4.19E-04
  total      1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06  1.52E+06
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page  279
 decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                               element radioactivity, curies
                                                basis =single reactor assembly
              initial******* d ******* d ******* d ******* d ******* d ******* d
  totals     3.01E+00  3.86E-15  2.33E-15  1.41E-15  8.51E-16  5.14E-16  3.10E-16
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page  280
 decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                               element thermal power, watts
                                                basis =single reactor assembly
              initial******* d ******* d ******* d ******* d ******* d ******* d
  totals     5.62E-02  1.13E-18  6.84E-19  4.13E-19  2.49E-19  1.51E-19  9.10E-20
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                light elements        page  281
 decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                               nuclide gamma power, watts
                                                basis =single reactor assembly
              initial******* d ******* d ******* d ******* d ******* d ******* d
  total      3.90E-02   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
1
    sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2                  actinides           page  282
 decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0                                               nuclide concentrations, gram atoms
                                                basis = single reactor assembly
              initial******* d ******* d ******* d ******* d ******* d ******* d
    he  4    6.76E+01  7.11E+01  7.43E+01  7.72E+01  7.98E+01  8.23E+01  8.45E+01
   pb206     5.45E-01  6.03E-01  6.44E-01  7.27E-01  7.92E-01  8.59E-01  9.28E-01
   pb207     3.08E-02  3.35E-02  3.62E-02  3.90E-02  4.17E-02  4.44E-02  4.72E-02
   pb208     9.77E-04  9.79E-04  9.79E-04  9.79E-04  9.79E-04  9.79E-04  9.79E-04
   pb210     4.40E-04  4.58E-04  4.75E-04  4.92E-04  5.07E-04  5.21E-04  5.35E-04
   bi209     1.06E-01  1.19E-01  1.33E-01  1.47E-01  1.62E-01  1.78E-01  1.94E-01
   po210     7.48E-06  7.79E-06  8.08E-06  8.35E-06  8.61E-06  8.86E-06  9.09E-06
   ra226     3.16E-02  3.29E-02  3.41E-02  3.53E-02  3.64E-02  3.74E-02  3.84E-02
   ac227     2.07E-05  2.07E-05  2.06E-05  2.06E-05  2.06E-05  2.06E-05  2.06E-05
   th229     3.45E-02  3.64E-02  3.83E-02  4.02E-02  4.21E-02  4.40E-02  4.58E-02
   th230     1.52E+00  1.58E+00  1.64E+00  1.69E+00  1.74E+00  1.79E+00  1.83E+00
   th232     4.16E-01  4.40E-01  4.64E-01  4.88E-01  5.12E-01  5.36E-01  5.61E-01
   th234     5.36E-07  5.36E-07  5.36E-07  5.36E-07  5.36E-07  5.36E-07  5.36E-07
   pa231     3.11E-02  3.11E-02  3.10E-02  3.10E-02  3.10E-02  3.10E-02  3.10E-02
   pa233     1.39E-06  1.39E-06  1.38E-06  1.38E-06  1.38E-06  1.38E-06  1.38E-06
    u233     8.02E-01  8.41E-01  8.80E-01  9.17E-01  9.54E-01  9.91E-01  1.03E+00
    u234     1.02E+01  1.01E+01  9.99E+00  9.90E+00  9.81E+00  9.72E+00  9.63E+00
    u235     6.53E+02  6.56E+02  6.58E+02  6.61E+02  6.63E+02  6.64E+02  6.66E+02
```

u236	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02
u238	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04	3.63E+04
np236	2.68E-06	2.62E-06	2.55E-06	2.49E-06	2.43E-06	2.37E-06	2.31E-06
np237	4.02E+01	4.01E+01	4.01E+01	4.00E+01	4.00E+01	3.99E+01	3.99E+01
pu239	2.43E+01	2.16E+01	1.91E+01	1.70E+01	1.50E+01	1.33E+01	1.18E+01
pu240	2.45E-01	1.58E-01	1.02E-01	6.54E-02	4.21E-02	2.71E-02	1.75E-02
pu242	4.86E-05	4.82E-05	4.78E-05	4.75E-05	4.71E-05	4.67E-05	4.64E-05
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

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sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 283
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0 element concentrations, gram atoms
basis = single reactor assembly

	initial*******	d*******	d*******	d*******	d*******	d*******	d*******
he	6.76E+01	7.11E+01	7.43E+01	7.72E+01	7.98E+01	8.23E+01	8.45E+01
pb	5.77E-01	6.38E-01	7.02E-01	7.68E-01	8.35E-01	9.05E-01	9.76E-01
bi	1.06E-01	1.19E-01	1.33E-01	1.47E-01	1.62E-01	1.78E-01	1.94E-01
po	7.48E-06	7.79E-06	8.08E-06	8.35E-06	8.61E-06	8.86E-06	9.09E-06
ra	3.16E-02	3.29E-02	3.41E-02	3.53E-02	3.64E-02	3.74E-02	3.84E-02
ac	2.08E-05	2.08E-05	2.08E-05	2.08E-05	2.07E-05	2.08E-05	2.08E-05
th	1.97E+00	2.06E+00	2.14E+00	2.22E+00	2.30E+00	2.37E+00	2.44E+00
pa	3.11E-02	3.11E-02	3.10E-02	3.10E-02	3.10E-02	3.10E-02	3.10E-02
u	3.71E+04	3.71E+04	3.71E+04	3.71E+04	3.71E+04	3.71E+04	3.71E+04
np	4.02E+01	4.01E+01	4.01E+01	4.00E+01	4.00E+01	3.99E+01	3.99E+01
pu	2.45E+01	2.17E+01	1.92E+01	1.70E+01	1.51E+01	1.34E+01	1.19E+01
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

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sas2h: far-field crit based on bkw 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 284
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0 nuclide concentrations, grams
basis =single reactor assembly

	initial*******	d*******	d*******	d*******	d*******	d*******	d*******
he 4	2.70E+02	2.84E+02	2.97E+02	3.09E+02	3.19E+02	3.29E+02	3.38E+02
pb206	1.12E+02	1.24E+02	1.37E+02	1.50E+02	1.63E+02	1.77E+02	1.91E+02
pb207	6.37E+00	6.93E+00	7.50E+00	8.07E+00	8.63E+00	9.20E+00	9.76E+00
pb208	2.03E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01
pb210	9.24E-02	9.42E-02	9.98E-02	1.03E-01	1.06E-01	1.09E-01	1.12E-01
bi209	2.21E+01	2.48E+01	2.77E+01	3.07E+01	3.39E+01	3.72E+01	4.06E+01
bi210	5.69E-05	5.92E-05	6.14E-05	6.35E-05	6.55E-05	6.74E-05	6.91E-05
po210	1.57E-03	1.64E-03	1.70E-03	1.75E-03	1.81E-03	1.86E-03	1.91E-03
rn222	4.59E-05	4.78E-05	4.96E-05	5.13E-05	5.29E-05	5.44E-05	5.58E-05
ra223	6.64E-06	6.62E-06	6.62E-06	6.61E-06	6.61E-06	6.60E-06	6.60E-06
ra225	3.99E-05	4.21E-05	4.43E-05	4.65E-05	4.87E-05	5.09E-05	5.30E-05
ra226	7.14E+00	7.43E+00	7.71E+00	7.97E+00	8.22E+00	8.46E+00	8.68E+00
ac225	2.70E-05	2.85E-05	3.00E-05	3.14E-05	3.29E-05	3.44E-05	3.58E-05
ac227	4.70E-03	4.69E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03
th227	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05
th229	7.90E+00	8.34E+00	8.77E+00	9.21E+00	9.64E+00	1.01E+01	1.05E+01
th230	3.50E+02	3.64E+02	3.77E+02	3.89E+02	4.01E+02	4.12E+02	4.22E+02
th231	8.21E-07	6.27E-07	6.29E-07	6.31E-07	6.33E-07	6.35E-07	6.36E-07
th232	9.64E+01	1.02E+02	1.08E+02	1.13E+02	1.19E+02	1.24E+02	1.30E+02
th234	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04
pa231	7.19E+00	7.18E+00	7.17E+00	7.16E+00	7.16E+00	7.16E+00	7.16E+00
pa233	5.24E-04	5.23E-04	5.23E-04	5.22E-04	5.22E-04	5.21E-04	5.21E-04
u233	1.87E+02	1.96E+02	2.05E+02	2.14E+02	2.22E+02	2.31E+02	2.39E+02
u234	2.38E+03	2.36E+03	2.34E+03	2.32E+03	2.30E+03	2.27E+03	2.25E+03
u235	1.54E+05	1.54E+05	1.55E+05	1.55E+05	1.56E+05	1.56E+05	1.56E+05
u236	4.62E+04	4.62E+04	4.62E+04	4.62E+04	4.62E+04	4.62E+04	4.62E+04
u238	8.63E+06	8.63E+06	8.63E+06	8.63E+06	8.63E+06	8.63E+06	8.63E+06
np236	6.33E-04	6.17E-04	6.02E-04	5.87E-04	5.73E-04	5.58E-04	5.45E-04

np237	9.53E+03	9.51E+03	9.50E+03	9.49E+03	9.48E+03	9.46E+03	9.45E+03
pu239	5.81E+03	5.15E+03	4.57E+03	4.05E+03	3.60E+03	3.19E+03	2.83E+03
pu240	5.87E+01	5.78E+01	2.44E+01	1.57E+01	1.01E+01	6.51E+00	4.19E+00
pu242	1.18E-02	1.17E-02	1.16E-02	1.15E-02	1.14E-02	1.13E-02	1.12E-02
am243	4.16E-05	2.81E-05	1.90E-05	1.28E-05	8.68E-06	5.86E-06	3.96E-06
total	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 285
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

element concentrations, grams
basis =single reactor assembly

	initial*******	d *******	d *******	d *******	d *******	d *******	d
he	2.70E+02	2.84E+02	2.97E+02	3.09E+02	3.19E+02	3.29E+02	3.38E+02
pb	1.19E+02	1.32E+02	1.45E+02	1.58E+02	1.72E+02	1.86E+02	2.01E+02
bi	2.21E+01	2.48E+01	2.77E+01	3.07E+01	3.39E+01	3.72E+01	4.06E+01
po	1.57E-03	1.64E-03	1.70E-03	1.75E-03	1.81E-03	1.86E-03	1.91E-03
rn	4.59E-05	4.78E-05	4.96E-05	5.13E-05	5.29E-05	5.44E-05	5.58E-05
ra	7.14E+00	7.63E+00	7.71E+00	7.97E+00	8.22E+00	8.46E+00	8.68E+00
ac	4.73E-03	4.72E-03	4.71E-03	4.71E-03	4.71E-03	4.71E-03	4.71E-03
th	4.55E+02	4.74E+02	4.93E+02	5.12E+02	5.29E+02	5.46E+02	5.62E+02
pa	7.19E+00	7.18E+00	7.17E+00	7.16E+00	7.16E+00	7.16E+00	7.16E+00
u	8.84E+06	8.84E+06	8.84E+06	8.84E+06	8.84E+06	8.84E+06	8.84E+06
np	9.53E+03	9.51E+03	9.50E+03	9.49E+03	9.48E+03	9.46E+03	9.45E+03
pu	5.87E+03	5.19E+03	4.59E+03	4.07E+03	3.61E+03	3.20E+03	2.83E+03
am	8.84E-02	1.43E-04	1.91E-05	1.28E-05	8.68E-06	5.86E-06	3.96E-06
totals	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06	8.85E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 286
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial*******	d *******	d *******	d *******	d *******	d *******	d
tl206	9.32E-06	9.70E-06	1.01E-05	1.04E-05	1.07E-05	1.10E-05	1.13E-05
tl207	3.39E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01	3.37E-01	3.37E-01
tl208	2.40E-03	4.28E-06	4.50E-06	4.71E-06	4.93E-06	5.14E-06	5.36E-06
tl209	3.29E-02	3.47E-02	3.65E-02	3.83E-02	4.01E-02	4.19E-02	4.37E-02
pb209	1.56E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
pb210	7.06E+00	7.35E+00	7.62E+00	7.88E+00	8.13E+00	8.36E+00	8.58E+00
pb211	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
pb212	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
pb214	7.06E+00	7.35E+00	7.63E+00	7.89E+00	8.13E+00	8.36E+00	8.58E+00
bi210	7.06E+00	7.35E+00	7.62E+00	7.88E+00	8.13E+00	8.36E+00	8.58E+00
bi211	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
bi212	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
bi213	1.56E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
bi214	7.06E+00	7.35E+00	7.63E+00	7.89E+00	8.13E+00	8.36E+00	8.58E+00
po210	7.06E+00	7.35E+00	7.62E+00	7.88E+00	8.13E+00	8.36E+00	8.58E+00
po211	9.35E-04	9.33E-04	9.32E-04	9.31E-04	9.31E-04	9.31E-04	9.31E-04
po212	4.29E-03	7.64E-06	8.02E-06	8.40E-06	8.78E-06	9.17E-06	9.55E-06
