AEB-98-02

Detailed Modeling and Analysis of the Zion Plant for Phase II of the Revised (NUREG-1465) Source Term Rebaselining for Operating Reactors

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Introduction

In order to more fully evaluate issues associated with implementation of the revised (NUREG-1465) source term (Reference 1) at operating reactors, including assessment of the impact of revised dose acceptance criteria, the staff undertook a systematic evaluation of dose analyses for a range of accidents at representative plants. This evaluation, termed rebaselining, was intended to explore significant trends, evaluate generic implications, and where possible, identify types of plant specific dependencies. The principal technical issues of rebaselining concerned the effect of the revised source term on calculation of individual offsite and control room doses, the effect on the dose calculation used for equipment qualification, and the impact of potential plant changes both on dose analyses and on severe accident risk. In implementing the rebaselining activity, the work was broken down into four phases, which divided the work according to the types of analyses and allowed insights gained to be incorporated into subsequent phases.

The purpose of this Accident Evaluation Branch report is to describe in more detail the modeling and analysis underlying the Phase II results presented in SECY-98-154 of June 30, 1998 (Reference 2). In particular, this Accident Evaluation Branch report describes the part of the Phase II analysis performed for the Zion plant. This analysis consisted of DBA dose calculations for the LOCA utilizing the modeling of the Zion FSAR. DBA dose calculations were performed with the HABIT 1.1 code (Reference 3) using both the TID-14844 (Reference 4) and revised source terms.

In Phase I, analyses were performed to calculate DBA doses using both the TID and revised source terms to assess the impact of the revised source term (and newer dose conversion factors) on individual dose. Calculations were performed for a spectrum of design basis accidents including loss of coolant, fuel handling, main steam line break, and rod drop accidents. Analyses in Phase I were performed using the analytical assumptions employed in the staff's confirmatory analyses and documented in the safety evaluation report. Analyses of the main steam line break accident do not specifically involve the revised source term; however, calculations were performed in this case to assess the revised dose acceptance criteria. Also, in the case of the fuel handling accident, the entire TID and revised source terms are not involved but rather the fission product release is limited to gap activity.

Phase II addressed the same types of calculations as Phase I (i.e., DBA dose calculations), but in Phase II the calculations were performed using the analytical models and assumptions employed by the licensees in their analyses described in the FSAR. The intent here was to evaluate the representative impact of the revised source term using industry methods to determine if different impacts would be seen. The staff also included in Phase II equipment qualification dose calculations using both the TID and revised source terms. As noted previously, the staff, as part of implementing the revised source term, will apply revised dose acceptance criteria (TEDE methodology) and a modification to the two hour interval for determining Exclusion Area Boundary doses. Rebaselining in Phases I and II also explored the impact of those revisions.

In Phase III, the staff addressed the impact of updated models in the RADTRAD code for fission product removal mechanisms by comparison with calculations using equivalent SRP models. (Phase I calculations using SER assumptions employed treatments which in some areas predate the SRP methods). All Phase III analyses utilized the revised source term. Phase III analyses also considered the calculation of doses using the MELCOR severe accident

code (References 5 and 6). MELCOR, which is an integrated code containing models for thermal hydraulic and fission product behavior, was used to assess margins in the DBA dose calculation. As part of Phase III, a study was also undertaken (Reference 7) to examine the long term revolatilization of iodine from the containment sump. As noted, the revised source term prescribes a relatively modest amount of iodine in vapor form. A condition which, in theory, could challenge the validity of this assumption is the long term revolatilization of iodine from water pools which are or have become acidic following an accident. Analyses were performed then to determine the extent of revolatilization of iodine, using the TRENDS code, a containment water chemistry code. These analyses predict both the transient pH of the sump/suppression pool and the amount of iodine revolatilization.

In Phase IV, a study was conducted to assess potential plant changes that may be feasible with the use of the revised source term. Some specific plant modifications have been proposed by pilot plants in conjunction with a generic industry proposal described in EPRI Technical Report, TR-105909, "Generic Framework for Application of Revised Source Term to Operating Plants," November 1995 (Reference 8). In addition to the specific plant modifications described in pilot plant submittals, the staff also evaluated other generic candidates such as containment leak rates. Finally, modification of plant systems, while acceptable from a design basis regulatory standpoint, may have severe accident risk impacts. Therefore, as part of Phase IV, we included the results of a study (Reference 9) to evaluate severe accident risk impacts of potential plant changes which may arise as a result of implementing the revised source term.

As indicated above, this report describes the modeling and analysis underlying the Zion plant analysis for Phase II of the rebaselining study. Results of the remaining parts of Phase II and the other phases described above are reported separately. Phase I work is documented in Reference 5. Phase II work not documented in this report is documented in Reference 5. The Phase III work is documented in References 5, 6, 7, and 10. The Phase IV work is documented in References 5 and 9.

DBA LOCA Dose Calculations Using FSAR Modeling

This Accident Evaluation Branch report describes the part of the Phase II analysis performed for the Zion plant. This analysis consisted of DBA dose calculations for the LOCA utilizing the modeling of the Zion FSAR. DBA dose calculations were performed with the HABIT 1.1 code using both the TID and revised source terms. In addition, the sensitivity of the doses to dose conversion factors was examined.

The following sections describe the input parameters and modeling used in the Phase II Zion calculations. In all of the calculations, the scenario was modeled by two leak paths to the environment: (1) a leak from the containment building atmosphere and (2) a leak of containment sump water through the ECCS.

Containment Leakage Model

The nodalization for the leak from the containment building atmosphere is shown in Figure 1. Model details are shown in the following tables. The input files, "TID/ICRP02/CONT/LOCA-T5A.INP" (TID-14844) and "1465/FGR/CONT/LOCA-T5A.INP" (NUREG-1465), are given in Appendix A.

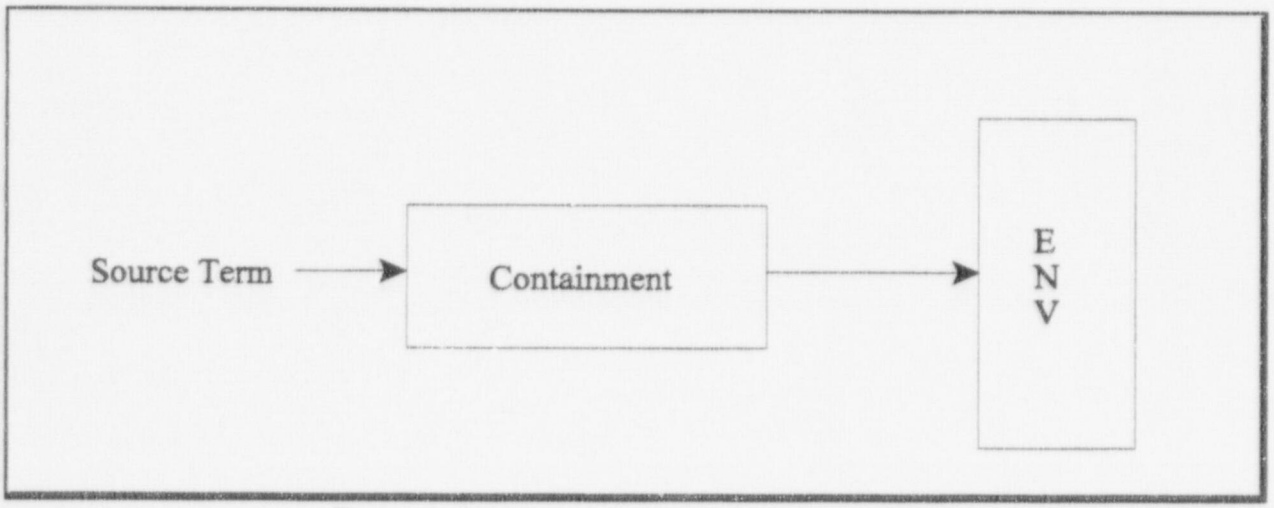

Figure 1: Zion Containment Leakage Nodalization

Containment Leakage Model Parameters		
Parameter	Value	
Plant Power	3391 MWt	
Release Fractions and Timing	As specified in each separate calculation	
Release Location	Directly to Containment Atmosphere	
Containment Volume	2.715×10^6 ft^3	
Containment Leak Rate	0-24 hours	0.1 %/day
	24-720 hours	0.045 %/day
Containment Spray Removal Rate Constant for Particulates	TID: 54 hr^{-1} for 5.12 min (DF=100), 0 thereafter 1465: 54 hr^{-1} for duration of accident	
Containment Spray Removal Rate Constant for Elemental Iodine	TID: 54 hr^{-1} for 5.12 min (DF=100), 0 thereafter 1465: 54 hr^{-1} for duration of accident	
Containment Spray Removal Rate Constant for Organic Iodine	0.0	
Sprays Initiation Time	Start of Accident	
Chemical Form of Iodine	As specified in each separate calculation	

Meteorology Data	
Exclusion Area Boundary*	
Time (hr)	X/Q (s/m^3)
0-2	9.2×10^{-4}
2-12	4.6×10^{-4}
12-96	7.8×10^{-5}
96-720	1.9×10^{-5}
Low Population Zone Distance	
Time (hr)	X/Q (s/m^3)
0-2	2.7×10^{-4}
2-12	1.4×10^{-4}
12-96	1.9×10^{-5}
96-720	4.2×10^{-6}

*HABIT 1.1 automatically uses only the 0-2 hr X/Q to determine the worst 2 hours dose.

