#040607

Examinatet of "Nuclide Importance to Criticality Safety, Decay Heating, and Source Terms Related to Transport and Interim Storage of High-Burnup LWR Fuel NUREG/CR-6700 ORNL/TM-2000/284" to identified the key isotopes that show the greatest variation in importance for extended regimes. This information is important to help identify the high-burnup spent fuel characteristics that may adversely affect the accuracy of current computational methods and data, assess the potential impact on previous guidance on isotopic source terms and decay heating, and thus help identify areas for methods and data improvement.

#040907

Examination of YMRP, NUREG-1804

#041007

Preliminary analysis of the power produced in each fuel pin cell of an assembly at the start of burn u and during depletion by unique NewT "Pin Power Edits" option.

#041107

Pin Power results analyse and deviding 218 pin cells of an assembly into the 5 main groups according power produced during depletion calculatins:

1.0818 - 1.0642 (8 pin cells)
1.0471 - 1.0261 (10)
1.026 - 0.9972 (8)
0.9888 - 0.9603 (25)
0.9546 - 0.9358 (8)

For the Assembly symmetry only ¼ assembly has been calculated with proper boundary conditions (reflection) on down and left surfaces.

#041207

Created and debugged Scale-NewT assembly depletion input for 5 different depletion materials according analyse results at the previouse step and comparison k-inf for the original (single material) and new (5 materials) inputs.

k-eff = 1.30802480 one depletion material
k-eff = 1.30802480 five depletion materials

#041307

Performed depletion calculations taking into account burnups for the set of pin cell groups for different thermal powers to calculate materials for axial burnup profiles; taking into account boron letdown during depletion; taking into account 232 nuclides; for 17 burnup cycles and number of cross-section libraries produced per cycle =3.

	Power[MWt]	**Burnup [gwd/mtu]**
Calculation cases		
ADRP_N_L4_W5_BMY_BGN_TMH_H0_G30_B40_P43	43.0292	40
ADRP_N_L4_W5_BMY_BGN_TMH_H0_G30_B27_P30	30	27
ADRP_N_L4_W5_BMY_BGN_TMH_H0_G30_B18_P20	20	18
ADRP_N_L4_W5_BMY_BGN_TMH_H0_G30_B9_P10	10	9

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#041607

Initiated software writing for MCNP input file creation by means of linear interpolation in 4-dimensional space of parameters (Nuclide; Depletion; Thermal Powers; Pin Cell groups).

#041707

Produced and debugged MCNP input for the case of 45 depleted materials (9 axial and 5 radial materials)
C21_A1_F1_W5_APB_B0 – base test case for single depleted material; k-eff = 1.16638 0.00239
C21_A7_F5_W5_APB_B0 – test case for for 45 depleted materials; k-eff = 1.16717 0.00217

#041807

Performed Keno 5.a k-eff calculations for the Hi-Star 100 mpc-24E CASC with 6-1/4-inch boral sheet with neutrons flux trap.

	Preliminary calculations	Original calculations
normalinp.out	0.9440 + or – 0.0016	0.94394 + or - 0.00061
accunit31b.out	0.9439 + or – 0.0018	0.94383 + or - 0.00063
accunit3140b.out	0.9458 + or – 0.0015	0.94572 + or - 0.00066

#042007

Completed MCNP calculations of PWR21 with 0.35 cm absorber plates (Fig.1. SN) consist of neutronit "a-978"
(borated ss; rho=7.745 g/cc; 8.8771E-2 at/(barn*cm))

.inp	.out	k-eff
C21_A1_F1_W5_APB_PM0_FT0_B0.inp	C21_A1_F1_W5_APB_PM0_FT0_B0.out	1.16843 0.00185
C21_A1_F1_W5_APB_PM2_FT0_B0.inp	C21_A1_F1_W5_APB_PM2_FT0_B0.out	1.16741 0.00250
C21_A1_F1_W5_APB_PM4_FT0_B0.inp	C21_A1_F1_W5_APB_PM4_FT0_B0.out	1.17114 0.00250
C21_A1_F1_W5_APB_PM6_FT0_B0.inp	C21_A1_F1_W5_APB_PM6_FT0_B0.out	1.17572 0.00214

Cases Codes at "Sheena-TZ&MCNP cases" sheet, file SN April 2007.xls

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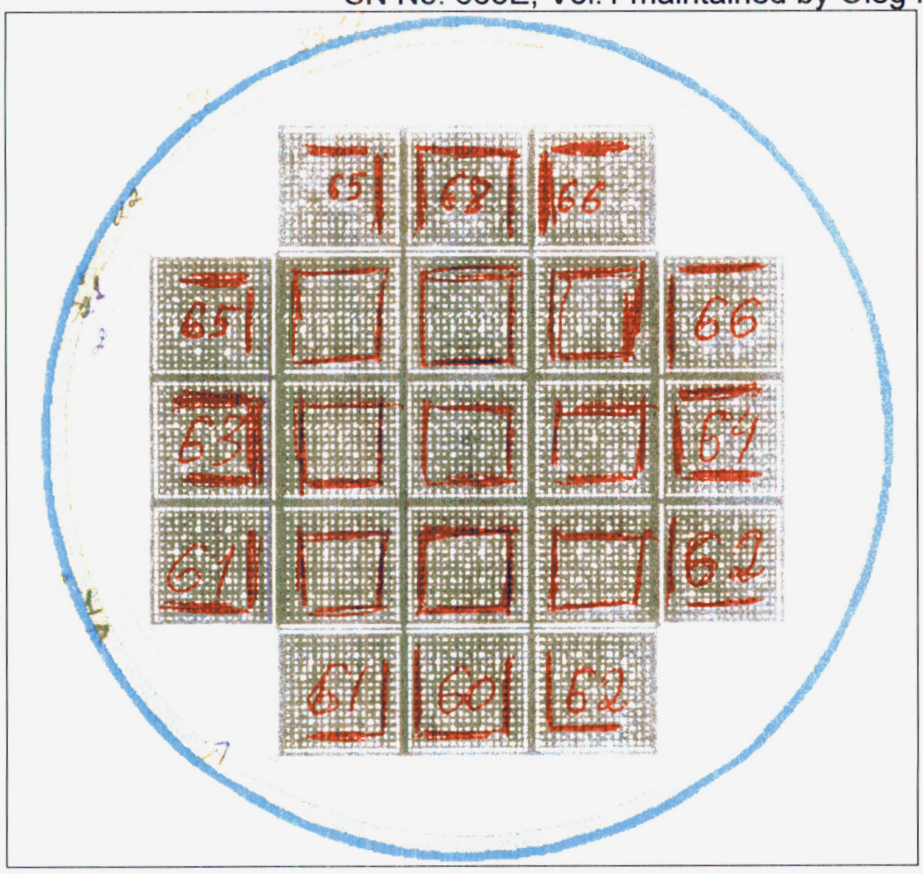

Fig.1. Absorber Plates locations:

#042307

Performed MCNP calculations of 21-PWR Waste Package with 0.35 cm absorber plates (Fig.1.) consist of boral at 0.0279 g/cm2 b-10 (75% x 0.0372)

.inp	.out	k-eff
C21_A1_F1_W5_APO_PM0_FT0_B0.inp	C21_A1_F1_W5_APO_PM0_FT0_B0.out	1.09517 0.00244

Cases Codes at "Sheena-TZ&MCNP cases" sheet, file SN April 2007.xls

#042407

Developed and debugged SCALE 5.1 (KENO V.a) input and performed calculation for 21-PWR Waste Package with 0.35cm absorber plates (Fig.1.) consist of boral at 0.0279 g/cm2 b-10 (75% x 0.0372). Performed results comparing with MCNP calculations of 21-PWR Waste Package.

.inp:	k-eff
P21_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO3.inp	1.0947 + or - 0.0015
.out:	
P21_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO3.out	

SN No. 663E, Vol.1 maintained by Oleg Povetko

Cases Codes at "Scale Calculations Cases" sheet, file SN April 2007.xls

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#042507

Developed KENO-Va input for 21-PWR Waste Package with Preliminary Transportation, Aging and Disposal Canister System (TAD) inside the PWR-21 according Preliminary Transportation, Aging and Disposal Canister System Performance Specification Revision B DOC ID: WMO-TADCS-0000001

New Absorber plates widthes and as a result new assemblies pitch has been implemented to the input and, for neutron absorber plates must cover all four longitudinal sides, absorber plates' locations has been changed according Fig.2.

TAD Canister	with a length of	212	in=	**538.48**	cm		External:	Internal:
	and a diameter of	66.5	in=	**168.91**	cm	Rad:	**84.455**	**79.455**
						thickness	**5**	

Absorber Plate Minimum Width:

0.433 inches= **1.09982** cm

TAD_Performance_Specification_Rev_B.pdf

1. Neutron absorber plates or tubes made from borated stainless steel produced by powder metallurgy and meeting ASTM A887-89 Grade "A" alloys.
2. Minimum thickness of neutron absorber plates shall be 0.433 inches. Maximum and nominal thickness can be based on structural requirements.
3. The neutron absorber plate shall have a boron content of 1.1 wt % to 1.2 wt %, a range that falls within the specification for 304B4 UNS S30464 as described in ASTM A887-89.
4. Neutron absorber plates or tubes must extend the full axial length (+0"/-½") of the canister internals at room temperature.
5. Neutron absorber plates or tubes must cover all four longitudinal sides of each fuel assembly.

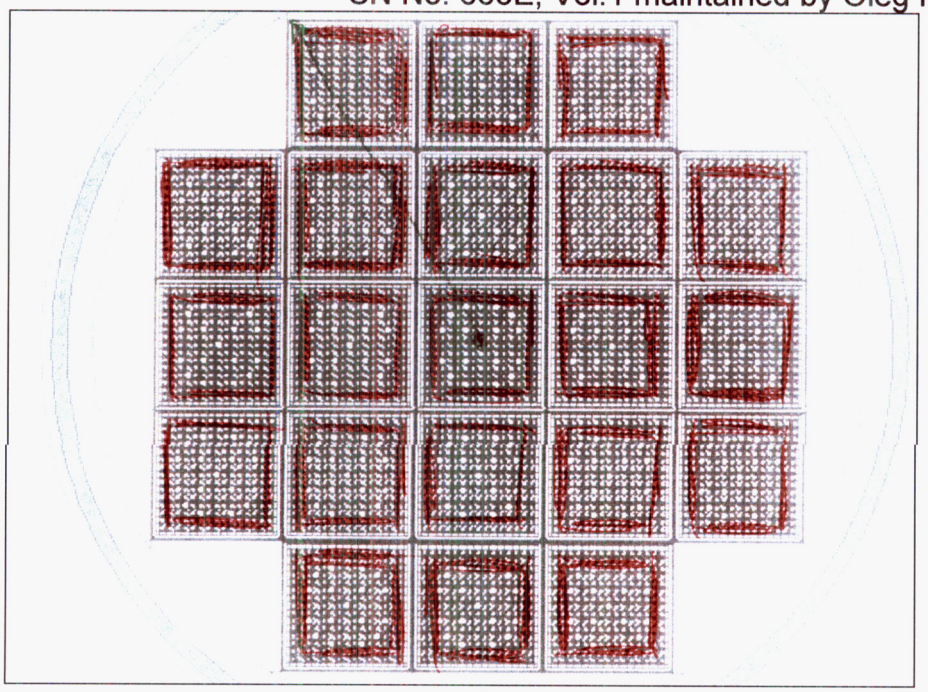

Fig.2. Absorber Plates locations

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#042607

Performed SCALE 5.1 (KENO V.a) PWR21 calculations with **1.1** cm absorber plates (Fig.2.) consist of boral at 0.0279 g/cm2 b-10 (75% x 0.0372) with TAD conteiner inside for the base case and three cases immitate absence of two, four and six absorber plates.

Cases Codes at "Scale Calculations Cases" sheet, file SN April 2007.xls

Base case:

.inp:	k-eff
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11.inp	0.98499 + or - 0.00044
.out:	
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11.out	

two plates out(unit 33)

.inp:	k-eff
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_2.inp	0.98947 + or - 0.00045
.out:	
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_2.out	

four plates out(unit 33)

.inp:	k-eff
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_4.inp	0.99552 + or - 0.00039
.out:	
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_4.out	

Six plates out (4 - from unit 33; + 1- 32-Right and 1- 34-Left)

.inp:	k-eff
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_6.inp	1.02379 + or - 0.00043
.out:	
TAD_K5a_L4_W5_BMN_BGN_TML_H360_G21_225_B0_P0_APO11_6.out	

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09/01/2007 (AK)(OP)

08/16/2007

Examination of DOE public report "Preclosure Criticality Analysis Process Report", Rev 01, March 2007

A single analysis process for determining the criticality potential or effective neutron multiplication factor (keff) of a configuration during preclosure operations.
The process can be applied to

- design calculations and
- preclosure safety analyses.

Specific deterministically selected design configurations (e.g., fully moderated, most reactive fuel state) are used for design calculations.

For the preclosure safety analysis, the probabilities of event sequences are estimated

For those event sequences that could lead to potentially critical configurations, the probability of reaching such a configuration will be evaluated

If the overall probability of reaching a potentially critical configuration is above the probability threshold, a criticality evaluation of that configuration will be performed

The proposed approach for out-of-package operations will use the most reactive fuel state (i.e., a fresh fuel assumption with no burnup credit for nonbreeder reactor fuel, or the calculated most reactive state for breeder reactor fuel)

The in-package operations will include credit for burnup similar to the postclosure methodology in *Disposal Criticality Analysis Methodology Topical Report* (YMP 2003).

The proposed approach will provide margin-to criticality for the preclosure time period.

Margin-to-criticality is the sum of

- biases and uncertainties,
- administrative margins, and
- reactivity due to use of bounding models and parameters.

For commercial SNF (CSNF), the primary difference between traditional licensing of fuel cycle facilities away from a reactor and the approach proposed here is the
absence of burnup credit in the traditional approach.

The proposed preclosure criticality analysis process is also applicable to scenarios involving the surface facility and fuel handling operations

The process describes only how the criticality calculations are performed for a given scenario

Sensitivity studies will be performed to ensure that a bounding representation is used.
The determination of the effective neutron multiplication factor (keff) for CSNF will consider the following:
A. Fuel rod parameters, including:
1. Fuel pellet diameter
2. Cladding material and inner and outer diameters
3. Fuel rod pellet or stack density and initial fissile enrichment of each fuel rod in the assembly (a bounding enrichment is acceptable)
4. Active fuel height.
B. Fuel assembly parameters, including:
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08/17/2007

1. Assembly length and planar dimensions
2. Fuel rod pitch
3. Total number of fuel rods in the assembly
4. Locations in the fuel assembly lattice that are empty or contain nonfuel material (e.g., guide tubes, burnable poison rods)
5. Integral neutron absorber (burnable poison) content of various fuel rods and locations in fuel assembly. This is typically proprietary information and may not be available. For out-of-package operations no credit will be taken for the presence of integral absorbers. For in-package operations, no credit will be taken for residual integral absorbers in the fuel.
6. Structural materials (e.g., grids) that are an integral part of the fuel assembly.

Sufficient margin will be incorporated into the calculated keff values to account for the reactivity effects of the following:

- **Nonuniform enrichment variation (this will be handled by using the maximum enrichment over the whole assembly length)**
- **Uncertainty in the calculation of keff (bias and uncertainty determined from benchmark calculations)**
- **Uncertainty in average enrichment (this will be handled by using the maximum enrichment over the whole assembly length).**

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The proposed analysis methods and neutron cross-section data will be benchmarked by comparison with critical experiments.

The benchmarking analysis will establish both a bias (defined as the mean difference between experimental and calculated values) and uncertainty of the mean with a one-sided tolerance factor for 95 percent probability at the 95 percent confidence level (Kopp 1998, pp. 3 and 4).

The maximum keff shall be evaluated from the following expression:

$$keff = k\ (calc) + \Delta k\ (uncert) + \Delta k\ (burnup)$$

where
k (calc) = calculated nominal value of keff
Δk (uncert) = manufacturing and calculational bias and uncertainties
Δk (burnup) = **correction for the effect of the axial distribution** in burnup when credit for burnup is taken (Note: provisions for the uncertainty in the average burnup of a fuel assembly must also be made in the loading criteria)

An acceptable method for determining the maximum reactivity may be either: (1) a worst-case combination with mechanical and material conditions set to maximize keff, or (2) a sensitivity study of the reactivity effects of tolerance variations.

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08/20/2007

Continued investigation of missing spent fuel rods and absorber plates neutronic reactivity effects for 44-BWR TAD WP in disposal configuration: MCNP, SCALE modeling, preliminary calculations and comparisons, refining the models

ASSEMBLY DESIGN:

It was assumed that the **GE 7x7** assembly design is the most limiting BWR fuel assembly design for reactivity calculations.

Table **08/20/2007-1** SB-575 N06022 Material Composition

Element/ Isotope	**ZAIDa**	**Wt%**	**Element/ Isotope**	**ZAID**	**Wt%**
C-nat	6000.50c	0.0150	Co-59	27059.50c	2.5000
Mn-55	25055.50c	0.5000	W-182[b]	74182.55c	0.7877
Si-nat	14000.50c	0.0800	W-183[b]	74183.55c	0.4278
Cr-50	24050.60c	0.8879	W-184[b]	74184.55c	0.9209
Cr-52	24052.60c	17.7863	W-186[b]	74186.55c	0.8636
Cr-53	24053.60c	2.0554	V	23000.50c	0.3500
Cr-54	24054.60c	0.5202	Fe-54	26054.60c	0.2260
Ni-58	28058.60c	36.8024	Fe-56	26056.60c	3.6759
Ni-60	28060.60c	14.6621	Fe-57	26057.60c	0.0865
Ni-61	28061.60c	0.6481	Fe-58	26058.60c	0.0116
Ni-62	28062.60c	2.0975	S-32	16032.50c	0.0200
Ni-64	28064.60c	0.5547	P-31	15031.50c	0.0200
Mo-nat	42000.50c	13.5000	Density = 8.69 g/cm^3		

b

W-180 cross section libraries are not available so the atom percents of the remaining isotopes were used to renormalize the elemental weight and derive isotopic weight percents excluding the negligible 0.120 atom percent in nature contribution from W-180.

