GE Nuclear Energy

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Supplemental Reload Licensing Report

for

Millstone Point Nuclear Power Station
Reload 14 Cycle 15

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Please read carefully

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Acknowledgment

The engineering and reload licensing analyses which form the technical basis of this Supplemental Reload Licensing Submittal, were performed by E. O. Electona of the Nuclear Fuel Section. The Supplemental Reload Licensing Submittal was prepared by P. A. Lambert of Fuel Licensing. This document has been reviewed and verified by both the Nuclear Fuel Section and C. W. Smith of Fuel Licensing.

The basis for this report is *General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A-10, February 1991; and the U.S. Supplement, NEDE-24011-P-A-10-US, March 1991.

1. Plant-Unique Items

Appendix A: Analysis Conditions
Appendix B: Limiting Conditions for Operation
Appendix C: Bases for Limiting Conditions for Operation
Appendix D: Changes in Analyses

2. Reload Fuel Bundles

Fuel Type	Cycle Loaded	Number
Irradiated		
GE8B-P8DQB338-11GZ-80M-145-T (BD338A)(GE8x8EB)	12	8
GE8B-P8DQB338-11GZ-80M-145-T (BD338A)(GE8x8EB)	13	196
GE10-P8HXB314-9GZ-100M-145-T (GE8x8NB-3)	14	188
New		
GE10-P8HXB324-10GZ-100M-145-T (GE8x8NB-3)	15	48
GE10-P8HXB324-11GZ-100M-145-T (GE8x8NB-3)	15	140
Total		580

3. Reference Core Loading Pattern

	MWd/ST	MWd/MT
Nominal previous cycle core average exposure at end of cycle:	23,601	26,016
Minimum previous cycle core average exposure at end of cycle from cold shutdown considerations:	23,201	25,575
Assumed reload cycle core average exposure at beginning of cycle:	13,556	14,943
Assumed reload cycle core average exposure at end of cycle:	24,216	26,693
Reference core loading pattern:	Figure 1	

4. Calculated Core Effective Multiplication and Control System Worth - No Voids, 20°C

Beginning of Cycle, $K_{effective}$

Uncontrolled	1.0970
Fully controlled	0.9481
Strongest control rod out	0.9792
R, Maximum increase in cold core reactivity with exposure into cycle, ΔK	0.0028

5. Standby Liquid Control System Shutdown Capability

Boron (ppm)	Shutdown Margin (ΔK) (20°C, Xenon Free)
660	0.052

6. Reload Unique GETAB AOO Analysis Initial Condition Parameters

Exposure: BOC15 to EOC15

Fuel	Peaking Factors				Bundle Power	Bundle Flow	Initial
Design	Local	Radial	Axial	R-Factor	(MWt)	(1,000 lb/hr)	MCPR
GE8X8NB-3	1.20	1.83	1.40	1.000	6.195	92.4	1.31
GE8X8EB	1.20	1.76	1.40	1.051	5.949	99.2	1.30

7. Selected Margin Improvement Options

Recirculation pump trip:	No
Rod withdrawal limiter:	No
Thermal power monitor:	No
Improved scram time:	Yes (ODYN Option B)
Exposure dependent limits:	No
Exposure points analyzed:	1 (EOC)

8. Operating Flexibility Options

Single-loop operation:	Yes
Load line limit:	Yes
Extended load line limit:	Yes
Maximum extended load line limit:	No
Increased core flow throughout the cycle:	No
Increased core flow at end of cycle:	No
Flow point analyzed:	N/A
Feedwater temperature reduction throughout the cycle:	No
Final feedwater temperature reduction:	Yes
Temperature reduction ΔT:	75°F
ARTS Program:	No
Maximum extended operating domain:	No
ADS valve out of service:	No
Safety/relief valve(s) out of service:	No
Main steam isolation valve out of service:	No
Turbine bypass out of service:	No
EOC Recirculation pump trip out of service:	No

9. Core-wide AOO Analysis Results

Methods used: GEMINI and GEXL-PLUS

Event	Flux (% NBR)	Q/A (% NBR)	Uncorrected ΔCPR GE8x8NB-3	Uncorrected ΔCPR BP8x8EB	Figure
Exposure range: BOC15 to EOC15					
Load rejection without bypass	431	124	0.24	0.23	2
Feedwater controller[1] failure					

[1] See Appendix D.