Breathing Rate	
Exclusion Area Boundary	
Time (hr)	Breathing Rate (m^3/s)
0-720	$3.47x10^{-4}$
Low Population Zone Distance	
Time (hr)	Breathing Rate (m^3/s)
0-8	$3.47x10^{-4}$
8-24	$2.21x10^{-4}$
24-720	$2.32x10^{-4}$

ECCS Leakage Model

The nodalization for the leak of containment sump water through the ECCS is shown in Figure 2. Model details are shown in the following table, with the exception of the meteorology data and breathing rates which are the same as for the containment leakage model. The input files, "TID/ICRP02/ECCS/LOCA-T5A.INP" (TID-14844) and "1465/FGR/ECCS/LOCA-T5A.INP" (NUREG-1465), are given in Appendix A.

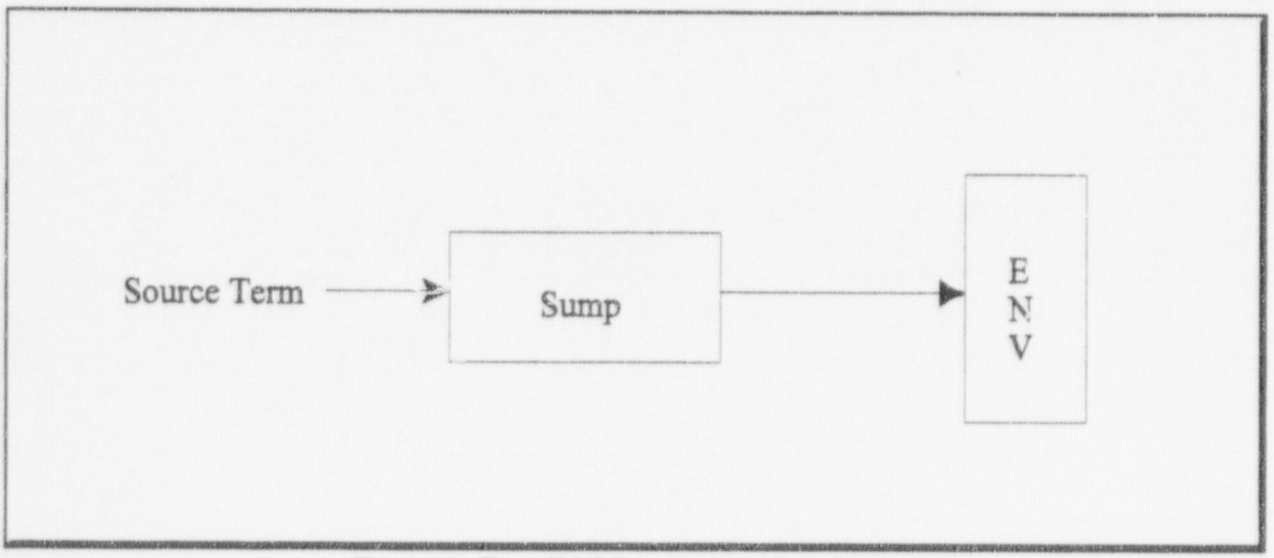

Figure 2: Zion ECCS Leakage Nodalization

ECCS Leakage model		
Plant Power	3391 MWt	
Release Fractions and Timing	As specified in each separate calculation	
Sump Water Volume	4.59×10^{4} ft^3	
Leak Rate to Environment	0-1 hours	8.122×10^{-4} cfm
	1-720 hours	0 cfm
Iodine release	10% of the iodine in the leaked ECCS water becomes airborne.	
Filter Efficiency for ECCS leakage	90% for all forms of iodine	
Mixing and Hold-up for ECCS leakage	Not modeled	

Results

In Phase II, offsite dose calculations were performed using both the TID and revised source terms to evaluate the impact of using the revised source term on individual dose. In this phase, FSAR modeling was used. This phase consisted of two steps. The first step was to repeat the offsite dose calculation in the FSAR using the TID source term. This provided assurance that the HABIT input files had been set up correctly. The second step was to perform the offsite dose calculation using the input files from the first step, but this time substituting the revised source term for the TID source term in the input files. The TID and revised source terms used in the containment leakage dose calculations are given in Tables 1 and 2. For the ECCS leakage dose calculations, only the iodine releases from the two source terms were used because other elements will either not dissolve in or revolatilize from sump water.

Group	Release at Time of Accident Initiation (core fraction)	Chemical Form		
		Elemental	Organic	Particulate
Noble gases	1	1	0	0
Iodine	.25	.9	.1	0

Table 1: TID-14844 source term for containment leakage dose calculation.

Group	Release Rates (core fractions per hour)		Chemical Form		
	gap release (from 0 to .5 hours)	in-vessel release (from .5 to 1.8 hours)	Elemental	Organic	Particulate
Noble gases	.1	.731	1	0	0
Iodine	.1	.269	.0485	.0015	.95
Alkali Metals	.1	.192	0	0	1
Tellurium Group	0	.0385	0	0	1
Barium,Strontium	0	.0154	0	0	1
Noble Metals	0	.00192	0	0	1
Cerium Group	0	.000385	0	0	1
Lanthanides	0	.000154	0	0	1

Table 2: NUREG-1465 source term for containment leakage dose calculation.

Because the original Zion FSAR model used ICRP Publication 2 (Reference 11) dose conversion factors and the revised source term will be used together with the updated dose conversion factors in Federal Guidance Reports 11 and 12 (FGR 11 & 12, References 12 and 13), an additional calculation was performed with the TID source term using updated dose conversion factors. (The two dose conversion factor files are given in Appendix A.) This allowed separation of the effects of changing the source term and changing the dose conversion factors. Therefore, a total of three cases were run; TID source term with ICRP 2 dose conversion factors, TID source term with FGR 11 & 12 dose conversion factors, and NUREG-1465 source term with FGR 11 & 12 dose conversion factors. Tables 3, 4, and 5 give the results for these three cases. Also, Table 6 compares the overall results from these three cases. In instances where the worst two hours Exclusion Area Boundary dose differs from the first two hours dose, the worst two hours dose is followed by the start time of the worst two hours. Also, the dose results differ from those reported in Reference 2 because the three cases were recently rerun and could not be duplicated exactly; however, the differences are not large enough to impact the analysis and conclusions.

	Exclusion Area Boundary Dose (rem)			Low Population Zone Distance Dose (rem)		
	Thyroid	Whole Body	TEDE	Thyroid	Whole Body	TEDE
Containment Leakage	176	6.22	NA	184	3.31	NA
ECCS Leakage	0.39	0.0012	NA	0.12	0.00035	NA
Total	176	6.22	NA	184	3.31	NA

Table 3: Results for TID source term with ICRP 2 dose conversion factors.

	Exclusion Area Boundary Dose (rem)			Low Population Zone Distance Dose (rem)		
	Thyroid	Whole Body	TEDE	Thyroid	Whole Body	TEDE
Containment Leakage	93.8	2.75	NA	105	1.51	NA
ECCS Leakage	0.22	0.00091	NA	0.066	0.00027	NA
Total	94.0	2.75	NA	105	1.51	NA

Table 4: Results for TID source term with FGR 11 & 12 dose conversion factors.

	Exclusion Area Boundary Dose (rem)			Low Population Zone Distance Dose (rem)		
	Thyroid	Whole Body	TEDE	Thyroid	Whole Body	TEDE
Containment Leakage	14.2	0.96 1.63(1.3h)	1.55 1.98 (.9h)	5.55	0.88	1.09
ECCS Leakage	0.032	0.00012	0.0011	0.0093	0.000034	0.00033
Total	14.2	0.96 1.63(1.3h)	1.55 1.98 (.9h)	5.56	0.88	1.09

Table 5: Results for NUREG-1465 source term with FGR 11 & 12 dose conversion factors.

Source Term/ Dose Conversion Factors	Exclusion Area Boundary Dose (rem)			Low Population Zone Distance Dose (rem)		
	Thyroid	Whole Body	TEDE	Thyroid	Whole Body	TEDE
TID-14844/ ICRP 2	176	6.22	NA	184	3.31	NA
TID-14844/ FGR 11 & 12	94.0	2.75	NA	105	1.51	NA
NUREG-1465/ FGR 11 & 12	14.2	0.96 1.63(1.3h)	1.55 1.98 (.9h)	5.56	0.88	1.09

Table 6: Summary table of results for Zion Phase II offsite dose calculations.

Smaller thyroid doses are calculated with the NUREG-1465 source term, as shown in Table 6, for two reasons. First, NUREG-1465 has almost no organic iodine compared with what was assumed in the FSAR (.15% versus 10%). Second, the particulate releases to the containment were assumed to be washed out by sprays at a high removal rate. Because of the high spray removal rate used by Zion, the TEDE dose is mostly a noble gas dose.