po213	1.53E+00	1.62E+00	1.70E+00	1.79E+00	1.87E+00	1.95E+00	2.04E+00
po214	7.06E+00	7.35E+00	7.62E+00	7.88E+00	8.13E+00	8.36E+00	8.58E+00
po215	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
po216	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
po218	7.06E+00	7.35E+00	7.63E+00	7.89E+00	8.13E+00	8.36E+00	8.58E+00
at217	1.57E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
rn219	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
rn220	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
rn222	7.06E+00	7.35E+00	7.63E+00	7.89E+00	8.13E+00	8.36E+00	8.58E+00
fr221	1.57E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
fr223	4.69E-03	4.68E-03	4.68E-03	4.67E-03	4.67E-03	4.67E-03	4.67E-03

ra223	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
ra224	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
ra225	1.57E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
ra226	7.06E+00	7.35E+00	7.63E+00	7.89E+00	8.13E+00	8.36E+00	8.58E+00
ra228	1.06E-05	1.12E-05	1.18E-05	1.24E-05	1.30E-05	1.37E-05	1.43E-05
ac225	1.57E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
ac227	3.40E-01	3.39E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01
ac228	1.06E-05	1.12E-05	1.18E-05	1.24E-05	1.30E-05	1.37E-05	1.43E-05
th227	3.35E-01	3.35E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01
th228	6.69E-03	1.19E-05	1.25E-05	1.31E-05	1.37E-05	1.43E-05	1.49E-05
th229	1.57E+00	1.65E+00	1.74E+00	1.83E+00	1.91E+00	2.00E+00	2.08E+00
th230	7.23E+00	7.51E+00	7.78E+00	8.03E+00	8.26E+00	8.49E+00	8.70E+00
th231	4.37E-01	3.33E-01	3.33E-01	3.36E-01	3.37E-01	3.38E-01	3.38E-01
th232	1.06E-05	1.12E-05	1.18E-05	1.24E-05	1.30E-05	1.37E-05	1.43E-05
th234	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00
pa231	3.40E-01	3.39E-01	3.39E-01	3.38E-01	3.38E-01	3.38E-01	3.38E-01
pa233	6.72E+00	6.71E+00	6.70E+00	6.69E+00	6.68E+00	6.67E+00	6.66E+00
pa234m	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00
pa234	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03	3.77E-03
u232	6.68E-03	7.24E-07	7.06E-07	6.89E-07	6.72E-07	6.55E-07	6.39E-07
u233	1.80E+00	1.89E+00	1.98E+00	2.06E+00	2.14E+00	2.23E+00	2.31E+00
u234	1.48E+01	1.47E+01	1.45E+01	1.44E+01	1.43E+01	1.41E+01	1.40E+01
u235	3.32E-01	3.33E-01	3.35E-01	3.36E-01	3.37E-01	3.38E-01	3.38E-01
u236	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 287
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide radioactivity, curies
basis =single reactor assembly

	initial******* d	******* d	******* d	******* d	******* d	******* d
u238	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00	2.90E+00
np236	8.34E-06	8.14E-06	7.94E-06	7.74E-06	7.55E-06	7.36E-06	7.18E-06
np237	6.72E+00	6.71E+00	6.70E+00	6.69E+00	6.68E+00	6.67E+00	6.66E+00
np239	3.03E+02	5.61E-06	3.79E-06	2.56E-06	1.73E-06	1.17E-06	7.91E-07
pu236	1.70E-05	7.24E-07	7.06E-07	6.89E-07	6.72E-07	6.55E-07	6.39E-07
pu239	3.60E+02	3.20E+02	2.84E+02	2.52E+02	2.23E+02	1.98E+02	1.76E+02
pu240	1.33E+01	8.59E+00	5.53E+00	3.56E+00	2.29E+00	1.48E+00	9.51E-01
pu242	4.65E-05	4.61E-05	4.58E-05	4.54E-05	4.51E-05	4.47E-05	4.44E-05
am243	8.31E-06	5.61E-06	3.79E-06	2.56E-06	1.73E-06	1.17E-06	7.91E-07
total	1.14E+03	4.61E+02	4.25E+02	3.94E+02	3.67E+02	3.44E+02	3.24E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 288
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

element thermal power, watts
basis =single reactor assembly

	initial******* d	******* d	******* d	******* d	******* d	******* d
tl	1.60E-03	1.58E-03	1.60E-03	1.63E-03	1.66E-03	1.69E-03	1.72E-03
pb	2.73E-02	2.84E-02	2.95E-02	3.05E-02	3.14E-02	3.23E-02	3.32E-02
bi	1.27E-01	1.32E-01	1.36E-01	1.41E-01	1.45E-01	1.48E-01	1.52E-01
po	9.03E-01	9.40E-01	9.76E-01	1.01E+00	1.04E+00	1.07E+00	1.10E+00
at	6.68E-02	7.05E-02	7.42E-02	7.79E-02	8.16E-02	8.52E-02	8.87E-02
rn	2.48E-01	2.58E-01	2.67E-01	2.75E-01	2.84E-01	2.91E-01	2.98E-01
fr	6.04E-02	6.38E-02	6.71E-02	7.05E-02	7.38E-02	7.71E-02	8.03E-02
ra	2.17E-01	2.26E-01	2.34E-01	2.41E-01	2.48E-01	2.55E-01	2.61E-01
ac	5.48E-02	5.78E-02	6.09E-02	6.39E-02	6.69E-02	6.99E-02	7.28E-02
th	2.66E-01	2.77E-01	2.87E-01	2.97E-01	3.06E-01	3.15E-01	3.23E-01
pa	4.17E-02	4.17E-02	4.16E-02	4.16E-02	4.16E-02	4.15E-02	4.15E-02
u	1.48E+00	6.41E-01	6.40E-01	6.39E-01	6.37E-01	6.36E-01	6.34E-01
np	1.01E+00	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.90E-01	1.90E-01
pu	1.20E+01	1.02E+01	8.99E+00	7.93E+00	7.01E+00	6.20E+00	5.49E+00

sm	1.01E-02	1.34E-05	1.39E-07	8.25E-08	5.58E-08	3.77E-08	2.55E-08
totals	1.65E+01	1.31E+01	1.20E+01	1.10E+01	1.02E+01	9.42E+00	8.77E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 289
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide gamma power, watts
basis =single reactor assembly

	initial*******	d *******	d *******	d *******	d *******	d *******	d *******
tl207	4.42E-06	4.41E-06	4.41E-06	4.40E-06	4.40E-06	4.40E-06	4.40E-06
tl208	4.79E-05	8.53E-08	8.96E-08	9.39E-08	9.82E-08	1.02E-07	1.07E-07
tl209	4.13E-04	4.36E-04	4.59E-04	4.82E-04	5.05E-04	5.27E-04	5.49E-04
pb210	2.11E-04	2.20E-04	2.28E-04	2.36E-04	2.43E-04	2.50E-04	2.56E-04
pb211	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04
pb212	5.75E-06	1.02E-08	1.08E-08	1.13E-08	1.18E-08	1.23E-08	1.28E-08
pb214	1.05E-02	1.09E-02	1.13E-02	1.17E-02	1.21E-02	1.24E-02	1.27E-02
bi210	1.30E-08	1.35E-08	1.40E-08	1.45E-08	1.49E-08	1.54E-08	1.58E-08
bi211	9.43E-05	9.42E-05	9.40E-05	9.40E-05	9.39E-05	9.39E-05	9.39E-05
bi212	4.17E-06	7.43E-09	7.81E-09	8.18E-09	8.55E-09	8.92E-09	9.30E-09
bi213	1.17E-03	1.24E-03	1.30E-03	1.37E-03	1.43E-03	1.49E-03	1.56E-03
bi214	6.31E-02	6.57E-02	6.81E-02	7.05E-02	7.27E-02	7.47E-02	7.67E-02
po210	3.56E-07	3.70E-07	3.84E-07	3.97E-07	4.10E-07	4.21E-07	4.32E-07
po211	4.27E-08	4.26E-08	4.26E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08
po214	3.47E-06	3.62E-06	3.75E-06	3.88E-06	4.00E-06	4.11E-06	4.22E-06
po215	3.54E-07	3.53E-07	3.53E-07	3.52E-07	3.52E-07	3.52E-07	3.52E-07
rn219	1.13E-04	1.13E-04	1.13E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04
rn222	1.63E-05	1.70E-05	1.76E-05	1.82E-05	1.88E-05	1.93E-05	1.98E-05
fr221	2.73E-04	2.90E-04	3.05E-04	3.20E-04	3.33E-04	3.50E-04	3.65E-04
fr223	1.60E-06	1.59E-06	1.59E-06	1.59E-06	1.59E-06	1.59E-06	1.59E-06
ra223	2.71E-04	2.70E-04	2.70E-04	2.70E-04	2.70E-04	2.70E-04	2.70E-04
ra225	1.34E-04	1.41E-04	1.48E-04	1.56E-04	1.63E-04	1.70E-04	1.77E-04
ra226	3.02E-04	3.15E-04	3.26E-04	3.38E-04	3.48E-04	3.58E-04	3.67E-04
ac225	1.56E-04	1.65E-04	1.73E-04	1.82E-04	1.90E-04	1.99E-04	2.07E-04
ac227	3.89E-07	3.88E-07	3.88E-07	3.87E-07	3.87E-07	3.87E-07	3.87E-07
ac228	5.52E-08	5.84E-08	6.16E-08	6.48E-08	6.80E-08	7.12E-08	7.44E-08
th227	2.21E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04
th229	8.78E-04	9.26E-04	9.75E-04	1.02E-03	1.07E-03	1.12E-03	1.17E-03
th230	7.20E-05	7.48E-05	7.75E-05	8.00E-05	8.23E-05	8.46E-05	8.66E-05
th231	8.02E-05	6.13E-05	6.15E-05	6.17E-05	6.19E-05	6.20E-05	6.22E-05
th234	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04	1.67E-04
pa231	8.06E-05	8.04E-05	8.03E-05	8.03E-05	8.02E-05	8.02E-05	8.02E-05
pa233	8.91E-03	8.89E-03	8.88E-03	8.86E-03	8.85E-03	8.84E-03	8.83E-03
pa234m	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04
pa234	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05
u233	1.32E-05	1.39E-05	1.45E-05	1.51E-05	1.58E-05	1.64E-05	1.69E-05
u234	1.41E-04	1.40E-04	1.39E-04	1.38E-04	1.36E-04	1.35E-04	1.34E-04
u235	3.27E-04	3.28E-04	3.30E-04	3.31E-04	3.32E-04	3.33E-04	3.33E-04
u236	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05
u238	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05	2.32E-05
np236	7.27E-09	7.09E-09	6.92E-09	6.75E-09	6.58E-09	6.42E-09	6.26E-09
np237	1.40E-03	1.40E-03	1.39E-03	1.39E-03	1.39E-03	1.39E-03	1.39E-03
pu239	1.73E-03	1.54E-03	1.36E-03	1.21E-03	1.07E-03	9.51E-04	8.44E-04
pu240	1.30E-04	8.40E-05	5.41E-05	3.48E-05	2.24E-05	1.44E-05	9.30E-06
total	3.63E-01	9.42E-02	9.71E-02	9.98E-02	1.02E-01	1.05E-01	1.07E-01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 290
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial*******	d *******	d *******	d *******	d *******	d *******	d *******
ll 6	3.17E-04	3.17E-04	3.17E-04	3.17E-04	3.17E-04	3.17E-04	3.17E-04

li 7	8.41E-06	8.41E-06	8.41E-06	8.41E-06	8.41E-06	8.41E-06	8.41E-06
be 9	1.62E-05	1.62E-05	1.62E-05	1.62E-05	1.62E-05	1.62E-05	1.62E-05
be 10	1.05E-04	1.05E-04	1.05E-04	1.05E-04	1.05E-04	1.05E-04	1.05E-04
zn 70	2.40E-06	2.40E-06	2.40E-06	2.40E-06	2.40E-06	2.40E-06	2.40E-06
ga 71	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05
ge 72	2.66E-03	2.66E-03	2.66E-03	2.66E-03	2.66E-03	2.66E-03	2.66E-03
ge 73	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02
ge 74	9.24E-03	9.24E-03	9.24E-03	9.24E-03	9.24E-03	9.24E-03	9.24E-03
as 75	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01
ge 76	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01
se 76	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04
se 77	7.55E-01	7.55E-01	7.55E-01	7.55E-01	7.55E-01	7.55E-01	7.55E-01
se 78	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00
se 79	3.80E+00	3.77E+00	3.74E+00	3.71E+00	3.67E+00	3.64E+00	3.61E+00
br 79	3.81E-01	4.14E-01	4.47E-01	4.80E-01	5.12E-01	5.44E-01	5.76E-01
se 80	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01
kr 80	3.99E-04	3.99E-04	3.99E-04	3.99E-04	3.99E-04	3.99E-04	3.99E-04
br 81	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01
kr 81	8.03E-07	7.92E-07	7.82E-07	7.71E-07	7.61E-07	7.50E-07	7.40E-07
se 82	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
kr 82	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02
kr 83	5.03E+01	5.03E+01	5.03E+01	5.03E+01	5.03E+01	5.03E+01	5.03E+01
kr 84	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02	1.06E+02
rb 85	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02
kr 86	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02
sr 86	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
rb 87	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02
sr 87	6.56E-04	6.71E-04	6.87E-04	7.02E-04	7.17E-04	7.32E-04	7.48E-04
sr 88	3.67E+02	3.67E+02	3.67E+02	3.67E+02	3.67E+02	3.67E+02	3.67E+02