10. Local Rod Withdrawal Error (With Limiting Instrument Failure) AOO Summary

Limiting rod pattern: Figure 3

Rod Block Reading	Rod Position (feet withdrawn)	ΔCPR GE8x8NB-3/GE8X8EB
104	4.0	0.13
105	4.5	0.15
106	4.5	0.15
107	5.0	0.17
108	5.5	0.20
109	6.0	0.22
110	8.5	0.27

Setpoint selected: 107

11. Cycle MCPR Values

Safety limit: 1.07

Single loop operation safety limit: 1.08

Non-pressurization events

	GE8x8NB-3	GE8x8EB
Exposure range: BOC15 to EOC15		
Fuel loading error	1.26	--
Rod withdrawal error	1.24	1.24

Pressurization events

	Option A		Option B	
	GE8x8NB-3	BP8x8EB	GE8x8NB-3	BP8x8EB
Exposure range: BOC15 to EOC15				
Load rejection without bypass	1.37	1.36	1.32	1.31

12. Overpressurization Analysis Summary

Event	P_{sl} (psig)	P_v (psig)	Plant Response
MSIV closure (flux scram)	1293	1310	Figure 4

13. Loading Error Results

Variable water gap misoriented bundle analysis: Yes

Event	ΔCPR
Misoriented fuel bundle	0.19

14. Control Rod Drop Analysis Results

Millstone Point Nuclear Power Station Unit 1 is a banked position withdrawal sequence (BPWS) plant; so the control rod drop accident analysis is not required. NRC approval is documented in NEDE-24011-P-A-10-US, March 1991.

15. Stability Analysis Results

Millstone Point Nuclear Power Station Unit 1 is exempt from the current requirement to submit a cycle-specific stability analysis as documented in the letter, C. O. Thomas (NRC) to H. C. Pfefferlen (GE), *Acceptance for Referencing of Licensing Topical Report NEDE-24011 Rev. 6, Amendment 8, 'Thermal Hydraulic Stability Amendment to GESTAR II,'* April 24, 1985.

However, Millstone-1 does comply with the requested actions of NRC Bulletin No. 88-07, Supplement 1, *Power Oscillations in Boiling Water Reactors (BWRs)*, June 15, 1988, and the Interim Recommendations for Stability Actions contained in the letter from R. C. Livingston (GE) to S. E. Scace (NU) *GE PRC 88-15 BWR Thermal Hydraulic Stability*, G-EH-8-172, November 4, 1988.

16. Loss-of-coolant Accident Results

LOCA method used: SAFE/REFLOOD/CHASTE
See *Loss of Coolant Accident Analysis Report for Millstone Point Unit 1 Nuclear Power Station*, General Electric Company, NEDC-31740P, July 1989, as amended.

16. Loss-of-coolant Accident Results (continued)

The reload 14 GE8x8NB-3 fuel bundle designs LOCA analyses result in a licensing basis peak clad temperature of 2170°F and a peak local oxidation fraction of <0.075. The single loop operation MAPLHGR multiplier of 0.86 is applicable to the new GE8x8NB-3 fuel designs. The following tables are the most limiting and the least limiting MAPLHGRs for the GE8x8NB-3 fuel designs:

Bundle Type: GE10-P8HXB324-10GZ-100M-145-T (GE8x8NB-3)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	10.90	11.67
0.2	0.2	10.95	11.70
1.0	1.1	11.07	11.83
2.0	2.2	11.25	12.01
3.0	3.3	11.43	12.20
4.0	4.4	11.63	12.38
5.0	5.5	11.84	12.56
6.0	6.6	12.02	12.59
7.0	7.7	12.16	12.62
8.0	8.8	12.32	12.65
9.0	9.9	12.48	12.65
10.0	11.0	12.64	12.65
12.5	13.8	12.65	12.65
15.0	16.5	12.53	12.65
20.0	22.0	12.05	12.10
25.0	27.6	11.44	11.54
35.0	38.6	10.19	10.35
45.0	49.6	8.65	9.01
50.55	55.72	5.90	6.20
51.11	56.34	---	5.91