Table **08/20/2007-2** Material Specifications for SA-240 S31600

Element/ Isotope	ZAIDa	Wt%	Element/ Isotope	ZAID	Wt%
C-natb	6000.50c	0.0200	Fe-54	26054.60c	3.7053
N-14b	7014.50c	0.0800	Fe-56	26056.60c	60.2691
Si-nat	14000.50c	0.7500	Fe-57	26057.60c	1.4173
P-31	15031.50c	0.0450	Fe-58	26058.60c	0.1905
S-32	16032.50c	0.0300	Ni-58	28058.60c	8.0641
Cr-50	24050.60c	0.7103	Ni-60	28060.60c	3.2127
Cr-52	24052.60c	14.2291	Ni-61	28061.60c	0.1420
Cr-53	24053.60c	1.6443	Ni-62	28062.60c	0.4596
Cr-54	24054.60c	0.4162	Ni-64	28064.60c	0.1216
Mn-55	25055.50c	2.0000	Mo-nat	42000.50c	2.5000
Densityc = 7.98 g/cm^3					

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Table **08/20/2007-3** Material Specifications for Al 6061

Element/Isotope	ZAIDa	Wt%	Element/Isotope	ZAID	Wt%
Si-nat	14000.50c	0.6000	Mg-nat	12000.50c	1.0000
Fe-54	26054.60c	0.0396	Cr-50	24050.60c	0.0081
Fe-56	26056.60c	0.6433	Cr-52	24052.60c	0.1632
Fe-57	26057.60c	0.0151	Cr-53	24053.60c	0.0189
Fe-58	26058.60c	0.0020	Cr-54	24054.60c	0.0048
Cu-63	29063.60c	0.1884	Ti-nat	22000.50c	0.1500
Cu-65	29065.60c	0.0866	Al-27b	13027.50c	96.9300
Mn-55	25055.50c	0.1500	Densityc = 2.7065 g/cm3		

Table **08/20/2007-4** Material Specifications for Grade 70 A516 Carbon Steel Composition

Element/Isotope	ZAIDa	Wt%	Element/Isotope	ZAID	Wt%
C-nat	6000.50c	0.2700	Fe-54	26054.60c	5.5558
Mn-55	25055.50c	1.0450	Fe-56	26056.60c	90.3584
P-31	15031.50c	0.0350	Fe-57	26057.60c	2.1252
S-32	16032.50c	0.0350	Fe-58	26058.60c	0.2856
Si-nat	14000.50c	0.2900	Density = 7.850 g/cm3		

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In order to simplify the geometry the spacer grids were omitted from the MCNP representations

The cladding composition was Zircaloy-2 as presented in Table **08/20/2007-5**

Table **08/20/2007-5** Zircaloy-2 Material Composition

Element/Isotope	ZAIDa	Wt%	Element/Isotope	ZAID	Wt%
Cr-50	24050.60c	0.0042	Ni-58	28058.60c	0.0370
Cr-52	24052.60c	0.0837	Ni-60	28060.60c	0.0147
Cr-53	24053.60c	0.0097	Ni-61	28061.60c	0.0007
Cr-54	24054.60c	0.0024	Ni-62	28062.60c	0.0021
Fe-54	26054.60c	0.0076	Ni-64	28064.60c	0.0006
Fe-56	26056.60c	0.1241	O-16	8016.50c	0.1250
Fe-57	26057.60c	0.0029	Zr-nat	40000.60c	98.1350
Fe-58	26058.60c	0.0004	Sn-nat	50000.35c	1.4500

Density = 6.55 g/cm^3

Table **08/20/2007-6** Zircaloy-4 Material Composition

Element/Isotope	ZAIDa	Wt%	Element/Isotope	ZAID	Wt%
Cr-50	24050.60c	0.0042	Fe-57	26057.60c	0.0045
Cr-52	24052.60c	0.0837	Fe-58	26058.60c	0.0006
Cr-53	24053.60c	0.0097	O-16	8016.50c	0.1250
Cr-54	24054.60c	0.0024	Zr-nat	40000.60c	98.1150
Fe-54	26054.60c	0.0119	Sn-nat	50000.35c	1.4500
Fe-56	26056.60c	0.1930	Density = 6.56b g/cm3		

Table **08/20/2007-7.** SS304 Material Composition

Element	Wt%	Element	Wt%
Carbon	0.080	Chromium	19.000
Nitrogen	0.100	Manganese	2.000
Silicon	0.750	Iron	68.745
Phosphorous	0.045	Nickel	9.250
Sulfur	0.030	Density = 7.94 g/cm3	

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The primary material components in the upper and lower tie-plate regions are

- SS304 (Table **08/20/2007-7**),
- Zircaloy-2 (Table **08/20/2007-5**),
- Zircaloy-4 as represented in Table **08/20/2007-6**, and
- moderator (represented as water at 1.0 g/cm^3 density).

Table **08/20/2007-8.** Tie-Plate Homogenized Material Compositions for BWR Fuel Assembly Design

Element/ Isotope	ZAIDa	Upper Tie-Plate Wt%		Lower Tie-Plate Wt%	
		Flooded	Dry	Flooded	Dry
H-1	1001.50c	4.7396	-	3.7212	-
C	6000.50c	0.0170	0.0294	0.0408	0.0612
N-14	7014.50c	0.0212	0.0368	0.0511	0.0765
O-16	8016.50c	37.6623	0.0790	29.5532	0.0294
Si	14000.50c	0.1591	0.2759	0.3829	0.5737
P-31	15031.50c	0.0095	0.0166	0.0230	0.0344
S	16000.60c	0.0064	0.0110	0.0153	0.0229
Cr-50	24050.60c	0.1699	0.2947	0.4060	0.6082
Cr-52	24052.60c	3.4032	5.9038	8.1318	12.1834
Cr-53	24053.60c	0.3933	0.6823	0.9397	1.4079
Cr-54	24054.60c	0.0995	0.1727	0.2379	0.3564
Mn-55	25055.50c	0.4242	0.7358	1.0210	1.5297
Fe-54	26054.60c	0.8272	1.4350	1.9845	2.9732
Fe-56	26056.60c	13.4536	23.3393	32.2754	48.3561
Fe-57	26057.60c	0.3164	0.5489	0.7591	1.1373
Fe-58	26058.60c	0.0425	0.0738	0.1020	0.1528
Ni-58	28058.60c	1.3261	2.3006	3.1769	4.7597
Ni-60	28060.60c	0.5283	0.9165	1.2657	1.8963
Ni-61	28061.60c	0.0234	0.0405	0.0559	0.0838
Ni-62	28062.60c	0.0756	0.1311	0.1811	0.2713
Ni-64	28064.60c	0.0200	0.0347	0.0479	0.0717
Zr	40000.60c	35.7552	62.028	15.3981	23.0699
Sn	50000.35c	0.5283	0.9166	0.2275	0.3409

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Fuel Material:

The uranium dioxide fresh fuel compositions for each uranium-235 enrichment used in this evaluation are specified in Table 12, and were calculated using Equation 7 (Bowman et al. 1995, p. 20) for each isotope based on the U-235 wt%.

Table **08/20/2007-9.** Fresh Fuel Compositions

Enrichment (wt% U-235)	Wt% U-234	Wt% U-235	Wt% U-236	Wt% U-238	Wt% Oxygen
1.5	0.0106	1.3222	0.0061	86.8098	11.8513
2.0	0.0144	1.7630	0.0081	86.3625	11.8519
2.5	0.0184	2.2037	0.0101	85.9152	11.8526
3.0	0.0224	2.6444	0.0122	85.4677	11.8533
3.5	0.0265	3.0851	0.0142	85.0202	11.8540
4.0	0.0306	3.5258	0.0162	84.5727	11.8547
4.5	0.0348	3.9665	0.0182	84.1251	11.8553
5.0	0.0390	4.4072	0.0203	83.6775	11.8560

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GEOMETRIC DESCRIPTIONS

I. Fuel Assembly

Table **08/21/2007-1**. 7x7 BWR Fuel Assembly Specifications

Assembly Component	Specification
Lattice	7x7
Fuel Pellet Outer Diameter[a]	1.23952 cm
Fuel Rod Cladding Thickness	0.08128 cm
Fuel Rod Cladding Inner Diameter	1.26746 cm
Fuel Rod Cladding Outer Diameter	1.43002 cm
Active Fuel Length	365.76 cm
Clad Material	Zircaloy-2
Channel Material	Zircaloy-2
Pin Pitch	1.87452 cm
Channel Inner Width	13.246 cm
Channel Thickness	0.3048 cm

[a] The representations use a smeared pellet density over the inner clad diameter

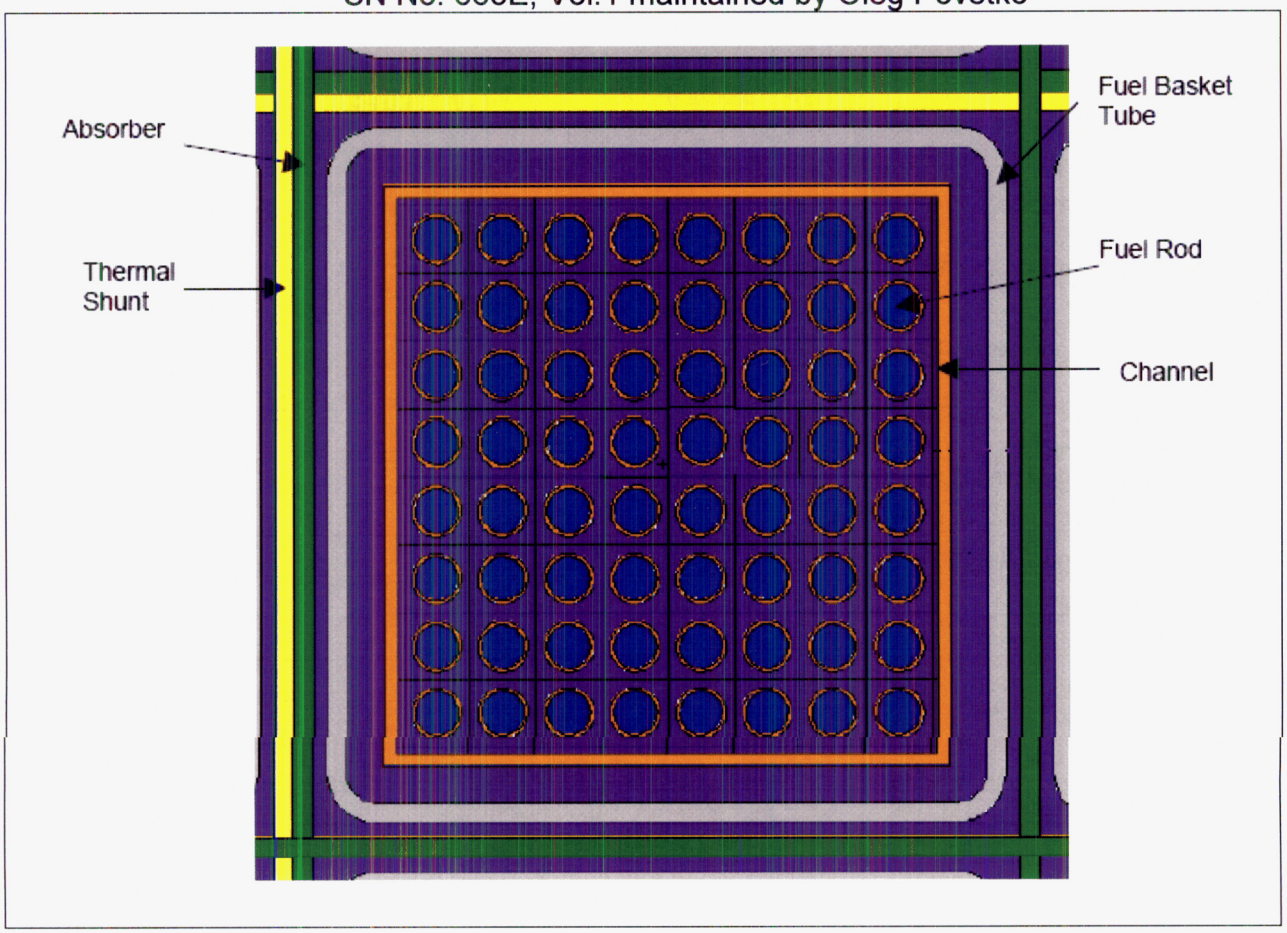

Figure 08/21/2007-1 7x7 BWR Channel Geometry

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44-134R

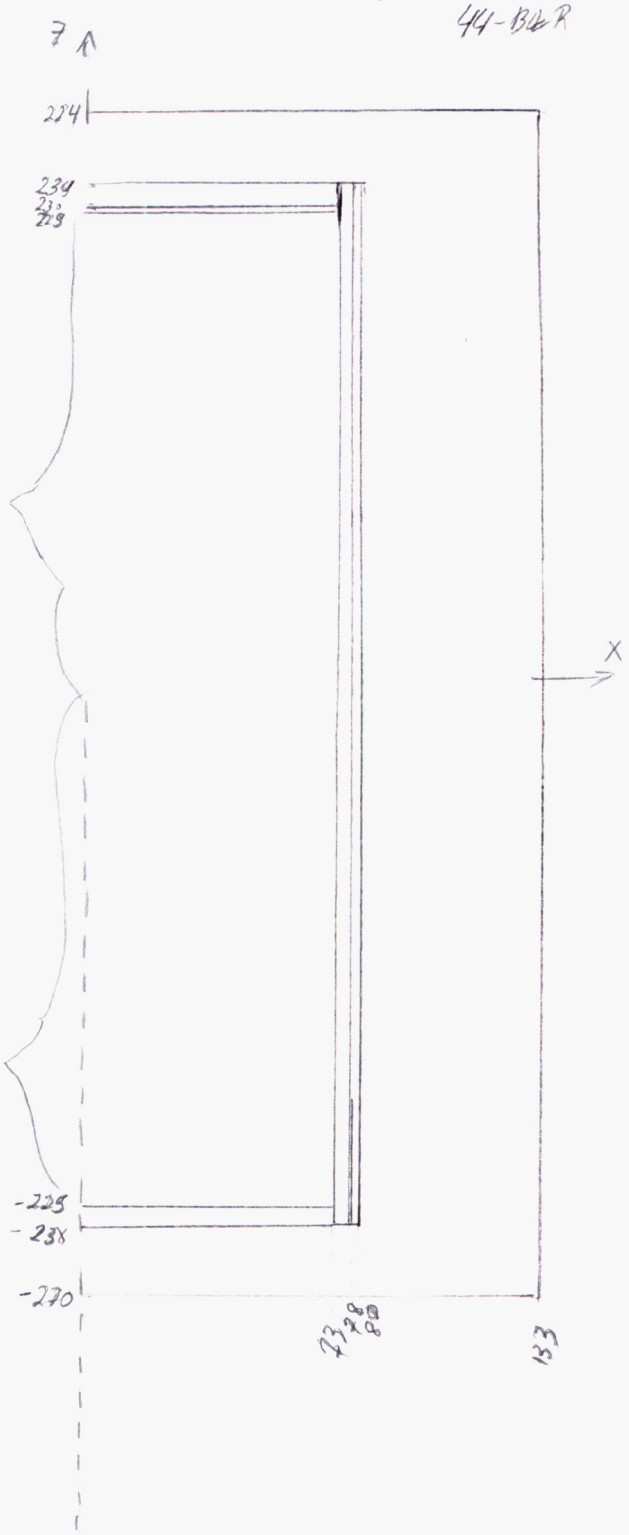

Figure 08/21/2007-2 44-BWR Axial Geometry

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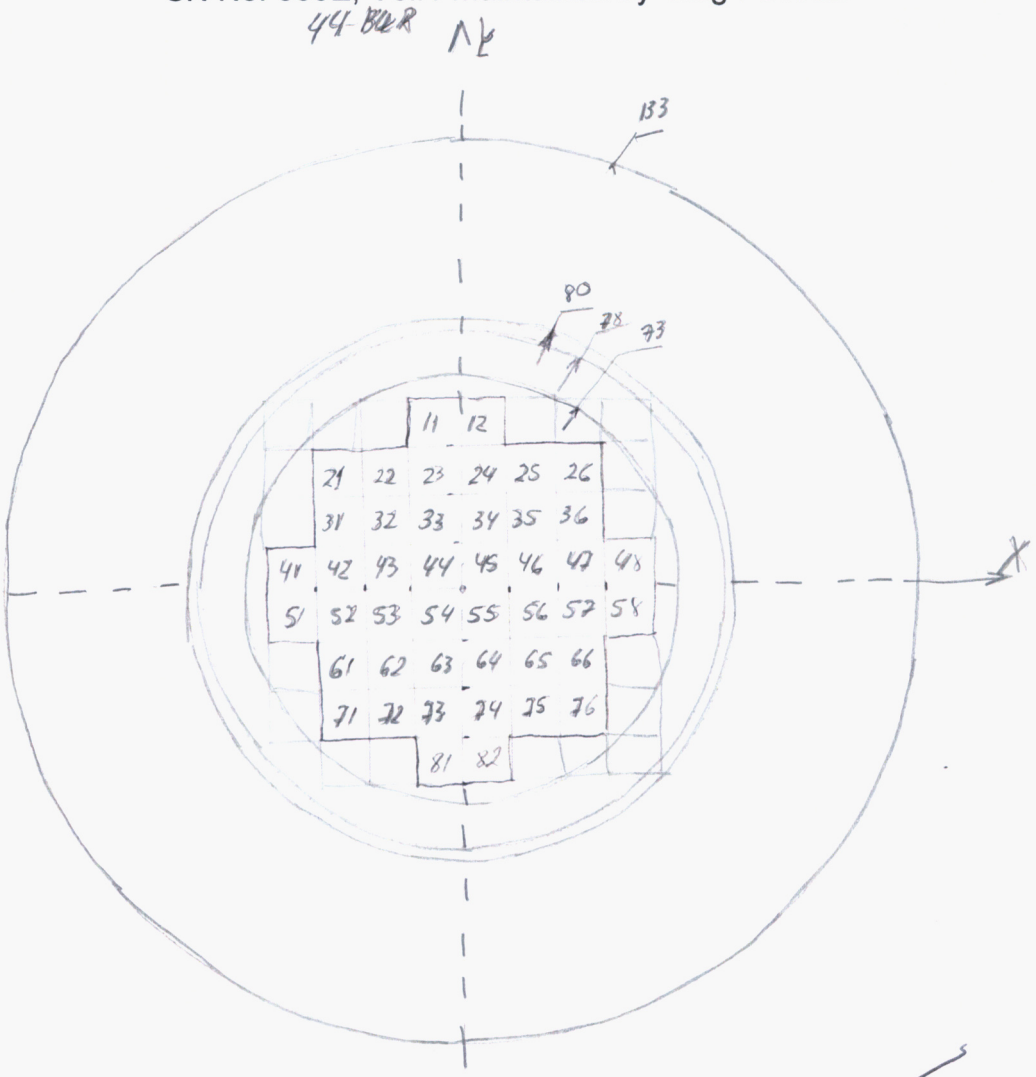
44 BLR
133
80
78
73
11 12
21 22 23 24 25 26
31 32 33 34 35 36
41 42 43 44 45 46 47 48
51 52 53 54 55 56 57 58
61 62 63 64 65 66
71 72 73 74 75 76
81 82

Figure 08/21/2007-1 44-BWR Radial Geometry

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Table **08/21/2007-2**. Test Case Codes

Test Case Code		0	1	2	3	4	5	6
		Waste Package	Axial Zones	Radial Zones	Total Fuel Mat. In an Assembly	W-Wt% U235	Burnup [gwd/mtu]	Absorber Plates Parameters
		44-BWR	A	R	F	W	B	AP
Base:	Value					5	Fresh	Neutronit A978 analogous to 304B6
							0	0.5 cm
BWR44_A6_R4_F1_W5_B0_APA05	Code:	**BWR44**	**6**	**4**	**1**	**5**	**0**	**A05**

Table **08/21/2007-2**. Calculations Results

Test Case	Comment	K-eff	Computer Time
C1-M **C1-Mo**	mcnp version 4b2; 44 BWR WP MODEL, Cooper GE 3b (7x7) Fuel Case No 1 Measured	0.74269 ± 0.00057	155.80 minutes
BWR44_A6_R4_F1_W5_B0_APA05.inp BWR44_A6_R4_F1_W5_B0_APA05.out	**50000.35c** has been chamged into the **50000.42c**	0.74327 ± 0.00056	31.79 minutes

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

11/01/2007 (AK)(OP)

Neutronic reactivity effect of missing absorber plates for 44-BWR TAD WP

Technical Progress Report

Draft. October 2007.

