

**ENCLOSURE 3**

**MONTICELLO NUCLEAR GENERATING PLANT  
CYCLE 26 SUPPLEMENTAL RELOAD LICENSING REPORT,  
0000-0092-5740-SRLR, Revision 3**

**73 pages follow**



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**Supplemental Reload Licensing Report**  
**for**  
**Monticello**  
**Reload 25 Cycle 26**  
**Maximum Extended Load Line Limit Plus (MELLLA+)**

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## **Acknowledgement**

The engineering and reload licensing analyses, which form the technical basis of this Supplemental Reload Licensing Report, were performed by GNF-A/GEH Nuclear Analysis personnel. The Supplemental Reload Licensing Report was prepared by W. Bennett. This document has been verified by G. Baka. The previously revised Supplemental Reload Licensing Reports were prepared by J. Su, and verified by Lynn Leatherwood. The latest revised Supplemental Reload Licensing Report was prepared by J. Su, and verified by GEH Nuclear Analysis Group.

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The basis for this report is *General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A-18, April 2011; and the U.S. Supplement, NEDE-24011-P-A-18-US, April 2011.

## 1. Plant Unique Items

Appendix A: Analysis Conditions  
 Appendix B: Thermal-Mechanical Compliance  
 Appendix C: Decrease in Core Coolant Temperature Event  
 Appendix D: Off-Rated Limits  
 Appendix E: Mislocated Fuel Loading Error  
 Appendix F: Turbine Trip with Bypass and Degraded Scram  
 Appendix G: Monticello Non-Standard SRLR Items  
 Appendix H: TRACG04 AOO Supplementary Information  
 Appendix I: NEDC-33173P-A Supplementary Information  
 Appendix J: MELLLA+ Supplementary Information  
 Appendix K: List of Acronyms

## 2. Reload Fuel Bundles

Fuel Type	Cycle Loaded	Number
<b>Irradiated:</b>		
GE14-P10DNAB393-17GZ-100T-145-T6-2599 (GE14C)	23	4
GE14-P10DNAB392-16GZ-100T-145-T6-2824 (GE14C)	23	21
GE14-P10DNAB392-16GZ-100T-145-T6-2931 (GE14C)	24	104
GE14-P10DNAB392-17GZ-100T-145-T6-2932 (GE14C)	24	43
GE14-P10DNAB392-16GZ-100T-145-T6-2931 (GE14C)	25	40
GE14-P10DNAB424-14GZ-100T-145-T6-3100 (GE14C)	25	16
GE14-P10DNAB375-16GZ-100T-145-T6-3101 (GE14C)	25	52
GE14-P10DNAB392-16GZ-100T-145-T6-3102 (GE14C)	25	40
GE14-P10DNAB391-12GZ-100T-145-T6-3103 (GE14C)	25	16
<b>New:</b>		
GE14-P10DNAB391-12GZ-100T-145-T6-3378 (GE14C)	26	44
GE14-P10DNAB391-15GZ-100T-145-T6-3377 (GE14C)	26	32
GE14-P10DNAB391-16GZ-100T-145-T6-3376 (GE14C)	26	40
GE14-P10DNAB373-16GZ-100T-145-T6-3375 (GE14C)	26	32
<b>Total:</b>		<b>484</b>

### 3. Reference Core Loading Pattern

	Core Average Exposure	Cycle Exposure
Nominal previous end-of-cycle exposure:	31967 MWd/MT (29000 MWd/ST)	13644 MWd/MT (12378 MWd/ST)
Minimum previous end-of-cycle exposure (for cold shutdown considerations):	31623 MWd/MT (28688 MWd/ST)	13300 MWd/MT (12066 MWd/ST)
Assumed reload beginning-of-cycle exposure:	18397 MWd/MT (16690 MWd/ST)	0 MWd/MT (0 MWd/ST)
Assumed reload end-of-cycle exposure (rated conditions):	31610 MWd/MT (28676 MWd/ST)	13213 MWd/MT (11987 MWd/ST)
Reference core loading pattern:	Figure 1	

