

PDR



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 24, 1980

Ms. Catherine Quigg
Pollution and Environmental Problems, Inc.
Box 309
Palatine, IL 60067

IN RESPONSE REFER
TO FOIA-79-512

Dear Ms. Quigg:

This supplements our previous letter to you dated December 6, 1979, and is in further reply to your letter dated November 28, 1979, in which you requested, pursuant to the Freedom of Information Act, a copy of all records which refer or are related to the use of higher fuel burnups in commercial light water nuclear reactors (i.e. the Zion and Quad-Cities nuclear stations in Illinois) . . . whether or not such records specifically identify those particular plants. The records you requested are all of those for the period of 1975 to the present and any known relevant record prior to that date.

In further response to your request, a copy of "Fuel Performance Data Collected by NRC Staff for Atomic Safety and Licensing Board" was presented as part of the written testimony of P. M. Wood at the ASLB hearing on River Bend at St. Francisville, Louisiana on May 26, 1976 (total 32 pages). This document is in addition to the documents previously provided to you, and, it was located after we had sent you our letter dated December 6, 1979. A copy is also being sent to the NRC Public Document Room (PDR) located at 1717 H Street, N.W., Washington, DC.

Sincerely,

A handwritten signature in dark ink, appearing to read "J. M. Felton", is written over a large, stylized "A" that serves as a checkmark or initial.

J. M. Felton, Director
Division of Rules and Records
Office of Administration

Enclosure: As stated

800 2120 390

PDR
November 28, 1979

Director
Division of Rules and Records
United States Nuclear Regulatory Commission
Washington, D.C. 20555

FREEDOM OF INFORMATION
ACT REQUEST

FOIA-79-512

REC'D 12-3-79

Re: Freedom of Information Act
Request re: Higher Fuel Burnup Experimentation
in United States Nuclear Reactors

To the Director:

This is a request under the Freedom of Information Act 5 U.S.C. §552, as amended, and the regulations of the Nuclear Regulatory Commission implementing the Act, 10 C.F.R. Part 9, Subpart A. This request is made on behalf of Pollution and Environmental Problems, Inc.

This request seeks all records, as defined in 10 C.F.R. Part 9, Subpart A, Section 9.3 a (b), which refer or related to the use of higher fuel burnups in commercial lightwater nuclear reactors (i.e. the Zion and Quad-Cities nuclear stations in Illinois)... whether or not such records specifically identify those particular plants. The records sought are all of those dated or which refer to the period from 1973 to and including the present date; unless there is some known relevant record prior to that date.

Because none of the statutory exemptions from the Act's mandatory disclosure provisions applies, access to the requested records should be granted within ten (10) working days. In the unlikely event, however, that access is denied to any part of the requested records, please describe the deleted material in detail and specify the statutory basis for the denial as well as your reasons for believing that the alleged statutory justification applies in this instance. Please separately state your reasons for not invoking your discretionary powers to release the requested documents in the public interest. If it is not possible to make these documents available to me personally, then I request they be made available to me at the U.S. NRC, Region III office in Glen Ellyn, Illinois.

I anticipate that you will make the requested materials available within the statutorily prescribed period. I also request that you waive any applicable fees since disclosure meets the statutory standard for waiver of fees in that "furnishing the information can be considered as primarily benefitting the general public." 5 U.S.C.A. §552 (a) (4) (A).

Sincerely,

Catherine Quigg

Catherine Quigg, research director
Pollution and Environmental Problems, Inc.
Box 309, Palatine, Illinois 60067
312/381-6695

DJP
7912180147

APPENDIX 1

Fuel Performance Data Collected by NRC Staff for Atomic Safety and
Licensing Board

This data, collected by the NRC Staff was presented as part of the written testimony of P. M. Wood at the ASLB hearing on River Bend at St. Francisville, Louisiana on May 26, 1976.

Additional data on Millstone 1 and Dresden 1 has been added.

Calculation of duty factors was done on a batch basis. This is less ambiguous than considering average cycle discharges since one discharge may contain fuel assemblies from several batches which may have had different enrichments, etc.

We have plotted the duty factors for the batches as a function of batch burnup. Data from stainless steel clad cores and small reactors were not included on the plots as they are not representative of current generation power plants. Data on BWRs are presented in Figure 5. Data on Westinghouse PWRs with Zircaloy cladding are presented in Figure 6. Data on Oconee-1 and Maine Yankee PWRs are shown separately in Figure 7 since their neutron economy and hence duty factors are slightly better than the Westinghouse cores.

FUEL PERFORMANCE DATA - Surry 1

TABLE 3

Batch Information						
1 Batch Number	1A1	1A2	2			
2 Number of Ass'ys in Batch	9	21	52			
3 Cycle In	1	1	1			
4 Date In	7/72	7/72	7/72			
5 Cycle Out	1	2	2			
6 Date Out	10/74	9/75	9/75			
7 Batch Weight (MTU)	3.96	9.34	23.9			
8 U-235 Enrichment In	1.57	1.87	2.57			
9 U-235 Enrichment Out	0.63	0.56	0.90			
10 Fissile Plutonium (% Initial Uranium)	0.40	0.43	0.48			
11 Total Plutonium (% Initial Uranium)	+	+	+			
12 Ratio Uranium in Spent Fuel to Initial Uranium	.977	.971	.968			
13 Batch Burnup, Predicted (MWD/MTU)	13300	20800	23800			
14 Batch Burnup, Actual (MWD/MTU)	14971	19792	22584			
15 Reason for Discharge of Batch	R	R	R			
16 Duty Factor, no recycle (10^6 kWh/ST(U_{308}))	22.9	30.3	23.9			
17 Duty Factor, U recycle (10^6 kWh/ST(U_{308}))	28.7	36.0	31.9			
Cycle Information						
1 Cycle Number	1	2				
2 Cycle Burnup, Predicted (MWD/MTU)	12600	8000				
3 Cycle Burnup, Actual (MWD/MTU)	11348	5960				
4 Energy Production (10^6 kWh)	6.9	3.6				
5 Cycle Length	R	R				

