MOL.19980825.0003

CRWMS/M&O

Calculation Cover Sheet

Complete only applicable items.

1. QA: L

Page: 1 Of: 91

2. Calculation Title Principle Isotope Burnup Credit Loading Curve for the 21 PWR Waste Package	
3. Document Identifier (including Revision Number) BBA000000-01717-0210-00008 REV 00	4. Total Pages 91
5. Total Attachments 1	6. Attachment Numbers - Number of pages in each I-29 (See Box 10)

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10. Remarks

Atachment I is contained on an attachment CD-ROM of this calculation file. The page number listed in Box 6 refers to the number of pages in the hard-copy listing of each file's content on the CD-ROM. THIS DOCUMENT WAS AN IN-PROCESS ACTIVITY PRIOR TO 8/14/98 AND WAS COMPLETED IN ACCORDANCE WITH REV 03 OF QAP-SI-0.

THE ELECTRONIC ATTACHMENTS HAVE BEEN CHECKED. JMS 8/19/98

PCG compliance review by WEWallin 8/19/98

EDITORIAL CHANGES WERE MADE ON PAGES 7 and 90 on 10/20/98 TWS FOR AHW 10.20.98

DAT 10/20/98

Revision History

11. Revision No.	12. Date Approved	13. Description of Revision
REV 00		Initial Issuance

Table of Contents:

1.0 Purpose

The purpose of this calculation is to determine the required minimum burnup as a function of initial pressurized water reactor (PWR) assembly enrichment that would permit loading of fuel into the 21 PWR waste package (WP), as provided for in QAP-2-0 Activity Evaluation, *Perform Criticality, Thermal, Structural, & Shielding Analyses* (Reference 7.1). The results are intended to show that PWR spent nuclear fuel (SNF) assemblies whose actual burnup exceeds the required minimum burnup may be loaded into a 21 PWR waste package with a stainless steel/boron criticality control basket design.

2.0 Method

The solution method employed was to use the SAS2H sequence of the SCALE 4.3 computer code system (Reference 7.4) to determine the isotopics of the SNF for various initial fuel enrichments and SNF burnups. The CRAFT computer code was used to control the processing of the eighteen axial nodes of the SNF burnup profile and simplify the usage of SAS2H. The isotopic description of the spent fuel provided by SAS2H was entered into a criticality model, and the Monte Carlo N-Particle Version 4A computer code (MCNP4A) (Reference 7.2) was used to calculate k_{eff} for criticality safety calculations.

3.0 Assumptions

3.1 The Crystal River Unit 3 SNF assembly A08 is representative of typical PWR SNF. This assumption is used in Section 5.1.

3.2 The isotopic contents created by adjusting the specific power are representative of isotopics which would be generated by typical irradiation cycles. This assumption is used in Section 5.5.

3.3 A modification to the Crystal River Unit 3 SNF assembly A08 to add a generic Burnable Poison Rod Assembly (BPRA) is representative of PWR SNF which has contained a BPRA during one or more irradiation cycles. This assumption is used in Section 5.3.

3.4 The bias of k_{eff} is 0.02 and the administrative limit is 0.95. This assumption is used in Sections 6.1 and 6.2.

4.0 Use of Computer Software

The calculation of nuclear reactivity of the fresh fuel configuration for the 21 PWR Uncanistered Fuel (UCF) WP was performed with the MCNP4A computer code. MCNP4A calculates k_{eff} for a variety of geometric configurations with neutron cross sections for elements and isotopes

described in the Evaluated Nuclear Data File version B-V (ENDF-B/V). MCNP4A is appropriate for the fuel geometries and materials required for these analyses. The calculations using the MCNP4A software were executed on a Hewlett-Packard workstation. The software qualification of the MCNP4A software, including problems related to calculation of k_{eff} for fissile systems, is summarized in the Monte Carlo N-Particle code Software Qualification Report for MCNP4A (Reference 7.3). The MCNP4A evaluations performed for this design are fully within the range of the validation for the MCNP4A software used. Access to and use of the MCNP4A software for this analysis was granted by Software Configuration Management and performed in accordance with the QAP-SI series procedures. Inputs for the MCNP4A software are included in Attachment I as described in the following design analysis.

The calculation of the isotopic contents of the PWR SNF assembly was performed with the SAS2H sequence of the SCALE 4.3 Modular Code System. SAS2H is designed for spent fuel depletion calculations to determine spent fuel isotopic content, decay heat rates, and radiation source terms. Thus, SAS2H is appropriate for the generation of isotopic contents for the calculations of this analysis. The calculations using the SAS2H software were executed on a Hewlett-Packard workstation. The software qualification of the SAS2H software, including benchmark problems related to generation of isotope contents, is summarized in the Software Qualification Report for the SCALE Modular Code system (Reference 7.5). The SAS2H evaluations performed for this design are fully within the range of the validation for the SAS2H software used. The associated 44GROUP cross section library was used for these calculations. Access to and use of the SAS2H software for this analysis was granted by Software Configuration Management and performed in accordance with the QAP-SI series procedures. Inputs for the CRAFT software are included in Attachment I as described in the following design analysis.

The isotopic contents of spent PWR fuel for long time periods were calculated with the ORIGEN-S module which is a part of the SAS2H code sequence. The SAS2H sequence provides isotopic data at the time of discharge from the reactor and for 5, 10, 15, 20, and 25 years after discharge. ORIGEN-S is run as a stand-alone module to provide isotopic data at longer time periods using the decay constants contained within the 44GROUP cross section library, to facilitate future analyses in the repository environment.

The CRAFT computer code (Reference 7.6) was used to orchestrate the performance of SAS2H runs for the eighteen axial nodes of the SNF assembly. The CRAFT computer code was developed by Waste Package Operations to facilitate isotopic calculations for burnup credit evaluations, and is thus used within its range of validity.

4.1 Software Approved for QA Work

4.1.1 MCNP 4A HP 9000 Version, CSCI: 30006 V 4A, installed on a Hewlett Packard Apollo 9000 Series Workstation.

The input files used are echoed in the output files. The output files are provided on CD-ROM recordable laser disc as Attachment I.

a) The MCNP 4A computer code (Reference 7.3) is an appropriate tool to be utilized to determine the criticality potential, k_{eff}, of fresh and spent lattices of PWR fuel assemblies.
b) This software has been validated over the range within which it was used.
c) It was previously obtained from the Software Control Management (SCM) in accordance with appropriate procedures.

4.1.2 SCALE 4.3 HP 9000 Version, CSCI: 30011 V4.3, installed on a Hewlett Packard Apollo 9000 Series Workstation.

The input files used are echoed in the output files. The output files are provided on CD-ROM recordable laser disc as Attachment I.

a) The SCALE 4.3 computer code (Reference 7.4) is an appropriate tool to be utilized to perform isotopic depletion calculations of PWR fuel assemblies via the SAS2H and ORIGEN-S modules.
b) This software has been validated over the range it was used.
c) It was previously obtained in accordance with appropriate procedures.

4.2 Software Routines

4.2.1 CRAFT – A Commercial Reactor Assembly Follow Taskmaster
Identification: CRAFT Version 1.0, compiled on December 16, 1996

Description and Testing: The CRAFT software routine (Reference 7.6) was written to automate the production of SAS2H input decks as required to support fuel assembly depletion calculations relevant to CRC evaluations. All calculations performed by the CRAFT code were verified by visual inspection and/or hand calculations. The CRAFT code, Version 1.0, compiled on December 16, 1996, was utilized to orchestrate the fuel assembly depletion calculations included in this analysis. CRAFT prepares the input files for SAS2H, runs SAS2H, and scans the SAS2H output file to remove unused text at the beginning of the SAS2H output file and produce a .CUT file. The .CUT file contains the isotopic data.

4.2.2 The UNIX operating system of the Hewlett-Packard computer was used to collect the data for the eighteen axial nodes from the CRAFT .CUT files and store the simplified output into a .SUM file for further processing. The UNIX awk command was then used to compare the isotopic name of each data line to a list of the principal isotopes, and include only isotopes on the principal isotope list in the .RES file which it produces. The

.RES file contains isotopic data for discharge, five years, ten years, fifteen years, twenty years, and twentyfive years cool time. The loading curves were calculated using only the spent fuel isotopics with a five year cool time but data for the other cool times was preserved. Eu-155 was included in the .RES files to facilitate future evaluation of the behavior of isotopics at long time periods, since Eu-155 is a parent nuclide in a decay chain for a principal isotope.

4.2.3 EXCEL - Microsoft® Excel 97 is a commercially available program which was used to convert the format of the isotopic data from grams to atoms per barn-cm. The converted data was inserted into an input file for later use by the MCNP4A program. The oxygen content of the spent fuel was also computed by Excel by summing the masses of the uranium isotopes and applying the ratio of atomic masses of oxygen and uranium in UO_2 (32/238).

5.0 Calculation

The calculation of loading curves is described in the Actinide-Only Burnup Credit Topical Report (Reference 7.7), Chapter 4, which describes the process of evaluation of the loading curve. The calculation is performed for PWR assemblies both with and without BPRAs inserted.

5.1 Method

The method of calculation is based upon the calculation of the isotopic constituents of irradiated fuel using the SAS2H sequence of the SCALE computer code system. The SAS2H sequence provides the isotopics present in the spent fuel when it is discharged from the reactor, and at later times after discharge. A period of five years after discharge is used for these calculations. The A08 assembly from Crystal River Unit 3 is used as the basic model for the PWR fuel assembly (Reference 7.6). The isotopic content for this assembly is calculated with initial U-235 enrichments ranging from 2.5 weight percent through 6.0 weight percent and with discharge burnups ranging from 10 GWd/MTU through 60 GWd/MTU. The specific power of the assembly is adjusted up or down to provide the desired discharge burnup. In actual plant operation, a longer or shorter cycle would typically be used which would result in a range of possible burnups for a given initial enrichment. In such cases, the isotopics are dependent upon the cycle lengths, which affect the amount of cool time available for isotopes to decay. The use of an adjustable specific power with a fixed irradiation cycle avoids the introduction of variability due to changing cycle times.

5.2 Use of Loading Curves

A burnup credit loading curve depicts the relationship between the initial enrichment of a fuel assembly and the required minium burnup needed to suppress the reactivity of that fuel assembly sufficiently to allow it to be safely loaded into the waste package. Any assembly whose burnup

exceeds the required minimum burnup, given the initial enrichment of the fuel assembly, may be placed in the waste package. The area in the figure above the loading curve line is the region of acceptable fuel assemblies, while assemblies whose enrichment and burnup place them into the area below the loading curve line may not be loaded.

The operator who is loading a waste package must be provided with a table of fuel assembly identifiers, initial enrichments, and burnups, and also whether the assembly contained a BPRA. The operator would verify that a given assembly falls into the acceptable region of the loading curve based upon this information.

5.3 Use of CRAFT ~~Computer Code~~ Software Routine[10/20/98, A.H.W] for Isotopic Generation by SAS2H

The CRAFT ~~computer code~~ software routine[10/20/98, A.H.W] automates the process of calculating the principal isotopes present in spent fuel five years after it has been discharged from the nuclear reactor. CRAFT orchestrates the use of the SAS2H isotopic depletion code system so that the detailed burnup history for each axial node of the assembly is properly represented in SAS2H. Since SAS2H can only model a single fuel assembly configuration, including presence of control rods, burnable absorbers, and variable axial profiles, the CRAFT code separates information describing these aspects of the fuel burnup into individual SAS2H runs. The PWR assemblies were modeled with an 18 axial-node model, using actual PWR data from Crystal River Unit 3 for assembly A08 (Reference 7.6). The A08 assembly did not contain BPRAs at any point during its irradiation, so a generic BPRA with a boron loading typical of the Crystal River cores was created, with 2.1 wt% B_4C. The CRAFT code was then used to produce isotopic data for a range of initial enrichments and burnups that encompasses the typical ranges found in commercial PWR fuel. The selected range spans first cores, which have low initial enrichments and burnups, and reaches to a high initial enrichment of 6.0 wt% and a burnup of 60 GWd/MTU.

5.4 CRAFT Input Models

The CRAFT input decks used in this analysis are contained in Attachment I; an example deck for assembly A08 with an initial enrichment of 4.0 wt% and a burnup of 35 GWd/MTU is listed in Figure 5.4-1. CRAFT inputs at different enrichments and cycle average burnups were created by varying this input to adjust the nodal burnups.

Figure 5.4-1. CRAFT Input Deck for Assembly A08 with 4.0 wt% enrichment and 35 GWd/MTU Burnup

```
N                  : This is not a pick-up case
Crystal River, Unit 3  : Reactor Identifier (35 GWd/MTU)
CR3                : Prefix Identifier for reactor
44group            : Scale cross-section library
4.00               : U-235 wt% enrichment in U of UO2
```

```
463630          : Grams of U per assembly
208             : Number of fuel rods in assembly
1.44272         : Pin-pitch in assembly (cm)
0.9398          : Fuel pellet diameter (cm)
0.95758         : Fuel rod cladding ID (cm)
1.0922          : Fuel rod cladding OD (cm)
360.172         : Fuel stack height (cm)
N               : No axial blanket fuel
INCONEL         : Spacer grid material
0.005757609     : Vol. frac. of mod. displaced by grids
ZIRC-4          : Fuel rod cladding material
640.0           : Avg. fuel rod cladding temp. (K)
N               : No cladding materials other than ZIRC-4
2200.0          : System pressure (psi)
N               : Activate BPRA tracking
5               : # of radial zones in the standard Path B model
3 0.63246       : Standard Path B model (Input Card 20)
2 0.67310
3 0.81397
500 2.97599
3 2.99939
1               : # of cross-section libraries per irradiation step
5               : SAS2H output print level
0.5             : Zone mesh factor for XSDRNPM
NO SPECIAL      : No special XSDRNPM control parameter specs.
4               : # of insertion reactor cycles
1A              : Insertion reactor cycle identifier
1               : # of stpts in cycle
0               : Stpt EFPD
0               : Length to stpt in calendar days
0               : Downtime at stpt
195.292         : Days of downtime at EOC
268.8           : Total cycle EFPD
413             : Total cycle length in calendar days
08              : Integer position of assembly in cycle
1B              : Insertion reactor cycle identifier
2               : # of stpts in cycle
0               : Stpt EFPD
0               : Length to stpt in calendar days
0               : Downtime at stpt
142.2           : Stpt EFPD
166             : Length to stpt in calendar days
14.792          : Downtime at stpt
```

```
97          : Days of downtime at EOC
171.3       : Total cycle EFPD
217         : Total cycle length in calendar days
08          : Integer position of assembly in cycle
02          : Insertion reactor cycle identifier
1           : # of stpts in cycle
0           : Stpt EFPD
0           : Length to stpt in calendar days
0           : Downtime at stpt
164.0       : Days of downtime at EOC
166.5       : Total cycle EFPD
212         : Total cycle length in calendar days
05          : Integer position of assembly in cycle
03          : Insertion reactor cycle identifier
3           : # of stpts in cycle
0           : Stpt EFPD
0           : Length to stpt in calendar days
0           : Downtime at stpt
168.5       : Stpt EFPD
193         : Length to stpt in calendar days
16.792      : Downtime at stpt
250.0       : Stpt EFPD
309         : Length to stpt in calendar days
13.333      : Downtime at stpt
73          : Days of downtime at EOC
323.0       : Total cycle EFPD
416         : Total cycle length in calendar days
02          : Integer position of assembly in cycle
N           : Flag for variable or constant irradiation step specs
1           : Relative insertion cycle #
1           : Relative stpt # in insertion cycle
67.2        : Irradiation step length in EFPD
4           : # of irradiation steps to next stpt
921.02      : ppmb
872.24      : ppmb
738.29      : ppmb
608.17      : ppmb
2           : Relative insertion cycle #
1           : Relative stpt # in insertion cycle
71.1        : Irradiation step length in EFPD
2           : # of irradiation steps to next stpt
518.65      : ppmb
256.11      : ppmb
```

```
2                : Relative stpt # in insertion cycle
29.1              : Irradiation step length in EFPD
1                : # of irradiation steps to next stpt
237.54             : ppmb
3                : Relative insertion cycle #
1                : Relative stpt # in insertion cycle
55.5              : Irradiation step length in EFPD
3                : # of irradiation steps to next stpt
688.93             : ppmb
527.51             : ppmb
353.48             : ppmb
4                : Relative insertion cycle #
1                : Relative stpt # in insertion cycle
56.167             : Irradiation step length in EFPD
3                : # of irradiation steps to next stpt
880.38             : ppmb
694.68             : ppmb
536.65             : ppmb
2                : Relative stpt # in insertion cycle
40.75             : Irradiation step length in EFPD
2                : # of irradiation steps to next stpt
382.60             : ppmb
267.17             : ppmb
3                : Relative stpt # in insertion cycle
36.5              : Irradiation step length in EFPD
2                : # of irradiation steps to next stpt
234.64             : ppmb
128.17             : ppmb
18               : # of axial nodes in CRC format
1   17.7800        : Node #, node height (cm)
2   20.0025
3   20.0025
4   20.0025
5   20.0025
6   20.0025
7   20.0025
8   20.0025
9   20.0025
10  20.0025
11  20.0025
12  20.0025
13  20.0025
14  20.0025
```

15 20.0025
16 20.0025
17 20.0025
18 22.3520
NO CRA INSERTION HISTORY
NO APSRA INSERTION HISTORY
18 : # of fuel temp axial nodes (BOC-1A to EOC-1A)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
831.5
998.8
1100.7
1152.6
1178.3
1190.2
1197.3
1204.6
1214.5
1226.5
1237.7
1245.0
1246.2
1241.8
1231.6
1202.4
1122.0
915.0

```
18              : # of fuel temp axial nodes (BOC-1B to Stpt2-1B)
1   17.7800     : Node #, node height (cm)
2   20.0025
3   20.0025
4   20.0025
5   20.0025
6   20.0025
7   20.0025
8   20.0025
9   20.0025
10  20.0025
11  20.0025
12  20.0025
13  20.0025
14  20.0025
15  20.0025
16  20.0025
17  20.0025
18  22.3520
884.1
1032.0
1084.2
1086.8
1073.2
1056.1
1041.7
1031.9
1026.8
1025.6
1027.5
1031.8
1038.0
1047.5
1069.8
1104.7
1092.1
948.1
18              : # of fuel temp axial nodes (Stpt2-1B to EOC-1B)
1   17.7800     : Node #, node height (cm)
2   20.0025
3   20.0025
4   20.0025
5   20.0025
```

6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
847.9
968.4
1026.9
1079.8
1145.2
1186.1
1204.7
1214.6
1221.5
1227.7
1233.0
1235.0
1228.6
1207.6
1168.0
1113.7
1042.4
897.3
18 : # of fuel temp axial nodes (BOC-2 to EOC-2)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025

12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
1134.5
1314.3
1382.3
1393.7
1389.9
1385.9
1385.5
1386.6
1383.7
1368.6
1339.1
1305.1
1275.2
1254.0
1244.3
1240.3
1210.7
1058.2
18 : # of fuel temp axial nodes (BOC-3 to Stpt2-3)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025

```
18   22.3520
975.9
1123.0
1175.9
1182.7
1171.9
1158.2
1148.0
1144.1
1148.9
1162.5
1181.0
1198.0
1207.8
1207.5
1196.1
1173.9
1131.9
1001.4
18              : # of fuel temp axial nodes (Stpt2-3 to Stpt3-3)
1    17.7800      : Node #, node height (cm)
2    20.0025
3    20.0025
4    20.0025
5    20.0025
6    20.0025
7    20.0025
8    20.0025
9    20.0025
10   20.0025
11   20.0025
12   20.0025
13   20.0025
14   20.0025
15   20.0025
16   20.0025
17   20.0025
18   22.3520
1013.2
1121.8
1144.6
1132.8
1115.7
```

1102.5
1094.5
1090.8
1090.7
1093.5
1097.2
1100.3
1102.4
1103.9
1102.9
1097.7
1081.7
999.0
18 : # of mod spec vol axial nodes (BOC-1A to EOC-1A)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0228
0.0228
0.0227
0.0227
0.0226
0.0225
0.0224
0.0223
0.0223
0.0222
0.0221

0.0220
0.0219
0.0218
0.0218
0.0217
0.0216
0.0216
18 : # of mod spec vol axial nodes (BOC-1B to Stpt2-1B)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0227
0.0226
0.0226
0.0225
0.0224
0.0223
0.0223
0.0222
0.0221
0.0221
0.0220
0.0220
0.0219
0.0218
0.0218
0.0217
0.0216

0.0216
18 : # of mod spec vol axial nodes (Stpt2-1B to EOC-1B)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0230
0.0229
0.0229
0.0228
0.0227
0.0226
0.0225
0.0224
0.0223
0.0222
0.0221
0.0220
0.0219
0.0219
0.0218
0.0217
0.0216
0.0216
18 : # of mod spec vol axial nodes (BOC-2 to EOC-2)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025

5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0237
0.0236
0.0234
0.0233
0.0231
0.0230
0.0228
0.0227
0.0226
0.0224
0.0223
0.0222
0.0221
0.0220
0.0219
0.0218
0.0217
0.0216
18 : # of mod spec vol axial nodes (BOC-3 to Stpt2-3)
1 17.7800. : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025

11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0234
0.0233
0.0232
0.0231
0.0229
0.0228
0.0227
0.0226
0.0225
0.0224
0.0223
0.0222
0.0221
0.0220
0.0219
0.0218
0.0217
0.0216
18 : # of mod spec vol axial nodes (Stpt2-3 to Stpt3-3)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025

17 20.0025
18 22.3520
0.0233
0.0232
0.0231
0.0230
0.0229
0.0228
0.0227
0.0226
0.0225
0.0224
0.0223
0.0221
0.0221
0.0220
0.0219
0.0218
0.0217
0.0216
(* Specific Power Data Adjusted for Desired Burnup Begins Here ***)**
18 : # of burnup axial nodes (BOC-1A)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
0.0
0.0
0.0

0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
18 : # of burnup axial nodes (BOC-1B)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
3.375
6.009
7.954
9.207
9.984
10.448
10.710
10.841
10.876

10.843
10.767
10.686
10.646
10.667
10.640
10.179
8.693
5.189
18 : # of burnup axial nodes (Stpt2-1B)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
5.532
9.525
12.192
13.704
14.528
14.952
15.155
15.244
15.270
15.256
15.225
15.212
15.253
15.377
15.533

15.270
13.459
8.309
18 : # of burnup axial nodes (BOC-2)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
5.969
10.224
13.050
14.679
15.598
16.095
16.340
16.448
16.486
16.487
16.479
16.487
16.539
16.647
16.745
16.381
14.411
8.916
18 : # of burnup axial nodes (BOC-3)
1 17.7800 : Node #, node height (cm)
2 20.0025

3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
11.324
18.438
22.548
24.518
25.440
25.851
25.991
25.980
25.865
25.684
25.517
25.450
25.521
25.713
25.880
25.387
22.646
14.470
18 : # of burnup axial nodes (Stpt2-3)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025

9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025
15 20.0025
16 20.0025
17 20.0025
18 22.3520
15.225
24.608
30.040
32.576
33.698
34.155
34.300
34.309
34.269
34.236
34.258
34.357
34.520
34.691
34.671
33.760
30.117
19.510
18 : # of burnup axial nodes (Stpt3-3)
1 17.7800 : Node #, node height (cm)
2 20.0025
3 20.0025
4 20.0025
5 20.0025
6 20.0025
7 20.0025
8 20.0025
9 20.0025
10 20.0025
11 20.0025
12 20.0025
13 20.0025
14 20.0025

15 20.0025
16 20.0025
17 20.0025
18 22.3520
17.472
27.957
33.841
36.447
37.522
37.926
38.039
38.044
38.026
38.042
38.127
38.295
38.527
38.759
38.761
37.775
33.837
22.163

5.5 Modeling of Irradiation History

The operation of commercial reactors is such that higher initial fuel enrichments are required to reach higher burnups, and higher burnups are desirable in that the length of the operating cycle is longer and the longer cycles provide better utilization of the power plant. The longer a reactor can run before it is shut down for refueling, the more economical it becomes even though the fuel, which is more enriched, is somewhat more expensive. Thus it would be expected that the irradiation cycle length would be dependent upon the initial enrichment. The CRAFT input decks do not reflect this actual fuel behavior; instead the cycle time periods were fixed for all calculations and the specific power of the fuel assembly was varied. This approach provides a common time basis for all isotopic data produced by SAS2H and avoids discontinuities which could appear between data points where, in actual practice, a fuel assembly would achieve lower burnup than the standard design value if it were prematurely removed from the reactor core, and could only achieve a higher burnup than the design value if it were overburned by replacing it into the reactor core for one more cycle than normal. Thus the actual history of an assembly which is burned less or more than the average (for its type and initial enrichment) would be unpredictable, since it would be based upon specific plant experiences, such as damaged assemblies which might be removed early and be replaced by assemblies which had been previously burned to approximately the design value. This unpredictable nature of actual irradiation histories is the reason for restricting the loading curve analyses to a single irradiation history, with an adjustable specific power to attain the desired burnup.

The scaling of specific power to provide a desired total burnup is accomplished by use of equation 5.5-1.

Equation 5.5-1.

$$P(i,j) = P(i,A08) * [B(j)/B(A08)]$$, where:

P(i,j) is the specific power for the ith axial node (nodes 1-18) and the jth burnup step. (There are three irradiation cycles with a total of six statepoints or burnup steps.)

P(i,A08) is the specific power for the ith axial node for Crystal River Unit 3 assembly A08.

B(j) is the burnup for the jth burnup step. The sum over j of all values of B(j) is the total burnup for the assembly.

B(A08) is the actual (total) burnup for assembly A08.

The values for each node and each statepoint are entered into a CRAFT input file (as shown in Figure 5.4-1) as the final set of six groups of data consisting of the node heights and the associated specific powers. The beginning of this set is indicated in Figure 5.4-1 with a marker phrase "(*** Specific Power Data Adjusted for Desired Burnup Begins Here***)". The initial

enrichment desired is also entered in the CRAFT input file as the fifth data entry at the beginning of the file.

5.6 MCNP4A Criticality Models

The MCNP4A model of the waste package was broken into eighteen axial segments to mimic the eighteen nodes analyzed by CRAFT and SAS2H. Fuel assembly end fittings and reflector regions above and below the fuel ends were included, as well as a detailed model of the waste package fuel basket and the waste package shells and ends. The cross section of the fuel basket shown in Figure 5.6-1 illustrates the arrangement of the 21 PWR fuel assemblies in the basket structure, surrounded by the waste package walls. Each fuel assembly is contained within a square ferritic steel tube inserted within a stainless steel/boron eggcrate fuel basket. Aluminum heat transfer shunts are inserted between the ferritic steel tube and stainless steel/boron eggcrate structure, as illustrated in Figure 5.6-2. The fuel assemblies rest against the eggcrate structure because the Waste Package rests in a horizontal position in the repository. These arrangements are documented in the 21-PWR Waste Package Disposal Container Assembly drawing series (Reference 7.8). The waste package was treated as flooded with pure water at one gram per cubic centimeter density, to provide the most conservative reactivity results. The nominal expected boron content was used in the stainless steel/boron alloy of the spent fuel basket. An example MCNP4A model input is given in Figure 5.6-4. The isotopic contents calculated by SAS2H, under the direction of CRAFT, were inserted into the MCNP4A model in the fuel cell card images for each enrichment/burnup data point which was analyzed. If an assembly contained a BPRA during its irradiation, its isotopic contents are more reactive than an assembly which did not. All assemblies are modeled without BPRAs in the guide tubes for the criticality analyses since no criticality credit is given for the BPRAs, even if they were to be present. The fuel assembly modeled in the MCNP4A analyses is a generic design and is not identical to assembly A08. The specific values of important model parameters are given in Table 5.6-1. Material densities are obtained from Reference 7.9.