### 4. Core Reactivity and Control System Worth - No Voids, 20°C

Beginning of Cycle, $k_{\text{effective}}$	
Uncontrolled	1.113
Fully controlled	0.957
Strongest control rod out	0.987
R, Maximum increase in strongest rod out reactivity during the cycle ( $\Delta k$ )	0.000
Cycle exposure at which R occurs	0 MWd/MT (0 MWd/ST)

### 5. Standby Liquid Control System Shutdown Capability

Boron (ppm) (at 20°C)	Shutdown Margin ( $\Delta k$ ) (at 160°C, Xenon Free)	
	Analytical Requirement	Achieved
660	$\geq 0.010$	0.018

## 6. Reload Unique GETAB Anticipated Operational Occurrences (AOO) Analysis Initial Condition Parameters <sup>1</sup>

Operating domain: ICF (HBB) Exposure range : BOC to EOC ( Application Condition: 1)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.0	1.47	1.33	0.981	6.107	111.6	1.69

Operating domain: LCF (HBB) Exposure range : BOC to EOC ( Application Condition: 1)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.0	1.48	1.25	0.986	6.142	83.0	1.52

Operating domain: ICF (UB) Exposure range : BOC to EOC ( Application Condition: 1)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.0	1.41	1.27	0.980	5.853	111.2	1.85

Operating domain: LCF (UB) Exposure range : BOC to EOC ( Application Condition: 1)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.0	1.40	1.39	0.985	5.808	83.7	1.67

<sup>1</sup> Exposure range designation is defined in Table 7-1. Application condition number is defined in Section 11.



## 7. Selected Margin Improvement Options <sup>2</sup>

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

**Table 7-1 Cycle Exposure Range Designation**

Name	Exposure Range <sup>3</sup>
BOC to EOC	BOC26 to EOC26

<sup>2</sup> Refer to the GESTAR basis document identified at the beginning of this report for the margin improvement options currently supported therein.

<sup>3</sup> End of Rated (EOR) is defined as the cycle exposure corresponding to all rods out, 100% power/100% flow, and normal feedwater temperature. For plants without mid-cycle OLMCPR points, EOR is not applicable.

## 8. Operating Flexibility Options <sup>4</sup>

The following information presents the operational domains and flexibility options which are supported by the reload licensing analysis.

<b>Extended Operating Domain (EOD):</b>	Yes
EOD type: Maximum Extended Load Line Limit Plus (MELLLA+)	
Minimum core flow at rated power:	80.0 %
<b>Increased Core Flow:</b>	Yes
Flow point analyzed throughout cycle:	105.0 %
<b>Feedwater Temperature Reduction:</b>	No
<b>ARTS Program:</b>	Yes
<b>Single Loop Operation:</b>	Yes <sup>5</sup>
<b>Equipment Out of Service:</b>	
Safety/relief valves Out of Service: (credit taken for 5 valves)	Yes
PROOS	Yes

## 9. Core-wide AOO Analysis Results <sup>6 7</sup>

Methods used: GEXL-PLUS, TRACG04

Operating domain: ICF (UB) Exposure range : BOC to EOC ( Application Condition: 1)				
			Uncorrected $\Delta$ CPR/ICPR	
Event	Flux (% rated)	Q/A (% rated)	GE14C	Fig.
FW Controller Failure	515.1	NA	0.227	2
Turbine Trip with Bypass	620.5	NA	0.269	3
Turbine Trip w/o Bypass	507.3	NA	0.213	4
Load Rejection w/o Bypass	347.1	NA	0.162	5
Inadvertent HPCI /L8	484.8	NA	0.234	6

<sup>4</sup> Refer to the GESTAR basis document identified at the beginning of this report for the operating flexibility options currently supported therein.

<sup>5</sup> SLO operation is not allowed in the MELLLA+ domain.

<sup>6</sup> Exposure range designation is defined in Table 7-1. Application condition number is defined in Section 11.

<sup>7</sup> The Q/A (% rated) output is not available from TRACG04.