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA - Ginna

TABLE 4

Batch Information						
1 Batch Number	1	2	3	4A	5A	
2 Number of Ass'ys in Batch	41	40	40	12	12	
3 Cycle In	1A	1A	1A	1.8	3	
4 Date In	11/69	11/69	11/60	5/71	11/72	
5 Cycle Out	2	2	1B	3	5	
6 Date Out	10/72	10/72	4/72	1/74	1/76	
7 Batch Weight (MTU)	16.3	15.7	15.3	4.6	4.7	
8 U-235 Enrichment In	2.44	2.78	2.48	2.22	2.26	
9 U-235 Enrichment Out	0.91	1.30	2.52	1.24	0.79	
10 Fissile Plutonium (% Initial Uranium)	0.54	0.54	0.37	0.60	0.54	
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+	
12 Ratio Uranium in Spent Fuel to Initial Uranium	.971	.974	.985	.965	.973	
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+	+	
14 Batch Burnup, Actual (MWD/MTU)	20900	18689	10117	25135	19318	
15 Reason for Discharge of Batch	F	F	S	R	R	
16 Duty Factor, no recycle (10 ⁶ kWhe/ST(U ₃ O ₈))	23.5	18.1	7.7	20.7	23.7	
17 Duty Factor, U recycle (10 ⁶ kWhe/ST(U ₃ O ₈))	32.2	29.4	23.2	29.7	31.1	
Cycle Information						
1 Cycle Number	1A	1B	2	3	4	5
2 Cycle Burnup, Predicted (MWD/MTU)	14500	8500	9350	14000	9600	8400
3 Cycle Burnup, Actual (MWD/MTU)	7700	8838	2630	10705	8033	6813
4 Energy Production (10 ⁶ kWhe)	2.8	3.2	1.0	3.9	2.9	2.5
5 Cycle Length	S/R	S	F	R	S	R

S - Scheduled Outage

E - Extended Cycle

P - Non-scheduled Outage

F - Fuel Failures

R - Repair to plant system

+ - Data not Available

TABLE 5

FUEL PERFORMANCE DATA - (Name withheld at request of Utility) PWR-1

Batch Information						
1 Batch Number	1	2				
2 Number of Ass'ys in Batch	52	48				
3 Cycle In	1	1				
4 Date In	10/72	10/72				
5 Cycle Out	1	2				
6 Date Out	10/74	10/75				
7 Batch Weight (MTU)	23.56	21.74				
8 U-235 Enrichment In	1.86	2.56				
9 U-235 Enrichment Out	0.83	0.79				
10 Fissile Plutonium (% Initial Uranium)	0.47	0.57				
11 Total Plutonium (% Initial Uranium)	+	+				
12 Ratio Uranium in Spent Fuel to Initial Uranium	.981	.968				
13 Batch Burnup, Predicted (MWD/MTU)	13690	24730				
14 Batch Burnup, Actual (MWD/MTU)	12350	22650				
15 Reason for Discharge of Batch	S/+	S/+				
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	19.0	24.1				
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	28.2	30.3				
Cycle Information						
1 Cycle Number	1	2				
2 Cycle Burnup, Predicted (MWD/MTU)	13590	9700				
3 Cycle Burnup, Actual (MWD/MTU)	9700	8843				
4 Energy Production (10^6 kWh)	7.2	4.7				
5 Cycle Length	S/+	S/+				

S - Scheduled Outage

E - Extended Cycle

P - Non-scheduled Outage

F - Fuel Failures

R - Repair to plant system

+ - Data not Available

Batch Information		* Ave Batch 293				
1 Batch Number	1	2	3	4		
2 Number of Ass'ys in Batch	53	104	52			
3 Cycle In	1	1	1			
4 Date In	5/70	9/70	6/74			
5 Cycle Out	1	2	3			
6 Date Out	7/73	8/74	10/75			
7 Batch Weight (MTU)	24.2	46	32.0			
8 U-235 Enrichment In	1.85	2.825*	3.10			
9 U-235 Enrichment Out	0.71	1.02*	1.26			
10 Fissile Plutonium (% Initial Uranium)	0.42	0.51*	0.51			
11 Total Plutonium (% Initial Uranium)	+	+	+			
12 Ratio Uranium in Spent Fuel to Initial Uranium	.976	.965*	.968			
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+			
14 Batch Burnup, Actual (MWD/MTU)	15860	25100*	23400			
15 Reason for Discharge of Batch	S	S	S			
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	24.6	23.7	20.1			
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	32.9	32.1	29.7			
Cycle Information						
1 Cycle Number	1	2	3			
2 Cycle Burnup, Predicted (MWD/MTU)	11500	9750	12500			
3 Cycle Burnup, Actual (MWD/MTU)	15300	9810	12837			
4 Energy Production (10^6 kWh)	8.3	5.3	7.2			
5 Cycle Length	5	5	5**			

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

** Abnormal
 Fuel Loading

FUEL PERFORMANCE DATA - Point Beach - 1

TABLE 7

Batch Information						
1 Batch Number	1	2	3A	3B	4	
2 Number of Ass'ys in Batch	41	40	3	37	43	
3 Cycle In	1	1	1	1	2	
4 Date In	12/70	12/70	12/70	12/70	3/73	
5 Cycle Out	1	2	1	2	3	
6 Date Out	9/72	4/74	9/72	4/74	11/75	
7 Batch Weight (MTU)	16.7	15.6	1.0	14.2	17.1	
8 U-235 Enrichment In	2.21	2.04	2.47	2.40	2.97	
9 U-235 Enrichment Out	0.88	0.89	2.18	1.38	+	
10 Fissile Plutonium (% Initial Uranium)	0.53	0.64	0.27	0.60	+	
11 Total Plutonium (% Initial Uranium)	0.71	0.85	0.32	0.79	+	
12 Ratio Uranium in Spent Fuel to Initial Uranium	.973	.959	.980	.965	+	
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+	+	
14 Batch Burnup, Actual (MWD/MTU)	19396	30755	13177	25344	+	
15 Reason for Discharge of Batch	S	S	F	F	R	
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))	24.5	27.0	10.2	19.6	+	
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))	34.3	33.8	24.2	29.2	+	
Cycle Information						
1 Cycle Number	1	2	3	4		
2 Cycle Burnup, Predicted (MWD/MTU)	+	+	+	+		
3 Cycle Burnup, Actual (MWD/MTU)	+	+	+	+		
4 Energy Production (10 ⁶ kWh)	+	+	+	+		
5 Cycle Length	S	S	S/F	R		

