



CALCULATION SUMMARY SHEET (CSS)

Document Identifier 32 - 5041666 - 02

DOC.20040623.0002

Title REACTOR RECORD UNCERTAINTY DETERMINATION

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COST CENTER 212020 REF. PAGE(S) 21

TM STATEMENT: REVIEWER INDEPENDENCE wfl

PURPOSE AND SUMMARY OF RESULTS:

This calculation evaluates burnup uncertainty for PWR and BWR fuel assemblies by using data from utility records. The records give the difference between calculated and measured burnup for fuel assemblies at the end of each fuel cycle. Evaluated here are the uncertainties in calculated minus measured burnup (*D*) and the percent difference of calculated to measured burnup (*P*), given by the equation:

$$P = 100 (\text{calculated burnup} - \text{measured burnup}) / (\text{measured burnup}).$$

The assembly data (Ref. 5) include nine PWR plants of two designs, designated as A and B. The six A plants are identified as A1, A2, A3, A4, A5, and A6. The three B plants are identified as B1, B2, and B3. No comparable burnup data was found for BWRs. Thus, BWR burnup uncertainty is evaluated by considering the BWR radial power uncertainty factors (CNRFs) from Ref. 5 in combination with the PWR burnup uncertainty results.

This evaluation uses a representative sample of industry data consisting of 5,447 assemblies having end-of-cycle (EOC) burnup >10,000 MWd/MTU. More than 10 cycles of data were available for A1, A2, B1, B2, and B3. Only one recent cycle of data was available for each A3, A4, A5, and A6. Due to the smaller sample size and recent timing of the records for these plants, these four cycles are combined in a separate evaluation from the other five plants.

The data for *D* and *P* for each plant are grouped by burnup and tested for normality. The groupings are: burnup >10,000, burnup of 10,000-30,000, burnup >30,000, identified as Bin 1, Bin 2, and Bin 3, respectively. If normal, the uncertainty for *D* and *P* is determined with a common one-sided tolerance limit method at 95% confidence and 95% probability. Further normality testing determines whether groups of plants can be combined for further burnup uncertainty evaluation. For individual plants, the uncertainty values for *P* range from 2.4% to 3.8% in Bin 1, from 2.7% to 4.2% in Bin 2, and from 2.0% to 3.2% in Bin 3. For each plant, the *P* uncertainty is less than the CNRF, which has a range on the order of 3-5% for the A and B plants. In the analysis for A3, A4, A5, and A6 combined, the uncertainty values for *P* are 1.0%, 1.3%, and 1.0% for Bins 1-3, respectively. Normality testing shows some plants can be grouped. Plants A1 and A2 can be combined to obtain an uncertainty of 2.7% for *P* in Bin 2. Plants B1, B2, and B3 can be combined for *P* in all three bins to give an uncertainty of 3.1% in Bin 1, 3.6% in Bin 2, and 2.3% in Bin 3. A1 and A2 can not be grouped for Bins 1 and 3. The combined data for A1, A2, B1, B2, and B3 does not pass the normality testing.

The calculated *P* uncertainty values are less than the CNRF in Ref. 5 for each plant evaluated. The CNRF range is on the order of 3-5% with higher values in effect for earlier fuel cycles. The results of this evaluation for *P* uncertainty indicate that the CNRF for each reactor provides a conservative estimate of burnup uncertainty, as expected. Moreover, since the BWR CNRFs fall within the same range as those for the PWRs, it is expected that the *P* uncertainty obtained from an analysis of BWR data would give values no greater than the largest value for *P* (4.2%) in the PWR uncertainty analysis.

The burnup uncertainties will be used to adjust either the waste package loading curves or the burnup values of assemblies shipped to the repository.

This engineering calculation supports the burnup credit methodology in Ref. 1 and is performed in accordance with the AREVA/FANP procedures (Ref. 2 and Ref. 3).

THE FOLLOWING COMPUTER CODES HAVE BEEN USED IN THIS DOCUMENT:

THE DOCUMENT CONTAINS ASSUMPTIONS THAT MUST BE VERIFIED PRIOR TO USE ON SAFETY-RELATED WORK

CODE/VERSION/REV

CODE/VERSION/REV

YES

NO

RECORD OF REVISIONS

<u>Revision Number</u>		<u>Date</u>
00	(Initial)	March 2004
01		May 2004

- The equation for σ_{inf} is deleted on p. 8 and the term " σ_{inf} " is replaced with " σ " in the equations for $D_{uncertainty}$ and $P_{uncertainty}$ on pp. 8-9 to follow Section 2-5.3 of Ref. 8.
- Step 1 is revised to correct the reference citations.
- In the equation for term b on p. 8., " z_p " is revised to " z_p^2 ".
- The lines for K_{inf} and σ_{inf} are deleted from Tables 1A through 9A and Tables 1B through 9B.
- " $K\sigma_{inf}$ " is revised to " $K\sigma$ " and the calculated values for $K\sigma_{inf}$ are revised to calculated values for $K\sigma$ in Tables 1A through 9A and Tables 1B through 9B.
- " D " is revised to " P " in the headings for Tables 1B, 2B, 3B, and 8B.
- " $K\sigma_{inf}$ " is revised to " $K\sigma$ " in the footnotes for Tables 1A through 9A and Tables 1B through 9B.
- K values revised in Tables 2A and 2B and 6A and 6B.
- In the first paragraph of Section 5.2.2, the part that reads "...lower burnup but fails at higher..." is revised to "...higher burnup but fails at lower...".
- In Table 9B, the value of σ for Assembly Burnup >10,000 is revised from 0.524 to 0.574.
- The values of D and P are revised in Tables 10A through 10C to be based on $K\sigma$ instead of $K\sigma_{inf}$.
- The fourth paragraph on the Calculation Summary Sheet is revised to be based on the values of $K\sigma$ listed in Tables 10A through 10C.

Revision Number

Date

02

May 2004

- The footnote on Tables 3A, 4A, 5A, 6A, 7A, 8A and 9A is changed to " $K\sigma$ is the uncertainty in calculated - measured burnup in MWD/MTU".
- The period is removed at the end of the title of Sections 5.2.8 and 5.2.9.
- The following sentence is added to the first paragraph of Section 1 and at the end of Section 6: "The burnup uncertainties will be used to adjust either the waste package loading curves or the burnup values of assemblies shipped to the repository."

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1. PURPOSE

The objective of this calculation is to evaluate commercial spent nuclear fuel (CSNF) burnup uncertainty based on pressurized water reactor (PWR) and boiling water reactor (BWR) records kept by each utility. The burnup uncertainties will be used to adjust either the waste package loading curves or the burnup values of assemblies shipped to the repository.

This engineering calculation supports the burnup credit methodology in Reference 1 and is performed in accordance with the AREVA/FANP procedures in References 2 and 3.

2. METHOD

Values of the radial power distribution and burnup for commercial nuclear fuel assemblies are determined from calibrated calculations that are continually verified with in-core measurements throughout the in-core irradiation history of the fuel assemblies. These values are documented in proprietary core operations records kept by each utility that operates commercial PWR and BWR reactors.

Burnup measures the exposure of nuclear fuel during reactor core power production and is usually expressed in units of GWd or MWd per MTU initially loaded into a fresh assembly. For each cycle of reactor operations, core operations reports provide measured burnup determined from an array of calibrated in-core detectors and calculated burnup determined from calculational models of the reactor core power distribution. The measured and calculated burnups are used to determine the difference between calculated minus measured burnup (D) and the percent difference of calculated to measured burnup (P) as follows:

$$D = \text{calculated burnup} - \text{measured burnup}$$

$$P = 100 (\text{calculated} - \text{measured}) / \text{measured}$$

Reactor records give the calculated burnup and measured burnups from which D and P are calculated. This calculation determines burnup uncertainty values based on a statistical analysis of D and P for nine PWR reactors for which data is documented in Reference 5.

Six reactors in this calculation have a similar plant design for fuel assemblies and in-core detectors and are designated as plants A1, A2, A3, A4, A5, and A6. The other three plants have a similar plant design for fuel assemblies and in-core detectors and are designated as plants B1, B2, and B3. The data used in this analysis are from fuel assemblies having either a 15 x 15 or a 17 x 17 array of fuel rods.

A search was done and no data was found for pairs of measured and calculated burnup data for BWR fuel assemblies. A proprietary report was obtained for BWR reactors that gives calculational nuclear reliability factors (CNRF), which express the uncertainty in the calculated radial power versus measured radial power in BWR reactors. These BWR CNRFs are listed in Reference 5. Since radial power uncertainties are directly related to burnup uncertainties, the

BWR CNRFs can be used to extend the uncertainty results for PWR plants to BWR plants for making a representative estimate of burnup uncertainty for BWR fuel assemblies.

The burnup uncertainty includes the effects on assembly average burnup resulting from the uncertainty associated with total core power and individual fuel assembly power. The uncertainty also includes systematic errors related to the in-core detector system for each plant, systematic errors related to the calculational models used in calculating assembly power, other unknown systematic errors associated with either plant design or plant operations, and random errors.

The steps used in the statistical analysis for D and P are listed below. The analysis is implemented with Excel spreadsheets.

Step 1. Use the Anderson-Darling method (Reference 7) to test the normality of the data for each plant (or group of plants) at the 95% confidence level. The test is implemented with the same Excel spreadsheet used for normality testing in Reference 6. The test statistic criterion at the 95% confidence level for sample sizes of greater than 50 is 0.752 (Reference 7).

Step 2. If the normality test is passed, calculate the mean and standard deviation of the data for each plant.

Step 3. Based on the mean and standard deviation of the normally distributed data, determine the uncertainty of either D or P based on the one-sided tolerance limit method in Reference 8 (pp. 2-14 and 2-15) at the 95% confidence (γ) and 95% probability (p) levels. The one-sided tolerance factor K is calculated as follows:

$$K = [z_p + (z_p^2 - ab)^{0.5}] / a$$

where

$$a = 1 - z_\gamma^2 / [2(n-1)]$$

$$b = z_p^2 - z_\gamma^2 / n$$

and

$$z_p = 1.645 \text{ for the 95\% probability level}$$

$$z_\gamma = 1.645 \text{ for the 95\% confidence level.}$$

The uncertainty for D and P at 95% confidence and 95% probability are then calculated as follows:

$$D_{\text{uncertainty}} = K\sigma$$

$$P_{\text{uncertainty}} = K\sigma$$

Step 4. Repeat steps 1-3 for plants A1 and A2 combined.

Step 5. Repeat steps 1-3 for plants B1, B2, and B3 combined.

Step 6. Repeat steps 1-3 for plants A1, A2, B1, B2, and B3 combined.

Step 7. Repeat steps 1-3 for plants A3, A4, A5, and A6 combined since these plants have a similar design and only one recent cycle of information is available for each plant.

3. ASSUMPTIONS

No specific assumptions are used in developing the current calculation.

4. USE OF COMPUTER SOFTWARE AND MODELS

No computer software or models were used.

5. CALCULATIONS

This section describes statistical calculations for the PWR data. The calculations are performed on data for P and D obtained from proprietary PWR commercial reactor records.

5.1 INPUTS

The data used in this calculation are obtained from Reference 5. The data is non-proprietary.

5.1.1 Data for Plants A1, A2, A3, A4, A5, and A6.

Attachments I and II list end-of-cycle (EOC) values of D and P versus burnup category for plants A1 and A2. Since only one set of EOC data was available for each of the Plants A3, A4, A5, and A6, the values of D and P versus burnup categories are listed together in Attachment VI. Only assemblies with measured burnup greater than 10,000 MWd/MTU are used in this calculation.

5.1.2 Data for Plants B1, B2, and B3

Attachments III, IV, and V list the values of D and P versus burnup for plants B1, B2, and B3, respectively. Only assemblies with measured burnup greater than 10,000 MWd/MTU are used in this calculation.

5.2 DESCRIPTION AND FLOW OF CALCULATIONS

5.2.1 Analysis for Plant A1

Tables 1A and 1B summarize the statistical analysis of *D* and *P* for plant A1 for non-partitioned data (fuel assemblies with burnup greater than 10,000 MWd/MTU) and two categories of partitioned data, e.g., a burnup of 10,000 to 30,000 MWd/MTU in one category and burnup of greater than 30,000 MWd/MTU in the second category. The non-partitioned data do not pass the normality test for either *D* or *P*. The partitioned data pass the normality test for both *D* and *P* at lower burnup but fail the normality test at higher burnup. The uncertainty in *D* and *P* is calculated for assemblies with burnup of 10,000-30,000 MWd/MTU.

Table 1A. Analysis of *D* for Plant A1

Plant A1			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	2147	1198	949
Anderson-Darling score	1.252	0.243	1.546
normality test	failed	passed	failed
mean	-	67.5	-
σ	-	328.6	-
K	-	1.720	-
$K\sigma$	-	565.2	-

Note: $K\sigma$ is the uncertainty in calculated - measured burnup in MWd/MTU.

Table 1B. Analysis of *P* for Plant A1

Plant A1			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	2147	1198	949
Anderson-Darling score	2.837	0.737	1.023
normality test	failed	passed	failed
mean	-	0.303	-
σ	-	1.627	-
K	-	1.720	-
$K\sigma$	-	2.798	-

Note: $K\sigma$ is the uncertainty in (calculated - measured)/measured burnup in %.