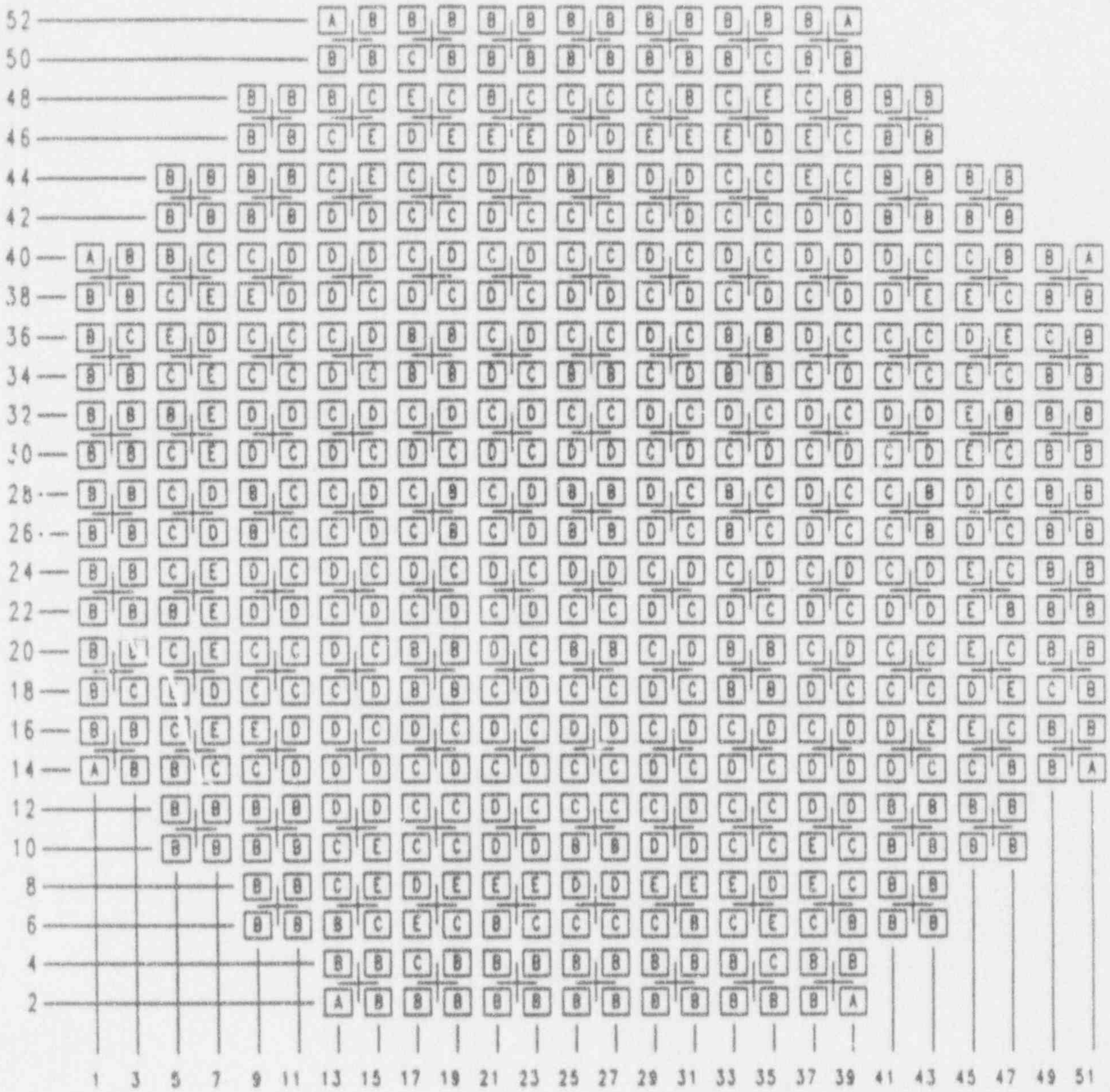
[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.

16. Loss-of-coolant Accident Results (continued)

Bundle Type: GE10-P8HXB324-11GZ-100M-145-T (GE8x8NB-3)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	10.60	11.39
0.2	0.2	10.66	11.46
1.0	1.1	10.78	11.58
2.0	2.2	10.96	11.72
3.0	3.3	11.14	11.85
4.0	4.4	11.34	11.99
5.0	5.5	11.55	12.14
6.0	6.6	11.76	12.29
7.0	7.7	11.92	12.43
8.0	8.8	12.07	12.55
9.0	9.9	12.23	12.55
10.0	11.0	12.40	12.55
12.5	13.8	12.55	12.55
15.0	16.5	12.51	12.55
20.0	22.0	12.04	12.09
25.0	27.6	11.43	11.54
35.0	38.6	10.18	10.34
45.0	49.6	8.58	8.91
50.41	55.57	5.90	6.18
50.92	56.13	---	5.92

[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.



FUEL TYPE

A=GE8B-P8DQB338-11GZ-80M-145-T (BD338A)
B=GE8B-P8DQB338-11GZ-80M-145-T (BD338A)
C=GE10-P8HXB314-9GZ-100M-145-T
D=GE10-P8HXB324-11GZ-100M-145-T
E=GE10-P8HXB324-10GZ-100M-145-T