## 10. Rod Withdrawal Error AOO Summary

The Rod Withdrawal Error (RWE) event was analyzed in the GE BWR Licensing Report *Average Power Range Monitor, Rod Block Monitor and Technical Specification Improvement (ARTS) Program for Monticello Nuclear Generating Plant*, NEDC-30492-P, April 1984. The cycle-specific  $\Delta$ CPR results reported in the table below are the more limiting of the ARTS generic and cycle-specific analysis. The cycle-specific RWE OLMCPR is determined by adding the cycle-specific  $\Delta$ CPR to the SLMCPR.

### RWE Results:

RBM Setpoint (%)	$\Delta$ CPR
114.0	0.25

The cycle specific RWE analysis is bounded by the generic  $\Delta$ CPR values reported in the above table.

The ITSP and LTSP MCPR limits associated with the HTSP reported in the above table are bounded by the Kp limits for this cycle.

The ARTS RWE analysis validated that the following MCPR values provide the required margin for full withdrawal of any control rod during this cycle:

For Power < 90%: MCPR  $\geq$  1.83

For Power  $\geq$  90%: MCPR  $\geq$  1.50

The RBM operability requirements have been evaluated and shown to be sufficient to ensure that the SLMCPR and cladding 1% plastic strain criteria will not be exceeded in the event of a RWE.

## 11. Cycle SLMCPR and OLMCPR Summary <sup>8 9 10</sup>

Two Loop Operation (TLO) safety limit:	1.15
Single Loop Operation (SLO) safety limit:	1.15
Stability MCPR Design Basis:	See Section 15
ECCS MCPR Design Basis:	See Section 16 (Initial MCPR)

### Non-pressurization Events:

Exposure range: BOC to EOC	
	All Fuel Types
Rod Withdrawal Error (114.0 % RBM Setpoint)	1.40
Loss of Feedwater Heating	1.32
Fuel Loading Error (Mislocated)	Not Limiting
Fuel Loading Error (Misoriented)	1.36
Rated Equivalent SLO Pump Seizure <sup>11</sup>	1.45

### Limiting Pressurization Events OLMCPR Summary Table: <sup>12</sup>

Appl. Cond.	Exposure Range	Option A	Option B
		GE14C	GE14C
1	Base Case		
	BOC to EOC	1.72	1.61

<sup>8</sup> Exposure range designation is defined in Table 7-1.

<sup>9</sup> For SLO, the MCPR operating limit is equal to the two loop value.

<sup>10</sup> The safety limit values presented include a 0.03 adder in accordance with extended operating domain licensing commitments.

<sup>11</sup> The cycle-independent OLMCPR for the recirculation pump seizure event for GE14C is 1.62 based on the cycle-specific SLO SLMCPR. When adjusted for the off-rated power/flow conditions of SLO, this limit corresponds to a rated OLMCPR of 1.45. This limit does not require an adjustment for the SLO SLMCPR.

<sup>12</sup> Each application condition (Appl. Cond.) covers the entire range of licensed flow and feedwater temperature unless specified otherwise. The OLMCPR values presented apply to rated power operation based on the two loop operation safety limit MCPR.

**Pressurization Events:** <sup>13</sup>

<b>Operating domain: ICF (UB)</b>		
<b>Exposure range : BOC to EOC ( Application Condition: 1)</b>		
	<b>Option A</b>	<b>Option B</b>
	<b>GE14C</b>	<b>GE14C</b>
FW Controller Failure	Not Limiting	Not Limiting
Turbine Trip with Bypass	1.61	1.61
Turbine Trip w/o Bypass	Not Limiting	Not Limiting
Load Rejection w/o Bypass	Not Limiting	Not Limiting
Inadvertent HPCI /L8	1.72	1.52

**12. Overpressurization Analysis Summary** <sup>14</sup>

<b>Event</b>	<b>Psl (psig)</b>	<b>Pdome (psig)</b>	<b>Pv (psig)</b>	<b>Plant Response</b>
MSIV Closure (Flux Scram) - ICF (HBB)	1315	1321	1345	Figure 7
MSIV Closure (Flux Scram) - LCF (HBB)	1301	1307	1328	Figure 8

<sup>13</sup> Application condition numbers shown for each of the following pressurization events represent the application conditions for which this event contributed in the determination of the limiting OLMCPR value.