5.2.2 Analysis for Plant A2

Tables 2A and 2B summarize the statistical analysis of *D* and *P* for plant A2 for non-partitioned and partitioned data. The non-partitioned data fails the normality test for *D* but passes for *P*. The partitioned data for *D* passes the normality test at higher burnup but fails at lower burnup. The partitioned data for *P* passes the normality test for both lower and higher burnup. The uncertainty for *D* and *P* is determined for each case that passes the normality test.

Table 2A. Analysis of *D* for Plant A2

Plant A2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	1965	1043	922
Anderson-Darling score	1.446	0.901	0.521
normality test	failed	failed	passed
mean	-	-	30.9
σ	-	-	484.6
K	-	-	1.731
K σ	-	-	838.7

Note: K σ is the uncertainty in calculated - measured burnup in MWd/MTU.

Table 2B. Analysis of *P* for Plant A2

Plant A2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	1965	1043	922
Anderson-Darling score	0.740	0.657	0.490
normality test	passed	passed	passed
mean	0.267	0.429	0.083
σ	1.387	1.540	1.164
K	1.703	1.725	1.731
K σ	2.362	2.657	2.015

Note: K σ is the uncertainty in (calculated - measured)/measured burnup in %.

5.2.3 Analysis for Plant B1

Tables 3A and 3B summarize the statistical analysis of *D* and *P* for plant B1. For *D*, the normality test is passed in all cases except for higher burnup. For *P*, the normality test is passed in all cases. The uncertainty in *D* and *P* is determined for each case that passes the normality test.

Table 3A. Analysis of *D* for Plant B1

Plant B1			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	436	237	199
Anderson-Darling score	0.393	0.225	0.763
normality test	passed	passed	failed
mean	-23.3	-46.7	-
σ	394.9	375.7	-
K	1.771	1.819	-
$K\sigma$	699.5	683.5	-

Note: $K\sigma$ is the uncertainty in calculated – measured in MWD/MTU..

Table 3B. Analysis of *P* for Plant B1

Plant B1			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	436	237	199
Anderson-Darling score	0.504	0.405	0.615
normality test	passed	passed	passed
mean	-0.094	-0.212	0.046
σ	1.600	1.905	1.124
K	1.771	1.819	1.836
$K\sigma$	2.834	3.466	2.064

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.4 Analysis for Plant B2

Tables 4A and 4B summarize the statistical analysis of *D* and *P* for plant B2. For *D* and *P*, the normality test is passed in all cases and the uncertainty is determined with the one-sided tolerance limit method.

Table 4A. Analysis of *D* for Plant B2

Plant B2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	312	194	118
Anderson-Darling score	0.378	0.248	0.165
normality test	passed	passed	passed
mean	-116.0	-82.0	-171.9
σ	558.4	453.3	696.4
K	1.796	183.9	1.899
$K\sigma$	1002.8	833.6	1322.6

Note: $K\sigma$ is the uncertainty in calculated – measured in MWD/MTU.

Table 4B. Analysis of *P* for Plant B2

Plant B2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	312	194	118
Anderson-Darling score	0.357	0.446	.168
normality test	passed	passed	passed
mean	-0.377	-0.377	-0.377
σ	2.089	2.299	1.698
K	1.796	1.839	1.899
$K\sigma$	3.752	4.228	3.225

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.5 Analysis for Plant B3

Tables 5A and 5B summarize the statistical analysis of Plant B3 data. All three categories pass the normality test for both D and P ; the one one-sided tolerance limit method is used to determine the uncertainty of D and P .

Table 5A. Analysis of D for Plant B3

Plant B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	363	231	132
Anderson-Darling score	0.411	0.509	0.449
normality test	passed	passed	passed
mean	-39.1	-19.0	-74.2
σ	400.5	380.8	432.0
K	1.784	1.822	1.884
$K\sigma$	714.5	693.7	814.0

Note: $K\sigma$ is the uncertainty in calculated – measured in MWD/MTU.

Table 5B. Analysis of P for Plant B3

Plant B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	363	231	132
Anderson-Darling score	0.392	0.585	0.500
normality test	passed	passed	passed
mean	-0.179	-0.170	-0.196
σ	1.737	1.987	1.188
K	1.784	1.822	1.884
$K\sigma$	3.100	3.619	2.238

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.6 Analysis for Plants A1 and A2 Combined

Tables 6A and 6B summarize the statistical analysis of the combined data for Plants A1 and A2. The lower burnup category passes the normality test for *D* and *P*; the one-sided tolerance limit method is used for determining the uncertainty of *D* and *P* for assemblies with burnup of 10,000 to 30,000 MWd/MTU.

Table 6A. Analysis of *D* for Plants A1 and A2 Combined

Plants A1 and A2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	4112	2241	1871
Anderson-Darling score	2.113	0.668	1.354
normality test	failed	passed	failed
mean	-	78.2	-
σ	-	326.1	-
K	-	1.699	-
$K\sigma$	-	554.1	-

Note: $K\sigma$ is the uncertainty in calculated – measured burnup in MWD/MTU.

Table 6B. Analysis of *P* for Plants A1 and A2 Combined

Plant A1 and A2			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	4112	2241	1871
Anderson-Darling score	2.562	0.552	0.883
normality test	failed	passed	failed
mean	-	0.362	-
σ	-	1.588	-
K	-	1.699	-
$K\sigma$	-	2.699	-

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.7 Analysis for Plants B1, B2, and B3 Combined

Tables 7A and 7B summarize the statistical analysis of the combined data for Plants B1, B2, and B3 combined. The lower burnup category passes the normality test for *D* while all categories pass the normality test for *P*; the one-sided tolerance limit method is used for determining the uncertainty of *D* and *P* for cases where the normality test is passed.

Table 7A. Analysis of *D* for Plants B1, B2, and B3 Combined

Plants B1, B2, and B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	1111	662	449
Anderson-Darling score	0.825	0.447	0.957
normality test	failed	passed	failed
mean	-	-47.4	-
σ	-	401.8	-
K	-	1.747	-
$K\sigma$	-	701.9	-

Note: $K\sigma$ is the uncertainty in calculated – measured burnup in MWd/MTU..

Table 7B. Analysis of *P* for Plants B1, B2, and B3 Combined

Plants B1, B2, and B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	1111	662	449
Anderson-Darling score	0.436	0.624	0.575
normality test	passed	passed	passed
mean	-0.201	-0.245	-0.137
σ	1.796	2.054	1.325
K	1.723	1.747	1.769
$K\sigma$	3.094	3.588	2.344

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.8 Analysis for Plants A1, A2, B1, B2, and B3 Combined

Tables 8A and 8B summarize the statistical analysis of the combined data for Plants A1, A2, B1, B2, and B3 combined. None of these categories pass the normality test for either *D* or *P*.

Table 8A. Analysis of *D* for Plants A1, A2, B1, B2, and B3 Combined

Plants A1, A2, B1, B2, and B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	5223	2903	2320
Anderson-Darling score	3.128	0.756	1.821
normality test	failed	failed	failed
mean	-	-	-
σ	-	-	-
K	-	-	-
$K\sigma$	-	-	-

Note: $K\sigma$ is the uncertainty in calculated – measured burnup in MWD/MTU..

Table 8B. Analysis of *P* for Plants A1, A2, B1, B2, and B3 Combined

Plants A1, A2, B1, B2, and B3			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	5223	2903	2320
Anderson-Darling score	3.585	1.163	1.309
normality test	failed	failed	failed
mean	-	-	-
σ	-	-	-
K	-	-	-
$K\sigma$	-	-	-

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

5.2.9 Analysis for Plants A3, A4, A5, and A6 Combined

Tables 9A and 9B summarize the statistical analysis of the combined EOC data for Plants A3, A4, A5, and A6. All categories pass the normality test for *D* and *P*.

Table 9A. Analysis of *D* for Plants A3, A4, A5, and A6 Combined

Plants A3, A4, A5, and A6			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	224	90	134
Anderson-Darling score	0.505	0.185	0.400
normality test	passed	passed	passed
mean	73.6	31.0	102.3
σ	193.2	149.9	213.2
K	1.825	1.940	1.882
$K\sigma$	352.5	290.8	401.4

Note: $K\sigma$ is the uncertainty in calculated – measured burnup in MWD/MTU..

Table 9B. Analysis of *P* for Plants A3, A4, A5, and A6 Combined

Plants A3, A4, A5, and A6			
Statistical Parameter	Assembly Burnup (MWd/MTU)		
	>10,000	10,000-30,000	>30,000
Number of Assemblies	224	90	134
Anderson-Darling score	0.338	0.338	0.302
normality test	passed	passed	passed
mean	0.220	0.164	0.258
σ	0.574	0.661	0.505
K	1.825	1.940	1.882
$K\sigma$	1.047	1.283	0.951

Note: $K\sigma$ is the uncertainty in (calculated – measured)/measured burnup in %.

6. RESULTS

Tables 10A-10C show the uncertainty analysis results for *P* and *D*.

Table 10A. *D* and *P* Uncertainty for Assemblies with Burnup > 10,000 MWd/MTU

Plant Records	Number of Assemblies Evaluated	Assemblies with Burnup > 10,000 MWd/MTU 95%/95% Uncertainty	
		<i>D</i> (MWd/MTU)	<i>P</i> (%)
A1	2147	Distribution not normal	Distribution not normal
A2	1965	Distribution not normal	2.4
B1	436	700	2.8
B2	312	1003	3.8
B3	363	715	3.1
A1 and A2	4112	Distribution not normal	Distribution not normal
B1, B2, and B3	1111	Distribution not normal	3.1
A1, A2, B1, B2, and B3	5223	Distribution not normal	Distribution not normal
A3, A4, A5, and A6	224	353	1.0

Table 10B. *D* and *P* Uncertainty for Assemblies with Burnup of 10,000-30,000 MWd/MTU

Plant Records	Number of Assemblies Evaluated	Assemblies with Burnup of 10,000-30,000 MWd/MTU 95%/95% Uncertainty	
		<i>D</i> (MWd/MTU)	<i>P</i> (%)
A1	1198	565	2.8
A2	1043	Distribution not normal	2.7
B1	237	684	3.5
B2	194	834	4.2
B3	231	694	3.6
A1 and A2	2241	554	2.7
B1, B2, and B3	662	702	3.6
A1, A2, B1, B2, and B3	2903	Distribution not normal	Distribution not normal
A3, A4, A5, and A6	90	291	1.3

Table 10C. *D* and *P* Uncertainty for Assemblies with Burnup > 30,000 MWd/MTU

Plant Records	Number of Assemblies Evaluated	Assemblies with Burnup > 30,000 MWd/MTU 95%/95% Uncertainty	
		<i>D</i> (MWd/MTU)	<i>P</i> (%)
A1	949	Distribution not normal	Distribution not normal
A2	922	839	2.0
B1	199	Distribution not normal	2.0
B2	118	1323	3.2
B3	132	814	2.2
A1 and A2	1871	Distribution not normal	Distribution not normal
B1, B2, and B3	449	Distribution not normal	2.3
A1, A2, B1, B2, and B3	2320	Distribution not normal	Distribution not normal
A3, A4, A5, and A6	134	401	1.0

The uncertainty values for P are less than the CNRF in Reference 5 for each of the plants evaluated. The range of CNRF for the plants investigated is on the order of 3-5%. The CNRFs in effect for earlier fuel cycles are higher than those for more recent fuel cycles and reflect industry advances such as higher burnup fuel and more advanced measurement techniques and computational models. The results for P indicate that the CNRF for each reactor investigated provides a bounding estimate of burnup uncertainty, as was expected.

The CNRFs given in Reference 5 for BWRs fall within the same range as those for the PWRs investigated. Therefore, it is expected that the uncertainty values for P that would be obtained from an analysis of data giving the difference between calculated and measured burnup for BWR fuel at EOC should be no worse than the largest values for P given in Tables 10A-10C.

The results given here for the difference between measured and calculated burnup for commercial nuclear fuel assemblies at EOC are based on analyses of data for 5447 PWR assemblies that are considered to be a representative sample of industry data.

By obtaining more information from the utilities, the data for each plant could be further evaluated to identify locations for which burnup is directly measured versus those for which burnup is inferred. Additionally, it is also expected that further analysis of such information would help in identifying and removing data for locations where the measured burnup is suspect due to issues with sensors in the in-core detector system. The reactor records used in this calculation permitted this screening and removal of suspect data for the B group plants but not for the A group plants.

In order for other plants to be finally accepted, the quality status of the data would need to be verified and a similar calculation performed using utility supplied information.

The burnup uncertainties will be used to adjust either the waste package loading curves or the burnup values of assemblies shipped to the repository.

7. REFERENCES

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2. AREVA/FANP Administrative Procedure, Number: 0402-01, Preparing and Processing FANP Calculations, February 2003, Framatome ANP, Lynchburg, VA 24506
3. AREVA/FANP Document Number 56-5015885-02, 2003. Framatome ANP, Inc. Quality Management Manual.
4. Not used.
5. AREVA/FANP Document Number 32-2200138-00, 2004. Reactor Record Evaluations for Burnup Uncertainty.
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7. D'Agostino, R.B. and Stephens, M.A. 1986. *Goodness-of-fit Techniques*. Statistics, Textbooks and Monographs, Volume 68. New York, New York: Marcel Dekker.
8. Natrella, M.G. 1963. *Experimental Statistics*. National Bureau of Standards Handbook 91. U.S. Government Printing Office, Washington, D.C.