I. 44-BWR TAD WP Common Parameters

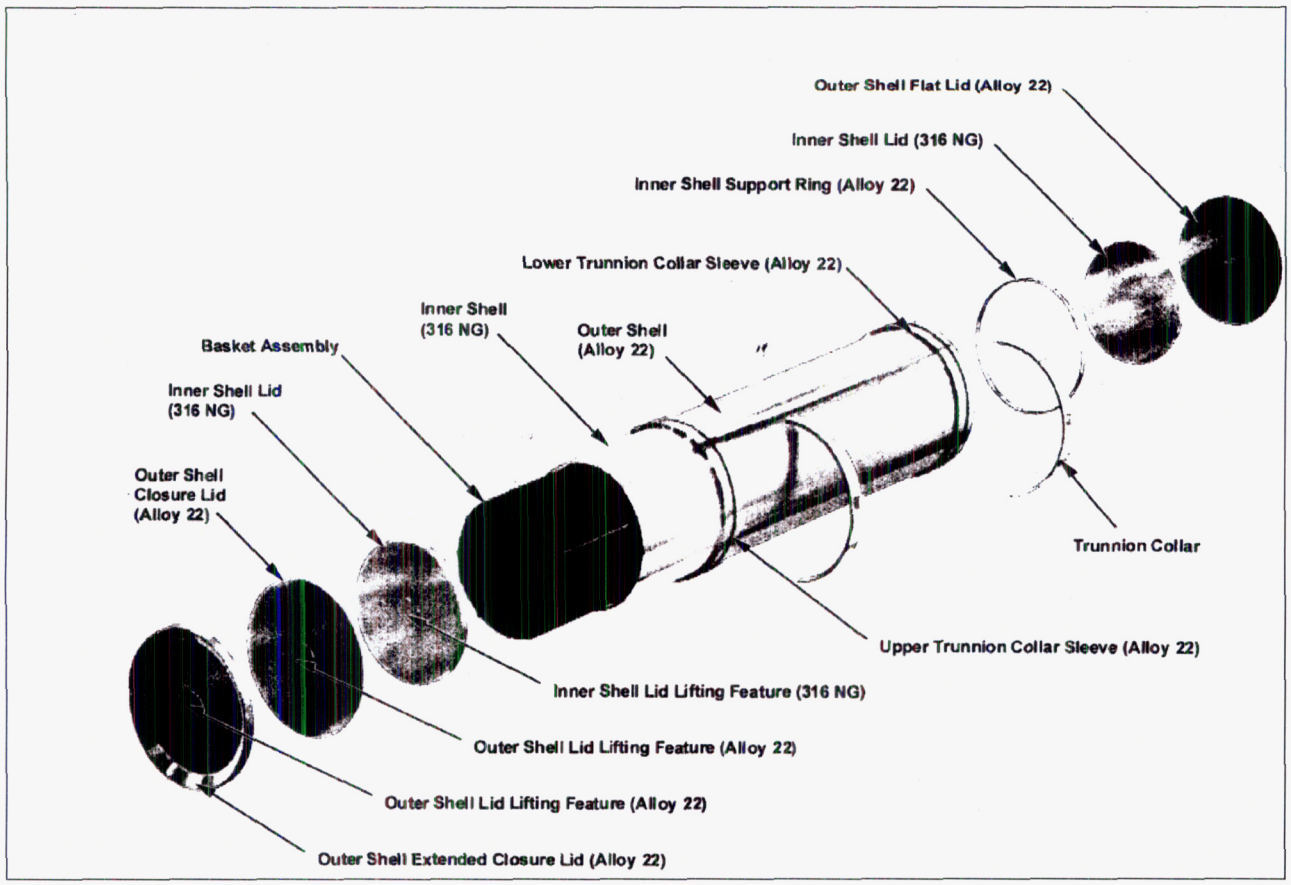

Figure I.1 44-BWR Disposal Container Configuration (from "***Uncanistered Spent Nuclear Fuel Disposal Container System Description Document***", SDD-UDC-SE-000001 REV 01, page 25)

- The 44-BWR is designed to hold forty-four commercial BWR assemblies, containing an average of 0.178 MTU/Assembly
- The 44-BWR design is the second most common waste package for the commercial assemblies making up approximately 3,732 of the waste packages needed
- The 44 **fuel tube openings** are 155.3 mm **x** 155.3 mm each
- The cavity is 4,585 mm long and has an inner diameter of 1,454 mm
- The basket length is 4,575 mm
- Waste package design shall reduce the dose rate at all external surfaces of a waste package to 1,450 rem/hr or less
- This criterion identifies a disposal container interface with the Waste Emplacement Retrieval System, Disposal Container Handling System, and Performance Confirmation Emplacement Drift Monitoring System

Table I.1 44-BWR Disposal Container/Waste Package Dimension

Outer Diameter	1.594 m
Outer Length	5.165 m
Empty Mass	28,068 kg
Loaded Mass	42,517 kg

II. 44-BWR TAD WP Absorber Plates

- The absorber plates, in addition to the thermal shunts (if applicable), pattern the arrangement of fuel assemblies inside the waste package
- The material composition and thickness of the absorber plates are tailored to provide fuel-basket structural strength to
    1. maintain fuel geometry
    2. to prevent criticality
- The fuel basket plates were represented as Ni-Gd Alloy (Unified Numbering System (UNS) designation is UNS N06464) with 1.5 wt% Gd as described in Table II.2.

Table II.1 44-BWR Disposal Container/Waist Package Components

Component Name	Material	Thickness	Quantity
Basket B-Sideguide	SA-516 K02700	10 mm	32
Basket B-Stiffener	SA-516 K02700	10 mm	64
Basket Cornerguide	SA-516 K02700	10 mm	32
Basket Stiffener	SA-516 K02700	10 mm	64
Fuel Basket A-Plate (Absorber Plate)	Neutronit A 978	5 mm	4
Fuel Basket B-Plate (Absorber Plate)	Neutronit A 978	5 mm	4
Fuel Basket C-Plate (Absorber Plate)	Neutronit A 978	5 mm	16
Fuel Basket D-Plate (Absorber Plate)	Neutronit A 978	5 mm	16
Fuel Basket E-Plate (Absorber Plate)	Neutronit A 978	5 mm	16
Fuel Basket F-Plate (Thermal Shunt)	SB-209 A96061 T4	5 mm	8
Fuel Basket G-Plate (Thermal Shunt)	SB-209 A96061 T4	5 mm	8
Fuel Basket Tube	SA-516 K02700	5 mm	44

(From "*Uncanistered Spent Nuclear Fuel Disposal Container System Description Document*", SDD-UDC-SE-000001 REV 01, page 28, Reference "Design Analysis for UCF Waste Package," Attachement II)

Table II.2. Material Specifications for Ni-Gd Alloy (UNS N06464) with 1.5 wt% Gd

Nuclide	A	SCALE ID	MCNP ID	Density (%)	Density at/cm^3
C-nat	12.0111	c	6000.50c	0.01	4.39210×10^{19}
25-MN					
	54.9381	MN-55	25055.50c	0.5	4.80122×10^{20}
Si-nat	28.0853	si	14000.50c	0.08	1.50268×10^{20}
24-CR					
	49.9461	CR-50	24050.60c	0.6602	6.97315×10^{20}
	51.9402	CR-52	24052.60c	13.2247	1.34319×10^{22}
	52.9408	CR-53	24053.60c	1.5283	1.52291×10^{21}
	53.9394	CR-54	24054.60c	0.3868	3.78299×10^{20}
28-NI					
	57.9357	NI-58	28058.60c	43.3679	3.94891×10^{22}
	59.9308	NI-60	28060.60c	17.2778	1.52087×10^{22}
	60.9314	NI-61	28061.60c	0.7637	6.61206×10^{20}
	61.928	NI-62	28062.60c	2.4717	2.10554×10^{21}
	63.9282	NI-64	28064.60c	0.6537	5.39437×10^{20}
42-MO					
	95.9402	mo	42000.50c	14.55	8.00051×10^{21}
27-CO	58.9332				
		CO-59	27059.50c	2	1.79030×10^{21}
Gd-152	151.9201	GD-152	64152.50c	0.0029	1.00702×10^{18}
Gd-154	153.9213	GD-154	64154.50c	0.032	1.09675×10^{19}
Gd-155	154.9229	GD-155	64155.50c	0.2187	7.44712×10^{19}
Gd-156	155.9225	GD-156	64156.50c	0.3045	1.03023×10^{20}
Gd-157	156.9241	GD-157	64157.50c	0.2343	7.87658×10^{19}
Gd-158	157.9237	GD-158	64158.50c	0.3742	1.25000×10^{20}
Gd-160	159.9269	GD-160	64160.50c	0.3335	1.10009×10^{20}
26-FE					
	53.9394	FE-54	26054.60c	0.0565	5.52583×10^{19}
	55.9345	FE-56	26056.60c	0.919	8.66744×10^{20}
	56.9351	FE-57	26057.60c	0.0216	2.00138×10^{19}
	57.9337	FE-58	26058.60c	0.0029	2.64072×10^{18}
S-32	31.9717	S-32	16032.50c	0.005	8.25010×10^{18}
P-31	30.9741	P-31	15031.50c	0.005	8.51582×10^{18}
O	15.9994	o	8016.50c	0.005	1.64862×10^{18}
			Total	**99.9899**	**8.59368×10^{22}**

III. ASSEMBLY DESIGN

Assumptions:

- It was assumed that the **GE 7x7** assembly design is the most limiting BWR fuel assembly design for reactivity calculations.
- In order to simplify the geometry the spacer grids were omitted from the MCNP representations.

The cladding composition was Zircaloy-2 as presented in Table III.1.

Table III.1 Zircaloy-2 Cladding Composition

Nuclide	A	SCALE ID	MCNP ID	Density (%)	Density at/cm^3
24-CR					
	49.9461	CR-50	24050.60c	0.0042	3.31696×10^{18}
	51.9402	CR-52	24052.60c	0.0837	6.35644×10^{19}
	52.9408	CR-53	24053.60c	0.0097	7.22726×10^{18}
	53.9394	CR-54	24054.60c	0.0024	1.75508×10^{18}
26-FE					
	53.9394	FE-54	26054.60c	0.0076	5.55776×10^{18}
	55.9345	FE-56	26056.60c	0.1241	8.75154×10^{19}
	56.9351	FE-57	26057.60c	0.0029	2.00914×10^{18}
	57.9337	FE-58	26058.60c	0.0004	2.72346×10^{17}
28-NI					
	57.9357	NI-58	28058.60c	0.037	2.51911×10^{19}
	59.9308	NI-60	28060.60c	0.0147	9.67519×10^{18}
	60.9314	NI-61	28061.60c	0.0007	4.53158×10^{17}
	61.928	NI-62	28062.60c	0.0021	1.33759×10^{18}
	63.9282	NI-64	28064.60c	0.0006	3.70212×10^{17}
50-SN	118.69				
		sn	50000.42c	1.45	4.81888×10^{20}
40-ZR	91.2196				
		zr	40000.60c	98.135	4.24354×10^{22}
			Total	**100.0001**	**4.34337** $\times 10^{22}$

Fuel Material

The uranium dioxide fresh fuel compositions for each uranium-235 enrichment used in this evaluation are specified in Table III.2, III.3, and were calculated using Equation 7 (Bowman et al. 1995, p. 20) for each isotope based on the U-235 wt%.

Table III.2 Fresh Fuel Compositions

Enrichment (wt% U-235)	Wt% U-234	Wt% U-235	Wt% U-236	Wt% U-238	Wt% Oxygen
1.5	0.0106	1.3222	0.0061	86.8098	11.8513
2.0	0.0144	1.7630	0.0081	86.3625	11.8519
2.5	0.0184	2.2037	0.0101	85.9152	11.8526
3.0	0.0224	2.6444	0.0122	85.4677	11.8533
3.5	0.0265	3.0851	0.0142	85.0202	11.8540
4.0	0.0306	3.5258	0.0162	84.5727	11.8547
4.5	0.0348	3.9665	0.0182	84.1251	11.8553
5.0	0.0390	4.4072	0.0203	83.6775	11.8560

Fuel Density = 10.741 g/cm^3 which is 98% theoretical density value of 10.96 g/cm^3 for UO2 (Todreas and Kazimi 1990, p. 296)

Table III.3 5% Enrichment Fresh Fuel Composition Atomic Densities for SCALE Input

Nuclide	A	SCALE ID	MCNP ID		Density (%)	Density at/cm^3
	235.0441	U-235	92235.50c		4.4072	1.21286x10^{21}
	236.0458	U-236	92236.50c		0.0203	5.56283 x10^{18}
	238.051	U-238	92238.50c		83.6775	2.27371 x10^{22}
8-O	15.9994					
		o	8016.50c		11.856	4.79325 x10^{22}
				Total	**100**	**7.18988** x10^{22}

IV. GEOMETRIC DESCRIPTIONS

Fuel Assembly

Common parameters of an assembly (Table IV.1) and its geometry (Figure IV.1) has been compiled from "*44-BWR Waste Package Loading Curve Evaluation*", CAL-DSU-NU-000008 REV 00A, and "*Uncanistered Spent Nuclear Fuel Disposal Container System Description Document*", SDD-UDC-SE-00000 1 REV 0 1

Table IV.1 7x7 BWR Fuel Assembly Specifications

Assembly Component	Specification
Lattice	7x7
Fuel Pellet Outer Diameter[a]	1.23952 cm
Fuel Rod Cladding Thickness	0.08128 cm
Fuel Rod Cladding Inner Diameter	1.26746 cm
Fuel Rod Cladding Outer Diameter	1.43002 cm
Active Fuel Length	365.76 cm
Clad Material	Zircaloy-2
Channel Material	Zircaloy-2
Pin Pitch	1.87452 cm
Channel Inner Width	13.246 cm
Channel Thickness	0.3048 cm

[a] The representations use a smeared pellet density over the inner clad diameter

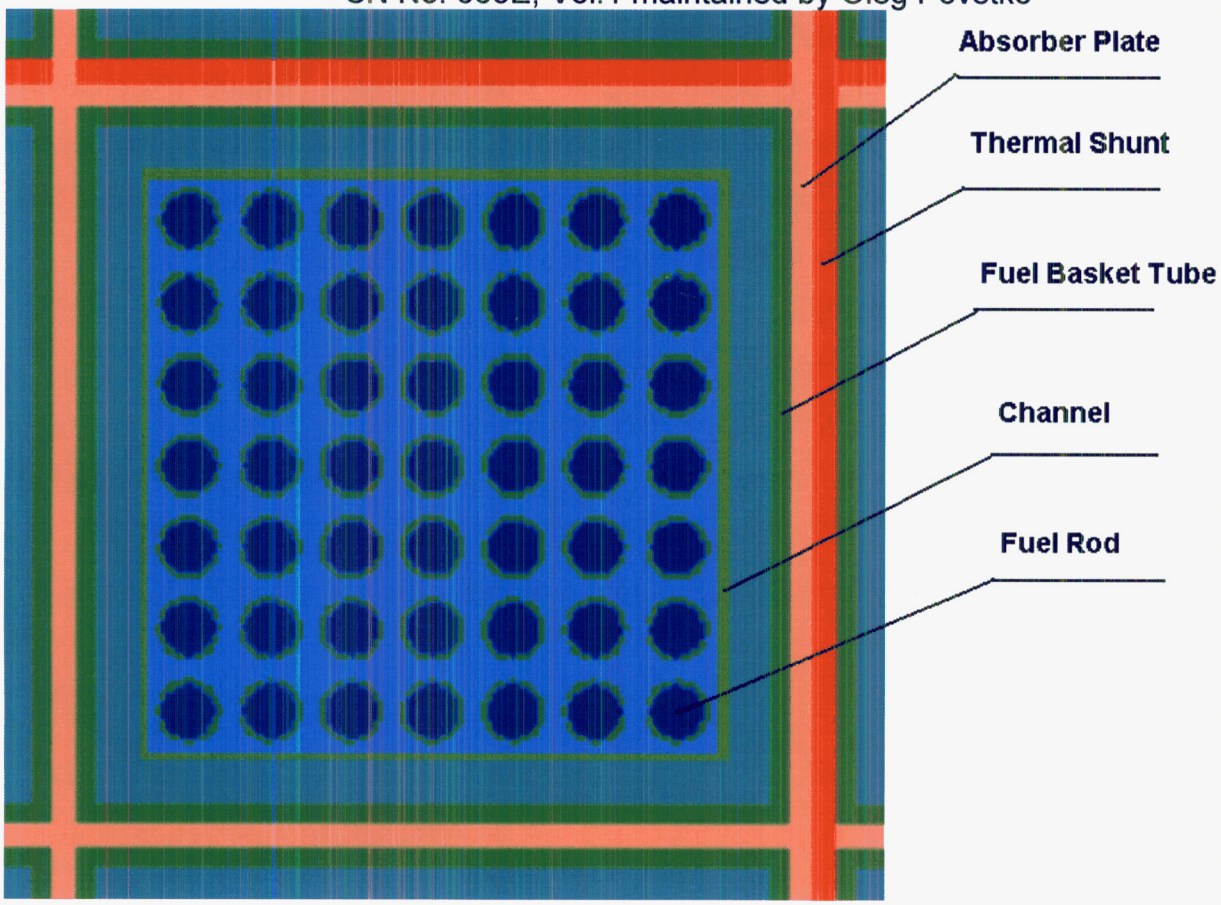

Figure IV.1 7x7 BWR Channel Geometry Plotted By SCALE Software

44-BWR TAD WP SCALE Input Geometry

Radial location of the Absorber Plates (Red Color Boxes), Thermal Shunts (Blue Color Boxes) and Fuel Assemblies are presented at the Figure IV.2. Their radial locations has been calculated in SN_August 2007.xls, sheet "44-BWR Geometry" and inputted at the SCALE software as a location of holes that represent several different types of units:

- Fuel Assembly - unit #500;
- Absorber Plate - units ## 100, 101, 105, 111, 121 and 141;
- Thermal Shunts – units ## 201m 202, 203 and 213;

Table IV.2 - IV.4 bind hole numbers at the SCALE input and its identification number at the Fig. IV.2.