REFERENCES

1. L. Soffer et al., "Accident Source Terms for Light-Water Nuclear Power Plants," NUREG-1465, February 1995

2. SECY-98-154, "Results of the Revised (NUREG-1465) Source Term Rebaselining for Operating Reactors," June 30, 1998

3. J.V. Ramsdell and S.A. Stage, "Computer Codes for Evaluation of Control Room Habitability (HABIT V1.1)," NUREG/CR-6210, Supp. 1, PNL-10496, Pacific Northwest Laboratory, October 1998

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5. M.M. Pilch et al., "Evaluation of Radiological Consequences of Design Basis Accidents at Operating Reactors Using the Revised Source Term," Letter Report, Sandia National Laboratories, September 1998

6. J.J. Carbajo, "MELCOR DBA LOCA Calculations," Letter Report, Oak Ridge National Laboratory, ORNL/NRC/LTR-97/21, January 1999

7. C.F Weber and E.C. Beahm, "Iodine Revolatilization in a Grand Gulf LOCA," ORNL/M-6544, January 1999

8. EPRI Technical Report, TR-105909, "Generic Framework for Application of Revised Source Term to Operating Plants," November 1995

9. H.P. Nourbakhsh et al., "Risk Importance of Containment and Related ESF System Performance Requirements," NUREG/CR-6418, BNL-NUREG-52489, Brookhaven National Laboratory, November 1998

10. C.G. Gingrich and J.H. Schaperow, "Detailed Modeling and Analysis of of Phase III of the Revised (NUREG-1465) Source Term Rebaselining for Operating Reactors," AEB-98-01 September 1998

11. International Committee on Radiological Protection (ICRP) Publication 2, Report of Committee II, "Permissible Dose for Internal Radiation," 1959

12. Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," EPA 520/1-88-020, Environmental Protection Agency, Washington, DC, 1988

13. Federal Guidance Report No. 12, "External Exposure to Radionuclides in Air, Water and Soil," EPA 420-r-93-081, Environmental Protection Agency, Washington, DC, 1993

APPENDIX A: HABIT 1.1 Input Files

TID/ICRP02/CONT/LOCA-T5A.INP:

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         0,          0            !Plate out factors
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        .9,         .1,          0              !Isotopic form, Group  2
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1465/FGR/CONT/LOCA-T5A.INP

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          9             !Number of time steps
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'RELEASE FRACTION', 6, 0, 0, 0, 1, 0.0000E+00
'RELEASE FRACTION', 7, 0, 0, 0, 1, 0.0000E+00
'RELEASE FRACTION', 8, 0, 0, 0, 1, 0.0000E+00
'TRANSFER PERCENT', 0, 0, 0, 1, 2, 0.1000E+00 , -.9990E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2700E-03 , -.9990E+03
'BREATH RATE      ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.2000E+01 , 0.8000E+01
'TRANSFER PERCENT', 0, 0, 0, 1, 2, 0.1000E+00 , -.9990E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1400E-03 , -.9990E+03
'BREATH RATE      ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.8000E+01 , 0.1200E+02
'TRANSFER PERCENT', 0, 0, 0, 1, 2, 0.1000E+00 , -.9990E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1400E-03 , -.9990E+03
'BREATH PATE      ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.1200E+02 , 0.2400E+02
'TRANSFER PERCENT', 0, 0, 0, 1, 2, 0.1000E+00 , -.9990E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1900E-04 , -.9990E+03
'BREATH RATE      ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.2400E+02 , 0.9600E+02
'TRANSFER PERCENT', 0, 0, 0, 1, 2, 0.4500E-01 , -.9990E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1900E-04 , -.9990E+03
'BREATH RATE      ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2320E-03 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.9600E+02 , 0.7200E+03
'X/Q              ', 0, 0, 0, 0, 3, -.9990E+03 , 0.4200E-05 , -.9990E+03
'TIME INTERVAL    ', 0, 0, 0, 0, 2, 0.7200E+03 , 0.7200E+03
'END              ', 0, 0, 0, 0, 1, 0.0000E+00
```

TID/ICRP02/ECCS/LOCA-T5A.INP

```
TACT5A release.
HABIT release design specification file 16:49:35 01-07-1999

STARTDATA  Time steps for STAND-ALONE
         1,          1,          1,          1,          1
!Print Flags
         1,          3,          1              !nNodes, nReceptors, nGroups
     'sump'           !Node names
         9            !Number of time steps
      3391,          0             !Plant power, Elapsed time
        .5            !Core release fractions
         0            !Plate out factors
        .1,          0,          0              !Isotopic form, Group  1
     45900           !Node volumes
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.0000E+00 , 0.8533E-01
'INITIAL FRACTION', 1, 0, 0, 0, 1, 0.1000E+01
'INITIAL FRACTION', 2, 0, 0, 0, 1, 0.1000E+01
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.8122E-03 , -.9990E+03
'FILTER EFF      ', 1, 1, 0, 1, 2, 0.9000E+02 , -.9990E+03
'FILTER EFF      ', 1, 2, 0, 1, 2, 0.9000E+02 , -.9990E+03
'FILTER EFF      ', 1, 3, 0, 1, 2, 0.9000E+02 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, 0.9200E-03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, 0.3470E-03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.8533E-01 , 0.1000E+01
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.8122E-03 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, 0.9200E-03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.1000E+01 , 0.2000E+01
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.0000E+00 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, 0.9200E-03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.2000E+01 , 0.8000E+01
'X/Q             ', 0, 0, 0, 0, 3, 0.4600E-03 , 0.1400E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.8000E+01 , 0.1200E+02
'X/Q             ', 0, 0, 0, 0, 3, 0.4600E-03 , 0.1400E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.1200E+02 , 0.2400E+02
'X/Q             ', 0, 0, 0, 0, 3, 0.7800E-04 , 0.1900E-04 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.2400E+02 , 0.9600E+02
'X/Q             ', 0, 0, 0, 0, 3, 0.7800E-04 , 0.1900E-04 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2320E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.9600E+02 , 0.7200E+03
'X/Q             ', 0, 0, 0, 0, 3, 0.1900E-04 , 0.4200E-05 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.7200E+03 , 0.7200E+03
'END             ', 0, 0, 0, 0, 1, 0.0000E+00
```

1465/FGR/ECCS/LOCA-T5A.INP

```
TACT5A release.
HABIT release design specification file 10:42:38 01-10-1999

STARTDATA:  Time steps for STAND-ALONE
         1,          1,          1,          1,          1
!Print Flags
         1,          3,          1                !nNodes, nReceptors, nGroups
     'sump'           !Node names
        10            !Number of time steps
      3391,          0             !Plant power, Elapsed time
     -00.0            !Core release fractions
     -00.0            !Plate out factors
        .1,     -00.0,      -00.0                 !Isotopic form, Group  1
     45900            !Node volumes
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.0000E+00 , 0.5000E+00
'RELEASE FRACTION', 1, 0, 0, 0, 1, 0.1000E+00
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.8122E-03 , -.9990E+03
'FILTER EFF      ', 1, 1, 0, 1, 2, 0.9000E+02 , -.9990E+03
'FILTER EFF      ', 1, 2, 0, 1, 2, 0.0000E+00 , -.9990E+03
'FILTER EFF      ', 1, 3, 0, 1, 2, 0.0000E+00 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, 0.9200E-03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, 0.3470E-03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.5000E+00 , 0.1000E+01
'RELEASE FRACTION', 1, 0, 0, 0, 1, 0.2692E+00
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.8122E-03 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.1000E+01 , 0.1800E+01
'RELEASE FRACTION', 1, 0, 0, 0, 1, 0.2692E+00
'TRANSFER CFM    ', 0, 0, 0, 1, 2, 0.0000E+00 , -.9990E+03
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.1800E+01 , 0.2000E+01
'RELEASE FRACTION', 1, 0, 0, 0, 1, 0.0000E+00
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2700E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.2000E+01 , 0.8000E+01
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1400E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.3470E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.8000E+01 , 0.1200E+02
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1400E-03 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.1200E+02 , 0.2400E+02
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1900E-04 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2210E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.2400E+02 , 0.9600E+02
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.1900E-04 , -.9990E+03
'BREATH RATE     ', 0, 0, 0, 0, 3, -.9990E+03 , 0.2320E-03 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.9600E+02 , 0.7200E+03
'X/Q             ', 0, 0, 0, 0, 3, -.9990E+03 , 0.4200E-05 , -.9990E+03
'TIME INTERVAL   ', 0, 0, 0, 0, 2, 0.7200E+03 , 0.7200E+03
'END             ', 0, 0, 0, 0, 1, 0.0000E+00
```

MLWR_TID.02

FILENAME: MLWR_TID.02

Organs: Whole Body, Skin, Thyroid, Lung, Bone, Liver

Source Term: TID 14844 groups.

The core specific activity (Ci/Mwt) has been traced to NUREG/CR-5106. The origin of the data has not been determined.

Dose Factors: ICRP 02.

Noble gas dose factors for thyroid, lung, bone, and liver are entered as inhalation dose factors. This is consistent with the way they were treated in earlier versions of TACT5, CONHAB, and HABIT. Apparently, the dose factors were divided by values that are of the order of magnitude of breathing rate.

Doses to the skin and organs from submersion only include the contributions from noble gases; contributions to the dose from remaining radionuclides are not considered.

All of the dose factors for many of the radionuclides in this file are zero. This is consistent with the previous files.

History: Created October 23, 1997 at Pacific Northwest National Laboratory. Based on the MLWRICRP.02 file contained in HABIT 1.0.

Notes: The order of the halogens and noble gases has been reversed in this file compared to the order in the original HABIT 1.0 file.

Format: HABIT Version 1.1

STARTDATA:

```
      5       6       3
NobleGasHalogens  Solids SodiumsPlutonms
      2       1       3       3       3
WHOLEBDY     SKIN THYROID    LUNG    BONE   LIVER
      0        0       1       1       1       1
      1        0       0       0       0       0
1.00000 0.00000 0.03000 0.12000 0.12000 0.12000
  ELEM.    ORG.   PART.