y 89	4.96E+02	4.96E+02	4.96E+02	4.96E+02	4.96E+02	4.96E+02	4.96E+02
zr 90	6.06E+02	6.06E+02	6.06E+02	6.06E+02	6.06E+02	6.06E+02	6.06E+02
zr 91	6.22E+02	6.22E+02	6.22E+02	6.22E+02	6.22E+02	6.22E+02	6.22E+02
zr 92	6.37E+02	6.37E+02	6.37E+02	6.37E+02	6.37E+02	6.37E+02	6.37E+02
zr 93	4.49E+02	4.48E+02	4.47E+02	4.46E+02	4.45E+02	4.44E+02	4.44E+02
nb 93	9.44E+00	1.03E+01	1.11E+01	1.20E+01	1.28E+01	1.37E+01	1.45E+01
nb 93m	4.73E-03	4.72E-03	4.71E-03	4.70E-03	4.70E-03	4.69E-03	4.68E-03
zr 94	7.10E+02	7.10E+02	7.10E+02	7.10E+02	7.10E+02	7.10E+02	7.10E+02
nb 94	5.49E-04	4.76E-04	4.13E-04	3.58E-04	3.10E-04	2.69E-04	2.34E-04
mo 95	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02	7.23E+02
zr 96	7.13E+02	7.13E+02	7.13E+02	7.13E+02	7.13E+02	7.13E+02	7.13E+02
mo 96	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00
mo 97	6.53E+02	6.53E+02	6.53E+02	6.53E+02	6.53E+02	6.53E+02	6.53E+02
mo 98	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02
tc 98	2.01E-04	2.01E-04	2.01E-04	2.01E-04	2.01E-04	2.00E-04	2.00E-04
tc 99	6.21E+02	6.12E+02	6.04E+02	5.96E+02	5.88E+02	5.80E+02	5.72E+02
ru 99	9.96E+01	1.08E+02	1.16E+02	1.25E+02	1.33E+02	1.41E+02	1.48E+02
mo100	7.55E+02	7.55E+02	7.55E+02	7.55E+02	7.55E+02	7.55E+02	7.55E+02
ru100	5.50E+00	5.50E+00	5.50E+00	5.50E+00	5.50E+00	5.50E+00	5.50E+00
ru101	6.24E+02	6.24E+02	6.24E+02	6.24E+02	6.24E+02	6.24E+02	6.24E+02
ru102	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.39E+02
rh103	3.99E+02	3.99E+02	3.99E+02	3.99E+02	3.99E+02	3.99E+02	3.99E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 291
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide concentrations, grams
basis =single reactor assembly

	initial******* d	******* d	******* d	******* d	******* d	******* d
ru104	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02
pd104	1.58E+01	1.58E+01	1.58E+01	1.58E+01	1.58E+01	1.58E+01
pd105	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02

pd106	8.76E+01	8.76E+01	8.76E+01	8.76E+01	8.76E+01	8.76E+01	8.76E+01
pd107	4.54E+01	4.54E+01	4.54E+01	4.53E+01	4.53E+01	4.53E+01	4.53E+01
ag107	2.09E-01	2.29E-01	2.49E-01	2.49E-01	2.89E-01	3.10E-01	3.30E-01
pd108	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01
cd108	5.25E-04	5.25E-04	5.25E-04	5.25E-04	5.25E-04	5.25E-04	5.25E-04
ag109	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01	1.84E+01
pd110	8.63E+00	8.63E+00	8.63E+00	8.63E+00	8.63E+00	8.63E+00	8.63E+00
cd110	5.61E-01	5.61E-01	5.61E-01	5.61E-01	5.61E-01	5.61E-01	5.61E-01
cd111	5.01E+00	5.01E+00	5.01E+00	5.01E+00	5.01E+00	5.01E+00	5.01E+00
cd112	3.25E+00	3.25E+00	3.25E+00	3.25E+00	3.25E+00	3.25E+00	3.25E+00
cd113	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
in113	4.50E-02	4.50E-02	4.50E-02	4.50E-02	4.50E-02	4.50E-02	4.50E-02
cd114	4.91E+00	4.91E+00	4.91E+00	4.91E+00	4.91E+00	4.91E+00	4.91E+00
sn114	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
in115	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00	1.67E+00
sn115	8.75E-02	8.75E-02	8.75E-02	8.75E-02	8.75E-02	8.75E-02	8.75E-02
cd116	2.72E+00	2.72E+00	2.72E+00	2.72E+00	2.72E+00	2.72E+00	2.72E+00
sn116	7.57E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02
sn117	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00	1.99E+00
sn118	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00
sn119	2.06E+00	2.06E+00	2.06E+00	2.06E+00	2.06E+00	2.06E+00	2.06E+00
sn120	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00
sb121	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00
sn122	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00
te122	3.56E-03	3.56E-03	3.56E-03	3.56E-03	3.56E-03	3.56E-03	3.56E-03
sb123	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.68E+00
te123	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06
sn124	4.46E+00	4.46E+00	4.46E+00	4.46E+00	4.46E+00	4.46E+00	4.46E+00
te124	5.36E-03	5.36E-03	5.36E-03	5.36E-03	5.36E-03	5.36E-03	5.36E-03
te125	5.20E+00	5.20E+00	5.20E+00	5.20E+00	5.20E+00	5.20E+00	5.20E+00
sn126	6.08E+00	5.91E+00	5.74E+00	5.57E+00	5.42E+00	5.26E+00	5.11E+00
te126	2.20E+00	2.38E+00	2.55E+00	2.71E+00	2.87E+00	3.02E+00	3.17E+00
i127	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01
te128	5.81E+01	5.81E+01	5.81E+01	5.81E+01	5.81E+01	5.81E+01	5.81E+01
xe128	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02	3.17E-02
i129	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02
xe129	2.49E-01	2.71E-01	2.94E-01	3.17E-01	3.39E-01	3.62E-01	3.85E-01
te130	2.79E+02	2.79E+02	2.79E+02	2.79E+02	2.79E+02	2.79E+02	2.79E+02
xe130	5.45E-01	5.45E-01	5.45E-01	5.45E-01	5.45E-01	5.45E-01	5.45E-01
xe131	4.50E+02	4.50E+02	4.50E+02	4.50E+02	4.50E+02	4.50E+02	4.50E+02
xe132	7.09E+02	7.09E+02	7.09E+02	7.09E+02	7.09E+02	7.09E+02	7.09E+02
ba132	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06	4.87E-06
cs133	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03
xe134	1.26E+03	1.26E+03	1.26E+03	1.26E+03	1.26E+03	1.26E+03	1.26E+03
ba134	1.07E+01	1.07E+01	1.07E+01	1.07E+01	1.07E+01	1.07E+01	1.07E+01
cs135	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03
ba135	1.46E+01	1.60E+01	1.73E+01	1.86E+01	1.99E+01	2.12E+01	2.26E+01
xe136	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03
ba136	4.03E+00	4.03E+00	4.03E+00	4.03E+00	4.03E+00	4.03E+00	4.03E+00

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sas2h: for-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 292
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0

nuclide concentrations, grams
basis w/single reactor assembly

	initial******* d	******* d	******* d	******* d	******* d	******* d	******* d
ba137	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
ba138	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03
la138	5.84E-03	5.84E-03	5.84E-03	5.84E-03	5.84E-03	5.84E-03	5.84E-03
la139	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03
ce140	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03	1.05E+03

pr141	9.73E+02	9.73E+02	9.73E+02	9.73E+02	9.73E+02	9.73E+02	9.73E+02
ce142	9.88E+02	9.88E+02	9.88E+02	9.88E+02	9.88E+02	9.88E+02	9.88E+02
nd142	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
nd143	9.53E+02	9.53E+02	9.53E+02	9.53E+02	9.53E+02	9.53E+02	9.53E+02
nd144	9.70E+02	9.70E+02	9.70E+02	9.70E+02	9.70E+02	9.70E+02	9.70E+02
nd145	6.66E+02	6.66E+02	6.66E+02	6.66E+02	6.66E+02	6.66E+02	6.66E+02
nd146	5.25E+02	5.25E+02	5.25E+02	5.25E+02	5.25E+02	5.25E+02	5.25E+02
sm146	8.37E-04	8.37E-04	8.37E-04	8.37E-04	8.37E-04	8.37E-04	8.37E-04
sm147	3.89E+02	3.89E+02	3.89E+02	3.89E+02	3.89E+02	3.89E+02	3.89E+02
nd148	2.98E+02	2.98E+02	2.98E+02	2.98E+02	2.98E+02	2.98E+02	2.98E+02
sm148	8.64E+00	8.64E+00	8.64E+00	8.64E+00	8.64E+00	8.64E+00	8.64E+00
sm149	8.79E+00	8.79E+00	8.79E+00	8.79E+00	8.79E+00	8.79E+00	8.79E+00
nd150	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02
sm150	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
eu151	3.76E+01	3.76E+01	3.76E+01	3.76E+01	3.76E+01	3.76E+01	3.76E+01
sm152	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01
gd152	2.01E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01
eu153	3.65E+01	3.65E+01	3.65E+01	3.65E+01	3.65E+01	3.65E+01	3.65E+01
sm154	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01	1.64E+01
gd154	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
gd155	6.66E-01	6.66E-01	6.66E-01	6.66E-01	6.66E-01	6.66E-01	6.66E-01
gd156	1.12E+01	1.12E+01	1.12E+01	1.12E+01	1.12E+01	1.12E+01	1.12E+01
gd157	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02	5.42E-02
gd158	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00	3.07E+00
tb159	4.41E-01	4.41E-01	4.41E-01	4.41E-01	4.41E-01	4.41E-01	4.41E-01
gd160	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
dy160	2.30E-03	2.30E-03	2.30E-03	2.30E-03	2.30E-03	2.30E-03	2.30E-03
dy161	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02
dy162	3.62E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02	3.62E-02
dy163	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02
dy164	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03	3.85E-03
ho165	2.94E-03	2.94E-03	2.94E-03	2.94E-03	2.94E-03	2.94E-03	2.94E-03
er166	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04
er167	1.25E-06	1.25E-06	1.25E-06	1.25E-06	1.25E-06	1.25E-06	1.25E-06
er170	5.06E-07	5.06E-07	5.06E-07	5.06E-07	5.06E-07	5.06E-07	5.06E-07
yb171	7.02E-07	7.02E-07	7.02E-07	7.02E-07	7.02E-07	7.02E-07	7.02E-07
total	2.78E+04	2.78E+04	2.78E+04	2.78E+04	2.78E+04	2.78E+04	2.78E+04

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 293
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0 nuclide radioactivity, curies
basis =single reactor assembly

	initial******* d	******* d	******* d	******* d	******* d	******* d	******* d
be 10	2.37E-06	2.36E-06	2.36E-06	2.36E-06	2.35E-06	2.35E-06	2.34E-06
se 79	5.22E-02	5.18E-02	5.13E-02	5.09E-02	5.04E-02	5.00E-02	4.95E-02
rb 87	2.18E-05	2.18E-05	2.18E-05	2.18E-05	2.18E-05	2.18E-05	2.18E-05
zr 93	1.13E+00	1.13E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00
nb 93m	1.13E+00	1.13E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00
nb 94	1.03E-04	8.92E-05	7.73E-05	6.71E-05	5.82E-05	5.05E-05	4.38E-05
tc 99	1.06E+01	1.05E+01	1.03E+01	1.02E+01	1.01E+01	9.92E+00	9.78E+00
pd107	2.33E-02	2.33E-02	2.33E-02	2.33E-02	2.33E-02	2.33E-02	2.33E-02
sn126	1.73E-01	1.68E-01	1.63E-01	1.58E-01	1.54E-01	1.49E-01	1.45E-01
sb126	2.31E-02	2.35E-02	2.28E-02	2.22E-02	2.15E-02	2.09E-02	2.03E-02
sb126m	1.74E-01	1.68E-01	1.63E-01	1.58E-01	1.54E-01	1.49E-01	1.45E-01
i129	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02
cs135	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.20E+00
ce142	2.37E-05	2.37E-05	2.37E-05	2.37E-05	2.37E-05	2.37E-05	2.37E-05
sm147	8.92E-06	8.92E-06	8.92E-06	8.92E-06	8.92E-06	8.92E-06	8.92E-06
total	2.54E+03	1.44E+01	1.42E+01	1.41E+01	1.39E+01	1.38E+01	1.36E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 294
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0
element thermal power, watts
basis =single reactor assembly

	initial	******* d	******* d	******* d	******* d	******* d	******* d
se	3.90E-01	1.62E-05	1.61E-05	1.59E-05	1.58E-05	1.57E-05	1.55E-05