Figure 1 Reference Core Loading Pattern

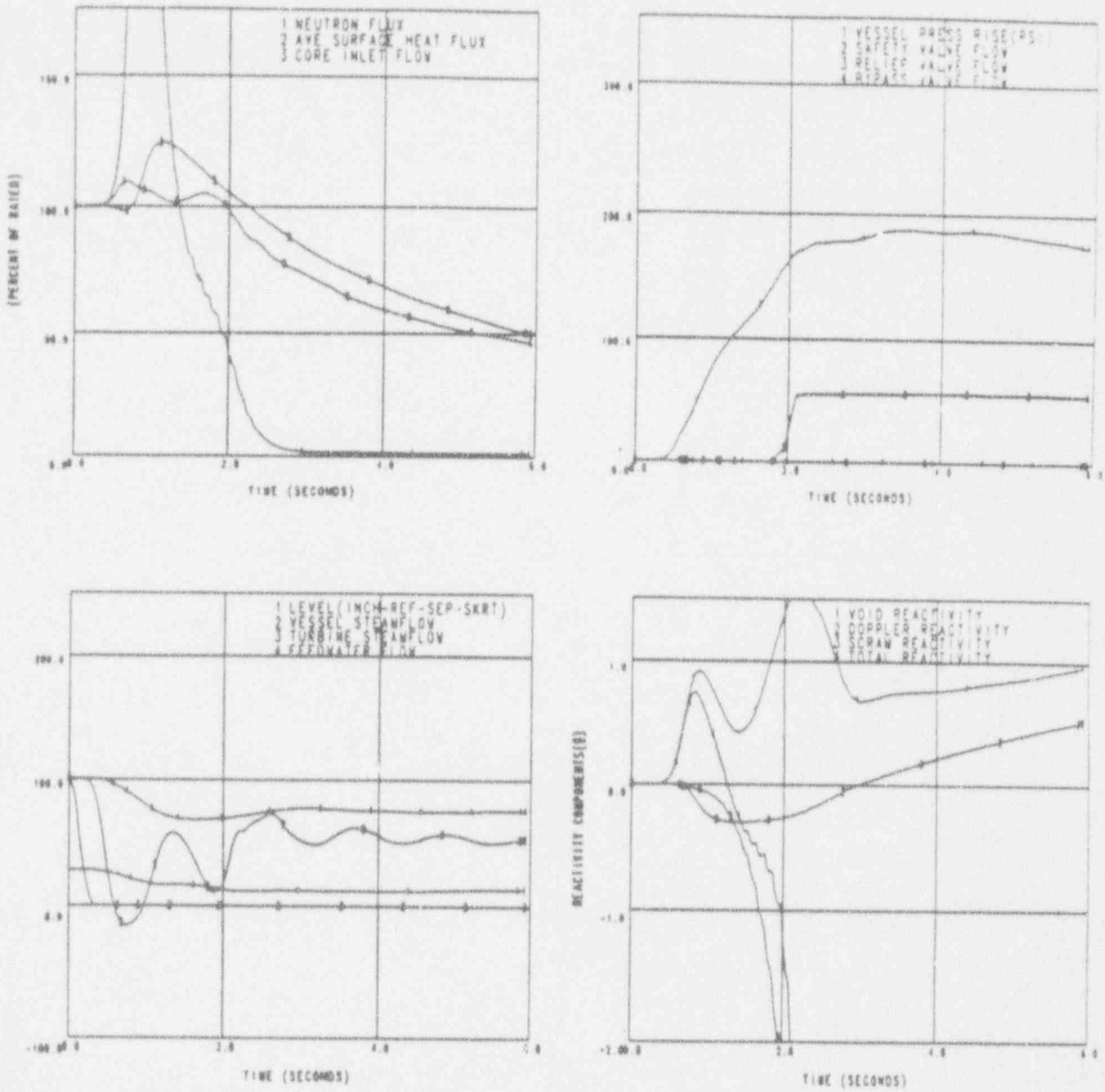


Figure 2 Plant Response to Load Rejection without Bypass (EOC15)

	2	6	10	14	18	22	26	30	34	38	42	46	50
51													
47						30		30					
43			38				18				38		
39				0		8		8		0			
35			6		32		12		32		6		
31		8		8		0		0		8		8	
27			12		10				10		12		
23		8		8		0		0		8		8	
19			6		32		12		32		6		
15				0		8		8		0			
11			38				18				38		
7						30		30					
3													