NA  22
          4  8.44800e-09  2.38400e-06
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.30000e+04  1.30000e+04  1.30000e+04  1.30000e+04
          0

NA  24
          4  1.27300e-05  1.42900e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.27800e+03  1.27800e+03  1.27800e+03  1.28000e+03
          0

GE  77
          3  1.70300e-05  3.76100e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
          0

SE  79
          3  3.38100e-13  6.92100e-03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.47000e+04  0.00000e+00  3.83000e+02
          0

BR  82
          2  5.45600e-06  6.90500e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
          0
```

```
KR  83M
           1  1.03500e-04  4.15200e+03
 5.02000e-06  1.14800e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  5.20100e-01  0.00000e+00  0.00000e+00
           0

BR  83
           2  8.02100e-05  2.93000e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

BR  84
           2  3.64600e-04  4.33900e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

KR  85M
           1  4.38500e-05  1.29700e+04
 3.72000e-02  1.18900e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.91900e+00  0.00000e+00  0.00000e+00
           1  KR  85       2.11000e-01

KR  85
           1  2.04200e-09  4.10200e+02
 5.25000e-04  6.88100e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.41600e+00  0.00000e+00  0.00000e+00
           0

BR  85
           2  3.85000e-03  4.92300e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

RB  86
           3  4.28900e-07  1.32400e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  1.69000e+04
           0

KR  87
           1  1.51900e-04  2.33500e+04
 1.87000e-01  5.96100e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.53700e+01  0.00000e+00  0.00000e+00
           0

KR  88
           1  6.87500e-05  3.20000e+04
 4.64000e-01  6.62700e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  3.13600e+01  0.00000e+00  0.00000e+00
           1  RB  88       1.00000e+00

RB  88
           3  6.46800e-04  1.20000e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  4.84000e+01
           0

KR  89
           1  3.63000e-03  3.97900e+04
 5.25000e-01  9.22220e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

RB  89
           3  3.62900e-03  1.53800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  3.20000e+01
           1  SR  89       1.00000e+00

SR  89
           3  1.58800e-07  1.55200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.74900e+05  3.80100e+04  0.00000e+00
           0
```

```
RB  90
           3  3.98200e-03  1.33500e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

SR  90
           3  8.02100e-10  7.40100e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.19600e+06  1.24400e+07  0.00000e+00
           1  Y   90       1.00000e+00

Y   90
           3  2.99300e-06  7.88700e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.12000e+04  2.61200e+02  0.00000e+00
           0

SR  91
           3  2.00500e-05  2.11800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.55700e+03  7.74100e+00  0.00000e+00
           2  Y   91M      5.74000e-01  Y   91       4.26000e-01

Y   91M
           3  2.29200e-04  1.23000e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.40200e+02  3.26400e-02  0.00000e+00
           1  Y   91       1.00000e+00

Y   91
           3  1.38300e-07  2.12100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.13000e+05  5.78100e+04  0.00000e+00
           0

SR  92
           3  7.29200e-05  2.50800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  2.06100e+03  8.43100e-01  0.00000e+00
           1  Y   92        1.00000e+00

Y   92
           3  5.34700e-05  2.53500e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.96100e+03  1.29200e+00  0.00000e+00
           0

SR  93
           3  1.44400e-03  3.01700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

Y   93
           3  1.90900e-05  3.16300e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.06200e+03  1.18200e+01  0.00000e+00
           1  ZR  93        1.00000e+00

ZR  93
           3  2.00600e-14  2.45900e-02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.12900e+04  5.22300e+04  2.92000e+03
           0

ZR  95
           3  1.26700e-07  3.85800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.21400e+05  1.33900e+04  4.30000e+03
           0

NB  95
           3  2.29200e-07  3.84200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.31100e+04  1.75800e+03  9.77000e+02
           0
```

```
ZR  97
           3  1.12900e-05  4.19700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.83900e+03  1.21400e+01  2.45000e+00
           2  NB  97M      1.00000e+00  NB  97       5.30000e-02

NB  97M
           3  1.15500e-02  3.98700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           1  NB  97       1.00000e+00

NB  97
           3  1.57300e-04  4.23500e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.99500e+02  2.77700e-02  7.03000e-03
           0

MO  99
           3  2.87400e-06  4.88600e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.14000e+04  0.00000e+00  1.51000e+03
           1  TC  99M      8.86000e-01

TC  99M
           3  3.18300e-05  4.27800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.54600e+01  1.28700e-04  3.64000e-04
           0

TC  99
           3  1.04200e-13  2.53400e-01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.01100e+05  3.13200e+01  4.64000e+01
           0

TC 101
           3  8.25000e-04  5.18800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  4.98500e+01  5.21500e-06  7.52000e-06
           0

RU 103
           3  2.02500e-07  5.38100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.31200e+04  1.90600e+02  0.00000e+00
           0

RU 105
           3  4.22100e-05  4.05100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.37500e+03  9.87700e-02  0.00000e+00
           1  RH 105       1.00000e+00

RU 106
           3  2.19700e-08  2.27000e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.17400e+06  8.64300e+03  0.00000e+00
           1  RH 106       1.00000e+00

RH 106
           3  2.31000e-02  2.27200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

PD 107
           3  3.13900e-15  3.97500e-03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.47200e+03  0.00000e+00  8.27000e+01
           0

RH 109
           3  1.92500e-04  1.22300e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0
```

```
PD 109
           3  1.40700e-05  1.27700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.85200e+03  0.00000e+00  4.63000e-01
           0

AG 111
           3  1.06900e-06  3.15900e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.33300e+04  4.25300e+01  1.78000e+01
           0

IN 115M
           3  4.22000e-05  9.01500e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.11400e+01  0.00000e+00  5.88800e+01  0.00000e+00
           0

SN 123
           3  2.75000e-04  1.83200e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  5.66500e+02  2.87800e+05  3.01500e+04  6.67000e+02
           0

SN 125
           3  8.44300e-07  5.69800e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  2.58800e+01  7.36700e+04  1.16200e+03  3.12000e+01
           1  SB 125       1.00000e+00

SB 125
           3  9.15800e-09  6.10300e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  6.74700e+00  2.17500e+05  6.66500e+03  7.44000e+01
           1  TE 125M      2.31000e-01

TE 125M
           3  1.38300e-07  1.25300e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  1.31300e+02  3.91900e+04  4.26800e+02  1.98000e+02
           0

SB 126
           3  6.41600e-07  9.70700e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  2.74600e+00  9.56900e+04  4.49700e+02  9.13000e+00
           0

SB 127
           3  2.06900e-06  4.52700e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  3.96800e-01  2.04800e+04  3.29900e+01  7.22000e-01
           2  TE 127       8.31000e-01  TE 127M      1.69000e-01

TE 127M
           3  7.63800e-08  6.11400e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  4.11000e+02  1.20000e+05  1.57500e+03  7.21000e+02
           1  TE 127       9.76000e-01

TE 127
           3  2.05600e-05  4.50100e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.32500e-01  8.13700e+02  1.75400e-01  8.03000e-02
           0

I  129
           2  1.29400e-15  0.00000e+00
 3.02000e-03  2.43500e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  5.54200e+06  0.00000e+00  2.47600e+03  2.11000e+03
           0

TE 129M
           3  2.35900e-07  1.66800e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  4.29700e+02  1.44800e+05  1.21900e+03  5.84000e+02
           1 TE 129      6.29000e-01
```

```
TE 129
           3  1.57300e-04  1.11100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  4.87200e-03  2.41800e+02  6.21900e-03  2.99000e-03
           0

I  131
           2  9.96400e-07  2.50800e+04
 8.72000e-02  1.65500e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.48500e+06  0.00000e+00  3.14900e+03  4.47000e+03
           1  XE 131M      1.10000e-02

XE 131M
           1  6.68000e-07  2.59500e+02
 2.92000e-03  3.99500e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.40000e+00  0.00000e+00  0.00000e+00
           0

TE 131
           3  4.62000e-04  2.74100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.17000e-03  1.74000e+02  1.39000e-03  7.44000e-04
           1  I  131       1.00000e+00

TE 131M
           3  6.41600e-06  4.80000e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  6.87900e+00  1.82300e+04  8.74300e+00  5.45000e+00
           2  I  131       7.78000e-01  TE 131       2.22000e-01

I  132
           2  8.26900e-05  3.80600e+04
 5.13700e-01  7.92700e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  5.35300e+04  0.00000e+00  1.44700e+02  4.07000e+02
           0

TE 132
           3  2.50600e-06  4.11500e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  2.36600e+01  3.59800e+04  3.25300e+01  2.69000e+01
           1  I  132       1.00000e+00

I  133
           2  9.21900e-06  5.62200e+04
 1.55100e-01  3.12000e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  3.97000e+05  0.00000e+00  1.07700e+03  1.85000e+03
           2  XE 133       9.71000e-01  XE 131M      2.90000e-02

XE 133M
           1  3.49000e-06  1.38400e+03
 8.00000e-03  5.39100e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.89000e+00  0.00000e+00  0.00000e+00
           1  XE 133       1.00000e+00

XE 133
           1  1.52200e-06  5.62200e+04
 9.33000e-03  5.45400e-02  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.57300e+00  0.00000e+00  0.00000e+00
           0

TE 133M
           3  2.31000e-04  1.78900e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  6.26900e-03  5.50600e+02  7.24400e-03  5.40000e-03
           0

I  134
           2  2.22800e-04  6.57500e+04
 5.32700e-01  8.59300e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  2.53700e+04  0.00000e+00  8.04700e+01  2.16000e+02
           0