<sup>14</sup> Overpressure calculated at an initial dome pressure of 1010 psig.

### 13. Fuel Loading Error Results

Variable water gap misoriented bundle analysis: Yes <sup>15</sup>

Misoriented Fuel Bundle	$\Delta$ CPR
GE14-P10DNAB392-16GZ-100T-145-T6-2931 (GE14C)	0.16
GE14-P10DNAB424-14GZ-100T-145-T6-3100 (GE14C)	0.13
GE14-P10DNAB375-16GZ-100T-145-T6-3101 (GE14C)	0.21
GE14-P10DNAB392-16GZ-100T-145-T6-3102 (GE14C)	0.16
GE14-P10DNAB391-12GZ-100T-145-T6-3103 (GE14C)	0.17
GE14-P10DNAB373-16GZ-100T-145-T6-3375 (GE14C)	0.21
GE14-P10DNAB391-16GZ-100T-145-T6-3376 (GE14C)	0.15
GE14-P10DNAB391-15GZ-100T-145-T6-3377 (GE14C)	0.07
GE14-P10DNAB391-12GZ-100T-145-T6-3378 (GE14C)	0.15

### 14. Control Rod Drop Analysis Results

This is a banked position withdrawal sequence plant, therefore, the control rod drop accident analysis is not required. NRC approval is documented in NEDE-24011-P-A-US.

### 15. Stability Analysis Results

Stability results for operation at EPU with MELLLA+ and DSS-CD are contained in this section. SLO will not be allowed in conjunction with operation in the MELLLA+ domain. Implementation of MELLLA+ operating domain requires the use of the Detect and Suppress Solution – Confirmation Density (DSS-CD) stability solution.

#### 15.1 Stability DSS-CD Solution

Monticello will implement the stability DSS-CD solution using the Oscillation Power Range Monitor (OPRM) as described in Reference 1 in Section 15.4. Plant-specific analyses for the DSS-CD Solution are provided in Reference 2 in Section 15.4. The Detect and Suppress function of the DSS-CD solution based on the OPRM system relies on the Confirmation Density Algorithm (CDA), which constitutes the licensing basis. The Backup Stability Protection (BSP) solution may be used by the plant in the event that the OPRM system is declared inoperable.

<sup>15</sup> Includes a 0.02 penalty due to variable water gap R-factor uncertainty.

The CDA enabled through the OPRM system and the BSP solution described in Reference 2 in Section 15.4 provide the stability licensing bases for Monticello Cycle 26. The safety evaluation report for Reference 1 in Section 15.4 concluded that the DSS-CD solution is acceptable subject to certain cycle-specific limitations and conditions. These cycle-specific limitations and conditions are met for Monticello Cycle 26.

## **15.2 Detect and Suppress Evaluation**

A reload DSS-CD evaluation has been performed in accordance with the licensing methodology described in Reference 1 in Section 15.4 to confirm the Amplitude Discriminator Setpoint ( $S_{AD}$ ) of the CDA established in Reference 2 in Section 15.4. The Cycle 26 DSS-CD evaluation and the results for the DSS-CD Reload Confirmation Applicability Checklist documented in Table 15-1 demonstrate that: 1) the DSS-CD Solution is applicable to Monticello Cycle 26; and 2) the  $S_{AD}=1.10$  established in Reference 2 in Section 15.4 is confirmed for operation of Monticello Cycle 26.

The  $S_{AD}=1.10$  setpoint is applicable to TLO and to SLO.