Axial and Radial geometry form SCALE output are presented at the Fig. IV.3 and IV.4

Table IV.2 SCALE Input Hole Numbers and correspondence Fuel Assembly Identification Numbers from Fig. IV.2

Hole #	Unit #	Assembly Code
1	500	11
2	500	12
3	500	21
4	500	22
5	500	23
6	500	24
7	500	25
8	500	26
9	500	31
10	500	32
11	500	33
12	500	34
13	500	35
14	500	36
15	500	41
16	500	42
17	500	43
18	500	44
19	500	45
20	500	46
21	500	47
22	500	48
23	500	51
24	500	52
25	500	53
26	500	54
27	500	55
28	500	56
29	500	57
30	500	58
31	500	61
32	500	62
33	500	63
34	500	64
35	500	65
36	500	66
37	500	71
38	500	72
39	500	73
40	500	74
41	500	75
42	500	76
43	500	81
44	500	82

Table IV.3 SCALE Input Hole Numbers and correspondence Absorber Plate Identification Numbers from Fig. IV.2

Hole #	Unit #	Absorber Plate Code
45	100	100
46	101	101
47	101	102
48	101	103
49	101	104
50	105	105
51	105	106
52	101	107
53	101	108
54	101	109
55	101	110
56	111	111
57	111	112
58	121	121
59	121	122
60	111	123
61	111	124
62	121	125
63	121	126
64	121	131
65	121	132
66	111	133
67	111	134
68	121	135
69	121	136
70	141	141
71	141	148
72	141	151
73	141	158
74	121	161
75	121	162
76	111	163
77	111	164
78	121	165
79	121	166
80	121	171
81	121	172
82	111	173
83	111	174
84	121	175
85	121	176
86	111	181
87	111	182

Table IV.3 SCALE Input Hole Numbers and correspondence Thermal Shunt Identification Numbers from Fig. IV.2

Hole #	Unit #	Thermal Shunt Code From
88	201	201
89	202	202
90	203	203
91	203	204
92	202	205
93	201	206
94	201	207
95	202	208
96	203	209
97	203	210
98	202	211
99	201	212
100	213	213
101	213	214
102	213	215
103	213	216

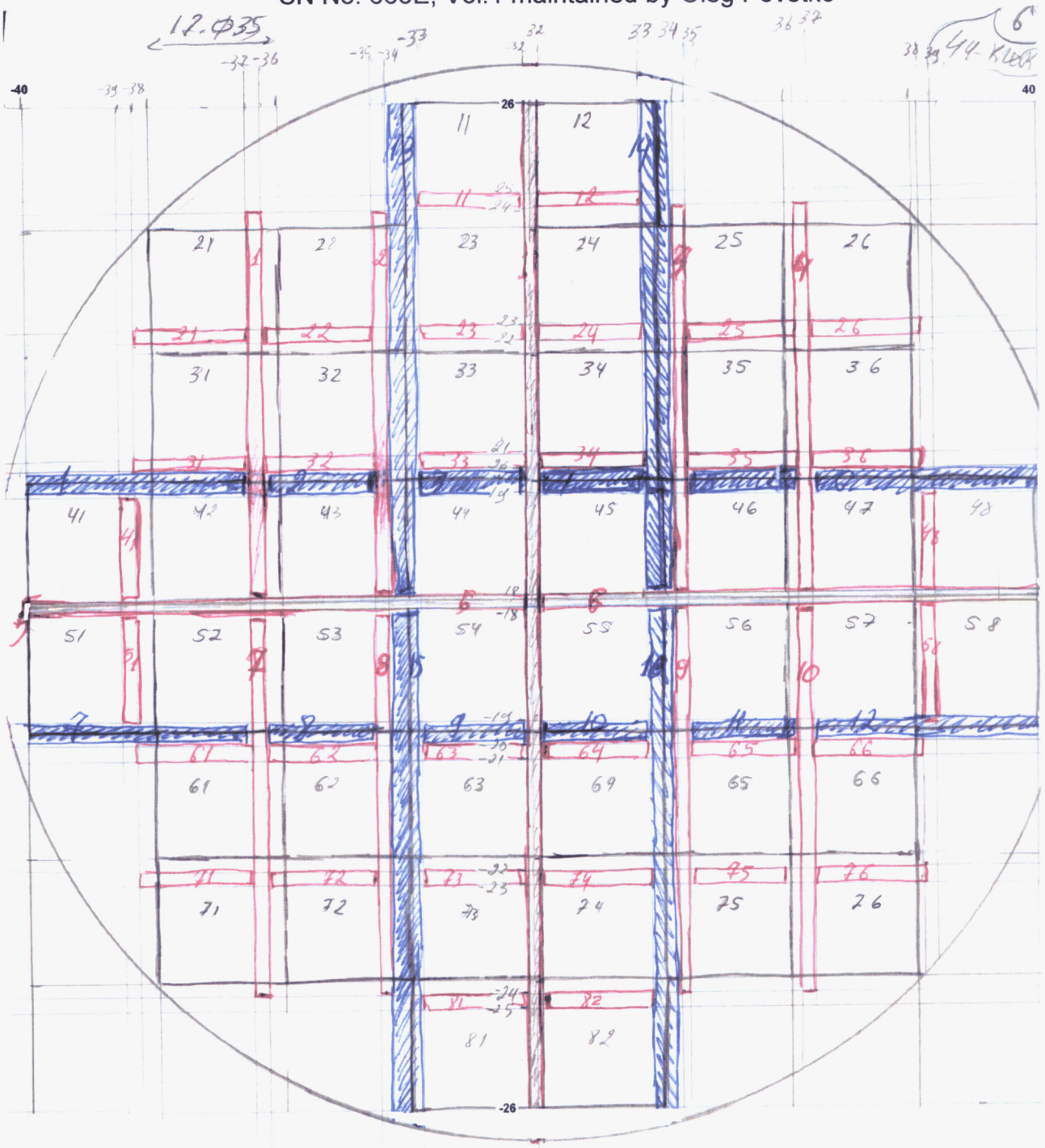

Fig. IV.2 44-BWR Absorber Plates, Thermal Shunts and Fuel Assemblies Radial Locations

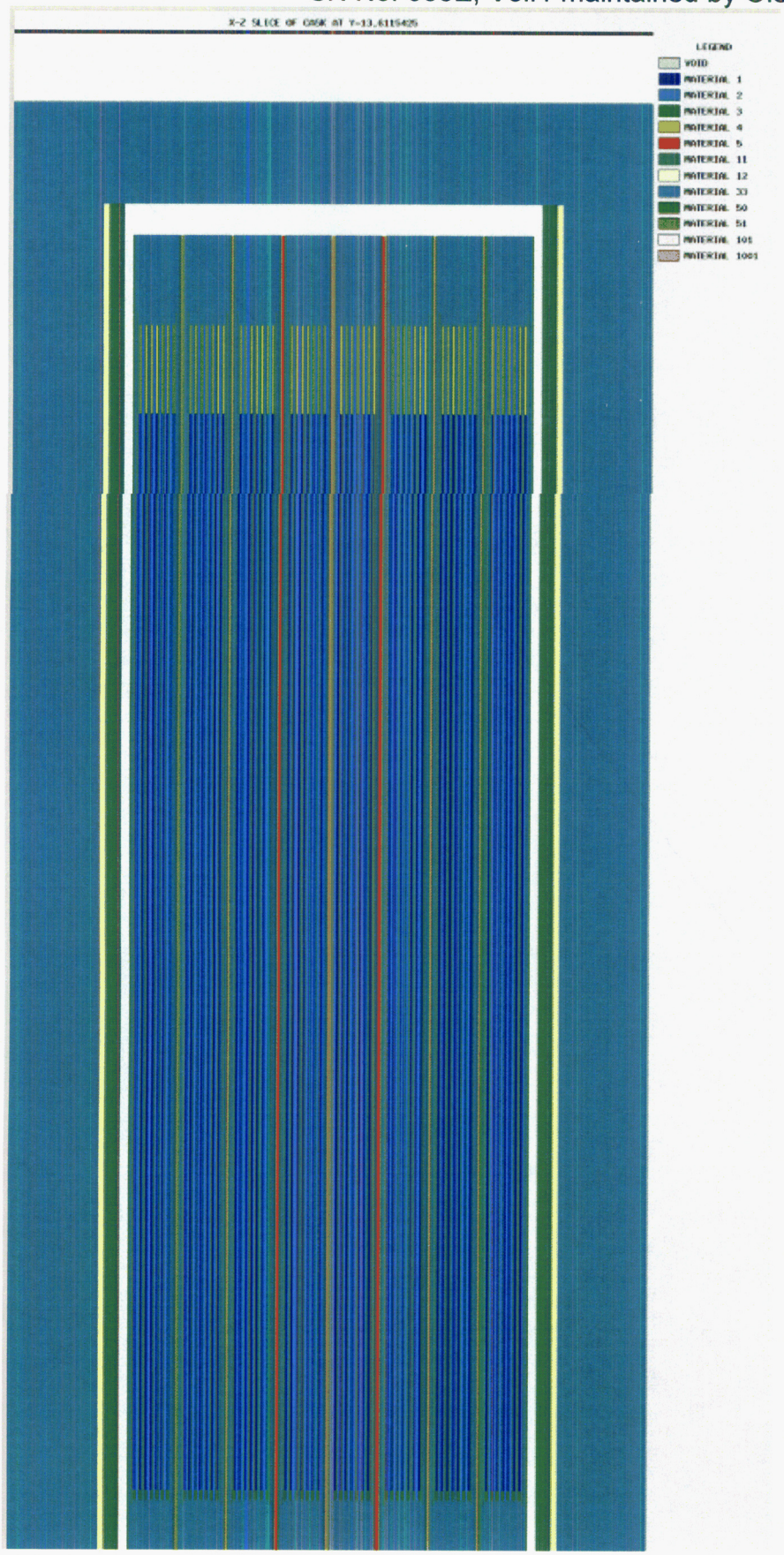
X-Z SLICE OF CASK AT Y=13.6115425
LEGEND
VOID
MATERIAL 1
MATERIAL 2
MATERIAL 3
MATERIAL 4
MATERIAL 5
MATERIAL 11
MATERIAL 12
MATERIAL 33
MATERIAL 50
MATERIAL 51
MATERIAL 101
MATERIAL 1001

Figure IV.3 44-BWR Axial Geometry Plotted By SCALE Software

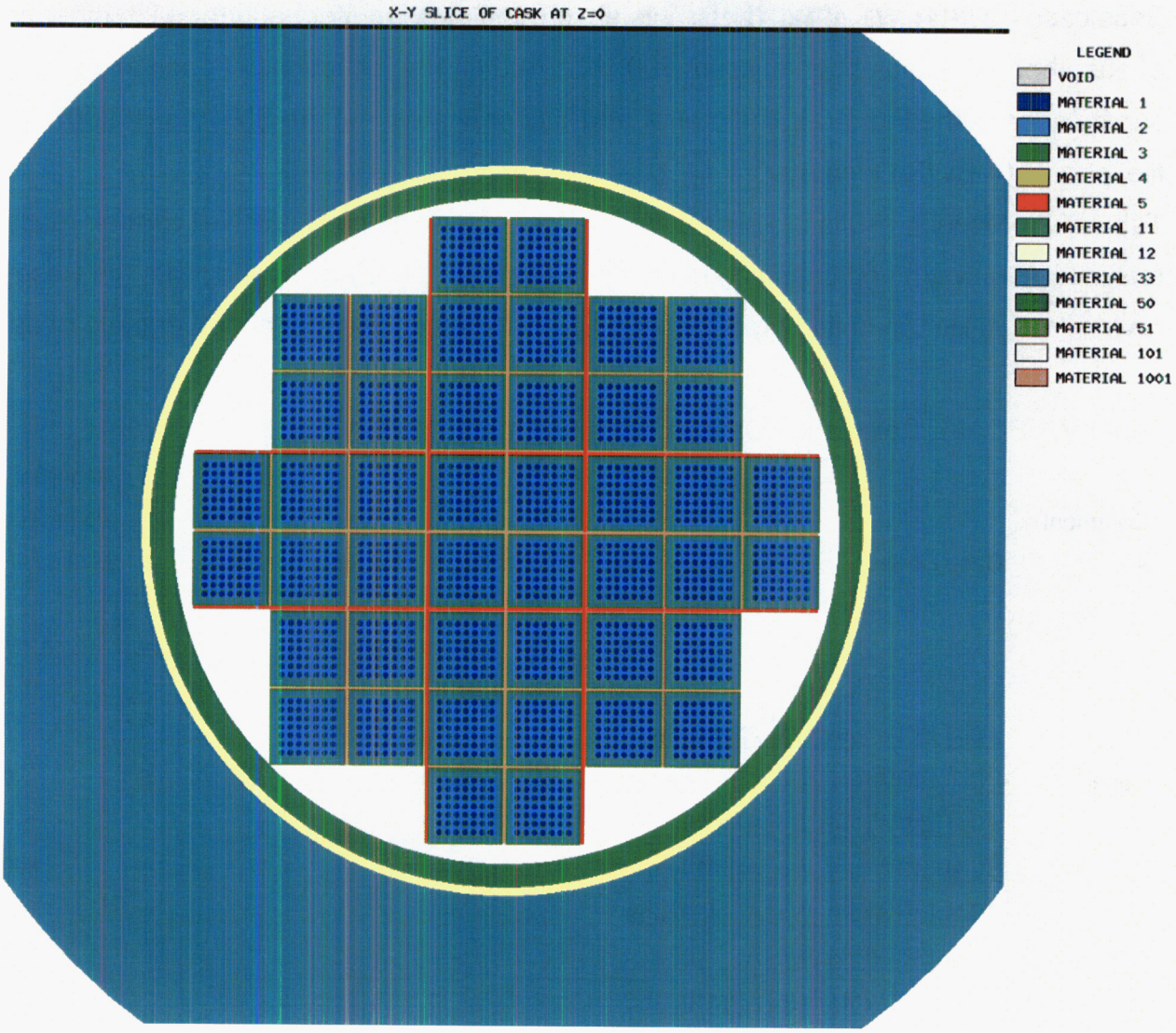

Figure IV.4 44-BWR Radial Geometry Plotted By SCALE Software

V. CALCULATION CASES AND RESULTS

Scale cases has been designed to take into account one missing absorber plates for one of the four absorber plate types (see Table IV.3 and Fig. IV.2)

Base case - **BWR44_W5_APM0** – has all its absorber plates inputted, and for each other cases one of absorber plates has been missed: 100, 102, 105 or 134. Locations of each absorber plate can be seen at the Fig. IV.2, and their X and Y coordinates – at the SN_August 2007.xls EXCEL file, sheet "44-BWR Geometry".

Table V.2 presents results of k_{eff} calculations for each of the cases as well as their reactivity (column "**Reactivity**") and changing in reactivity (column "**Delta**") comparing with the Base Case – "**BWR44_W5_APM0**", in units of reactivity * 10^4, which is the weight of absorber plate of each type.

Table V.1 SCALE Calculation Cases Codes and input / output files

Comments	Case Codes		Waste Package	W-Wt% U235	Absorber Plate Missed
		Value:	44-BWR	**W**	**APM**
Base Case	**SCALE\BWR44_W5_APM0.inp**				
	SCALE\BWR44_W5_APM0.out	Code:	**BWR44**	**5**	**0**
	SCALE\BWR44_W5_APM100.inp				
	SCALE\BWR44_W5_APM100.out				**100**
	SCALE\BWR44_W5_APM102.inp				
	SCALE\BWR44_W5_APM102.out				**102**
	SCALE\BWR44_W5_APM105.inp				
	SCALE\BWR44_W5_APM105.out				**105**
	SCALE\BWR44_W5_APM134.inp				
	SCALE\BWR44_W5_APM134.out				**134**

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Table V.2 Reactivity Effects of Missing Absorber Plates of Different Types

Test Case Code	k_{eff}	+/-	Reactivity*	Delta**
			10^4	10^4
BWR44_W5_APM0	0.95208	0.0004	503.32	0
BWR44_W5_APM100	0.97406	0.00041	266.31	237
BWR44_W5_APM102	0.96245	0.00041	390.15	113
BWR44_W5_APM105	0.96603	0.00037	351.65	152
BWR44_W5_APM134	0.95677	0.00038	451.83	51

* **Reactivity = $(1 - k_{eff}) / k_{eff}$**

** **Delta = Reactivity(case) – Reactivity("BWR44_W5_APM0")**

No new entries on this page

01/02/2008 (AK)(OP)
#12012007

TDMAT Input for 4.5% Fuel Enrichment Sheet "TDMAT Input 4.5%" of the SN December 2007 Postclosure.xlsx EXCEL file.

P= **10** MW/MTU

	#	MCNP ID	/ SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
Group of Fuel Rods #1 (Table 5.1.1.2)	1	92233.50C	u233	6.12E-03	2.29E-02	5.36E-02	9.70E-02
	2	92234.50C	u234	5.78E+01	5.63E+01	5.49E+01	5.37E+01
	3	92235.50C	u235	6.56E+03	6.15E+03	5.80E+03	5.38E+03
	4	92236.50C	u236	1.09E+02	1.99E+02	2.83E+02	3.77E+02
	5	92238.50C	u238	1.47E+05	1.46E+05	1.46E+05	1.46E+05
	6	94238.50C	pu238	6.90E-27	2.32E-25	1.44E-24	5.01E-24
	7	94239.50C	pu239	1.07E+02	2.06E+02	2.94E+02	3.58E+02
	8	94240.50C	pu240	1.69E+00	6.61E+00	1.33E+01	2.18E+01
	9	94241.50C	pu241	7.85E-13	1.46E-10	2.80E-09	2.13E-08
	10	94242.50C	pu242	5.50E-03	9.91E-02	4.53E-01	1.35E+00
	11	93237.55C	np237	1.98E+00	7.51E+00	1.78E+01	3.23E+01
	12	60143.50C	nd143	1.22E+01	2.61E+01	3.83E+01	5.24E+01
	13	60145.50C	nd145	8.33E+00	1.80E+01	2.66E+01	3.69E+01
	14	62147.50C	sm147	4.76E+00	9.97E+00	1.44E+01	1.94E+01
	15	62149.50C	sm149	4.15E-01	4.21E-01	4.40E-01	4.29E-01
	16	62150.50C	sm150	2.07E+00	5.06E+00	7.86E+00	1.13E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	8.71E-01	2.31E+00	3.78E+00	5.69E+00
	19	63153.55C	eu153	4.23E-01	1.03E+00	1.74E+00	2.70E+00
	20	64155.50C	gd155	5.42E-02	8.36E-02	1.06E-01	1.35E-01
	21	63151.55C	eu151	7.60E-01	1.27E+00	1.58E+00	1.76E+00
	22	42095.50C	mo95	8.98E+00	1.94E+01	2.88E+01	4.01E+01
	23	43099.50C	tc99	8.90E+00	1.93E+01	2.88E+01	4.01E+01
	24	44101.50C	ru101	7.85E+00	1.72E+01	2.58E+01	3.62E+01
	25	44103.50C	rh103	4.97E+00	1.09E+01	1.65E+01	2.30E+01
	26	95241.50c	am241	5.10E-08	4.09E-07	1.28E-06	3.07E-06
	27	95242.50c	am242m	5.13E-27	1.73E-25	1.07E-24	3.72E-24
	28	95243.50C	am243	1.90E-05	7.56E-04	5.66E-03	2.34E-02
	29	47109.50C	ag109	1.27E-01	4.01E-01	7.81E-01	1.30E+00