TE 134
           3  2.75000e-04  3.99900e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  3.43700e-03  4.37700e+02  3.84300e-03  3.22000e-03
           1  I  134       1.00000e+00
```

```
CS 134
           3  9.55100e-09  1.01900e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.21600e+04  4.66200e+04  1.06000e+05
           0

I  135
           2  2.86400e-05  5.10300e+04
 4.21700e-01  5.80300e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  1.23500e+05  0.00000e+00  3.35400e+02  8.73000e+02
           2  XE 135       8.35000e-01  XE 135M      1.65000e-01

XE 135M
           1  7.40000e-04  1.55700e+04
 9.92000e-02  1.48400e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.23100e+00  0.00000e+00  0.00000e+00
           1  XE 135       1.00000e+00

XE 135
           1  2.09200e-05  5.36300e+04
 5.72000e-02  1.62000e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.06100e+00  0.00000e+00  0.00000e+00
           0

CS 135
           3  7.29300e-15  2.90900e-02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.56600e+03  1.45900e+04  1.29000e+04
           0

I  136
           2  8.34900e-03  0.00000e+00
 6.78600e-01  1.30000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

CS 136
           3  6.16000e-07  1.66700e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  1.50000e+03  4.87900e+03  1.83000e+04
           0

XE 137
           1  2.96100e-03  5.10300e+04
 4.53000e-02  5.67600e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.74800e+01  0.00000e+00  0.00000e+00
           0

CS 137
           3  7.29200e-10  1.90700e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.40000e+03  5.97700e+04  7.76000e+04
           1  BA 137M      1.00000e+00

BA 137M
           3  4.52900e-03  1.81100e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           0

XE 138
           1  6.79600e-04  4.77500e+04
 2.81000e-01  4.24900e-01  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.44500e+01  0.00000e+00  0.00000e+00
           1  CS 138       1.00000e+00

CS 138
           3  3.58700e-04  4.87800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.06600e+00  4.13700e+01  7.76000e+01
           0

CS 139
           3  1.21600e-03  4.47800e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.83700e+00  2.55700e+01  3.63000e+01
           0
```

```
BA 139
          3  1.39300e-04  4.60400e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.69700e+02  1.16700e-01  8.32000e-05
          0

BA 140
          3  6.26600e-07  4.27400e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.58700e+05  4.88400e+03  6.13000e+00
          1  LA 140       1.00000e+00

LA 140
          3  4.77400e-06  4.34200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.70100e+04  4.30100e+01  2.17000e+01
          0

BA 141
          3  6.41600e-04  4.34500e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.41900e+02  1.24700e-02  9.41000e-06
          1  LA 141       1.00000e+00

LA 141
          3  4.93600e-05  4.37100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.34500e+03  5.34200e-01  1.66000e-01
          1  CE 141       1.00000e+00

CE 141
          3  2.50600e-07  4.38700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.51700e+04  2.49400e+03  1.69000e+03
          0

BA 142
          3  1.05000e-03  3.76200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  1.48700e+02  3.29400e-03  3.38000e-06
           1  LA 142       1.00000e+00

LA 142
           3  1.25500e-04  3.88300e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  7.90700e+02  8.53600e-02  3.88000e-02
           0

CE 143
           3  6.03000e-06  3.55200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.97200e+03  2.33400e+01  1.72000e+01
           1  PR 143       1.00000e+00

PR 143
           3  5.85400e-07  3.46700e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  3.50600e+04  1.16800e+03  4.69000e+02
           0

CE 144
           3  2.76600e-08  2.29400e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.71600e+05  4.28600e+05  1.79000e+05
           1  PR 144       9.86000e-01

PR 144
           3  6.67600e-04  2.30200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.27200e+02  3.76300e-03  1.56000e-03
           0

ND 147
           3  7.09800e-07  1.73300e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.75900e+04  6.59200e+02  7.62000e+02
           1  PM 147       1.00000e+00
```

```
PM 147
           3  8.71800e-09  4.88100e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.60200e+04  8.36800e+04  7.87000e+03
           0

ND 149
           3  9.66500e-05  1.12100e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  3.67600e+02  0.00000e+00
           0

PM 149
           3  3.62500e-06  1.12200e+04
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  7.20600e+03  3.43900e+01  4.87000e+00
           0

PM 151
           3  6.87500e-06  6.82800e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  3.93900e+03  8.49600e+00  1.42000e+00
           0

SM 151
           3  2.16800e-10  7.22600e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.45400e+04  8.58900e+04  1.48000e+04
           0

EU 155
           3  1.29200e-08  2.97300e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  9.46300e+04  1.00500e+05  1.43000e+04
           0

EU 156
           3  5.34700e-07  1.57500e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  8.55600e+04  1.92700e+03  1.48000e+03
           0

GD 159
           3  1.06900e-05  3.08300e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  6.47800e+02  0.00000e+00
           0

U  235
           3  3.09600e-17  9.16900e-05
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.89600e+07  1.00100e+07  0.00000e+00
           0

U  237
           3  1.18800e-06  3.45600e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.02000e+04  3.67300e+01  0.00000e+00
           1  NP 237       1.00000e+00

NP 237
           3  1.02700e-14  2.15000e-03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  5.21500e+07  1.69300e+09  1.47000e+08
           0

PU 238
           5  2.43100e-10  2.77500e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.82500e+08  2.73700e+09  3.87000e+08
           0

NP 238
           3  3.81900e-06  7.74100e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.01600e+04  2.96200e+02  8.00000e+00
           1  PU 238       1.00000e+00
```

```
PU 239
           5  9.01200e-13  1.22700e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.71600e+08  3.18800e+09  4.31000e+08
           1  U  235       1.00000e+00

U  239
           3  4.91600e-04  8.92800e+05
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
           1  NP 239       1.00000e+00

NP 239
           3  3.44200e-06  8.29300e+05
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  4.70200e+03  2.86600e+01  2.82000e+00
           1  PU 239       1.00000e+00

PU 240
           5  3.34200e-12  7.23500e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.71600e+08  3.18300e+09  4.30000e+08
           0

PU 241
           5  1.67100e-09  3.77900e+03
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  1.51700e+05  6.40700e+07  3.28000e+06
           1  AM 241       1.00000e+00

AM 241
           3  4.80300e-11  1.57100e+01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.06200e+07  1.01300e+09  3.59000e+08
           1  NP 237       1.00000e+00

PU 242
           5  5.81200e-14  2.11000e-02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
```

```
 0.00000e+00  0.00000e+00  0.00000e+00  1.65100e+08  2.95400e+09  4.15000e+08
           0

CM 242
           3  4.93600e-08  9.01800e+02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  3.92300e+07  1.48300e+07  1.51000e+07
           1  PU 238       1.00000e+00

AM 242M
           3  1.43200e-10  1.45700e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  2.44300e+07  1.01900e+09  3.46000e+08
           0

CM 243
           3  6.85500e-10  3.52800e-01
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.31200e+07  7.85600e+08  2.97000e+08
           1  PU 239       1.00000e+00

AM 243
           3  2.76600e-12  5.30600e-02
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  5.74700e+07  1.01300e+09  3.47000e+08
           1  NP 239       1.00000e+00

CM 244
           3  1.24800e-09  1.49700e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  6.06200e+07  5.90400e+08  2.54000e+08
           1  PU 240       1.00000e+00

AM 244
           3  4.43100e-04  3.18600e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
 0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  2.98500e+03  0.00000e+00
           1  CM 244       1.00000e+00
```

MLWR_RB.32P

```
FILENAME:      MLWR_RB.32

Organs:        TEDE, Deep Dose, CEDE, Skin, Thyroid,
               Lung, R Marrow, Bone Sfc, Gonad, Breast

Source Term:   NUREG-1465 groups.

Dose Factors:  FGR 11 and FGR 12.

History:       Created May 27, 1997 at Pacific Northwest National Laboratory
               from MLWR1465.fgr.

Note:          Dose factors follow FGR 11 & 12 format, e.g. division between
               external and internal pathways.... Clearance class for
               Inhalation dose factors selected by isotope for clearance class
               giving highest dose factor.

               Decay constants are from FGR 12 Appendix A except for
               radionuclides not listed in the appendix (e.g., Kr-89).  Decay
               constants for those radionuclides are from NUREG/CR-5106 (TACT5).

               Core specific activity (Ci/Mw) is for a 3412 Mw PWR from
               NUREG/CR-4467.

Format:        HABIT Version 1.1

STARTDATA:
       9       10        3
NobleGasHalogens Alk_Met TellursBar-Stro Nob_Met Lanthan  Cerium   Other
       2        1        3         3         3        3        3        3
    TEDEDEEPDOSE COMMEDE     SKIN THYROID    LUNGR MARROWBONESURF   GONAD  BREAST
       2        0        1        0        1        1        1        1        1
       1        1        0        0        0        0        0        0        0
 1.00000  1.00000  1.00000  0.00000  0.03000  0.12000  0.12000  0.03000  0.25000  0.15000
   ELEM.     ORG.    PART.