Table 5.6-1. MCNP4A Model Parameters

Model Parameter	Value
Inner Dimension of Ferritic Steel Square Tube	226 mm (nominal 9 inches)
Thickness of Ferritic Steel Tube Wall	5 mm, ρ = 7.832 g/cm^3
Thickness of Aluminum Thermal Shunt	5 mm, ρ = 2.700 g/cm^3
Boron Content of Stainless Steel/Boron Eggcrate	1.6 weight percent in ASTM SS316B6A, ρ = 7.770 g/cm^3

Table 5.6-1. MCNP4A Model Parameters	
Model Parameter	Value
Thickness of Stainless Steel/Boron Eggcrate Plates	7 mm
Areal Density of Stainless Steel/Boron Plates	16 mg/cm^3 B-10

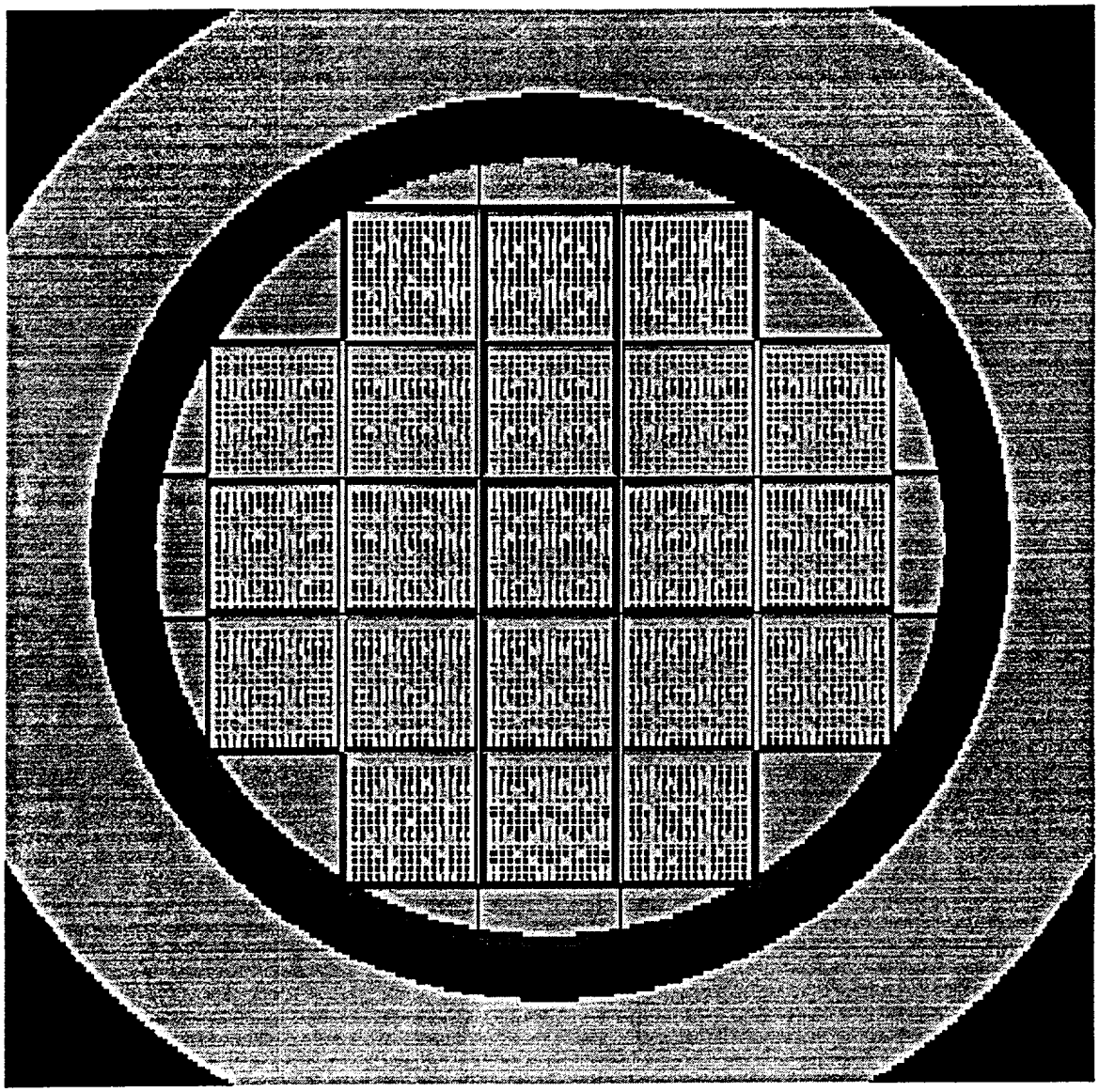

Figure 5.6-1. 21 PWR Assembly Layout

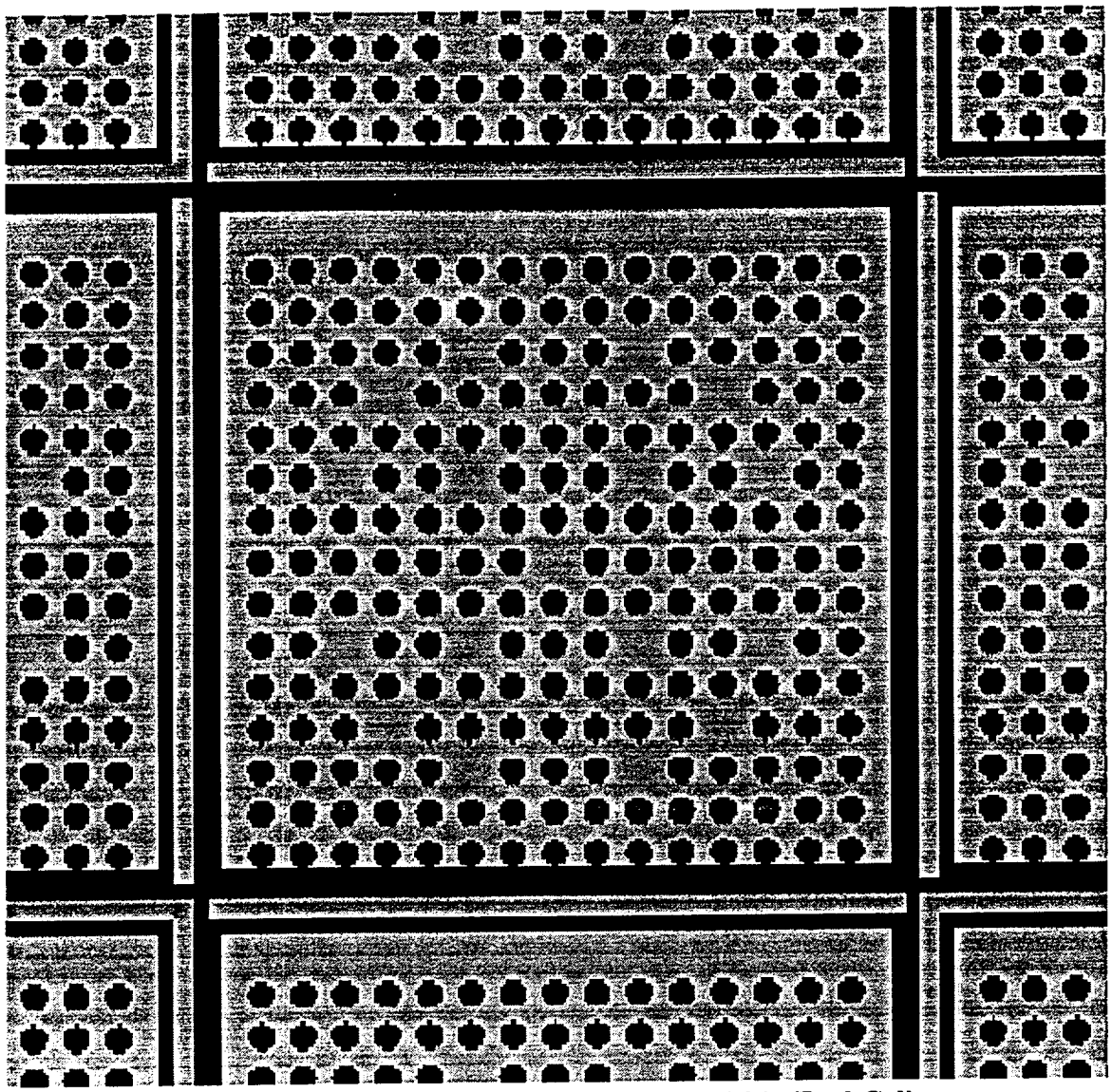

Figure 5.6-2. PWR Assembly Resting within Fuel Cell

Figure 5.6-4. MCNP4A Criticality Model

```
21 PWR WP MODEL, B&W 15x15 Fuel: 4.0wt%,35 GWd/MTU,5 yrs wpa4035
C    CELL SPECIFICATIONS
C    OUTSIDE WORLD
1    0    -1:2:3  IMP:N=0
C    REFLECTOR REGION ARROUND WASTE PACKAGE
C     12" of Water around Container
2    1  -1.0000    1  -2  -3   5     IMP:N=1
C     Water in Skirt above Container
3    1  -1.0000   -6  -8   9         IMP:N=1
C     12" of Water above Container
4    1  -1.0000    6  -5  -3         IMP:N=1
C     Water in Shirt below Container
5    1  -1.0000    4  -8  -7         IMP:N=1
C     12" of Water below Container
6    1  -1.0000    1  -5  -4         IMP:N=1
C    BARRIER CELLS
C     Outer Barrier Top Skirt
7    2  -7.8320    9  -5  -6   8     IMP:N=1
C     Outer Barrier
8    2  -7.8320    7  -5  -9  10     IMP:N=1
C     Outer Barrier Bottom Skirt
9    2  -7.8320    4  -5  -7   8     IMP:N=1
C     Outer Barrier Lid
10   2  -7.8320     -9  -10  12       IMP:N=1
C     Outer Barrier Bottom
11   2  -7.8320     7  -10  -11       IMP:N=1
C     Gap between Inner and Outer Barrier Lids
12   1  -1.0000    -12  13  -10       IMP:N=1
C     Gap between Inner and Outer Barriers
13   1  -1.0000    -10  -13  14  11   IMP:N=1
C     Inner Barrier
14   3  -8.4425    -14  15  16  -17   IMP:N=1
C     Inner Barrier Lid
15   3  -8.4425    -13  -14  17       IMP:N=1
C     Inner Barrier Bottom
16   3  -8.4425     11  -14  -15       IMP:N=1
C    THERMAL SHUNT CELLS
17   14  -2.7000     15  -17  -19  23  -50  -51  IMP:N=1 $ Left-Center
18   14  -2.7000     15  -17  -21  25   50  -51  IMP:N=1 $ Bottom-Center
19   14  -2.7000     15  -17   18  -22  50   51  IMP:N=1 $ Right-Center
```

```
20   14 -2.7000    15 -17  20 -24 -50  51  IMP:N=1 $ Top-Center
21   14 -2.7000    15 -17  20 -24 -23  27  IMP:N=1 $ Left-Top
22   2  -7.8320    15 -17  20 -24 -27  31  IMP:N=1 $ Left-Top
23   1  -1.0000    15 -17  20 -24 -31 -16  IMP:N=1 $ Left-Top
24   14 -2.7000    15 -17 -21  25 -23  27  IMP:N=1 $ Left-Bottom
25   2  -7.8320    15 -17 -21  25 -27  31  IMP:N=1 $ Left-Bottom
26   1  -1.0000    15 -17 -21  25 -31 -16  IMP:N=1 $ Left-Bottom
27   14 -2.7000    15 -17 -19  23 -25  29  IMP:N=1 $ Bottom-Left
28   2  -7.8320    15 -17 -19  23 -29  33  IMP:N=1 $ Bottom-Left
29   1  -1.0000    15 -17 -19  23 -33 -16  IMP:N=1 $ Bottom-Left
30   14 -2.7000    15 -17  18 -22 -25  29  IMP:N=1 $ Bottom-Right
31   2  -7.8320    15 -17  18 -22 -29  33  IMP:N=1 $ Bottom-Right
32   1  -1.0000    15 -17  18 -22 -33 -16  IMP:N=1 $ Bottom-Right
33   14 -2.7000    15 -17 -21  25  22 -26  IMP:N=1 $ Right-Bottom
34   2  -7.8320    15 -17 -21  25  26 -30  IMP:N=1 $ Right-Bottom
35   1  -1.0000    15 -17 -21  25  30 -16  IMP:N=1 $ Right-Bottom
36   14 -2.7000    15 -17  20 -24  22 -26  IMP:N=1 $ Right-Top
37   2  -7.8320    15 -17  20 -24  26 -30  IMP:N=1 $ Right-Top
38   1  -1.0000    15 -17  20 -24  30 -16  IMP:N=1 $ Right-Top
39   14 -2.7000    15 -17  18 -22  24 -28  IMP:N=1 $ Top-Right
40   2  -7.8320    15 -17  18 -22  28 -32  IMP:N=1 $ Top-Right
41   1  -1.0000    15 -17  18 -22  32 -16  IMP:N=1 $ Top-Right
42   14 -2.7000    15 -17 -19  23  24 -28  IMP:N=1 $ Top-Left
43   2  -7.8320    15 -17 -19  23  28 -32  IMP:N=1 $ Top-Left
44   1  -1.0000    15 -17 -19  23  32 -16  IMP:N=1 $ Top-Left
C    ASSEMBLY LATTICE
C     Assembly Sub-lattices - Full Model
C    Center Window
45   0     15 -17 -18  19 -20  21  FILL=1 (-73.8 -73.8 0) IMP:N=1
C    Left Window
46   0     15 -17 -20  21 -23 -16  FILL=1 (-74.3 -73.8 0) IMP:N=1
C    Bottom-Left Window
47   0     15 -17 -23 -25 -16      FILL=1 (-74.3 -74.3 0) IMP:N=1
C    Bottom Window
48   0     15 -17 -18  19 -25 -16  FILL=1 (-73.8 -74.3 0) IMP:N=1
C    Bottom-Right Window
49   0     15 -17  22 -25 -16      FILL=1 (-73.3 -74.3 0) IMP:N=1
C    Right Window
50   0     15 -17 -20  21  22 -16  FILL=1 (-73.3 -73.8 0) IMP:N=1
C    Top-Right Window
51   0     15 -17  22  24 -16      FILL=1 (-73.3 -73.3 0) IMP:N=1
C    Top Window
52   0     15 -17 -18  19  24 -16  FILL=1 (-73.8 -73.3 0) IMP:N=1
```

```
C    Top-Left Window
53   0     15 -17 -23  24 -16     FILL=1 (-74.3 -73.3 0) IMP:N=1
C    Full Model Model
C    54   0     15 -16 -17       FILL=1 (-73.8 -73.8 0) IMP:N=1
C    55   0     15 -16 -17 -34  36   FILL=1 (0 -80.8 0) IMP:N=1 $ Degraded
C    56   0     15 -16 -17  34 -35   FILL=1 (0 -75.8 0) IMP:N=1 $ Degraded
C    57   0     15 -16 -17  35       FILL=1 (0 -73.8 0) IMP:N=1 $ Degraded
C    58   0     15 -16 -17 -36  37   FILL=1 (0 -75.8 0) IMP:N=1 $ Degraded
C    59   0     15 -16 -17 -37       FILL=1 (0 -73.8 0) IMP:N=1 $ Degraded
C    Assembly Lattice Description
60   1  -1.0000  -42  43 -44  45  IMP:N=1 LAT=1 U=1
     FILL=0:6 0:6 0:0   1  1 50 50 50  1  1
                        1 50 64 62 60 50  1
                       50 64 52 52 52 60 50
                       50 66 52 52 52 58 50
                       50 68 52 52 52 56 50
                        1 50 68 54 56 50  1
                        1  1 50 50 50  1  1          $ Full model
C    WET EMPTY ASSEMBLY LATTICE
C    Center
61   1  -1.0000  -46  47 -48  49  IMP:N=1  U=50
C    Right Side
62   2  -7.8320   46  50  51     IMP:N=1  U=50
C    Top
63   2  -7.8320   48 -50  51     IMP:N=1  U=50
C    Left Side
64   2  -7.8320  -47 -50 -51     IMP:N=1  U=50
C    Bottom
65   2  -7.8320  -49  50 -51     IMP:N=1  U=50
C    DRY EMPTY ASSEMBLY LATTICE
C    Center
66   4  -0.001225  -46  47 -48  49  IMP:N=1  U=51
C    Right Side
67   2  -7.8320   46  50  51      IMP:N=1  U=51
C    Top
68   2  -7.8320   48 -50  51      IMP:N=1  U=51
C    Left Side
69   2  -7.8320  -47 -50 -51      IMP:N=1  U=51
C    Bottom
70   2  -7.8320  -49  50 -51      IMP:N=1  U=51
C    FULL ASSEMBLY LATTICE POSITIONS
C    Code: boron in [B=] all panels [all], left [l], bottom, [b], right [r], top [t]
C    WET FULL ASSEMBLY LATTICE B=all
```

```
71   1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=52
C      Left Side of Assembly Outside Lattice
72   1 -1.0000  -53 -50 -51 IMP:N=1 FILL=30 U=52
C      Bottom of Assembly Outside Lattice
73   1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=52
C      Right Side of Assembly Outside Lattice
74   1 -1.0000   52  50  51 IMP:N=1 FILL=32 U=52
C      Top of Assembly Outside Lattice
75   1 -1.0000  -50  51  54 IMP:N=1 FILL=33 U=52
C    DRY FULL ASSEMBLY LATTICE B=all
76   4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=53
C      Left Side of Assembly Outside Lattice
77   4 -0.001225  -53 -50 -51 IMP:N=1 FILL=34 U=53
C      Bottom of Assembly Outside Lattice
78   4 -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=53
C      Right Side of Assembly Outside Lattice
79   4 -0.001225   52  50  51 IMP:N=1 FILL=36 U=53
C      Top of Assembly Outside Lattice
80   4 -0.001225  -50  51  54 IMP:N=1 FILL=37 U=53
C    WET FULL ASSEMBLY LATTICE B=lbr
81   1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=54
C      Left Side of Assembly Outside Lattice
82   1 -1.0000  -53 -50 -51 IMP:N=1 FILL=30 U=54
C      Bottom of Assembly Outside Lattice
83   1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=54
C      Right Side of Assembly Outside Lattice
84   1 -1.0000   52  50  51 IMP:N=1 FILL=32 U=54
C      Top of Assembly Outside Lattice
85   1 -1.0000  -50  51  54 IMP:N=1 FILL=41 U=54
C    DRY FULL ASSEMBLY LATTICE B=lbr
86   4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=55
C      Left Side of Assembly Outside Lattice
87   4 -0.001225  -53 -50 -51 IMP:N=1 FILL=34 U=55
C      Bottom of Assembly Outside Lattice
88   4 -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=55
C      Right Side of Assembly Outside Lattice
89   4 -0.001225   52  50  51 IMP:N=1 FILL=36 U=55
C      Top of Assembly Outside Lattice
90   4 -0.001225  -50  51  54 IMP:N=1 FILL=45 U=55
C    WET FULL ASSEMBLY LATTICE B=lb
91   1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=56
C      Left Side of Assembly Outside Lattice
92   1 -1.0000  -53 -50 -51 IMP:N=1 FILL=30 U=56
```

```
C      Bottom of Assembly Outside Lattice
93   1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=56
C      Right Side of Assembly Outside Lattice
94   1 -1.0000   52  50  51 IMP:N=1 FILL=40 U=56
C      Top of Assembly Outside Lattice
95   1 -1.0000  -50  51  54 IMP:N=1 FILL=41 U=56
C    DRY FULL ASSEMBLY LATTICE B=lb
96   4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=57
C      Left Side of Assembly Outside Lattice
97   4 -0.001225  -53 -50 -51 IMP:N=1 FILL=34 U=57
C      Bottom of Assembly Outside Lattice
98   4 -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=57
C      Right Side of Assembly Outside Lattice
99   4 -0.001225   52  50  51 IMP:N=1 FILL=44 U=57
C      Top of Assembly Outside Lattice
100  4 -0.001225  -50  51  54 IMP:N=1 FILL=45 U=57
C    WET FULL ASSEMBLY LATTICE B=lbt
101  1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=58
C      Left Side of Assembly Outside Lattice
102  1 -1.0000  -53 -50 -51 IMP:N=1 FILL=30 U=58
C      Bottom of Assembly Outside Lattice
103  1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=58
C      Right Side of Assembly Outside Lattice
104  1 -1.0000   52  50  51 IMP:N=1 FILL=40 U=58
C      Top of Assembly Outside Lattice
105  1 -1.0000  -50  51  54 IMP:N=1 FILL=33 U=58
C    DRY FULL ASSEMBLY LATTICE B=lbt
106  4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=59
C      Left Side of Assembly Outside Lattice
107  4 -0.001225  -53 -50 -51 IMP:N=1 FILL=34 U=59
C      Bottom of Assembly Outside Lattice
108  4 -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=59
C      Right Side of Assembly Outside Lattice
109  4 -0.001225   52  50  51 IMP:N=1 FILL=44 U=59
C      Top of Assembly Outside Lattice
110  4 -0.001225  -50  51  54 IMP:N=1 FILL=37 U=59
C    WET FULL ASSEMBLY LATTICE B=lt
111  1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=60
C      Left Side of Assembly Outside Lattice
112  1 -1.0000  -53 -50 -51 IMP:N=1 FILL=30 U=60
C      Bottom of Assembly Outside Lattice
113  1 -1.0000   50 -51 -55 IMP:N=1 FILL=39 U=60
C      Right Side of Assembly Outside Lattice
```

```
114  1 -1.0000   52  50  51 IMP:N=1 FILL=40 U=60
C      Top of Assembly Outside Lattice
115  1 -1.0000  -50  51  54 IMP:N=1 FILL=33 U=60
C    DRY FULL ASSEMBLY LATTICE B=lt
116  4 -0.001225 -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=61
C      Left Side of Assembly Outside Lattice
117  4 -0.001225 -53 -50 -51 IMP:N=1 FILL=34 U=61
C      Bottom of Assembly Outside Lattice
118  4 -0.001225  50 -51 -55 IMP:N=1 FILL=43 U=61
C      Right Side of Assembly Outside Lattice
119  4 -0.001225  52  50  51 IMP:N=1 FILL=44 U=61
C      Top of Assembly Outside Lattice
120  4 -0.001225 -50  51  54 IMP:N=1 FILL=37 U=61
C    WET FULL ASSEMBLY LATTICE B=lrt
121  1 -1.0000 -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=62
C      Left Side of Assembly Outside Lattice
122  1 -1.0000 -53 -50 -51 IMP:N=1 FILL=30 U=62
C      Bottom of Assembly Outside Lattice
123  1 -1.0000  50 -51 -55 IMP:N=1 FILL=39 U=62
C      Right Side of Assembly Outside Lattice
124  1 -1.0000  52  50  51 IMP:N=1 FILL=32 U=62
C      Top of Assembly Outside Lattice
125  1 -1.0000 -50  51  54 IMP:N=1 FILL=33 U=62
C    DRY FULL ASSEMBLY LATTICE B=lrt
126  4 -0.001225 -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=63
C      Left Side of Assembly Outside Lattice
127  4 -0.001225 -53 -50 -51 IMP:N=1 FILL=34 U=63
C      Bottom of Assembly Outside Lattice
128  4 -0.001225  50 -51 -55 IMP:N=1 FILL=43 U=63
C      Right Side of Assembly Outside Lattice
129  4 -0.001225  52  50  51 IMP:N=1 FILL=36 U=63
C      Top of Assembly Outside Lattice
130  4 -0.001225 -50  51  54 IMP:N=1 FILL=37 U=63
C    WET FULL ASSEMBLY LATTICE B=rt
131  1 -1.0000 -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=64
C      Left Side of Assembly Outside Lattice
132  1 -1.0000 -53 -50 -51 IMP:N=1 FILL=38 U=64
C      Bottom of Assembly Outside Lattice
133  1 -1.0000  50 -51 -55 IMP:N=1 FILL=39 U=64
C      Right Side of Assembly Outside Lattice
134  1 -1.0000  52  50  51 IMP:N=1 FILL=32 U=64
C      Top of Assembly Outside Lattice
135  1 -1.0000 -50  51  54 IMP:N=1 FILL=33 U=64
```

```
C    DRY FULL ASSEMBLY LATTICE B=rt
136  4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=65
C      Left Side of Assembly Outside Lattice
137  4 -0.001225  -53 -50 -51 IMP:N=1 FILL=42 U=65
C      Bottom of Assembly Outside Lattice
138  4 -0.001225   50 -51 -55 IMP:N=1 FILL=43 U=65
C      Right Side of Assembly Outside Lattice
139  4 -0.001225   52  50  51 IMP:N=1 FILL=36 U=65
C      Top of Assembly Outside Lattice
140  4 -0.001225  -50  51  54 IMP:N=1 FILL=37 U=65
C    WET FULL ASSEMBLY LATTICE B=brt
142  1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=66
C      Left Side of Assembly Outside Lattice
143  1 -1.0000  -53 -50 -51 IMP:N=1 FILL=38 U=66
C      Bottom of Assembly Outside Lattice
144  1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=66
C      Right Side of Assembly Outside Lattice
145  1 -1.0000   52  50  51 IMP:N=1 FILL=32 U=66
C      Top of Assembly Outside Lattice
146  1 -1.0000  -50  51  54 IMP:N=1 FILL=33 U=66
C    DRY FULL ASSEMBLY LATTICE B=brt
147  4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=67
C      Left Side of Assembly Outside Lattice
148  4 -0.001225  -53 -50 -51 IMP:N=1 FILL=42 U=67
C      Bottom of Assembly Outside Lattice
149  4 -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=67
C      Right Side of Assembly Outside Lattice
150  4 -0.001225   52  50  51 IMP:N=1 FILL=36 U=67
C      Top of Assembly Outside Lattice
151  4 -0.001225  -50  51  54 IMP:N=1 FILL=37 U=67
C    WET FULL ASSEMBLY LATTICE B=br
152  1 -1.0000  -52  53 -54  55  IMP:N=1 FILL=20   (0 -0.8 0) U=68
C      Left Side of Assembly Outside Lattice
153  1 -1.0000  -53 -50 -51 IMP:N=1 FILL=38 U=68
C      Bottom of Assembly Outside Lattice
154  1 -1.0000   50 -51 -55 IMP:N=1 FILL=31 U=68
C      Right Side of Assembly Outside Lattice
155  1 -1.0000   52  50  51 IMP:N=1 FILL=32 U=68
C      Top of Assembly Outside Lattice
156  1 -1.0000  -50  51  54 IMP:N=1 FILL=41 U=68
C    DRY FULL ASSEMBLY LATTICE B=br
157  4 -0.001225  -52  53 -54  55  IMP:N=1 FILL=22 (0 -0.8 0) U=69
C      Left Side of Assembly Outside Lattice
```

```
158  4  -0.001225  -53 -50 -51 IMP:N=1 FILL=42 U=69
C       Bottom of Assembly Outside Lattice
159  4  -0.001225   50 -51 -55 IMP:N=1 FILL=35 U=69
C       Right Side of Assembly Outside Lattice
160  4  -0.001225   52  50  51 IMP:N=1 FILL=36 U=69
C       Top of Assembly Outside Lattice
161  4  -0.001225  -50  51  54 IMP:N=1 FILL=37 U=69
C    FUEL CELL BASKET STRUCTURE
C    Fuel Cell Basket Structure -       WET - Borated panels
C      Water Gap    - Assembly Left
170  1  -1.0000   57          IMP:N=1 U=30
C      CS Tube - Assembly Left
171  2  -7.8320  -57  47     IMP:N=1 U=30
C      SS Panel - Assembly Left
172  5  -7.7700  -47         IMP:N=1 U=30
C      Water Gap    - Assembly Bottom
173  1  -1.0000   59          IMP:N=1 U=31
C      CS Tube - Assembly Bottom
174  2  -7.8320  -59  49     IMP:N=1 U=31
C      SS Panel - Assembly Bottom
175  5  -7.7700  -49         IMP:N=1 U=31
C      Water Gap    - Assembly Right
176  1  -1.0000  -56          IMP:N=1 U=32
C      CS Tube - Assembly Right
177  2  -7.8320   56 -46     IMP:N=1 U=32
C      SS Panel - Assembly Right
178  5  -7.7700   46         IMP:N=1 U=32
C      Water Gap    - Assembly Top
179  1  -1.0000  -58          IMP:N=1 U=33
C      CS Tube - Assembly Top
180  2  -7.8320   58 -48     IMP:N=1 U=33
C      SS Panel - Assembly Top
181  5  -7.7700   48         IMP:N=1 U=33
C    FUEL CELL BASKET STRUCTURE -       DRY - Borated panels
C      Gap    - Assembly Left
182  4  -0.001225   57          IMP:N=1 U=34
C      CS Tube - Assembly Left
183  2  -7.8320  -57  47     IMP:N=1 U=34
C      SS Panel - Assembly Left
184  5  -7.7700  -47         IMP:N=1 U=34
C      Gap    - Assembly Bottom
185  4  -0.001225   59          IMP:N=1 U=35
C      CS Tube - Assembly Bottom
```

```
186  2 -7.8320  -59  49     IMP:N=1 U=35
C      SS Panel - Assembly Bottom
187  5 -7.7700  -49         IMP:N=1 U=35
C      Gap    - Assembly Right
188  4 -0.001225  -56          IMP:N=1 U=36
C      CS Tube - Assembly Right
189  2 -7.8320   56 -46      IMP:N=1 U=36
C      SS Panel - Assembly Right
190  5 -7.7700   46         IMP:N=1 U=36
C      Gap    - Assembly Top
191  4 -0.001225  -58          IMP:N=1 U=37
C      CS Tube - Assembly Top
192  2 -7.8320   58 -48     IMP:N=1 U=37
C      SS Panel - Assembly Top
193  5 -7.7700   48         IMP:N=1 U=37
C    FUEL CELL BASKET STRUCTURE -       WET - Unborated panels
C      Water Gap    - Assembly Left
194  1 -1.0000   57           IMP:N=1 U=38
C      CS Tube - Assembly Left
195  2 -7.8320  -57  47     IMP:N=1 U=38
C      Panel - Assembly Left
196  2 -7.8320  -47         IMP:N=1 U=38
C      Water Gap    - Assembly Bottom
197  1 -1.0000   59           IMP:N=1 U=39
C .    CS Tube - Assembly Bottom
198  2 -7.8320  -59  49     IMP:N=1 U=39
C      Panel - Assembly Bottom
199  2 -7.8320  -49         IMP:N=1 U=39
C      Water Gap    - Assembly Right
200  1 -1.0000  -56           IMP:N=1 U=40
C      CS Tube - Assembly Right
201  2 -7.8320   56 -46      IMP:N=1 U=40
C      Panel - Assembly Right
202  2 -7.8320   46         IMP:N=1 U=40
C      Water Gap    - Assembly Top
203  1 -1.0000  -58           IMP:N=1 U=41
C      CS Tube - Assembly Top
204  2 -7.8320   58 -48     IMP:N=1 U=41
C      Panel - Assembly Top
205  2 -7.8320   48         IMP:N=1 U=41
C    FUEL CELL BASKET STRUCTURE -       DRY - Unborated panels
C      Gap    - Assembly Left
206  4 -0.001225   57          IMP:N=1 U=42
```

```
C      CS Tube - Assembly Left
207  2  -7.8320  -57  47     IMP:N=1 U=42
C      Panel - Assembly Left
208  2  -7.8320  -47         IMP:N=1 U=42
C      Gap    - Assembly Bottom
209  4  -0.001225  59          IMP:N=1 U=43
C      CS Tube - Assembly Bottom
210  2  -7.8320  -59  49     IMP:N=1 U=43
C      Panel - Assembly Bottom
211  2  -7.8320  -49         IMP:N=1 U=43
C      Gap    - Assembly Right
212  4  -0.001225  -56          IMP:N=1 U=44
C      CS Tube - Assembly Right
213  2  -7.8320   56 -46      IMP:N=1 U=44
C      Panel - Assembly Right
214  2  -7.8320   46          IMP:N=1 U=44
C      Gap    - Assembly Top
215  4  -0.001225  -58          IMP:N=1 U=45
C      CS Tube - Assembly Top
216  2  -7.8320   58 -48     IMP:N=1 U=45
C      Panel - Assembly Top
217  2  -7.8320   48         IMP:N=1 U=45
C
C    WET PIN LATTICE DESCRIPTION
250  1  -1.0000  -60 61 -62  63  IMP:N=1 LAT=1  U=20
     FILL -8:8 -8:8 0:0  20 16R
                 20 2 14R 20
                 20 2 14R 20
                 20 2 4R 4 2 2R 4 2 4R 20
                 20 2 2R 4 2 6R 4 2 2R 20
                 20 2 14R 20
                 20 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 20
                 20 2 14R 20
                 20 2 6R 6 2 6R 20
                 20 2 14R 20
                 20 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 20
                 20 2 14R 20
                 20 2 2R 4 2 6R 4 2 2R 20
                 20 2 4R 4 2 2R 4 2 4R 20
                 20 2 14R 20
                 20 2 14R 20
                 20 16R
C    MIXED PIN LATTICE DESCRIPTION
```

```
C   251  4  -0.001225  -60 61 -62  63  IMP:N=1 LAT=1  U=21
C    FILL -8:8 -8:8 0:0  21 16R
C                21 2 14R 21
C                21 2 14R 21
C                21 2 4R 4 2 2R 4 2 4R 21
C                21 2 2R 4 2 6R 4 2 2R 21
C                21 2 14R 21
C                21 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 21
C                21 2 14R 21
C                21 2 6R 7 2 6R 21
C                21 3 14R 21
C                21 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 21
C                21 3 14R 21
C                21 3 2R 5 3 6R 5 3 2R 21
C                21 3 4R 4 5 2R 5 3 4R 21
C                21 3 14R 21
C                21 3 14R 21
C                21 16R
C    DRY PIN LATTICE DESCRIPTION
252  4  -0.001225  -60 61 -62  63  IMP:N=1 LAT=1  U=22
    FILL -8:8 -8:8 0:0  22 16R
                22 3 14R 22
                22 3 14R 22
                22 3 4R 5 3 2R 5 3 4R 22
                22 3 2R 5 3 6R 5 3 2R 22
                22 3 14R 22
                22 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 22
                22 3 14R 22
                22 3 6R 7 3 6R 22
                22 3 14R 22
                22 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 22
                22 3 14R 22
                22 3 2R 5 3 6R 5 3 2R 22
                22 3 4R 5 3 2R 5 3 4R 22
                22 3 14R 22
                22 3 14R 22
                22 16R
C    WET INSTRUMENTATION TUBE
260  1  -1.0000   102          IMP:N=1 U=6 $ Water Above Assembly
261  7  -3.2788  -102  103       IMP:N=1 U=6 $ Upper End Fitting
262  1  -1.0000  -103  104  65   IMP:N=1 U=6 $ Upper Plenum, Water
C   263  1  -1.0000   65 -104  122    IMP:N=1 U=6 $ Water Arround Tube
264  1  -1.0000   65 -104  123   IMP:N=1 U=6 $ Water Arround Tube
```

```
265  20 -1.5518  65 -123  124   IMP:N=1 U=6 $ Spacer Grid     #1
266  1  -1.0000  65 -124  125   IMP:N=1 U=6 $ Water Arround Tube
267  20 -1.5518  65 -125  126   IMP:N=1 U=6 $ Spacer Grid     #2
268  1  -1.0000  65 -126  127   IMP:N=1 U=6 $ Water Arround Tube
269  20 -1.5518  65 -127  128   IMP:N=1 U=6 $ Spacer Grid     #3
270  1  -1.0000  65 -128  129   IMP:N=1 U=6 $ Water Arround Tube
271  20 -1.5518  65 -129  130   IMP:N=1 U=6 $ Spacer Grid     #4
272  1  -1.0000  65 -130  131   IMP:N=1 U=6 $ Water Arround Tube
273  20 -1.5518  65 -131  132   IMP:N=1 U=6 $ Spacer Grid     #5
274  1  -1.0000  65 -132  133   IMP:N=1 U=6 $ Water Arround Tube
275  20 -1.5518  65 -133  134   IMP:N=1 U=6 $ Spacer Grid     #6
276  1  -1.0000  65 -134  122   IMP:N=1 U=6 $ Water Arround Tube
281  6  -6.5600  64 -65 -103  122 IMP:N=1 U=6 $ Tube
282  1  -1.0000 -64 -103  122    IMP:N=1 U=6 $ Water In Tube
283  9  -2.4413  -122           IMP:N=1 U=6 $ Lower End Fitting
C    DRY INSTRUMENTATION TUBE
284  4  -0.001225  102          IMP:N=1 U=7 $ Air Above Assembly
285  10 -2.6074   -102  103      IMP:N=1 U=7 $ Upper End Fitting
286  4  -0.001225 -103  104  65   IMP:N=1 U=7 $ Upper Plenum, Air
C  287  4  -0.001225  65 -104  122   IMP:N=1 U=7 $ Air Arround Tube
288  4  -0.001225  65 -104   123   IMP:N=1 U=7 $ Air Arround Tube
289  21 -0.6522   65 -123  124   IMP:N=1 U=7 $ Spacer Grid     #1
290  4  -0.001225  65 -124  125   IMP:N=1 U=7 $ Air Arround Tube
291  21 -0.6522   65 -125  126   IMP:N=1 U=7 $ Spacer Grid     #2
292  4  -0.001225  65 -126  127   IMP:N=1 U=7 $ Air Arround Tube
293  21 -0.6522   65 -127  128   IMP:N=1 U=7 $ Spacer Grid     #3
294  4  -0.001225  65 -128  129   IMP:N=1 U=7 $ Air Arround Tube
295  21 -0.6522   65 -129  130   IMP:N=1 U=7 $ Spacer Grid     #4
296  4  -0.001225  65 -130  131   IMP:N=1 U=7 $ Air Arround Tube