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number		1	2A	2B	3A	
2 Number of Ass'ys in Batch		41	20	36	24	
3 Cycle In		1	1	1	1	
4 Date In		2/73	2/73	2/73	2/73	
5 Cycle Out		1	1	2	2	
6 Date Out		10/74	10/74	2/76	2/76	
7 Batch Weight (MTU)		+	+	+	+	
8 U-235 Enrichment In		2.01	2.10	2.10	2.15	
9 U-235 Enrichment Out		1.06	1.14	0.76	0.81	
10 Fissile Plutonium (% Initial Uranium)		0.44	0.44	0.56	0.54	
11 Total Plutonium (% Initial Uranium)		+	+	+	+	
12 Ratio Uranium in Spent Fuel to Initial Uranium		.982	.982	.972	.973	
13 Batch Burnup, Predicted (MWD/MTU)		11373	11748	19328	16091	
14 Batch Burnup, Actual (MWD/MTU)		11560	11535	19203	18678	
15 Reason for Discharge of Batch		S	S	S	S	
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))		16.3	15.5	25.6	24.2	
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))		28.2	27.8	33.8	32.8	
Cycle Information						
1 Cycle Number		1	2			
2 Cycle Burnup, Predicted (MWD/MTU)		9597	+			
3 Cycle Burnup, Actual (MWD/MTU)		9576	+			
4 Energy Production (10^6 kWh)		+	+			
5 Cycle Length		S	S			

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	1	2	3	4	5	6
2 Number of Ass'ys in Batch	12	56	4	58	24	64
3 Cycle In	1	1	1	1	1	1
4 Date In	10/72	10/72	10/72	10/72	10/72	10/72
5 Cycle Out	1	1	1	12	1A	1A
6 Date Out	6/75	6/75	6/75	6/75	6/75	6/75
7 Batch Weight (MTU)	4.7	20.1	1.5	2.9	8.6	29.1
8 U-235 Enrichment In	2.01	2.40	2.95	2.01	2.40	2.95
9 U-235 Enrichment Out	1.08	1.36	2.10	0.32	1.08	1.81
10 Fissile Plutonium (% Initial Uranium)	0.39	0.41	0.32	0.46	0.46	0.33
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+	+
12 Ratio Uranium in Spent Fuel to Initial Uranium	.984	.983	.987	.977	.977	.983
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+	+	+
14 Batch Burnup, Actual (MWD/MTU)	10925	10911	8468	15518	15993	11772
15 Reason for Discharge of Batch	F	F	F	S	S	S
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	15.4	12.5	7.7	21.8	18.3	10.7
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	27.3	24.2	22.2	30.7	28.3	23.5
Cycle Information						
1 Cycle Number	1	1A	1+1A			
2 Cycle Burnup, Predicted (MWD/MTU)	+	+	15000			
3 Cycle Burnup, Actual (MWD/MTU)	10112	4456	14568			
4 Energy Production (10^6 kWh)	6.7	2.9	9.6			
5 Cycle Length	F	S				

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	7	8				
2 Number of Ass'ys in Batch	69	2				
3 Cycle In	1A	1A				
4 Date In	10/74	10/74				
5 Cycle Out	1A	1A				
6 Date Out	6/75	6/75				
7 Batch Weight (MTU)	26.7	0.8				
8 U-235 Enrichment In	1.93	2.33				
9 U-235 Enrichment Out	1.42	2.03				
10 Fissile Plutonium (% Initial Uranium)	0.24	0.14				
11 Total Plutonium (% Initial Uranium)	+	+				
12 Ratio Uranium in Spent Fuel to Initial Uranium	.992	.996				
13 Batch Burnup, Predicted (MWD/MTU)	+	+				
14 Batch Burnup, Actual (MWD/MTU)	5111	2769				
15 Reason for Discharge of Batch	5	5				
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))	7.5	3.3				
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))	22.4	19.0				
Cycle Information						
1 Cycle Number						
2 Cycle Burnup, Predicted (MWD/MTU)						
3 Cycle Burnup, Actual (MWD/MTU)						
4 Energy Production (10 ⁶ kWh)						
5 Cycle Length						

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available

Batch Information						
1 Batch Number		1	2	3	4	5
2 Number of Ass'ys in Batch		+	+	+	+	+
3 Cycle In		1	1	1	2	3
4 Date In		3/66	3/66	3/66	12/67	3/69
5 Cycle Out		1	2	3	4	5
6 Date Out		9/67	2/69	3/70	12/72	10/75
7 Batch Weight (MTU)		+	+	+	+	+
8 U-235 Enrichment In		2.40	3.26	4.08	4.10	4.08
9 U-235 Enrichment Out		1.51 ^{EE}	1.76 ^{EE}	2.11 ^{EE}	1.96	2.10
10 Fissile Plutonium (% Initial Uranium)		0.41 ^{EE}	0.55 ^{EE}	0.62 ^{EE}	0.63	0.60
11 Total Plutonium (% Initial Uranium)		+	+	+	+	+
12 Ratio Uranium in Spent Fuel to Initial Uranium		.981	.972	.966	.965	.968
13 Batch Burnup, Predicted (MWD/MTU)		+	+	+	+	+
14 Batch Burnup, Actual (MWD/MTU)		12655 [*]	19039 [*]	24215 [*]	25247	22884
15 Reason for Discharge of Batch		S	S	S	S	R
16 Duty Factor, no recycle (10 ⁶ kWhr/ST(U ₃ O ₈))		12.2	15.5	15.4	16.0	14.6
17 Duty Factor, U recycle (10 ⁶ kWhr/ST(U ₃ O ₈))		28.7	29.1	28.0	27.1	26.4
Cycle Information		* From gamma-ray data. ** Based on NPS Reprocessing data.				
1 Cycle Number		1	2	3	4	5
2 Cycle Burnup, Predicted (MWD/MTU)		10300	7060	8400	8700	7150
3 Cycle Burnup, Actual (MWD/MTU)		10650	7340	7138	9932	5341
4 Energy Production (10 ⁶ kWhr)		+	0.8	0.5	0.7	0.4
5 Cycle Length		S	S	S	S	R

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information							
1 Batch Number		1	2	3	4	5	6
2 Number of Ass'ys in Batch		+	+	+	40	36	38
3 Cycle In		1	1	2	3	4	5
4 Date In		8/60	8/60	9/62	11/63	9/64	11/65
5 Cycle Out		1	2	3	4	5	6
6 Date Out		5/62	9/63	8/64	6/65	10/66	3/68
7 Batch Weight (MTU)		+	+	+	10.9	9.8	10.4
8 U-235 Enrichment In		3.40	3.40	4.1	4.10	4.10	4.83
9 U-235 Enrichment Out		2.7	2.6	2.8	2.5	2.4	2.1
10 Fissile Plutonium (% Initial Uranium)		0.36	0.51	0.54	0.59	0.63	0.74
11 Total Plutonium (% Initial Uranium)		+	+	+	+	+	+
12 Ratio Uranium in Spent Fuel to Initial Uranium		.987	.984	.980	.975	.974	.969
13 Batch Burnup, Predicted (MWD/MTU)		+	+	+	+	+	+
14 Batch Burnup, Actual (MWD/MTU)		8470	10150	12900	16500	17250	22515
15 Reason for Discharge of Batch		E	E	E	E	E	E
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))		6.6	7.9	8.1	10.4	10.9	12.0
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))		25.7	27.3	22.3	23.2	23.0	19.1
Cycle Information							
1 Cycle Number		1	2	3	4	5	6
2 Cycle Burnup, Predicted (MWD/MTU)		+	+	+	+	+	+
3 Cycle Burnup, Actual (MWD/MTU)		+	+	+	+	+	+
4 Energy Production (10 ⁶ kWh)		1.3	1.2	0.9	1.3	1.3	1.9
5 Cycle Length		E	E	E	E	E	E