rb	2.97E+00	1.06E-08	1.06E-08	1.06E-08	1.06E-08	1.06E-08	1.06E-08
zr	1.45E+00	1.27E-04	1.27E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
nb	2.44E+00	1.94E-04	1.94E-04	1.93E-04	1.93E-04	1.92E-04	1.92E-04
tc	8.85E-01	5.25E-03	5.18E-03	5.11E-03	5.04E-03	4.97E-03	4.91E-03
pd	5.94E-03	1.29E-06	1.29E-06	1.29E-06	1.28E-06	1.28E-06	1.28E-06
sn	2.29E-01	2.61E-04	2.54E-04	2.47E-04	2.40E-04	2.33E-04	2.26E-04
sb	9.16E-01	2.61E-03	2.53E-03	2.46E-03	2.39E-03	2.32E-03	2.26E-03
i	2.52E+00	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05	1.02E-05
cs	2.21E+00	4.04E-04	4.04E-04	4.03E-04	4.03E-04	4.02E-04	4.02E-04
sm	3.66E-03	1.23E-07	1.23E-07	1.23E-07	1.23E-07	1.23E-07	1.23E-07
totals	3.15E+01	8.87E-03	8.72E-03	8.57E-03	8.42E-03	8.28E-03	8.13E-03

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 295
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0
nuclide gamma power, watts
basis =single reactor assembly

	initial	******* d	******* d	******* d	******* d	******* d	******* d
nb 93m	1.26E-05	1.25E-05	1.25E-05	1.25E-05	1.25E-05	1.25E-05	1.24E-05
nb 94	9.58E-07	8.31E-07	7.21E-07	6.25E-07	5.42E-07	4.70E-07	4.08E-07
tc 99	3.90E-08	3.85E-08	3.80E-08	3.75E-08	3.70E-08	3.64E-08	3.60E-08
sn126	1.34E-04	1.30E-04	1.26E-04	1.22E-04	1.19E-04	1.16E-04	1.12E-04
sb126	4.09E-04	3.83E-04	3.72E-04	3.62E-04	3.51E-04	3.41E-04	3.32E-04
sb126m	1.60E-03	1.54E-03	1.50E-03	1.46E-03	1.42E-03	1.38E-03	1.34E-03
i129	3.18E-06	3.18E-06	3.18E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06
total	1.56E+01	2.07E-03	2.01E-03	1.96E-03	1.90E-03	1.85E-03	1.80E-03

1
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 296
decay, following reactor irradiation identified by: power= 9.787E-04mw, burnup=2.6809E+04mwd, flux= 6.14E+07n/cm**2-sec
0
element gamma power, watts
basis =single reactor assembly

	initial	******* d	******* d	******* d	******* d	******* d	******* d
nb	1.12E+00	1.34E-05	1.32E-05	1.31E-05	1.30E-05	1.29E-05	1.28E-05
tc	4.43E-01	3.99E-08	3.94E-08	3.89E-08	3.84E-08	3.79E-08	3.74E-08
sn	1.50E-01	1.30E-04	1.26E-04	1.22E-04	1.19E-04	1.16E-04	1.12E-04
sb	6.30E-01	1.93E-03	1.87E-03	1.82E-03	1.77E-03	1.72E-03	1.67E-03
i	1.65E+00	3.18E-06	3.18E-06	3.17E-06	3.17E-06	3.17E-06	3.17E-06
totals	1.56E+01	2.07E-03	2.01E-03	1.96E-03	1.90E-03	1.85E-03	1.80E-03

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photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 26809.mwd, flux= 6.14E+07 n**2-sec
0 spectrum of photon release rates, photons/sec
basis = single reactor assembly
0

emean (mev)	initial	******* d	******* d	******* d	******* d	******* d	******* d
				time after discharge			
1.00E-02	6.07E+10	3.25E-06	1.96E-06	1.18E-06	7.15E-07	4.32E-07	2.61E-07
3.00E-02	1.99E+10	6.32E-07	3.82E-07	2.30E-07	1.39E-07	8.41E-08	5.08E-08
5.50E-02	1.39E+10	2.12E-07	1.28E-07	7.73E-08	4.67E-08	2.82E-08	1.70E-08
8.50E-02	8.13E+09	3.81E-08	2.30E-08	1.39E-08	8.39E-09	5.07E-09	3.06E-09
1.20E-01	5.78E+09	4.45E-09	2.69E-09	1.62E-09	9.81E-10	5.92E-10	3.58E-10
1.70E-01	6.05E+09	7.20E-11	4.35E-11	2.63E-11	1.59E-11	9.59E-12	5.79E-12
3.00E-01	4.93E+09	2.44E-24	2.44E-24	2.44E-24	2.43E-24	2.43E-24	2.42E-24

	6.50E-01	3.42E+09	2.06E-26	2.06E-26	2.05E-26	2.05E-26	2.04E-26	2.04E-26
	1.13E+00	5.89E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	1.58E+00	1.07E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	2.00E+00	2.11E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	2.40E+00	4.28E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	2.80E+00	2.32E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	3.25E+00	1.70E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	3.75E+00	1.64E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.25E+00	2.15E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	4.28E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	7.01E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	2.57E+11	4.13E-06	2.50E-06	1.51E-06	9.11E-07	5.50E-07	3.32E-07
0	mev/sec	2.48E+11	6.68E-08	4.04E-08	2.44E-08	1.47E-08	8.90E-09	5.38E-09

0 spectrum of energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	******* d	******* d	******* d	******* d	******* d	******* d
		time after discharge					
1.00E-02	6.20E+05	3.32E-11	2.00E-11	1.21E-11	7.31E-12	4.42E-12	2.67E-12
3.00E-02	6.11E+05	1.94E-11	1.17E-11	7.06E-12	4.27E-12	2.58E-12	1.56E-12
5.50E-02	7.82E+05	1.19E-11	7.19E-12	4.34E-12	2.62E-12	1.59E-12	9.57E-13
8.50E-02	7.06E+05	3.31E-12	2.00E-12	1.21E-12	7.29E-13	4.40E-13	2.66E-13
1.20E-01	7.08E+05	5.46E-13	3.30E-13	1.99E-13	1.20E-13	7.26E-14	4.39E-14
1.70E-01	1.05E+06	1.25E-14	7.56E-15	4.57E-15	2.76E-15	1.67E-15	1.01E-15
3.00E-01	2.12E+06	7.49E-28	7.48E-28	7.47E-28	7.45E-28	7.44E-28	7.42E-28
6.50E-01	2.27E+06	1.37E-29	1.37E-29	1.36E-29	1.36E-29	1.36E-29	1.36E-29
1.13E+00	6.77E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
1.58E+00	1.72E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
2.00E+00	4.32E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
2.40E+00	1.05E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
2.80E+00	7.20E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.25E+00	5.65E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	6.28E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	9.32E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	2.08E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.94E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.53E+08	6.83E-11	4.13E-11	2.49E-11	1.51E-11	9.09E-12	5.49E-12
0 gamma watts	3.97E-02	1.07E-20	6.47E-21	3.91E-21	2.36E-21	1.43E-21	8.62E-22

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photon spectrum as a function of time for fission products

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00 mw, burnup= 26809.mwd, flux= 6.14E+07 n**2-sec
0 spectrum of photon release rates, photons/sec
basis = single reactor assembly

0

emean (mev)	initial	******* d	******* d	******* d	******* d	******* d	******* d
		time after discharge					
1.00E-02	3.16E+13	2.94E+10	2.90E+10	2.87E+10	2.84E+10	2.81E+10	2.78E+10
3.00E-02	1.38E+13	7.89E+09	7.75E+09	7.62E+09	7.49E+09	7.36E+09	7.24E+09
5.50E-02	7.37E+12	3.33E+09	3.27E+09	3.21E+09	3.15E+09	3.10E+09	3.04E+09
8.50E-02	5.08E+12	3.93E+09	3.83E+09	3.73E+09	3.63E+09	3.54E+09	3.45E+09
1.20E-01	4.17E+12	4.54E+08	4.46E+08	4.37E+08	4.29E+08	4.21E+08	4.13E+08
1.70E-01	6.65E+12	2.56E+08	2.51E+08	2.45E+08	2.39E+08	2.34E+08	2.29E+08
3.00E-01	1.35E+13	4.43E+09	4.31E+09	4.18E+09	4.06E+09	3.95E+09	3.84E+09
6.50E-01	2.81E+13	1.41E+10	1.56E+10	1.52E+10	1.47E+10	1.43E+10	1.39E+10
1.13E+00	9.45E+12	3.06E+08	2.97E+08	2.89E+08	2.81E+08	2.73E+08	2.65E+08
1.58E+00	4.88E+12	2.25E+07	2.18E+07	2.12E+07	2.06E+07	2.00E+07	1.94E+07
2.00E+00	1.48E+12	6.06E+00	5.88E+00	5.72E+00	5.55E+00	5.40E+00	5.24E+00
2.40E+00	1.27E+12	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04	5.41E-04

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          2.80E+00  5.08E+11  2.84E-04  2.84E-04  2.84E-04  2.84E-04  2.84E-04  2.84E-04
          3.25E+00  2.94E+11  1.45E-04  1.45E-04  1.45E-04  1.45E-04  1.45E-04  1.45E-04
          3.75E+00  1.49E+11  7.28E-05  7.28E-05  7.28E-05  7.28E-05  7.28E-05  7.28E-05
          4.25E+00  1.63E+11  3.65E-05  3.65E-05  3.65E-05  3.65E-05  3.65E-05  3.65E-05
          6.75E+00  4.77E+10  1.83E-05  1.83E-05  1.83E-05  1.83E-05  1.83E-05  1.83E-05
          5.50E+00  3.56E+10  1.36E-05  1.36E-05  1.36E-05  1.36E-05  1.36E-05  1.36E-05
0            total  1.28E+14  6.60E+10  6.48E+10  6.36E+10  6.24E+10  6.13E+10  6.02E+10
0          mev/sec  5.38E+13  1.33E+10  1.29E+10  1.26E+10  1.22E+10  1.19E+10  1.16E+10
0                                spectrum of energy release rates, mev/watt-sec
                                          basis = single reactor assembly
0
           emean                                  time after discharge
           (mev)     initial******* d ******* d ******* d ******* d ******* d ******* d
          1.00E-02  3.23E+08  3.00E+05  2.97E+05  2.93E+05  2.90E+05  2.87E+05  2.84E+05
          3.00E-02  4.24E+08  2.42E+05  2.38E+05  2.34E+05  2.30E+05  2.26E+05  2.22E+05
          5.50E-02  4.14E+08  1.87E+05  1.84E+05  1.80E+05  1.77E+05  1.74E+05  1.71E+05
          8.50E-02  4.41E+08  3.41E+05  3.32E+05  3.24E+05  3.16E+05  3.08E+05  3.00E+05
          1.20E-01  5.11E+08  5.57E+04  5.47E+04  5.36E+04  5.26E+04  5.16E+04  5.07E+04
          1.70E-01  1.16E+09  4.46E+04  4.35E+04  4.25E+04  4.16E+04  4.06E+04  3.97E+04
          3.00E-01  4.12E+09  1.36E+06  1.32E+06  1.28E+06  1.25E+06  1.21E+06  1.18E+06
          6.50E-01  1.86E+10  1.07E+07  1.04E+07  1.01E+07  9.78E+06  9.50E+06  9.23E+06
          1.13E+00  1.09E+10  3.52E+05  3.42E+05  3.32E+05  3.23E+05  3.13E+05  3.04E+05
          1.58E+00  7.86E+09  3.61E+04  3.51E+04  3.41E+04  3.31E+04  3.22E+04  3.13E+04
          2.00E+00  3.02E+09  1.24E-02  1.20E-02  1.17E-02  1.14E-02  1.10E-02  1.07E-02
          2.40E+00  3.11E+09  1.33E-06  1.33E-06  1.33E-06  1.33E-06  1.33E-06  1.33E-06
          2.80E+00  1.45E+09  8.13E-07  8.13E-07  8.13E-07  8.13E-07  8.13E-07  8.13E-07
          3.25E+00  9.76E+08  4.82E-07  4.82E-07  4.82E-07  4.82E-07  4.82E-07  4.82E-07
          3.75E+00  5.70E+08  2.79E-07  2.79E-07  2.79E-07  2.79E-07  2.79E-07  2.79E-07
          4.25E+00  7.08E+08  1.59E-07  1.59E-07  1.59E-07  1.59E-07  1.59E-07  1.59E-07
          4.75E+00  2.52E+08  8.89E-08  8.89E-08  8.89E-08  8.89E-08  8.89E-08  8.89E-08
          5.50E+00  2.00E+08  7.63E-08  7.63E-08  7.63E-08  7.63E-08  7.63E-08  7.63E-08
0            total  5.50E+10  1.36E+07  1.32E+07  1.28E+07  1.25E+07  1.21E+07  1.18E+07
0     gamma watts   8.63E+00  2.13E-03  2.07E-03  2.01E-03  1.96E-03  1.91E-03  1.85E-03
1                                                                                          page 299
0                   principal photon sources in group  1, photons/sec
     mean energy =  .0180 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.81E+10) at ******* d
  nuclide                                   time after discharge
           initial******* d ******* d ******* d ******* d ******* d ******* d