 CO  58
```

```
           6  1.13310e-07  2.70100e+02
  1.76120e-01  1.76120e-01  0.00000e+00  2.06460e-01  1.76490e-01  1.71680e-01  1.67610e-01  2.74170e-01
1.72420e-01  1.96100e-01
  1.08780e+04  0.00000e+00  1.08780e+04  0.00000e+00  3.22640e+03  5.92000e+04  3.41510e+03  2.56410e+03
2.28290e+03  3.46690e+03
           0

 CO  60
           6  4.16990e-09  1.98000e+02
  4.66200e-01  4.66200e-01  0.00000e+00  5.36500e-01  4.69900e-01  4.58800e-01  4.55100e-01  6.58600e-01
4.55100e-01  5.14300e-01
  2.18670e+05  0.00000e+00  2.18670e+05  0.00000e+00  5.99400e+04  1.27650e+06  6.36400e+04  4.99500e+04
1.76120e+04  6.80800e+04
           0

 KR  85M
           1  4.29780e-05  9.18900e+03
  2.76760e-02  2.76760e-02  0.00000e+00  8.28800e-02  2.71210e-02  2.60480e-02  2.37910e-02  6.95600e-02
2.70470e-02  3.11170e-02
  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
           1  KR  85       2.11000e-01

 KR  85
           1  2.05030e-09  1.94900e+02
  4.40300e-04  4.40300e-04  0.00000e+00  4.88400e-02  4.36600e-04  4.21800e-04  4.03300e-04  8.14000e-04
4.32900e-04  4.95800e-04
  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e-00  0.00000e+00  0.00000e+00  0.00000e-00
0.00000e+00  0.00000e+00
           0

 KR  87
           1  1.51410e-04  1.67100e+04
  1.52440e-01  1.52440e-01  0.00000e+00  5.06900e-01  1.52810e-01  1.49480e-01  1.48000e-01  2.22740e-01
1.48000e-01  1.66500e-01
  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
           0  RB  87       1.00000e+00
```

```
 KR  88
             1  6.77960e-05  2.25000e+04
  3.77400e-01  3.77400e-01  0.00000e+00  4.99500e-01  3.81100e-01  3.73700e-01  3.70000e-01  5.14300e-01
3.66300e-01  4.10700e-01
  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
             0  RB  88       1.00000e+00

 RB  86
             3  4.29930e-07  1.41000e+01
  1.77970e-02  1.77970e-02  0.00000e+00  1.79450e-01  1.79080e-02  1.74270e-02  1.71680e-02  2.60850e-02
1.74270e-02  1.97580e-02
  6.62300e+03  0.00000e+00  6.62300e+03  0.00000e+00  4.92100e+03  1.22100e+04  8.58400e+03  1.57990e+04
4.95800e+03  4.92100e+03
             0

 SR  89
             5  1.58860e-07  2.80400e+04
  2.86010e-04  2.86010e-04  0.00000e+00  1.36530e-01  2.81200e-04  2.61960e-04  2.36430e-04  7.17800e-04
2.86010e-04  3.35960e-04
  4.14400e+04  0.00000e+00  4.14400e+04  0.00000e+00  2.94520e+01  3.08950e+05  3.95900e+02  5.88300e+02
2.94150e+01  2.94520e+01
             0

 SR  90
             5  7.54790e-10  1.51300e+03
  2.78610e-05  2.78610e-05  0.00000e+00  3.40400e-02  2.71210e-05  2.38280e-05  2.01280e-05  8.43600e-05
2.87860e-05  3.51130e-05
  1.29870e+06  0.00000e+00  1.29870e+06  0.00000e+00  9.95300e+02  1.05820e+07  1.21360e+05  2.62330e+05
9.95300e+02  9.95300e+02
             1  Y   90       1.00000e+00

 SR  91
             5  2.02670e-05  3.62800e+04
  1.27650e-01  1.27650e-01  0.00000e+00  3.01180e-01  1.28390e-01  1.24690e-01  1.22470e-01  1.92400e-01
1.25060e-01  1.41710e-01
  1.66130e+03  0.00000e+00  1.66130e+03  0.00000e+00  3.56680e+01  7.88100e+03  8.25100e+01  4.69900e+01
2.09050e+02  6.43800e+01
             1  Y   91       4.22000e-01  Y   91M      5.78000e-01
```

```
 SR  92
            5  7.10480e-05  3.778 e+04
  2.51230e-01  2.51230e-01  0.00000e+00  3.16720e-01  2.52340e-01  2.46790e-01  2.44940e-01  3.51130e-01
2.44570e-01  2.76760e-01
  8.06600e+02  0.00000e+00  8.06600e+02  0.00000e+00  1.45040e+01  3.88500e+03  2.58260e+01  1.61320e+01
3.77400e+01  2.40130e+01
            1  Y   92       1.00000e+00

 Y   90
            7  3.00850e-06  1.62400e+03
  7.03000e-04  7.03000e-04  0.00000e+00  2.30880e-01  6.91900e-04  6.54900e-04  5.99400e-04  1.64280e-03
6.99300e-04  8.14000e-04
  8.43600e+03  0.00000e+00  8.43600e+03  0.00000e+00  1.91290e+00  3.44470e+04  5.62400e+01  5.58700e+01
1.91290e+00  1.91290e+00
            0

 Y   91
            7  1.37110e-07  3.42200e+04
  9.62000e-04  9.62000e-04  0.00000e+00  1.42450e-01  9.62000e-04  9.25000e-04  8.91700e-04  1.68720e-03
9.47200e-04  1.08410e-03
  4.88400e+04  0.00000e+00  4.88400e+04  0.00000e+00  3.14500e+01  3.65190e+05  1.18030e+03  1.17660e+03
3.03400e+01  3.30040e+01
            0

 Y   92
            7  5.43900e-05  3.79400e+04
  4.81000e-02  4.81000e-02  0.00000e+00  4.21800e-01  4.81000e-02  4.69900e-02  4.62500e-02  7.21500e-02
4.69900e-02  5.32800e-02
  7.80700e+02  0.00000e+00  7.80700e+02  0.00000e+00  3.88500e+00  4.58800e+03  7.65900e+00  5.58700e+00
9.65700e+00  5.55000e+00
            0

 Y   93
            7  1.90630e-05  4.30900e+04
  1.77600e-02  1.77600e-02  0.00000e+00  3.14500e-01  1.77230e-02  1.73160e-02  1.69460e-02  2.80460e-02
1.72790e-02  1.96100e-02
  2.15340e+03  0.00000e+00  2.15340e+03  0.00000e+00  3.42620e+00  9.32400e+03  1.49480e+01  1.16180e+01
1.96470e+01  5.43800e+00
            0  ZR  93       1.00000e+00
```

```
 ZR  95
           7  1.25390e-07  4.35700e+04
  1.33200e-01  1.33200e-01  0.00000e+00  1.66500e-01  1.33570e-01  1.29870e-01  1.26910e-01  2.07940e-01
1.30610e-01  1.48370e-01
  2.36430e+04  0.00000e+00  2.36430e+04  0.00000e+00  5.32800e+03  8.02900e+03  4.81000e+04  3.81100e+05
6.95600e+03  7.06700e+03
           1  NB  95       9.93000e-01  NB  95M      7.00000e-03

 ZR  97
           7  1.13930e-05  4.57800e+04
  3.33740e-02  3.33740e-02  0.00000e+00  2.05350e-01  3.34110e-02  3.25970e-02  3.19680e-02  5.10600e-02
3.25600e-02  3.69630e-02
  4.32900e+03  0.00000e+00  4.32900e+03  0.00000e+00  8.54700e+01  1.51700e+04  2.35690e+02  1.29500e+02
6.80800e+02  1.73900e+02
           0  NB  97M      9.47000e-01  NB  97       5.30000e-02

 NB  95
           7  2.28240e-07  4.11100e+04
  1.38380e-01  1.38380e-01  0.00000e+00  1.59100e-01  1.38750e-01  1.35050e-01  1.31720e-01  2.14230e-01
1.35420e-01  1.53920e-01
  5.80900e+03  0.00000e+00  5.80900e+03  0.00000e+00  1.32460e+03  3.07840e+04  1.63540e+03  1.89814e+03
1.59840e+03  1.50590e+03
           0

 MO  99
           6  2.91730e-06  4.84800e+04
  2.69360e-02  2.69360e-02  0.00000e+00  1.16180e-01  2.68990e-02  2.61220e-02  2.52340e-02  4.58800e-02
2.63810e-02  3.00810e-02
  3.95900e+03  0.00000e+00  3.95900e+03  0.00000e+00  5.62400e+01  1.58730e+04  1.93880e+02  1.52810e+02
3.51870e+02  1.01750e+02
           1  TC  99M      8.76000e-01  TC  99       1.24000e-01

 TC  99M
           6  3.19840e-05  4.12800e+04
  2.17930e-02  2.17930e-02  0.00000e+00  2.64180e-02  2.12750e-02  2.03130e-02  1.81670e-02  6.03100e-02
2.12750e-02  2.46050e-02
  3.25600e+01  0.00000e+00  3.25600e+01  0.00000e+00  1.85370e+02  8.43600e+01  1.24320e+01  9.69400e+00
1.02490e+01  7.95500e+00
           0  TC  99       1.00000e+00
```

```
 RU 103
           6  2.04240e-07  3.65200e+04
  8.32500e-02  8.32500e-02  0.00000e+00  1.02490e-01  8.28800e-02  8.06600e-02  7.77000e-02  1.43930e-01
8.10300e-02  9.28700e-02
  8.95400e+03  0.00000e+00  8.95400e+03  0.00000e+00  9.50900e+02  5.77200e+04  1.18030e+03  8.76900e+02
1.13590e+03  1.15070e+03
           0  RH 103M      9.97000E-01