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	7	8	9	10	11	
2 Number of Ass'ys in Batch	36	36	36	36	36	
3 Cycle In	6	7	8	9	10	
4 Date In	11/66	5/70	9/69	11/70	5/72	
5 Cycle Out	7	8	9	10	11	
6 Date Out	8/69	10/70	3/72	5/74	10/75	
7 Batch Weight (MTU)	9.9	9.9	9.9	9.9	8.8	
8 U-235 Enrichment In	4.94	4.75	4.99	4.94	4.00	
9 U-235 Enrichment Out	2.0	2.1	2.8	2.6	1.9	
10 Fissile Plutonium (% Initial Uranium)	0.76	0.74	0.76	0.84	0.77	
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+	
12 Ratio Uranium in Spent Fuel to Initial Uranium	.966	.969	.967	.964	.965	
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+	+	
14 Batch Burnup, Actual (MWD/MTU)	24282	23188	23874	26037	25277	
15 Reason for Discharge of Batch	E	E	E	E	E	
16 Duty Factor, no recycle (10^6 kWhe/ST(U_{308}))	12.6	12.4	12.4	13.5	16.4	
17 Duty Factor, U recycle (10^6 kWhe/ST(U_{308}))	19.2	20.0	25.1	25.3	27.7	
Cycle Information						
1 Cycle Number	7	8	9	10	11	
2 Cycle Burnup, Predicted (MWD/MTU)	10000	12000	12000	14000	13000	
3 Cycle Burnup, Actual (MWD/MTU)	+	+	+	+	+	
4 Energy Production (10^6 kWhe)	1.8	1.6	1.8	1.8	+	
5 Cycle Length	E	E	E	E	E	

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA - Connecticut Yankee

Table 12

Batch Information						
1 Batch Number	1	2	3	4	5	
2 Number of Ass'ys in Batch	52	52	52	52	52	
3 Cycle In	1	1	1	2	3	
4 Date In	1/68	1/68	1/68	6/70	5/71	
5 Cycle Out	1	2	3	4	5	
6 Date Out	4/70	4/71	6/72	7/73	5/75	
7 Batch Weight (MTU)	19.2	19.2	19.2	19.2	20.9	
8 U-235 Enrichment In	3.02	3.24	3.67	3.65	4.00	
9 U-235 Enrichment Out	1.52	1.20	1.27	1.38	1.39	
10 Fissile Plutonium (% Initial Uranium)	0.66	0.80	0.86	0.94	0.71	
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+	
12 Ratio Uranium in Spent Fuel to Initial Uranium	.972	.965	.958	.962	.956	
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+	+	
14 Batch Burnup, Actual (MWD/MTU)	18670	25035	30989	27685	32960	
15 Reason for Discharge of Batch	S	S	S	R	S	
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	16.5	20.5	22.1	19.9	21.4	
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	28.7	28.8	31.6	28.5	29.4	
Cycle Information						
1 Cycle Number	1	2	3	4	5	
2 Cycle Burnup, Predicted (MWD/MTU)	14100	6953	9500	10450	11750	
3 Cycle Burnup, Actual (MWD/MTU)	11359	4994	6688	5985	8485	
4 Energy Production (10^6 kWh)	8.4	3.7	4.9	4.4	6.3	
5 Cycle Length	S	S	S	R	S	

S - Scheduled Outage

E - Extended Cycle

P - Non-scheduled Outage

F - Fuel Failures

R - Repair to plant system

+ - Data not Available

FUEL PERFORMANCE DATA - (Name withheld at request of Utility) PWR-2 TABLE 13

Batch Information					
1 Batch Number	1	2	3	4	4A
2 Number of Ass'ys in Batch	53	52	52	48	(Mixed Grade) 4
3 Cycle In	1	1	1	2	2
4 Date In	6/67	1/67	6/67	11/70	11/70
5 Cycle Out	1	2	3	4	3
6 Date Out	10/70	12/71	6/73	2/75	6/73
7 Batch Weight (MTU)	+	+	+	+	+
8 U-235 Enrichment In	3.16	3.40	3.86	4.00	0.84/0.38
9 U-235 Enrichment Out	1.65	1.46	1.55	1.66	0.47
10 Fissile Plutonium (% Initial Uranium)	0.55	0.63	0.69	0.67	1.76
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+
12 Ratio Uranium in Spent Fuel to Initial Uranium	.973	.965	.959	.960	—
13 Batch Burnup, Predicted (MWD/MTU)	17500	23500	28900	28400	19000
14 Batch Burnup, Actual (MWD/MTU)	18080	25000	29700	29400	19300
15 Reason for Discharge of Batch	E	E	E	E	E
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))	15.2	19.4	20.1	19.1	—
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))	27.5	30.0	29.9	29.1	—
Cycle Information					
1 Cycle Number	1	2	3	4	
2 Cycle Burnup, Predicted (MWD/MTU)	+	+	+	+	
3 Cycle Burnup, Actual (MWD/MTU)	+	+	+	+	
4 Energy Production (10 ⁶ kWh)	3.6	1.9	2.3	2.5	
5 Cycle Length	E	E	E	E	

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available

FUEL PERFORMANCE DATA - QUAD CITIES 1

TABLE 14

Batch Information						
1 Batch Number	1	2				
2 Number of Ass'ys in Batch	64	156				
3 Cycle In	1	1				
4 Date In	4/72	4/72				
5 Cycle Out	1	2				
6 Date Out	3/74	1/76				
7 Batch Weight (MTU)	12.18	2942				
8 U-235 Enrichment In	2.13	2.13				
9 U-235 Enrichment Out	1.34	.93				
10 Fissile Plutonium (% Initial Uranium)	+	+				
11 Total Plutonium (% Initial Uranium)	+	+				
12 Ratio Uranium in Spent Fuel to Initial Uranium	.986	.976				
13 Batch Burnup, Predicted (MWD/MTU)	13,750	13,750				
14 Batch Burnup, Actual (MWD/MTU)	9,360	16,470				
15 Reason for Discharge of Batch	S	S				
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	12.9	22.7				
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	28.7	34.0				
Cycle Information						
1 Cycle Number	1	2				
2 Cycle Burnup, Predicted (MWD/MTU)	12,676	3,858				
3 Cycle Burnup, Actual (MWD/MTU)	8,047	6,054				
4 Energy Production (10^6 kWh)	8.7	6.9				
5 Cycle Length	S	E				