8. ATTACHMENTS

ATTACHMENT I: Data for Plant A1

ATTACHMENT II: Data for Plant A2

ATTACHMENT III: Data for Plant B1

ATTACHMENT IV: Data for Plant B2

ATTACHMENT V: Data for Plant B3

ATTACHMENT VI: Data for Plants A3, A4, A5, and A6 Combined

ATTACHMENT I: Data for Plant A1

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
A1	<30000	-363	-3.624
A1	<30000	-30	-0.294
A1	<30000	-130	-1.261
A1	<30000	-290	-2.770
A1	<30000	-290	-2.770
A1	<30000	-300	-2.863
A1	<30000	-350	-3.324
A1	<30000	-380	-3.598
A1	<30000	-390	-3.690
A1	<30000	10	0.093
A1	<30000	0	0.000
A1	<30000	-40	-0.372
A1	<30000	-210	-1.923
A1	<30000	-350	-3.165
A1	<30000	-360	-3.252
A1	<30000	-400	-3.600
A1	<30000	200	1.797
A1	<30000	-450	-4.032
A1	<30000	10	0.088
A1	<30000	-190	-1.649
A1	<30000	-350	-2.997
A1	<30000	123	1.051
A1	<30000	186	1.574
A1	<30000	-5	-0.040
A1	<30000	-5	-0.040
A1	<30000	-40	-0.339
A1	<30000	69	0.583
A1	<30000	67	0.563
A1	<30000	-35	-0.289
A1	<30000	-48	-0.398
A1	<30000	-173	-1.439
A1	<30000	90	0.743
A1	<30000	-259	-2.114
A1	<30000	-418	-3.400
A1	<30000	290	2.342
A1	<30000	-210	-1.692
A1	<30000	-210	-1.692
A1	<30000	250	2.013
A1	<30000	-577	-4.635
A1	<30000	-270	-2.165
A1	<30000	-280	-2.244
A1	<30000	160	1.279
A1	<30000	-320	-2.556
A1	<30000	567	4.526
A1	<30000	-570	-4.544
A1	<30000	110	0.876
A1	<30000	90	0.715
A1	<30000	80	0.635
A1	<30000	-390	-3.098
A1	<30000	482	3.821
A1	<30000	-648	-5.132
A1	<30000	78	0.614

A1	<30000	0	0.000
A1	<30000	-470	-3.710
A1	<30000	405	3.189
A1	<30000	358	2.807
A1	<30000	-894	-7.011
A1	<30000	297	2.323
A1	<30000	-92	-0.715
A1	<30000	246	1.916
A1	<30000	-190	-1.477
A1	<30000	-148	-1.147
A1	<30000	181	1.399
A1	<30000	-272	-2.095
A1	<30000	-284	-2.181
A1	<30000	779	5.977
A1	<30000	632	4.789
A1	<30000	-485	-3.670
A1	<30000	170	1.282
A1	<30000	-189	-1.420
A1	<30000	140	1.053
A1	<30000	-581	-4.370
A1	<30000	470	3.520
A1	<30000	479	3.584
A1	<30000	465	3.477
A1	<30000	-660	-4.934
A1	<30000	40	0.299
A1	<30000	451	3.370
A1	<30000	296	2.187
A1	<30000	282	2.082
A1	<30000	-150	-1.105
A1	<30000	-180	-1.323
A1	<30000	-230	-1.684
A1	<30000	-230	-1.684
A1	<30000	-240	-1.756
A1	<30000	203	1.471
A1	<30000	144	1.041
A1	<30000	203	1.461
A1	<30000	59	0.422
A1	<30000	158	1.133
A1	<30000	145	1.041
A1	<30000	35	0.251
A1	<30000	10	0.070
A1	<30000	24	0.170
A1	<30000	-100	-0.715
A1	<30000	-20	-0.140
A1	<30000	-6	-0.040
A1	<30000	-141	-1.000
A1	<30000	-42	-0.299
A1	<30000	-56	-0.398
A1	<30000	-280	-1.976
A1	<30000	-83	-0.587
A1	<30000	-274	-1.922
A1	<30000	-308	-2.153
A1	<30000	-410	-2.867
A1	<30000	-450	-3.138
A1	<30000	-258	-1.797
A1	<30000	-383	-2.667

A1	<30000	-393	-2.733
A1	<30000	-438	-3.035
A1	<30000	-481	-3.326
A1	<30000	-572	-3.929
A1	<30000	587	4.004
A1	<30000	495	3.359
A1	<30000	492	3.338
A1	<30000	438	2.955
A1	<30000	402	2.712
A1	<30000	240	1.608
A1	<30000	-966	-6.463
A1	<30000	258	1.719
A1	<30000	190	1.263
A1	<30000	209	1.389
A1	<30000	110	0.730
A1	<30000	159	1.051
A1	<30000	290	1.912
A1	<30000	-30	-0.197
A1	<30000	-40	-0.263
A1	<30000	210	1.377
A1	<30000	110	0.717
A1	<30000	90	0.586
A1	<30000	-160	-1.040
A1	<30000	-210	-1.360
A1	<30000	0	0.000
A1	<30000	-330	-2.121
A1	<30000	-110	-0.706
A1	<30000	132	0.847
A1	<30000	-130	-0.834
A1	<30000	-140	-0.897
A1	<30000	112	0.715
A1	<30000	-390	-2.497
A1	<30000	88	0.563
A1	<30000	-400	-2.559
A1	<30000	71	0.452
A1	<30000	-410	-2.621
A1	<30000	497	3.178
A1	<30000	-430	-2.746
A1	<30000	24	0.150
A1	<30000	422	2.690
A1	<30000	-6	-0.040
A1	<30000	-5	-0.030
A1	<30000	408	2.596
A1	<30000	402	2.554
A1	<30000	380	2.417
A1	<30000	-39	-0.249
A1	<30000	-49	-0.309
A1	<30000	-97	-0.616
A1	<30000	-105	-0.666
A1	<30000	-105	-0.666
A1	<30000	-151	-0.951
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A1	<30000	-167	-1.049
A1	<30000	-162	-1.019
A1	<30000	-173	-1.088
A1	<30000	-221	-1.390

A1	<30000	198	1.245
A1	<30000	-218	-1.371
A1	<30000	-229	-1.439
A1	<30000	-258	-1.614
A1	<30000	161	1.010
A1	<30000	116	0.725
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A1	<30000	81	0.503
A1	<30000	-398	-2.468
A1	<30000	-21	-0.130
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A1	<30000	190	1.173
A1	<30000	508	3.135
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A1	<30000	481	2.965
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A1	<30000	210	1.276
A1	<30000	222	1.348
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A1	<30000	-90	-0.546
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A1	<30000	158	0.959
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A1	<30000	-379	-2.296
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A1	<30000	517	3.093
A1	<30000	507	3.029

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A1	<30000	239	1.430
A1	<30000	320	1.909
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A1	<30000	283	1.688
A1	<30000	274	1.636
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A1	<30000	126	0.746
A1	<30000	369	2.187
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A1	<30000	369	2.187
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A1	<30000	59	0.351
A1	<30000	124	0.735
A1	<30000	27	0.160
A1	<30000	262	1.543
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A1	<30000	-220	-1.295
A1	<30000	255	1.502
A1	<30000	80	0.471
A1	<30000	14	0.080
A1	<30000	70	0.412
A1	<30000	-240	-1.411
A1	<30000	411	2.417
A1	<30000	60	0.353
A1	<30000	22	0.130
A1	<30000	368	2.155
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A1	<30000	240	1.399
A1	<30000	228	1.327
A1	<30000	237	1.379
A1	<30000	232	1.348
A1	<30000	276	1.605
A1	<30000	266	1.543
A1	<30000	28	0.160
A1	<30000	695	4.037
A1	<30000	174	1.010
A1	<30000	231	1.338
A1	<30000	-490	-2.839
A1	<30000	208	1.204
A1	<30000	180	1.041

A1	<30000	187	1.082
A1	<30000	156	0.898
A1	<30000	280	1.616
A1	<30000	14	0.080
A1	<30000	143	0.827
A1	<30000	91	0.523
A1	<30000	68	0.392
A1	<30000	68	0.392
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A1	<30000	442	2.533
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A1	<30000	-17	-0.100
A1	<30000	110	0.629
A1	<30000	304	1.740
A1	<30000	-317	-1.807
A1	<30000	431	2.459
A1	<30000	376	2.145
A1	<30000	60	0.342
A1	<30000	-73	-0.418
A1	<30000	30	0.171
A1	<30000	284	1.616
A1	<30000	60	0.341
A1	<30000	-940	-5.335
A1	<30000	185	1.051
A1	<30000	279	1.585
A1	<30000	630	3.569
A1	<30000	-184	-1.039
A1	<30000	570	3.224
A1	<30000	73	0.412
A1	<30000	-110	-0.621
A1	<30000	188	1.061
A1	<30000	148	0.837
A1	<30000	187	1.051
A1	<30000	-170	-0.956
A1	<30000	-150	-0.841
A1	<30000	-160	-0.897
A1	<30000	39	0.220
A1	<30000	57	0.321
A1	<30000	-260	-1.455
A1	<30000	380	2.123
A1	<30000	-50	-0.279
A1	<30000	280	1.558
A1	<30000	610	3.393
A1	<30000	270	1.502
A1	<30000	-57	-0.319
A1	<30000	-41	-0.229
A1	<30000	580	3.220
A1	<30000	-205	-1.137
A1	<30000	-203	-1.127
A1	<30000	560	3.106
A1	<30000	250	1.387
A1	<30000	-161	-0.892
A1	<30000	200	1.108
A1	<30000	219	1.215
A1	<30000	180	0.996

A1	<30000	600	3.319
A1	<30000	-221	-1.225
A1	<30000	-181	-1.000
A1	<30000	-364	-2.009
A1	<30000	192	1.061
A1	<30000	530	2.920
A1	<30000	640	3.520
A1	<30000	490	2.694
A1	<30000	86	0.472
A1	<30000	380	2.087
A1	<30000	490	2.683
A1	<30000	24	0.130
A1	<30000	-9	-0.050
A1	<30000	550	3.007
A1	<30000	-338	-1.845
A1	<30000	480	2.623
A1	<30000	469	2.564
A1	<30000	-37	-0.200
A1	<30000	340	1.854
A1	<30000	-397	-2.162
A1	<30000	330	1.798
A1	<30000	240	1.308
A1	<30000	-77	-0.418
A1	<30000	370	2.013
A1	<30000	394	2.145
A1	<30000	-121	-0.656
A1	<30000	200	1.088
A1	<30000	270	1.467
A1	<30000	98	0.533
A1	<30000	136	0.735
A1	<30000	210	1.137
A1	<30000	72	0.392
A1	<30000	440	2.381
A1	<30000	115	0.624
A1	<30000	280	1.513
A1	<30000	340	1.838
A1	<30000	-562	-3.035
A1	<30000	70	0.378
A1	<30000	260	1.404
A1	<30000	223	1.204
A1	<30000	120	0.647
A1	<30000	250	1.346
A1	<30000	20	0.110
A1	<30000	10	0.054
A1	<30000	260	1.399
A1	<30000	160	0.861
A1	<30000	180	0.968
A1	<30000	70	0.376
A1	<30000	317	1.698
A1	<30000	-46	-0.249
A1	<30000	10	0.054
A1	<30000	-135	-0.725
A1	<30000	83	0.442
A1	<30000	220	1.176
A1	<30000	90	0.481
A1	<30000	190	1.014

A1	<30000	40	0.213
A1	<30000	700	3.735
A1	<30000	-195	-1.039
A1	<30000	0	0.000
A1	<30000	280	1.493
A1	<30000	50	0.266
A1	<30000	535	2.849
A1	<30000	120	0.638
A1	<30000	146	0.776
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A1	<30000	200	0.685
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A1	>30000	-60	-0.163

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A1	>30000	-300	-0.781
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A1	>30000	-350	-0.842
A1	>30000	-350	-0.841
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A1	>30000	-225	-0.527
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A1	>30000	-302	-0.646
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A1	>30000	103	0.220
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A1	>30000	-650	-1.377
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A1	>30000	-420	-0.882
A1	>30000	-434	-0.912
A1	>30000	268	0.563
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A1	>30000	-482	-1.010
A1	>30000	556	1.163
A1	>30000	-540	-1.131
A1	>30000	-473	-0.990
A1	>30000	1397	2.923
A1	>30000	-412	-0.862
A1	>30000	-398	-0.833
A1	>30000	547	1.143
A1	>30000	352	0.735
A1	>30000	-640	-1.338
A1	>30000	-290	-0.606
A1	>30000	-200	-0.418
A1	>30000	-610	-1.274
A1	>30000	1139	2.375
A1	>30000	-550	-1.147
A1	>30000	553	1.153
A1	>30000	-676	-1.410
A1	>30000	-430	-0.896
A1	>30000	1055	2.197
A1	>30000	130	0.271
A1	>30000	60	0.125
A1	>30000	476	0.990
A1	>30000	-405	-0.843
A1	>30000	-129	-0.269
A1	>30000	80	0.166
A1	>30000	-173	-0.359
A1	>30000	-773	-1.604
A1	>30000	749	1.554
A1	>30000	-712	-1.478
A1	>30000	-40	-0.083
A1	>30000	-278	-0.577
A1	>30000	-839	-1.739
A1	>30000	-160	-0.332
A1	>30000	257	0.533
A1	>30000	450	0.932
A1	>30000	-160	-0.331
A1	>30000	766	1.585
A1	>30000	1265	2.617
A1	>30000	-971	-2.009
A1	>30000	1455	3.008
A1	>30000	150	0.311
A1	>30000	-270	-0.558
A1	>30000	-1014	-2.095