 RU 105
           6  4.33650e-05  2.40800e+04
  1.40970e-01  1.40970e-01  0.00000e+00  2.49010e-01  1.40600e-01  1.36900e-01  1.32830e-01  2.32360e-01
1.37640e-01  1.56880e-01
  4.55100e+02  0.00000e+00  4.55100e+02  0.00000e+00  1.53550e+01  2.12010e+03  2.84900e+01  1.70940e+01
5.88300e+01  2.44570e+01
           1  RH 105       1.00000e+00

 RU 106
           6  2.17890e-08  8.47600e+03
  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
  4.77300e+05  0.00000e+00  4.77300e+05  0.00000e+00  6.36400e+03  3.84800e+06  6.51200e+03  5.95700e+03
4.81000e+03  6.58600e+03
           0  RH 106       1.00000e+00

 RH 105
           6  5.44520e-06  1.63200e+04
  1.37640e-02  1.37640e-02  0.00000e+00  3.95900e-02  1.36160e-02  1.32090e-02  1.25060e-02  2.78610e-02
1.34680e-02  1.53920e-02
  9.54600e+02  0.00000e+00  9.54600e+02  0.00000e+00  1.06560e+01  3.54460e+03  2.87490e+01  1.65020e+01
7.80700e+01  2.07570e+01
           0

 SB 127
           4  2.08380e-06  2.26500e+03
  1.23210e-01  1.23210e-01  0.00000e+00  2.06460e-01  1.23210e-01  1.19880e-01  1.16180e-01  2.04240e-01
1.20620e-01  1.37640e-01
  6.03100e+03  0.00000e+00  6.03100e+03  0.00000e+00  2.27550e+02  2.56780e+04  5.95700e+02  4.95800e+02
9.32400e+02  3.37440e+02
           2  TE 127       8.24000e-01  TE 127M      1.76000e-01
```

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 SB 129
             4  4.45700e-05  7.92100e+03
  2.64180e-01  2.64180e-01  0.00000e+00  3.88500e-01  2.64920e-01  2.58260e-01  2.53820e-01  3.95900e-01
2.57890e-01  2.92670e-01
  6.43800e+02  0.00000e+00  6.43800e+02  0.00000e+00  3.59640e+01  3.32260e+03  6.29000e+01  5.40200e+01
7.95500e+01  4.73600e+01
             2  TE 129       7.75000e-01  TE 129M      2.25000e-01

 TE 127M
             4  7.36010e-08  2.88300e+02
  5.43900e-04  5.43900e-04  0.00000e+00  3.14130e-03  5.55000e-04  2.81940e-04  2.37910e-04  1.45780e-03
7.03000e-04  9.95300e-04
  2.14970e+04  0.00000e+00  2.14970e+04  0.00000e+00  3.57420e+02  1.23580e+05  1.98320e+04  7.54800e+04
4.07000e+02  4.07000e+02
             1  TE 127       9.76000e-01

 TE 127
             4  2.05930e-05  2.18600e+03
  8.95400e-04  8.95400e-04  0.00000e+00  4.21800e-02  8.88000e-04  8.58400e-04  8.17700e-04  1.72050e-03
8.76900e-04  1.01010e-03
  3.18200e+02  0.00000e+00  3.18200e+02  0.00000e+00  6.80800e+00  1.57990e+03  1.51330e+01  1.51330e+01
7.47400e+00  6.95600e+00
             0

 TE 129M
             4  2.38770e-07  1.96400e+03
  5.73500e-03  5.73500e-03  0.00000e+00  5.51300e-02  5.77200e-03  5.40200e-03  5.25400e-03  9.62000e-03
5.77200e-03  6.69700e-03
  2.39390e+04  0.00000e+00  2.39390e+04  0.00000e+00  5.77200e+02  1.49110e+05  1.14700e+04  2.60850e+04
6.58600e+02  6.25300e+02
             1  TE 129       6.50000e-01  I  129       3.50000e-01

 TE 129
             4  1.65980e-04  7.47000e+03
  1.01750e-02  1.01750e-02  0.00000e+00  1.32090e-01  1.01380e-02  9.76800e-03  9.39800e-03  1.80560e-02
1.00270e-02  1.15440e-02
  8.95400e+01  0.00000e+00  8.95400e+01  0.00000e+00  6.03100e+00  4.92100e+02  7.28900e+00  7.51100e+00
6.47500e+00  6.21600e+00
             0  I  129       1.00000e+00
```

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 TE 131M
           4  6.41800e-06  3.75500e+03
  2.59370e-01  2.59370e-01  0.00000e+00  3.27450e-01  2.59740e-01  2.52710e-01  2.47160e-01  4.03300e-01
2.53450e-01  2.87860e-01
  6.40100e+03  0.00000e+00  6.40100e+03  0.00000e+00  1.33570e+05  8.25100e+03  5.21700e+02  8.39900e+02
8.65800e+02  3.42250e+02
           1  I  131       7.78000e-01  TE 131       2.22000e-01

 TE 132
           4  2.46220e-06  3.71500e+04
  3.81100e-02  3.81100e-02  0.00000e+00  5.14300e-02  3.77400e-02  3.57050e-02  3.31150e-02  8.95400e-02
3.77400e-02  4.36600e-02
  9.43500e+03  0.00000e+00  9.43500e+03  0.00000e+00  2.32360e+05  6.17900e+03  1.57990e+03  2.63440e+03
1.53550e+03  1.34310e+03
           1  I  132       1.00000e+00

 I  131
           2  9.97830e-07  2.55900e+04
  6.73400e-02  6.73400e-02  0.00000e+00  1.10260e-01  6.69700e-02  6.51200e-02  6.21600e-02  1.27650e-01
6.58600e-02  7.54800e-02
  3.28930e+04  0.00000e+00  3.28930e+04  0.00000e+00  1.08040e+06  2.43090e+03  2.31620e+02  2.12010e+02
9.36100e+01  2.91560e+02
           0  XE 131M      1.11000e-02

 I  132
           2  8.37130e-05  3.77000e+04
  4.14400e-01  4.14400e-01  0.00000e+00  5.84600e-01  4.14400e-01  4.03300e-01  3.95900e-01  6.40100e-01
4.03300e-01  4.58800e-01
  3.81100e+02  0.00000e+00  3.81100e+02  0.00000e+00  6.43800e+03  1.00270e+03  5.18000e+01  4.53800e+01
3.68150e+01  5.21700e+01
           0

 I  133
           2  9.25680e-06  5.38600e+04
  1.08780e-01  1.08780e-01  0.00000e+00  2.15710e-01  1.08410e-01  1.05820e-01  1.02490e-01  1.80190e-01
1.06190e-01  1.21360e-01
  5.84600e+03  0.00000e+00  5.84600e+03  0.00000e+00  1.79820e+05  3.03400e+03  1.00640e+02  9.32400e+01
7.21500e+01  1.08780e+02
           1  XE 133       9.71000e-01  XE 133M      2.90000e-02
```

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 I  134
              2  2.19630e-04  5.90900e+04
   4.81000e-01  4.81000e-01  0.00000e+00  6.91900e-01  4.81000e-01  4.69900e-01  4.62500E-01  7.25200e-01
4.69900e-01  5.32800e-01
   1.31350e+02  0.00000e+00  1.31350e+02  0.00000e+00  1.06560e+03  5.29100e+02  2.24960e+01  1.96470e+01
1.57250e+01  2.28290e+01
              0

 I  135
              2  2.91290e-05  5.08500e+04
   2.95260e-01  2.95260e-01  0.00000e+00  4.10700e-01  2.96370e-01  2.90080e-01  2.87120e-01  4.18100e-01
2.87490e-01  3.25230e-01
   1.22840e+03  0.00000e+00  1.22840e+03  0.00000e+00  3.13020e+04  1.63170e+03  8.28800e+01  7.43700e+01
6.29000e+01  8.65800e+01
              1  XE 135       8.46000e-01  XE 135M      1.54000e-01

 XE 133
              1  1.52960e-06  5.39400e+04
   5.77200e-03  5.77200e-03  0.00000e+00  1.83890e-02  5.58700e-03  4.88400e-03  3.95900e-03  1.89810e-02
5.95700e-03  7.25200e-03
   0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
              0

 XE 135
              1  2.11820e-05  1.10900e+04
   4.40300e-02  4.40300e-02  0.00000e+00  1.15440e-01  4.36600e-02  4.18100e-02  3.95900e-02  9.50900e-02
4.32900e-02  4.92100e-02
   0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00  0.00000e+00
0.00000e+00  0.00000e+00
              0  CS 135       1.00000e+00

 CS 134
              3  1.06590e-08  3.69900e+03
   2.80090e-01  2.80090e-01  0.00000e+00  3.49650e-01  2.80090e-01  2.72690e-01  2.66030e-01  4.44000e-01
2.73800e-01  3.11910e-01
   4.62500e+04  0.00000e+00  4.62500e+04  0.00000e+00  4.10700e+04  4.36600e+04  4.36600e+04  4.07000e+04
4.81000e+04  3.99600e+04
              0
```

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 CS 136
            3  6.12410e-07  1.14900e+03
  3.92200e-01  3.92200e-01  0.00000e+00  4.62500e-01  3.95900e-01  3.84800e-01  3.73700e-01  6.14200e-01
3.84800e-01  4.36600e-01
  7.32600e+03  0.00000e+00  7.32600e+03  0.00000e+00  6.40100e+03  8.58400e+03  6.88200e+03  6.29000e+03
6.95600e+03  6.17900e+03
            0