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	1	2				
2 Number of Ass'ys in Batch	144	94				
3 Cycle In	1	1				
4 Date In	5/72	5/72				
5 Cycle Out	1	2A				
6 Date Out	12/74	10/75				
7 Batch Weight (MTU)	27.46	17.93				
8 U-235 Enrichment In	2.13	2.13				
9 U-235 Enrichment Out	1.20	1.20				
10 Fissile Plutonium (% Initial Uranium)	+	+				
11 Total Plutonium (% Initial Uranium)	+	+				
12 Ratio Uranium in Spent Fuel to Initial Uranium	.985	.985				
13 Batch Burnup, Predicted (MWD/MTU)	13,750	13,750				
14 Batch Burnup, Actual (MWD/MTU)	11,490	11,750				
15 Reason for Discharge of Batch	S	P/F				
16 Duty Factor, no recycle (10^6 kWhe/ST(U_3O_8))	15.9	16.1				
17 Duty Factor, U recycle (10^6 kWhe/ST(U_3O_8))	30.5	30.8				
Cycle Information						
1 Cycle Number	1	2A				
2 Cycle Burnup, Predicted (MWD/MTU)	12,676	3,858				
3 Cycle Burnup, Actual (MWD/MTU)	10,692	1,764				
4 Energy Production (10^6 kWhe)	11.5	1.92				
5 Cycle Length	S	P/F				

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA - DRESDEN 2 (No batch or cycle data supplied for first three cycles)

TABLE 16

Batch Information						
1 Batch Number		1	2	3		
2 Number of Ass'ys in Batch		156	156	4		
3 Cycle In		3	3	4		
4 Date In		5/72	5/72	5/72		
5 Cycle Out		3	4	+		
6 Date Out		11/74	3/76	3/76		
7 Batch Weight (MTU)		29.38	29.27	0.75		
8 U-235 Enrichment In		2.13	2.13	2.30		
9 U-235 Enrichment Out		1.13	.92	1.97		
10 Fissile Plutonium (% Initial Uranium)		+	+	+		
11 Total Plutonium (% Initial Uranium)		+	+	+		
12 Ratio Uranium in Spent Fuel to Initial Uranium		.980	.976	.995		
13 Batch Burnup, Predicted (MWD/MTU)		13,750	16,520	16,520		
14 Batch Burnup, Actual (MWD/MTU)		12,413	16,741	3,253		
15 Reason for Discharge of Batch		S	S	S/F		
16 Duty Factor, no recycle (10^6 kWhe/ST(U_3O_8))		17.1	22.9	4.1		
17 Duty Factor, U recycle (10^6 kWhe/ST(U_3O_8))		30.5	34.1	23.1		
Cycle Information						
1 Cycle Number		1	1A	2	3	4
2 Cycle Burnup, Predicted (MWD/MTU)		+	+	+	12,676	3,858
3 Cycle Burnup, Actual (MWD/MTU)		+	+	+	10,913	3,968
4 Energy Production (10^6 kWhe)		+	4.14	+	11.6	4.2
5 Cycle Length		P/F	P/F	P/F	S	S

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	1	2	3			
2 Number of Ass'ys in Batch	52	44	141			
3 Cycle In	1	1	1			
4 Date In	8/71	8/71	8/71			
5 Cycle Out	1	2	3			
6 Date Out	3/73	3/74	4/75			
7 Batch Weight (MTU)	9.86	8.39	26.84			
8 U-235 Enrichment In	2.13	2.13	2.13			
9 U-235 Enrichment Out	1.47	1.26	1.07			
10 Fissile Plutonium (% Initial Uranium)	+	+	+			
11 Total Plutonium (% Initial Uranium)	+	+	+			
12 Ratio Uranium in Spent Fuel to Initial Uranium	.980	.984	.983			
13 Batch Burnup, Predicted (MWD/MTU)	13,750	13,750	14,740			
14 Batch Burnup, Actual (MWD/MTU)	6,899	10,995	13,936			
15 Reason for Discharge of Batch	S	S	S			
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	9.5	15.1	19.2			
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	25.0	30.7	32.5			
Cycle Information						
1 Cycle Number	1	2	3			
2 Cycle Burnup, Predicted (MWD/MTU)	12,676	3,858	3,858			
3 Cycle Burnup, Actual (MWD/MTU)	6,724	3,527	3,086			
4 Energy Production (10^6 kWh)	7.3	3.57	3.18			
5 Cycle Length	S	S	P/F			

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	1	2	3	4		
2 Number of Ass'ys in Batch	20	116	80	268		
3 Cycle In	1	1	1	1		
4 Date In	9/70	9/70	9/70	9/70		
5 Cycle Out	1	2	3	4		
6 Date Out	4/73	4/74	1/75	10/76		
7 Batch Weight (MTU)	3.9	22.9	15.5	52.0		
8 U-235 Enrichment In	2.25	2.25	2.25	2.25		
9 U-235 Enrichment Out	1.53	1.15	1.04	0.98		
10 Fissile Plutonium (% Initial Uranium)	0.33	0.41	0.42	0.43		
11 Total Plutonium (% Initial Uranium)	0.41	0.59	0.63	0.66		
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.986	0.978	0.975	0.974		
13 Batch Burnup, Predicted (MWD/MTU)	+	+	+	+		
14 Batch Burnup, Actual (MWD/MTU)	7,850	13,750	15,930	16,900		
15 Reason for Discharge of Batch	P/F	S/F	S/F	S/F		
16 Duty Factor, no recycle (10^6 kWhe/ST(U_3O_8))	10.2	17.9	20.8	21.9		
17 Duty Factor, U recycle (10^6 kWhe/ST(U_3O_8))	27.7	31.0	32.7	33.0		
Cycle Information						
1 Cycle Number	1	2	3	4		
2 Cycle Burnup, Predicted (MWD/MTU)	8,480	4,200	5,100	4,420		
3 Cycle Burnup, Actual (MWD/MTU)	7,850	4,410	3,100	3,240		
4 Energy Production (10^6 kWhe)	6.0	3.4	2.3	2.4		
5 Cycle Length	P	E	P	P		