A1	>30000	538	1.112
A1	>30000	668	1.379
A1	>30000	1395	2.881
A1	>30000	-484	-1.000
A1	>30000	270	0.557
A1	>30000	-340	-0.701
A1	>30000	-410	-0.845
A1	>30000	-340	-0.701
A1	>30000	-360	-0.742
A1	>30000	-92	-0.190
A1	>30000	120	0.247
A1	>30000	490	1.006
A1	>30000	-324	-0.666
A1	>30000	428	0.878
A1	>30000	-286	-0.587
A1	>30000	1041	2.135
A1	>30000	162	0.331
A1	>30000	162	0.331
A1	>30000	108	0.220
A1	>30000	-311	-0.636
A1	>30000	275	0.563
A1	>30000	-150	-0.307
A1	>30000	34	0.070
A1	>30000	-580	-1.186
A1	>30000	-447	-0.912
A1	>30000	50	0.102
A1	>30000	-1189	-2.420
A1	>30000	-187	-0.379
A1	>30000	-80	-0.162
A1	>30000	468	0.949
A1	>30000	-441	-0.892
A1	>30000	240	0.486
A1	>30000	-470	-0.951
A1	>30000	-220	-0.445
A1	>30000	384	0.776
A1	>30000	369	0.746
A1	>30000	110	0.222
A1	>30000	-340	-0.686
A1	>30000	259	0.523
A1	>30000	-390	-0.787
A1	>30000	-433	-0.872
A1	>30000	-470	-0.947
A1	>30000	50	0.101
A1	>30000	-540	-1.086
A1	>30000	-160	-0.321
A1	>30000	5	0.010
A1	>30000	-190	-0.381
A1	>30000	-150	-0.301
A1	>30000	-200	-0.401
A1	>30000	-308	-0.616
A1	>30000	-347	-0.695
A1	>30000	-290	-0.580
A1	>30000	-360	-0.720
A1	>30000	-199	-0.398
A1	>30000	-450	-0.899
A1	>30000	-427	-0.853

A1	>30000	-480	-0.959
A1	>30000	-590	-1.176
A1	>30000	-50	-0.099
A1	>30000	-673	-1.332
A1	>30000	-130	-0.257
A1	>30000	-752	-1.488
A1	>30000	-220	-0.435
A1	>30000	-352	-0.695
A1	>30000	-882	-1.739
A1	>30000	-320	-0.631
A1	>30000	-1108	-2.143
A1	>30000	230	0.441
A1	>30000	220	0.422
A1	>30000	-60	-0.114
A1	>30000	-320	-0.607
A1	>30000	590	1.081
A1	>30000	220	0.400
A1	>30000	-130	-0.235
A1	>30000	-330	-0.595
A1	>30000	75	0.130
A1	>30000	-35	-0.060
A1	>30000	-110	-0.190
A1	>30000	-435	-0.744

ATTACHMENT II: Data for Plant A2

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
A2	<30000	-74	-0.715
A2	<30000	-108	-1.039
A2	<30000	-130	-1.254
A2	<30000	-330	-3.110
A2	<30000	-37	-0.299
A2	<30000	-50	-0.408
A2	<30000	-66	-0.537
A2	<30000	-83	-0.675
A2	<30000	-89	-0.725
A2	<30000	-246	-1.980
A2	<30000	-351	-2.799
A2	<30000	-399	-3.176
A2	<30000	-86	-0.675
A2	<30000	-210	-1.643
A2	<30000	-343	-2.657
A2	<30000	-361	-2.790
A2	<30000	61	0.452
A2	<30000	18	0.130
A2	<30000	4	0.030
A2	<30000	4	0.030
A2	<30000	-133	-0.980
A2	<30000	156	1.143
A2	<30000	-192	-1.410
A2	<30000	78	0.573
A2	<30000	117	0.857
A2	<30000	95	0.695
A2	<30000	-125	-0.912
A2	<30000	-134	-0.980
A2	<30000	55	0.402
A2	<30000	-287	-2.086
A2	<30000	-244	-1.768
A2	<30000	120	0.867
A2	<30000	-137	-0.990
A2	<30000	99	0.715
A2	<30000	-462	-3.316
A2	<30000	-3	-0.020
A2	<30000	-42	-0.299
A2	<30000	-55	-0.388
A2	<30000	-316	-2.248
A2	<30000	-312	-2.220
A2	<30000	-345	-2.449
A2	<30000	-370	-2.620
A2	<30000	-120	-0.853
A2	<30000	-190	-1.342
A2	<30000	-189	-1.332
A2	<30000	-444	-3.129
A2	<30000	-467	-3.288
A2	<30000	-888	-6.191
A2	<30000	343	2.333
A2	<30000	289	1.958
A2	<30000	286	1.937
A2	<30000	216	1.461

A2	<30000	-12	-0.080
A2	<30000	-31	-0.210
A2	<30000	-34	-0.229
A2	<30000	-43	-0.289
A2	<30000	-65	-0.438
A2	<30000	128	0.857
A2	<30000	-110	-0.735
A2	<30000	56	0.371
A2	<30000	-166	-1.108
A2	<30000	-74	-0.488
A2	<30000	47	0.311
A2	<30000	-303	-1.999
A2	<30000	-20	-0.130
A2	<30000	308	2.020
A2	<30000	-100	-0.656
A2	<30000	-289	-1.884
A2	<30000	-166	-1.078
A2	<30000	-203	-1.322
A2	<30000	162	1.051
A2	<30000	157	1.020
A2	<30000	159	1.031
A2	<30000	-249	-1.614
A2	<30000	-267	-1.730
A2	<30000	96	0.624
A2	<30000	70	0.452
A2	<30000	-337	-2.172
A2	<30000	-33	-0.210
A2	<30000	-67	-0.428
A2	<30000	-11	-0.070
A2	<30000	-116	-0.735
A2	<30000	96	0.604
A2	<30000	-228	-1.429
A2	<30000	222	1.389
A2	<30000	59	0.371
A2	<30000	24	0.150
A2	<30000	27	0.170
A2	<30000	-359	-2.239
A2	<30000	-361	-2.248
A2	<30000	594	3.702
A2	<30000	71	0.442
A2	<30000	-66	-0.408
A2	<30000	-98	-0.606
A2	<30000	430	2.659
A2	<30000	-69	-0.428
A2	<30000	-157	-0.970
A2	<30000	443	2.733
A2	<30000	-183	-1.127
A2	<30000	-501	-3.082
A2	<30000	-551	-3.391
A2	<30000	408	2.512
A2	<30000	-127	-0.784
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A2	<30000	413	2.533
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A2	<30000	284	1.740

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A2	<30000	263	1.605
A2	<30000	263	1.605
A2	<30000	286	1.740
A2	<30000	182	1.102
A2	<30000	68	0.412
A2	<30000	156	0.939
A2	<30000	458	2.764
A2	<30000	616	3.713
A2	<30000	72	0.432
A2	<30000	450	2.712
A2	<30000	141	0.847
A2	<30000	422	2.543
A2	<30000	422	2.543
A2	<30000	563	3.381
A2	<30000	-8	-0.050
A2	<30000	308	1.843
A2	<30000	394	2.354
A2	<30000	298	1.781
A2	<30000	295	1.760
A2	<30000	446	2.659
A2	<30000	426	2.543
A2	<30000	237	1.410
A2	<30000	230	1.368
A2	<30000	387	2.302
A2	<30000	208	1.235
A2	<30000	291	1.729
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A2	<30000	153	0.908
A2	<30000	155	0.918
A2	<30000	322	1.906
A2	<30000	133	0.786
A2	<30000	389	2.302
A2	<30000	298	1.760
A2	<30000	241	1.420
A2	<30000	-267	-1.575
A2	<30000	70	0.412
A2	<30000	222	1.307
A2	<30000	-306	-1.797
A2	<30000	116	0.685
A2	<30000	101	0.594
A2	<30000	256	1.502
A2	<30000	205	1.204
A2	<30000	237	1.389
A2	<30000	134	0.786
A2	<30000	197	1.153
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A2	<30000	174	1.020
A2	<30000	182	1.061
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A2	<30000	152	0.888
A2	<30000	-17	-0.100
A2	<30000	99	0.573
A2	<30000	564	3.274
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A2	<30000	87	0.503
A2	<30000	129	0.746
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A2	<30000	89	0.513
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A2	<30000	-76	-0.438
A2	<30000	9	0.050
A2	<30000	-5	-0.030
A2	<30000	406	2.333
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A2	<30000	-324	-1.855
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A2	<30000	-490	-2.780
A2	<30000	433	2.449
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A2	<30000	349	1.968
A2	<30000	259	1.451
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A2	<30000	459	2.564
A2	<30000	439	2.449
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A2	<30000	185	1.031
A2	<30000	482	2.690
A2	<30000	647	3.605
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A2	<30000	285	1.574
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A2	<30000	411	2.260
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A2	<30000	536	2.934
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A2	<30000	189	1.020
A2	<30000	123	0.664
A2	<30000	311	1.678
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A2	<30000	7	0.039
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A2	<30000	-154	-0.823

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A2	<30000	-78	-0.418
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A2	<30000	553	2.923
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A2	<30000	377	1.958
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A2	>30000	483	1.133

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A2	>30000	344	0.806
A2	>30000	-601	-1.410
A2	>30000	115	0.271
A2	>30000	77	0.180
A2	>30000	-106	-0.249
A2	>30000	167	0.392
A2	>30000	301	0.705
A2	>30000	81	0.190
A2	>30000	206	0.482
A2	>30000	493	1.153
A2	>30000	94	0.220
A2	>30000	-47	-0.110
A2	>30000	577	1.348
A2	>30000	-81	-0.190
A2	>30000	250	0.583
A2	>30000	1013	2.365
A2	>30000	578	1.348
A2	>30000	359	0.837
A2	>30000	39	0.090
A2	>30000	751	1.750
A2	>30000	311	0.725
A2	>30000	-116	-0.269
A2	>30000	294	0.685
A2	>30000	34	0.080
A2	>30000	82	0.190
A2	>30000	273	0.634
A2	>30000	-47	-0.110
A2	>30000	-9	-0.020
A2	>30000	147	0.341
A2	>30000	-94	-0.220
A2	>30000	-43	-0.100
A2	>30000	321	0.746
A2	>30000	576	1.338
A2	>30000	-82	-0.190
A2	>30000	-65	-0.150
A2	>30000	559	1.297
A2	>30000	-73	-0.170
A2	>30000	462	1.071
A2	>30000	551	1.276
A2	>30000	724	1.678
A2	>30000	-121	-0.279
A2	>30000	-210	-0.488
A2	>30000	511	1.184
A2	>30000	493	1.143
A2	>30000	-176	-0.408
A2	>30000	-30	-0.070
A2	>30000	770	1.781
A2	>30000	-449	-1.039
A2	>30000	432	1.000
A2	>30000	770	1.781
A2	>30000	-78	-0.180
A2	>30000	165	0.381
A2	>30000	-39	-0.090
A2	>30000	-39	-0.090
A2	>30000	-22	-0.050

A2	>30000	-369	-0.853
A2	>30000	200	0.462
A2	>30000	-829	-1.913
A2	>30000	-331	-0.764
A2	>30000	-284	-0.656
A2	>30000	161	0.371
A2	>30000	315	0.725
A2	>30000	616	1.420
A2	>30000	1039	2.396
A2	>30000	284	0.654
A2	>30000	-164	-0.379
A2	>30000	-216	-0.498
A2	>30000	-139	-0.319
A2	>30000	-323	-0.744
A2	>30000	-434	-1.000
A2	>30000	-263	-0.606
A2	>30000	135	0.311
A2	>30000	-48	-0.110
A2	>30000	964	2.218
A2	>30000	100	0.231
A2	>30000	1447	3.327
A2	>30000	-452	-1.039
A2	>30000	591	1.358
A2	>30000	333	0.766
A2	>30000	884	2.030
A2	>30000	-829	-1.903
A2	>30000	-148	-0.339
A2	>30000	-182	-0.418
A2	>30000	259	0.594
A2	>30000	-428	-0.980
A2	>30000	246	0.563
A2	>30000	250	0.573
A2	>30000	-615	-1.410
A2	>30000	-683	-1.565
A2	>30000	-221	-0.507
A2	>30000	26	0.060
A2	>30000	508	1.163
A2	>30000	928	2.124
A2	>30000	330	0.756
A2	>30000	189	0.432
A2	>30000	1310	2.997
A2	>30000	-441	-1.010
A2	>30000	-689	-1.575
A2	>30000	251	0.573
A2	>30000	-369	-0.843
A2	>30000	-304	-0.695
A2	>30000	-1039	-2.372
A2	>30000	-374	-0.853
A2	>30000	-114	-0.259
A2	>30000	569	1.297
A2	>30000	1078	2.459
A2	>30000	-576	-1.313
A2	>30000	-83	-0.190
A2	>30000	-210	-0.478
A2	>30000	-400	-0.912
A2	>30000	1339	3.050