Notes

1. Number indicates number of notches withdrawn out of 48; a blank is a withdrawn rod.
2. Error rod is (14, 39).

Figure 3 Limiting Rod Pattern

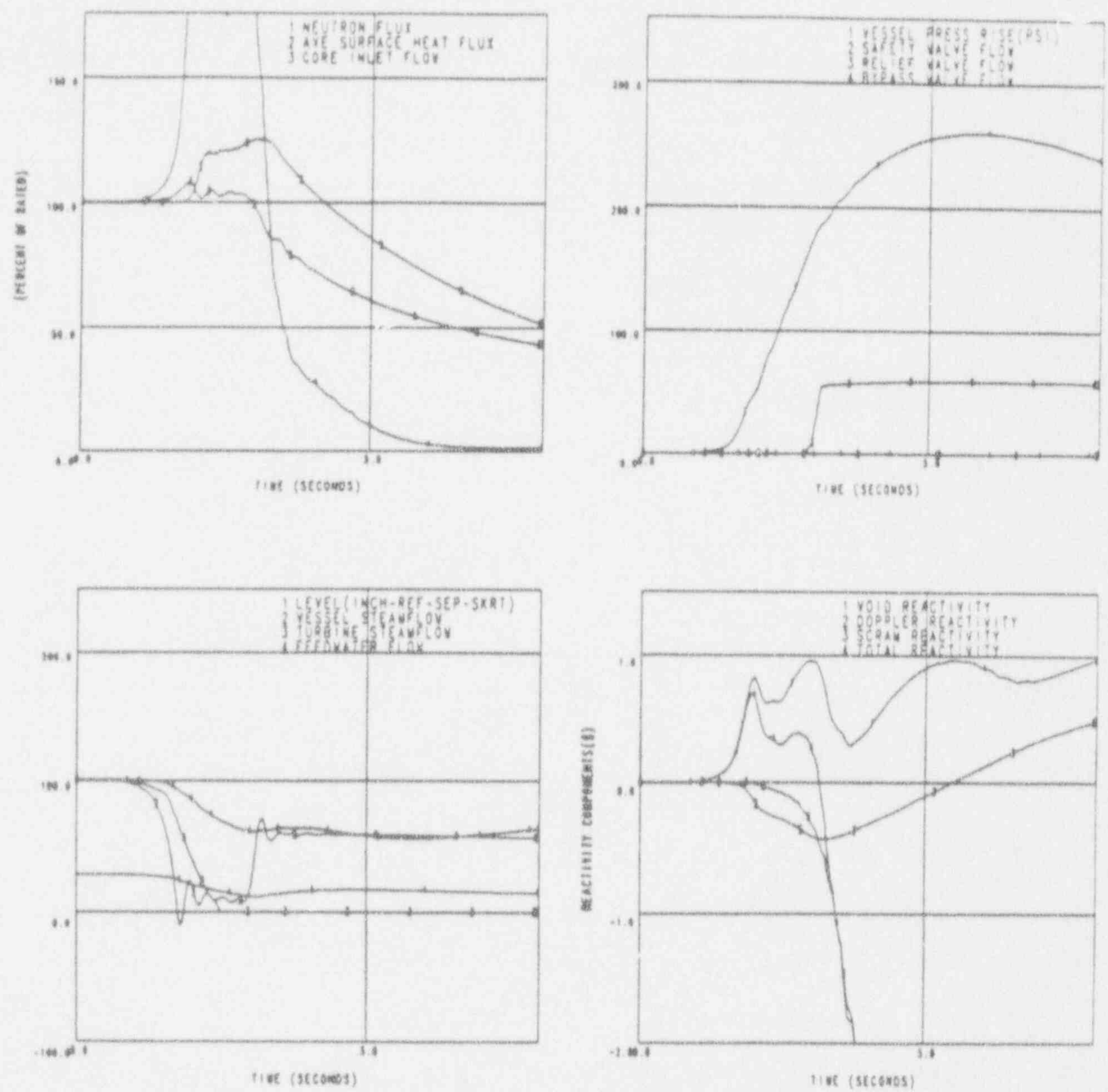


Figure 4 Plant Response to MSIV Closure, Flux Scram (EOC15)

Appendix A

Analysis Conditions

To reflect actual plant parameters accurately, the values shown in Table A-1 were used this cycle.

Table A-1

Parameter	Analysis Value
Thermal power, MWt	2011
Dome pressure, psig	1035
Steam flow, Mlb/hr	8.06
Turbine pressure, psig	975
Core flow, Mlb/hr	69.0
Reactor pressure, psia	1065
Inlet enthalpy, BTU/lb	526.7
Non-fuel power fraction	0.038
No. of Safety/Relief Valves	5[1]
Lowest setpoint, psig	1128

[1] Transient analyses assumed 1 of 6 S/RVs out of service.

Appendix B

Limiting Conditions for Operation

This appendix provides the limiting condition for operation (LCO) for each of the reactor fuel assembly limits identified below:

(1) Average Planar Linear Heat Generation Rate (APLHGR)
(2) Linear Heat Generation Rate (LHGR)
(3) Minimum Critical Power Ratio (MCPR)

Surveillance requirements and required actions are specified in the Technical Specifications. The reactor fuel assembly limit bases are given in Appendix C.

APLHGR

During power operation, the APLHGR for each type of fuel as a function of axial location and average planar exposure shall not exceed limits based on applicable APLHGR limit values which have been approved for the respective fuel and lattice types determined by the approved methodology described in GESTAR II (NEDE-24011-P-A). If hand calculations are required, the APLHGR for each type of fuel as a function of average planar exposure shall not exceed the limiting value for the most limiting lattice (excluding natural uranium) shown in Tables B-1 through B-4.

LHGR

During steady-state power operation, the LHGR of any rod in any assembly at any axial location shall not exceed the following:

14.4 kW/ft for GE8x8EB (GE8B) and GE8x8NB-3 (GE10) fuel

MCPR

The applicable fuel cladding integrity safety limit MCPR for this cycle is 1.07. During power operation, the MCPR for each type of fuel shall be equal to or greater than the limiting value (shown in Table B-5) times the K_f (shown in Figure B-1).

Appendix B (continued)

Limiting Conditions for Operation

Table B-1

Maximum Average Planar Linear Heat Generation Rate

Bundle Type: GE10-P8HXB324-10GZ-100M-145-T (GE8x8NB-3)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	10.90	11.67
0.2	0.2	10.95	11.70
1.0	1.1	11.07	11.83
2.0	2.2	11.25	12.01
3.0	3.3	11.43	12.20
4.0	4.4	11.63	12.38
5.0	5.5	11.84	12.56
6.0	6.6	12.02	12.59
7.0	7.7	12.16	12.62
8.0	8.8	12.32	12.65
9.0	9.9	12.48	12.65
10.0	11.0	12.64	12.65
12.5	13.8	12.65	12.65
15.0	16.5	12.53	12.65
20.0	22.0	12.05	12.10
25.0	27.6	11.44	11.54
35.0	38.6	10.19	10.35
45.0	49.6	8.65	9.01
50.55	55.72	5.90	6.20
51.11	56.34	---	5.91

[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.