   se 79   5.14E+07  5.09E+07  5.05E+07  5.00E+07  4.96E+07  4.92E+07  4.87E+07
   zr 93   2.70E+08  2.70E+08  2.69E+08  2.69E+08  2.68E+08  2.68E+08  2.67E+08
   nb 93m  7.87E+09  7.86E+09  7.84E+09  7.83E+09  7.81E+09  7.80E+09  7.78E+09
   tc 99   1.76E+10  1.73E+10  1.71E+10  1.69E+10  1.66E+10  1.64E+10  1.62E+10
   sn126   6.09E+08  5.91E+08  5.74E+08  5.58E+08  5.42E+08  5.27E+08  5.12E+08
   sb126   1.44E+08  1.35E+08  1.31E+08  1.27E+08  1.24E+08  1.20E+08  1.17E+08
   sb126m  1.89E+09  1.82E+09  1.77E+09  1.72E+09  1.67E+09  1.62E+09  1.58E+09
   i129    4.21E+07  4.21E+07  4.21E+07  4.21E+07  4.21E+07  4.21E+07  4.21E+07
   cs135   1.26E+09  1.26E+09  1.26E+09  1.25E+09  1.25E+09  1.25E+09  1.25E+09
0                   principal photon sources in group  2, photons/sec
     mean energy =  .0300 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.36E+09) at ******* d
  nuclide                                   time after discharge
           initial******* d ******* d ******* d ******* d ******* d ******* d
   se 79   1.06E+07  1.05E+07  1.04E+07  1.03E+07  1.02E+07  1.01E+07  1.00E+07
   zr 93   2.02E+07  2.01E+07  2.01E+07  2.01E+07  2.00E+07  2.00E+07  2.00E+07
   tc 99   4.25E+09  4.19E+09  4.14E+09  4.08E+09  4.02E+09  3.97E+09  3.91E+09
   sn126   2.14E+09  2.08E+09  2.02E+09  1.97E+09  1.91E+09  1.86E+09  1.80E+09
   sb126   5.53E+07  5.18E+07  5.03E+07  4.89E+07  4.75E+07  4.62E+07  4.49E+07
   sb126m  6.75E+08  6.51E+08  6.33E+08  6.15E+08  5.97E+08  5.80E+08  5.64E+08
   i129    6.17E+08  6.17E+08  6.17E+08  6.16E+08  6.16E+08  6.16E+08  6.16E+08
   cs135   2.67E+08  2.66E+08  2.66E+08  2.66E+08  2.65E+08  2.65E+08  2.65E+08
0                   principal photon sources in group  3, photons/sec
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    mean energy =  .0550 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.10E+09) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 se 79   3.83E+06  3.80E+06  3.77E+06  3.73E+06  3.70E+06  3.67E+06  3.64E+06
 tc 99   2.05E+09  2.02E+09  2.00E+09  1.97E+09  1.94E+09  1.92E+09  1.89E+09
 sn126   7.85E+08  7.63E+08  7.41E+08  7.20E+08  7.00E+08  6.80E+08  6.61E+08
 sb126   2.72E+07  2.55E+07  2.48E+07  2.41E+07  2.34E+07  2.27E+07  2.21E+07
 sb126m  4.02E+08  3.87E+08  3.76E+08  3.66E+08  3.55E+08  3.45E+08  3.35E+08
 i129    2.26E+07  2.26E+07  2.26E+07  2.26E+07  2.26E+07  2.26E+07  2.25E+07
 cs135   1.06E+08  1.06E+08  1.06E+08  1.06E+08  1.05E+08  1.05E+08  1.05E+08
0                 principal photon sources in group  4, photons/sec
    mean energy =  .0850 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.54E+09) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 tc 99   7.29E+08  7.19E+08  7.09E+08  7.00E+08  6.90E+08  6.81E+08  6.72E+08
 sn126   3.03E+09  2.95E+09  2.86E+09  2.78E+09  2.70E+09  2.63E+09  2.55E+09
 sb126   1.43E+07  1.34E+07  1.30E+07  1.26E+07  1.23E+07  1.19E+07  1.16E+07
 sb126m  2.27E+08  2.19E+08  2.12E+08  2.06E+08  2.00E+08  1.95E+08  1.89E+08
 cs135   2.74E+07  2.73E+07  2.73E+07  2.73E+07  2.72E+07  2.72E+07  2.72E+07
1                                                                                                          page 300
0                 principal photon sources in group  5, photons/sec
    mean energy =  .1200 mev.  nuclides exceeding  1.0E-03 of total group release rate (4.21E+08) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 tc 99   2.85E+08  2.81E+08  2.77E+08  2.74E+08  2.70E+08  2.66E+08  2.63E+08
 sn126   8.05E+06  7.82E+06  7.59E+06  7.38E+06  7.17E+06  6.96E+06  6.77E+06
 sb126   9.16E+06  8.58E+06  8.33E+06  8.10E+06  7.87E+06  7.64E+06  7.43E+06
 sb126m  1.55E+08  1.50E+08  1.46E+08  1.42E+08  1.37E+08  1.34E+08  1.30E+08
 cs135   6.59E+06  6.59E+06  6.58E+06  6.57E+06  6.56E+06  6.55E+06  6.54E+06
0                 principal photon sources in group  6, photons/sec
    mean energy =  .1700 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.34E+08) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 tc 99   9.51E+07  9.38E+07  9.26E+07  9.13E+07  9.01E+07  8.88E+07  8.76E+07
 sn126   3.58E+06  3.48E+06  3.38E+06  3.29E+06  3.19E+06  3.10E+06  3.01E+06
 sb126   1.07E+07  1.00E+07  9.72E+06  9.45E+06  9.18E+06  8.92E+06  8.66E+06
 sb126m  1.54E+08  1.48E+08  1.44E+08  1.40E+08  1.36E+08  1.32E+08  1.28E+08
 cs135   7.25E+05  7.24E+05  7.23E+05  7.22E+05  7.21E+05  7.20E+05  7.19E+05
0                 principal photon sources in group  7, photons/sec
    mean energy =  .3000 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.95E+09) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 tc 99   7.02E+06  6.92E+06  6.83E+06  6.74E+06  6.64E+06  6.55E+06  6.47E+06
 sb126   6.44E+08  6.03E+08  5.86E+08  5.69E+08  5.53E+08  5.37E+08  5.22E+08
 sb126m  3.96E+09  3.82E+09  3.71E+09  3.61E+09  3.50E+09  3.40E+09  3.31E+09
0                 principal photon sources in group  8, photons/sec
    mean energy =  .6500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.43E+10) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 sb126   3.55E+09  3.32E+09  3.23E+09  3.14E+09  3.05E+09  2.96E+09  2.88E+09
 sb126m  1.32E+10  1.27E+10  1.24E+10  1.20E+10  1.17E+10  1.13E+10  1.10E+10
0                 principal photon sources in group  9, photons/sec
    mean energy = 1.1250 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.73E+08) at ******* d
nuclide                                                  time after discharge
          initial******* d ******* d ******* d ******* d ******* d ******* d
 sb126   1.11E+08  1.04E+08  1.01E+08  9.83E+07  9.55E+07  9.28E+07  9.01E+07
 sb126m  2.09E+08  2.02E+08  1.96E+08  1.91E+08  1.85E+08  1.80E+08  1.75E+08
1                                                                                                          page 301
0                 principal photon sources in group 10, photons/sec
    mean energy = 1.5750 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.00E+07) at ******* d
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    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     sb126   2.60E+06  2.43E+06  2.37E+06  2.30E+06  2.23E+06  2.17E+06  2.11E+06
     sb126m  2.08E+07  2.00E+07  1.94E+07  1.89E+07  1.84E+07  1.78E+07  1.73E+07
0                principal photon sources in group 11, photons/sec
       mean energy = 2.0000 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.40E+00) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     sb126   3.77E-02  3.53E-02  3.43E-02  3.33E-02  3.24E-02  3.15E-02  3.06E-02
     sb126m  6.24E+00  6.02E+00  5.85E+00  5.68E+00  5.52E+00  5.36E+00  5.21E+00
0                principal photon sources in group 12, photons/sec
       mean energy = 2.4000 mev.  nuclides exceeding  1.0E-03 of total group release rate (5.41E-04) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   3.93E-04  3.93E-04  3.93E-04  3.93E-04  3.93E-04  3.93E-04  3.93E-04
     sm147   1.48E-04  1.48E-04  1.48E-04  1.48E-04  1.48E-04  1.48E-04  1.48E-04
0                principal photon sources in group 13, photons/sec
       mean energy = 2.8000 mev.  nuclides exceeding  1.0E-03 of total group release rate (2.84E-04) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   2.06E-04  2.06E-04  2.06E-04  2.06E-04  2.06E-04  2.06E-04  2.06E-04
     sm147   7.76E-05  7.76E-05  7.76E-05  7.76E-05  7.76E-05  7.76E-05  7.76E-05
0                principal photon sources in group 14, photons/sec
       mean energy = 3.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.45E-04) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   1.05E-04  1.05E-04  1.05E-04  1.05E-04  1.05E-04  1.05E-04  1.05E-04
     sm147   3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05  3.96E-05
0                principal photon sources in group 15, photons/sec
       mean energy = 3.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (7.28E-05) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   5.29E-05  5.29E-05  5.29E-05  5.29E-05  5.29E-05  5.29E-05  5.29E-05
     sm147   1.99E-05  1.99E-05  1.99E-05  1.99E-05  1.99E-05  1.99E-05  1.99E-05
1                                                                                                          page 302
0                principal photon sources in group 16, photons/sec
       mean energy = 4.2500 mev.  nuclides exceeding  1.0E-03 of total group release rate (3.65E-05) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   2.65E-05  2.65E-05  2.65E-05  2.65E-05  2.65E-05  2.65E-05  2.65E-05
     sm147   9.97E-06  9.97E-06  9.97E-06  9.97E-06  9.97E-06  9.97E-06  9.97E-06
0                principal photon sources in group 17, photons/sec
       mean energy = 4.7500 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.83E-05) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   1.33E-05  1.33E-05  1.33E-05  1.33E-05  1.33E-05  1.33E-05  1.33E-05
     sm147   5.00E-06  5.00E-06  5.00E-06  5.00E-06  5.00E-06  5.00E-06  5.00E-06
0                principal photon sources in group 18, photons/sec
       mean energy = 5.5000 mev.  nuclides exceeding  1.0E-03 of total group release rate (1.36E-05) at ******* d
    nuclide                                                  time after discharge
              initial******* d ******* d ******* d ******* d ******* d ******* d
     ce142   9.86E-06  9.86E-06  9.86E-06  9.86E-06  9.86E-06  9.86E-06  9.86E-06
     sm147   3.71E-06  3.71E-06  3.71E-06  3.71E-06  3.71E-06  3.71E-06  3.71E-06
1                                                                                                          page 303
                 photon spectrum as a function of time for heavy metals and their daughters

0                          sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                                 power=    .00 mw, burnup=  26809.mwd, flux= 6.14E+07 n**2-sec
0                                     actinide photon release rates, photons/sec
                                     basis = single reactor assembly
```