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

Batch Information						
1 Batch Number	1	2	3	4	5	6
2 Number of Ass'ys in Batch	17	31	104	148	194	6
3 Cycle In	1A	1A	1A	1A	1A	2
4 Date In	10/69	10/69	10/69	10/69	10/69	6/73
5 Cycle Out	1B	1C	2	3	4	4
6 Date Out	9/71	3/72	4/73	3/74	9/75	9/75
7 Batch Weight (MTU)	3.12	5.69	19.10	22.20	35.50	1.10
8 U-235 Enrichment In	2.11	2.11	2.11	2.11	2.11	2.30
9 U-235 Enrichment Out	1.57	1.40	1.10	0.88	0.78	0.72
10 Fissile Plutonium (% Initial Uranium)	0.30	0.34	0.43	0.47	0.50	0.47
11 Total Plutonium (% Initial Uranium)	0.35	0.39	0.54	0.64	0.71	0.64
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.991	0.988	0.981	0.976	0.974	0.976
13 Batch Burnup, Predicted (MWD/MTU)	14,600	14,500	14,500	17,100	20,700	23,200
14 Batch Burnup, Actual (MWD/MTU)	5,700	8,010	12,580	16,800	18,950	17,130
15 Reason for Discharge of Batch	S/F	S/F	S/F	S/F	S/F	S/F
16 Duty Factor, no recycle (10^6 kWhr/ST(U_3O_8))	8.0	11.2	17.5	23.4	26.4	21.6
17 Duty Factor, U recycle (10^6 kWhr/ST(U_3O_8))	25.5	26.9	30.9	34.0	35.4	32.1
Cycle Information						
1 Cycle Number	1A	1B	1C	2	3	4
2 Cycle Burnup, Predicted (MWD/MTU)	7,770	2,980	5,640	4,980	5,900	7,930
3 Cycle Burnup, Actual (MWD/MTU)	5,080	2,480	4,210	4,490	6,360	+
4 Energy Production (10^6 kWhr)	4.05	1.94	3.34	3.44	4.90	+
5 Cycle Length	P/F	S	S	S	S	+

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA - OYSTER CREEK

TABLE 20

Batch Information						
1 Batch Number	1	2	3	4	5	6
2 Number of Ass'ys in Batch	24	136	148	68	112	56
3 Cycle In	1A	1A	1A	1A	1A	1A
4 Date In	12/69	12/69	12/69	12/69	12/69	12/69
5 Cycle Out	1A	1B	2	3	4	5
6 Date Out	9/71	5/72	4/73	4/74	3/75	12/75
7 Batch Weight (MTU)	+	+	+	+	+	+
8 U-235 Enrichment In	2.1	2.1	2.1	2.1	2.1	2.1
9 U-235 Enrichment Out	1.3	1.1	0.9	0.7	0.6	0.8
10 Fissile Plutonium (% Initial Uranium)	0.35	0.40	0.45	0.47	0.48	0.47
11 Total Plutonium (% Initial Uranium)	+	+	+	+	+	+
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.986	0.981	0.975	0.971	0.967	0.971
13 Batch Burnup, Predicted (MWD/MTU)	9,700	12,600	17,200	21,800	25,700	28,900
14 Batch Burnup, Actual (MWD/MTU)	9,200	12,200	16,600	19,800	22,300	19,400
15 Reason for Discharge of Batch	S	S	S	S	S	P/R
16 Duty Factor, no recycle (10^6 kWh/ST(U_{2O_8}))	13.0	17.1	23.3	27.8	32.0	27.1
17 Duty Factor, U recycle (10^6 kWh/ST(U_{3O_8}))	28.0	29.1	34.5	35.4	38.0	37.0
Cycle Information						
1 Cycle Number	1A	1B	2	3	4	5
2 Cycle Burnup, Predicted (MWD/MTU)	8,300	3,000	5,600	5,600	5,600	5,600
3 Cycle Burnup, Actual (MWD/MTU)	8,300	2,600	4,500	4,200	4,200	2,500
4 Energy Production (10^6 kWh)	6.80	2.26	3.98	3.54	3.59	1.96
5 Cycle Length	S	S	S	S	S	P/R

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA - OYSTER CREEK (Continued)

Batch Information						
1 Batch Number	7					
2 Number of Ass'ys in Batch	4					
3 Cycle In	2					
4 Date In	6/72					
5 Cycle Out	3					
6 Date Out	4/74					
7 Batch Weight (MTU)	+					
8 U-235 Enrichment In	2.6					
9 U-235 Enrichment Out	1.7					
10 Fissile Plutonium (% Initial Uranium)	0.38					
11 Total Plutonium (% Initial Uranium)	+					
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.984					
13 Batch Burnup, Predicted (MWD/MTU)	11,600					
14 Batch Burnup, Actual (MWD/MTU)	10,400					
15 Reason for Discharge of Batch						
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))	11.4					
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))	28.0					
Cycle Information						
1 Cycle Number						
2 Cycle Burnup, Predicted (MWD/MTU)						
3 Cycle Burnup, Actual (MWD/MTU)						
4 Energy Production (10 ⁶ kWh)						
5 Cycle Length						

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available

Batch Information						
1 Batch Number	1	2	3	4	5	5a
2 Number of Ass'ys in Batch	4	32	4	152	168	8
3 Cycle In	1	1	1	1	1	1
4 Cycle In	9/72	9/72	9/72	9/72	9/72	9/72
5 Cycle Out	1	1	1	2	2	18
6 Cycle Out	11/73	11/73	11/73	1/74	1/74	3/73
7 Batch Weight (MTU)	0.77	7.19	0.77	29.42	32.52	1.55
8 U-235 Enrichment In	2.50	2.50	2.50	2.50	2.50	2.50
9 U-235 Enrichment Out	2.11	2.05	2.00	1.78	1.67	2.39
10 Fissile Plutonium (% Initial Uranium)	0.197	0.228	0.250	0.331	0.371	0.0623
11 Total Plutonium (% Initial Uranium)	0.213	0.250	0.276	0.380	0.434	0.0628
12 Ratio Uranium in Spent Fuel to Initial Uranium	.994	.993	.992	.988	.986	1.0
13 Batch Burnup, Predicted (MWD/MTU)						
14 Batch Burnup, Actual (MWD/MTU)	3,670	4,512	4,512	7,622	9,124	927
15 Reason for Discharge of Batch	P/F	P/F	P/F	P/F	P/F	P/F
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))	4.2	5.2	5.2	8.8	10.4	1.1
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))	22.5	23.3	21.2	25.8	26.5	17.3
Cycle Information						
1 Cycle Number						
2 Cycle Burnup, Predicted (MWD/MTU)						
3 Cycle Burnup, Actual (MWD/MTU)						
4 Energy Production (10 ⁶ kWh)						
5 Cycle Length						