A2	>30000	114	0.261
A2	>30000	-593	-1.351
A2	>30000	-546	-1.244
A2	>30000	110	0.251
A2	>30000	-640	-1.458
A2	>30000	-666	-1.517
A2	>30000	-692	-1.575
A2	>30000	520	1.184
A2	>30000	-530	-1.205
A2	>30000	-538	-1.225
A2	>30000	669	1.523
A2	>30000	1243	2.828
A2	>30000	1035	2.354
A2	>30000	979	2.229
A2	>30000	1243	2.828
A2	>30000	774	1.760
A2	>30000	462	1.051
A2	>30000	9	0.020
A2	>30000	1184	2.690
A2	>30000	0	0.000
A2	>30000	-753	-1.710
A2	>30000	-328	-0.744
A2	>30000	-197	-0.448
A2	>30000	-75	-0.170
A2	>30000	490	1.112
A2	>30000	342	0.776
A2	>30000	-445	-1.010
A2	>30000	324	0.735
A2	>30000	-818	-1.855
A2	>30000	-110	-0.249
A2	>30000	-553	-1.254
A2	>30000	782	1.771
A2	>30000	777	1.760
A2	>30000	442	1.000
A2	>30000	883	1.999
A2	>30000	-502	-1.137
A2	>30000	746	1.688
A2	>30000	-325	-0.735
A2	>30000	397	0.898
A2	>30000	-529	-1.196
A2	>30000	-953	-2.153
A2	>30000	-251	-0.567
A2	>30000	299	0.675
A2	>30000	973	2.197
A2	>30000	-919	-2.076
A2	>30000	775	1.750
A2	>30000	178	0.402
A2	>30000	-421	-0.951
A2	>30000	281	0.634
A2	>30000	191	0.432
A2	>30000	285	0.644
A2	>30000	-642	-1.449
A2	>30000	290	0.654
A2	>30000	-251	-0.567
A2	>30000	192	0.432
A2	>30000	174	0.392

A2	>30000	548	1.235
A2	>30000	-142	-0.319
A2	>30000	626	1.410
A2	>30000	-725	-1.633
A2	>30000	210	0.472
A2	>30000	156	0.351
A2	>30000	654	1.471
A2	>30000	18	0.040
A2	>30000	223	0.503
A2	>30000	-453	-1.019
A2	>30000	599	1.348
A2	>30000	309	0.695
A2	>30000	192	0.432
A2	>30000	-234	-0.527
A2	>30000	-1182	-2.657
A2	>30000	58	0.130
A2	>30000	-1153	-2.591
A2	>30000	-1442	-3.241
A2	>30000	80	0.180
A2	>30000	94	0.210
A2	>30000	623	1.399
A2	>30000	377	0.847
A2	>30000	359	0.806
A2	>30000	31	0.070
A2	>30000	346	0.776
A2	>30000	-18	-0.040
A2	>30000	-151	-0.339
A2	>30000	152	0.341
A2	>30000	323	0.725
A2	>30000	-1249	-2.799
A2	>30000	301	0.675
A2	>30000	-49	-0.110
A2	>30000	-71	-0.160
A2	>30000	-147	-0.329
A2	>30000	-4	-0.010
A2	>30000	-102	-0.229
A2	>30000	383	0.857
A2	>30000	722	1.616
A2	>30000	234	0.523
A2	>30000	557	1.245
A2	>30000	-227	-0.507
A2	>30000	420	0.939
A2	>30000	-169	-0.379
A2	>30000	-1168	-2.610
A2	>30000	257	0.573
A2	>30000	225	0.503
A2	>30000	-227	-0.507
A2	>30000	298	0.664
A2	>30000	45	0.100
A2	>30000	185	0.412
A2	>30000	486	1.082
A2	>30000	463	1.031
A2	>30000	-804	-1.787
A2	>30000	190	0.422
A2	>30000	-375	-0.833
A2	>30000	514	1.143

A2	>30000	395	0.878
A2	>30000	-5	-0.010
A2	>30000	-277	-0.616
A2	>30000	90	0.200
A2	>30000	886	1.968
A2	>30000	-513	-1.137
A2	>30000	277	0.614
A2	>30000	-941	-2.086
A2	>30000	-451	-1.000
A2	>30000	-535	-1.186
A2	>30000	109	0.241
A2	>30000	-144	-0.319
A2	>30000	-624	-1.381
A2	>30000	-36	-0.080
A2	>30000	-279	-0.616
A2	>30000	-54	-0.120
A2	>30000	-59	-0.130
A2	>30000	291	0.644
A2	>30000	-68	-0.150
A2	>30000	-686	-1.517
A2	>30000	-647	-1.429
A2	>30000	990	2.187
A2	>30000	638	1.410
A2	>30000	-805	-1.778
A2	>30000	-243	-0.537
A2	>30000	-131	-0.289
A2	>30000	873	1.926
A2	>30000	-329	-0.725
A2	>30000	27	0.060
A2	>30000	-440	-0.970
A2	>30000	-203	-0.448
A2	>30000	804	1.771
A2	>30000	450	0.990
A2	>30000	404	0.888
A2	>30000	-36	-0.080
A2	>30000	-1007	-2.210
A2	>30000	-227	-0.498
A2	>30000	-232	-0.508
A2	>30000	-118	-0.259
A2	>30000	-159	-0.349
A2	>30000	578	1.266
A2	>30000	-684	-1.497
A2	>30000	-37	-0.080
A2	>30000	-1147	-2.506
A2	>30000	490	1.071
A2	>30000	-250	-0.547
A2	>30000	796	1.740
A2	>30000	-250	-0.547
A2	>30000	1088	2.375
A2	>30000	543	1.184
A2	>30000	384	0.837
A2	>30000	361	0.786
A2	>30000	955	2.082
A2	>30000	-1302	-2.837
A2	>30000	473	1.031
A2	>30000	-905	-1.970

A2	>30000	-1343	-2.922
A2	>30000	1198	2.606
A2	>30000	648	1.410
A2	>30000	352	0.766
A2	>30000	-551	-1.196
A2	>30000	-220	-0.478
A2	>30000	-238	-0.517
A2	>30000	134	0.291
A2	>30000	745	1.616
A2	>30000	213	0.462
A2	>30000	46	0.100
A2	>30000	251	0.543
A2	>30000	171	0.371
A2	>30000	79	0.170
A2	>30000	-398	-0.862
A2	>30000	415	0.898
A2	>30000	0	0.000
A2	>30000	107	0.231
A2	>30000	60	0.130
A2	>30000	576	1.245
A2	>30000	-463	-1.000
A2	>30000	350	0.756
A2	>30000	-32	-0.070
A2	>30000	515	1.112
A2	>30000	37	0.080
A2	>30000	-56	-0.120
A2	>30000	-28	-0.060
A2	>30000	-14	-0.030
A2	>30000	-28	-0.060
A2	>30000	299	0.644
A2	>30000	408	0.878
A2	>30000	919	1.978
A2	>30000	-111	-0.239
A2	>30000	-135	-0.289
A2	>30000	187	0.402
A2	>30000	-107	-0.229
A2	>30000	290	0.624
A2	>30000	-246	-0.527
A2	>30000	145	0.311
A2	>30000	-112	-0.239
A2	>30000	-407	-0.872
A2	>30000	-287	-0.616
A2	>30000	-283	-0.606
A2	>30000	-402	-0.862
A2	>30000	-269	-0.577
A2	>30000	-310	-0.666
A2	>30000	-260	-0.557
A2	>30000	386	0.827
A2	>30000	-347	-0.744
A2	>30000	178	0.381
A2	>30000	-205	-0.438
A2	>30000	174	0.371
A2	>30000	-302	-0.646
A2	>30000	-371	-0.794
A2	>30000	160	0.341
A2	>30000	568	1.215

A2	>30000	-445	-0.951
A2	>30000	-482	-1.029
A2	>30000	-500	-1.068
A2	>30000	-112	-0.239
A2	>30000	550	1.174
A2	>30000	714	1.523
A2	>30000	488	1.041
A2	>30000	-432	-0.921
A2	>30000	179	0.381
A2	>30000	-579	-1.235
A2	>30000	589	1.256
A2	>30000	412	0.878
A2	>30000	-23	-0.050
A2	>30000	-598	-1.274
A2	>30000	-552	-1.176
A2	>30000	-52	-0.110
A2	>30000	-571	-1.215
A2	>30000	576	1.225
A2	>30000	-117	-0.249
A2	>30000	663	1.410
A2	>30000	1340	2.849
A2	>30000	1340	2.849
A2	>30000	-718	-1.526
A2	>30000	189	0.402
A2	>30000	-701	-1.488
A2	>30000	170	0.361
A2	>30000	486	1.031
A2	>30000	161	0.341
A2	>30000	-766	-1.623
A2	>30000	-752	-1.594
A2	>30000	80	0.170
A2	>30000	709	1.502
A2	>30000	-853	-1.807
A2	>30000	76	0.160
A2	>30000	400	0.847
A2	>30000	-880	-1.865
A2	>30000	666	1.410
A2	>30000	114	0.241
A2	>30000	304	0.644
A2	>30000	-230	-0.488
A2	>30000	95	0.200
A2	>30000	642	1.358
A2	>30000	295	0.624
A2	>30000	-831	-1.759
A2	>30000	-882	-1.865
A2	>30000	57	0.120
A2	>30000	1054	2.229
A2	>30000	-436	-0.921
A2	>30000	47	0.100
A2	>30000	252	0.533
A2	>30000	-746	-1.575
A2	>30000	982	2.072
A2	>30000	119	0.251
A2	>30000	-43	-0.090
A2	>30000	195	0.412
A2	>30000	-400	-0.843

A2	>30000	-916	-1.932
A2	>30000	-1012	-2.133
A2	>30000	109	0.231
A2	>30000	-189	-0.398
A2	>30000	-236	-0.498
A2	>30000	-241	-0.507
A2	>30000	-222	-0.468
A2	>30000	-434	-0.912
A2	>30000	-745	-1.565
A2	>30000	-350	-0.735
A2	>30000	48	0.100
A2	>30000	-29	-0.060
A2	>30000	-783	-1.643
A2	>30000	-280	-0.587
A2	>30000	-138	-0.289
A2	>30000	-190	-0.398
A2	>30000	201	0.422
A2	>30000	648	1.358
A2	>30000	-1204	-2.525
A2	>30000	-223	-0.468
A2	>30000	-468	-0.980
A2	>30000	542	1.133
A2	>30000	-460	-0.961
A2	>30000	-563	-1.176
A2	>30000	-172	-0.359
A2	>30000	-889	-1.855
A2	>30000	-399	-0.833
A2	>30000	-215	-0.448
A2	>30000	-1039	-2.162
A2	>30000	-244	-0.507
A2	>30000	-263	-0.547
A2	>30000	-192	-0.398
A2	>30000	-391	-0.813
A2	>30000	-306	-0.636
A2	>30000	-344	-0.715
A2	>30000	-397	-0.823
A2	>30000	-449	-0.931
A2	>30000	-168	-0.349
A2	>30000	-121	-0.249
A2	>30000	155	0.321
A2	>30000	-53	-0.110
A2	>30000	-198	-0.408
A2	>30000	-391	-0.803
A2	>30000	-420	-0.862
A2	>30000	-150	-0.309
A2	>30000	-497	-1.019
A2	>30000	364	0.746
A2	>30000	235	0.482
A2	>30000	275	0.563
A2	>30000	118	0.241
A2	>30000	-74	-0.150
A2	>30000	-709	-1.439
A2	>30000	-403	-0.813
A2	>30000	-526	-1.059
A2	>30000	-830	-1.662
A2	>30000	-850	-1.701

A2	>30000	1195	2.386
A2	>30000	831	1.647
A2	>30000	815	1.616
A2	>30000	472	0.929
A2	>30000	-97	-0.190
A2	>30000	-287	-0.557
A2	>30000	-569	-1.098
A2	>30000	-754	-1.449
A2	>30000	170	0.321

ATTACHMENT III: Data for Plant B1

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
B1	<30000	334	3.261
B1	<30000	247	2.386
B1	<30000	110	1.010
B1	<30000	-98	-0.896
B1	<30000	189	1.694
B1	<30000	477	4.083
B1	<30000	-107	-0.900
B1	<30000	394	3.298
B1	<30000	-134	-1.106
B1	<30000	489	4.029
B1	<30000	-261	-2.130
B1	<30000	186	1.499
B1	<30000	-103	-0.822
B1	<30000	325	2.586
B1	<30000	417	3.231
B1	<30000	20	0.154
B1	<30000	-398	-3.064
B1	<30000	323	2.446
B1	<30000	378	2.860
B1	<30000	-157	-1.176
B1	<30000	-25	-0.186
B1	<30000	122	0.902
B1	<30000	367	2.708
B1	<30000	-122	-0.896
B1	<30000	194	1.423
B1	<30000	-483	-3.503
B1	<30000	319	2.249
B1	<30000	-183	-1.279
B1	<30000	50	0.348
B1	<30000	492	3.388
B1	<30000	423	2.904
B1	<30000	282	1.892
B1	<30000	-701	-4.641
B1	<30000	-55	-0.361
B1	<30000	-685	-4.420
B1	<30000	-61	-0.393
B1	<30000	-257	-1.653
B1	<30000	-374	-2.402
B1	<30000	109	0.699
B1	<30000	43	0.275
B1	<30000	-51	-0.326
B1	<30000	-211	-1.346
B1	<30000	-466	-2.970
B1	<30000	57	0.361
B1	<30000	180	1.137
B1	<30000	-145	-0.914
B1	<30000	76	0.477