0

emean (mev)	initial	******* d	******* d	******* d	******* d	******* d	******* d
		time after discharge					
1.00E-02	1.77E+13	1.74E+12	1.67E+12	1.61E+12	1.56E+12	1.51E+12	1.48E+12
3.00E-02	1.13E+12	1.36E+11	1.39E+11	1.43E+11	1.46E+11	1.49E+11	1.52E+11
5.50E-02	1.40E+12	9.02E+10	9.24E+10	9.46E+10	9.68E+10	9.88E+10	1.01E+11
8.50E-02	6.52E+12	2.77E+11	2.82E+11	2.87E+11	2.92E+11	2.96E+11	3.01E+11
1.20E-01	6.51E+12	5.47E+10	5.56E+10	5.65E+10	5.74E+10	5.83E+10	5.92E+10
1.70E-01	2.54E+11	5.20E+10	5.34E+10	5.47E+10	5.59E+10	5.71E+10	5.83E+10
3.00E-01	3.75E+12	3.52E+11	3.60E+11	3.68E+11	3.75E+11	3.82E+11	3.88E+11
6.50E-01	3.51E+11	1.85E+11	1.92E+11	1.99E+11	2.05E+11	2.11E+11	2.16E+11
1.13E+00	2.99E+11	8.36E+10	8.67E+10	8.96E+10	9.24E+10	9.50E+10	9.74E+10
1.58E+00	9.21E+10	9.58E+10	9.94E+10	1.03E+11	1.06E+11	1.09E+11	1.12E+11
2.00E+00	1.91E+10	1.99E+10	2.06E+10	2.13E+10	2.20E+10	2.26E+10	2.32E+10
2.40E+00	1.13E+10	1.18E+10	1.22E+10	1.26E+10	1.30E+10	1.34E+10	1.37E+10
2.80E+00	4.32E+08	3.64E+08	3.78E+08	3.90E+08	4.03E+08	4.14E+08	4.25E+08
3.25E+00	9.02E+07	9.38E+07	9.74E+07	1.01E+08	1.04E+08	1.07E+08	1.10E+08
3.75E+00	9.55E+03	8.41E+03	7.73E+03	7.28E+03	6.97E+03	6.75E+03	6.60E+03
4.25E+00	5.45E+03	4.81E+03	4.42E+03	4.16E+03	3.98E+03	3.86E+03	3.78E+03
4.75E+00	3.12E+03	2.75E+03	2.53E+03	2.38E+03	2.28E+03	2.21E+03	2.17E+03
5.50E+00	2.78E+03	2.45E+03	2.25E+03	2.12E+03	2.04E+03	1.98E+03	1.94E+03
0 total	3.81E+13	3.10E+12	3.06E+12	3.04E+12	3.02E+12	3.01E+12	3.00E+12
0 mev/sec	3.57E+12	6.06E+11	6.25E+11	6.43E+11	6.60E+11	6.76E+11	6.91E+11