297  21 -0.6522   65 -131  132   IMP:N=1 U=7 $ Spacer Grid     #5
298  4  -0.001225  65 -132  133   IMP:N=1 U=7 $ Air Arround Tube
299  21 -0.6522   65 -133  134   IMP:N=1 U=7 $ Spacer Grid     #6
300  4  -0.001225  65 -134  122   IMP:N=1 U=7 $ Air Arround Tube
305  6  -6.5600    64 -65 -103  122 IMP:N=1 U=7 $ Tube
306  4  -0.001225 -64 -103  122    IMP:N=1 U=7 $ Air In Tube
307  12 -2.4413   -122           IMP:N=1 U=7 $ Lower End Fitting
C    WET CONTROL ROD/GUIDE TUBE
308  1  -1.0000  102            IMP:N=1 U=4 $ Water Above Assembly
309  7  -3.2788 -102  103        IMP:N=1 U=4 $ Upper End Fitting
310  1  -1.0000 -103  104  70    IMP:N=1 U=4 $ Upper Plenum, Water
C 311  1  -1.0000  70 -104  122   IMP:N=1 U=4 $ Water Arround Tube
312  1  -1.0000  70 -104  123   IMP:N=1 U=4 $ Water Arround Tube
313  20 -1.5518  70 -123  124   IMP:N=1 U=4 $ Spacer Grid     #1
```

```
314  1 -1.0000  70 -124  125   IMP:N=1 U=4 $ Water Arround Tube
315  20 -1.5518  70 -125  126   IMP:N=1 U=4 $ Spacer Grid    #2
316  1 -1.0000  70 -126  127   IMP:N=1 U=4 $ Water Arround Tube
317  20 -1.5518  70 -127  128   IMP:N=1 U=4 $ Spacer Grid    #3
318  1 -1.0000  70 -128  129   IMP:N=1 U=4 $ Water Arround Tube
319  20 -1.5518  70 -129  130   IMP:N=1 U=4 $ Spacer Grid    #4
320  1 -1.0000  70 -130  131   IMP:N=1 U=4 $ Water Arround Tube
321  20 -1.5518  70 -131  132   IMP:N=1 U=4 $ Spacer Grid    #5
322  1 -1.0000  70 -132  133   IMP:N=1 U=4 $ Water Arround Tube
323  20 -1.5518  70 -133  134   IMP:N=1 U=4 $ Spacer Grid    #6
324  1 -1.0000  70 -134  122   IMP:N=1 U=4 $ Water Arround Tube
329  6 -6.5600  69 -70 -103  122 IMP:N=1 U=4 $ Guide Tube
330  1 -1.0000 -69 -103  122    IMP:N=1 U=4 $ No DCRA Rod
C   331  1 -1.0000  68 -69 -104  122 IMP:N=1 U=4  $ GT DCRA Rod Gap
C   332  6 -6.5600  67 -68 -104  122 IMP:N=1 U=4  $ DCRA Cladding
C   333  1 -1.0000  66 -67 -104  122 IMP:N=1 U=4  $ Cladding NA Gap
C   334  13 -7.8300 -66 -104  122    IMP:N=1 U=4  $ DCRA Rod
335  9 -2.4413   -122         IMP:N=1 U=4 $ Lower End Fitting
C   DRY CONTROL ROD/GUIDE TUBE
336  4 -0.001225  102          IMP:N=1 U=5 $ Air Above Assembly
337  10 -2.6074   -102  103       IMP:N=1 U=5 $ Upper End Fitting
338  4 -0.001225 -103  104  70    IMP:N=1 U=5 $ Upper Plenum, Air
C  339  4 -0.001225  70 -104  122    IMP:N=1 U=5 $ Air Arround Tube
340  4 -0.001225  70 -104  123   IMP:N=1 U=5 $ Air Arround Tube
341  21 -0.6522   70 -123  124   IMP:N=1 U=5 $ Spacer Grid    #1
342  4 -0.001225  70 -124  125   IMP:N=1 U=5 $ Air Arround Tube
343  21 -0.6522   70 -125  126   IMP:N=1 U=5 $ Spacer Grid    #2
344  4 -0.001225  70 -126  127   IMP:N=1 U=5 $ Air Arround Tube
345  21 -0.6522   70 -127  128   IMP:N=1 U=5 $ Spacer Grid    #3
346  4 -0.001225  70 -128  129   IMP:N=1 U=5 $ Air Arround Tube
347  21 -0.6522   70 -129  130   IMP:N=1 U=5 $ Spacer Grid    #4
348  4 -0.001225  70 -130  131   IMP:N=1 U=5 $ Air Arround Tube
349  21 -0.6522   70 -131  132   IMP:N=1 U=5 $ Spacer Grid    #5
350  4 -0.001225  70 -132  133   IMP:N=1 U=5 $ Air Arround Tube
351  21 -0.6522   70 -133  134   IMP:N=1 U=5 $ Spacer Grid    #6
352  4 -0.001225  70 -134  122   IMP:N=1 U=5 $ Air Arround Tube
357  6 -6.5600   69 -70 -103  122 IMP:N=1 U=5 $ Guide Tube
358  4 -0.001225 -69 -103  122   IMP:N=1 U=5 $ No DCRA Rod
C   359  4 -0.001225  68 -69 -104  122  IMP:N=1 U=5  $ GT DCRA Rod Gap
C   360  6 -6.5600   67 -68 -104  122  IMP:N=1 U=5  $ DCRA Cladding
C   361  1 -0.001225  66 -67 -104  122  IMP:N=1 U=4  $ Cladding DCRA Gap
C   362  13 -7.8300   -66 -104  122    IMP:N=1 U=5  $ DCRA Rod
363  12 -2.4413   -122         IMP:N=1 U=5 $ Lower End Fitting
```

```
C    WET FUEL ROD
370  1 -1.0000    102          IMP:N=1 U=2 $ Water Above Assembly
371  7 -3.2788   -102  103       IMP:N=1 U=2 $ Upper End Fitting
372  1 -1.0000   -103  104 -72    IMP:N=1 U=2 $ Upper Plenum
C  373  1 -1.0000    73 -103  122    IMP:N=1 U=2 $ Water Arround Fuel Rod
374  1 -1.0000  73 -103  123   IMP:N=1 U=2 $ Water Arround Rod
375  20 -1.5518  73 -123  124   IMP:N=1 U=2 $ Spacer Grid     #1
376  1 -1.0000  73 -124  125   IMP:N=1 U=2 $ Water Arround Rod
377  20 -1.5518  73 -125  126   IMP:N=1 U=2 $ Spacer Grid     #2
378  1 -1.0000  73 -126  127   IMP:N=1 U=2 $ Water Arround Rod
379  20 -1.5518  73 -127  128   IMP:N=1 U=2 $ Spacer Grid     #3
380  1 -1.0000  73 -128  129   IMP:N=1 U=2 $ Water Arround Rod
381  20 -1.5518  73 -129  130   IMP:N=1 U=2 $ Spacer Grid     #4
382  1 -1.0000  73 -130  131   IMP:N=1 U=2 $ Water Arround Rod
383  20 -1.5518  73 -131  132   IMP:N=1 U=2 $ Spacer Grid     #5
384  1 -1.0000  73 -132  133   IMP:N=1 U=2 $ Water Arround Rod
385  20 -1.5518  73 -133  134   IMP:N=1 U=2 $ Spacer Grid     #6
386  1 -1.0000  73 -134  122   IMP:N=1 U=2 $ Water Arround Rod
391  6 -6.5600    72 -73 -103  122 IMP:N=1 U=2 $ Cladding
392  1 -1.0000    71 -72 -104  122 IMP:N=1 U=2 $ Cladding-Pellet Gap
393  101 -9.9390 -71 -104  105 IMP:N=1 U=2 $ Fuel Pellet: Region  1
394  102 -9.8858 -71 -105  106 IMP:N=1 U=2 $ Fuel Pellet: Region  2
395  103 -9.8446 -71 -106  107 IMP:N=1 U=2 $ Fuel Pellet: Region  3
396  104 -9.8070 -71 -107  108 IMP:N=1 U=2 $ Fuel Pellet: Region  4
397  105 -9.8076 -71 -108  109 IMP:N=1 U=2 $ Fuel Pellet: Region  5
398  106 -9.8047 -71 -109  110 IMP:N=1 U=2 $ Fuel Pellet: Region  6
399  107 -9.8043 -71 -110  111 IMP:N=1 U=2 $ Fuel Pellet: Region  7
400  108 -9.8032 -71 -111  112 IMP:N=1 U=2 $ Fuel Pellet: Region  8
401  109 -9.8039 -71 -112  113 IMP:N=1 U=2 $ Fuel Pellet: Region  9
402  110 -9.8038 -71 -113  114 IMP:N=1 U=2 $ Fuel Pellet: Region 10
403  111 -9.8049 -71 -114  115 IMP:N=1 U=2 $ Fuel Pellet: Region 11
404  112 -9.8023 -71 -115  116 IMP:N=1 U=2 $ Fuel Pellet: Region 12
405  113 -9.8031 -71 -116  117 IMP:N=1 U=2 $ Fuel Pellet: Region 13
406  114 -9.8022 -71 -117  118 IMP:N=1 U=2 $ Fuel Pellet: Region 14
407  115 -9.8023 -71 -118  119 IMP:N=1 U=2 $ Fuel Pellet: Region 15
408  116 -9.8016 -71 -119  120 IMP:N=1 U=2 $ Fuel Pellet: Region 16
409  117 -9.8382 -71 -120  121 IMP:N=1 U=2 $ Fuel Pellet: Region 17
410  118 -9.9080 -71 -121  122 IMP:N=1 U=2 $ Fuel Pellet: Region 18
411  9 -2.4413   -122          IMP:N=1 U=2 $ Lower End Fitting
C    DRY FUEL ROD
412  4 -0.001225  102          IMP:N=1 U=3 $ Air Above Assembly
413  10 -2.6074   -102  103       IMP:N=1 U=3 $ Upper End Fitting
414  4 -0.001225 -103  104 -72    IMP:N=1 U=3 $ Upper Plenum, Air
```

```
C  415  4 -0.001225  73 -103  122    IMP:N=1 U=3 $ Air Arround Fuel Rod
416  4 -0.001225  73 -103  123   IMP:N=1 U=3 $ Air Arround Rod
417  21 -0.6522   73 -123  124   IMP:N=1 U=3 $ Spacer Grid    #1
418  4 -0.001225  73 -124  125   IMP:N=1 U=3 $ Air Arround Rod
419  21 -0.6522   73 -125  126   IMP:N=1 U=3 $ Spacer Grid    #2
420  4 -0.001225  73 -126  127   IMP:N=1 U=3 $ Air Arround Rod
421  21 -0.6522   73 -127  128   IMP:N=1 U=3 $ Spacer Grid    #3
422  4 -0.001225  73 -128  129   IMP:N=1 U=3 $ Air Arround Rod
423  21 -0.6522   73 -129  130   IMP:N=1 U=3 $ Spacer Grid    #4
424  4 -0.001225  73 -130  131   IMP:N=1 U=3 $ Air Arround Rod
425  21 -0.6522   73 -131  132   IMP:N=1 U=3 $ Spacer Grid    #5
426  4 -0.001225  73 -132  133   IMP:N=1 U=3 $ Air Arround Rod
427  21 -0.6522   73 -133  134   IMP:N=1 U=3 $ Spacer Grid    #6
428  4 -0.001225  73 -134  122   IMP:N=1 U=3 $ Air Arround Rod
433  6 -6.5600    72 -73 -103  122 IMP:N=1 U=3 $ Cladding
434  4 -0.001225  71 -72 -104  122 IMP:N=1 U=3 $ Cladding-Pellet Gap
435  101 -9.9390 -71 -104  105 IMP:N=1 U=3 $ Fuel Pellet: Region  1
436  102 -9.8858 -71 -105  106 IMP:N=1 U=3 $ Fuel Pellet: Region  2
437  103 -9.8446 -71 -106  107 IMP:N=1 U=3 $ Fuel Pellet: Region  3
438  104 -9.8070 -71 -107  108 IMP:N=1 U=3 $ Fuel Pellet: Region  4
439  105 -9.8076 -71 -108  109 IMP:N=1 U=3 $ Fuel Pellet: Region  5
440  106 -9.8047 -71 -109  110 IMP:N=1 U=3 $ Fuel Pellet: Region  6
441  107 -9.8043 -71 -110  111 IMP:N=1 U=3 $ Fuel Pellet: Region  7
442  108 -9.8032 -71 -111  112 IMP:N=1 U=3 $ Fuel Pellet: Region  8
443  109 -9.8039 -71 -112  113 IMP:N=1 U=3 $ Fuel Pellet: Region  9
444  110 -9.8038 -71 -113  114 IMP:N=1 U=3 $ Fuel Pellet: Region 10
445  111 -9.8049 -71 -114  115 IMP:N=1 U=3 $ Fuel Pellet: Region 11
446  112 -9.8023 -71 -115  116 IMP:N=1 U=3 $ Fuel Pellet: Region 12
447  113 -9.8031 -71 -116  117 IMP:N=1 U=3 $ Fuel Pellet: Region 13
448  114 -9.8022 -71 -117  118 IMP:N=1 U=3 $ Fuel Pellet: Region 14
449  115 -9.8023 -71 -118  119 IMP:N=1 U=3 $ Fuel Pellet: Region 15
450  116 -9.8016 -71 -119  120 IMP:N=1 U=3 $ Fuel Pellet: Region 16
451  117 -9.8382 -71 -120  121 IMP:N=1 U=3 $ Fuel Pellet: Region 17
452  118 -9.9080 -71 -121  122 IMP:N=1 U=3 $ Fuel Pellet: Region 18
453  12 -2.4413   -122          IMP:N=1 U=3 $ Lower End Fitting

C   SURFACE SPECIFICATIONS
1*  PZ  -66.48     $ Bottom of Reflector Region
2*  CZ  113.67     $ OR of Reflector Region
3*  PZ  527.98     $ Top of Reflector Region
4   PZ  -36.00     $ Bottom of Outer Barrier
5   CZ  83.17      $ OR of Outer Barrier
6   PZ  497.50     $ Top of Outer Barrier Shirt
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7  PZ -13.50    $ Bottom of Outer Barrier Bottom
8  CZ  76.52    $ IR of Outer Barrier Skirt
9  PZ 475.00    $ Top of Outer Barrier Lid
10 CZ  73.17    $ IR of Outer Barrier
11 PZ  -2.50    $ Bottom of Inner Barrier Bottom
12 PZ 464.00    $ Bottom of Outer Barrier Lid
13 PZ 461.00    $ Top of Inner Barrier
14 CZ  73.165   $ OR of Inner Barrier
C  ASSEMBLY REGION LATTICE
15 PZ   0.0     $ Assembly Lattice Region, Bottom/Top Inner Barrier
16 CZ  71.165   $ Assembly Lattice Region, Sides/IR Inner Barrier
17 PZ 458.50    $ Assembly Lattice Region, Top/Bottom Inner Barrier Lid
C  THERMAL SHUNTS
18 PX  11.95
19 PX -11.95
20 PY  11.95
21 PY -11.95
22 PX  12.45
23 PX -12.45
24 PY  12.45
25 PY -12.45
26 PX  61.65
27 PX -61.65
28 PY  61.65
29 PY -61.65
30 PX  62.35
31 PX -62.35
32 PY  62.35
33 PY -62.35
C  34 PX  12.30   $ For Collapsed Model
C  35 PX  36.90   $ For Collapsed Model
C  36 PX -12.30   $ For Collapsed Model
C  37 PX -36.90   $ For Collapsed Model
C  FUEL ASSEMBLY CELL LATTICE
42 PX  12.29999  $ ACTUAL 12.30
43 PX -12.29999
44 PY  12.29999
45 PY -12.29999
C  OUTER ASSEMBLY STRUCTURAL/CRITICALITY MATERIAL
46 PX  11.95
47 PX -11.95
48 PY  11.95
49 PY -11.95
```

```
C   45 degree planes
50  P   1. -1.  0. 0.
51  P   1.  1.  0. 0.
52  PX  11.45000
53  PX -11.45000
54  PY  11.45000
55  PY -11.45000
C   FUEL CELL LATTICE FOR STRUCTURAL/CRITICALITY MATERIAL
C   ASSEMBLY PIN LATTICE BOUNDS Actual 11.45
56  PX  11.450001  $ UCF Intact Inside Tube ID
57  PX -11.450001
58  PY  11.450001
59  PY -11.450001
C   PIN LATTICE BOUNDS
60  PX  0.72136
61  PX -0.72136
62  PY  0.72136
63  PY -0.72136
C    INSTRUMENTATION TUBE
64  CZ  0.56007
65  CZ  0.62611
C    CONTROL ROD/GUIDE TUBE
C   66  CZ  0.45340  $ 0.49022
C   67  CZ  0.46990  $ 0.50292
C   68  CZ  0.54610  $ 0.56007
69  CZ  0.62230  $ 0.63246
70  CZ  0.67310
C    FUEL ROD
71  CZ  0.468122
72  CZ  0.478790
73  CZ  0.546100
C   ASSEMBLY LATTICE HEIGHTS
C   100  PZ  457.50     $ Top of Basket
C   101  PZ  455.50     $ Top of Borated Basket
102  PZ  408.94     $ Top of Assembly Upper End Fitting
103  PZ  391.636    $ Top of Fuel Rod Plenums
104  PZ  376.895    $ Top of Fuel Zone  1
105  PZ  359.115    $ Top of Fuel Zone  2
106  PZ  339.1125   $ Top of Fuel Zone  3
107  PZ  319.110    $ Top of Fuel Zone  4
108  PZ  299.1075   $ Top of Fuel Zone  5
109  PZ  279.105    $ Top of Fuel Zone  6
110  PZ  259.1025   $ Top of Fuel Zone  7
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111  PZ  239.100    $ Top of Fuel Zone  8
112  PZ  219.0975   $ Top of Fuel Zone  9
113  PZ  199.095    $ Top of Fuel Zone 10
114  PZ  179.0925   $ Top of Fuel Zone 11
115  PZ  159.090    $ Top of Fuel Zone 12
116  PZ  139.0875   $ Top of Fuel Zone 13
117  PZ  119.085    $ Top of Fuel Zone 14
118  PZ   99.0825   $ Top of Fuel Zone 15
119  PZ   79.080    $ Top of Fuel Zone 16
120  PZ   59.0775   $ Top of Fuel Zone 17
121  PZ   39.075    $ Top of Fuel Zone 18
122  PZ   16.723    $ Top of Assembly Lower End Fitting
123  PZ  338.455    $ Top of Intermediate Spacer Grid   #1
124  PZ  333.375    $ Bottom of Intermediate Spacer Grid #1
125  PZ  284.876    $ Top of Intermediate Spacer Grid   #2
126  PZ  279.796    $ Bottom of Intermediate Spacer Grid #2
127  PZ  231.300    $ Top of Intermediate Spacer Grid   #3
128  PZ  226.220    $ Bottom of Intermediate Spacer Grid #3
129  PZ  177.721    $ Top of Intermediate Spacer Grid   #4
130  PZ  172.641    $ Bottom of Intermediate Spacer Grid #4
131  PZ  124.143    $ Top of Intermediate Spacer Grid   #5
132  PZ  119.063    $ Bottom of Intermediate Spacer Grid #5
133  PZ   70.485    $ Top of Intermediate Spacer Grid   #6
134  PZ   65.405    $ Bottom of Intermediate Spacer Grid #6
C 135  PZ   30.485    $ Top of Intermediate Spacer Grid   #7
C 136  PZ   25.405    $ Bottom of Intermediate Spacer Grid #7
C 137  PZ   15.485    $ Top of Intermediate Spacer Grid   #8
C 138  PZ   10.405    $ Bottom of Intermediate Spacer Grid #8

MODE  N
KCODE  2000 1. 17 107
SDEF   AXS= 0 0 1 POS= 0 0 0 EXT=D1 RAD=D2 ERG=D3
SI1    16.723  376.895
SI2    0.0 62.0
SP3    -2
C      MATERIAL SPECIFICATIONS
C        WATER AT 300 K d=1.0000 g/cc
M1     1001.50C  6.691-2   8016.50C  3.345-2
MT1    LWTR.01T
C      A516 CARBON STEEL d=7.832 g/cc
M2     6000.50C -0.00220  14000.50C -0.002750  15031.50C -0.00035
       16032.50C -0.00035  25055.50C -0.0090
       26000.55C -0.98535
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C       ALLOY 625 d=8.4425 g/cc
M3    6000.50C -0.0010
     13027.50C -0.0040
     14000.50C -0.0050
     15031.50C -0.00015
     16032.50C -0.00015
     22000.50C -0.0040
     24000.50C -0.2150
     25055.50C -0.0050
     26000.55C -0.0500
     27059.50C -0.0093
     28000.50C -0.5800
     41093.50C -0.0182
     42000.50C -0.0900
     73181.50C -0.0182
C       AIR d=0.001225 g/cc
M4    7014.50C  -0.80   8016.50C  -0.20
C       SS316B6A  1.6%  d=7.77 g/cc
M5    5010.50C -0.00288  5011.50C -0.013120
      6000.50C -0.00030  7014.50C -0.00100 14000.50C -0.0075
     15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
     25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
     42000.50C -0.02500
C       ZIRCALOY-4 d=6.56 g/cc
M6    8016.50C -0.0012  24000.50C -0.0010  26000.55C -0.0020
     40000.50C -0.9818  50000.35C -0.0140
C       WET MIXTURE: Homogenized Assembly Upper Fitting d=3.2788 g/cc
M7    1001.50C   -0.0229442945
      6000.50C   -0.0002446895
      7014.50C   -0.0006682182
      8016.50C   -0.1820907254
     13027.50C   -0.0005528009
     14000.50C   -0.0135854842
     15031.50C   -0.0003006982
     16032.50C   -0.0002004655
     22000.50C   -0.0056385693
     24000.50C   -0.1479840976
     25055.50C   -0.0102443933
     26000.55C   -0.4534580242
     28000.50C   -0.1249322516
     40000.50C   -0.0159111009
     41093.50C   -0.0009950416
     42000.50C   -0.0200222603
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     50000.35C   -0.0002268847
MT7  LWTR.01T
C       WET MIXTURE: Homogenized Plenum Region d=2.32 g/cc
C M8    1001.50C -0.090796  6000.50C -0.000060  7014.50C -0.000010
C      8016.50C -0.720497 13027.50C -0.000214 14000.50C -0.003097
C     15031.50C -0.000005 16032.50C -0.000003 22000.50C -0.000765
C     24000.50C -0.034784 25055.50C -0.002483 26000.55C -0.105186
C     28000.50C -0.038095 41093.50C -0.000306 42000.50C -0.003700
C MT8  LWTR.01T
C       WET MIXTURE: Homogenized Assembly Lower Fittings d=2.4413 g/cc
M9    1001.50C   -0.0362750033
      6000.50C   -0.0002029875
      7014.50C   -0.0005392492
      8016.50C   -0.2878955812
     13027.50C   -0.0005151595
     14000.50C   -0.0109910478
     15031.50C   -0.0002426621
     16032.50C   -0.0001617748
     22000.50C   -0.0052546266
     24000.50C   -0.1220669961
     25055.50C   -0.0082948018
     26000.55C   -0.3685345958
     28000.50C   -0.1080784830
     40000.50C   -0.0329773168
     41093.50C   -0.0009272870
     42000.50C   -0.0165721868
     50000.35C   -0.0004702408
MT9  LWTR.01T
C       DRY MIXTURE:  Homogenized Assembly Upper Fitting d=2.6074 g/cc
M10   6000.50C   -0.0003076944
      7014.50C   -0.0010929258
      8016.50C   -0.0000876169
     13027.50C   -0.0006951411
     14000.50C   -0.0170835973
     15031.50C   -0.0003781247
     16032.50C   -0.0002520831
     22000.50C   -0.0070904390
     24000.50C   -0.1860883779
     25055.50C   -0.0128822121
     26000.55C   -0.5702184869
     28000.50C   -0.1571009347
     40000.50C   -0.0200080346
     41093.50C   -0.0012512539
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     42000.50C   -0.0251777725
     50000.35C   -0.0002853050
C       DRY MIXTURE:  Homogenized Assembly Plenum Region d=1.51 g/cc
C M11   6000.50C -0.000060  7014.50C -0.649044  8016.50C -0.162259
C    13027.50C -0.000214 14000.50C -0.003097 15031.50C -0.000005
C    16032.50C -0.000003 22000.50C -0.000765 24000.50C -0.034784
C    25055.50C -0.002483 26000.55C -0.105186 28000.50C -0.038095
C    41093.50C -0.000306 42000.50C -0.003700
C       DRY MIXTURE:  Homogenized Assembly Lower Fittings d=2.4413 g/cc
M12    6000.50C   -0.0003001589
     7014.50C   -0.0012670989
     8016.50C   -0.0001770282
    13027.50C   -0.0007617696
    14000.50C   -0.0162525324
    15031.50C   -0.0003588261
    16032.50C   -0.0002392174
    22000.50C   -0.0077700498
    24000.50C   -0.1805012452
    25055.50C   -0.0122655762
    26000.55C   -0.5449544558
    28000.50C   -0.1598163416
    40000.50C   -0.0487637685
    41093.50C   -0.0013711853
    42000.50C   -0.0245053982
    50000.35C   -0.0006953481
C       B4C  d=?.?? g/cc
C    M13   5010.50C -0.16
C          5011.50C -0.64
C          6000.50C -0.20
C       Aluminum 6061 d=2.70
M14  12000.50C -0.00100
    13027.50C -0.98680
    14000.50C -0.00600
    22000.50C -0.00150
    24000.50C -0.00195
    25055.50C -0.00150
    26000.55C -0.00700
    29000.50C -0.00275
C    WET MIXTURE: Homogenized ZIRCALOY-4 Spacer Grid d=1.5518 g/cc
M20    1001.50C   -0.0649609762
     8016.50C   -0.5159923084
    24000.50C   -0.0004195502
    26000.55C   -0.0008391004
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     40000.50C   -0.4119143624
     50000.35C   -0.0058737025
MT20  LWTR.01T
C     DRY MIXTURE: Homogenized ZIRCALOY-4 Spacer Grid d=0.6522 g/cc
M21   7014.50C   -0.4643598595
      8016.50C   -0.1165934251
     24000.50C   -0.0004195502
     26000.55C   -0.0008391004
     40000.50C   -0.4119143624
     50000.35C   -0.0058737025
C      FUEL REGION
M101      8016.50C  -1.207E-01
         92233.50C  -2.659E-10
         92234.50C  -2.489E-04
         92235.50C  -2.075E-02
         92236.50C  -2.930E-03
         92238.50C  -8.471E-01
         93237.50C  -2.673E-04
         94238.50C  -2.430E-05
         94239.50C  -4.117E-03
         94240.50C  -9.212E-04
         94241.50C  -3.439E-04
         94242.50C  -6.393E-05
         95241.50C  -1.432E-05
         95242.50C  -2.714E-07
         95243.50C  -6.116E-06
         42095.50C  -3.283E-04
         43099.50C  -4.079E-04
         44101.50C  -3.694E-04
         45103.50C  -2.149E-04
         47109.50C  -2.639E-05
         60143.50C  -4.824E-04
         60145.50C  -3.616E-04
         62147.50C  -5.177E-05
         62149.50C  -2.318E-06
         62150.50C  -1.251E-04
         62151.50C  -1.140E-05
         63151.50C  -4.737E-07
         62152.50C  -6.275E-05
         63153.50C  -3.851E-05
         63155.50C  -7.634E-07
         64155.50C  -8.364E-07
M102      8016.50C  -1.213E-01
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        92233.50C  -3.645E-10
        92234.50C  -2.159E-04
        92235.50C  -1.427E-02
        92236.50C  -3.996E-03
        92238.50C  -8.482E-01
        93237.50C  -5.294E-04
        94238.50C  -7.677E-05
        94239.50C  -4.941E-03
        94240.50C  -1.611E-03
        94241.50C  -6.982E-04
        94242.50C  -2.320E-04
        95241.50C  -2.807E-05
        95242.50C  -5.893E-07
        95243.50C  -3.679E-05
        42095.50C  -5.082E-04
        43099.50C  -6.309E-04
        44101.50C  -5.888E-04
        45103.50C  -3.330E-04
        47109.50C  -5.433E-05
        60143.50C  -6.905E-04
        60145.50C  -5.468E-04
        62147.50C  -7.045E-05
        62149.50C  -2.460E-06
        62150.50C  -2.159E-04
        62151.50C  -1.352E-05
        63151.50C  -5.482E-07
        62152.50C  -9.919E-05
        63153.50C  -7.711E-05
        63155.50C  -1.625E-06
        64155.50C  -1.767E-06
M103     8016.50C  -1.218E-01
        92233.50C  -3.907E-10
        92234.50C  -1.999E-04
        92235.50C  -1.151E-02
        92236.50C  -4.436E-03
        92238.50C  -8.482E-01
        93237.50C  -6.702E-04
        94238.50C  -1.194E-04
        94239.50C  -5.138E-03
        94240.50C  -1.956E-03
        94241.50C  -8.717E-04
        94242.50C  -3.696E-04
        95241.50C  -3.392E-05
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        95242.50C  -7.259E-07
        95243.50C  -7.107E-05
        42095.50C  -6.124E-04
        43099.50C  -7.497E-04
        44101.50C  -7.145E-04
        45103.50C  -3.907E-04
        47109.50C  -7.180E-05
        60143.50C  -7.814E-04
        60145.50C  -6.441E-04
        62147.50C  -7.814E-05
        62149.50C  -2.488E-06
        62150.50C  -2.692E-04
        62151.50C  -1.460E-05
        63151.50C  -5.880E-07
        62152.50C  -1.176E-04
        63153.50C  -1.007E-04
        63155.50C  -2.227E-06
        64155.50C  -2.416E-06
M104     8016.50C  -1.223E-01
        92233.50C  -3.886E-10
        92234.50C  -1.928E-04
        92235.50C  -1.032E-02
        92236.50C  -4.594E-03
        92238.50C  -8.479E-01
        93237.50C  -7.364E-04
        94238.50C  -1.436E-04
        94239.50C  -5.264E-03
        94240.50C  -2.098E-03
        94241.50C  -9.457E-04
        94242.50C  -4.381E-04
        95241.50C  -3.682E-05
        95242.50C  -7.839E-07
        95243.50C  -9.147E-05
        42095.50C  -6.607E-04
        43099.50C  -8.020E-04
        44101.50C  -7.738E-04
        45103.50C  -4.169E-04
        47109.50C  -8.020E-05
        60143.50C  -8.232E-04
        60145.50C  -6.890E-04
        62147.50C  -8.161E-05
        62149.50C  -2.480E-06
        62150.50C  -2.936E-04
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        62151.50C  -1.513E-05
        63151.50C  -6.087E-07
        62152.50C  -1.254E-04
        63153.50C  -1.120E-04
        63155.50C  -2.560E-06
        64155.50C  -2.776E-06
M105     8016.50C  -1.223E-01
        92233.50C  -3.815E-10
        92234.50C  -1.903E-04
        92235.50C  -1.007E-02
        92236.50C  -4.629E-03
        92238.50C  -8.479E-01
        93237.50C  -7.613E-04
        94238.50C  -1.531E-04
        94239.50C  -5.299E-03
        94240.50C  -2.143E-03
        94241.50C  -9.701E-04
        94242.50C  -4.663E-04
        95241.50C  -3.822E-05
        95242.50C  -8.150E-07
        95243.50C  -9.994E-05
        42095.50C  -6.783E-04
        43099.50C  -8.161E-04
        44101.50C  -7.878E-04
        45103.50C  -4.275E-04
        47109.50C  -8.302E-05
        60143.50C  -8.338E-04
        60145.50C  -6.995E-04
        62147.50C  -8.373E-05
        62149.50C  -2.473E-06
        62150.50C  -3.024E-04
        62151.50C  -1.530E-05
        63151.50C  -6.156E-07
        62152.50C  -1.286E-04
        63153.50C  -1.166E-04
        63155.50C  -2.679E-06
        64155.50C  -2.906E-06
M106     8016.50C  -1.223E-01
        92233.50C  -3.746E-10
        92234.50C  -1.895E-04
        92235.50C  -9.719E-03
        92236.50C  -4.666E-03
        92238.50C  -8.481E-01
```