No new entries on this page

P= **20** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	2.04E-02	8.87E-02	2.00E-01	3.33E-01
	2	92234.50C	u234	5.64E+01	5.38E+01	5.21E+01	5.16E+01
	3	92235.50C	u235	6.22E+03	5.46E+03	4.83E+03	4.10E+03
	4	92236.50C	u236	1.86E+02	3.60E+02	5.14E+02	6.76E+02
	5	92238.50C	u238	1.46E+05	1.46E+05	1.46E+05	1.45E+05
	6	94238.50C	pu238	8.47E-26	2.10E-24	1.00E-23	2.67E-23
	7	94239.50C	pu239	1.99E+02	3.51E+02	4.70E+02	5.31E+02
	8	94240.50C	pu240	5.84E+00	2.02E+01	3.72E+01	5.70E+01
	9	94241.50C	pu241	9.44E-11	1.57E-08	2.66E-07	1.83E-06
	10	94242.50C	pu242	7.57E-02	1.14E+00	4.46E+00	1.17E+01
	11	93237.55C	np237	6.71E+00	2.96E+01	6.70E+01	1.12E+02
Group of Fuel Rods #1 (Table 5.1.1.2)	12	60143.50C	nd143	2.40E+01	4.99E+01	7.15E+01	9.49E+01
	13	60145.50C	nd145	1.64E+01	3.50E+01	5.11E+01	6.99E+01
	14	62147.50C	sm147	9.17E+00	1.84E+01	2.54E+01	3.30E+01
	15	62149.50C	sm149	4.79E-01	5.00E-01	5.32E-01	5.15E-01
	16	62150.50C	sm150	4.57E+00	1.08E+01	1.69E+01	2.42E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	2.05E+00	5.32E+00	8.35E+00	1.20E+01
	19	63153.55C	eu153	9.32E-01	2.51E+00	4.52E+00	7.31E+00
	20	64155.50C	gd155	8.01E-02	1.31E-01	1.97E-01	3.03E-01
	21	63151.55C	eu151	1.22E+00	1.75E+00	2.06E+00	2.18E+00
	22	42095.50C	mo95	1.78E+01	3.81E+01	5.59E+01	7.69E+01
	23	43099.50C	tc99	1.77E+01	3.80E+01	5.61E+01	7.75E+01
	24	44101.50C	ru101	1.57E+01	3.43E+01	5.14E+01	7.19E+01
	25	44103.50C	rh103	1.01E+01	2.20E+01	3.30E+01	4.54E+01
	26	95241.50c	am241	3.44E-07	2.66E-06	1.34E-05	6.45E-05
	27	95242.50c	am242m	6.31E-26	1.56E-24	7.46E-24	1.99E-23
	28	95243.50C	am243	5.44E-04	1.87E-02	1.21E-01	4.46E-01
	29	47109.50C	ag109	3.56E-01	1.20E+00	2.36E+00	3.95E+00

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

P= **30** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	4.48E-02	1.89E-01	3.93E-01	5.98E-01
	2	92234.50C	u234	5.51E+01	5.21E+01	5.15E+01	5.41E+01
	3	92235.50C	u235	5.90E+03	4.82E+03	3.98E+03	3.04E+03
	4	92236.50C	u236	2.62E+02	5.11E+02	7.15E+02	9.17E+02
	5	92238.50C	u238	1.46E+05	1.46E+05	1.45E+05	1.44E+05
	6	94238.50C	pu238	3.29E-25	6.18E-24	2.39E-23	5.10E-23
	7	94239.50C	pu239	2.77E+02	4.54E+02	5.78E+02	6.13E+02
	8	94240.50C	pu240	1.15E+01	3.63E+01	6.30E+01	9.21E+01
	9	94241.50C	pu241	1.49E-09	2.22E-07	3.37E-06	2.11E-05
	10	94242.50C	pu242	3.28E-01	4.26E+00	1.47E+01	3.53E+01
Group of Fuel Rods #1 (Table 5.1.1.2)	11	93237.55C	np237	1.49E+01	6.34E+01	1.32E+02	2.01E+02
	12	60143.50C	nd143	3.52E+01	7.15E+01	1.00E+02	1.28E+02
	13	60145.50C	nd145	2.44E+01	5.11E+01	7.38E+01	9.93E+01
	14	62147.50C	sm147	1.33E+01	2.55E+01	3.38E+01	4.20E+01
	15	62149.50C	sm149	5.49E-01	5.87E-01	6.28E-01	6.00E-01
	16	62150.50C	sm150	7.19E+00	1.71E+01	2.68E+01	3.83E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	3.37E+00	8.38E+00	1.26E+01	1.75E+01
	19	63153.55C	eu153	1.54E+00	4.45E+00	8.17E+00	1.32E+01
	20	64155.50C	gd155	1.01E-01	1.96E-01	3.41E-01	5.72E-01
	21	63151.55C	eu151	1.53E+00	2.01E+00	2.36E+00	2.48E+00
	22	42095.50C	mo95	2.64E+01	5.61E+01	8.15E+01	1.11E+02
	23	43099.50C	tc99	2.63E+01	5.60E+01	8.20E+01	1.12E+02
	24	44101.50C	ru101	2.35E+01	5.13E+01	7.67E+01	1.07E+02
	25	44103.50C	rh103	1.53E+01	3.31E+01	4.89E+01	6.59E+01
	26	95241.50c	am241	1.00E-06	1.18E-05	1.13E-04	6.54E-04
	27	95242.50c	am242m	2.45E-25	4.60E-24	1.78E-23	3.80E-23
	28	95243.50C	am243	3.66E-03	1.11E-01	6.34E-01	2.11E+00
	29	47109.50C	ag109	6.71E-01	2.30E+00	4.50E+00	7.47E+00

No new entries on this page

P= **43** MW/MTU

Group of Fuel Rods # 1 (Table 5.1.1.2)

#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233	9.08E-02	3.48E-01	6.52E-01	8.97E-01
2	92234.50C	u234	5.37E+01	5.11E+01	5.43E+01	6.40E+01
3	92235.50C	u235	5.49E+03	4.06E+03	3.05E+03	1.98E+03
4	92236.50C	u236	3.58E+02	6.87E+02	9.32E+02	1.14E+03
5	92238.50C	u238	1.46E+05	1.45E+05	1.44E+05	1.43E+05
6	94238.50C	pu238	9.91E-25	1.36E-23	4.16E-23	6.88E-23
7	94239.50C	pu239	3.63E+02	5.46E+02	6.56E+02	6.54E+02
8	94240.50C	pu240	2.02E+01	5.85E+01	9.57E+01	1.32E+02
9	94241.50C	pu241	1.66E-08	2.16E-06	2.88E-05	1.59E-04
10	94242.50C	pu242	1.14E+00	1.25E+01	3.83E+01	8.43E+01
11	93237.55C	np237	3.03E+01	1.17E+02	2.19E+02	3.01E+02
12	60143.50C	nd143	4.92E+01	9.66E+01	1.31E+02	1.59E+02
13	60145.50C	nd145	3.44E+01	7.09E+01	1.01E+02	1.33E+02
14	62147.50C	sm147	1.81E+01	3.30E+01	4.14E+01	4.84E+01
15	62149.50C	sm149	6.48E-01	7.05E-01	7.54E-01	7.10E-01
16	62150.50C	sm150	1.08E+01	2.60E+01	4.08E+01	5.80E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	5.18E+00	1.22E+01	1.77E+01	2.39E+01
19	63153.55C	eu153	2.48E+00	7.52E+00	1.38E+01	2.17E+01
20	64155.50C	gd155	1.30E-01	3.15E-01	6.04E-01	1.03E+00
21	63151.55C	eu151	1.79E+00	2.26E+00	2.70E+00	2.81E+00
22	42095.50C	mo95	3.75E+01	7.85E+01	1.13E+02	1.51E+02
23	43099.50C	tc99	3.74E+01	7.86E+01	1.14E+02	1.53E+02
24	44101.50C	ru101	3.37E+01	7.32E+01	1.09E+02	1.51E+02
25	44103.50C	rh103	2.21E+01	4.72E+01	6.83E+01	8.91E+01
26	95241.50c	am241	2.73E-06	7.48E-05	8.88E-04	4.83E-03
27	95242.50c	am242m	7.37E-25	1.01E-23	3.09E-23	5.12E-23
28	95243.50C	am243	1.90E-02	4.91E-01	2.45E+00	7.24E+00
29	47109.50C	ag109	1.19E+00	4.09E+00	7.89E+00	1.29E+01

No new entries on this page

P= **55** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.45E-01	5.01E-01	8.68E-01	1.10E+00
	2	92234.50C	u234	5.26E+01	5.17E+01	6.05E+01	7.81E+01
	3	92235.50C	u235	5.13E+03	3.45E+03	2.34E+03	1.29E+03
	4	92236.50C	u236	4.43E+02	8.30E+02	1.09E+03	1.27E+03
	5	92238.50C	u238	1.46E+05	1.45E+05	1.43E+05	1.41E+05
	6	94238.50C	pu238	1.95E-24	2.06E-23	5.26E-23	7.00E-23
	7	94239.50C	pu239	4.28E+02	6.01E+02	6.94E+02	6.65E+02
	8	94240.50C	pu240	2.89E+01	7.88E+01	1.23E+02	1.61E+02
	9	94241.50C	pu241	8.30E-08	9.61E-06	1.14E-04	5.57E-04
	10	94242.50C	pu242	2.55E+00	2.47E+01	6.91E+01	1.42E+02
	11	93237.55C	np237	4.84E+01	1.68E+02	2.91E+02	3.67E+02
Group of Fuel Rods # 1 (Table 5.1.1.2)	12	60143.50C	nd143	6.15E+01	1.17E+02	1.53E+02	1.74E+02
	13	60145.50C	nd145	4.33E+01	8.79E+01	1.23E+02	1.58E+02
	14	62147.50C	sm147	2.22E+01	3.84E+01	4.57E+01	5.02E+01
	15	62149.50C	sm149	7.45E-01	8.17E-01	8.70E-01	8.13E-01
	16	62150.50C	sm150	1.43E+01	3.47E+01	5.45E+01	7.61E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	6.85E+00	1.54E+01	2.19E+01	2.91E+01
	19	63153.55C	eu153	3.49E+00	1.08E+01	1.94E+01	2.96E+01
	20	64155.50C	gd155	1.63E-01	4.59E-01	9.04E-01	1.50E+00
	21	63151.55C	eu151	1.97E+00	2.46E+00	2.99E+00	3.09E+00
	22	42095.50C	mo95	4.75E+01	9.82E+01	1.39E+02	1.83E+02
	23	43099.50C	tc99	4.74E+01	9.84E+01	1.40E+02	1.85E+02
	24	44101.50C	ru101	4.30E+01	9.31E+01	1.38E+02	1.90E+02
	25	44103.50C	rh103	2.84E+01	5.97E+01	8.44E+01	1.06E+02
	26	95241.50c	am241	6.28E-06	3.04E-04	3.47E-03	1.68E-02
	27	95242.50c	am242m	1.45E-24	1.54E-23	3.91E-23	5.21E-23
	28	95243.50C	am243	5.61E-02	1.27E+00	5.65E+00	1.52E+01
	29	47109.50C	ag109	1.76E+00	6.02E+00	1.14E+01	1.84E+01

No new entries on this page

P= **10** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	6.77E-03	2.51E-02	5.88E-02	1.06E-01
	2	92234.50C	u234	6.51E+01	6.34E+01	6.18E+01	6.05E+01
	3	92235.50C	u235	7.40E+03	6.95E+03	6.56E+03	6.10E+03
	4	92236.50C	u236	1.21E+02	2.20E+02	3.13E+02	4.16E+02
	5	92238.50C	u238	1.65E+05	1.65E+05	1.65E+05	1.64E+05
	6	94238.50C	pu238	7.34E-27	2.48E-25	1.55E-24	5.43E-24
	7	94239.50C	pu239	1.20E+02	2.30E+02	3.30E+02	4.03E+02
	8	94240.50C	pu240	1.85E+00	7.21E+00	1.46E+01	2.38E+01
	9	94241.50C	pu241	8.03E-13	1.49E-10	2.87E-09	2.19E-08
	10	94242.50C	pu242	5.78E-03	1.04E-01	4.78E-01	1.42E+00
	11	93237.55C	np237	2.18E+00	8.24E+00	1.95E+01	3.55E+01
Group of Fuel Rods #2 (Table 5.1.1.2)	12	60143.50C	nd143	1.34E+01	2.86E+01	4.20E+01	5.75E+01
	13	60145.50C	nd145	9.13E+00	1.97E+01	2.92E+01	4.04E+01
	14	62147.50C	sm147	5.21E+00	1.09E+01	1.58E+01	2.13E+01
	15	62149.50C	sm149	4.69E-01	4.76E-01	4.99E-01	4.87E-01
	16	62150.50C	sm150	2.25E+00	5.52E+00	8.60E+00	1.23E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	9.49E-01	2.50E+00	4.12E+00	6.19E+00
	19	63153.55C	eu153	4.64E-01	1.13E+00	1.90E+00	2.95E+00
	20	64155.50C	gd155	6.00E-02	9.26E-02	1.17E-01	1.49E-01
	21	63151.55C	eu151	8.40E-01	1.41E+00	1.77E+00	1.98E+00
	22	42095.50C	mo95	9.83E+00	2.13E+01	3.16E+01	4.39E+01
	23	43099.50C	tc99	9.75E+00	2.11E+01	3.15E+01	4.40E+01
	24	44101.50C	ru101	8.60E+00	1.88E+01	2.83E+01	3.97E+01
	25	44103.50C	rh103	5.46E+00	1.20E+01	1.81E+01	2.53E+01
	26	95241.50c	am241	5.51E-08	4.43E-07	1.39E-06	3.30E-06
	27	95242.50c	am242m	5.47E-27	1.85E-25	1.16E-24	4.04E-24
	28	95243.50C	am243	1.98E-05	7.88E-04	5.92E-03	2.45E-02
	29	47109.50C	ag109	1.39E-01	4.38E-01	8.53E-01	1.42E+00

No new entries on this page

P= **20** MW/MTU

Group of Fuel Rods #2 (Table 5.1.1.2)	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	2.25E-02	9.73E-02	2.20E-01	3.68E-01
	2	92234.50C	u234	6.35E+01	6.06E+01	5.87E+01	5.81E+01
	3	92235.50C	u235	7.02E+03	6.18E+03	5.50E+03	4.69E+03
	4	92236.50C	u236	2.06E+02	3.97E+02	5.68E+02	7.47E+02
	5	92238.50C	u238	1.65E+05	1.64E+05	1.64E+05	1.63E+05
	6	94238.50C	pu238	9.07E-26	2.27E-24	1.10E-23	2.96E-23
	7	94239.50C	pu239	2.23E+02	3.94E+02	5.31E+02	6.03E+02
	8	94240.50C	pu240	6.38E+00	2.21E+01	4.07E+01	6.26E+01
	9	94241.50C	pu241	9.66E-11	1.61E-08	2.74E-07	1.89E-06
	10	94242.50C	pu242	7.98E-02	1.21E+00	4.73E+00	1.24E+01
	11	93237.55C	np237	7.36E+00	3.24E+01	7.37E+01	1.23E+02
	12	60143.50C	nd143	2.63E+01	5.47E+01	7.86E+01	1.05E+02
	13	60145.50C	nd145	1.80E+01	3.83E+01	5.61E+01	7.68E+01
	14	62147.50C	sm147	1.01E+01	2.02E+01	2.80E+01	3.64E+01
	15	62149.50C	sm149	5.41E-01	5.66E-01	6.03E-01	5.84E-01
	16	62150.50C	sm150	5.00E+00	1.19E+01	1.85E+01	2.65E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	2.23E+00	5.80E+00	9.12E+00	1.31E+01
	19	63153.55C	eu153	1.02E+00	2.74E+00	4.93E+00	7.97E+00
	20	64155.50C	gd155	8.88E-02	1.45E-01	2.16E-01	3.30E-01
	21	63151.55C	eu151	1.36E+00	1.97E+00	2.33E+00	2.47E+00
	22	42095.50C	mo95	1.95E+01	4.17E+01	6.14E+01	8.44E+01
	23	43099.50C	tc99	1.94E+01	4.16E+01	6.16E+01	8.51E+01
	24	44101.50C	ru101	1.72E+01	3.75E+01	5.64E+01	7.89E+01
	25	44103.50C	rh103	1.11E+01	2.42E+01	3.63E+01	5.00E+01
	26	95241.50c	am241	3.73E-07	2.87E-06	1.42E-05	6.73E-05
	27	95242.50c	am242m	6.75E-26	1.69E-24	8.18E-24	2.20E-23
	28	95243.50C	am243	5.68E-04	1.96E-02	1.28E-01	4.70E-01
	29	47109.50C	ag109	3.90E-01	1.31E+00	2.58E+00	4.32E+00

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

P= **30** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	4.92E-02	2.08E-01	4.35E-01	6.65E-01
	2	92234.50C	u234	6.21E+01	5.87E+01	5.79E+01	6.07E+01
	3	92235.50C	u235	6.66E+03	5.48E+03	4.56E+03	3.52E+03
	4	92236.50C	u236	2.89E+02	5.63E+02	7.91E+02	1.02E+03
	5	92238.50C	u238	1.65E+05	1.64E+05	1.63E+05	1.62E+05
	6	94238.50C	pu238	3.54E-25	6.76E-24	2.65E-23	5.75E-23
	7	94239.50C	pu239	3.11E+02	5.13E+02	6.56E+02	7.00E+02
	8	94240.50C	pu240	1.25E+01	3.98E+01	6.93E+01	1.02E+02
	9	94241.50C	pu241	1.53E-09	2.28E-07	3.49E-06	2.20E-05
	10	94242.50C	pu242	3.46E-01	4.51E+00	1.57E+01	3.77E+01
	11	93237.55C	np237	1.63E+01	6.97E+01	1.46E+02	2.23E+02
Group of Fuel Rods #2 (Table 5.1.1.2)	12	60143.50C	nd143	3.86E+01	7.86E+01	1.11E+02	1.42E+02
	13	60145.50C	nd145	2.67E+01	5.61E+01	8.11E+01	1.09E+02
	14	62147.50C	sm147	1.46E+01	2.81E+01	3.73E+01	4.65E+01
	15	62149.50C	sm149	6.18E-01	6.62E-01	7.11E-01	6.81E-01
	16	62150.50C	sm150	7.86E+00	1.87E+01	2.94E+01	4.21E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	3.67E+00	9.14E+00	1.38E+01	1.92E+01
	19	63153.55C	eu153	1.68E+00	4.84E+00	8.92E+00	1.44E+01
	20	64155.50C	gd155	1.12E-01	2.15E-01	3.72E-01	6.23E-01
	21	63151.55C	eu151	1.71E+00	2.27E+00	2.68E+00	2.82E+00
	22	42095.50C	mo95	2.90E+01	6.15E+01	8.95E+01	1.22E+02
	23	43099.50C	tc99	2.89E+01	6.14E+01	9.02E+01	1.23E+02
	24	44101.50C	ru101	2.58E+01	5.62E+01	8.42E+01	1.18E+02
	25	44103.50C	rh103	1.67E+01	3.63E+01	5.39E+01	7.28E+01
	26	95241.50c	am241	1.09E-06	1.25E-05	1.18E-04	6.82E-04
	27	95242.50c	am242m	2.63E-25	5.03E-24	1.97E-23	4.28E-23
	28	95243.50C	am243	3.83E-03	1.16E-01	6.70E-01	2.24E+00
	29	47109.50C	ag109	7.33E-01	2.51E+00	4.93E+00	8.19E+00

No new entries on this page

P= **43** MW/MTU

Group of Fuel Rods # 2 (Table 5.1.1.2)