0 actinide energy release rates, mev/watt-sec
basis = single reactor assembly

0

emean (mev)	initial	******* d	******* d	******* d	******* d	******* d	******* d
		time after discharge					
1.00E-02	1.81E+08	1.78E+07	1.70E+07	1.64E+07	1.59E+07	1.55E+07	1.51E+07
3.00E-02	3.48E+07	4.16E+06	4.27E+06	4.38E+06	4.48E+06	4.57E+06	4.67E+06
5.50E-02	7.87E+07	5.07E+06	5.20E+06	5.32E+06	5.44E+06	5.55E+06	5.66E+06
8.50E-02	5.66E+08	2.41E+07	2.45E+07	2.49E+07	2.53E+07	2.57E+07	2.61E+07
1.20E-01	7.99E+08	6.70E+06	6.82E+06	6.93E+06	7.04E+06	7.15E+06	7.26E+06
1.70E-01	4.41E+07	9.03E+06	9.27E+06	9.50E+06	9.72E+06	9.93E+06	1.01E+07
3.00E-01	1.15E+09	1.08E+08	1.10E+08	1.13E+08	1.15E+08	1.17E+08	1.19E+08
6.50E-01	2.33E+08	1.23E+08	1.28E+08	1.32E+08	1.36E+08	1.40E+08	1.44E+08
1.13E+00	3.44E+08	9.61E+07	9.96E+07	1.03E+08	1.06E+08	1.09E+08	1.12E+08
1.58E+00	1.48E+08	1.54E+08	1.60E+08	1.66E+08	1.71E+08	1.76E+08	1.80E+08
2.00E+00	3.91E+07	4.07E+07	4.22E+07	4.36E+07	4.50E+07	4.62E+07	4.74E+07
2.40E+00	2.77E+07	2.88E+07	2.99E+07	3.09E+07	3.19E+07	3.28E+07	3.37E+07
2.80E+00	1.24E+06	1.04E+06	1.08E+06	1.12E+06	1.15E+06	1.18E+06	1.22E+06
3.25E+00	2.99E+05	3.12E+05	3.23E+05	3.34E+05	3.45E+05	3.55E+05	3.64E+05
3.75E+00	3.66E+01	3.22E+01	2.96E+01	2.79E+01	2.67E+01	2.59E+01	2.53E+01
4.25E+00	2.37E+01	2.09E+01	1.92E+01	1.81E+01	1.73E+01	1.68E+01	1.64E+01
4.75E+00	1.52E+01	1.34E+01	1.23E+01	1.16E+01	1.11E+01	1.08E+01	1.05E+01
5.50E+00	1.56E+01	1.38E+01	1.27E+01	1.19E+01	1.14E+01	1.11E+01	1.09E+01
0 total	3.65E+09	6.19E+08	6.38E+08	6.57E+08	6.74E+08	6.91E+08	7.06E+08
0 gamma watts	5.72E-01	9.71E-02	1.00E-01	1.03E-01	1.06E-01	1.08E-01	1.11E-01

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	******* d	******* d	******* d	******* d	******* d	******* d
pb210	1.71E-05	1.78E-05	1.85E-05	1.91E-05	1.97E-05	2.02E-05	2.08E-05
bi210	4.36E-03	4.54E-03	4.71E-03	4.87E-03	5.02E-03	5.16E-03	5.30E-03
bi211	5.39E+02	5.38E+02	5.38E+02	5.37E+02	5.37E+02	5.37E+02	5.37E+02

bi212	2.93E+00	5.22E-03	5.49E-03	5.75E-03	6.01E-03	6.27E-03	6.53E-03
bi213	3.62E+01	3.82E+01	4.02E+01	4.22E+01	4.42E+01	4.62E+01	4.81E+01
bi214	1.98E+00	2.06E+00	2.14E+00	2.21E+00	2.28E+00	2.34E+00	2.40E+00
po210	5.37E+03	5.59E+03	5.80E+03	6.00E+03	6.18E+03	6.36E+03	6.53E+03
po211	2.14E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.12E+00	2.12E+00
po212	1.50E+01	2.68E-02	2.81E-02	2.94E-02	3.08E-02	3.21E-02	3.35E-02
po213	4.78E+03	5.04E+03	5.31E+03	5.57E+03	5.84E+03	6.10E+03	6.35E+03
po214	1.76E+04	1.83E+04	1.90E+04	1.97E+04	2.03E+04	2.09E+04	2.14E+04
po215	7.62E+02	7.61E+02	7.60E+02	7.59E+02	7.59E+02	7.58E+02	7.58E+02
po216	1.17E+01	2.09E-02	2.19E-02	2.30E-02	2.40E-02	2.51E-02	2.61E-02
po218	8.39E+03	8.73E+03	9.06E+03	9.37E+03	9.66E+03	9.93E+03	1.02E+04
at217	3.10E+03	3.27E+03	3.44E+03	3.61E+03	3.78E+03	3.95E+03	4.12E+03
rn218	2.63E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	6.06E+02	6.05E+02	6.04E+02	6.04E+02	6.03E+02	6.03E+02	6.03E+02
rn220	9.28E+00	1.65E-02	1.74E-02	1.82E-02	1.90E-02	1.99E-02	2.07E-02
rn222	6.12E+03	6.38E+03	6.61E+03	6.84E+03	7.05E+03	7.25E+03	7.44E+03
fr221	2.26E+03	2.39E+03	2.51E+03	2.64E+03	2.76E+03	2.88E+03	3.00E+03
fr223	2.30E-04	2.29E-04	2.29E-04	2.29E-04	2.29E-04	2.29E-04	2.29E-04
ra222	2.04E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	3.51E+02	3.50E+02	3.50E+02	3.49E+02	3.49E+02	3.49E+02	3.49E+02
ra224	6.56E+00	1.17E-02	1.23E-02	1.29E-02	1.34E-02	1.40E-02	1.46E-02
ra226	3.58E+03	3.73E+03	3.87E+03	4.00E+03	4.12E+03	4.24E+03	4.35E+03
ac225	1.62E+03	1.71E+03	1.81E+03	1.90E+03	1.98E+03	2.07E+03	2.16E+03
ac227	2.59E+00	2.58E+00	2.58E+00	2.58E+00	2.57E+00	2.57E+00	2.57E+00
ac228	1.85E-10	1.96E-10	2.06E-10	2.17E-10	2.28E-10	2.38E-10	2.49E-10
th226	1.84E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	3.87E+02	3.86E+02	3.86E+02	3.86E+02	3.85E+02	3.85E+02	3.85E+02
th228	5.53E+00	9.86E-03	1.04E-02	1.08E-02	1.13E-02	1.18E-02	1.23E-02
th229	9.49E+02	1.00E+03	1.05E+03	1.11E+03	1.16E+03	1.21E+03	1.26E+03
th230	3.38E+03	3.51E+03	3.64E+03	3.75E+03	3.87E+03	3.97E+03	4.07E+03
th232	2.35E-03	2.49E-03	2.63E-03	2.77E-03	2.90E-03	3.04E-03	3.18E-03
pa231	2.06E+02	2.06E+02	2.06E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02
u230	1.45E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u231	1.07E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	5.15E+00	5.39E-04	5.45E-04	5.31E-04	5.18E-04	5.05E-04	4.93E-04
u233	9.52E+02	9.99E+02	1.04E+03	1.09E+03	1.13E+03	1.18E+03	1.22E+03
u234	7.45E+03	7.38E+03	7.31E+03	7.25E+03	7.18E+03	7.11E+03	7.05E+03
u235	1.23E+02	1.23E+02	1.23E+02	1.24E+02	1.24E+02	1.25E+02	1.25E+02
u236	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03
u238	8.30E+02	8.30E+02	8.30E+02	8.30E+02	8.30E+02	8.30E+02	8.30E+02
np235	2.86E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np237	3.20E+03	3.19E+03	3.19E+03	3.18E+03	3.18E+03	3.18E+03	3.17E+03
pu236	1.75E-02	7.47E-04	7.29E-04	7.11E-04	6.93E-04	6.76E-04	6.59E-04
pu237	2.85E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu238	9.75E+03	1.80E-10	1.67E-19	2.18E-28	.00E+00	.00E+00	.00E+00

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neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

initial ******* d ******* d ******* d ******* d ******* d ******* d

pu239	2.65E+05	2.18E+05	1.93E+05	1.71E+05	1.52E+05	1.35E+05	1.20E+05
pu240	9.15E+03	5.89E+03	3.79E+03	2.44E+03	1.57E+03	1.01E+03	6.52E+02
pu241	4.85E-03	2.22E-15	1.58E-15	1.13E-15	8.02E-16	5.71E-16	4.07E-16
pu242	2.60E-02	2.58E-02	2.56E-02	2.54E-02	2.52E-02	2.51E-02	2.49E-02
pu244	5.01E-23	5.90E-23	6.78E-23	7.66E-23	8.53E-23	9.39E-23	1.02E-22
am239	3.39E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

am240	5.32E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	2.61E+02	3.60E-01	4.29E-04	5.40E-07	7.34E-10	3.97E-11	2.76E-11
am242m	1.74E-04	2.22E-13	2.83E-22	3.68E-31	.00E+00	.00E+00	.00E+00
am243	6.23E-03	4.21E-03	2.84E-03	1.92E-03	1.30E-03	8.78E-04	5.93E-04
cm241	5.44E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	3.33E-01	6.89E-11	8.78E-20	1.11E-28	.00E+00	.00E+00	.00E+00
cm243	1.32E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm244	5.23E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm245	1.96E-10	1.39E-10	9.91E-11	7.06E-11	5.02E-11	3.58E-11	2.55E-11
cm246	2.28E-12	1.24E-12	6.74E-13	3.46E-13	1.99E-13	1.08E-13	5.86E-14
cm247	1.24E-18	1.24E-18	1.24E-18	1.24E-18	1.24E-18	1.24E-18	1.24E-18
cm248	3.72E-19	3.69E-19	3.66E-19	3.63E-19	3.60E-19	3.57E-19	3.54E-19
bk249	7.86E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf249	7.42E-21	1.96E-24	5.28E-28	.00E+00	.00E+00	.00E+00	.00E+00
cf250	3.48E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf251	2.44E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	3.38E+05	3.00E+05	2.76E+05	2.55E+05	2.37E+05	2.21E+05	2.08E+05

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neutron source intensity as a function of time