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        94238.50C  -1.562E-04
        94239.50C  -5.229E-03
        94240.50C  -2.155E-03
        94241.50C  -9.676E-04
        94242.50C  -4.771E-04
        95241.50C  -3.858E-05
        95242.50C  -8.152E-07
        95243.50C  -1.031E-04
        42095.50C  -6.856E-04
        43099.50C  -8.305E-04
        44101.50C  -8.022E-04
        45103.50C  -4.347E-04
        47109.50C  -8.481E-05
        60143.50C  -8.411E-04
        60145.50C  -7.103E-04
        62147.50C  -8.481E-05
        62149.50C  -2.431E-06
        62150.50C  -3.071E-04
        62151.50C  -1.513E-05
        63151.50C  -6.088E-07
        62152.50C  -1.300E-04
        63153.50C  -1.184E-04
        63155.50C  -2.714E-06
        64155.50C  -2.944E-06
M107    8016.50C   -1.223E-01
        92233.50C  -3.675E-10
        92234.50C  -1.888E-04
        92235.50C  -9.613E-03
        92236.50C  -4.701E-03
        92238.50C  -8.482E-01
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        94238.50C  -1.572E-04
        94239.50C  -5.230E-03
        94240.50C  -2.165E-03
        94241.50C  -9.677E-04
        94242.50C  -4.806E-04
        95241.50C  -3.893E-05
        95242.50C  -8.222E-07
        95243.50C  -1.035E-04
        42095.50C  -6.891E-04
        43099.50C  -8.305E-04
        44101.50C  -7.987E-04
```

	45103.50C	-4.347E-04
	47109.50C	-8.482E-05
	60143.50C	-8.411E-04
	60145.50C	-7.104E-04
	62147.50C	-8.552E-05
	62149.50C	-2.414E-06
	62150.50C	-3.078E-04
	62151.50C	-1.510E-05
	63151.50C	-6.075E-07
	62152.50C	-1.311E-04
	63153.50C	-1.191E-04
	63155.50C	-2.731E-06
	64155.50C	-2.962E-06
M108	8016.50C	-1.224E-01
	92233.50C	-3.676E-10
	92234.50C	-1.895E-04
	92235.50C	-9.544E-03
	92236.50C	-4.702E-03
	92238.50C	-8.483E-01
	93237.50C	-7.671E-04
	94238.50C	-1.569E-04
	94239.50C	-5.195E-03
	94240.50C	-2.162E-03
	94241.50C	-9.651E-04
	94242.50C	-4.842E-04
	95241.50C	-3.859E-05
	95242.50C	-8.084E-07
	95243.50C	-1.039E-04
	42095.50C	-6.892E-04
	43099.50C	-8.306E-04
	44101.50C	-7.988E-04
	45103.50C	-4.347E-04
	47109.50C	-8.483E-05
	60143.50C	-8.412E-04
	60145.50C	-7.104E-04
	62147.50C	-8.589E-05
	62149.50C	-2.389E-06
	62150.50C	-3.068E-04
	62151.50C	-1.493E-05
	63151.50C	-6.007E-07
	62152.50C	-1.311E-04
	63153.50C	-1.184E-04
	63155.50C	-2.731E-06

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        64155.50C  -2.962E-06
M109     8016.50C  -1.224E-01
        92233.50C  -3.711E-10
        92234.50C  -1.895E-04
        92235.50C  -9.614E-03
        92236.50C  -4.666E-03
        92238.50C  -8.482E-01
        93237.50C  -7.652E-04
        94238.50C  -1.575E-04
        94239.50C  -5.230E-03
        94240.50C  -2.162E-03
        94241.50C  -9.704E-04
        94242.50C  -4.842E-04
        95241.50C  -3.858E-05
        95242.50C  -8.153E-07
        95243.50C  -1.039E-04
        42095.50C  -6.892E-04
        43099.50C  -8.270E-04
        44101.50C  -7.987E-04
        45103.50C  -4.347E-04
        47109.50C  -8.517E-05
        60143.50C  -8.411E-04
        60145.50C  -7.068E-04
        62147.50C  -8.588E-05
        62149.50C  -2.403E-06
        62150.50C  -3.078E-04
        62151.50C  -1.507E-05
        63151.50C  -6.061E-07
        62152.50C  -1.304E-04
        63153.50C  -1.191E-04
        63155.50C  -2.765E-06
        64155.50C  -2.999E-06
M110     8016.50C  -1.224E-01
        92233.50C  -3.746E-10
        92234.50C  -1.895E-04
        92235.50C  -9.614E-03
        92236.50C  -4.666E-03
        92238.50C  -8.482E-01
        93237.50C  -7.652E-04
        94238.50C  -1.572E-04
        94239.50C  -5.230E-03
        94240.50C  -2.151E-03
        94241.50C  -9.704E-04
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        94242.50C  -4.807E-04
        95241.50C  -3.823E-05
        95242.50C  -8.049E-07
        95243.50C  -1.039E-04
        42095.50C  -6.856E-04
        43099.50C  -8.305E-04
        44101.50C  -8.058E-04
        45103.50C  -4.312E-04
        47109.50C  -8.518E-05
        60143.50C  -8.411E-04
        60145.50C  -7.139E-04
        62147.50C  -8.588E-05
        62149.50C  -2.400E-06
        62150.50C  -3.075E-04
        62151.50C  -1.496E-05
        63151.50C  -6.018E-07
        62152.50C  -1.315E-04
        63153.50C  -1.195E-04
        63155.50C  -2.765E-06
        64155.50C  -2.998E-06
M111    8016.50C   -1.223E-01
        92233.50C  -3.781E-10
        92234.50C  -1.902E-04
        92235.50C  -9.648E-03
        92236.50C  -4.736E-03
        92238.50C  -8.481E-01
        93237.50C  -7.670E-04
        94238.50C  -1.565E-04
        94239.50C  -5.229E-03
        94240.50C  -2.155E-03
        94241.50C  -9.649E-04
        94242.50C  -4.806E-04
        95241.50C  -3.753E-05
        95242.50C  -7.876E-07
        95243.50C  -1.038E-04
        42095.50C  -6.891E-04
        43099.50C  -8.340E-04
        44101.50C  -8.022E-04
        45103.50C  -4.347E-04
        47109.50C  -8.481E-05
        60143.50C  -8.411E-04
        60145.50C  -7.138E-04
        62147.50C  -8.517E-05
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        62150.50C  -3.082E-04
        62151.50C  -1.493E-05
        63151.50C  -6.001E-07
        62152.50C  -1.308E-04
        63153.50C  -1.194E-04
        63155.50C  -2.765E-06
        64155.50C  -2.998E-06
M112     8016.50C  -1.224E-01
        92233.50C  -3.817E-10
        92234.50C  -1.892E-04
        92235.50C  -9.439E-03
        92236.50C  -4.667E-03
        92238.50C  -8.483E-01
        93237.50C  -7.688E-04
        94238.50C  -1.579E-04
        94239.50C  -5.195E-03
        94240.50C  -2.169E-03
        94241.50C  -9.706E-04
        94242.50C  -4.913E-04
        95241.50C  -3.719E-05
        95242.50C  -7.774E-07
        95243.50C  -1.053E-04
        42095.50C  -6.857E-04
        43099.50C  -8.377E-04
        44101.50C  -8.095E-04
        45103.50C  -4.348E-04
        47109.50C  -8.590E-05
        60143.50C  -8.448E-04
        60145.50C  -7.176E-04
        62147.50C  -8.483E-05
        62149.50C  -2.379E-06
        62150.50C  -3.107E-04
        62151.50C  -1.486E-05
        63151.50C  -5.972E-07
        62152.50C  -1.322E-04
        63153.50C  -1.198E-04
        63155.50C  -2.783E-06
        64155.50C  -3.016E-06
M113     8016.50C  -1.224E-01
        92233.50C  -3.888E-10
        92234.50C  -1.889E-04
        92235.50C  -9.438E-03
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        92238.50C  -8.483E-01
        93237.50C  -7.731E-04
        94238.50C  -1.586E-04
        94239.50C  -5.195E-03
        94240.50C  -2.173E-03
        94241.50C  -9.732E-04
        94242.50C  -4.948E-04
        95241.50C  -3.683E-05
        95242.50C  -7.670E-07
        95243.50C  -1.067E-04
        42095.50C  -6.928E-04
        43099.50C  -8.412E-04
        44101.50C  -8.129E-04
        45103.50C  -4.383E-04
        47109.50C  -8.624E-05
        60143.50C  -8.483E-04
        60145.50C  -7.175E-04
        62147.50C  -8.518E-05
        62149.50C  -2.389E-06
        62150.50C  -3.125E-04
        62151.50C  -1.490E-05
        63151.50C  -5.982E-07
        62152.50C  -1.333E-04
        63153.50C  -1.205E-04
        63155.50C  -2.800E-06
        64155.50C  -3.033E-06
M114    8016.50C   -1.224E-01
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        92235.50C  -9.297E-03
        92236.50C  -4.702E-03
        92238.50C  -8.484E-01
        93237.50C  -7.783E-04
        94238.50C  -1.623E-04
        94239.50C  -5.196E-03
        94240.50C  -2.183E-03
        94241.50C  -9.787E-04
        94242.50C  -5.055E-04
        95241.50C  -3.719E-05
        95242.50C  -7.774E-07
        95243.50C  -1.095E-04
        42095.50C  -6.928E-04
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        45103.50C  -4.383E-04
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        60143.50C  -8.484E-04
        60145.50C  -7.246E-04
        62147.50C  -8.484E-05
        62149.50C  -2.375E-06
        62150.50C  -3.150E-04
        62151.50C  -1.486E-05
        63151.50C  -5.967E-07
        62152.50C  -1.336E-04
        63153.50C  -1.216E-04
        63155.50C  -2.834E-06
        64155.50C  -3.070E-06
M115    8016.50C   -1.224E-01
        92233.50C  -3.924E-10
        92234.50C  -1.879E-04
        92235.50C  -9.297E-03
        92236.50C  -4.773E-03
        92238.50C  -8.484E-01
        93237.50C  -7.732E-04
        94238.50C  -1.603E-04
        94239.50C  -5.160E-03
        94240.50C  -2.176E-03
        94241.50C  -9.733E-04
        94242.50C  -5.019E-04
        95241.50C  -3.719E-05
        95242.50C  -7.705E-07
        95243.50C  -1.085E-04
        42095.50C  -6.964E-04
        43099.50C  -8.448E-04
        44101.50C  -8.165E-04
        45103.50C  -4.348E-04
        47109.50C  -8.660E-05
        60143.50C  -8.448E-04
        60145.50C  -7.246E-04
        62147.50C  -8.554E-05
        62149.50C  -2.365E-06
        62150.50C  -3.142E-04
        62151.50C  -1.473E-05
        63151.50C  -5.911E-07
        62152.50C  -1.336E-04
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        63155.50C  -2.834E-06
        64155.50C  -3.069E-06
M116     8016.50C  -1.224E-01
        92233.50C  -3.888E-10
        92234.50C  -1.907E-04
        92235.50C  -9.651E-03
        92236.50C  -4.703E-03
        92238.50C  -8.484E-01
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        94238.50C  -1.494E-04
        94239.50C  -5.090E-03
        94240.50C  -2.116E-03
        94241.50C  -9.380E-04
        94242.50C  -4.702E-04
        95241.50C  -3.649E-05
        95242.50C  -7.567E-07
        95243.50C  -9.823E-05
        42095.50C  -6.787E-04
        43099.50C  -8.237E-04
        44101.50C  -7.989E-04
        45103.50C  -4.277E-04
        47109.50C  -8.343E-05
        60143.50C  -8.343E-04
        60145.50C  -7.105E-04
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        62149.50C  -2.337E-06
        62150.50C  -3.040E-04
        62151.50C  -1.439E-05
        63151.50C  -5.778E-07
        62152.50C  -1.312E-04
        63153.50C  -1.170E-04
        63155.50C  -2.698E-06
        64155.50C  -2.922E-06
M117     8016.50C  -1.219E-01
        92233.50C  -3.733E-10
        92234.50C  -2.012E-04
        92235.50C  -1.120E-02
        92236.50C  -4.439E-03
        92238.50C  -8.488E-01
        93237.50C  -6.435E-04
        94238.50C  -1.144E-04
        94239.50C  -4.930E-03
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        94240.50C  -1.915E-03
        94241.50C  -8.289E-04
        94242.50C  -3.627E-04
        95241.50C  -3.342E-05
        95242.50C  -6.885E-07
        95243.50C  -6.759E-05
        42095.50C  -6.198E-04
        43099.50C  -7.537E-04
        44101.50C  -7.149E-04
        45103.50C  -3.909E-04
        47109.50C  -7.079E-05
        60143.50C  -7.783E-04
        60145.50C  -6.480E-04
        62147.50C  -8.171E-05
        62149.50C  -2.310E-06
        62150.50C  -2.677E-04
        62151.50C  -1.356E-05
        63151.50C  -5.459E-07
        62152.50C  -1.194E-04
        63153.50C  -1.007E-04
        63155.50C  -2.228E-06
        64155.50C  -2.416E-06
M118     8016.50C  -1.211E-01
        92233.50C  -2.923E-10
        92234.50C  -2.351E-04
        92235.50C  -1.743E-02
        92236.50C  -3.443E-03
        92238.50C  -8.481E-01
        93237.50C  -3.642E-04
        94238.50C  -4.119E-05
        94239.50C  -4.381E-03
        94240.50C  -1.204E-03
        94241.50C  -4.766E-04
        94242.50C  -1.202E-04
        95241.50C  -2.037E-05
        95242.50C  -3.977E-07
        95243.50C  -1.420E-05
        42095.50C  -4.162E-04
        43099.50C  -5.101E-04
        44101.50C  -4.694E-04
        45103.50C  -2.685E-04
        47109.50C  -3.724E-05
        60143.50C  -5.821E-04
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        60145.50C  -4.475E-04
        62147.50C  -6.415E-05
        62149.50C  -2.234E-06
        62150.50C  -1.618E-04
        62151.50C  -1.150E-05
        63151.50C  -4.715E-07
        62152.50C  -8.043E-05
        63153.50C  -5.414E-05
        63155.50C  -1.094E-06
        64155.50C  -1.193E-06
PRINT
```

5.7 Isotopic Data at Long Time Periods

The decay of isotopes out to one million years was run as a stand-alone ORIGEN-S case after the SAS2H burnup calculation. The ORIGEN-S calculation uses the isotopic output from SAS2H and applies the decay constants contained within the 44GROUP cross section library to calculate the isotopic data at desired time periods. The isotopic data provided by these calculations are provided to facilitate future analyses in the repository environment, and are not used for the loading curves.

6.0 Results

The loading curves for the 21 PWR Waste Package are shown in Figure 6-1, and are tabulated in Table 6-1. Two curves are shown: one for PWR assemblies which contained a BPRA at some point in their irradiation (legend: BPRAs) and one for PWR assemblies which never contained a BPRA (legend: No BPRAs).