B1	<30000	-137	-0.858
B1	<30000	-284	-1.778
B1	<30000	-357	-2.225
B1	<30000	-165	-1.021
B1	<30000	-397	-2.444
B1	<30000	-168	-1.031
B1	<30000	-175	-1.072
B1	<30000	-300	-1.827
B1	<30000	-58	-0.351
B1	<30000	202	1.222
B1	<30000	-9	-0.054
B1	<30000	352	2.113
B1	<30000	-369	-2.214
B1	<30000	-460	-2.755
B1	<30000	-64	-0.383
B1	<30000	518	3.089
B1	<30000	-301	-1.794
B1	<30000	-243	-1.446
B1	<30000	-110	-0.653
B1	<30000	-92	-0.545
B1	<30000	-7	-0.041
B1	<30000	454	2.672
B1	<30000	-180	-1.059
B1	<30000	81	0.477
B1	<30000	-216	-1.267
B1	<30000	-559	-3.276
B1	<30000	332	1.941
B1	<30000	-656	-3.836
B1	<30000	479	2.776
B1	<30000	-105	-0.605
B1	<30000	565	3.250
B1	<30000	167	0.959
B1	<30000	-415	-2.384
B1	<30000	-314	-1.796
B1	<30000	-471	-2.689
B1	<30000	-355	-2.027
B1	<30000	674	3.825
B1	<30000	-147	-0.833
B1	<30000	166	0.938
B1	<30000	-16	-0.090
B1	<30000	-399	-2.237
B1	<30000	-420	-2.350
B1	<30000	-461	-2.573
B1	<30000	43	0.240
B1	<30000	282	1.572
B1	<30000	-573	-3.162
B1	<30000	-348	-1.921
B1	<30000	-273	-1.502
B1	<30000	-237	-1.301
B1	<30000	-613	-3.359
B1	<30000	-395	-2.163

B1	<30000	-158	-0.863
B1	<30000	704	3.826
B1	<30000	-335	-1.813
B1	<30000	-522	-2.817
B1	<30000	-208	-1.119
B1	<30000	-450	-2.399
B1	<30000	206	1.095
B1	<30000	-143	-0.760
B1	<30000	-442	-2.345
B1	<30000	-467	-2.476
B1	<30000	-646	-3.410
B1	<30000	370	1.933
B1	<30000	100	0.520
B1	<30000	236	1.223
B1	<30000	-183	-0.944
B1	<30000	-609	-3.140
B1	<30000	182	0.936
B1	<30000	-956	-4.911
B1	<30000	165	0.842
B1	<30000	-117	-0.597
B1	<30000	282	1.440
B1	<30000	51	0.260
B1	<30000	51	0.259
B1	<30000	32	0.162
B1	<30000	62	0.313
B1	<30000	1	0.005
B1	<30000	-133	-0.668
B1	<30000	157	0.789
B1	<30000	55	0.276
B1	<30000	-142	-0.711
B1	<30000	-939	-4.689
B1	<30000	-132	-0.659
B1	<30000	-578	-2.882
B1	<30000	230	1.139
B1	<30000	175	0.866
B1	<30000	87	0.429
B1	<30000	-289	-1.426
B1	<30000	359	1.770
B1	<30000	39	0.191
B1	<30000	-319	-1.564
B1	<30000	381	1.860
B1	<30000	-122	-0.594
B1	<30000	-167	-0.809
B1	<30000	318	1.537
B1	<30000	168	0.811
B1	<30000	354	1.709
B1	<30000	162	0.782
B1	<30000	69	0.332
B1	<30000	181	0.869
B1	<30000	-71	-0.339
B1	<30000	117	0.557

B1	<30000	359	1.705
B1	<30000	364	1.723
B1	<30000	-179	-0.847
B1	<30000	241	1.125
B1	<30000	152	0.709
B1	<30000	-169	-0.786
B1	<30000	402	1.868
B1	<30000	-492	-2.277
B1	<30000	-550	-2.502
B1	<30000	-459	-2.085
B1	<30000	-327	-1.483
B1	<30000	-268	-1.209
B1	<30000	-242	-1.091
B1	<30000	224	1.009
B1	<30000	-644	-2.898
B1	<30000	370	1.660
B1	<30000	346	1.551
B1	<30000	-39	-0.175
B1	<30000	-295	-1.315
B1	<30000	-93	-0.414
B1	<30000	270	1.201
B1	<30000	201	0.894
B1	<30000	-541	-2.367
B1	<30000	-557	-2.436
B1	<30000	128	0.559
B1	<30000	-201	-0.869
B1	<30000	512	2.211
B1	<30000	567	2.443
B1	<30000	94	0.402
B1	<30000	-77	-0.325
B1	<30000	-300	-1.261
B1	<30000	-396	-1.658
B1	<30000	620	2.593
B1	<30000	-149	-0.617
B1	<30000	-232	-0.957
B1	<30000	-845	-3.483
B1	<30000	-781	-3.214
B1	<30000	-278	-1.141
B1	<30000	-381	-1.562
B1	<30000	80	0.327
B1	<30000	-360	-1.461
B1	<30000	646	2.619
B1	<30000	712	2.849
B1	<30000	272	1.085
B1	<30000	584	2.323
B1	<30000	1098	4.352
B1	<30000	-398	-1.574
B1	<30000	118	0.461
B1	<30000	711	2.773
B1	<30000	390	1.513
B1	<30000	-544	-2.100

B1	<30000	-355	-1.367
B1	<30000	9	0.034
B1	<30000	-654	-2.491
B1	<30000	-522	-1.976
B1	<30000	59	0.223
B1	<30000	-512	-1.932
B1	<30000	112	0.422
B1	<30000	-2	-0.008
B1	<30000	-89	-0.333
B1	<30000	-342	-1.263
B1	<30000	308	1.134
B1	<30000	806	2.941
B1	<30000	367	1.330
B1	<30000	-255	-0.923
B1	<30000	-851	-3.077
B1	<30000	-33	-0.119
B1	<30000	-574	-2.067
B1	<30000	-1006	-3.588
B1	<30000	234	0.833
B1	<30000	-253	-0.899
B1	<30000	-498	-1.760
B1	<30000	-661	-2.335
B1	<30000	462	1.621
B1	<30000	92	0.323
B1	<30000	422	1.474
B1	<30000	330	1.149
B1	<30000	-729	-2.528
B1	<30000	100	0.345
B1	<30000	-30	-0.103
B1	<30000	946	3.227
B1	<30000	-371	-1.262
B1	<30000	86	0.291
B1	<30000	-261	-0.880
B1	<30000	131	0.440
B1	<30000	335	1.120
B1	<30000	523	1.748
B1	<30000	-215	-0.717
B1	>30000	-738	-2.453
B1	>30000	-138	-0.456
B1	>30000	487	1.598
B1	>30000	463	1.509
B1	>30000	-624	-2.030
B1	>30000	491	1.597
B1	>30000	92	0.299
B1	>30000	-706	-2.289
B1	>30000	-197	-0.639
B1	>30000	-331	-1.072
B1	>30000	451	1.459
B1	>30000	186	0.599
B1	>30000	160	0.513
B1	>30000	691	2.210

B1	>30000	-78	-0.249
B1	>30000	74	0.237
B1	>30000	118	0.374
B1	>30000	-264	-0.837
B1	>30000	893	2.827
B1	>30000	86	0.272
B1	>30000	153	0.484
B1	>30000	121	0.383
B1	>30000	319	1.008
B1	>30000	1006	3.177
B1	>30000	473	1.492
B1	>30000	798	2.512
B1	>30000	-297	-0.932
B1	>30000	365	1.143
B1	>30000	671	2.100
B1	>30000	-83	-0.259
B1	>30000	61	0.190
B1	>30000	376	1.167
B1	>30000	159	0.493
B1	>30000	341	1.057
B1	>30000	-401	-1.241
B1	>30000	62	0.192
B1	>30000	-533	-1.648
B1	>30000	100	0.309
B1	>30000	816	2.506
B1	>30000	395	1.212
B1	>30000	-119	-0.364
B1	>30000	1016	3.109
B1	>30000	158	0.483
B1	>30000	405	1.236
B1	>30000	-890	-2.710
B1	>30000	-157	-0.475
B1	>30000	-136	-0.411
B1	>30000	-636	-1.923
B1	>30000	-161	-0.485
B1	>30000	-70	-0.211
B1	>30000	-266	-0.799
B1	>30000	414	1.239
B1	>30000	-585	-1.750
B1	>30000	-354	-1.058
B1	>30000	39	0.116
B1	>30000	-37	-0.110
B1	>30000	88	0.262
B1	>30000	322	0.958
B1	>30000	-582	-1.721
B1	>30000	139	0.410
B1	>30000	-677	-1.993
B1	>30000	473	1.386
B1	>30000	-36	-0.105
B1	>30000	334	0.970
B1	>30000	163	0.471

B1	>30000	-165	-0.477
B1	>30000	-8	-0.023
B1	>30000	-27	-0.078
B1	>30000	-21	-0.060
B1	>30000	318	0.911
B1	>30000	447	1.276
B1	>30000	169	0.482
B1	>30000	58	0.165
B1	>30000	33	0.094
B1	>30000	0	0.000
B1	>30000	900	2.560
B1	>30000	-32	-0.091
B1	>30000	413	1.170
B1	>30000	-443	-1.254
B1	>30000	320	0.903
B1	>30000	-777	-2.191
B1	>30000	221	0.623
B1	>30000	-147	-0.414
B1	>30000	273	0.767
B1	>30000	49	0.137
B1	>30000	167	0.468
B1	>30000	190	0.531
B1	>30000	-4	-0.011
B1	>30000	529	1.469
B1	>30000	239	0.663
B1	>30000	-256	-0.710
B1	>30000	-604	-1.674
B1	>30000	442	1.223
B1	>30000	318	0.878
B1	>30000	-205	-0.564
B1	>30000	376	1.033
B1	>30000	-343	-0.942
B1	>30000	-425	-1.163
B1	>30000	-394	-1.078
B1	>30000	297	0.813
B1	>30000	-38	-0.104
B1	>30000	64	0.174
B1	>30000	-25	-0.068
B1	>30000	-279	-0.755
B1	>30000	-767	-2.071
B1	>30000	91	0.246
B1	>30000	126	0.340
B1	>30000	-897	-2.420
B1	>30000	-23	-0.062
B1	>30000	279	0.748
B1	>30000	-8	-0.021
B1	>30000	280	0.744
B1	>30000	793	2.105
B1	>30000	344	0.908
B1	>30000	367	0.966
B1	>30000	487	1.277

B1	>30000	255	0.668
B1	>30000	-4	-0.010
B1	>30000	393	1.026
B1	>30000	-6	-0.016
B1	>30000	-351	-0.913
B1	>30000	554	1.438
B1	>30000	-172	-0.443
B1	>30000	234	0.603
B1	>30000	269	0.692
B1	>30000	-178	-0.458
B1	>30000	41	0.105
B1	>30000	-258	-0.660
B1	>30000	148	0.377
B1	>30000	470	1.187
B1	>30000	413	1.043
B1	>30000	-494	-1.239
B1	>30000	-460	-1.151
B1	>30000	535	1.338
B1	>30000	116	0.290
B1	>30000	92	0.230
B1	>30000	-423	-1.055
B1	>30000	164	0.409
B1	>30000	960	2.388
B1	>30000	61	0.152
B1	>30000	-908	-2.255
B1	>30000	-273	-0.675
B1	>30000	-42	-0.104
B1	>30000	-426	-1.048
B1	>30000	169	0.413
B1	>30000	-199	-0.483
B1	>30000	-21	-0.051
B1	>30000	-453	-1.092
B1	>30000	-63	-0.151
B1	>30000	-20	-0.048
B1	>30000	378	0.901
B1	>30000	-62	-0.147
B1	>30000	181	0.429
B1	>30000	-138	-0.325
B1	>30000	260	0.607
B1	>30000	330	0.769
B1	>30000	469	1.088
B1	>30000	220	0.509
B1	>30000	-417	-0.964
B1	>30000	-240	-0.555
B1	>30000	-805	-1.860
B1	>30000	-72	-0.166
B1	>30000	228	0.524
B1	>30000	231	0.526
B1	>30000	223	0.506
B1	>30000	-717	-1.617
B1	>30000	40	0.090

B1	>30000	-828	-1.863
B1	>30000	-560	-1.260
B1	>30000	-67	-0.150
B1	>30000	-301	-0.671
B1	>30000	268	0.596
B1	>30000	-615	-1.355
B1	>30000	-292	-0.643
B1	>30000	-72	-0.158
B1	>30000	-829	-1.796
B1	>30000	189	0.407
B1	>30000	-781	-1.680
B1	>30000	-388	-0.831
B1	>30000	-143	-0.306
B1	>30000	-319	-0.681
B1	>30000	292	0.622
B1	>30000	70	0.149
B1	>30000	-298	-0.626
B1	>30000	19	0.039
B1	>30000	-219	-0.455
B1	>30000	-1048	-2.140
B1	>30000	-151	-0.308
B1	>30000	83	0.168
B1	>30000	1075	2.175
B1	>30000	-230	-0.453
B1	>30000	-53	-0.104
B1	>30000	-359	-0.701
B1	>30000	-828	-1.617
B1	>30000	-21	-0.041
B1	>30000	-315	-0.606
B1	>30000	583	1.118
B1	>30000	69	0.130
B1	>30000	-813	-1.418