Appendix B (continued)

Limiting Conditions for Operation

Table B-2

Maximum Average Planar Linear Heat Generation Rate

Bundle Type: GE10-P8HXB324-11GZ-100M-145-T (GE8x8NB-3)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	10.60	11.39
0.2	0.2	10.66	11.46
1.0	1.1	10.78	11.58
2.0	2.2	10.96	11.72
3.0	3.3	11.14	11.85
4.0	4.4	11.34	11.99
5.0	5.5	11.55	12.14
6.0	6.6	11.76	12.29
7.0	7.7	11.92	12.43
8.0	8.8	12.07	12.55
9.0	9.9	12.23	12.55
10.0	11.0	12.40	12.55
12.5	13.8	12.55	12.55
15.0	16.5	12.51	12.55
20.0	22.0	12.04	12.09
25.0	27.6	11.43	11.54
35.0	38.6	10.18	10.34
45.0	49.6	8.58	8.91
50.41	55.57	5.90	6.18
50.92	56.13	---	5.92

[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.

Appendix B (continued)

Limiting Conditions for Operation

Table B-3

Maximum Average Planar Linear Heat Generation Rate

Bundle Type: GE10-P8HXB314-9GZ-100M-145-T (GE8x8NB-3)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	11.37	11.85
0.2	0.2	11.41	11.88
1.0	1.1	11.51	11.96
2.0	2.2	11.65	12.08
3.0	3.3	11.79	12.15
4.0	4.4	11.94	12.23
5.0	5.5	12.07	12.30
6.0	6.6	12.21	12.32
7.0	7.7	12.34	12.34
8.0	8.8	12.36	12.36
9.0	9.9	12.38	12.38
10.0	11.0	12.40	12.40
12.5	13.8	12.50	12.50
15.0	16.5	12.50	12.50
20.0	22.0	12.17	12.23
25.0	27.6	11.51	11.62
35.0	38.6	10.22	10.23
45.0	49.6	8.72	8.81
50.69	55.9	5.90	6.01
51.01	56.2	---	5.85

[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.

Appendix B (continued)

Limiting Conditions for Operation

Table B-4

Maximum Average Planar Linear Heat Generation Rate

Bundle Type: BD338A (GE8x8EB)

Average Planar Exposure		MAPLHGR (kw/ft)[1]	
(GWd/ST)	(GWd/MT)	Most Limiting	Least Limiting
0.0	0.0	10.32	10.68
0.2	0.2	10.40	10.70
1.0	1.1	10.55	10.80
2.0	2.2	10.75	11.03
3.0	3.3	10.96	11.25
4.0	4.4	11.19	11.48
5.0	5.5	11.42	11.70
6.0	6.6	11.66	11.74
7.0	7.7	11.78	11.78
8.0	8.8	11.82	11.82
9.0	9.9	11.86	11.86
10.0	11.0	11.90	11.90
12.5	13.8	11.90	11.90
15.0	16.5	11.90	11.90
20.0	22.0	11.90	11.90
25.0	27.6	11.54	11.56
35.0	38.6	9.73	9.77
45.0	49.6	7.44	7.49
45.24	49.87	7.37	7.42

[1] A 0.95 multiplier must be applied when operating at less than 90% of Rated Core Flow.

Appendix B (continued)

Limiting Conditions for Operation

Table B-5

Operating Limit MCPRs for Cycle 15

Option B

BOC15 to EOC with FFWTR	Fuel Type
1.31	GE8X8EB (GE8B)
1.32	GE88XNB-3 (GE10)

Option A

BOC15 to EOC with FFWTR	Fuel Type
1.36	GE8X8EB (GE8B)
1.37	GE88XNB-3 (GE10)