#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233	9.97E-02	3.85E-01	7.26E-01	1.01E+00
2	92234.50C	u234	6.05E+01	5.76E+01	6.10E+01	7.15E+01
3	92235.50C	u235	6.22E+03	4.65E+03	3.52E+03	2.33E+03
4	92236.50C	u236	3.95E+02	7.59E+02	1.03E+03	1.27E+03
5	92238.50C	u238	1.64E+05	1.63E+05	1.62E+05	1.61E+05
6	94238.50C	pu238	1.07E-24	1.50E-23	4.69E-23	7.91E-23
7	94239.50C	pu239	4.07E+02	6.20E+02	7.50E+02	7.51E+02
8	94240.50C	pu240	2.20E+01	6.43E+01	1.06E+02	1.47E+02
9	94241.50C	pu241	1.70E-08	2.23E-06	3.01E-05	1.68E-04
10	94242.50C	pu242	1.20E+00	1.33E+01	4.10E+01	9.08E+01
11	93237.55C	np237	3.32E+01	1.29E+02	2.44E+02	3.38E+02
12	60143.50C	nd143	5.41E+01	1.07E+02	1.45E+02	1.77E+02
13	60145.50C	nd145	3.77E+01	7.79E+01	1.11E+02	1.47E+02
14	62147.50C	sm147	1.99E+01	3.64E+01	4.59E+01	5.39E+01
15	62149.50C	sm149	7.28E-01	7.95E-01	8.54E-01	8.06E-01
16	62150.50C	sm150	1.18E+01	2.84E+01	4.48E+01	6.38E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	5.64E+00	1.33E+01	1.94E+01	2.63E+01
19	63153.55C	eu153	2.70E+00	8.20E+00	1.51E+01	2.38E+01
20	64155.50C	gd155	1.43E-01	3.43E-01	6.58E-01	1.13E+00
21	63151.55C	eu151	2.01E+00	2.57E+00	3.08E+00	3.21E+00
22	42095.50C	mo95	4.11E+01	8.62E+01	1.24E+02	1.66E+02
23	43099.50C	tc99	4.10E+01	8.63E+01	1.25E+02	1.69E+02
24	44101.50C	ru101	3.70E+01	8.03E+01	1.20E+02	1.67E+02
25	44103.50C	rh103	2.42E+01	5.19E+01	7.54E+01	9.89E+01
26	95241.50c	am241	2.95E-06	7.80E-05	9.28E-04	5.09E-03
27	95242.50c	am242m	7.99E-25	1.12E-23	3.49E-23	5.88E-23
28	95243.50C	am243	1.99E-02	5.17E-01	2.60E+00	7.75E+00
29	47109.50C	ag109	1.30E+00	4.47E+00	8.65E+00	1.42E+01

No new entries on this page

P= **55** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.59E-01	5.56E-01	9.72E-01	1.24E+00
	2	92234.50C	u234	5.92E+01	5.81E+01	6.77E+01	8.73E+01
	3	92235.50C	u235	5.83E+03	3.97E+03	2.74E+03	1.54E+03
	4	92236.50C	u236	4.88E+02	9.18E+02	1.21E+03	1.43E+03
	5	92238.50C	u238	1.64E+05	1.63E+05	1.61E+05	1.59E+05
	6	94238.50C	pu238	2.13E-24	2.31E-23	6.00E-23	8.17E-23
	7	94239.50C	pu239	4.82E+02	6.85E+02	7.96E+02	7.66E+02
	8	94240.50C	pu240	3.17E+01	8.68E+01	1.36E+02	1.81E+02
	9	94241.50C	pu241	8.54E-08	9.98E-06	1.20E-04	5.94E-04
	10	94242.50C	pu242	2.70E+00	2.63E+01	7.43E+01	1.54E+02
	11	93237.55C	np237	5.31E+01	1.87E+02	3.26E+02	4.15E+02
Group of Fuel Rods # 2 (Table 5.1.1.2)	12	60143.50C	nd143	6.75E+01	1.29E+02	1.70E+02	1.96E+02
	13	60145.50C	nd145	4.75E+01	9.68E+01	1.36E+02	1.76E+02
	14	62147.50C	sm147	2.44E+01	4.24E+01	5.09E+01	5.64E+01
	15	62149.50C	sm149	8.36E-01	9.21E-01	9.85E-01	9.24E-01
	16	62150.50C	sm150	1.56E+01	3.80E+01	5.99E+01	8.41E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	7.47E+00	1.69E+01	2.41E+01	3.22E+01
	19	63153.55C	eu153	3.80E+00	1.18E+01	2.12E+01	3.26E+01
	20	64155.50C	gd155	1.79E-01	5.00E-01	9.88E-01	1.65E+00
	21	63151.55C	eu151	2.22E+00	2.80E+00	3.41E+00	3.54E+00
	22	42095.50C	mo95	5.21E+01	1.08E+02	1.54E+02	2.03E+02
	23	43099.50C	tc99	5.20E+01	1.08E+02	1.55E+02	2.06E+02
	24	44101.50C	ru101	4.72E+01	1.02E+02	1.52E+02	2.10E+02
	25	44103.50C	rh103	3.12E+01	6.58E+01	9.35E+01	1.19E+02
	26	95241.50c	am241	6.72E-06	3.17E-04	3.65E-03	1.79E-02
	27	95242.50c	am242m	1.59E-24	1.72E-23	4.47E-23	6.08E-23
	28	95243.50C	am243	5.89E-02	1.35E+00	6.04E+00	1.63E+01
	29	47109.50C	ag109	1.93E+00	6.59E+00	1.26E+01	2.03E+01

No new entries on this page

P= **10** MW/MTU

Group of Fuel Rods # 3 (Table 5.1.1.2)	#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
	1	92233.50C	u233	5.16E-03	1.90E-02	4.45E-02	8.04E-02
	2	92234.50C	u234	5.06E+01	4.93E+01	4.81E+01	4.71E+01
	3	92235.50C	u235	5.76E+03	5.43E+03	5.13E+03	4.78E+03
	4	92236.50C	u236	9.21E+01	1.67E+02	2.38E+02	3.16E+02
	5	92238.50C	u238	1.28E+05	1.28E+05	1.28E+05	1.28E+05
	6	94238.50C	pu238	5.39E-27	1.83E-25	1.16E-24	4.05E-24
	7	94239.50C	pu239	9.23E+01	1.77E+02	2.55E+02	3.12E+02
	8	94240.50C	pu240	1.39E+00	5.42E+00	1.10E+01	1.79E+01
	9	94241.50C	pu241	5.62E-13	1.04E-10	2.02E-09	1.54E-08
	10	94242.50C	pu242	4.19E-03	7.55E-02	3.47E-01	1.03E+00
	11	93237.55C	np237	1.66E+00	6.23E+00	1.47E+01	2.68E+01
	12	60143.50C	nd143	1.01E+01	2.16E+01	3.18E+01	4.35E+01
	13	60145.50C	nd145	6.89E+00	1.49E+01	2.21E+01	3.06E+01
	14	62147.50C	sm147	3.94E+00	8.26E+00	1.19E+01	1.61E+01
	15	62149.50C	sm149	3.67E-01	3.73E-01	3.91E-01	3.82E-01
	16	62150.50C	sm150	1.69E+00	4.15E+00	6.48E+00	9.29E+00
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	7.11E-01	1.87E+00	3.09E+00	4.65E+00
	19	63153.55C	eu153	3.50E-01	8.47E-01	1.43E+00	2.21E+00
	20	64155.50C	gd155	4.58E-02	7.07E-02	8.93E-02	1.13E-01
	21	63151.55C	eu151	6.41E-01	1.09E+00	1.37E+00	1.54E+00
	22	42095.50C	mo95	7.42E+00	1.61E+01	2.39E+01	3.32E+01
	23	43099.50C	tc99	7.36E+00	1.59E+01	2.38E+01	3.32E+01
	24	44101.50C	ru101	6.49E+00	1.42E+01	2.14E+01	3.00E+01
	25	44103.50C	rh103	4.12E+00	9.04E+00	1.37E+01	1.91E+01
	26	95241.50c	am241	4.11E-08	3.31E-07	1.04E-06	2.45E-06
	27	95242.50c	am242m	4.01E-27	1.36E-25	8.59E-25	3.02E-24
	28	95243.50C	am243	1.43E-05	5.67E-04	4.28E-03	1.77E-02
	29	47109.50C	ag109	1.05E-01	3.30E-01	6.43E-01	1.07E+00

No new entries on this page

P= **20** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.70E-02	7.35E-02	1.67E-01	2.80E-01
	2	92234.50C	u234	4.94E+01	4.72E+01	4.57E+01	4.52E+01
	3	92235.50C	u235	5.48E+03	4.85E+03	4.33E+03	3.71E+03
	4	92236.50C	u236	1.57E+02	3.02E+02	4.32E+02	5.70E+02
	5	92238.50C	u238	1.28E+05	1.28E+05	1.27E+05	1.27E+05
	6	94238.50C	pu238	6.70E-26	1.70E-24	8.29E-24	2.25E-23
	7	94239.50C	pu239	1.72E+02	3.05E+02	4.13E+02	4.71E+02
	8	94240.50C	pu240	4.79E+00	1.66E+01	3.08E+01	4.74E+01
	9	94241.50C	pu241	6.78E-11	1.13E-08	1.93E-07	1.34E-06
	10	94242.50C	pu242	5.78E-02	8.77E-01	3.45E+00	9.10E+00
Group of Fuel Rods # 3 (Table 5.1.1.2)	11	93237.55C	np237	5.58E+00	2.45E+01	5.59E+01	9.39E+01
	12	60143.50C	nd143	1.98E+01	4.14E+01	5.97E+01	7.96E+01
	13	60145.50C	nd145	1.36E+01	2.90E+01	4.25E+01	5.82E+01
	14	62147.50C	sm147	7.60E+00	1.53E+01	2.13E+01	2.77E+01
	15	62149.50C	sm149	4.22E-01	4.41E-01	4.71E-01	4.57E-01
	16	62150.50C	sm150	3.76E+00	8.93E+00	1.39E+01	2.00E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	1.67E+00	4.35E+00	6.87E+00	9.89E+00
	19	63153.55C	eu153	7.68E-01	2.06E+00	3.70E+00	5.97E+00
	20	64155.50C	gd155	6.78E-02	1.10E-01	1.63E-01	2.48E-01
	21	63151.55C	eu151	1.05E+00	1.53E+00	1.82E+00	1.94E+00
	22	42095.50C	mo95	1.47E+01	3.15E+01	4.65E+01	6.40E+01
	23	43099.50C	tc99	1.46E+01	3.14E+01	4.66E+01	6.45E+01
	24	44101.50C	ru101	1.30E+01	2.84E+01	4.27E+01	5.98E+01
	25	44103.50C	rh103	8.35E+00	1.83E+01	2.75E+01	3.79E+01
	26	95241.50c	am241	2.79E-07	2.13E-06	1.03E-05	4.81E-05
	27	95242.50c	am242m	4.98E-26	1.26E-24	6.17E-24	1.68E-23
	28	95243.50C	am243	4.09E-04	1.42E-02	9.26E-02	3.42E-01
	29	47109.50C	ag109	2.94E-01	9.84E-01	1.95E+00	3.25E+00

No new entries on this page

P= **30** MW/MTU

Group of Fuel Rods # 3 (Table 5.1.1.2)	#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
	1	92233.50C	u233	3.72E-02	1.58E-01	3.31E-01	5.10E-01
	2	92234.50C	u234	4.84E+01	4.57E+01	4.51E+01	4.71E+01
	3	92235.50C	u235	5.21E+03	4.32E+03	3.61E+03	2.82E+03
	4	92236.50C	u236	2.20E+02	4.29E+02	6.04E+02	7.78E+02
	5	92238.50C	u238	1.28E+05	1.27E+05	1.27E+05	1.26E+05
	6	94238.50C	pu238	2.63E-25	5.10E-24	2.03E-23	4.45E-23
	7	94239.50C	pu239	2.40E+02	3.99E+02	5.13E+02	5.51E+02
	8	94240.50C	pu240	9.43E+00	3.00E+01	5.25E+01	7.75E+01
	9	94241.50C	pu241	1.07E-09	1.61E-07	2.48E-06	1.57E-05
	10	94242.50C	pu242	2.51E-01	3.29E+00	1.15E+01	2.78E+01
	11	93237.55C	np237	1.23E+01	5.28E+01	1.11E+02	1.71E+02
	12	60143.50C	nd143	2.92E+01	5.96E+01	8.41E+01	1.09E+02
	13	60145.50C	nd145	2.02E+01	4.25E+01	6.16E+01	8.33E+01
	14	62147.50C	sm147	1.10E+01	2.13E+01	2.85E+01	3.56E+01
	15	62149.50C	sm149	4.81E-01	5.16E-01	5.55E-01	5.33E-01
	16	62150.50C	sm150	5.92E+00	1.41E+01	2.22E+01	3.18E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	2.75E+00	6.88E+00	1.05E+01	1.46E+01
	19	63153.55C	eu153	1.26E+00	3.63E+00	6.69E+00	1.08E+01
	20	64155.50C	gd155	8.50E-02	1.62E-01	2.79E-01	4.68E-01
	21	63151.55C	eu151	1.32E+00	1.78E+00	2.10E+00	2.22E+00
	22	42095.50C	mo95	2.19E+01	4.65E+01	6.79E+01	9.26E+01
	23	43099.50C	tc99	2.18E+01	4.65E+01	6.84E+01	9.38E+01
	24	44101.50C	ru101	1.95E+01	4.25E+01	6.39E+01	8.93E+01
	25	44103.50C	rh103	1.27E+01	2.75E+01	4.09E+01	5.55E+01
	26	95241.50c	am241	8.14E-07	9.07E-06	8.40E-05	4.88E-04
	27	95242.50c	am242m	1.95E-25	3.79E-24	1.51E-23	3.31E-23
	28	95243.50C	am243	2.76E-03	8.40E-02	4.88E-01	1.64E+00
	29	47109.50C	ag109	5.52E-01	1.89E+00	3.71E+00	6.19E+00

No new entries on this page

P= **43** MW/MTU

#	MCNP ID /	SCALE ID				
		Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
1	92233.50C	u233	7.54E-02	2.93E-01	5.57E-01	7.78E-01
2	92234.50C	u234	4.71E+01	4.48E+01	4.73E+01	5.53E+01
3	92235.50C	u235	4.87E+03	3.69E+03	2.82E+03	1.89E+03
4	92236.50C	u236	3.01E+02	5.79E+02	7.92E+02	9.81E+02
5	92238.50C	u238	1.28E+05	1.27E+05	1.26E+05	1.25E+05
6	94238.50C	pu238	8.02E-25	1.15E-23	3.63E-23	6.22E-23
7	94239.50C	pu239	3.16E+02	4.85E+02	5.90E+02	5.93E+02
8	94240.50C	pu240	1.66E+01	4.87E+01	8.06E+01	1.13E+02
9	94241.50C	pu241	1.20E-08	1.58E-06	2.15E-05	1.21E-04
10	94242.50C	pu242	8.75E-01	9.75E+00	3.03E+01	6.75E+01
11	93237.55C	np237	2.51E+01	9.82E+01	1.87E+02	2.61E+02
12	60143.50C	nd143	4.09E+01	8.11E+01	1.11E+02	1.37E+02
13	60145.50C	nd145	2.85E+01	5.91E+01	8.44E+01	1.12E+02
14	62147.50C	sm147	1.51E+01	2.77E+01	3.52E+01	4.16E+01
15	62149.50C	sm149	5.65E-01	6.18E-01	6.66E-01	6.30E-01
16	62150.50C	sm150	8.89E+00	2.14E+01	3.39E+01	4.85E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	4.23E+00	1.01E+01	1.48E+01	2.01E+01
19	63153.55C	eu153	2.03E+00	6.15E+00	1.13E+01	1.80E+01
20	64155.50C	gd155	1.09E-01	2.58E-01	4.94E-01	8.53E-01
21	63151.55C	eu151	1.57E+00	2.01E+00	2.42E+00	2.53E+00
22	42095.50C	mo95	3.11E+01	6.53E+01	9.43E+01	1.27E+02
23	43099.50C	tc99	3.10E+01	6.54E+01	9.52E+01	1.29E+02
24	44101.50C	ru101	2.79E+01	6.09E+01	9.12E+01	1.27E+02
25	44103.50C	rh103	1.83E+01	3.94E+01	5.75E+01	7.59E+01
26	95241.50c	am241	2.19E-06	5.58E-05	6.64E-04	3.67E-03
27	95242.50c	am242m	5.96E-25	8.53E-24	2.70E-23	4.63E-23
28	95243.50C	am243	1.44E-02	3.76E-01	1.91E+00	5.74E+00
29	47109.50C	ag109	9.78E-01	3.37E+00	6.54E+00	1.08E+01

Group of Fuel Rods # 3 (Table 5.1.1.2)

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

P= **55** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.20E-01	4.25E-01	7.50E-01	9.63E-01
	2	92234.50C	u234	4.62E+01	4.52E+01	5.23E+01	6.73E+01
	3	92235.50C	u235	4.58E+03	3.16E+03	2.21E+03	1.26E+03
	4	92236.50C	u236	3.72E+02	7.02E+02	9.30E+02	1.10E+03
	5	92238.50C	u238	1.28E+05	1.27E+05	1.25E+05	1.24E+05
	6	94238.50C	pu238	1.60E-24	1.78E-23	4.71E-23	6.51E-23
	7	94239.50C	pu239	3.74E+02	5.37E+02	6.29E+02	6.05E+02
	8	94240.50C	pu240	2.39E+01	6.60E+01	1.04E+02	1.40E+02
	9	94241.50C	pu241	6.01E-08	7.09E-06	8.65E-05	4.33E-04
	10	94242.50C	pu242	1.97E+00	1.94E+01	5.51E+01	1.16E+02
Group of Fuel Rods # 3 (Table 5.1.1.2)	11	93237.55C	np237	4.02E+01	1.43E+02	2.52E+02	3.23E+02
	12	60143.50C	nd143	5.12E+01	9.85E+01	1.31E+02	1.53E+02
	13	60145.50C	nd145	3.60E+01	7.35E+01	1.03E+02	1.35E+02
	14	62147.50C	sm147	1.85E+01	3.24E+01	3.92E+01	4.38E+01
	15	62149.50C	sm149	6.47E-01	7.15E-01	7.68E-01	7.21E-01
	16	62150.50C	sm150	1.18E+01	2.87E+01	4.55E+01	6.42E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	5.62E+00	1.28E+01	1.84E+01	2.47E+01
	19	63153.55C	eu153	2.85E+00	8.82E+00	1.60E+01	2.48E+01
	20	64155.50C	gd155	1.35E-01	3.75E-01	7.43E-01	1.26E+00
	21	63151.55C	eu151	1.73E+00	2.20E+00	2.69E+00	2.78E+00
	22	42095.50C	mo95	3.94E+01	8.19E+01	1.17E+02	1.55E+02
	23	43099.50C	tc99	3.93E+01	8.22E+01	1.18E+02	1.58E+02
	24	44101.50C	ru101	3.57E+01	7.76E+01	1.16E+02	1.61E+02
	25	44103.50C	rh103	2.36E+01	5.00E+01	7.16E+01	9.15E+01
	26	95241.50c	am241	4.94E-06	2.26E-04	2.63E-03	1.31E-02
	27	95242.50c	am242m	1.19E-24	1.32E-23	3.50E-23	4.84E-23
	28	95243.50C	am243	4.26E-02	9.83E-01	4.46E+00	1.22E+01
	29	47109.50C	ag109	1.45E+00	4.98E+00	9.52E+00	1.55E+01