Figure 6-1. Loading Curve for a 21 PWR Waste Package for Uncanistered Spent Fuel

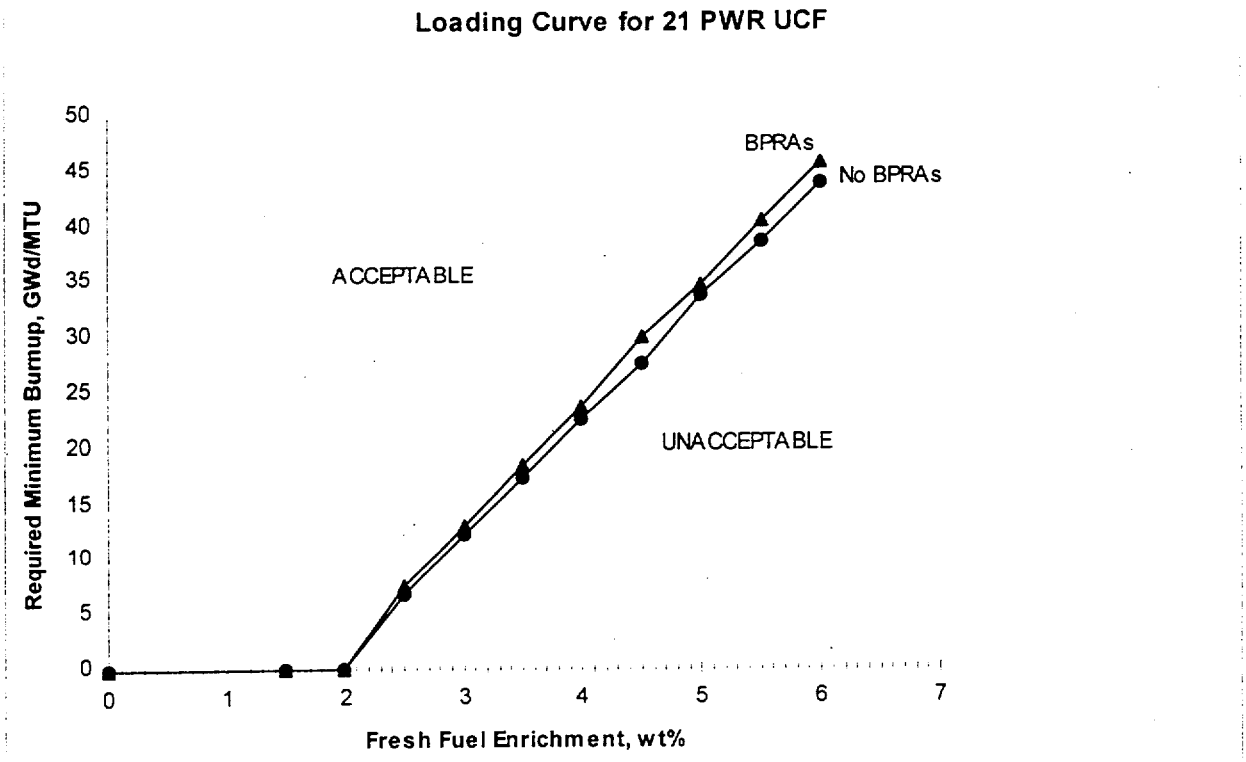

Table 6-1. Loading Curve Data for a 21 PWR Waste Package for Uncanistered Spent Fuel

21 PWR Waste Package - Intact Geometry Principal Isotope Burnup Credit with Eighteen Axial Nodes			
No BPRAs		BPRAs	
Initial Enrichment (wt%)	Required Minimum Burnup (GWd/MTU)	Initial Enrichment (wt%)	Required Minimum Burnup (GWd/MTU)
0.00	0.00	0.00	0
1.50	0.0	1.50	0
1.98	0.0	1.98	0
2.50	6.8	2.50	7.5
3.00	12.3	3.00	13.1
3.50	17.4	3.50	18.5
4.00	22.5	4.00	23.7
4.50	27.7	4.50	30.1
5.00	33.8	5.00	34.7
5.50	38.7	5.50	40.4
6.00	43.9	6.00	45.7

6.1 Fresh Fuel

The maximum enrichment of fresh, unirradiated fuel which can be loaded into the waste package sets the point at which no burnup is required. Fuel enrichments greater than this value require burnup credit. The determination of the maximum fresh fuel enrichment limit for the 21 PWR basket is made by calculating k_{eff} for a range of initial enrichments, and plotting these results against the initial enrichment. The resulting curve shows the dependence of waste package fuel basket reactivity versus initial fuel enrichment, as illustrated in Figure 6.1-1. The intersection of this curve and a line representing the desired k_{eff} value (the administrative limit, such as 0.95) occurs at the maximum fresh fuel enrichment limit. The k_{eff} plotted in this analysis include a margin of 0.02 for bias and uncertainty of the bias, plus a two sigma allowance for calculational uncertainty. The k_{eff} values calculated for the waste package with fresh fuel are tabulated in Table 6.1-1. Note that these fresh fuel assemblies do not contain BPRAs.

Figure 6.1-1. 21 PWR UCF Waste Package Maximum Fresh Fuel Enrichment Limit

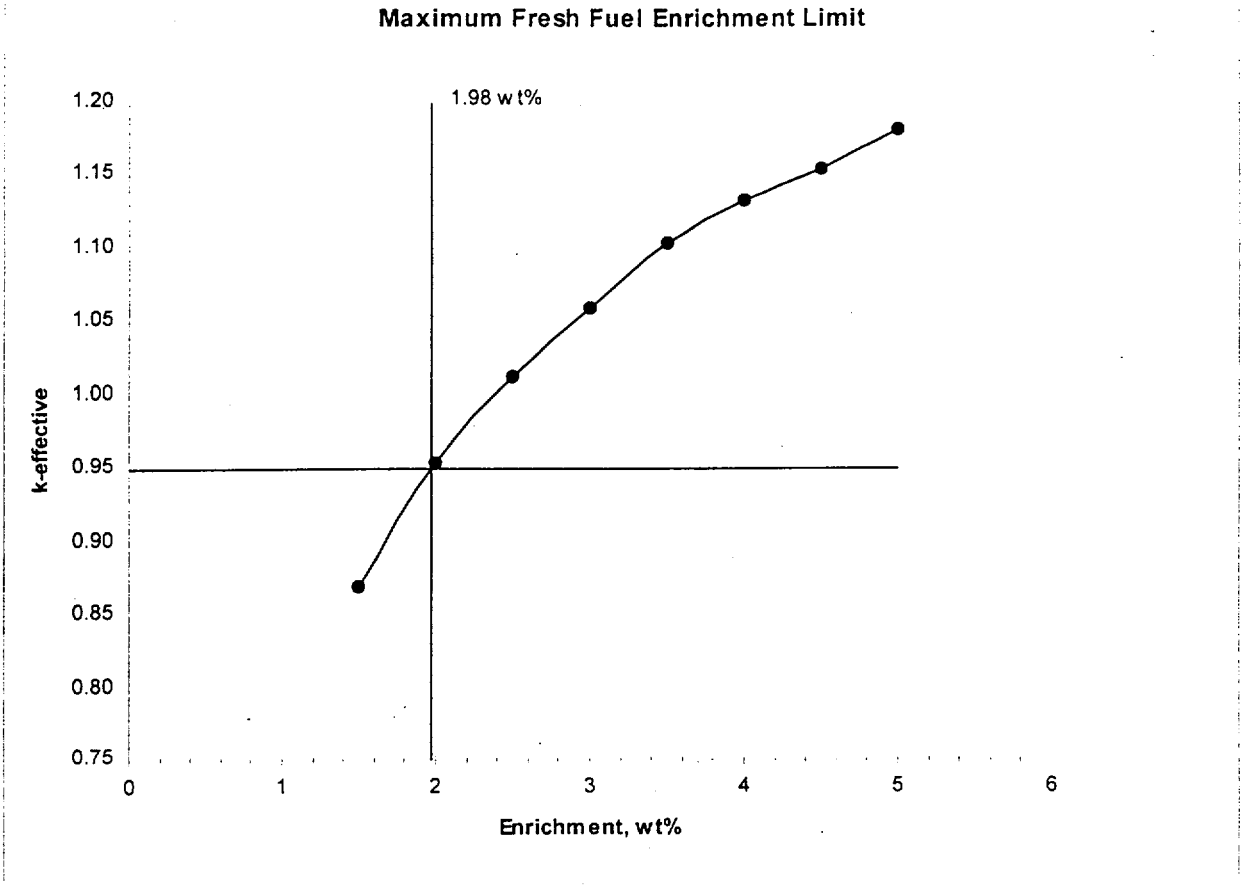

Table 6.1-1. 21 PWR UCF Waste Package Maximum Fresh Fuel Enrichment Limit

Principal Isotope Burnup Credit with Eighteen Axial Nodes			No BPRAs	
Case Name	Enrichment	k-calculated	sigma	k-effective
UCF001	1.5 wt%	0.84757	0.00135	0.870
UCF002	2.0 wt%	0.93134	0.00154	0.954
UCF003	2.5 wt%	0.98962	0.00169	1.013
UCF004	3.0 wt%	1.03682	0.00153	1.060
UCF005	3.5 wt%	1.08022	0.00169	1.104
UCF006	4.0 wt%	1.10866	0.00201	1.133
UCF007	4.5 wt%	1.13015	0.00210	1.154
UCF008	5.0 wt%	1.15748	0.00184	1.181

6.2 Burned Fuel

The required minimum burnup for each initial enrichment data point is determined by plotting the calculated k_{eff} versus the burnup, as shown in Figures 6.2-1 through 6.2-8. The k_{eff} plotted in this analysis include a margin of 0.02 for bias and uncertainty of the bias, plus a two sigma allowance for calculational uncertainty. The burnup value of the intersection of the plotted curve with the administrative limit for k-effective (0.95) is the required minimum burnup. Any burnup greater than this value will result in a k-effective less than 0.95. The required minimum burnup curves are plotted for enrichments of 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, and 6.0 weight percent U-235, with and without BPRAs. As suggested in the *Topical Report on Actinide-Only Burnup Credit for PWR Spent Nuclear Fuel Packages* (Reference 7.7), five or more k_{eff} calculations were performed for each curve.

6.2.1 2.5 wt% Initial Enrichment

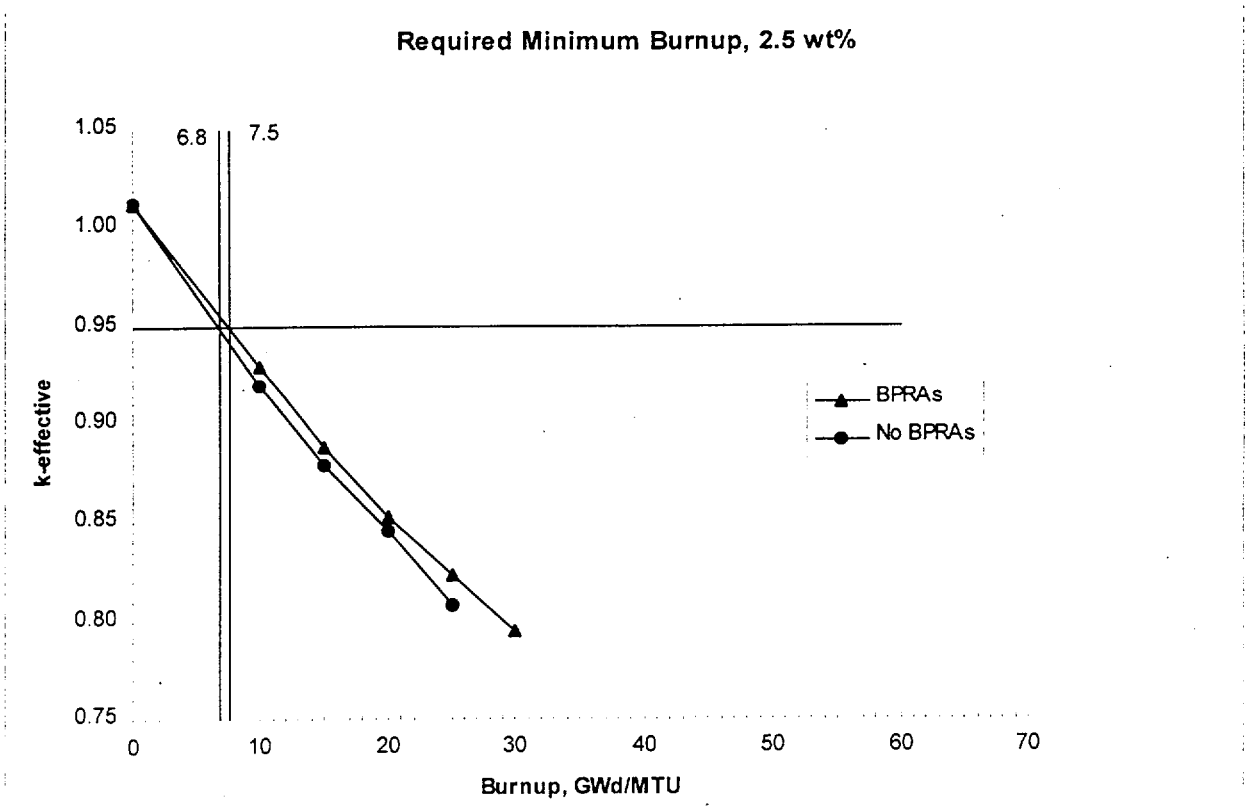

Figure 6.2-1. Required Minimum Burnup for 2.5 wt% U-235

Table 6.2-1. Required Minimum Burnup for 2.5 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				2.50 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
UCF003	0 GWd/MTU	0.98962	0.00169	1.013
A2510	10 GWd/MTU	0.89608	0.00156	0.919
A2515	15 GWd/MTU	0.85508	0.00159	0.878
A2520	20 GWd/MTU	0.82144	0.00174	0.845
A2525	25 GWd/MTU	0.78444	0.00143	0.807
BPRAs B2510	10 GWd/MTU	0.90646	0.00163	0.930
B2515	15 GWd/MTU	0.86446	0.00162	0.888
B2520	20 GWd/MTU	0.82933	0.00149	0.852
B2525	25 GWd/MTU	0.79989	0.00142	0.823
B2530	30 GWd/MTU	0.77174	0.00141	0.795

6.2.2 3.0 wt% Initial Enrichment

Figure 6.2-2. Required Minimum Burnup for 3.0 wt% U-235

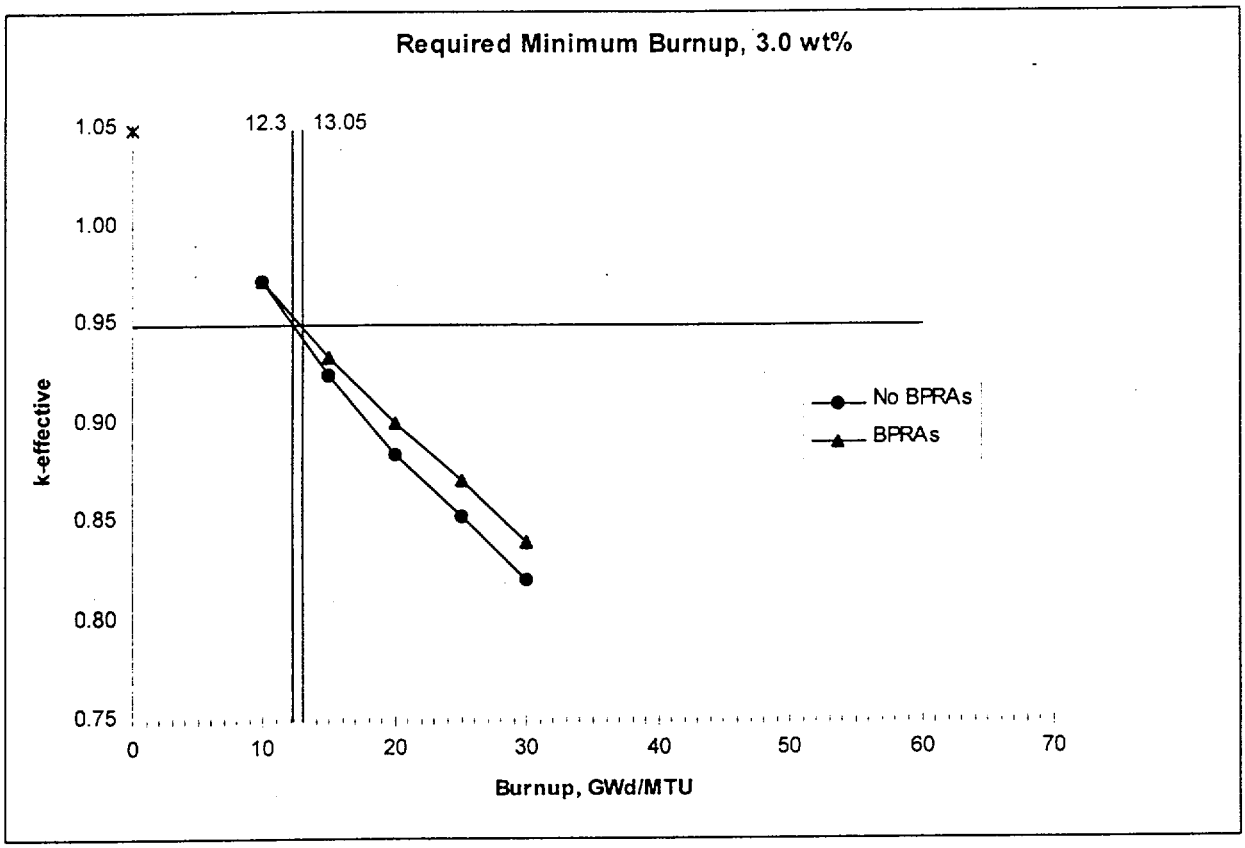

Table 6.2-2. Required Minimum Burnup for 3.0 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				3.00 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
A3010	10 GWd/MTU	0.94801	0.00192	0.972
A3015	15 GWd/MTU	0.90156	0.00172	0.925
A3020	20 GWd/MTU	0.86148	0.00162	0.885
A3025	25 GWd/MTU	0.82938	0.00163	0.853
A3030	30 GWd/MTU	0.79747	0.00142	0.820
BPRAs B3010	10 GWd/MTU	0.94878	0.00188	0.973
B3015	15 GWd/MTU	0.91071	0.00155	0.934
B3020	20 GWd/MTU	0.87747	0.00156	0.901
B3025	25 GWd/MTU	0.84838	0.00155	0.871
B3030	30 GWd/MTU	0.81675	0.00158	0.840

6.2.3 3.5 wt% Initial Enrichment

Figure 6.2-3. Required Minimum Burnup for 3.5 wt% U-235

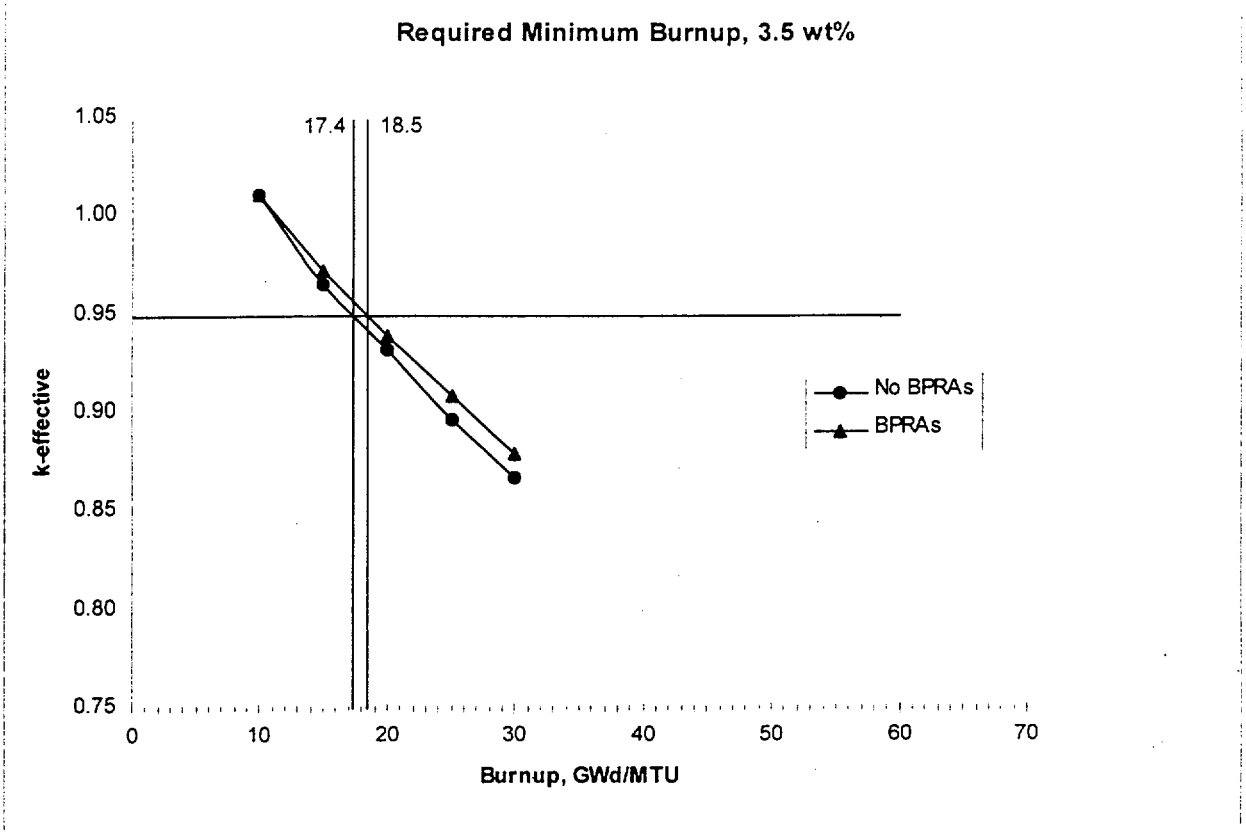

Table 6.2-3. Required Minimum Burnup for 3.5 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				3.50 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
A3510	10 GWd/MTU	0.98798	0.00180	1.012
A3515	15 GWd/MTU	0.94294	0.00164	0.966
A3520	20 GWd/MTU	0.90909	0.00164	0.932
A3525	25 GWd/MTU	0.87388	0.00163	0.897
A3530	30 GWd/MTU	0.84406	0.00172	0.868
BPRAs B3510	10 GWd/MTU	0.98785	0.00167	1.011
B3515	15 GWd/MTU	0.94981	0.00166	0.973
B3520	20 GWd/MTU	0.91618	0.00165	0.939
B3525	25 GWd/MTU	0.88567	0.00157	0.909
B3530	30 GWd/MTU	0.85595	0.00168	0.879

6.2.4 4.0 wt% Initial Enrichment

The full range of burnups, from 10 through 60 GWd/MTU, was investigated at 4.0 wt% initial enrichment without BPRAs to determine if there were any interesting features in the curve; there were none, and the curve is continuous and does not change slope discontinuously. Thus it is an adequate procedure to calculate k_{eff} at five data points in the region where the curve crosses the limit for k_{eff} (0.95).

Figure 6.2-4. Required Minimum Burnup for 4.0 wt% U-235

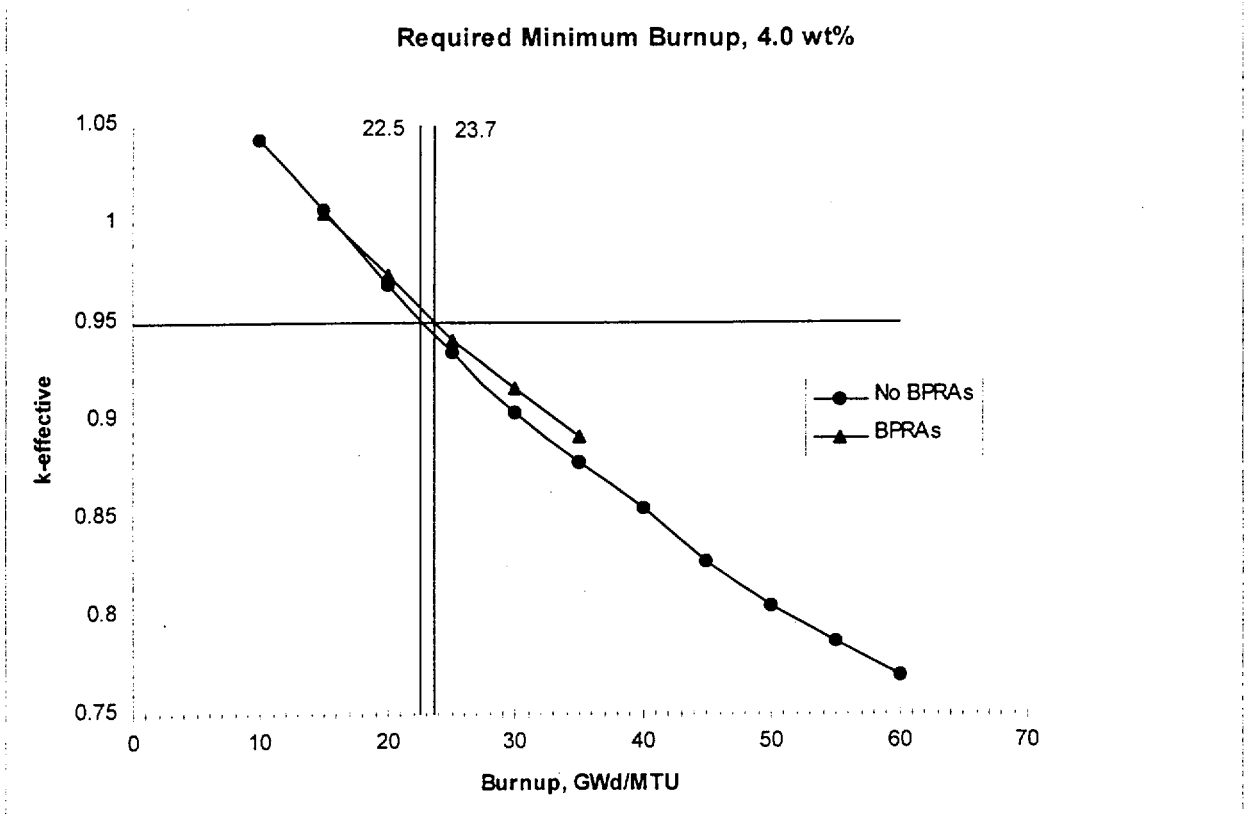

Table 6.2-4. Required Minimum Burnup for 4.0 wt% U-235, No BPRAs

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				4.00 Weight Percent No BPRAs
Case Name	Burnup	k-calculated	sigma	k-effective
A4010	10 GWd/MTU	1.01963	0.00174	1.043
A4015	15 GWd/MTU	0.98467	0.00155	1.008
A4020	20 GWd/MTU	0.94542	0.00161	0.969
A4025	25 GWd/MTU	0.91082	0.00166	0.934
A4030	30 GWd/MTU	0.88066	0.00158	0.904
A4035	35 GWd/MTU	0.85533	0.00176	0.879
A4040	40 GWd/MTU	0.83147	0.00175	0.855
A4045	45 GWd/MTU	0.80475	0.00147	0.828
A4050	50 GWd/MTU	0.78067	0.00182	0.804
A4055	55 GWd/MTU	0.76341	0.00160	0.787
A4060	60 GWd/MTU	0.74550	0.00177	0.769

Table 6.2-4. Required Minimum Burnup for 4.0 wt% U-235 (Continued), BPRAs

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				4.00 Weight Percent BPRAs
Case Name	Burnup	k-calculated	sigma	k-effective
B4015	15 GWd/MTU	0.98232	0.00144	1.005
B4020	20 GWd/MTU	0.95062	0.00149	0.974
B4025	25 GWd/MTU	0.91723	0.00182	0.941
B4030	30 GWd/MTU	0.89300	0.00147	0.916
B4035	35 GWd/MTU	0.86813	0.00169	0.892