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available

FUEL PERFORMANCE DATA - VERMONT YANKEE (Continued)

Batch Information						
1 Batch Number	56					
2 Number of Ass'ys in Batch	8					
3 Cycle In	1X					
4 Date In	8/73					
5 Cycle Out	2					
6 Date Out	1/74					
7 Batch Weight (MTU)	1.55					
8 U-235 Enrichment In	2.50					
9 U-235 Enrichment Out	1.67					
10 Fissile Plutonium (% Initial Uranium)	0.370					
11 Total Plutonium (% Initial Uranium)	0.434					
12 Ratio Uranium in Spent Fuel to Initial Uranium	.986					
13 Batch Burnup, Predicted (MWD/MTU)						
14 Batch Burnup, Actual (MWD/MTU)	9,124					
15 Reason for Discharge of Batch	P/F					
16 Duty Factor, no recycle (10 ⁶ kWhr/ST(U ₃ O ₈))	10.4					
17 Duty Factor, U recycle (10 ⁶ kWhr/ST(U ₃ O ₈))	26.5					
Cycle Information						
1 Cycle Number						
2 Cycle Burnup, Predicted (MWD/MTU)						
3 Cycle Burnup, Actual (MWD/MTU)						
4 Energy Production (10 ⁶ kWhr)						
5 Cycle Length						

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA

MILLSTONE - I

Batch Information						
1 Batch Number	1	2	3	4	5	6
2 Number of Ass'ys in Batch	28	205	130	5	3	8
3 Cycle In	1	1	1	1	2	2
4 Date In	12/70	12/70	12/70	12/70	3/73	3/73
5 Cycle Out	1	2	3	3	2	3
6 Date Out	9/72	8/74	9/75	9/75	8/74	9/75
7 Batch Weight (MTU)	5.45	40.0	25.4	0.977	0.583	1.554
8 U-235 Enrichment In	2.081	2.081	2.081	2.081	2.30	2.30
9 U-235 Enrichment Out	1.359	0.985	0.834	1.121	1.664	1.392
10 Fissile Plutonium (% Initial Uranium)	0.351	0.454	0.475	0.422	0.307	0.399
11 Total Plutonium (% Initial Uranium)	-	-	-	-	-	-
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.987	0.979	0.976	0.975	0.984	0.967
13 Batch Burnup, Predicted (MWD/MTU)	8360	14400	16058	16058	6900	16058
14 Batch Burnup, Actual (MWD/MTU)	-	14	16540	12090	6900	10671
15 Reason for Discharge of Batch	F	S/F	S/F	S/F	F	F
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	-	21.5	24.3	17.8	8.69	13.5
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	-	34.3	35.3	33.1	26.2	28.2

Cycle Information						
1 Cycle Number	1	2	3			
2 Cycle Burnup, Predicted (MWD/MTU)	-	5210	4839			
3 Cycle Burnup, Actual (MWD/MTU)	7749	5435	4453			
4 Energy Production (10^6 kWh)	6.81	4.71	3.90			
5 Cycle Length	P/R	P/R	S			

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

FUEL PERFORMANCE DATA -

DRESDEN-1

①

Batch Information						
1 Batch Number (DISCHARGE)	1	2	3	4	5	6
2 Number of Ass'ys in Batch	178	89	97	100	65	1
3 Cycle In	*	*	*	*	*	*
4 Date In	*	*	*	*	*	*
5 Cycle Out	1	2	3	4	5	6
6 Date Out	11/7/62	4/12/64	3/28/65	1/12/67	2/03/68	9/06/68
7 Batch Weight (MTU)	19.961	9.792	10.105	10.464	6.771	0.108
8 U-235 Enrichment In	1.47	1.47	1.47	1.47	1.47	1.47
9 U-235 Enrichment Out	0.920	0.727	0.624	0.583	0.624	0.254
10 Fissile Plutonium (% Initial Uranium)	+	+	0.314	+	0.314	0.454
11 Total Plutonium (% Initial Uranium)	0.331	0.423	0.433	+	0.431	0.713
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.992	0.991	0.981	0.979	0.982	0.962
13 Batch Burnup, Predicted (MWD/MTU)	8,269	8,269	8,269	8,269	8,269	8,269
14 Batch Burnup, Actual (MWD/MTU)	6,385	9,488	10,358	12,671	10,006	23,527
15 Reason for Discharge of Batch	S	S	S	S	S	S
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	13.65	20.25	22.25	27.1	21.4	50.4
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	28.4	31.6	32.7	35.4	31.5	50.4
Cycle Information						
1 Cycle Number	1	2	3	4	5	6
2 Cycle Burnup, Predicted (MWD/MTU)	+	+	+	+	+	23,220
3 Cycle Burnup, Actual (MWD/MTU)	6,390	9,370	9,260	10,030	10,550	16,140
4 Energy Production (10^6 kWh)	2.080	1.327	0.984	2.257	0.943	1.749
5 Cycle Length	S	S	S	S	S	S

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available
 * - RECORDS MAINTAINED ON DISCHARGE BATCH PAPER

FUEL PERFORMANCE DATA - DRESDEN -1

(2)

Batch Information						
1 Batch Number (DISCHARGE)	7	8	9	10	11	12
2 Number of Ass'ys in Batch	8	8	103	1	4	4
3 Cycle In	*	*	*	*	*	*
4 Date In	*	*	*	*	*	*
5 Cycle Out	1	2	3	6	4	5
6 Date Out	11/7/62	4/12/64	3/28/65	9/11/69	1/13/67	2/23/67
7 Batch Weight (MTU)	0.625	0.654	8.431	0.090	0.393	0.401
8 U-235 Enrichment In	2.51	2.51	2.51	2.51	2.245	2.245
9 U-235 Enrichment Out	2.08	1.72	1.72	2.302	1.434	1.320
10 Fissile Plutonium (% Initial Uranium)	+	+	0.277	0.404	0.321	0.349
11 Total Plutonium (% Initial Uranium)	0.265	0.332	0.336	0.711	0.395	0.428
12 Ratio Uranium in Spent Fuel to Initial Uranium	0.995	0.985	0.985	0.964	0.987	0.930
13 Batch Burnup, Predicted (MWD/MTU)	13,230	13,230	13,220	13,220	+	+
14 Batch Burnup, Actual (MWD/MTU)	7,531	8,127	8,177	25,693	8,758	10,316
15 Reason for Discharge of Batch	S	S	S	S	F	S
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))	8.62	9.25	9.32	29.4	11.25	13.3
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))	41.7	24.3	24.5	29.4	26.7	27.3
Cycle Information						
1 Cycle Number	7	8	9A	9B		
2 Cycle Burnup, Predicted (MWD/MTU)	23,120	23,570	23,180	23,180		
3 Cycle Burnup, Actual (MWD/MTU)	19,620	19,420	24,590	19,700		
4 Energy Production (10^6 kWh)	2.151	1.842	0.149	1.021		
5 Cycle Length	S	S	R	S		