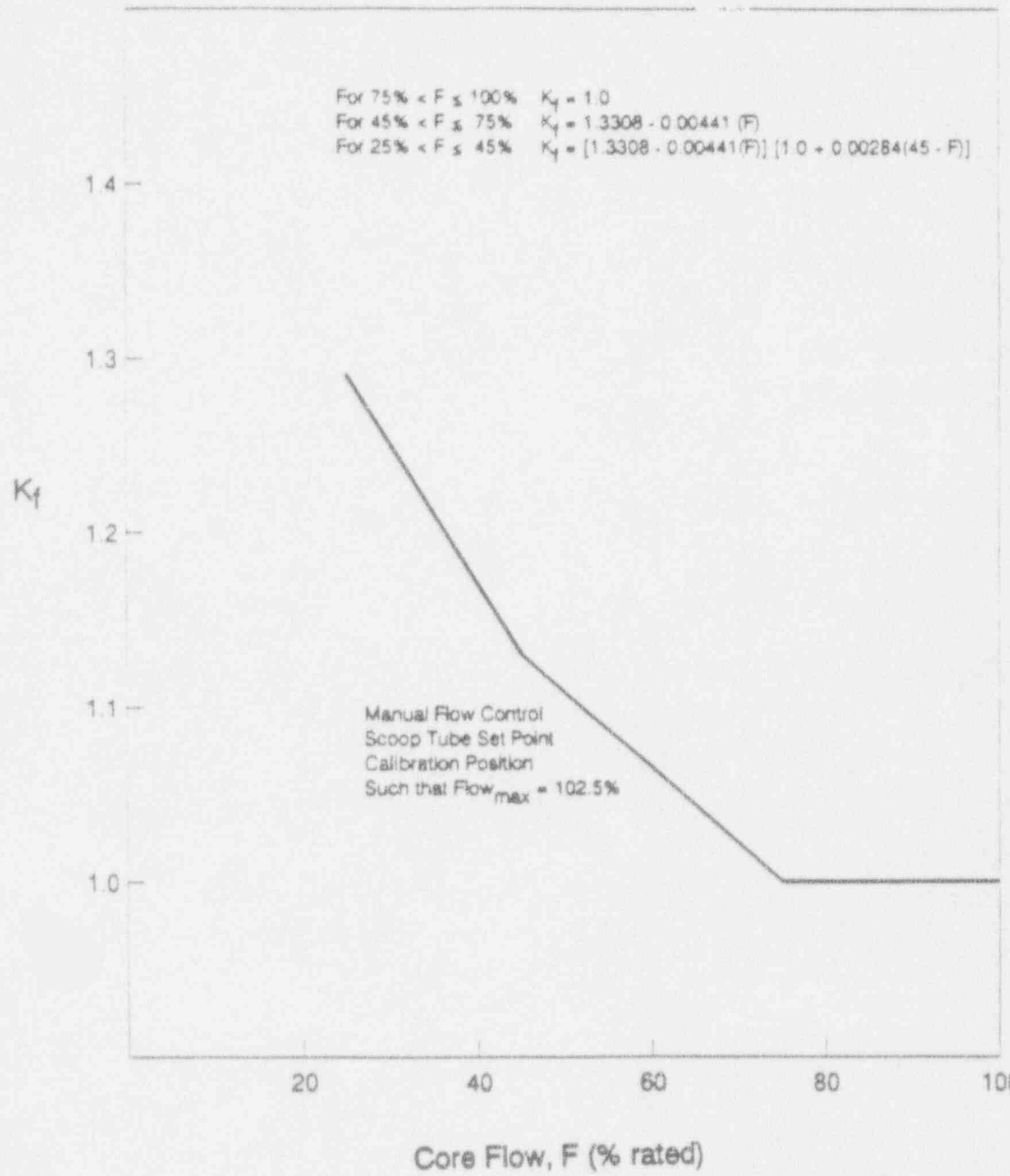


Figure B-1 Flow-Dependent MCPR Multiplier for Millstone

Appendix C

Bases for Limiting Conditions for Operation

This appendix provides the bases for each of the reactor fuel assembly limits identified in appendix B.

APLHGR

This specification assures that the peak cladding temperature (PCT) following the postulated design basis loss-of-coolant accident (LOCA) will not exceed the limits specified in 10CFR50.46 and that the fuel mechanical design analysis limits specified in Reference C-1 will not be exceeded.

Thermal Mechanical Design Analysis: NRC approved methods (specified in Reference C-1) are used to demonstrate that all fuel rods in a lattice operating at the bounding power history meet the fuel design limits specified in Reference C-1. No single fuel rod follows, or is capable of following, this bounding power history. This bounding power history is used as the basis for the fuel design analysis APLHGR limit.

LOCA Analysis: A LOCA analysis is performed in accordance with 10CFR50, Appendix K to demonstrate that the permissible planar power (Maximum APLHGR) limits comply with the ECCS limits specified in 10CFR50.46. The analysis is performed for the most limiting break size, break location, and single failure combination for the plant. The methods used are discussed in Reference C-2.

The APLHGR limit is the most limiting composite of the fuel design analysis APLHGR limit and the ECCS APLHGR limit.

The peak cladding temperature following a postulated loss-of-coolant accident is primarily a function of the average heat generation rate of all the rods of a fuel assembly at any axial location and is only dependent secondarily on the rod-to-rod power distribution within an assembly. Since expected local variations in power distribution within a fuel assembly affect the calculated peak clad temperature by less than ±20°F relative to the peak temperature for a typical fuel design, the limit on the average linear heat generation rate is sufficient to assure that calculated temperatures are within the 10CFR50 Appendix K limit.

Appendix C (continued)

Bases for Limiting Conditions for Operation

Conservative LOCA calculations predict that nucleate boiling will be maintained for several seconds following a design basis LOCA. This results in early removal of significant amounts of stored energy which, if present later in the transient, when heat transfer coefficients are considerably lower, would result in higher peak cladding temperature. As core flow is reduced below about 90%, the time of onset of boiling transition makes a sudden change from greater than about 5 seconds to less than 1 second. The approved ECCS evaluation model requires that at the first onset of local boiling transition, the severely reduced heat transfer coefficients must be applied to the affected planar area of the bundle, and thus exaggerates the calculated peak clad temperature. The effect is to significantly reduce the energy calculated to be removed from the fuel during blowdown. This results in an increase in calculated peak clad temperature of about 100°F which can be offset by a 5% reduction in MAPLHGR. For flows less than 90% of rated, a 5% reduction in the MAPLHGR limits shown in Figures B-1 and B-2, derived for 100% flow will assure that the plant is operated in compliance to 10CFR50.46 at those lower flows.