No new entries on this page

P= **10** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.46E-02	5.30E-02	1.24E-01	2.24E-01
	2	92234.50C	u234	1.45E+02	1.41E+02	1.38E+02	1.35E+02
	3	92235.50C	u235	1.65E+04	1.56E+04	1.47E+04	1.38E+04
	4	92236.50C	u236	2.59E+02	4.68E+02	6.67E+02	8.85E+02
	5	92238.50C	u238	3.67E+05	3.66E+05	3.66E+05	3.65E+05
	6	94238.50C	pu238	1.46E-26	4.97E-25	3.16E-24	1.11E-23
	7	94239.50C	pu239	2.62E+02	5.05E+02	7.29E+02	8.94E+02
	8	94240.50C	pu240	3.84E+00	1.50E+01	3.05E+01	4.98E+01
	9	94241.50C	pu241	1.47E-12	2.71E-10	5.28E-09	4.00E-08
	10	94242.50C	pu242	1.12E-02	2.01E-01	9.32E-01	2.76E+00
	11	93237.55C	np237	4.69E+00	1.74E+01	4.11E+01	7.47E+01
Group of Fuel Rods # 4 (Table 5.1.1.2)	12	60143.50C	nd143	2.82E+01	6.00E+01	8.85E+01	1.21E+02
	13	60145.50C	nd145	1.92E+01	4.13E+01	6.14E+01	8.50E+01
	14	62147.50C	sm147	1.10E+01	2.30E+01	3.33E+01	4.49E+01
	15	62149.50C	sm149	1.06E+00	1.07E+00	1.13E+00	1.10E+00
	16	62150.50C	sm150	4.67E+00	1.15E+01	1.80E+01	2.58E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	1.97E+00	5.16E+00	8.53E+00	1.28E+01
	19	63153.55C	eu153	9.76E-01	2.35E+00	3.96E+00	6.12E+00
	20	64155.50C	gd155	1.29E-01	1.99E-01	2.51E-01	3.17E-01
	21	63151.55C	eu151	1.80E+00	3.08E+00	3.90E+00	4.42E+00
	22	42095.50C	mo95	2.07E+01	4.46E+01	6.65E+01	9.22E+01
	23	43099.50C	tc99	2.05E+01	4.43E+01	6.64E+01	9.24E+01
	24	44101.50C	ru101	1.81E+01	3.94E+01	5.95E+01	8.33E+01
	25	44103.50C	rh103	1.15E+01	2.52E+01	3.82E+01	5.33E+01
	26	95241.50c	am241	1.13E-07	9.11E-07	2.87E-06	6.72E-06
	27	95242.50c	am242m	1.09E-26	3.70E-25	2.35E-24	8.29E-24
	28	95243.50C	am243	3.77E-05	1.50E-03	1.14E-02	4.68E-02
	29	47109.50C	ag109	2.93E-01	9.15E-01	1.79E+00	2.96E+00

No new entries on this page

P= **20** MW/MTU

#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233	4.76E-02	2.05E-01	4.67E-01	7.87E-01
2	92234.50C	u234	1.41E+02	1.35E+02	1.31E+02	1.29E+02
3	92235.50C	u235	1.57E+04	1.40E+04	1.25E+04	1.08E+04
4	92236.50C	u236	4.40E+02	8.46E+02	1.21E+03	1.60E+03
5	92238.50C	u238	3.66E+05	3.65E+05	3.64E+05	3.63E+05
6	94238.50C	pu238	1.82E-25	4.66E-24	2.31E-23	6.34E-23
7	94239.50C	pu239	4.89E+02	8.73E+02	1.19E+03	1.36E+03
8	94240.50C	pu240	1.33E+01	4.62E+01	8.58E+01	1.32E+02
9	94241.50C	pu241	1.77E-10	2.94E-08	5.08E-07	3.51E-06
10	94242.50C	pu242	1.55E-01	2.35E+00	9.30E+00	2.45E+01
11	93237.55C	np237	1.56E+01	6.83E+01	1.56E+02	2.64E+02
12	60143.50C	nd143	5.53E+01	1.15E+02	1.67E+02	2.23E+02
13	60145.50C	nd145	3.79E+01	8.06E+01	1.19E+02	1.62E+02
14	62147.50C	sm147	2.12E+01	4.26E+01	5.94E+01	7.74E+01
15	62149.50C	sm149	1.21E+00	1.27E+00	1.36E+00	1.32E+00
16	62150.50C	sm150	1.04E+01	2.48E+01	3.88E+01	5.55E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	4.61E+00	1.20E+01	1.91E+01	2.74E+01
19	63153.55C	eu153	2.14E+00	5.69E+00	1.03E+01	1.65E+01
20	64155.50C	gd155	1.91E-01	3.08E-01	4.56E-01	6.88E-01
21	63151.55C	eu151	2.96E+00	4.37E+00	5.23E+00	5.61E+00
22	42095.50C	mo95	4.09E+01	8.76E+01	1.29E+02	1.78E+02
23	43099.50C	tc99	4.07E+01	8.74E+01	1.30E+02	1.80E+02
24	44101.50C	ru101	3.62E+01	7.89E+01	1.19E+02	1.66E+02
25	44103.50C	rh103	2.33E+01	5.09E+01	7.68E+01	1.06E+02
26	95241.50c	am241	7.69E-07	5.86E-06	2.79E-05	1.28E-04
27	95242.50c	am242m	1.36E-25	3.46E-24	1.72E-23	4.72E-23
28	95243.50C	am243	1.09E-03	3.75E-02	2.47E-01	9.11E-01
29	47109.50C	ag109	8.17E-01	2.73E+00	5.41E+00	9.03E+00

Group of Fuel Rods # 4 (Table 5.1.1.2)

No new entries on this page

P= **30** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.04E-01	4.42E-01	9.33E-01	1.44E+00
	2	92234.50C	u234	1.38E+02	1.31E+02	1.29E+02	1.34E+02
	3	92235.50C	u235	1.50E+04	1.25E+04	1.05E+04	8.29E+03
	4	92236.50C	u236	6.18E+02	1.20E+03	1.70E+03	2.19E+03
	5	92238.50C	u238	3.66E+05	3.64E+05	3.62E+05	3.61E+05
	6	94238.50C	pu238	7.18E-25	1.42E-23	5.72E-23	1.28E-22
	7	94239.50C	pu239	6.85E+02	1.15E+03	1.48E+03	1.61E+03
	8	94240.50C	pu240	2.62E+01	8.36E+01	1.47E+02	2.17E+02
	9	94241.50C	pu241	2.80E-09	4.20E-07	6.55E-06	4.16E-05
	10	94242.50C	pu242	6.73E-01	8.82E+00	3.11E+01	7.53E+01
Group of Fuel Rods # 4 (Table 5.1.1.2)	11	93237.55C	np237	3.43E+01	1.48E+02	3.13E+02	4.85E+02
	12	60143.50C	nd143	8.14E+01	1.66E+02	2.36E+02	3.06E+02
	13	60145.50C	nd145	5.62E+01	1.18E+02	1.72E+02	2.33E+02
	14	62147.50C	sm147	3.07E+01	5.94E+01	7.97E+01	9.99E+01
	15	62149.50C	sm149	1.38E+00	1.48E+00	1.60E+00	1.54E+00
	16	62150.50C	sm150	1.64E+01	3.91E+01	6.17E+01	8.85E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	7.60E+00	1.91E+01	2.91E+01	4.07E+01
	19	63153.55C	eu153	3.51E+00	1.00E+01	1.86E+01	3.00E+01
	20	64155.50C	gd155	2.39E-01	4.51E-01	7.74E-01	1.29E+00
	21	63151.55C	eu151	3.75E+00	5.11E+00	6.07E+00	6.45E+00
	22	42095.50C	mo95	6.09E+01	1.29E+02	1.89E+02	2.58E+02
	23	43099.50C	tc99	6.07E+01	1.29E+02	1.91E+02	2.62E+02
	24	44101.50C	ru101	5.43E+01	1.18E+02	1.78E+02	2.49E+02
	25	44103.50C	rh103	3.53E+01	7.67E+01	1.15E+02	1.56E+02
	26	95241.50c	am241	2.25E-06	2.45E-05	2.24E-04	1.30E-03
	27	95242.50c	am242m	5.34E-25	1.05E-23	4.26E-23	9.51E-23
	28	95243.50C	am243	7.34E-03	2.23E-01	1.31E+00	4.40E+00
	29	47109.50C	ag109	1.53E+00	5.24E+00	1.03E+01	1.72E+01

No new entries on this page

P= **43** MW/MTU

	#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
	1	92233.50C	u233	2.11E-01	8.23E-01	1.58E+00	2.23E+00
	2	92234.50C	u234	1.35E+02	1.28E+02	1.35E+02	1.57E+02
	3	92235.50C	u235	1.40E+04	1.07E+04	8.27E+03	5.66E+03
	4	92236.50C	u236	8.43E+02	1.62E+03	2.23E+03	2.77E+03
	5	92238.50C	u238	3.65E+05	3.63E+05	3.60E+05	3.57E+05
	6	94238.50C	pu238	2.21E-24	3.23E-23	1.04E-22	1.83E-22
	7	94239.50C	pu239	9.03E+02	1.40E+03	1.72E+03	1.74E+03
	8	94240.50C	pu240	4.62E+01	1.36E+02	2.26E+02	3.18E+02
	9	94241.50C	pu241	3.14E-08	4.15E-06	5.73E-05	3.25E-04
	10	94242.50C	pu242	2.35E+00	2.62E+01	8.22E+01	1.84E+02
	11	93237.55C	np237	7.01E+01	2.76E+02	5.30E+02	7.47E+02
Group of Fuel Rods # 4 (Table 5.1.1.2)	12	60143.50C	nd143	1.14E+02	2.27E+02	3.12E+02	3.88E+02
	13	60145.50C	nd145	7.94E+01	1.65E+02	2.36E+02	3.14E+02
	14	62147.50C	sm147	4.21E+01	7.75E+01	9.89E+01	1.18E+02
	15	62149.50C	sm149	1.62E+00	1.78E+00	1.92E+00	1.83E+00
	16	62150.50C	sm150	2.47E+01	5.95E+01	9.45E+01	1.35E+02
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	1.17E+01	2.79E+01	4.12E+01	5.62E+01
	19	63153.55C	eu153	5.63E+00	1.70E+01	3.15E+01	5.01E+01
	20	64155.50C	gd155	3.06E-01	7.14E-01	1.37E+00	2.37E+00
	21	63151.55C	eu151	4.47E+00	5.82E+00	7.01E+00	7.39E+00
	22	42095.50C	mo95	8.65E+01	1.82E+02	2.63E+02	3.55E+02
	23	43099.50C	tc99	8.63E+01	1.82E+02	2.66E+02	3.61E+02
	24	44101.50C	ru101	7.78E+01	1.69E+02	2.55E+02	3.55E+02
	25	44103.50C	rh103	5.12E+01	1.10E+02	1.61E+02	2.14E+02
	26	95241.50c	am241	6.04E-06	1.48E-04	1.77E-03	9.86E-03
	27	95242.50c	am242m	1.64E-24	2.40E-23	7.76E-23	1.36E-22
	28	95243.50C	am243	3.82E-02	1.00E+00	5.14E+00	1.55E+01
	29	47109.50C	ag109	2.72E+00	9.34E+00	1.82E+01	3.00E+01

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

P= **55** MW/MTU

#	MCNP ID /	SCALE ID				
		Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
1	92233.50C	u233	3.37E-01	1.20E+00	2.14E+00	2.78E+00
2	92234.50C	u234	1.32E+02	1.29E+02	1.49E+02	1.91E+02
3	92235.50C	u235	1.32E+04	9.26E+03	6.54E+03	3.85E+03
4	92236.50C	u236	1.04E+03	1.97E+03	2.63E+03	3.13E+03
5	92238.50C	u238	3.65E+05	3.62E+05	3.58E+05	3.54E+05
6	94238.50C	pu238	4.43E-24	5.07E-23	1.37E-22	1.95E-22
7	94239.50C	pu239	1.07E+03	1.56E+03	1.84E+03	1.79E+03
8	94240.50C	pu240	6.65E+01	1.85E+02	2.94E+02	3.96E+02
9	94241.50C	pu241	1.58E-07	1.87E-05	2.32E-04	1.18E-03
10	94242.50C	pu242	5.28E+00	5.23E+01	1.50E+02	3.16E+02
11	93237.55C	np237	1.13E+02	4.03E+02	7.18E+02	9.32E+02
12	60143.50C	nd143	1.43E+02	2.76E+02	3.70E+02	4.36E+02
13	60145.50C	nd145	1.00E+02	2.05E+02	2.90E+02	3.79E+02
14	62147.50C	sm147	5.16E+01	9.08E+01	1.11E+02	1.25E+02
15	62149.50C	sm149	1.85E+00	2.05E+00	2.22E+00	2.09E+00
16	62150.50C	sm150	3.27E+01	7.98E+01	1.27E+02	1.80E+02
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	1.56E+01	3.56E+01	5.14E+01	6.92E+01
19	63153.55C	eu153	7.90E+00	2.44E+01	4.46E+01	6.92E+01
20	64155.50C	gd155	3.78E-01	1.04E+00	2.06E+00	3.51E+00
21	63151.55C	eu151	4.96E+00	6.38E+00	7.82E+00	8.16E+00
22	42095.50C	mo95	1.10E+02	2.28E+02	3.28E+02	4.36E+02
23	43099.50C	tc99	1.10E+02	2.29E+02	3.31E+02	4.43E+02
24	44101.50C	ru101	9.94E+01	2.16E+02	3.24E+02	4.51E+02
25	44103.50C	rh103	6.59E+01	1.40E+02	2.01E+02	2.59E+02
26	95241.50c	am241	1.35E-05	5.99E-04	7.06E-03	3.56E-02
27	95242.50c	am242m	3.30E-24	3.77E-23	1.02E-22	1.45E-22
28	95243.50C	am243	1.14E-01	2.63E+00	1.21E+01	3.33E+01
29	47109.50C	ag109	4.03E+00	1.38E+01	2.65E+01	4.32E+01

Group of Fuel Rods # 4 (Table 5.1.1.2)

No new entries on this page

P= **10** MW/MTU

#	MCNP ID	/ SCALE ID				
		Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
1	92233.50C	u233	5.76E-03	2.09E-02	4.89E-02	8.82E-02
2	92234.50C	u234	5.79E+01	5.64E+01	5.51E+01	5.39E+01
3	92235.50C	u235	6.60E+03	6.24E+03	5.91E+03	5.54E+03
4	92236.50C	u236	1.03E+02	1.85E+02	2.64E+02	3.50E+02
5	92238.50C	u238	1.47E+05	1.46E+05	1.46E+05	1.46E+05
6	94238.50C	pu238	5.63E-27	1.92E-25	1.23E-24	4.35E-24
7	94239.50C	pu239	1.05E+02	2.02E+02	2.92E+02	3.59E+02
8	94240.50C	pu240	1.51E+00	5.89E+00	1.20E+01	1.96E+01
9	94241.50C	pu241	5.53E-13	1.02E-10	2.00E-09	1.51E-08
10	94242.50C	pu242	4.28E-03	7.68E-02	3.58E-01	1.06E+00
11	93237.55C	np237	1.86E+00	6.85E+00	1.62E+01	2.94E+01
12	60143.50C	nd143	1.11E+01	2.36E+01	3.49E+01	4.76E+01
13	60145.50C	nd145	7.55E+00	1.62E+01	2.42E+01	3.34E+01
14	62147.50C	sm147	4.32E+00	9.03E+00	1.31E+01	1.77E+01
15	62149.50C	sm149	4.25E-01	4.33E-01	4.55E-01	4.45E-01
16	62150.50C	sm150	1.83E+00	4.51E+00	7.07E+00	1.01E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	7.71E-01	2.02E+00	3.34E+00	5.02E+00
19	63153.55C	eu153	3.84E-01	9.23E-01	1.56E+00	2.40E+00
20	64155.50C	gd155	5.10E-02	7.89E-02	9.97E-02	1.25E-01
21	63151.55C	eu151	7.12E-01	1.22E+00	1.56E+00	1.77E+00
22	42095.50C	mo95	8.12E+00	1.75E+01	2.61E+01	3.62E+01
23	43099.50C	tc99	8.06E+00	1.74E+01	2.61E+01	3.63E+01
24	44101.50C	ru101	7.11E+00	1.55E+01	2.34E+01	3.27E+01
25	44103.50C	rh103	4.52E+00	9.89E+00	1.50E+01	2.10E+01
26	95241.50c	am241	4.41E-08	3.56E-07	1.12E-06	2.62E-06
27	95242.50c	am242m	4.19E-27	1.43E-25	9.15E-25	3.23E-24
28	95243.50C	am243	1.44E-05	5.69E-04	4.33E-03	1.78E-02
29	47109.50C	ag109	1.15E-01	3.59E-01	7.03E-01	1.16E+00

Group of Fuel Rods # 5 (Table 5.1.1.2)

No new entries on this page

SN No. 663E, Vol.1 maintained by Oleg Povetko

P= **20** MW/MTU

#	MCNP ID	/ SCALE ID	Years of Burnup: 0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233	1.88E-02	8.07E-02	1.85E-01	3.11E-01
2	92234.50C	u234	5.66E+01	5.41E+01	5.23E+01	5.17E+01
3	92235.50C	u235	6.29E+03	5.61E+03	5.03E+03	4.37E+03
4	92236.50C	u236	1.74E+02	3.34E+02	4.80E+02	6.31E+02
5	92238.50C	u238	1.47E+05	1.46E+05	1.46E+05	1.45E+05
6	94238.50C	pu238	7.05E-26	1.82E-24	9.07E-24	2.51E-23
7	94239.50C	pu239	1.95E+02	3.50E+02	4.78E+02	5.50E+02
8	94240.50C	pu240	5.23E+00	1.81E+01	3.38E+01	5.20E+01
9	94241.50C	pu241	6.69E-11	1.11E-08	1.93E-07	1.33E-06
10	94242.50C	pu242	5.93E-02	8.99E-01	3.58E+00	9.41E+00
11	93237.55C	np237	6.15E+00	2.69E+01	6.18E+01	1.04E+02
12	60143.50C	nd143	2.17E+01	4.53E+01	6.57E+01	8.77E+01
13	60145.50C	nd145	1.49E+01	3.17E+01	4.67E+01	6.38E+01
14	62147.50C	sm147	8.33E+00	1.68E+01	2.34E+01	3.05E+01
15	62149.50C	sm149	4.87E-01	5.11E-01	5.48E-01	5.35E-01
16	62150.50C	sm150	4.09E+00	9.71E+00	1.52E+01	2.18E+01
17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152	1.80E+00	4.69E+00	7.47E+00	1.08E+01
19	63153.55C	eu153	8.40E-01	2.23E+00	4.03E+00	6.47E+00
20	64155.50C	gd155	7.58E-02	1.22E-01	1.80E-01	2.70E-01
21	63151.55C	eu151	1.18E+00	1.75E+00	2.10E+00	2.26E+00
22	42095.50C	mo95	1.61E+01	3.44E+01	5.09E+01	7.00E+01
23	43099.50C	tc99	1.60E+01	3.43E+01	5.12E+01	7.06E+01
24	44101.50C	ru101	1.42E+01	3.10E+01	4.68E+01	6.54E+01
25	44103.50C	rh103	9.17E+00	2.00E+01	3.03E+01	4.17E+01
26	95241.50c	am241	3.01E-07	2.28E-06	1.08E-05	4.89E-05
27	95242.50c	am242m	5.25E-26	1.35E-24	6.75E-24	1.87E-23
28	95243.50C	am243	4.13E-04	1.43E-02	9.45E-02	3.48E-01
29	47109.50C	ag109	3.21E-01	1.07E+00	2.13E+00	3.54E+00