 CS 137
            3  7.32650e-10  1.91700e+03
  2.86380e-05  2.86380e-05  0.00000e+00  3.19310e-02  2.79350e-05  2.47160e-05  2.10900e-05  8.47300e-05
2.94520e-05  3.57790e-05
  3.19310e+04  0.00000e+00  3.19310e+04  0.00000e+00  2.93410e+04  3.26340e+04  3.07100e+04  2.93780e+04
3.24120e+04  2.90080e+04
            0  BA 137M      9.46000e-01

 BA 139
            5  1.39690e-04  4.98200e+04
  8.02900e-03  8.02900e-03  0.00000e+00  2.27920e-01  7.88100e-03  7.51100e-03  6.91900e-03  1.95730e-02
7.88100e-03  9.06500e-03
  1.71680e+02  0.00000e+00  1.71680e+02  0.00000e+00  8.88000e+00  9.36100e+02  1.26170e+01  9.21300e+00
9.47200e+00  9.10200e+00
            0

 BA 140
            5  6.29710e-07  4.92700e+04
  3.17460e-02  3.17460e-02  0.00000e+00  9.32400e-02  3.15610e-02  3.05990e-02  2.93410e-02  5.73500e-02
3.11170e-02  3.56680e-02
  3.73700e+03  0.00000e+00  3.73700e+03  0.00000e+00  9.47200e+02  6.14200e+03  4.77300e+03  8.91700e+03
1.59100e+03  1.06190e+03
            1  LA 140       1.00000e+00

 LA 140
            7  4.78100e-06  5.03000e+04
  4.32900e-01  4.32900e-01  0.00000e+00  6.14200e-01  4.36600e-01  4.25500e-01  4.21800e-01  6.25300e-01
4.21800e-01  4.77300e-01
  4.84700e+03  0.00000e+00  4.84700e+03  0.00000e+00  2.54190e+02  1.55770e+04  7.91800e+02  5.21700e+02
1.67980e+03  5.36500e+02
            0
```

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 LA 141
              7  4.89930e-05  4.39600e+04
  8.84300e-03  8.84300e-03  0.00000e+00  2.43460e-01  8.84300e-03  8.65800e-03  8.54700e-03  1.29130e-02
8.62100e-03  9.76800e-03
  5.80900e+02  0.00000e+00  5.80900e+02  0.00000e+00  3.47800e+01  2.39020e+03  1.08410e+02  4.44000e+02
3.73700e+01  3.64080e+01
              1  CE 141       1.00000e+00

 LA 142
              7  1.24890e-04  4.45200e+04
  5.32800e-01  5.32800e-01  0.00000e+00  7.99200e-01  5.36500e-01  5.25400e-01  5.25400e-01  7.21500e-01
5.18000e-01  5.80900e-01
  2.53080e+02  0.00000e+00  2.53080e+02  0.00000e+00  3.23380e+01  1.11370e+03  5.03200e+01  4.10700e+01
6.14200e+01  4.18100e+01
              0

 CE 141
              8  2.46840e-07  4.47500e+04
  1.26910e-02  1.26910e-02  0.00000e+00  3.77400e-02  1.23950e-02  1.17290e-02  1.04710e-02  3.48170e-02
1.25060e-02  1.45410e-02
  8.95400e+03  0.00000e+00  8.95400e+03  0.00000e+00  9.43500e+01  6.17900e+04  3.31520e+02  9.39800e+02
2.04980e+02  1.65020e+02
              0

 CE 143
              8  5.83460e-06  4.34900e+04
  4.77300e-02  4.77300e-02  0.00000e+00  1.46520e-01  4.73600e-02  4.55100e-02  4.32900e-02  9.32400e-02
4.73600e-02  5.43900e-02
  3.38920e+03  0.00000e+00  3.38920e+03  0.00000e+00  2.30510e+01  1.43560e+04  1.09520e+02  6.06800e+01
2.78610e+02  6.14200e+01
              1  PR 143       1.00000e+00

 CE 144
              8  2.82190e-08  2.68500e+04
  3.15610e-03  3.15610e-03  0.00000e+00  1.08410e-02  3.08210e-03  2.84530e-03  2.47160e-03  9.21300e-03
3.15610e-03  3.73700e-03
  3.73700e+05  0.00000e+00  3.73700e+05  0.00000e+00  1.08040e+03  2.92670e+06  1.06560e+04  1.74640e+04
8.84300e+02  1.28760e+03
              0  PR 144       9.82200e-01  PR 144M      1.78000e-02
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 PR 143
           7  5.91630e-07  4.26200e+04
  7.77000e-05  7.77000e-05  0.00000e+00  6.51200e-02  7.58500e-05  6.88200e-05  5.99400e-05  2.19410e-04
7.88100e-05  9.43500e-05
  8.10300e+03  0.00000e+00  8.10300e+03  0.00000e+00  6.21600e-06  4.92100e+04  5.47600e+01  5.51300e+01
1.61690e-05  8.21400e-06
           0

 ND 147
           7  7.30650e-07  1.90900e+04
  2.29030e-02  2.29030e-02  0.00000e+00  7.21500e-02  2.26440e-02  2.15340e-02  1.99800e-02  4.88400e-02
2.26810e-02  2.63440e-02
  6.84500e+03  0.00000e+00  6.84500e+03  0.00000e+00  6.73400e+01  3.92200e+04  3.40030e+02  1.20620e+03
3.11170e+02  1.27650e+02
           0  PM 147       1.00000e+00

 NP 239
           8  3.40660e-06  5.43400e+05
  2.84530e-02  2.84530e-02  0.00000e+00  5.92000e-02  2.78240e-02  2.65660e-02  2.40500e-02  7.40000e-02
2.78610e-02  3.23010e-02
  2.50860e+03  0.00000e+00  2.50860e+03  0.00000e+00  2.81940e+01  8.73200e+03  7.69600e+02  7.51100e+03
2.75650e+02  6.03100e+01
           1  PU 239       1.00000e+00

 PU 238
           8  2.50500e-10  3.43000e+01
  1.80560e-05  1.80560e-05  0.00000e+00  1.51330e-04  1.48370e-05  3.92200e-06  6.21600e-06  3.44100e-05
2.42720e-05  4.69900e-05
  3.92200e+08  0.00000e+00  3.92200e+08  0.00000e+00  3.55940e+03  6.80800e+07  5.62400e+08  7.03000e+09
1.03600e+08  3.70000e+03
           0  U  234       1.00000e+00

 PU 239
           8  9.13340e-13  7.56500e+00
  1.56880e-05  1.56880e-05  0.00000e+00  6.88200e-05  1.43560e-05  9.80500e-06  9.87900e-06  3.50390e-05
1.79080e-05  2.79350e-05
  4.29200e+08  0.00000e+00  4.29200e+08  0.00000e+00  3.34110e+03  6.40100e+07  6.25300e+08  7.80700e+09
1.17660e+08  3.41140e+03
           0  U  235       1.00000e+00
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 PU 240
              8  3.36230e-12  8.47600e+00
   1.75750e-05  1.75750e-05  0.00000e+00  1.45040e-04  1.45040e-05  4.03300e-06  6.10500e-06  3.42620e-05
2.35320e-05  4.55100e-05
   4.29200e+08  0.00000e+00  4.29200e+08  0.00000e+00  3.34850e+03  6.40100e+07  6.25300e+08  7.80700e+09
1.17660e+08  3.51870e+03
              0  U  236       1.00000e+00

 PU 241
              8  1.52640e-09  1.59200e+03
   2.68250e-07  2.68250e-07  0.00000e+00  4.32900e-07  2.58260e-07  2.39760e-07  2.08310e-07  8.10300e-07
2.66030e-07  3.20790e-07
   8.25100e+06  0.00000e+00  8.25100e+06  0.00000e+00  4.58800e+01  2.74540e+04  1.24320e+07  1.55400e+08
2.52340e+06  1.13220e+02
              1  AM 241       1.00000e+00

 AM 241
              7  5.08550e-11  1.06100e+00
   3.02660e-03  3.02660e-03  0.00000e+00  4.73600e-03  2.89710e-03  2.49380e-03  1.92770e-03  1.06190e-02
3.17460e-03  3.95900e-03
   4.44000e+08  0.00000e+00  4.44000e+08  0.00000e+00  5.92000e+03  6.80800e+07  6.43800e+08  3.02900e+09
1.20250e+08  9.87900e+03
              0  NP 237       1.00000e+00

 CM 242
              7  4.92780e-08  4.02400e+02
   2.10530e-05  2.10530e-05  0.00000e+00  1.58730e-04  1.81670e-05  4.18100e-06  6.99300e-06  3.92200e-05
2.89710e-05  5.47600e-05
   1.72970e+07  0.00000e+00  1.72790e+07  0.00000e+00  3.48170e+03  5.73500e+07  1.44300e+07  1.80190e+08
2.10900e+06  3.49280e+03
              1  PU 238       1.00000e+00

 CM 244
              7  1.21370e-09  2.48700e+01
   1.81670e-05  1.81670e-05  0.00000e+00  1.44670e-04  1.55030e-05  2.61960e-06  5.40200e-06  3.26340e-05
2.55300e-05  4.92100e-05
   2.47900e+08  0.00000e+00  2.47900e+08  0.00000e+00  3.73700e+03  7.14100e+07  3.47060e+08  4.32900e+09
5.88300e+07  3.84800e+03
              1  PU 240       1.00000e+00
```