ATTACHMENT IV: Data for Plant B2

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
B2	<30000	-155	-1.522
B2	<30000	-491	-4.817
B2	<30000	-382	-3.726
B2	<30000	500	4.854
B2	<30000	97	0.931
B2	<30000	66	0.628
B2	<30000	-164	-1.540
B2	<30000	108	0.994
B2	<30000	-359	-3.295
B2	<30000	259	2.319
B2	<30000	76	0.653
B2	<30000	-289	-2.432
B2	<30000	-126	-1.057
B2	<30000	420	3.492
B2	<30000	-264	-2.183
B2	<30000	506	4.175
B2	<30000	482	3.947
B2	<30000	283	2.267
B2	<30000	50	0.397
B2	<30000	121	0.955
B2	<30000	610	4.781
B2	<30000	302	2.363
B2	<30000	-42	-0.329
B2	<30000	-89	-0.694
B2	<30000	-217	-1.663
B2	<30000	143	1.094
B2	<30000	-253	-1.872
B2	<30000	-198	-1.452
B2	<30000	-232	-1.692
B2	<30000	37	0.263
B2	<30000	183	1.291
B2	<30000	-464	-3.272
B2	<30000	-178	-1.250
B2	<30000	500	3.497
B2	<30000	72	0.498
B2	<30000	104	0.717
B2	<30000	-345	-2.378
B2	<30000	-322	-2.209
B2	<30000	-183	-1.249
B2	<30000	500	3.401
B2	<30000	700	4.762
B2	<30000	-342	-2.320
B2	<30000	200	1.342
B2	<30000	737	4.925
B2	<30000	-58	-0.384
B2	<30000	600	3.947
B2	<30000	-113	-0.740

B2	<30000	332	2.154
B2	<30000	-22	-0.142
B2	<30000	-258	-1.659
B2	<30000	472	2.944
B2	<30000	-443	-2.754
B2	<30000	-281	-1.744
B2	<30000	-616	-3.789
B2	<30000	800	4.908
B2	<30000	-88	-0.538
B2	<30000	139	0.848
B2	<30000	-758	-4.587
B2	<30000	-94	-0.568
B2	<30000	-546	-3.286
B2	<30000	86	0.516
B2	<30000	-394	-2.348
B2	<30000	-63	-0.373
B2	<30000	-470	-2.766
B2	<30000	408	2.357
B2	<30000	-797	-4.596
B2	<30000	253	1.457
B2	<30000	-20	-0.115
B2	<30000	586	3.318
B2	<30000	-627	-3.530
B2	<30000	-667	-3.745
B2	<30000	-293	-1.645
B2	<30000	-165	-0.926
B2	<30000	-678	-3.771
B2	<30000	-333	-1.845
B2	<30000	-335	-1.853
B2	<30000	-316	-1.741
B2	<30000	-104	-0.564
B2	<30000	687	3.692
B2	<30000	-328	-1.739
B2	<30000	223	1.180
B2	<30000	317	1.677
B2	<30000	-724	-3.761
B2	<30000	-193	-1.002
B2	<30000	-313	-1.615
B2	<30000	-566	-2.903
B2	<30000	178	0.913
B2	<30000	24	0.122
B2	<30000	-280	-1.420
B2	<30000	-700	-3.530
B2	<30000	-409	-2.058
B2	<30000	-799	-4.011
B2	<30000	-417	-2.091
B2	<30000	-604	-3.017
B2	<30000	-708	-3.534
B2	<30000	-568	-2.827
B2	<30000	-629	-3.129
B2	<30000	-410	-2.039

B2	<30000	-99	-0.484
B2	<30000	523	2.531
B2	<30000	-431	-2.083
B2	<30000	824	3.974
B2	<30000	-385	-1.839
B2	<30000	-663	-3.151
B2	<30000	-205	-0.974
B2	<30000	-809	-3.812
B2	<30000	360	1.687
B2	<30000	50	0.234
B2	<30000	489	2.282
B2	<30000	405	1.890
B2	<30000	443	2.049
B2	<30000	-456	-2.101
B2	<30000	-226	-1.028
B2	<30000	683	3.106
B2	<30000	137	0.617
B2	<30000	-83	-0.373
B2	<30000	-100	-0.448
B2	<30000	190	0.849
B2	<30000	-581	-2.594
B2	<30000	-774	-3.449
B2	<30000	54	0.239
B2	<30000	-900	-3.930
B2	<30000	243	1.060
B2	<30000	-623	-2.691
B2	<30000	-1026	-4.423
B2	<30000	-245	-1.043
B2	<30000	290	1.235
B2	<30000	429	1.819
B2	<30000	0	0.000
B2	<30000	100	0.422
B2	<30000	-105	-0.443
B2	<30000	165	0.693
B2	<30000	192	0.805
B2	<30000	-1133	-4.722
B2	<30000	127	0.525
B2	<30000	-1164	-4.810
B2	<30000	318	1.311
B2	<30000	310	1.278
B2	<30000	-318	-1.302
B2	<30000	-800	-3.265
B2	<30000	-743	-3.020
B2	<30000	-412	-1.670
B2	<30000	174	0.696
B2	<30000	-250	-0.997
B2	<30000	248	0.984
B2	<30000	-137	-0.542
B2	<30000	-911	-3.580
B2	<30000	474	1.858
B2	<30000	-510	-1.972

B2	<30000	-552	-2.124
B2	<30000	100	0.383
B2	<30000	260	0.994
B2	<30000	0	0.000
B2	<30000	800	3.053
B2	<30000	509	1.940
B2	<30000	-273	-1.031
B2	<30000	633	2.385
B2	<30000	138	0.520
B2	<30000	11	0.041
B2	<30000	-972	-3.644
B2	<30000	-260	-0.969
B2	<30000	291	1.083
B2	<30000	-400	-1.479
B2	<30000	-121	-0.447
B2	<30000	711	2.617
B2	<30000	506	1.862
B2	<30000	135	0.496
B2	<30000	-714	-2.621
B2	<30000	100	0.365
B2	<30000	228	0.828
B2	<30000	-500	-1.812
B2	<30000	-33	-0.119
B2	<30000	90	0.323
B2	<30000	921	3.307
B2	<30000	-237	-0.850
B2	<30000	-1200	-4.301
B2	<30000	-538	-1.925
B2	<30000	-131	-0.468
B2	<30000	300	1.071
B2	<30000	646	2.302
B2	<30000	604	2.114
B2	<30000	-93	-0.325
B2	<30000	422	1.470
B2	<30000	38	0.132
B2	<30000	-721	-2.484
B2	<30000	419	1.441
B2	<30000	305	1.045
B2	<30000	-191	-0.654
B2	<30000	-310	-1.058
B2	<30000	-1381	-4.685
B2	<30000	200	0.676
B2	<30000	-121	-0.408
B2	<30000	132	0.441
B2	<30000	332	1.108
B2	>30000	-439	-1.459
B2	>30000	695	2.304
B2	>30000	-86	-0.285
B2	>30000	-824	-2.723
B2	>30000	-266	-0.874
B2	>30000	374	1.226

B2	>30000	331	1.077
B2	>30000	200	0.649
B2	>30000	-702	-2.263
B2	>30000	-203	-0.652
B2	>30000	-854	-2.731
B2	>30000	-86	-0.274
B2	>30000	899	2.858
B2	>30000	142	0.448
B2	>30000	775	2.418
B2	>30000	361	1.123
B2	>30000	-746	-2.311
B2	>30000	-57	-0.176
B2	>30000	140	0.431
B2	>30000	449	1.371
B2	>30000	-419	-1.265
B2	>30000	-371	-1.115
B2	>30000	-576	-1.725
B2	>30000	-186	-0.556
B2	>30000	1179	3.487
B2	>30000	-95	-0.281
B2	>30000	1189	3.493
B2	>30000	-332	-0.975
B2	>30000	312	0.915
B2	>30000	-510	-1.489
B2	>30000	-5	-0.015
B2	>30000	183	0.530
B2	>30000	50	0.145
B2	>30000	317	0.906
B2	>30000	341	0.965
B2	>30000	268	0.749
B2	>30000	540	1.464
B2	>30000	843	2.282
B2	>30000	944	2.551
B2	>30000	594	1.595
B2	>30000	-726	-1.939
B2	>30000	-747	-1.983
B2	>30000	-85	-0.224
B2	>30000	221	0.580
B2	>30000	-39	-0.102
B2	>30000	22	0.057
B2	>30000	993	2.587
B2	>30000	858	2.234
B2	>30000	249	0.647
B2	>30000	593	1.536
B2	>30000	-1403	-3.622
B2	>30000	-144	-0.372
B2	>30000	-302	-0.770
B2	>30000	-918	-2.341
B2	>30000	-260	-0.663
B2	>30000	-3	-0.008
B2	>30000	-494	-1.251

B2	>30000	504	1.276
B2	>30000	-673	-1.703
B2	>30000	-1021	-2.582
B2	>30000	-1078	-2.720
B2	>30000	-1116	-2.791
B2	>30000	-972	-2.414
B2	>30000	-259	-0.638
B2	>30000	-658	-1.618
B2	>30000	-760	-1.866
B2	>30000	-1016	-2.487
B2	>30000	-1364	-3.299
B2	>30000	243	0.587
B2	>30000	-255	-0.615
B2	>30000	1287	3.099
B2	>30000	-821	-1.975
B2	>30000	-489	-1.176
B2	>30000	-190	-0.457
B2	>30000	-620	-1.477
B2	>30000	204	0.482
B2	>30000	-133	-0.312
B2	>30000	-267	-0.624
B2	>30000	-559	-1.305
B2	>30000	10	0.023
B2	>30000	-377	-0.855
B2	>30000	-42	-0.095
B2	>30000	-205	-0.458
B2	>30000	-193	-0.428
B2	>30000	-505	-1.115
B2	>30000	-355	-0.782
B2	>30000	-460	-1.011
B2	>30000	-547	-1.200
B2	>30000	-1037	-2.271
B2	>30000	-1335	-2.906
B2	>30000	1953	4.152
B2	>30000	519	1.101
B2	>30000	-1777	-3.769
B2	>30000	-1630	-3.452
B2	>30000	-1630	-3.452
B2	>30000	-10	-0.021
B2	>30000	99	0.208
B2	>30000	-66	-0.138
B2	>30000	-794	-1.665
B2	>30000	541	1.130
B2	>30000	639	1.326
B2	>30000	-774	-1.603
B2	>30000	883	1.824
B2	>30000	-312	-0.634
B2	>30000	-765	-1.553
B2	>30000	248	0.502
B2	>30000	168	0.339
B2	>30000	-368	-0.742

B2	>30000	-1656	-3.325
B2	>30000	-1032	-2.048
B2	>30000	349	0.684
B2	>30000	-1732	-3.368
B2	>30000	106	0.206
B2	>30000	142	0.275
B2	>30000	183	0.351
B2	>30000	-709	-1.352
B2	>30000	-873	-1.663
B2	>30000	894	1.681

ATTACHMENT V: Data for Plant B3

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
B3	<30000	238	2.339
B3	<30000	-330	-3.173
B3	<30000	370	3.544
B3	<30000	21	0.198
B3	<30000	-293	-2.759
B3	<30000	170	1.573
B3	<30000	90	0.830
B3	<30000	-190	-1.746
B3	<30000	16	0.147
B3	<30000	-300	-2.737
B3	<30000	-182	-1.655
B3	<30000	-40	-0.362
B3	<30000	-159	-1.435
B3	<30000	-250	-2.232
B3	<30000	130	1.135
B3	<30000	280	2.435
B3	<30000	-70	-0.596
B3	<30000	340	2.862
B3	<30000	330	2.768
B3	<30000	-396	-3.271
B3	<30000	-30	-0.243
B3	<30000	37	0.300
B3	<30000	350	2.816
B3	<30000	249	1.991
B3	<30000	340	2.680
B3	<30000	326	2.539
B3	<30000	-109	-0.847
B3	<30000	249	1.914
B3	<30000	-297	-2.264
B3	<30000	-85	-0.640
B3	<30000	445	3.350
B3	<30000	255	1.918
B3	<30000	129	0.965
B3	<30000	479	3.488
B3	<30000	-72	-0.517
B3	<30000	-303	-2.174
B3	<30000	293	2.093
B3	<30000	53	0.376
B3	<30000	-183	-1.292
B3	<30000	50	0.346
B3	<30000	-306	-2.114
B3	<30000	299	2.030
B3	<30000	289	1.952
B3	<30000	-280	-1.889
B3	<30000	376	2.530
B3	<30000	-173	-1.164
B3	<30000	-302	-2.013