6.2.5 4.5 wt% Initial Enrichment

Figure 6.2-5. Required Minimum Burnup for 4.5 wt% U-235

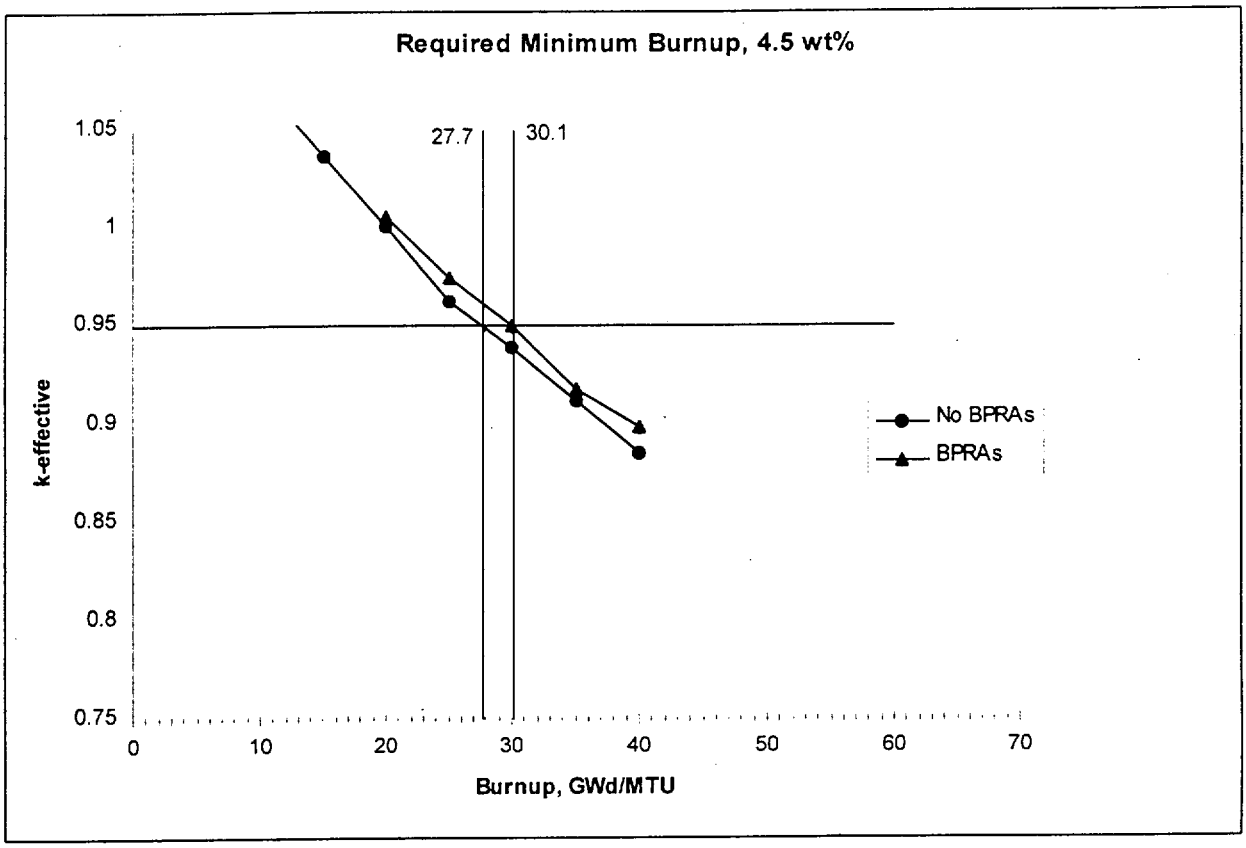

Table 6.2-5. Required Minimum Burnup for 4.5 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes			4.50 Weight Percent	
Case Name	Burnup	k-calculated	sigma	k-effective
A4510	10 GWd/MTU	1.05087	0.00181	1.074
A4515	15 GWd/MTU	1.01406	0.00161	1.037
A4520	20 GWd/MTU	0.97803	0.00173	1.001
A4525	25 GWd/MTU	0.93931	0.00166	0.963
A4530	30 GWd/MTU	0.91561	0.00165	0.939
A4535	35 GWd/MTU	0.88815	0.00173	0.912
A4540	40 GWd/MTU	0.86243	0.00161	0.886
BPRAs				
B4520	20 GWd/MTU	0.98289	0.00186	1.007
B4525	25 GWd/MTU	0.95120	0.00167	0.975
B4530	30 GWd/MTU	0.92705	0.00166	0.950
B4535	35 GWd/MTU	0.89516	0.00147	0.918
B4540	40 GWd/MTU	0.87560	0.00156	0.899

6.2.6 5.0 wt% Initial Enrichment

Figure 6.2-6. Required Minimum Burnup for 5.0 wt% U-235

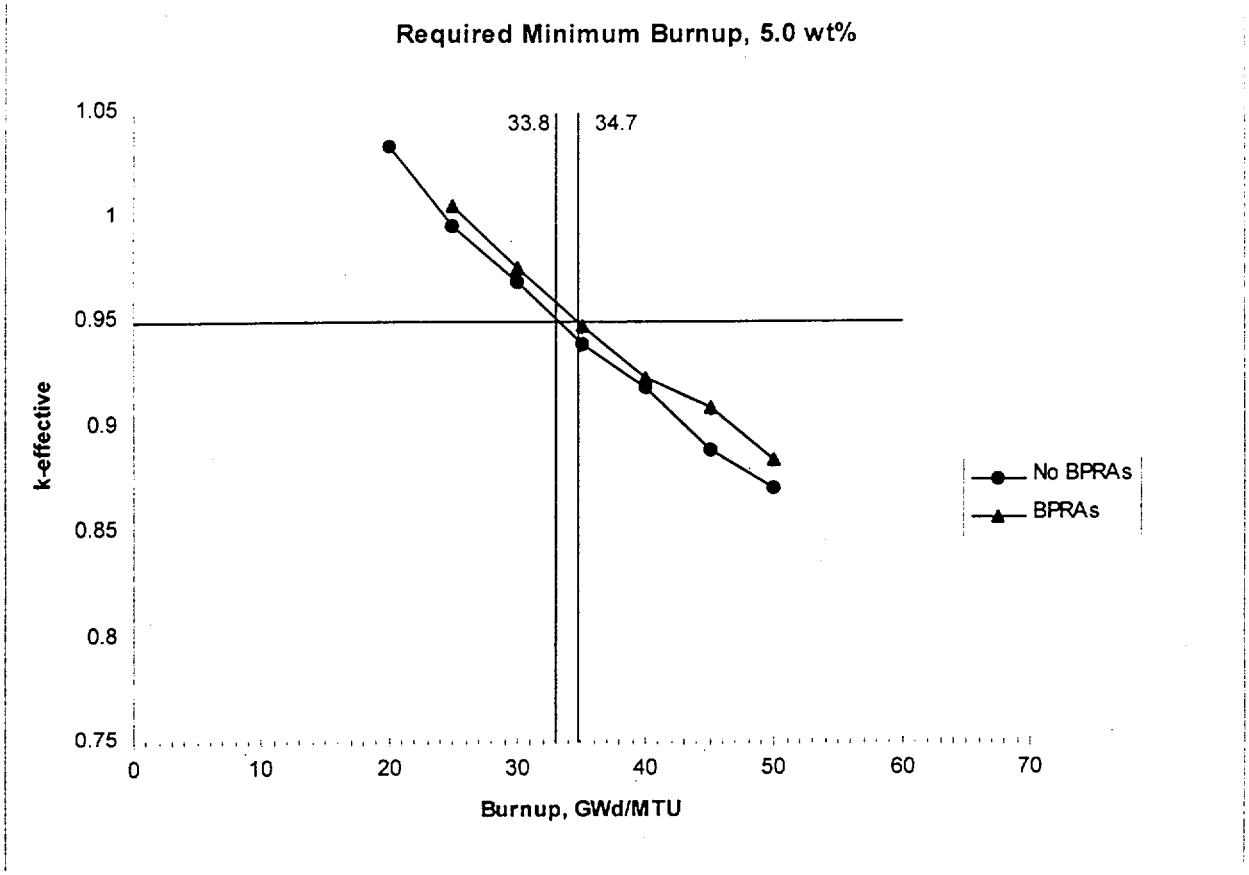

Table 6.2-6. Required Minimum Burnup for 5.0 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				5.00 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
A5020	20 GWd/MTU	1.01028	0.00176	1.034
A5025	25 GWd/MTU	0.97187	0.00192	0.996
A5030	30 GWd/MTU	0.94542	0.00169	0.969
A5035	35 GWd/MTU	0.91646	0.00146	0.939
A5040	40 GWd/MTU	0.89529	0.00168	0.919
A5045	45 GWd/MTU	0.86586	0.00170	0.889
A5050	50 GWd/MTU	0.84695	0.00186	0.871
BPRAs				
b5025	25 GWd/MTU	0.98209	0.00170	1.005
b5030	30 GWd/MTU	0.95230	0.00166	0.976
b5035	35 GWd/MTU	0.92424	0.00175	0.948
b5040	40 GWd/MTU	0.89978	0.00183	0.923
b5045	45 GWd/MTU	0.88561	0.00184	0.909
b5050	50 GWd/MTU	0.86040	0.00187	0.884

6.2.7 5.5 wt% Initial Enrichment

Figure 6.2-7. Required Minimum Burnup for 5.5 wt% U-235

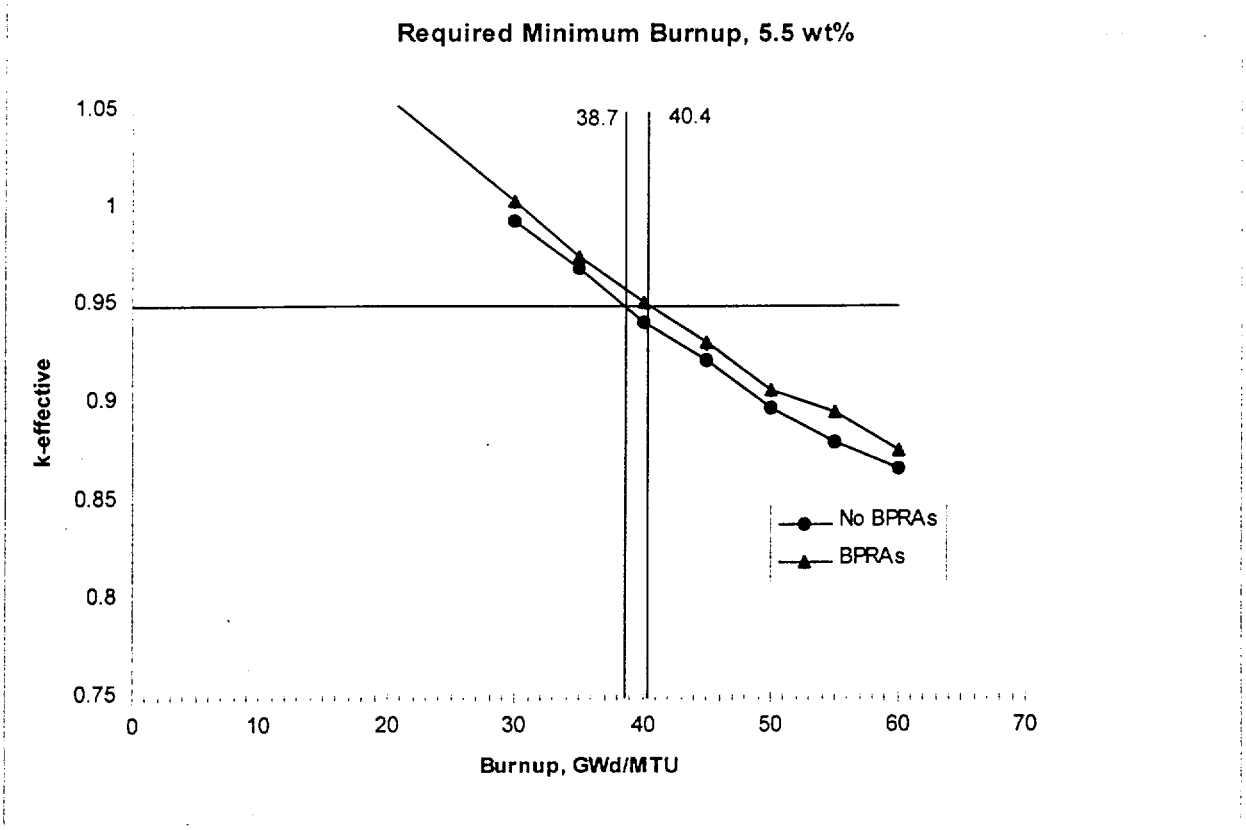

Table 6.2-7. Required Minimum Burnup for 5.5 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				5.50 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
A5530	30 GWd/MTU	0.97062	0.00166	0.994
A5535	35 GWd/MTU	0.94584	0.00198	0.970
A5540	40 GWd/MTU	0.91813	0.00165	0.941
A5545	45 GWd/MTU	0.89869	0.00166	0.922
A5550	50 GWd/MTU	0.87409	0.00193	0.898
A5555	55 GWd/MTU	0.85644	0.00185	0.880
A5560	60 GWd/MTU	0.84299	0.00194	0.867
BPRAs B5520	20 GWd/MTU	1.03423	0.00158	1.057
B5530	30 GWd/MTU	0.98041	0.00159	1.004
B5535	35 GWd/MTU	0.95146	0.00178	0.975
B5540	40 GWd/MTU	0.92866	0.00180	0.952
B5545	45 GWd/MTU	0.90856	0.00163	0.932
B5550	50 GWd/MTU	0.88350	0.00198	0.907
B5555	55 GWd/MTU	0.87248	0.00187	0.896
B5560	60 GWd/MTU	0.85344	0.00180	0.877

6.2.8 6.0 wt% Initial Enrichment

Figure 6.2-8. Required Minimum Burnup for 6.0 wt% U-235

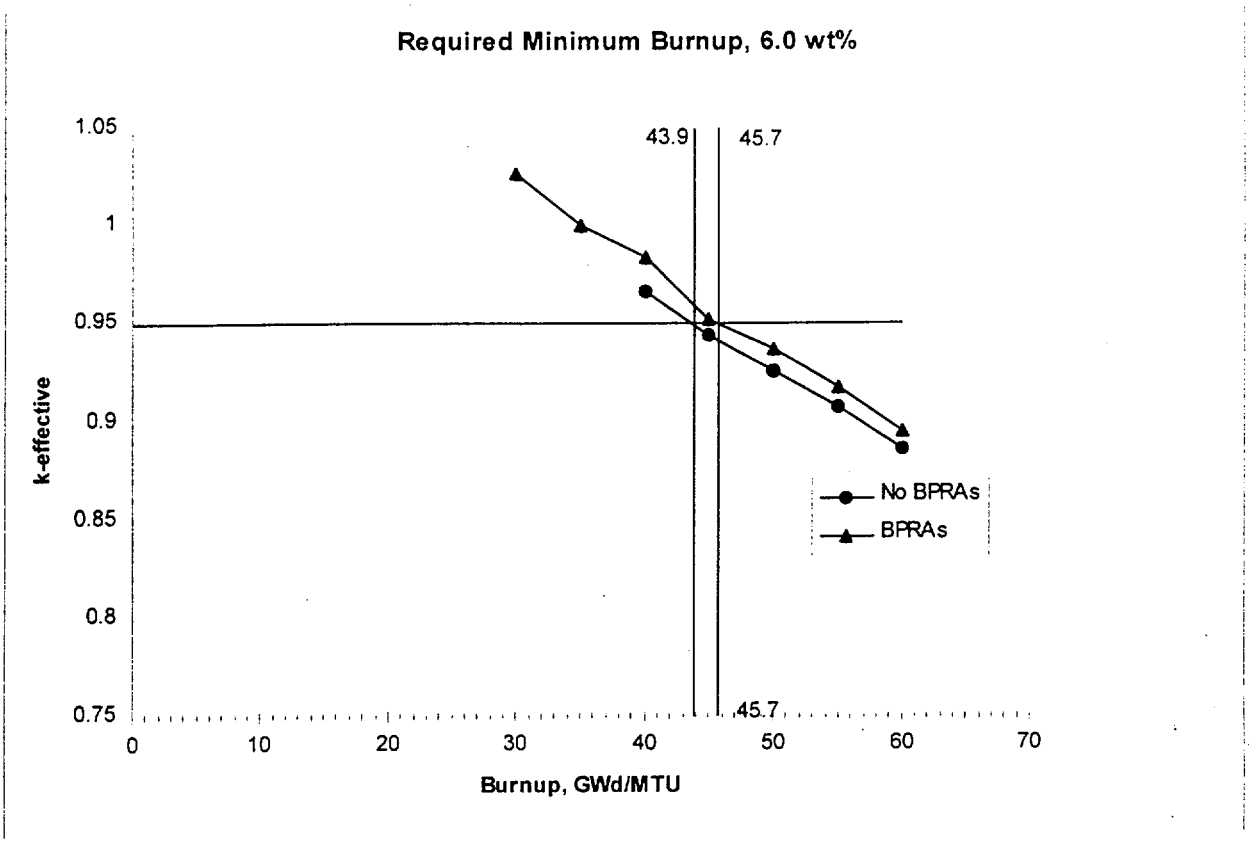

Table 6.2-8. Required Minimum Burnup for 6.0 wt% U-235

21 PWR Waste Package - Intact Principal Isotope Burnup Credit with Eighteen Axial Nodes				6.00 Weight Percent
Case Name	Burnup	k-calculated	sigma	k-effective
A6040	40 GWd/MTU	0.94353	0.00164	0.967
A6045	45 GWd/MTU	0.92105	0.00175	0.945
A6050	50 GWd/MTU	0.90318	0.00156	0.926
A6055	55 GWd/MTU	0.88357	0.00196	0.907
A6060	60 GWd/MTU	0.86183	0.00197	0.886
BPRAs				
B6030	30 GWd/MTU	1.00256	0.00189	1.026
B6035	35 GWd/MTU	0.97667	0.00166	1.000
B6040	40 GWd/MTU	0.96046	0.00166	0.984
B6045	45 GWd/MTU	0.92895	0.00193	0.953
B6050	50 GWd/MTU	0.91390	0.00181	0.938
B6055	55 GWd/MTU	0.89495	0.00155	0.918
B6060	60 GWd/MTU	0.87221	0.00181	0.896

7.0 References

7.1 QAP-2-0 Activity Evaluation, ID Number WP-20, *Perform Criticality, Thermal, Structural, & Shielding Analyses*, Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O), August 3, 1997, Accession #: MOL.19971215.0104.

7.2 Briesmeister, Judith F., Ed., *MCNP- A General Monte Carlo Code for Neutron and Photon Transport(Version 3A)*[10/20/98, A.H.W], Los Alamos National Laboratory, LA-7396-M, Rev. 2, April 1991, Accession #: NNA.19900702.0023.

7.3 *Software Qualification Report for the MCNP4A, A General Monte Carlo N-Particle Transport Code*, Configuration Software Configuration Identifier (CSCI): 30006 V4A, Document Identifier Number (DI#): 30006-2003 REV 02, CRWMS M&O, Accession #: MOL.~~19971117.0529.~~19971117.0535[10/20/98, A.H.W].

7.4 *SCALE 4.3: Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation*, User's Manual Volumes 0 through 3, Oak Ridge National Laboratory, Document Number: CCC-545, Technical Information Center (TIC) #: 238047.

7.5 *Software Qualification Report for the SCALE Modular Code System Version 4.3*, SCALE Version 4.3 CSCI: 30011 V4.3, DI#: 30011-2002 REV 00, CRWMS M&O, Accession #: MOL.19970522.0030.

7.6 *CRC Depletion Calculations for the Non-Rodded Assemblies in Batches 1, 2, and 3 of Crystal River Unit 3*, DI#: BBA000000-01717-0200-00032 REV 00, CRWMS M&O, Accession #: MOL.~~19971208.0161.~~19971208.0171[10/20/98, A.H.W].

7.7 *Topical Report on Actinide-Only Burnup Credit for PWR Spent Nuclear Fuel Packages*, Office of Civilian Radioactive Waste Management, DOE/RW-0472 Rev. 0, May 1995, Accession #: HQO.19950504.0001.

7.8 21-PWR Waste Package Disposal Container Assembly, DI#: BBAA00000-01717-2700-15998 REV 00, CRWMS M&O, Accession #: MOL.19971222.0299.

7.9 *Material Compositions and Number Densities for Neutronic Calculations*, DI#: BBA000000-01717-0200-00002 REV 00, CRWMS M&O, Accession #: MOL.19960624.0023.

8.0 Attachments

Attachment I lists CRAFT computer input files, and output files (from SAS2H as run by CRAFT, and from MCNP4A). MCNP4A input files are echoed in the output files and are therefore not included separately. The files are saved on a CD-ROM. The CD-ROM was produced with a Hewlett-Packard 7200i CD-Rewritable drive using CD-Recordable media.

Attachment I: CRAFT Input Files and CRAFT and MCNP4A Output Files

Attachment I consists of CRAFT computer input files, consolidated SAS2H output files as run by CRAFT, and MCNP4A output files. The MCNP4A input files are echoed in the output files and are therefore not included separately in this attachment. The files are contained on an attachment CD-ROM of this calculation file. The information contained in this hard-copy representation of Attachment I is a listing of the various files that are contained on the attachment CD-ROM. An extraneous file with the filename A25.LST is contained on the CD-ROM with a file size of 262 bytes. This file is meaningless to this calculation and should be ignored.

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 2.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A2510	O	911,297	9/30/97	5:21p	MCNP4A Output for 10 GWd/MTU
A2510	RES	45,540	9/10/97	1:06p	Isotopic Results for 10 GWd/MTU
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A2515	O	910,933	9/30/97	6:34p	MCNP4A Output for 15 GWd/MTU
A2515	RES	45,540	9/10/97	1:07p	Isotopic Results for 15 GWd/MTU
A2515I	DAT	16,226	9/10/97	1:07p	CRAFT Input for 15 GWd/MTU
A2520	O	910,828	9/30/97	6:42p	MCNP4A Output for 20 GWd/MTU
A2520	RES	45,540	9/10/97	1:07p	Isotopic Results for 20 GWd/MTU
A2520I	DAT	16,229	9/10/97	1:07p	CRAFT Input for 20 GWd/MTU
A2525	O	909,430	2/24/98	5:10p	MCNP4A Output for 25 GWd/MTU
A2525	RES	45,540	9/10/97	1:07p	Isotopic Results for 25 GWd/MTU
A2525I	DAT	16,256	9/10/97	1:07p	CRAFT Input for 25 GWd/MTU
A2530	RES	45,540	9/10/97	1:07p	Isotopic Results for 30 GWd/MTU
A2530I	DAT	16,258	9/10/97	1:07p	CRAFT Input for 30 GWd/MTU
A2535	RES	45,540	9/10/97	1:07p	Isotopic Results for 35 GWd/MTU
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A2540I	DAT	16,275	9/10/97	1:07p	CRAFT Input for 40 GWd/MTU
A2545	RES	45,540	9/10/97	1:07p	Isotopic Results for 45 GWd/MTU
A2545I	DAT	16,278	9/10/97	1:07p	CRAFT Input for 45 GWd/MTU
A2550	RES	45,540	9/10/97	1:07p	Isotopic Results for 50 GWd/MTU
A2550I	DAT	16,280	9/10/97	1:07p	CRAFT Input for 50 GWd/MTU
A2555	RES	45,540	9/10/97	1:07p	Isotopic Results for 55 GWd/MTU
A2555I	DAT	16,282	9/10/97	1:07p	CRAFT Input for 55 GWd/MTU
A2560	RES	45,540	9/10/97	1:07p	Isotopic Results for 60 GWd/MTU
A2560I	DAT	16,286	9/10/97	1:07p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 3.0 wt% Enrichment