Group of Fuel Rods # 5 (Table 5.1.1.2)

No new entries on this page

P= **30** MW/MTU

#	MCNP ID	/ SCALE ID	Years of Burnup:	0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233		4.09E-02	1.74E-01	3.70E-01	5.75E-01
2	92234.50C	u234		5.54E+01	5.24E+01	5.15E+01	5.36E+01
3	92235.50C	u235		6.00E+03	5.03E+03	4.25E+03	3.38E+03
4	92236.50C	u236		2.44E+02	4.74E+02	6.71E+02	8.65E+02
5	92238.50C	u238		1.46E+05	1.46E+05	1.45E+05	1.44E+05
6	94238.50C	pu238		2.79E-25	5.56E-24	2.27E-23	5.14E-23
7	94239.50C	pu239		2.74E+02	4.61E+02	6.00E+02	6.52E+02
8	94240.50C	pu240		1.03E+01	3.29E+01	5.80E+01	8.57E+01
9	94241.50C	pu241		1.06E-09	1.59E-07	2.50E-06	1.59E-05
10	94242.50C	pu242		2.58E-01	3.38E+00	1.20E+01	2.90E+01
11	93237.55C	np237		1.35E+01	5.83E+01	1.24E+02	1.93E+02
12	60143.50C	nd143		3.20E+01	6.55E+01	9.30E+01	1.21E+02
13	60145.50C	nd145		2.21E+01	4.64E+01	6.77E+01	9.15E+01
14	62147.50C	sm147		1.21E+01	2.34E+01	3.14E+01	3.94E+01
15	62149.50C	sm149		5.54E-01	5.97E-01	6.47E-01	6.25E-01
16	62150.50C	sm150		6.45E+00	1.53E+01	2.43E+01	3.47E+01
17	62151.50C	sm151		0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152		2.97E+00	7.45E+00	1.14E+01	1.60E+01
19	63153.55C	eu153		1.38E+00	3.93E+00	7.29E+00	1.18E+01
20	64155.50C	gd155		9.49E-02	1.78E-01	3.04E-01	5.05E-01
21	63151.55C	eu151		1.50E+00	2.05E+00	2.45E+00	2.61E+00
22	42095.50C	mo95		2.40E+01	5.08E+01	7.46E+01	1.02E+02
23	43099.50C	tc99		2.39E+01	5.08E+01	7.52E+01	1.03E+02
24	44101.50C	ru101		2.13E+01	4.65E+01	7.01E+01	9.79E+01
25	44103.50C	rh103		1.39E+01	3.02E+01	4.52E+01	6.13E+01
26	95241.50c	am241		8.79E-07	9.44E-06	8.56E-05	4.95E-04
27	95242.50c	am242m		2.08E-25	4.14E-24	1.69E-23	3.82E-23
28	95243.50C	am243		2.80E-03	8.51E-02	5.02E-01	1.68E+00
29	47109.50C	ag109		6.03E-01	2.06E+00	4.06E+00	6.74E+00

Group of Fuel Rods # 5 (Table 5.1.1.2)

No new entries on this page

P= **43** MW/MTU

#	MCNP ID	/ SCALE ID	Years of Burnup:	0.551951	1.20493	1.81456	2.54511
1	92233.50C	u233		8.30E-02	3.26E-01	6.29E-01	8.94E-01
2	92234.50C	u234		5.39E+01	5.13E+01	5.39E+01	6.26E+01
3	92235.50C	u235		5.63E+03	4.34E+03	3.37E+03	2.34E+03
4	92236.50C	u236		3.33E+02	6.41E+02	8.83E+02	1.10E+03
5	92238.50C	u238		1.46E+05	1.45E+05	1.44E+05	1.43E+05
6	94238.50C	pu238		8.62E-25	1.28E-23	4.20E-23	7.50E-23
7	94239.50C	pu239		3.62E+02	5.65E+02	6.98E+02	7.14E+02
8	94240.50C	pu240		1.82E+01	5.35E+01	8.95E+01	1.26E+02
9	94241.50C	pu241		1.19E-08	1.58E-06	2.20E-05	1.25E-04
10	94242.50C	pu242		9.02E-01	1.01E+01	3.18E+01	7.09E+01
11	93237.55C	np237		2.76E+01	1.09E+02	2.11E+02	3.00E+02
12	60143.50C	nd143		4.49E+01	8.93E+01	1.24E+02	1.54E+02
13	60145.50C	nd145		3.12E+01	6.47E+01	9.31E+01	1.24E+02
14	62147.50C	sm147		1.66E+01	3.05E+01	3.90E+01	4.65E+01
15	62149.50C	sm149		6.48E-01	7.14E-01	7.77E-01	7.42E-01
16	62150.50C	sm150		9.69E+00	2.33E+01	3.72E+01	5.32E+01
17	62151.50C	sm151		0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	62152.50C	sm152		4.59E+00	1.09E+01	1.62E+01	2.21E+01
19	63153.55C	eu153		2.21E+00	6.66E+00	1.24E+01	1.97E+01
20	64155.50C	gd155		1.21E-01	2.80E-01	5.37E-01	9.28E-01
21	63151.55C	eu151		1.79E+00	2.34E+00	2.84E+00	3.01E+00
22	42095.50C	mo95		3.40E+01	7.14E+01	1.04E+02	1.40E+02
23	43099.50C	tc99		3.40E+01	7.16E+01	1.05E+02	1.42E+02
24	44101.50C	ru101		3.06E+01	6.66E+01	1.00E+02	1.40E+02
25	44103.50C	rh103		2.01E+01	4.33E+01	6.37E+01	8.45E+01
26	95241.50c	am241		2.36E-06	5.67E-05	6.79E-04	3.80E-03
27	95242.50c	am242m		6.41E-25	9.53E-24	3.12E-23	5.58E-23
28	95243.50C	am243		1.46E-02	3.83E-01	1.98E+00	5.97E+00
29	47109.50C	ag109		1.07E+00	3.67E+00	7.16E+00	1.18E+01

Group of Fuel Rods # 5 (Table 5.1.1.2)

No new entries on this page

P= **55** MW/MTU

	#	MCNP ID /	SCALE ID				
			Years of Burnup:	**0.551951**	**1.20493**	**1.81456**	**2.54511**
	1	92233.50C	u233	1.33E-01	4.77E-01	8.56E-01	1.12E+00
	2	92234.50C	u234	5.29E+01	5.16E+01	5.94E+01	7.63E+01
	3	92235.50C	u235	5.31E+03	3.76E+03	2.68E+03	1.62E+03
	4	92236.50C	u236	4.12E+02	7.79E+02	1.04E+03	1.25E+03
	5	92238.50C	u238	1.46E+05	1.45E+05	1.43E+05	1.42E+05
	6	94238.50C	pu238	1.74E-24	2.03E-23	5.58E-23	8.14E-23
	7	94239.50C	pu239	4.31E+02	6.32E+02	7.51E+02	7.35E+02
	8	94240.50C	pu240	2.62E+01	7.28E+01	1.17E+02	1.58E+02
	9	94241.50C	pu241	5.99E-08	7.14E-06	8.94E-05	4.58E-04
	10	94242.50C	pu242	2.03E+00	2.01E+01	5.82E+01	1.23E+02
	11	93237.55C	np237	4.44E+01	1.60E+02	2.87E+02	3.77E+02
Group of Fuel Rods # 5 (Table 5.1.1.2)	12	60143.50C	nd143	5.62E+01	1.09E+02	1.47E+02	1.75E+02
	13	60145.50C	nd145	3.94E+01	8.07E+01	1.14E+02	1.50E+02
	14	62147.50C	sm147	2.03E+01	3.58E+01	4.37E+01	4.94E+01
	15	62149.50C	sm149	7.41E-01	8.26E-01	8.97E-01	8.50E-01
	16	62150.50C	sm150	1.28E+01	3.13E+01	4.99E+01	7.08E+01
	17	62151.50C	sm151	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	18	62152.50C	sm152	6.09E+00	1.40E+01	2.02E+01	2.72E+01
	19	63153.55C	eu153	3.10E+00	9.58E+00	1.75E+01	2.72E+01
	20	64155.50C	gd155	1.49E-01	4.05E-01	8.10E-01	1.38E+00
	21	63151.55C	eu151	1.99E+00	2.58E+00	3.17E+00	3.33E+00
	22	42095.50C	mo95	4.31E+01	8.97E+01	1.29E+02	1.72E+02
	23	43099.50C	tc99	4.31E+01	9.01E+01	1.31E+02	1.75E+02
	24	44101.50C	ru101	3.91E+01	8.50E+01	1.28E+02	1.78E+02
	25	44103.50C	rh103	2.59E+01	5.51E+01	7.97E+01	1.03E+02
	26	95241.50c	am241	5.23E-06	2.29E-04	2.72E-03	1.38E-02
	27	95242.50c	am242m	1.29E-24	1.51E-23	4.15E-23	6.06E-23
	28	95243.50C	am243	4.34E-02	1.01E+00	4.66E+00	1.29E+01
	29	47109.50C	ag109	1.58E+00	5.42E+00	1.04E+01	1.70E+01

No new entries on this page

#12022007

Critica Limits (CL) and Upper Subcritical Limits (USL) calculations results for the Loading Curve evaluation:

5% Enrichment (File Loading Curve December 2007.xlsx, sheet "5 % Enrichment"):

Postclosure Burnup (GWd/ MTU)	AENCF	CL(AENCF)	Preclosure Burnup (GWd/ MTU)	AENCF	USL (AENCF)
10	0.1689	0.981423	10	0.1689	0.931423
15	0.1755	0.98101	15	0.1741	0.931098
20	0.1824	0.980578	20	0.1812	0.930653
25	0.1874	0.980265	25	0.1864	0.930328
30	0.1936	0.979877	30	0.1928	0.929927
35	0.2004	0.979451	35	0.1994	0.929514
40	0.2047	0.979182	40	0.2036	0.929251
45	0.2125	0.978693	45	0.2101	0.928844

4.5% Enrichment: (File Loading Curve December 2007.xlsx, sheet "4.5 % Enrichment"):

Postclosure Burnup (GWd/ MTU)	AENCF	CL(AENCF)	Preclosure Burnup (GWd/ MTU)	AENCF	USL (AENCF)
5	0.1661	0.981599	5	0.1654	0.931643
10	0.1727	0.981186	10	0.172	0.931229
15	0.1793	0.980772	15	0.1786	0.930816
20	0.1863	0.980334	20	0.1855	0.930384
25	0.1918	0.979989	25	0.1918	0.929989
30	0.1982	0.979589	30	0.1977	0.92962
35	0.2067	0.979056	35	0.2044	0.9292
40	0.2107	0.978806	40	0.2104	0.928825
45	0.2187	0.978305	45	0.2188	0.928299

No new entries on this page.

4.2% Enrichment: (File Loading Curve December 2007.xlsx, sheet "4.2 % Enrichment"):

Postclosure Burnup (GWd/ MTU)	AENCF	CL(AENCF)	Preclosure Burnup (GWd/ MTU)	AENCF	USL (AENCF)
5	0.17	0.981355	5	0.1669	0.931549
10	0.1763	0.98096	10	0.1739	0.93111
15	0.1841	0.980472	15	0.1809	0.930672
20	0.1915	0.980008	20	0.18795	0.930231
25	0.1979	0.979608	25	0.1942	0.929839
30	0.2044	0.9792	30	0.2006	0.929438
35	0.2126	0.978687	35	0.20805	0.928972
40	0.218	0.978349	40	0.21375	0.928615
45	0.2257	0.977867	45	0.22195	0.928101

2.83% Enrichment: (File Loading Curve December 2007.xlsx, sheet "2.83 % Enrichment"):

Postclosure Burnup (GWd/ MTU)	AENCF	CL(AENCF)	Preclosure Burnup (GWd/ MTU)	AENCF	USL (AENCF)
			5	0.18225	0.930588
10	0.1885	0.980196	10	0.19205	0.929974
15	0.1983	0.979582	15	0.20185	0.92936
20	0.2067	0.979056	20	0.211	0.928787
25	0.2136	0.978624	25	0.21895	0.928289
30	0.2215	0.97813	30	0.2273	0.927766
35	0.231	0.977535	35	0.236	0.927222
40	0.2379	0.977103	40	0.2434	0.926758

No new entries on this page.

#12032007

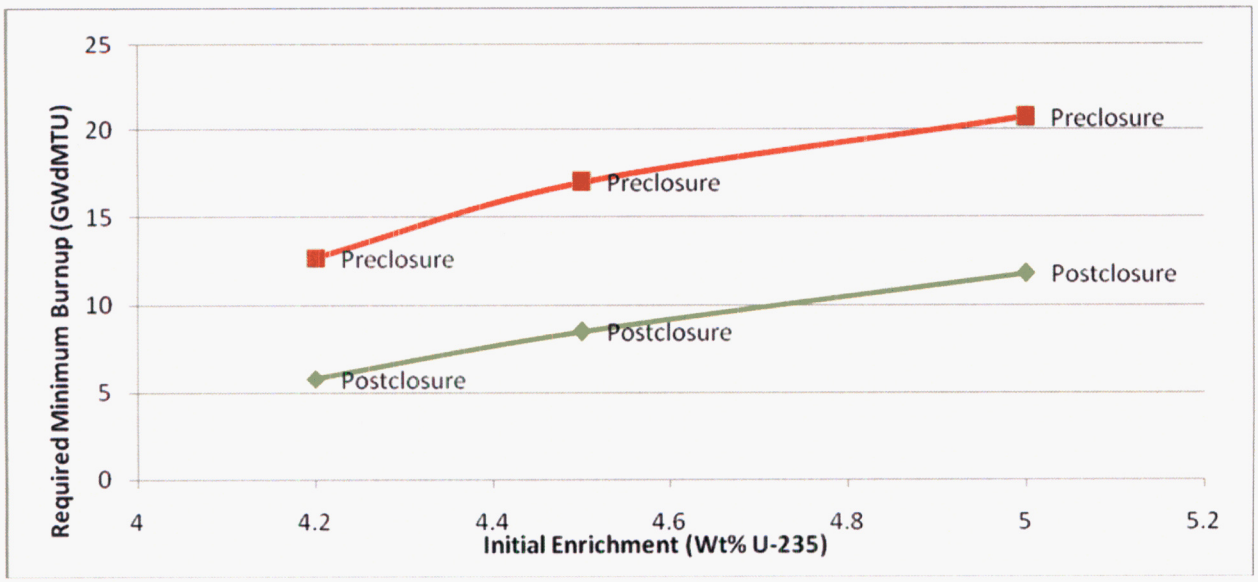
Loading Curve for the Postclosure and Preclosure periods (see Loading Curve December 2007.xlsx, sheet "Loading Curve")

Postclosure:

Initial Enrichment Wt% U-235	Required Minimum Burnup GWdMTU
4.2	5.8
4.5	8.5
5	11.8

Preclosure:

Initial Enrichment Wt% U-235	Required Minimum Burnup GWdMTU
4.2	12.7
4.5	17
5	20.7



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#12042007 #12052007

Work Plan for Milestone 14002.01.181.830 (Gap 11)
Conducted sensitivity analyses for burnup credit for the corresponding loading curve:

Assembly Misloading

MCNP Calculation Cases
Base case 1: All assemblies in a TAD are filled with the same universe (Universe #56);
Base case 2: Central Assembly is filled with its own, different universe (Universe #57), but inputted parameters for the Universe #57 is completely the same as for the Universe #56, so the physical properties of the central and all the others assemblies are the same.

MCNP case	Enrichment	Burnup	Central Assembly Enrichment	Central Assembly Burnup
	Wt % U-235	gWd/MT U	Wt % U-235	gWd/MT U
5% Enrichment, Burnup 20.7 Gwd/MTU:				
TAD_A7_F5_W5_APB11_B20p7 (Base Case) All assemblies in a TAD are the same	5	20.7	-	-
TAD_A7_F5_W5_APB11_B20p7_Misload_ (Base Case) Additional Input for the Central Assembly	5	20.7	5	20.7
TAD_A7_F5_W5_APB11_B20p7_Misload_0B	5	20.7	5	0
TAD_A7_F5_W5_APB11_B20p7_Misload_9B	5	20.7	5	9
4.5% Enrichment, Burnup 17 Gwd/MTU:				
TAD_A7_F5_W45_APB11_B17 (Base Case) All assemblies in a TAD are the same	4.5	17	-	-
TAD_A7_F5_W45_APB11_B17_Misload_ (Base Case) Additional Input for the Central Assembly	4.5	17	4.5	17
TAD_A7_F5_W45_APB11_B17_Misload_0B	4.5	17	4.5	0
TAD_A7_F5_W45_APB11_B17_Misload_9B	4.5	17	4.5	9
4.2% Enrichment, Burnup 12.7 Gwd/MTU:				
TAD_A7_F5_W42_APB11_B12p7 (Base Case) All assemblies in a TAD are the same	4.2	12.7	-	-
TAD_A7_F5_W42_APB11_B12p7_Misload_ (Base Case) Additional Input for the Central Assembly	4.2	12.7	4.2	12.7
TAD_A7_F5_W42_APB11_B12p7_Misload_0B	4.2	12.7	4.2	0

No new entries on this page.

Misleading Assembly Calculation Results
(see SN December 2007 Postclosure.xlsx, Sheet "Misleading Assembly")

MCNP case	K_{eff} (σ)	Reactivity ($*10^4$)
5% Enrichment, Burnup 20.7 Gwd/MTU:		
TAD_A7_F5_W5_APB11_B20p7	0.92478 (0.00243)	-
TAD_A7_F5_W5_APB11_B20p7_Misload_	0.92074 (0.00188)	-
TAD_A7_F5_W5_APB11_B20p7_Misload_0B	0.95872 (0.00203)	430
TAD_A7_F5_W5_APB11_B20p7_Misload_9B	0.93226 (0.00196)	134
4.5% Enrichment, Burnup 17 Gwd/MTU:		
TAD_A7_F5_W45_APB11_B17	0.92164 (0.00213)	-
TAD_A7_F5_W45_APB11_B17_Misload_	0.91872 (0.00215)	-
TAD_A7_F5_W45_APB11_B17_Misload_0B	0.94973 (0.00211)	355
TAD_A7_F5_W45_APB11_B17_Misload_9B	0.93065 (0.00250)	140
4.2% Enrichment, Burnup 12.7 Gwd/MTU:		
TAD_A7_F5_W42_APB11_B12p7	0.93603 (0.00194)	-
TAD_A7_F5_W42_APB11_B12p7_Misload_	0.93372 (0.00231)	-
TAD_A7_F5_W42_APB11_B12p7_Misload_0B	0.95466 (0.00196)	235

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