0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

initial	******* d	******* d	******* d	******* d	******* d	******* d
th230	8.67E-02	9.01E-02	9.33E-02	9.64E-02	9.92E-02	1.02E-01	1.04E-01
pa231	2.58E-02	2.58E-02	2.58E-02	2.57E-02	2.57E-02	2.57E-02	2.57E-02
u232	3.17E-04	3.43E-08	3.35E-08	3.26E-08	3.18E-08	3.10E-08	3.03E-08
u234	1.60E+01	1.59E+01	1.57E+01	1.56E+01	1.54E+01	1.53E+01	1.52E+01
u235	1.50E+00	1.51E+00	1.51E+00	1.52E+00	1.52E+00	1.52E+00	1.53E+00
u236	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02	1.76E+02
u237	1.65E-10	8.13E-29	5.79E-29	4.12E-29	2.93E-29	2.09E-29	1.49E-29
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	1.15E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.00E-07	9.79E-08	9.55E-08	9.31E-08	9.08E-08	8.86E-08	8.64E-08
np238	2.37E-09	6.51E-26	8.29E-35	.00E+00	.00E+00	.00E+00	.00E+00
np239	2.35E-06	4.36E-14	2.95E-14	1.99E-14	1.35E-14	9.10E-15	6.15E-15
pu236	1.18E-03	5.06E-05	4.93E-05	4.81E-05	4.69E-05	4.57E-05	4.46E-05
pu238	1.80E+03	3.32E-11	3.08E-20	3.92E-29	4.94E-38	.00E+00	.00E+00
pu239	1.31E+02	1.17E+02	1.03E+02	9.17E+01	8.14E+01	7.22E+01	6.40E+01
pu240	6.08E+04	3.92E+04	2.52E+04	1.62E+04	1.05E+04	6.74E+03	4.34E+03
pu241	1.46E-04	8.00E-17	5.70E-17	4.06E-17	2.89E-17	2.06E-17	1.46E-17
pu242	2.03E+01	2.01E+01	2.00E+01	1.98E+01	1.97E+01	1.95E+01	1.94E+01
pu243	2.02E-13	5.36E-29	5.36E-29	5.36E-29	5.36E-29	5.36E-29	5.36E-29
pu244	1.20E-17	1.41E-17	1.62E-17	1.83E-17	2.04E-17	2.25E-17	2.45E-17
am241	1.00E-01	1.31E-04	1.65E-07	2.08E-10	2.83E-13	1.53E-14	1.06E-14
am242m	8.28E-04	1.05E-12	1.34E-21	1.71E-30	2.18E-39	.00E+00	.00E+00
am242	5.54E-06	1.14E-15	1.46E-24	1.91E-33	.00E+00	.00E+00	.00E+00
am243	2.87E-05	1.94E-05	1.31E-05	8.85E-06	5.98E-06	4.04E-06	2.73E-06
am244	7.08E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.66E+00	3.44E-10	4.38E-19	5.58E-28	.00E+00	.00E+00	.00E+00
cm243	2.87E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm244	6.82E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm245	5.30E-11	3.78E-11	2.69E-11	1.91E-11	1.36E-11	9.70E-12	6.90E-12
cm246	8.26E-08	4.47E-08	2.43E-08	1.32E-08	7.17E-09	3.89E-09	2.11E-09
cm248	6.09E-12	6.06E-12	5.99E-12	5.94E-12	5.89E-12	5.84E-12	5.79E-12
cm250	3.25E-25	2.75E-25	2.33E-25	1.97E-25	1.67E-25	1.42E-25	1.20E-25
bk249	4.34E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf249	4.51E-21	1.19E-24	3.15E-28	8.30E-32	2.19E-35	5.75E-39	.00E+00

```
     cf250   2.92E-19   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
0     total  1.80E+05  1.57E+05  1.43E+05  1.34E+05  1.28E+05  1.24E+05  1.22E+05
      ---------------------------------------------------------------------------
0     total  5.18E+05  4.56E+05  4.18E+05  3.88E+05  3.65E+05  3.45E+05  3.29E+05
1                                                                                                  page 307
                                alpha-n neutron source spectrum as a function of time
                                   (using reaction spectra for uranium dioxide)

0                               sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                                     alpha-n neutron spectra, neutrons/sec/basis
                                        basis = single reactor assembly

      boundaries, mev    initial ******* d ******* d ******* d ******* d ******* d ******* d

  1 6.43E+00 - 2.00E+01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  2 3.00E+00 - 6.43E+00 6.551E+04 7.948E+04 6.965E+04 6.438E+04 5.983E+04 5.589E+04 5.246E+04
  3 1.85E+00 - 3.00E+00 1.856E+05 1.578E+05 1.442E+05 1.333E+05 1.239E+05 1.157E+05 1.086E+05
  4 1.40E+00 - 1.85E+00 4.984E+04 3.679E+04 3.606E+04 3.333E+04 3.098E+04 2.893E+04 2.716E+04
  5 9.00E-01 - 1.40E+00 2.804E+04 1.950E+04 1.923E+04 1.778E+04 1.652E+04 1.543E+04 1.449E+04
  6 4.00E-01 - 9.00E-01 8.144E+03 5.431E+03 5.460E+03 5.047E+03 4.691E+03 4.382E+03 4.113E+03
  7 1.00E-01 - 4.00E-01 1.273E+03 8.392E+02 9.616E+02 8.888E+02 8.260E+02 7.716E+02 7.243E+02
  8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 10 5.50E-04 - 3.00E-03  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 11 1.00E-04 - 5.50E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 12 3.00E-05 - 1.00E-04  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 13 1.00E-05 - 3.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 14 3.05E-06 - 1.00E-05  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 15 1.77E-06 - 3.05E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 16 1.30E-06 - 1.77E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 17 1.13E-06 - 1.30E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 18 1.00E-06 - 1.13E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 19 8.00E-07 - 1.00E-06  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 20 4.00E-07 - 8.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 21 3.25E-07 - 4.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 22 2.25E-07 - 3.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 23 1.00E-07 - 2.25E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 24 5.00E-08 - 1.00E-07  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 25 3.00E-08 - 5.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 26 1.00E-08 - 3.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
 27 1.00E-11 - 1.00E-08  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
0                      3.384E+05 2.999E+05 2.756E+05 2.547E+05 2.367E+05 2.211E+05 2.076E+05
1                                                                                                  page 308
                                spontaneous fission neutron source spectrum as a function of time

0                               sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
                                     spontaneous fission neutron spectra, neutrons/sec/basis
                                        basis = single reactor assembly

      boundaries, mev    initial ******* d ******* d ******* d ******* d ******* d ******* d

  1 6.43E+00 - 2.00E+01 3.438E+03 2.967E+03 2.684E+03 2.514E+03 2.405E+03 2.335E+03 2.290E+03
  2 3.00E+00 - 6.43E+00 3.768E+04 3.279E+04 2.988E+04 2.800E+04 2.678E+04 2.600E+04 2.550E+04
  3 1.85E+00 - 3.00E+00 4.106E+04 3.558E+04 3.231E+04 3.027E+04 2.896E+04 2.811E+04 2.757E+04
  4 1.40E+00 - 1.85E+00 2.327E+04 2.036E+04 1.865E+04 1.748E+04 1.672E+04 1.623E+04 1.592E+04
  5 9.00E-01 - 1.40E+00 3.194E+04 2.792E+04 2.555E+04 2.393E+04 2.290E+04 2.223E+04 2.180E+04
  6 4.00E-01 - 9.00E-01 3.559E+04 3.086E+04 2.803E+04 2.626E+04 2.512E+04 2.439E+04 2.391E+04
  7 1.00E-01 - 4.00E-01 7.026E+03 6.065E+03 5.488E+03 5.142E+03 4.919E+03 4.775E+03 4.683E+03
  8 1.70E-02 - 1.00E-01  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
  9 3.00E-03 - 1.70E-02  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00  .000E+00
```

10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.800E+05	1.565E+05	1.426E+05	1.336E+05	1.278E+05	1.241E+05	1.217E+05	

1 page 309

total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

boundaries, mev	initial ******* d	******* d	******* d	******* d	******* d	******* d	******* d
1 6.43E+00 - 2.80E+01	3.438E+03	2.967E+03	2.684E+03	2.514E+03	2.405E+03	2.335E+03	2.290E+03
2 3.00E+00 - 6.43E+00	1.032E+05	1.123E+05	9.953E+04	9.238E+04	8.661E+04	8.189E+04	7.796E+04
3 1.85E+00 - 3.00E+00	2.266E+05	1.934E+05	1.765E+05	1.636E+05	1.529E+05	1.438E+05	1.362E+05
4 1.40E+00 - 1.85E+00	7.311E+04	5.716E+04	5.471E+04	5.081E+04	4.769E+04	4.516E+04	4.308E+04
5 9.00E-01 - 1.40E+00	5.998E+04	4.742E+04	4.478E+04	4.171E+04	3.942E+04	3.766E+04	3.628E+04
6 4.00E-01 - 9.00E-01	4.373E+04	3.629E+04	3.349E+04	3.131E+04	2.981E+04	2.877E+04	2.803E+04
7 1.00E-01 - 4.00E-01	8.299E+03	6.925E+03	6.449E+03	6.031E+03	5.745E+03	5.547E+03	5.407E+03
8 1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9 3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10 5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11 1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12 3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13 1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14 3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15 1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16 1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17 1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18 1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19 8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20 6.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21 3.25E-07 - 6.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22 2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23 1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24 5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25 3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26 1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27 1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0	5.184E+05	4.564E+05	4.182E+05	3.883E+05	3.646E+05	3.452E+05	3.292E+05

1

1 * gamma sources determined *

0case applies the following photon data base

```
                    master photon library
                    in binary mode
0    the sources include photons of nuclides for...

       light elements
       actinides
       fission products
1                   gamma source spectrum for gamma lines (sas2)
0                                  9131250.00  day time of the requested nuclides
0                        energy interval in mev       photons / second      mev / second
0
                    1.0000E-02 to        5.0000E-02        6.9808E+11        2.0942E+10
                    5.0000E-02 to        1.0000E-01        3.8584E+11        2.8938E+10
                    1.0000E-01 to        2.0000E-01        1.1289E+11        1.6934E+10
                    2.0000E-01 to        3.0000E-01        1.4488E+11        3.6220E+10
                    3.0000E-01 to        4.0000E-01        2.2971E+11        8.0400E+10
                    4.0000E-01 to        6.0000E-01        4.4709E+10        2.2354E+10
                    6.0000E-01 to        8.0000E-01        1.7332E+11        1.2132E+11
                    8.0000E-01 to        1.0000E+00        2.0805E+10        1.8725E+10
                    1.0000E+00 to        1.3300E+00        8.4120E+10        9.7999E+10
                    1.3300E+00 to        1.6600E+00        4.4072E+10        6.5888E+10
                    1.6600E+00 to        2.0000E+00        7.0645E+10        1.2928E+11
                    2.0000E+00 to        2.5000E+00        2.6955E+10        6.0650E+10
                    2.5000E+00 to        3.0000E+00        4.4295E+08        1.2181E+09
                    3.0000E+00 to        4.0000E+00        1.0172E+08        3.5601E+08
                    4.0000E+00 to        5.0000E+00        5.8590E+03        2.6366E+04
                    5.0000E+00 to        6.5000E+00        2.3016E+03        1.3234E+04
                    6.5000E+00 to        8.0000E+00        4.4274E+02        3.2099E+03
                    8.0000E+00 to        1.0000E+01        9.2729E+01        8.3456E+02
0                   totals                                  2.0366E+12        7.0123E+11
0
0                   total energy from nuclides with spectrum data     =   7.0123E+11
0                   total energy from nuclides with no spectrum data =   5.7340E+01
1
0  .results on logical unit no. 71, position  2, for time step  6, subcase32. (run position 1, case position 2)
   title: sas2h: far-field crit based on bkw 15x15, 3.60wt%, 20gwd/mtu 40% h2o/ 8% uo2
0     .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
```