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available

* - RECORDS MAINTAINED ON DISCHARGE BATCH 5A

FUEL PERFORMANCE DATA - DRESDEN-1

③

Batch Information							
1 Batch Number (DISCHARGE)		13	14	15	16	17	18
2 Number of Ass'ys in Batch		24	20	3	36	2	27
3 Cycle In		*	*	*	*	*	*
4 Cycle Out		*	*	*	*	*	*
5 Cycle Out		6	7	8	9A	4	5
6 Date Out		9/26/69	9/10/71	10/8/73	9/1/74	1/13/67	2/2/67
7 Batch Weight (MTU)		2.472	1.981	0.297	3.563	0.197	2.699
8 U-235 Enrichment In		2.245	2.245	2.245	2.245	1.73	1.73
9 U-235 Enrichment Out		0.969	0.619	0.634	0.593	0.842	0.77%
10 Fissile Plutonium (% Initial Uranium)		0.456	0.481	0.479	0.486	0.351	0.374
11 Total Plutonium (% Initial Uranium)		0.562	0.675	0.674	0.689	0.461	0.506
12 Ratio Uranium in Spent Fuel to Initial Uranium		0.977	0.967	0.967	0.967	0.983	0.982
13 Batch Burnup, Predicted (MWD/MTU)		+	+	+	+	+	+
14 Batch Burnup, Actual (MWD/MTU)		16,154	23,739	23,741	24,631	12,036	14,045
15 Reason for Discharge of Batch		S	S	S	S	S	S
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))		20.7	30.6	30.6	31.6	21.25	24.7
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))		31.2	36.5	36.7	36.8	33.2	36.5
Cycle Information							
1 Cycle Number							
2 Cycle Burnup, Predicted (MWD/MTU)							
3 Cycle Burnup, Actual (MWD/MTU)							
4 Energy Production (10^6 kWh)							
5 Cycle Length							

S - Scheduled Outage
 E - Extended Cycle
 P - Non-scheduled Outage

F - Fuel Failures
 R - Repair to plant system
 + - Data not Available

* - RECORDS MAINTAINED ON DISCHARGE BATCH BASIS

FUEL PERFORMANCE DATA - DRESDEN-1

(4)

Batch Information							
1 Batch Number (DISCHARGE)		19	20	21	22	23	24
2 Number of Ass'ys in Batch		58	69	4	1	21	9
3 Cycle In		*	*	*	*	*	*
4 Date In		*	*	*	*	*	*
5 Cycle Out		5	7	8	9A	9B	6
6 Date Out		9/2/69	9/10/71	10/2/72	9/1/74	9/1/75	9/6/69
7 Batch Weight (MTU)		5.761	6.850	0.394	0.099	2.071	0.940
8 U-235 Enrichment In		1.73	1.73	1.73	1.73	1.73	2.245
9 U-235 Enrichment Out		0.592	0.582	0.325	0.325	0.492	1.323
10 Fissile Plutonium (% Initial Uranium)		0.329	0.414	0.453	0.446	0.430	0.346
11 Total Plutonium (% Initial Uranium)		0.537	0.588	0.716	0.623	0.631	0.422
12 Ratio Uranium in Spent Fuel to Initial Uranium		0.979	0.975	0.966	0.969	0.973	0.985
13 Batch Burnup, Predicted (MWD/MTU)		+	+	+	+	+	+
14 Batch Burnup, Actual (MWD/MTU)		15,421	17,730	25,490	23,214	19,974	10,303
15 Reason for Discharge of Batch		S	S	S	S	S	F
16 Duty Factor, no recycle (10 ⁶ kWh/ST(U ₃ O ₈))		27.2	31.25	45.0	40.8	35.2	13.3
17 Duty Factor, U recycle (10 ⁶ kWh/ST(U ₃ O ₈))		39.3	38.8	45.0	43.4	42.5	27.2
Cycle Information							
1 Cycle Number							
2 Cycle Burnup, Predicted (MWD/MTU)							
3 Cycle Burnup, Actual (MWD/MTU)							
4 Energy Production (10 ⁶ kWh)							
5 Cycle Length							

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available
* - RECORDS MAINTAINED ON DISCHARGE SHEET BASE

FUEL PERFORMANCE DATA - DRESDEN-1

5

Batch Information							
1 Batch Number (DISCHARGE)		25	26	27	28	29	30
2 Number of Ass'ys in Batch		15	11	2	16	17	24
3 Cycle In		*	*	*	*	*	*
4 Date In		*	*	*	*	*	*
5 Cycle Out		7	8	98	7	8	95
6 Date Out		9/10/71	10/8/73	9/1/75	9/10/71	10/8/73	9/1/75
7 Batch Weight (MTU)		1.559	1.129	0.205	1.609	1.690	2.323
8 U-235 Enrichment In		2.245	2.245	2.245	2.245	2.245	2.245
9 U-235 Enrichment Out		0.981	0.811	0.723	1.062	0.762	0.622
10 Fissile Plutonium (% Initial Uranium)		0.423	0.457	0.470	0.407	0.474	0.482
11 Total Plutonium (% Initial Uranium)		0.649	0.616	0.646	0.519	0.627	0.667
12 Ratio Uranium in Spent Fuel to Initial Uranium		0.977	0.972	0.970	0.979	0.971	0.957
13 Batch Burnup, Predicted (MWD/MTU)		+	+	+	23,220	23,220	23,220
14 Batch Burnup, Actual (MWD/MTU)		15,841	19,609	21,529	14,326	20,221	23,207
15 Reason for Discharge of Batch		S	S	S	S	S	F
16 Duty Factor, no recycle (10^6 kWh/ST(U_3O_8))		20.4	25.2	27.6	18.45	26.1	30.6
17 Duty Factor, U recycle (10^6 kWh/ST(U_3O_8))		30.9	33.9	34.8	29.5	33.8	36.4
Cycle Information							
1 Cycle Number							
2 Cycle Burnup, Predicted (MWD/MTU)							
3 Cycle Burnup, Actual (MWD/MTU)							
4 Energy Production (10^6 kWh)							
5 Cycle Length							

S - Scheduled Outage
E - Extended Cycle
P - Non-scheduled Outage

F - Fuel Failures
R - Repair to plant system
+ - Data not Available
* - RECORDS MAINTAINED ON DISCHARGE BATCH BASIS