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A3010	O	911,014	7/13/97	3:08a	MCNP4A Output for 10 GWd/MTU
A3010	RES	45,540	9/10/97	1:14p	Isotopic Results for 10 GWd/MTU
A3010I	DAT	16,196	9/10/97	1:14p	CRAFT Input for 10 GWd/MTU
A3015	O	910,776	10/8/97	9:25a	MCNP4A Output for 15 GWd/MTU
A3015	RES	45,540	10/6/97	4:59p	Isotopic Results for 15 GWd/MTU
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A3020	O	910,650	7/13/97	4:27a	MCNP4A Output for 20 GWd/MTU
A3020	RES	45,540	9/10/97	1:14p	Isotopic Results for 20 GWd/MTU
A3020I	DAT	16,229	9/10/97	1:14p	CRAFT Input for 20 GWd/MTU
A3025	O	911,087	7/13/97	5:46a	MCNP4A Output for 25 GWd/MTU
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A3030I	DAT	16,258	9/10/97	1:14p	CRAFT Input for 30 GWd/MTU
A3035	RES	45,540	9/10/97	1:14p	Isotopic Results for 35 GWd/MTU
A3035I	DAT	16,271	9/10/97	1:14p	CRAFT Input for 35 GWd/MTU
A3040	RES	45,540	9/10/97	1:14p	Isotopic Results for 40 GWd/MTU
A3040I	DAT	16,275	9/10/97	1:14p	CRAFT Input for 40 GWd/MTU
A3045	RES	45,540	9/10/97	1:14p	Isotopic Results for 45 GWd/MTU
A3045I	DAT	16,278	9/10/97	1:14p	CRAFT Input for 45 GWd/MTU
A3050	RES	45,540	9/10/97	1:14p	Isotopic Results for 50 GWd/MTU
A3050I	DAT	16,280	9/10/97	1:14p	CRAFT Input for 50 GWd/MTU
A3055	RES	45,540	9/10/97	1:14p	Isotopic Results for 55 GWd/MTU
A3055I	DAT	16,282	9/10/97	1:14p	CRAFT Input for 55 GWd/MTU
A3060	RES	45,540	9/10/97	1:14p	Isotopic Results for 60 GWd/MTU
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PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 3.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A3510	O	911,063	7/14/97	12:59a	MCNP4A Output for 10 GWd/MTU
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A3510I	DAT	16,196	9/10/97	1:20p	CRAFT Input for 10 GWd/MTU
A3515	O	910,825	7/14/97	2:14a	MCNP4A Output for 15 GWd/MTU
A3515	RES	45,540	9/10/97	1:20p	Isotopic Results for 15 GWd/MTU
A3515I	DAT	16,226	9/10/97	1:20p	CRAFT Input for 15 GWd/MTU
A3520	O	910,839	7/14/97	3:30a	MCNP4A Output for 20 GWd/MTU
A3520	RES	45,540	9/10/97	1:20p	Isotopic Results for 20 GWd/MTU
A3520I	DAT	16,229	9/10/97	1:20p	CRAFT Input for 20 GWd/MTU
A3525	O	910,867	7/14/97	1:31a	MCNP4A Output for 25 GWd/MTU
A3525	RES	45,540	9/10/97	1:20p	Isotopic Results for 25 GWd/MTU
A3525I	DAT	16,256	9/10/97	1:20p	CRAFT Input for 25 GWd/MTU
A3530	O	910,839	7/14/97	2:48a	MCNP4A Output for 30 GWd/MTU
A3530	RES	45,540	9/10/97	1:20p	Isotopic Results for 30 GWd/MTU
A3530I	DAT	16,258	9/10/97	1:20p	CRAFT Input for 30 GWd/MTU
A3535	RES	45,540	9/10/97	1:20p	Isotopic Results for 35 GWd/MTU
A3535I	DAT	16,271	9/10/97	1:21p	CRAFT Input for 35 GWd/MTU
A3540	RES	45,540	9/10/97	1:21p	Isotopic Results for 40 GWd/MTU
A3540I	DAT	16,275	9/10/97	1:21p	CRAFT Input for 40 GWd/MTU
A3545	RES	45,540	9/10/97	1:21p	Isotopic Results for 45 GWd/MTU
A3545I	DAT	16,278	9/10/97	1:21p	CRAFT Input for 45 GWd/MTU
A3550	RES	45,540	9/10/97	1:21p	Isotopic Results for 50 GWd/MTU
A3550I	DAT	16,280	9/10/97	1:21p	CRAFT Input for 50 GWd/MTU
A3555	RES	45,540	9/10/97	1:21p	Isotopic Results for 55 GWd/MTU
A3555I	DAT	16,282	9/10/97	1:21p	CRAFT Input for 55 GWd/MTU
A3560	RES	45,540	9/10/97	1:21p	Isotopic Results for 60 GWd/MTU
A3560I	DAT	16,286	9/10/97	1:21p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 4.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A4010	O	910,650	10/1/97	1:45p	MCNP4A Output for 10 GWd/MTU
A4010	RES	45,540	9/10/97	1:38p	Isotopic Results for 10 GWd/MTU
A4010I	DAT	16,196	9/10/97	1:38p	CRAFT Input for 10 GWd/MTU
A4015	O	910,762	10/1/97	2:15p	MCNP4A Output for 15 GWd/MTU
A4015	RES	45,540	9/10/97	1:38p	Isotopic Results for 15 GWd/MTU
A4015I	DAT	16,226	9/10/97	1:38p	CRAFT Input for 15 GWd/MTU
A4020	O	910,888	10/1/97	4:40p	MCNP4A Output for 20 GWd/MTU
A4020	RES	45,540	9/10/97	1:38p	Isotopic Results for 20 GWd/MTU
A4020I	DAT	16,229	9/10/97	1:38p	CRAFT Input for 20 GWd/MTU
A4025	O	910,713	10/1/97	4:52p	MCNP4A Output for 25 GWd/MTU
A4025	RES	45,540	9/10/97	1:38p	Isotopic Results for 25 GWd/MTU
A4025I	DAT	16,256	9/10/97	1:38p	CRAFT Input for 25 GWd/MTU
A4030	O	910,713	10/1/97	10:01p	MCNP4A Output for 30 GWd/MTU
A4030	RES	45,540	9/10/97	1:38p	Isotopic Results for 30 GWd/MTU
A4030I	DAT	16,258	9/10/97	1:38p	CRAFT Input for 30 GWd/MTU
A4035	O	910,832	10/1/97	11:34p	MCNP4A Output for 35 GWd/MTU
A4035	RES	45,540	9/16/97	11:24a	Isotopic Results for 35 GWd/MTU
A4035I	DAT	16,273	9/16/97	11:24a	CRAFT Input for 35 GWd/MTU
A4040	O	910,790	10/2/97	12:50a	MCNP4A Output for 40 GWd/MTU
A4040	RES	45,540	9/10/97	1:38p	Isotopic Results for 40 GWd/MTU
A4040I	DAT	16,275	9/10/97	1:38p	CRAFT Input for 40 GWd/MTU
A4045	O	910,958	10/2/97	2:06a	MCNP4A Output for 45 GWd/MTU
A4045	RES	45,540	9/10/97	1:38p	Isotopic Results for 45 GWd/MTU
A4045I	DAT	16,278	9/10/97	1:38p	CRAFT Input for 45 GWd/MTU
A4050	O	910,559	10/2/97	3:23a	MCNP4A Output for 50 GWd/MTU
A4050	RES	45,540	9/10/97	1:38p	Isotopic Results for 50 GWd/MTU
A4050I	DAT	16,280	9/10/97	1:38p	CRAFT Input for 50 GWd/MTU
A4055	O	910,909	10/2/97	4:40a	MCNP4A Output for 55 GWd/MTU
A4055	RES	45,540	9/10/97	1:38p	Isotopic Results for 55 GWd/MTU
A4055I	DAT	16,282	9/10/97	1:38p	CRAFT Input for 55 GWd/MTU
A4060	O	910,954	10/2/97	5:58a	MCNP4A Output for 60 GWd/MTU
A4060	RES	45,540	9/10/97	1:38p	Isotopic Results for 60 GWd/MTU
A4060I	DAT	16,286	9/10/97	1:38p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 4.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A4510	O	909,528	9/25/97	9:14a	MCNP4A Output for 10 GWd/MTU
A4510	RES	45,540	9/10/97	1:48p	Isotopic Results for 10 GWd/MTU
A4510I	DAT	16,196	9/10/97	1:48p	CRAFT Input for 10 GWd/MTU
A4515	O	910,636	10/2/97	12:33a	MCNP4A Output for 15 GWd/MTU
A4515	RES	45,540	9/10/97	1:48p	Isotopic Results for 15 GWd/MTU
A4515I	DAT	16,226	9/10/97	1:48p	CRAFT Input for 15 GWd/MTU
A4520	O	910,839	9/29/97	12:51p	MCNP4A Output for 20 GWd/MTU
A4520	RES	45,540	9/10/97	1:48p	Isotopic Results for 20 GWd/MTU
A4520I	DAT	16,229	9/10/97	1:48p	CRAFT Input for 20 GWd/MTU
A4525	O	910,692	10/2/97	8:42a	MCNP4A Output for 25 GWd/MTU
A4525	RES	45,540	9/10/97	1:48p	Isotopic Results for 25 GWd/MTU
A4525I	DAT	16,256	9/10/97	1:48p	CRAFT Input for 25 GWd/MTU
A4530	O	910,839	9/29/97	2:08p	MCNP4A Output for 30 GWd/MTU
A4530	RES	45,540	9/10/97	1:48p	Isotopic Results for 30 GWd/MTU
A4530I	DAT	16,258	9/10/97	1:48p	CRAFT Input for 30 GWd/MTU
A4535	O	910,426	9/30/97	1:08p	MCNP4A Output for 35 GWd/MTU
A4535	RES	45,540	9/15/97	4:48p	Isotopic Results for 35 GWd/MTU
A4535I	DAT	16,271	9/15/97	4:48p	CRAFT Input for 35 GWd/MTU
A4540	O	910,776	9/29/97	2:29p	MCNP4A Output for 40 GWd/MTU
A4540	RES	45,540	9/10/97	1:48p	Isotopic Results for 40 GWd/MTU
A4540I	DAT	16,275	9/10/97	1:48p	CRAFT Input for 40 GWd/MTU
A4545	RES	45,540	9/10/97	1:48p	Isotopic Results for 45 GWd/MTU
A4545I	DAT	16,278	9/10/97	1:48p	CRAFT Input for 45 GWd/MTU
A4550	RES	45,540	9/10/97	1:48p	Isotopic Results for 50 GWd/MTU
A4550I	DAT	16,280	9/10/97	1:48p	CRAFT Input for 50 GWd/MTU
A4555	RES	45,540	9/16/97	12:12p	Isotopic Results for 55 GWd/MTU
A4555I	DAT	16,282	9/16/97	12:12p	CRAFT Input for 55 GWd/MTU
A4560	RES	45,540	9/10/97	1:48p	Isotopic Results for 60 GWd/MTU
A4560I	DAT	16,286	9/10/97	1:48p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 5.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A5010	RES	45,540	9/15/97	4:45p	Isotopic Results for 10 GWd/MTU
A5010I	DAT	16,196	9/15/97	4:45p	CRAFT Input for 10 GWd/MTU
A5015	RES	45,540	9/15/97	4:45p	Isotopic Results for 15 GWd/MTU
A5015I	DAT	16,226	9/15/97	4:45p	CRAFT Input for 15 GWd/MTU
A5020	O	910,746	10/3/97	12:32a	MCNP4A Output for 20 GWd/MTU
A5020	RES	45,540	9/15/97	4:45p	Isotopic Results for 20 GWd/MTU
A5020I	DAT	16,229	9/15/97	4:45p	CRAFT Input for 20 GWd/MTU
A5025	O	908,992	2/25/98	10:46a	MCNP4A Output for 25 GWd/MTU
A5025	RES	45,540	9/16/97	12:27p	Isotopic Results for 25 GWd/MTU
A5025I	DAT	16,258	9/16/97	12:27p	CRAFT Input for 25 GWd/MTU
A5030	O	910,839	10/3/97	1:45a	MCNP4A Output for 30 GWd/MTU
A5030	RES	45,540	9/16/97	12:28p	Isotopic Results for 30 GWd/MTU
A5030I	DAT	16,259	9/16/97	12:28p	CRAFT Input for 30 GWd/MTU
A5035	O	909,141	2/25/98	10:45a	MCNP4A Output for 35 GWd/MTU
A5035	RES	45,540	9/16/97	12:29p	Isotopic Results for 35 GWd/MTU
A5035I	DAT	16,271	9/16/97	12:29p	CRAFT Input for 35 GWd/MTU
A5040	O	910,965	10/3/97	2:58a	MCNP4A Output for 40 GWd/MTU
A5040	RES	45,540	9/16/97	12:29p	Isotopic Results for 40 GWd/MTU
A5040I	DAT	16,275	9/16/97	12:30p	CRAFT Input for 40 GWd/MTU
A5045	O	908,884	2/25/98	10:45a	MCNP4A Output for 45 GWd/MTU
A5045	RES	45,540	9/16/97	12:30p	Isotopic Results for 45 GWd/MTU
A5045I	DAT	16,278	9/16/97	12:29p	CRAFT Input for 45 GWd/MTU
A5050	O	910,958	10/3/97	4:13a	MCNP4A Output for 50 GWd/MTU
A5050	RES	45,540	9/15/97	4:45p	Isotopic Results for 50 GWd/MTU
A5050I	DAT	16,280	9/15/97	4:45p	CRAFT Input for 50 GWd/MTU
A5055	RES	45,540	9/15/97	4:45p	Isotopic Results for 55 GWd/MTU
A5055I	DAT	16,282	9/15/97	4:45p	CRAFT Input for 55 GWd/MTU
A5060	RES	45,540	9/15/97	4:45p	Isotopic Results for 60 GWd/MTU
A5060I	DAT	16,285	9/15/97	4:45p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 5.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A5510	RES	45,540	9/24/97	10:14a	Isotopic Results for 10 GWd/MTU
A5510I	DAT	16,196	9/24/97	10:14a	CRAFT Input for 10 GWd/MTU
A5515	RES	45,540	9/24/97	10:14a	Isotopic Results for 15 GWd/MTU
A5515I	DAT	16,226	9/24/97	10:14a	CRAFT Input for 15 GWd/MTU
A5520	RES	45,540	9/24/97	10:14a	Isotopic Results for 20 GWd/MTU
A5520I	DAT	16,229	9/24/97	10:14a	CRAFT Input for 20 GWd/MTU
A5525	RES	45,540	9/24/97	10:23a	Isotopic Results for 25 GWd/MTU
A5525I	DAT	16,258	9/24/97	10:15a	CRAFT Input for 25 GWd/MTU
A5530	O	910,762	10/10/97	5:46p	MCNP4A Output for 30 GWd/MTU
A5530	RES	45,540	9/24/97	10:15a	Isotopic Results for 30 GWd/MTU
A5530I	DAT	16,259	9/24/97	10:15a	CRAFT Input for 30 GWd/MTU
A5535	O	910,706	10/10/97	12:13p	MCNP4A Output for 35 GWd/MTU
A5535	RES	45,540	9/24/97	10:15a	Isotopic Results for 35 GWd/MTU
A5535I	DAT	16,271	9/24/97	10:15a	CRAFT Input for 35 GWd/MTU
A5540	O	910,650	10/9/97	3:39p	MCNP4A Output for 40 GWd/MTU
A5540	RES	45,540	9/24/97	10:19a	Isotopic Results for 40 GWd/MTU
A5540I	DAT	16,275	9/24/97	10:15a	CRAFT Input for 40 GWd/MTU
A5545	O	910,839	10/10/97	11:17a	MCNP4A Output for 45 GWd/MTU
A5545	RES	45,540	9/24/97	10:19a	Isotopic Results for 45 GWd/MTU
A5545I	DAT	16,278	9/24/97	10:17a	CRAFT Input for 45 GWd/MTU
A5550	O	910,594	10/9/97	5:32p	MCNP4A Output for 50 GWd/MTU
A5550	RES	45,540	9/24/97	10:17a	Isotopic Results for 50 GWd/MTU
A5550I	DAT	16,280	9/24/97	10:17a	CRAFT Input for 50 GWd/MTU
A5555	O	910,580	10/10/97	4:14p	MCNP4A Output for 55 GWd/MTU
A5555	RES	45,540	9/24/97	10:23a	Isotopic Results for 55 GWd/MTU
A5555I	DAT	16,282	9/24/97	10:17a	CRAFT Input for 55 GWd/MTU
A5560	O	915,243	10/10/97	12:40p	MCNP4A Output for 60 GWd/MTU
A5560	RES	45,540	9/24/97	10:17a	Isotopic Results for 60 GWd/MTU
A5560I	DAT	16,286	9/24/97	10:17a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies without BPRAs, Directory LOADPWR

Data Files for 6.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
A6010	RES	45,540	9/24/97	10:26a	Isotopic Results for 10 GWd/MTU
A6010I	DAT	16,196	9/24/97	10:26a	CRAFT Input for 10 GWd/MTU
A6015	RES	45,540	9/24/97	10:26a	Isotopic Results for 15 GWd/MTU
A6015I	DAT	16,226	9/24/97	10:26a	CRAFT Input for 15 GWd/MTU
A6020	RES	45,540	9/24/97	10:26a	Isotopic Results for 20 GWd/MTU
A6020I	DAT	16,229	9/24/97	10:26a	CRAFT Input for 20 GWd/MTU
A6025	RES	45,540	9/24/97	10:26a	Isotopic Results for 25 GWd/MTU
A6025I	DAT	16,258	9/24/97	10:27a	CRAFT Input for 25 GWd/MTU
A6030	RES	45,540	9/24/97	10:27a	Isotopic Results for 30 GWd/MTU
A6030I	DAT	16,259	9/24/97	10:27a	CRAFT Input for 30 GWd/MTU
A6035	RES	45,540	9/24/97	10:27a	Isotopic Results for 35 GWd/MTU
A6035I	DAT	16,271	9/24/97	10:27a	CRAFT Input for 35 GWd/MTU
A6040	O	910,776	10/11/97	11:57a	MCNP4A Output for 40 GWd/MTU
A6040	RES	45,540	9/24/97	10:27a	Isotopic Results for 40 GWd/MTU
A6040I	DAT	16,275	9/24/97	10:27a	CRAFT Input for 40 GWd/MTU
A6045	O	910,832	10/11/97	3:33p	MCNP4A Output for 45 GWd/MTU
A6045	RES	45,540	9/24/97	10:27a	Isotopic Results for 45 GWd/MTU
A6045I	DAT	16,278	9/24/97	10:27a	CRAFT Input for 45 GWd/MTU
A6050	O	910,776	10/11/97	1:28p	MCNP4A Output for 50 GWd/MTU
A6050	RES	45,540	9/24/97	10:27a	Isotopic Results for 50 GWd/MTU
A6050I	DAT	16,280	9/24/97	10:28a	CRAFT Input for 50 GWd/MTU
A6055	O	910,958	10/11/97	4:45p	MCNP4A Output for 55 GWd/MTU
A6055	RES	45,540	9/24/97	10:28a	Isotopic Results for 55 GWd/MTU
A6055I	DAT	16,282	9/24/97	10:28a	CRAFT Input for 55 GWd/MTU
A6060	O	910,830	10/11/97	5:59p	MCNP4A Output for 60 GWd/MTU
A6060	RES	45,540	9/24/97	10:28a	Isotopic Results for 60 GWd/MTU
A6060I	DAT	16,285	9/24/97	10:28a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 2.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B2510	O	909,150	2/24/98	9:18a	MCNP4A Output for 10 GWd/MTU
B2510	RES	45,540	2/23/98	9:54a	Isotopic Results for 10 GWd/MTU
B2510I	DAT	17,029	2/6/98	9:53a	CRAFT Input for 10 GWd/MTU
B2515	O	909,334	2/24/98	12:39p	MCNP4A Output for 15 GWd/MTU
B2515	RES	45,540	2/23/98	9:54a	Isotopic Results for 15 GWd/MTU
B2515I	DAT	17,059	2/6/98	9:53a	CRAFT Input for 15 GWd/MTU
B2520	O	909,414	2/24/98	2:35p	MCNP4A Output for 20 GWd/MTU
B2520	RES	45,540	2/23/98	9:54a	Isotopic Results for 20 GWd/MTU
B2520I	DAT	17,062	2/6/98	9:53a	CRAFT Input for 20 GWd/MTU
B2525	O	909,705	2/24/98	2:35p	MCNP4A Output for 25 GWd/MTU
B2525	RES	45,540	2/23/98	9:54a	Isotopic Results for 25 GWd/MTU
B2525I	DAT	17,089	2/6/98	9:53a	CRAFT Input for 25 GWd/MTU
B2530	O	909,458	2/24/98	3:27p	MCNP4A Output for 30 GWd/MTU
B2530	RES	45,540	2/23/98	9:55a	Isotopic Results for 30 GWd/MTU
B2530I	DAT	17,091	2/6/98	9:53a	CRAFT Input for 30 GWd/MTU
B2535	RES	45,540	2/23/98	9:55a	Isotopic Results for 35 GWd/MTU
B2535I	DAT	17,108	2/6/98	9:53a	CRAFT Input for 35 GWd/MTU
B2540	RES	45,540	2/23/98	9:55a	Isotopic Results for 40 GWd/MTU
B2540I	DAT	17,108	2/6/98	9:53a	CRAFT Input for 40 GWd/MTU
B2545	RES	45,540	2/23/98	9:55a	Isotopic Results for 45 GWd/MTU
B2545I	DAT	17,111	2/6/98	9:53a	CRAFT Input for 45 GWd/MTU
B2550	RES	45,540	2/23/98	9:55a	Isotopic Results for 50 GWd/MTU
B2550I	DAT	17,113	2/6/98	9:53a	CRAFT Input for 50 GWd/MTU
B2555	RES	45,540	2/23/98	9:55a	Isotopic Results for 55 GWd/MTU
B2555I	DAT	17,115	2/6/98	9:53a	CRAFT Input for 55 GWd/MTU
B2560	RES	45,540	2/23/98	9:56a	Isotopic Results for 60 GWd/MTU
B2560I	DAT	17,119	2/6/98	9:53a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 3.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B3010	O	909,617	2/23/98	3:21p	MCNP4A Output for 10 GWd/MTU
B3010	RES	45,540	2/11/98	1:29p	Isotopic Results for 10 GWd/MTU
B3010I	DAT	22,208	1/14/98	9:58p	CRAFT Input for 10 GWd/MTU
B3015	O	909,243	2/23/98	5:05p	MCNP4A Output for 15 GWd/MTU
B3015	RES	45,540	2/11/98	1:30p	Isotopic Results for 15 GWd/MTU
B3015I	DAT	22,327	1/14/98	9:58p	CRAFT Input for 15 GWd/MTU
B3020	O	909,138	2/24/98	8:38a	MCNP4A Output for 20 GWd/MTU
B3020	RES	45,540	2/11/98	1:30p	Isotopic Results for 20 GWd/MTU
B3020I	DAT	22,327	1/14/98	9:59p	CRAFT Input for 20 GWd/MTU
B3025	O	908,754	2/24/98	2:47p	MCNP4A Output for 25 GWd/MTU
B3025	RES	45,540	2/23/98	9:50a	Isotopic Results for 25 GWd/MTU
B3025I	DAT	22,327	1/14/98	9:59p	CRAFT Input for 25 GWd/MTU
B3030	O	909,295	2/24/98	8:37a	MCNP4A Output for 30 GWd/MTU
B3030	RES	45,540	2/23/98	9:50a	Isotopic Results for 30 GWd/MTU
B3030I	DAT	22,327	1/14/98	9:59p	CRAFT Input for 30 GWd/MTU
B3035	RES	45,540	2/23/98	9:51a	Isotopic Results for 35 GWd/MTU
B3035I	DAT	22,327	1/14/98	10:00p	CRAFT Input for 35 GWd/MTU
B3040	RES	45,540	2/23/98	9:51a	Isotopic Results for 40 GWd/MTU
B3040I	DAT	22,327	1/14/98	10:00p	CRAFT Input for 40 GWd/MTU
B3045	RES	45,540	2/11/98	1:31p	Isotopic Results for 45 GWd/MTU
B3045I	DAT	22,327	1/14/98	10:01p	CRAFT Input for 45 GWd/MTU
B3050	RES	45,540	2/11/98	1:31p	Isotopic Results for 50 GWd/MTU
B3050I	DAT	22,327	1/14/98	10:01p	CRAFT Input for 50 GWd/MTU
B3055	RES	45,540	2/11/98	1:31p	Isotopic Results for 55 GWd/MTU
B3055I	DAT	22,327	1/14/98	10:01p	CRAFT Input for 55 GWd/MTU
B3060	RES	45,540	2/11/98	1:31p	Isotopic Results for 60 GWd/MTU
B3060I	DAT	22,327	1/14/98	10:02p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 3.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B3510	O	909,351	2/5/98	3:02p	MCNP4A Output for 10 GWd/MTU
B3510	RES	45,540	2/2/98	10:02a	Isotopic Results for 10 GWd/MTU
B3510I	DAT	17,029	2/6/98	9:54a	CRAFT Input for 10 GWd/MTU
B3515	O	909,204	2/3/98	10:54a	MCNP4A Output for 15 GWd/MTU
B3515	RES	45,540	2/2/98	10:02a	Isotopic Results for 15 GWd/MTU
B3515I	DAT	17,059	2/6/98	9:54a	CRAFT Input for 15 GWd/MTU
B3520	O	909,166	2/3/98	5:04p	MCNP4A Output for 20 GWd/MTU
B3520	RES	45,540	2/2/98	10:03a	Isotopic Results for 20 GWd/MTU
B3520I	DAT	17,062	2/6/98	9:54a	CRAFT Input for 20 GWd/MTU
B3525	O	908,915	2/4/98	9:05a	MCNP4A Output for 25 GWd/MTU
B3525	RES	45,540	2/2/98	10:03a	Isotopic Results for 25 GWd/MTU
B3525I	DAT	17,089	2/6/98	9:54a	CRAFT Input for 25 GWd/MTU
B3530	O	909,061	2/4/98	9:05a	MCNP4A Output for 30 GWd/MTU
B3530	RES	45,540	2/2/98	10:03a	Isotopic Results for 30 GWd/MTU
B3530I	DAT	17,091	2/6/98	9:54a	CRAFT Input for 30 GWd/MTU
B3535	RES	45,540	2/2/98	10:03a	Isotopic Results for 35 GWd/MTU
B3535I	DAT	17,108	2/6/98	9:54a	CRAFT Input for 35 GWd/MTU
B3540	RES	45,540	2/2/98	10:03a	Isotopic Results for 40 GWd/MTU
B3540I	DAT	17,108	2/6/98	9:54a	CRAFT Input for 40 GWd/MTU
B3545	RES	45,540	2/4/98	11:21a	Isotopic Results for 45 GWd/MTU
B3545I	DAT	17,111	2/6/98	9:54a	CRAFT Input for 45 GWd/MTU
B3550	RES	45,540	2/4/98	11:22a	Isotopic Results for 50 GWd/MTU
B3550I	DAT	17,113	2/6/98	9:54a	CRAFT Input for 50 GWd/MTU
B3555	RES	45,540	2/4/98	11:22a	Isotopic Results for 55 GWd/MTU
B3555I	DAT	17,115	2/6/98	9:54a	CRAFT Input for 55 GWd/MTU
B3560	RES	45,540	2/4/98	11:22a	Isotopic Results for 60 GWd/MTU
B3560I	DAT	17,119	2/6/98	9:54a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 4.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B4010	RES	45,540	1/22/98	2:06p	Isotopic Results for 10 GWd/MTU
B4010I	DAT	17,029	2/6/98	1:58p	CRAFT Input for 10 GWd/MTU
B4015	O	909,215	2/6/98	9:27a	MCNP4A Output for 15 GWd/MTU
B4015	RES	45,540	1/22/98	2:04p	Isotopic Results for 15 GWd/MTU
B4015I	DAT	17,059	2/6/98	1:58p	CRAFT Input for 15 GWd/MTU
B4020	O	911,014	1/25/98	9:26p	MCNP4A Output for 20 GWd/MTU
B4020	RES	45,540	1/22/98	2:04p	Isotopic Results for 20 GWd/MTU
B4020I	DAT	17,062	2/6/98	1:58p	CRAFT Input for 20 GWd/MTU
B4025	O	910,650	1/12/98	8:21p	MCNP4A Output for 25 GWd/MTU
B4025	RES	45,540	1/12/98	4:16p	Isotopic Results for 25 GWd/MTU
B4025I	DAT	17,089	2/6/98	1:58p	CRAFT Input for 25 GWd/MTU
B4030	O	910,818	1/12/98	7:44p	MCNP4A Output for 30 GWd/MTU
B4030	RES	45,540	1/12/98	4:15p	Isotopic Results for 30 GWd/MTU
B4030I	DAT	17,091	2/6/98	1:58p	CRAFT Input for 30 GWd/MTU
B4035	O	908,859	2/6/98	9:28a	MCNP4A Output for 35 GWd/MTU
B4035	RES	45,540	1/22/98	2:04p	Isotopic Results for 35 GWd/MTU
B4035I	DAT	17,108	2/6/98	1:58p	CRAFT Input for 35 GWd/MTU
B4040	RES	45,540	1/22/98	2:05p	Isotopic Results for 40 GWd/MTU
B4040I	DAT	17,108	2/6/98	1:58p	CRAFT Input for 40 GWd/MTU
B4045	RES	45,540	1/22/98	2:05p	Isotopic Results for 45 GWd/MTU
B4045I	DAT	17,111	2/6/98	1:58p	CRAFT Input for 45 GWd/MTU
B4050	RES	45,540	1/22/98	2:06p	Isotopic Results for 50 GWd/MTU
B4050I	DAT	17,113	2/6/98	1:58p	CRAFT Input for 50 GWd/MTU
B4055	RES	45,540	1/22/98	2:06p	Isotopic Results for 55 GWd/MTU
B4055I	DAT	17,115	2/6/98	1:58p	CRAFT Input for 55 GWd/MTU
B4060	RES	45,540	1/22/98	2:03p	Isotopic Results for 60 GWd/MTU
B4060I	DAT	17,119	2/6/98	1:58p	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 4.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B4510	RES	45,540	2/6/98	9:20a	Isotopic Results for 10 GWd/MTU
B4510I	DAT	17,029	2/6/98	9:54a	CRAFT Input for 10 GWd/MTU
B4515	RES	45,540	2/6/98	9:21a	Isotopic Results for 15 GWd/MTU
B4515I	DAT	17,059	2/6/98	9:54a	CRAFT Input for 15 GWd/MTU
B4520	O	909,141	2/9/98	9:13a	MCNP4A Output for 20 GWd/MTU
B4520	RES	45,540	2/6/98	9:21a	Isotopic Results for 20 GWd/MTU
B4520I	DAT	17,062	2/6/98	9:54a	CRAFT Input for 20 GWd/MTU
B4525	O	909,176	2/9/98	9:14a	MCNP4A Output for 25 GWd/MTU
B4525	RES	45,540	2/6/98	9:21a	Isotopic Results for 25 GWd/MTU
B4525I	DAT	17,089	2/6/98	9:54a	CRAFT Input for 25 GWd/MTU
B4530	O	908,863	2/9/98	9:14a	MCNP4A Output for 30 GWd/MTU
B4530	RES	45,540	2/6/98	9:21a	Isotopic Results for 30 GWd/MTU
B4530I	DAT	17,091	2/6/98	9:54a	CRAFT Input for 30 GWd/MTU
B4535	O	909,062	2/23/98	12:14p	MCNP4A Output for 35 GWd/MTU
B4535	RES	45,540	2/6/98	2:39p	Isotopic Results for 35 GWd/MTU
B4535I	DAT	17,108	2/6/98	9:54a	CRAFT Input for 35 GWd/MTU
B4540	O	908,758	2/23/98	1:51p	MCNP4A Output for 40 GWd/MTU
B4540	RES	45,540	2/11/98	1:28p	Isotopic Results for 40 GWd/MTU
B4540I	DAT	17,108	2/6/98	9:54a	CRAFT Input for 40 GWd/MTU
B4545	RES	45,540	2/11/98	1:28p	Isotopic Results for 45 GWd/MTU
B4545I	DAT	17,111	2/6/98	9:54a	CRAFT Input for 45 GWd/MTU
B4550	RES	45,540	2/11/98	1:28p	Isotopic Results for 50 GWd/MTU
B4550I	DAT	17,113	2/6/98	9:54a	CRAFT Input for 50 GWd/MTU
B4555	RES	45,540	2/11/98	1:29p	Isotopic Results for 55 GWd/MTU
B4555I	DAT	17,115	2/6/98	9:54a	CRAFT Input for 55 GWd/MTU
B4560	RES	45,540	2/11/98	1:29p	Isotopic Results for 60 GWd/MTU
B4560I	DAT	17,119	2/6/98	9:54a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 5.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B5010	RES	45,540	2/23/98	9:57a	Isotopic Results for 10 GWd/MTU
B5010I	DAT	17,029	2/6/98	9:54a	CRAFT Input for 10 GWd/MTU
B5015	RES	45,540	2/23/98	9:58a	Isotopic Results for 15 GWd/MTU
B5015I	DAT	17,059	2/6/98	9:54a	CRAFT Input for 15 GWd/MTU
B5020	RES	45,540	2/23/98	9:58a	Isotopic Results for 20 GWd/MTU
B5020I	DAT	17,062	2/6/98	9:54a	CRAFT Input for 20 GWd/MTU
B5025	O	908,928	2/26/98	9:39a	MCNP4A Output for 25 GWd/MTU
B5025	RES	45,540	2/23/98	9:58a	Isotopic Results for 25 GWd/MTU
B5025I	DAT	17,089	2/6/98	9:54a	CRAFT Input for 25 GWd/MTU
B5030	O	909,253	2/25/98	1:47p	MCNP4A Output for 30 GWd/MTU
B5030	RES	45,540	2/23/98	9:58a	Isotopic Results for 30 GWd/MTU
B5030I	DAT	17,091	2/6/98	9:54a	CRAFT Input for 30 GWd/MTU
B5035	O	908,772	2/25/98	5:17p	MCNP4A Output for 35 GWd/MTU
B5035	RES	45,540	2/23/98	9:58a	Isotopic Results for 35 GWd/MTU
B5035I	DAT	17,108	2/6/98	9:54a	CRAFT Input for 35 GWd/MTU
B5040	O	909,153	2/26/98	11:00a	MCNP4A Output for 40 GWd/MTU
B5040	RES	45,540	2/23/98	9:58a	Isotopic Results for 40 GWd/MTU
B5040I	DAT	17,108	2/6/98	9:55a	CRAFT Input for 40 GWd/MTU
B5045	O	908,929	2/26/98	3:55p	MCNP4A Output for 45 GWd/MTU
B5045	RES	45,540	2/23/98	9:58a	Isotopic Results for 45 GWd/MTU
B5045I	DAT	17,111	2/6/98	9:55a	CRAFT Input for 45 GWd/MTU
B5050	O	908,719	2/26/98	6:16p	MCNP4A Output for 50 GWd/MTU
B5050	RES	45,540	2/23/98	9:59a	Isotopic Results for 50 GWd/MTU
B5050I	DAT	17,113	2/6/98	9:55a	CRAFT Input for 50 GWd/MTU
B5055	RES	45,540	2/23/98	9:59a	Isotopic Results for 55 GWd/MTU
B5055I	DAT	17,115	2/6/98	9:55a	CRAFT Input for 55 GWd/MTU
B5060	RES	45,540	2/23/98	9:59a	Isotopic Results for 60 GWd/MTU
B5060I	DAT	17,119	2/6/98	9:55a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 5.5 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B5510	RES	45,540	2/25/98	11:00a	Isotopic Results for 10 GWd/MTU
B5510I	DAT	17,029	2/6/98	9:55a	CRAFT Input for 10 GWd/MTU
B5515	RES	45,540	2/25/98	11:00a	Isotopic Results for 15 GWd/MTU
B5515I	DAT	17,059	2/6/98	9:55a	CRAFT Input for 15 GWd/MTU
B5520	O	911,077	3/7/98	9:09p	MCNP4A Output for 20 GWd/MTU
B5520	RES	45,540	2/25/98	11:00a	Isotopic Results for 20 GWd/MTU
B5520I	DAT	17,062	2/6/98	9:55a	CRAFT Input for 20 GWd/MTU
B5525	RES	45,540	2/25/98	11:00a	Isotopic Results for 25 GWd/MTU
B5525I	DAT	17,089	2/6/98	9:55a	CRAFT Input for 25 GWd/MTU
B5530	O	910,697	3/7/98	11:53p	MCNP4A Output for 30 GWd/MTU
B5530	RES	45,540	2/25/98	11:00a	Isotopic Results for 30 GWd/MTU
B5530I	DAT	17,091	2/6/98	9:55a	CRAFT Input for 30 GWd/MTU
B5535	O	910,902	3/8/98	1:17a	MCNP4A Output for 35 GWd/MTU
B5535	RES	45,540	2/25/98	11:00a	Isotopic Results for 35 GWd/MTU
B5535I	DAT	17,108	2/6/98	9:55a	CRAFT Input for 35 GWd/MTU
B5540	O	910,699	3/8/98	4:03a	MCNP4A Output for 40 GWd/MTU
B5540	RES	45,540	2/25/98	11:01a	Isotopic Results for 40 GWd/MTU
B5540I	DAT	17,108	2/6/98	9:55a	CRAFT Input for 40 GWd/MTU
B5545	O	910,783	3/8/98	5:15a	MCNP4A Output for 45 GWd/MTU
B5545	RES	45,540	2/25/98	11:01a	Isotopic Results for 45 GWd/MTU
B5545I	DAT	17,111	2/6/98	9:55a	CRAFT Input for 45 GWd/MTU
B5550	O	910,958	3/8/98	6:29a	MCNP4A Output for 50 GWd/MTU
B5550	RES	45,540	2/25/98	11:01a	Isotopic Results for 50 GWd/MTU
B5550I	DAT	17,113	2/6/98	9:55a	CRAFT Input for 50 GWd/MTU
B5555	O	910,790	3/8/98	7:42a	MCNP4A Output for 55 GWd/MTU
B5555	RES	45,540	2/25/98	11:01a	Isotopic Results for 55 GWd/MTU
B5555I	DAT	17,115	2/6/98	9:55a	CRAFT Input for 55 GWd/MTU
B5560	O	910,867	3/8/98	8:56a	MCNP4A Output for 60 GWd/MTU
B5560	RES	45,540	2/26/98	9:36a	Isotopic Results for 60 GWd/MTU
B5560I	DAT	17,119	2/6/98	9:55a	CRAFT Input for 60 GWd/MTU