B3	<30000	-702	-4.645
B3	<30000	261	1.721
B3	<30000	-175	-1.149
B3	<30000	-286	-1.876
B3	<30000	-441	-2.891
B3	<30000	-423	-2.739
B3	<30000	-381	-2.461
B3	<30000	315	2.026
B3	<30000	-433	-2.782
B3	<30000	-574	-3.688
B3	<30000	-566	-3.604
B3	<30000	-130	-0.823
B3	<30000	-557	-3.511
B3	<30000	-49	-0.308
B3	<30000	81	0.508
B3	<30000	-448	-2.809
B3	<30000	478	2.989
B3	<30000	-315	-1.968
B3	<30000	390	2.435
B3	<30000	-159	-0.992
B3	<30000	161	0.998
B3	<30000	541	3.352
B3	<30000	-190	-1.154
B3	<30000	-597	-3.622
B3	<30000	-239	-1.450
B3	<30000	-687	-4.155
B3	<30000	-408	-2.465
B3	<30000	-446	-2.694
B3	<30000	-143	-0.863
B3	<30000	-332	-1.995
B3	<30000	-350	-2.103
B3	<30000	-171	-1.027
B3	<30000	93	0.558
B3	<30000	170	1.019
B3	<30000	316	1.894
B3	<30000	-90	-0.538
B3	<30000	-117	-0.700
B3	<30000	213	1.257
B3	<30000	252	1.487
B3	<30000	176	1.038
B3	<30000	-139	-0.818
B3	<30000	-397	-2.332
B3	<30000	-775	-4.527
B3	<30000	-534	-3.117
B3	<30000	-529	-3.086
B3	<30000	-122	-0.711
B3	<30000	-245	-1.428
B3	<30000	-491	-2.860
B3	<30000	-422	-2.442
B3	<30000	189	1.086
B3	<30000	-69	-0.396

B3	<30000	-179	-1.021
B3	<30000	-267	-1.512
B3	<30000	-318	-1.779
B3	<30000	-87	-0.486
B3	<30000	-447	-2.492
B3	<30000	-730	-4.061
B3	<30000	-232	-1.286
B3	<30000	-120	-0.663
B3	<30000	-518	-2.851
B3	<30000	-832	-4.566
B3	<30000	237	1.297
B3	<30000	-490	-2.667
B3	<30000	239	1.292
B3	<30000	-754	-4.074
B3	<30000	253	1.367
B3	<30000	-558	-3.008
B3	<30000	78	0.419
B3	<30000	395	2.100
B3	<30000	76	0.403
B3	<30000	392	2.071
B3	<30000	634	3.328
B3	<30000	56	0.293
B3	<30000	406	2.118
B3	<30000	258	1.333
B3	<30000	394	2.029
B3	<30000	371	1.902
B3	<30000	-755	-3.853
B3	<30000	244	1.244
B3	<30000	-264	-1.338
B3	<30000	25	0.127
B3	<30000	-945	-4.721
B3	<30000	-812	-4.039
B3	<30000	-2	-0.010
B3	<30000	-153	-0.750
B3	<30000	334	1.627
B3	<30000	27	0.131
B3	<30000	-128	-0.621
B3	<30000	-435	-2.105
B3	<30000	679	3.285
B3	<30000	250	1.209
B3	<30000	-182	-0.876
B3	<30000	10	0.048
B3	<30000	240	1.147
B3	<30000	742	3.541
B3	<30000	318	1.510
B3	<30000	72	0.342
B3	<30000	-15	-0.071
B3	<30000	-168	-0.790
B3	<30000	240	1.128
B3	<30000	180	0.844
B3	<30000	-100	-0.458

B3	<30000	21	0.096
B3	<30000	552	2.518
B3	<30000	-357	-1.628
B3	<30000	-2	-0.009
B3	<30000	-496	-2.251
B3	<30000	-437	-1.981
B3	<30000	-447	-2.023
B3	<30000	513	2.318
B3	<30000	-409	-1.823
B3	<30000	-82	-0.362
B3	<30000	-597	-2.619
B3	<30000	-151	-0.661
B3	<30000	339	1.472
B3	<30000	-203	-0.878
B3	<30000	149	0.643
B3	<30000	-854	-3.640
B3	<30000	346	1.474
B3	<30000	-268	-1.135
B3	<30000	-330	-1.391
B3	<30000	188	0.787
B3	<30000	257	1.070
B3	<30000	-110	-0.458
B3	<30000	88	0.363
B3	<30000	822	3.363
B3	<30000	475	1.943
B3	<30000	271	1.107
B3	<30000	565	2.303
B3	<30000	184	0.746
B3	<30000	588	2.379
B3	<30000	500	2.004
B3	<30000	345	1.377
B3	<30000	-28	-0.112
B3	<30000	-315	-1.244
B3	<30000	-757	-2.983
B3	<30000	-104	-0.402
B3	<30000	194	0.735
B3	<30000	11	0.041
B3	<30000	-123	-0.457
B3	<30000	-756	-2.776
B3	<30000	236	0.864
B3	<30000	433	1.575
B3	<30000	-219	-0.793
B3	<30000	-89	-0.322
B3	<30000	170	0.611
B3	<30000	1222	4.386
B3	<30000	756	2.703
B3	<30000	547	1.954
B3	<30000	903	3.225
B3	<30000	350	1.248
B3	<30000	-39	-0.138
B3	<30000	223	0.788

B3	<30000	116	0.409
B3	<30000	-133	-0.468
B3	<30000	485	1.703
B3	<30000	-475	-1.667
B3	<30000	-228	-0.799
B3	<30000	-192	-0.672
B3	<30000	379	1.325
B3	<30000	-178	-0.620
B3	<30000	-340	-1.181
B3	<30000	1086	3.769
B3	<30000	-447	-1.551
B3	<30000	149	0.517
B3	<30000	303	1.050
B3	<30000	-394	-1.363
B3	<30000	277	0.958
B3	<30000	-492	-1.691
B3	<30000	-80	-0.275
B3	<30000	-18	-0.062
B3	<30000	57	0.196
B3	<30000	343	1.172
B3	<30000	455	1.550
B3	<30000	-211	-0.714
B3	<30000	-360	-1.218
B3	<30000	-145	-0.490
B3	<30000	30	0.101
B3	<30000	73	0.245
B3	<30000	384	1.287
B3	<30000	225	0.753
B3	<30000	-296	-0.990
B3	<30000	719	2.401
B3	<30000	434	1.447
B3	>30000	-171	-0.570
B3	>30000	-80	-0.266
B3	>30000	751	2.496
B3	>30000	-73	-0.242
B3	>30000	-90	-0.298
B3	>30000	712	2.351
B3	>30000	-276	-0.906
B3	>30000	-717	-2.348
B3	>30000	141	0.462
B3	>30000	386	1.261
B3	>30000	-274	-0.890
B3	>30000	267	0.860
B3	>30000	-131	-0.422
B3	>30000	74	0.238
B3	>30000	417	1.337
B3	>30000	-63	-0.202
B3	>30000	-193	-0.617
B3	>30000	268	0.851
B3	>30000	171	0.538
B3	>30000	-240	-0.756

B3	>30000	9	0.028
B3	>30000	-237	-0.742
B3	>30000	-163	-0.510
B3	>30000	-23	-0.072
B3	>30000	629	1.964
B3	>30000	292	0.908
B3	>30000	266	0.825
B3	>30000	-176	-0.544
B3	>30000	-483	-1.493
B3	>30000	-958	-2.957
B3	>30000	-561	-1.730
B3	>30000	-150	-0.462
B3	>30000	-317	-0.970
B3	>30000	503	1.538
B3	>30000	78	0.238
B3	>30000	72	0.219
B3	>30000	-559	-1.691
B3	>30000	-464	-1.396
B3	>30000	-488	-1.467
B3	>30000	-569	-1.705
B3	>30000	-249	-0.743
B3	>30000	689	2.044
B3	>30000	244	0.724
B3	>30000	-376	-1.115
B3	>30000	850	2.508
B3	>30000	-2	-0.006
B3	>30000	-322	-0.949
B3	>30000	-1329	-3.894
B3	>30000	-158	-0.463
B3	>30000	-639	-1.866
B3	>30000	-402	-1.167
B3	>30000	-65	-0.188
B3	>30000	138	0.398
B3	>30000	798	2.300
B3	>30000	-168	-0.484
B3	>30000	34	0.097
B3	>30000	28	0.080
B3	>30000	-182	-0.518
B3	>30000	247	0.702
B3	>30000	-316	-0.891
B3	>30000	147	0.415
B3	>30000	366	1.026
B3	>30000	119	0.333
B3	>30000	-528	-1.479
B3	>30000	14	0.039
B3	>30000	115	0.319
B3	>30000	466	1.285
B3	>30000	-47	-0.129
B3	>30000	-550	-1.512
B3	>30000	-411	-1.130
B3	>30000	-245	-0.673

B3	>30000	-308	-0.843
B3	>30000	560	1.529
B3	>30000	-80	-0.218
B3	>30000	-933	-2.533
B3	>30000	210	0.566
B3	>30000	-466	-1.254
B3	>30000	-210	-0.564
B3	>30000	-426	-1.141
B3	>30000	302	0.807
B3	>30000	366	0.972
B3	>30000	-1089	-2.888
B3	>30000	-275	-0.729
B3	>30000	-485	-1.280
B3	>30000	92	0.243
B3	>30000	-419	-1.104
B3	>30000	418	1.099
B3	>30000	-533	-1.397
B3	>30000	658	1.721
B3	>30000	75	0.196
B3	>30000	-863	-2.231
B3	>30000	-48	-0.124
B3	>30000	-346	-0.875
B3	>30000	-103	-0.260
B3	>30000	-46	-0.116
B3	>30000	363	0.910
B3	>30000	997	2.498
B3	>30000	-32	-0.080
B3	>30000	-343	-0.849
B3	>30000	-868	-2.142
B3	>30000	-512	-1.242
B3	>30000	631	1.525
B3	>30000	-422	-1.011
B3	>30000	-72	-0.172
B3	>30000	532	1.265
B3	>30000	845	2.006
B3	>30000	614	1.449
B3	>30000	13	0.031
B3	>30000	-477	-1.118
B3	>30000	-477	-1.098
B3	>30000	-207	-0.475
B3	>30000	-155	-0.351
B3	>30000	157	0.354
B3	>30000	-202	-0.455
B3	>30000	390	0.875
B3	>30000	14	0.031
B3	>30000	266	0.591
B3	>30000	-230	-0.510
B3	>30000	-327	-0.720
B3	>30000	83	0.182
B3	>30000	-611	-1.335
B3	>30000	-543	-1.186

B3	>30000	-245	-0.533
B3	>30000	298	0.648
B3	>30000	183	0.394
B3	>30000	-634	-1.358
B3	>30000	-418	-0.883
B3	>30000	-301	-0.629
B3	>30000	-392	-0.812
B3	>30000	822	1.665
B3	>30000	-76	-0.150
B3	>30000	-358	-0.706

ATTACHMENT VI: Data for Plants A3, A4, A5, and A6 Combined

Plant	Burnup (MWd/MTU)	D (MWd/MTU)	P (%)
A3	<30,000	143	0.940
A3	<30,000	142	0.933
A4	<30,000	-50	-0.277
A3	<30,000	229	1.222
A3	<30,000	-16	-0.084
A4	<30,000	41	0.214
A6	<30,000	-98	-0.511
A4	<30,000	-115	-0.594
A6	<30,000	157	0.805
A6	<30,000	2	0.010
A5	<30,000	56	0.281
A5	<30,000	254	1.263
A3	<30,000	218	1.075
A3	<30,000	109	0.534
A5	<30,000	-215	-1.043
A4	<30,000	317	1.522
A4	<30,000	194	0.925
A3	<30,000	280	1.322
A3	<30,000	142	0.666
A4	<30,000	29	0.133
A6	<30,000	300	1.376
A4	<30,000	4	0.018
A6	<30,000	97	0.441
A5	<30,000	380	1.719
A6	<30,000	146	0.657
A5	<30,000	218	0.978
A6	<30,000	16	0.072
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A4	<30,000	137	0.568

A3	<30,000	78	0.323
A6	<30,000	-9	-0.037
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A4	<30,000	55	0.222
A4	<30,000	55	0.222
A6	<30,000	19	0.077
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7.11	>30,000	284	0.689
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A5	>30,000	-255	-0.479
A5	>30,000	-97	-0.181

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9. DESIGN VERIFICATION CHECKLIST

Document Identifier <u>32 – 5041666 - 02</u>				
Title <u>Reactor Record Uncertainty Determination</u>				
1.	Were the inputs correctly selected and incorporated into design or analysis?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A
2.	Are assumptions necessary to perform the design or analysis activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verifications when the detailed design activities are completed?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
3.	Are the appropriate quality and quality assurance requirements specified? Or, for documents prepared per FANP procedures, have the procedural requirements been met?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A
4.	If the design or analysis cites or is required to cite requirements or criteria based upon applicable codes, standards, specific regulatory requirements, including issue and addenda, are these properly identified, and are the requirements/criteria for design or analysis met?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A
5.	Have applicable construction and operating experience been considered?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
6.	Have the design interface requirements been satisfied?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
7.	Was an appropriate design or analytical method used?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A
8.	Is the output reasonable compared to inputs?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A
9.	Are the specified parts, equipment and processes suitable for the required application?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
10.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
11.	Have adequate maintenance features and requirements been specified?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
12.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
13.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
14.	Has the design properly considered radiation exposure to the public and plant personnel?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
15.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
16.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
17.	Are adequate handling, storage, cleaning and shipping requirements specified?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
18.	Are adequate identification requirements specified?	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> N/A
19.	Is the document prepared and being released under the FANP Quality Assurance Program? If not, are requirements for record preparation review, approval, retention, etc., adequately specified?	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N/A



9. DESIGN VERIFICATION CHECKLIST

Comments: None.

Verified By:
(First, MI, Last)

Mehmet Saglam
Printed / Typed Name

M. Saglam
Signature

5/26/2004
Date

Framatome ANP, Inc., an AREVA and Siemens company