LHGR

This specification assures that the linear heat generation rate in any rod is less than the design linear heat generation rate. The LHGR shall be checked daily during reactor operation at ≥25% power to determine if fuel burnup or control rod movement has caused changes in power distribution. For LHGR to be a limiting value below 25% rated thermal power, the MTPF would have to be greater than 10 which is precluded by a considerable margin when employing any permissible control rod pattern.

MCPR

The required operating limit MCPRs at steady-state operating conditions as specified in appendix B are derived from the established fuel cladding integrity safety limit MCPR specified in appendix A and an analysis of anticipated operational occurrences (AOO). For any AOO analysis evaluation with the initial condition of the reactor being at the steady-state operating limit, it is required that the resulting MCPR does not decrease below the safety limit MCPR at any time during the occurrence.

Appendix C (continued)

Bases for Limiting Conditions for Operation

The steady-state value for MCPR was selected to provide a margin to accommodate AOOs and uncertainties in monitoring the core operating state as well as uncertainties in the critical power correlation itself. This value ensures that:

1. For the initial conditions of the LOCA analysis, a MCPR of 1.24 is satisfied, and

2. For any of the special AOOs or disturbances, caused by single operator error or single equipment malfunction, the value of MCPR is conservatively assumed to exist prior to the initiation of the occurrence or disturbance.

To assure that the fuel cladding integrity safety limit MCPR is not exceeded during any AOO, the most limiting AOOs have been analyzed to determine which ones result in the largest reduction in Critical Power Ratio (CPR). The type of AOOs evaluated were loss of flow, increase in pressure and power, positive reactivity insertion, and coolant temperature decrease.

The codes used to perform the AOO analyses that serve as the basis for the operating limit MCPR are described in Reference C-1. Conditions at limiting exposures are used for nuclear data to provide conservatism relative to core exposure aspects. Plant-unique initial conditions and system parameters are used as inputs to the AOO codes. The ΔCPR calculated by the AOO codes is adjusted using NRC approved adjustment factors to account for code uncertainties and to provide a 95/95 licensing basis.

The limiting AOO yields the largest ΔCPR. The ΔCPR for the limiting AOO is added to the fuel cladding integrity safety limit MCPR to establish the minimum operating limit MCPR.

The purpose of the K_f factor is to define operating limits at other than rated flow conditions. At less than 100% flow, the required MCPR is the product of the operating limit MCPR and the K_f factor. Specifically, the K_f factor provides the required thermal margin to protect against a flow increase AOO. The most limiting AOO initiated from less than rated flow conditions is the recirculation pump speedup caused by a motor generator speed controller failure. Below 45% rated flow the K_f is increased as required for application of GEXL-PLUS.

Appendix C (continued)

Bases for Limiting Conditions for Operation

The K_f factor values are generically developed as described in Reference C-1.

At core thermal power levels less than or equal to 25%, the reactor will be operating at minimum recirculation pump speed and the moderator void content will be very small. For all designated control rod patterns which may be employed at this point, thermal hydraulic analysis indicates that the resulting MCPR value is in excess of requirements. With this low void content, any inadvertent core flow increase would only place operation in a more conservative mode relative to MCPR. The daily requirement for calculating MCPR above 25% rated thermal power is sufficient, since power distribution shifts are very slow when there have not been significant power or control rod changes. The requirement for calculating MCPR when a limiting control rod pattern is approached ensures that the MCPR will be known following a change in power or power shape, regardless of magnitude, that could place operation at a thermal limit.

The use of the Option B operating limit MCPR requires additional scram time testing and verification as described in Reference C-3.

References

C-1. *General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A (latest approved version).

C-2. *General Electric Company Analytical Model for Loss-of-Coolant Analysis in Accordance with 10CFR50, Appendix K*, NEDO-20566-P-A, September 1986.

C-3. Letter, R. C. Tedesco (NRC) to G. G. Sherwood (GE), *Acceptance for Referencing General Electric Licensing Topical Report NEDO-24154/NEDE-24154P*, February 4, 1981.

Appendix D

Changes in Analyses

The feedwater controller failure (FWCF) was run for Cycle 14 and the Option B ΔCPR was 0.09 lower than the result for the generator load rejection without bypass (LRNBP). The minimum 0.09 ΔCPR margin between the events was calculated with limiting assumptions for both events. The LRNBP was conservatively analyzed at rated operating conditions and the FWCF was conservatively analyzed at reduced feedwater temperature. Since there are no changes in plant operating parameters which would significantly affect this ΔCPR difference and the Cycle 15 LRNBP yielded a similar ΔCPR to last cycle, the FWCF will still be far from limiting and, therefore, has not been analyzed this cycle.

The loss of feedwater heating (LFWH) event is a reduction in core coolant temperature event which has been far from limiting in past cycles (ΔCPR of 0.11 compared to 0.26 for the limiting LRNBP in Cycle 14). There is no reason for the severity of the LFWH event to increase significantly in Cycle 15. The LRNBP results were similar to last cycle; therefore, the LFWH event has not been analyzed for Cycle 15.