PWR Data for Assemblies with BPRAs, Directory LOADBPR

Data Files for 6.0 wt% Enrichment

Filename	Extension	Size (bytes)	Date	Time	Description
B6010	RES	45,540	3/13/98	10:45a	Isotopic Results for 10 GWd/MTU
B6010I	DAT	17,029	2/6/98	9:55a	CRAFT Input for 10 GWd/MTU
B6015	RES	45,540	3/13/98	10:45a	Isotopic Results for 15 GWd/MTU
B6015I	DAT	17,059	2/6/98	9:55a	CRAFT Input for 15 GWd/MTU
B6020	RES	45,540	3/13/98	10:45a	Isotopic Results for 20 GWd/MTU
B6020I	DAT	17,062	2/6/98	9:55a	CRAFT Input for 20 GWd/MTU
B6025	RES	45,540	3/13/98	10:45a	Isotopic Results for 25 GWd/MTU
B6025I	DAT	17,089	2/6/98	9:55a	CRAFT Input for 25 GWd/MTU
B6030	O	909,052	3/13/98	3:51p	MCNP4A Output for 30 GWd/MTU
B6030	RES	45,540	3/13/98	10:45a	Isotopic Results for 30 GWd/MTU
B6030I	DAT	17,091	2/6/98	9:55a	CRAFT Input for 30 GWd/MTU
B6035	O	909,078	3/16/98	8:52a	MCNP4A Output for 35 GWd/MTU
B6035	RES	45,540	3/13/98	10:45a	Isotopic Results for 35 GWd/MTU
B6035I	DAT	17,108	2/6/98	9:55a	CRAFT Input for 35 GWd/MTU
B6040	O	909,141	3/16/98	10:40a	MCNP4A Output for 40 GWd/MTU
B6040	RES	45,540	3/13/98	10:46a	Isotopic Results for 40 GWd/MTU
B6040I	DAT	17,108	2/6/98	9:55a	CRAFT Input for 40 GWd/MTU
B6045	O	910,895	5/4/98	8:35p	MCNP4A Output for 45 GWd/MTU
B6045	RES	45,540	3/13/98	10:46a	Isotopic Results for 45 GWd/MTU
B6045I	DAT	17,111	2/6/98	9:55a	CRAFT Input for 45 GWd/MTU
B6050	O	910,797	5/4/98	6:26p	MCNP4A Output for 50 GWd/MTU
B6050	RES	45,540	3/13/98	10:46a	Isotopic Results for 50 GWd/MTU
B6050I	DAT	17,113	2/6/98	9:55a	CRAFT Input for 50 GWd/MTU
B6055	O	910,611	5/4/98	9:48p	MCNP4A Output for 55 GWd/MTU
B6055	RES	45,540	3/13/98	10:46a	Isotopic Results for 55 GWd/MTU
B6055I	DAT	17,115	2/6/98	9:55a	CRAFT Input for 55 GWd/MTU
B6060	O	910,643	5/4/98	11:11p	MCNP4A Output for 60 GWd/MTU
B6060	RES	45,540	3/13/98	10:46a	Isotopic Results for 60 GWd/MTU
B6060I	DAT	17,119	2/6/98	9:55a	CRAFT Input for 60 GWd/MTU

Million Year Decay Data, Directory 1MYDECAY

Filename	Extension	Size (bytes)	Date	Time	Description
A2510N01	SUM	72,480	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 1
A2510N02	SUM	72,570	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 2
A2510N03	SUM	72,592	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 3
A2510N04	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 4
A2510N05	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 5
A2510N06	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 6
A2510N07	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 7
A2510N08	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 8
A2510N09	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 9
A2510N10	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 10
A2510N11	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 11
A2510N12	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 12
A2510N13	SUM	72,659	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 13
A2510N14	SUM	72,659	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 14
A2510N15	SUM	72,637	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 15
A2510N16	SUM	72,614	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 16
A2510N17	SUM	72,592	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 17
A2510N18	SUM	72,547	11/4/97	2:33p	Isotopics for 2.5 wt%, 10 GWd/MTU, Node 18
A2515N01	SUM	72,570	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 1
A2515N02	SUM	72,681	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 2
A2515N03	SUM	72,730	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 3
A2515N04	SUM	72,814	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 4
A2515N05	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 5
A2515N06	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 6
A2515N07	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 7
A2515N08	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 8
A2515N09	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 9
A2515N10	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 10
A2515N11	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 11
A2515N12	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 12
A2515N13	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 13
A2515N14	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 14
A2515N15	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 15
A2515N16	SUM	72,814	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 16
A2515N17	SUM	72,730	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 17
A2515N18	SUM	72,614	10/16/97	1:24p	Isotopics for 2.5 wt%, 15 GWd/MTU, Node 18
A2520N01	SUM	72,592	10/16/97	1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 1
A2520N02	SUM	72,814	10/16/97	1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 2
A2520N03	SUM	72,840	10/16/97	1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 3
A2520N04	SUM	72,859	10/16/97	1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 4

A2520N05	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 5
A2520N06	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 6
A2520N07	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 7
A2520N08	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 8
A2520N09	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 9
A2520N10	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 10
A2520N11	SUM	72,859	10/16/97 1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 11
A2520N12	SUM	72,859	10/16/97 1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 12
A2520N13	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 13
A2520N14	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 14
A2520N15	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 15
A2520N16	SUM	72,859	10/16/97 1:23p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 16
A2520N17	SUM	72,840	10/16/97 1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 17
A2520N18	SUM	72,730	10/16/97 1:24p	Isotopics for 2.5 wt%, 20 GWd/MTU, Node 18
A2525N01	SUM	72,659	10/16/97 1:24p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 1
A2525N02	SUM	72,840	10/16/97 1:24p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 2
A2525N03	SUM	73,157	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 3
A2525N04	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 4
A2525N05	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 5
A2525N06	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 6
A2525N07	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 7
A2525N08	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 8
A2525N09	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 9
A2525N10	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 10
A2525N11	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 11
A2525N12	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 12
A2525N13	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 13
A2525N14	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 14
A2525N15	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 15
A2525N16	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 16
A2525N17	SUM	72,885	10/16/97 1:23p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 17
A2525N18	SUM	72,840	10/16/97 1:24p	Isotopics for 2.5 wt%, 25 GWd/MTU, Node 18
A2530N01	SUM	72,788	10/16/97 1:24p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 1
A2530N02	SUM	73,157	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 2
A2530N03	SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 3
A2530N04	SUM	73,175	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 4
A2530N05	SUM	73,175	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 5
A2530N06	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 6
A2530N07	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 7
A2530N08	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 8
A2530N09	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 9
A2530N10	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 10
A2530N11	SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 11

A2530N12 SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 12
A2530N13 SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 13
A2530N14 SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 14
A2530N15 SUM	73,194	10/16/97 1:22p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 15
A2530N16 SUM	73,175	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 16
A2530N17 SUM	73,179	10/16/97 1:23p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 17
A2530N18 SUM	72,840	10/16/97 1:24p	Isotopics for 2.5 wt%, 30 GWd/MTU, Node 18
A3015N01 SUM	72,480	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 1
A3015N02 SUM	72,570	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 2
A3015N03 SUM	72,592	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 3
A3015N04 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 4
A3015N05 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 5
A3015N06 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 6
A3015N07 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 7
A3015N08 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 8
A3015N09 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 9
A3015N10 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 10
A3015N11 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 11
A3015N12 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 12
A3015N13 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 13
A3015N14 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 14
A3015N15 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 15
A3015N16 SUM	72,614	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 16
A3015N17 SUM	72,592	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 17
A3015N18 SUM	72,525	11/4/97 2:33p	Isotopics for 3.0 wt%, 15 GWd/MTU, Node 18
A3020N01 SUM	72,570	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 1
A3020N02 SUM	72,814	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 2
A3020N03 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 3
A3020N04 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 4
A3020N05 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 5
A3020N06 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 6
A3020N07 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 7
A3020N08 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 8
A3020N09 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 9
A3020N10 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 10
A3020N11 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 11
A3020N12 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 12
A3020N13 SUM	72,859	10/16/97 1:23p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 13
A3020N14 SUM	72,859	10/16/97 1:23p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 14
A3020N15 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 15
A3020N16 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 16
A3020N17 SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 17
A3020N18 SUM	72,712	10/16/97 1:24p	Isotopics for 3.0 wt%, 20 GWd/MTU, Node 18

A3025N01	SUM	72,637	10/16/97 1:24p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 1
A3025N02	SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 2
A3025N03	SUM	72,859	10/16/97 1:24p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 3
A3025N04	SUM	72,885	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 4
A3025N05	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 5
A3025N06	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 6
A3025N07	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 7
A3025N08	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 8
A3025N09	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 9
A3025N10	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 10
A3025N11	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 11
A3025N12	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 12
A3025N13	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 13
A3025N14	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 14
A3025N15	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 15
A3025N16	SUM	73,157	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 16
A3025N17	SUM	72,859	10/16/97 1:23p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 17
A3025N18	SUM	72,814	10/16/97 1:24p	Isotopics for 3.0 wt%, 25 GWd/MTU, Node 18
A3030N01	SUM	72,788	10/16/97 1:24p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 1
A3030N02	SUM	72,859	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 2
A3030N03	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 3
A3030N04	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 4
A3030N05	SUM	73,175	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 5
A3030N06	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 6
A3030N07	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 7
A3030N08	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 8
A3030N09	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 9
A3030N10	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 10
A3030N11	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 11
A3030N12	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 12
A3030N13	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 13
A3030N14	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 14
A3030N15	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 15
A3030N16	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 16
A3030N17	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 17
A3030N18	SUM	72,840	10/16/97 1:24p	Isotopics for 3.0 wt%, 30 GWd/MTU, Node 18
A3035N01	SUM	72,814	10/16/97 1:24p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 1
A3035N02	SUM	73,179	10/16/97 1:23p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 2
A3035N03	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 3
A3035N04	SUM	73,196	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 4
A3035N05	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 5
A3035N06	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 6
A3035N07	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 7

A3035N08	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 8
A3035N09	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 9
A3035N10	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 10
A3035N11	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 11
A3035N12	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 12
A3035N13	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 13
A3035N14	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 14
A3035N15	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 15
A3035N16	SUM	73,192	10/16/97 1:22p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 16
A3035N17	SUM	73,171	10/16/97 1:23p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 17
A3035N18	SUM	72,859	10/16/97 1:23p	Isotopics for 3.0 wt%, 35 GWd/MTU, Node 18
A3520N01	SUM	72,570	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 1
A3520N02	SUM	72,814	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 2
A3520N03	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 3
A3520N04	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 4
A3520N05	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 5
A3520N06	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 6
A3520N07	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 7
A3520N08	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 8
A3520N09	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 9
A3520N10	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 10
A3520N11	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 11
A3520N12	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 12
A3520N13	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 13
A3520N14	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 14
A3520N15	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 15
A3520N16	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 16
A3520N17	SUM	72,840	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 17
A3520N18	SUM	72,689	11/4/97 2:33p	Isotopics for 3.5 wt%, 20 GWd/MTU, Node 18
A3525N01	SUM	72,637	10/16/97 1:24p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 1
A3525N02	SUM	72,840	10/16/97 1:24p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 2
A3525N03	SUM	72,859	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 3
A3525N04	SUM	72,859	10/16/97 1:24p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 4
A3525N05	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 5
A3525N06	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 6
A3525N07	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 7
A3525N08	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 8
A3525N09	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 9
A3525N10	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 10
A3525N11	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 11
A3525N12	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 12
A3525N13	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 13
A3525N14	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 14

A3525N15	SUM	72,885	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 15
A3525N16	SUM	72,859	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 16
A3525N17	SUM	72,859	10/16/97 1:23p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 17
A3525N18	SUM	72,814	10/16/97 1:24p	Isotopics for 3.5 wt%, 25 GWd/MTU, Node 18
A3530N01	SUM	72,730	10/16/97 1:24p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 1
A3530N02	SUM	72,859	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 2
A3530N03	SUM	73,157	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 3
A3530N04	SUM	73,179	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 4
A3530N05	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 5
A3530N06	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 6
A3530N07	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 7
A3530N08	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 8
A3530N09	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 9
A3530N10	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 10
A3530N11	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 11
A3530N12	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 12
A3530N13	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 13
A3530N14	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 14
A3530N15	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 15
A3530N16	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 16
A3530N17	SUM	73,157	10/16/97 1:23p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 17
A3530N18	SUM	72,840	10/16/97 1:24p	Isotopics for 3.5 wt%, 30 GWd/MTU, Node 18
A3535N01	SUM	72,814	10/16/97 1:24p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 1
A3535N02	SUM	73,157	10/16/97 1:23p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 2
A3535N03	SUM	73,190	10/16/97 1:23p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 3
A3535N04	SUM	73,190	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 4
A3535N05	SUM	73,190	10/16/97 1:23p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 5
A3535N06	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 6
A3535N07	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 7
A3535N08	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 8
A3535N09	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 9
A3535N10	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 10
A3535N11	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 11
A3535N12	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 12
A3535N13	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 13
A3535N14	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 14
A3535N15	SUM	73,192	10/16/97 1:22p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 15
A3535N16	SUM	73,190	10/16/97 1:23p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 16
A3535N17	SUM	73,175	10/16/97 1:23p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 17
A3535N18	SUM	72,840	10/16/97 1:24p	Isotopics for 3.5 wt%, 35 GWd/MTU, Node 18
A4025N01	SUM	72,637	10/16/97 1:24p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 1
A4025N02	SUM	72,840	10/16/97 1:24p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 2
A4025N03	SUM	72,840	10/16/97 1:24p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 3

A4025N04	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 4
A4025N05	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 5
A4025N06	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 6
A4025N07	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 7
A4025N08	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 8
A4025N09	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 9
A4025N10	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 10
A4025N11	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 11
A4025N12	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 12
A4025N13	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 13
A4025N14	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 14
A4025N15	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 15
A4025N16	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 16
A4025N17	SUM	72,840	10/16/97 1:24p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 17
A4025N18	SUM	72,814	10/16/97 1:24p	Isotopics for 4.0 wt%, 25 GWd/MTU, Node 18
A4030N01	SUM	72,730	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 1
A4030N02	SUM	72,840	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 2
A4030N03	SUM	73,157	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 3
A4030N04	SUM	73,157	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 4
A4030N05	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 5
A4030N06	SUM	73,175	11/4/97 2:32p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 6
A4030N07	SUM	73,175	11/4/97 2:32p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 7
A4030N08	SUM	73,175	11/4/97 2:32p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 8
A4030N09	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 9
A4030N10	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 10
A4030N11	SUM	73,175	11/4/97 2:32p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 11
A4030N12	SUM	73,175	11/4/97 2:32p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 12
A4030N13	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 13
A4030N14	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 14
A4030N15	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 15
A4030N16	SUM	73,175	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 16
A4030N17	SUM	72,859	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 17
A4030N18	SUM	72,840	11/4/97 2:33p	Isotopics for 4.0 wt%, 30 GWd/MTU, Node 18
A4035N01	SUM	72,814	10/16/97 1:24p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 1
A4035N02	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 2
A4035N03	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 3
A4035N04	SUM	73,190	10/16/97 1:22p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 4
A4035N05	SUM	73,190	10/16/97 1:22p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 5
A4035N06	SUM	73,190	10/16/97 1:22p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 6
A4035N07	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 7
A4035N08	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 8
A4035N09	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 9
A4035N10	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 10

A4035N11	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 11
A4035N12	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 12
A4035N13	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 13
A4035N14	SUM	73,186	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 14
A4035N15	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 15
A4035N16	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 16
A4035N17	SUM	73,175	10/16/97 1:23p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 17
A4035N18	SUM	72,840	10/16/97 1:24p	Isotopics for 4.0 wt%, 35 GWd/MTU, Node 18
A4040N01	SUM	72,840	10/16/97 1:24p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 1
A4040N02	SUM	73,157	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 2
A4040N03	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 3
A4040N04	SUM	73,192	10/16/97 1:22p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 4
A4040N05	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 5
A4040N06	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 6
A4040N07	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 7
A4040N08	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 8
A4040N09	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 9
A4040N10	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 10
A4040N11	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 11
A4040N12	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 12
A4040N13	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 13
A4040N14	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 14
A4040N15	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 15
A4040N16	SUM	73,188	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 16
A4040N17	SUM	73,190	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 17
A4040N18	SUM	72,859	10/16/97 1:23p	Isotopics for 4.0 wt%, 40 GWd/MTU, Node 18
A4530N01	SUM	72,708	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 1
A4530N02	SUM	72,840	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 2
A4530N03	SUM	72,877	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 3
A4530N04	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 4
A4530N05	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 5
A4530N06	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 6
A4530N07	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 7
A4530N08	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 8
A4530N09	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 9
A4530N10	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 10
A4530N11	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 11
A4530N12	SUM	73,186	11/4/97 2:32p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 12
A4530N13	SUM	73,186	11/4/97 2:32p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 13
A4530N14	SUM	73,182	11/4/97 2:32p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 14
A4530N15	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 15
A4530N16	SUM	73,167	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 16
A4530N17	SUM	72,859	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 17

A4530N18	SUM	72,859	11/4/97 2:33p	Isotopics for 4.5 wt%, 30 GWd/MTU, Node 18
A4535N01	SUM	72,814	10/16/97 1:24p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 1
A4535N02	SUM	72,877	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 2
A4535N03	SUM	73,204	10/16/97 1:22p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 3
A4535N04	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 4
A4535N05	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 5
A4535N06	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 6
A4535N07	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 7
A4535N08	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 8
A4535N09	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 9
A4535N10	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 10
A4535N11	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 11
A4535N12	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 12
A4535N13	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 13
A4535N14	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 14
A4535N15	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 15
A4535N16	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 16
A4535N17	SUM	73,167	10/16/97 1:23p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 17
A4535N18	SUM	72,855	10/16/97 1:24p	Isotopics for 4.5 wt%, 35 GWd/MTU, Node 18
A4540N01	SUM	72,840	10/16/97 1:24p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 1
A4540N02	SUM	73,167	10/16/97 1:23p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 2
A4540N03	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 3
A4540N04	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 4
A4540N05	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 5
A4540N06	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 6
A4540N07	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 7
A4540N08	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 8
A4540N09	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 9
A4540N10	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 10
A4540N11	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 11
A4540N12	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 12
A4540N13	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 13
A4540N14	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 14
A4540N15	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 15
A4540N16	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 16
A4540N17	SUM	73,188	10/16/97 1:23p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 17
A4540N18	SUM	72,851	10/16/97 1:24p	Isotopics for 4.5 wt%, 40 GWd/MTU, Node 18
A4545N01	SUM	72,840	10/16/97 1:24p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 1
A4545N02	SUM	73,192	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 2
A4545N03	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 3
A4545N04	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 4
A4545N05	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 5
A4545N06	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 6

A4545N07	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 7
A4545N08	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 8
A4545N09	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 9
A4545N10	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 10
A4545N11	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 11
A4545N12	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 12
A4545N13	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 13
A4545N14	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 14
A4545N15	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 15
A4545N16	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 16
A4545N17	SUM	73,226	10/16/97 1:22p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 17
A4545N18	SUM	72,877	10/16/97 1:23p	Isotopics for 4.5 wt%, 45 GWd/MTU, Node 18
A5035N01	SUM	72,814	10/16/97 1:24p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 1
A5035N02	SUM	72,877	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 2
A5035N03	SUM	73,178	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 3
A5035N04	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 4
A5035N05	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 5
A5035N06	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 6
A5035N07	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 7
A5035N08	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 8
A5035N09	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 9
A5035N10	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 10
A5035N11	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 11
A5035N12	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 12
A5035N13	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 13
A5035N14	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 14
A5035N15	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 15
A5035N16	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 16
A5035N17	SUM	73,174	10/16/97 1:23p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 17
A5035N18	SUM	72,855	10/16/97 1:24p	Isotopics for 5.0 wt%, 35 GWd/MTU, Node 18
A5040N01	SUM	72,840	10/16/97 1:24p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 1
A5040N02	SUM	73,149	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 2
A5040N03	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 3
A5040N04	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 4
A5040N05	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 5
A5040N06	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 6
A5040N07	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 7
A5040N08	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 8
A5040N09	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 9
A5040N10	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 10
A5040N11	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 11
A5040N12	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 12
A5040N13	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 13

A5040N14	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 14
A5040N15	SUM	73,184	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 15
A5040N16	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 16
A5040N17	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 17
A5040N18	SUM	72,851	10/16/97 1:24p	Isotopics for 5.0 wt%, 40 GWd/MTU, Node 18
A5045N01	SUM	72,840	10/16/97 1:24p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 1
A5045N02	SUM	73,170	10/16/97 1:23p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 2
A5045N03	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 3
A5045N04	SUM	73,226	11/3/97 11:20a	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 4
A5045N05	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 5
A5045N06	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 6
A5045N07	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 7
A5045N08	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 8
A5045N09	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 9
A5045N10	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 10
A5045N11	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 11
A5045N12	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 12
A5045N13	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 13
A5045N14	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 14
A5045N15	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 15
A5045N16	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 16
A5045N17	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 17
A5045N18	SUM	72,877	10/16/97 1:23p	Isotopics for 5.0 wt%, 45 GWd/MTU, Node 18
A5050N01	SUM	72,851	10/16/97 1:24p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 1
A5050N02	SUM	73,188	10/16/97 1:23p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 2
A5050N03	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 3
A5050N04	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 4
A5050N05	SUM	73,222	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 5
A5050N06	SUM	73,222	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 6
A5050N07	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 7
A5050N08	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 8
A5050N09	SUM	73,222	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 9
A5050N10	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 10
A5050N11	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 11
A5050N12	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 12
A5050N13	SUM	73,233	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 13
A5050N14	SUM	73,233	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 14
A5050N15	SUM	73,218	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 15
A5050N16	SUM	73,222	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 16
A5050N17	SUM	73,226	10/16/97 1:22p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 17
A5050N18	SUM	73,163	10/16/97 1:23p	Isotopics for 5.0 wt%, 50 GWd/MTU, Node 18
A5545N01	SUM	72,855	10/16/97 1:24p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 1
A5545N02	SUM	73,170	10/16/97 1:23p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 2

A5545N03	SUM	73,188	10/16/97 1:23p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 3
A5545N04	SUM	73,184	10/16/97 1:23p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 4
A5545N05	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 5
A5545N06	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 6
A5545N07	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 7
A5545N08	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 8
A5545N09	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 9
A5545N10	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 10
A5545N11	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 11
A5545N12	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 12
A5545N13	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 13
A5545N14	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 14
A5545N15	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 15
A5545N16	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 16
A5545N17	SUM	73,188	10/16/97 1:23p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 17
A5545N18	SUM	72,877	10/16/97 1:23p	Isotopics for 5.5 wt%, 45 GWd/MTU, Node 18
A5550N01	SUM	72,855	10/16/97 1:24p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 1
A5550N02	SUM	73,188	10/16/97 1:23p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 2
A5550N03	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 3
A5550N04	SUM	73,226	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 4
A5550N05	SUM	73,222	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 5
A5550N06	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 6
A5550N07	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 7
A5550N08	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 8
A5550N09	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 9
A5550N10	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 10
A5550N11	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 11
A5550N12	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 12
A5550N13	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 13
A5550N14	SUM	73,218	10/16/97 1:22p	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 14
A5550N15	SUM	73,218	10/17/97 10:44a	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 15
A5550N16	SUM	73,222	10/17/97 10:44a	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 16
A5550N17	SUM	73,226	10/17/97 10:44a	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 17
A5550N18	SUM	73,163	10/17/97 10:44a	Isotopics for 5.5 wt%, 50 GWd/MTU, Node 18
A5555N01	SUM	72,851	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 1
A5555N02	SUM	73,188	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 2
A5555N03	SUM	73,226	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 3
A5555N04	SUM	73,237	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 4
A5555N05	SUM	73,237	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 5
A5555N06	SUM	73,239	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 6
A5555N07	SUM	73,239	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 7
A5555N08	SUM	73,239	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 8
A5555N09	SUM	73,239	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 9

A5555N10	SUM	73,239	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 10
A5555N11	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 11
A5555N12	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 12
A5555N13	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 13
A5555N14	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 14
A5555N15	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 15
A5555N16	SUM	73,233	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 16
A5555N17	SUM	73,222	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 17
A5555N18	SUM	73,170	10/17/97 10:44a	Isotopics for 5.5 wt%, 55 GWd/MTU, Node 18

PWR Data for UCF Maximum Fresh Fuel Enrichment, Directory LOADPWR/UCF

Data Files UCF Calculations

Filename	Extension	Size (bytes)	Date	Time	Description
UCF001	O	653,209	07-10-97	1:44p	MCNP4A output for fresh 1.5 wt% enrichment
UCF002	O	653,307	07-10-97	1:44p	MCNP4A output for fresh 2.0 wt% enrichment
UCF003	O	652,908	07-10-97	1:45p	MCNP4A output for fresh 2.5 wt% enrichment
UCF004	O	653,721	07-10-97	1:45p	MCNP4A output for fresh 3.0 wt% enrichment
UCF005	O	652,796	07-10-97	1:45p	MCNP4A output for fresh 3.5 wt% enrichment
UCF006	O	652,558	07-10-97	1:45p	MCNP4A output for fresh 4.0 wt% enrichment
UCF007	O	652,521	07-10-97	1:45p	MCNP4A output for fresh 4.5 wt% enrichment
UCF008	O	652,537	07-10-97	1:46p	MCNP4A output for fresh 5.0 wt% enrichment