**Table 15-1 DSS-CD Reload Confirmation Applicability Checklist**

Parameter	DSS-CD Criterion	Monticello Cycle 26 Results	Acceptance
BWR Product Line	BWR/3-6 design	BWR/3	Confirmed
Fuel Product Line	GE14 and earlier GE designs	GE14	Confirmed
Operating Domain (TLO)	$\leq$ EPU/MELLLA+ including currently licensed operational flexibility features	EPU/MELLLA+ including currently licensed operational flexibility features	Confirmed
Operating Domain (SLO)	$\leq$ EPU/MELLLA including currently licensed operational flexibility features	EPU/MELLLA including currently licensed operational flexibility features	Confirmed
Rated $T_{FW}$ Reduction	$\leq 120^{\circ}\text{F}$ (EPU/MELLLA) No $T_{FW}$ Reduction (MELLLA+ Extension)	No $T_{FW}$ Reduction	Confirmed
Margin for TLO (See Table 2-2 in Section 15.4, Reference 2)	See Table 2-2 in Section 15.4, Reference 2	0.286	Confirmed
Margin for SLO (See Table 2-2 in Section 15.4, Reference 2)	See Table 2-2 in Section 15.4, Reference 2	0.365	Confirmed

### 15.3 Backup Stability Protection

Reference 1 in Section 15.4 describes two BSP options that are based on selected elements from three distinct constituents: BSP Manual Regions, BSP Boundary, and Automated BSP (ABSP) setpoints.

The Manual BSP region boundaries and the BSP Boundary were calculated for Monticello Cycle 26 for normal feedwater temperature operation. The endpoints of the regions are defined in Table 15-2. The Scram Region boundary, the Controlled Entry Region boundary, and the BSP Boundary are shown in Figure 9.

The ABSP APRM Simulated Thermal Power (STP) setpoints associated with the ABSP Scram Region from Reference 3 are confirmed for Cycle 26 and are defined in Table 15-3. These ABSP setpoints bound both TLO and SLO.



**Table 15-2 BSP Endpoints for Normal Feedwater Temperature**

Endpoint	Power (%)	Flow (%)	Definition
A1	72.5	44.5	Scram Region Boundary, HFCL
B1	42.6	33.7	Scram Region Boundary, NCL
A2	89.3	66.1	Controlled Entry Region Boundary, HFCL
B2	28.6	31.2	Controlled Entry Region Boundary, NCL
A3	100.0	91.8	BSP Boundary Intercept, HFCL
B3	56.6	40.7	BSP Boundary Intercept, Scram Region

**Table 15-3 ABSP Setpoints for the Scram Region**

Parameter	Symbol	Value
Slope of ABSP APRM flow-biased trip linear segment.	m	1.30
ABSP APRM flow-biased trip setpoint power intercept. Constant Power Line for Trip from zero Drive Flow to Flow Breakpoint value.	$P_{BSP-TRIP}$	38.0 %RTP
ABSP APRM flow-biased trip setpoint drive flow intercept. Constant Flow Line for Trip.	$W_{BSP-TRIP}$	55.8 %RDF
Flow Breakpoint value	$W_{BSP-BREAK}$	37.9 %RDF

## 15.4 References

1. *General Electric Boiling Water Reactor Detect and Suppress Solution – Confirmation Density*, NEDC-33075P-A, Revision 6, January 2008.
2. *Safety Analysis Report for Monticello Maximum Extended Load Line Limit Analysis Plus*, NEDC-33435P, Revision 1, December 2009.
3. *Instrument Limits Calculation, Northern States Power – Minnesota (NSPM), Monticello Nuclear Generating Plant, Average Power Range Monitor NUMAC PRNM Setpoints - MELLLA+ Automatic Backup Stability Protection (ABSP)*, 0000-0105-4810-R2 MNGP-M+ABSP-APRM-Calc-2009-P, Revision 2, June 2011.

## 16. Loss-of-Coolant Accident Results <sup>16</sup>

### 16.1 10CFR50.46 Licensing Results

The ECCS-LOCA analysis is based on the SAFER/GESTR-LOCA methodology. The licensing results in the new cycle are summarized in the following table.

**Table 16.1-1 Licensing Results**

<b>Fuel Type</b>	<b>Licensing Basis PCT (°F)</b>	<b>Local Oxidation (%)</b>	<b>Core-Wide Metal-Water Reaction (%)</b>
GE14C	2140	< 10.00	< 0.20

The Monticello SAFER/GESTR-LOCA analysis results are documented in References 1, 2, and 3 for GE14C in Section 16.4.

The RHR intertie open line analysis is documented in Reference 4 for GE14C in Section 16.4. Reference 1 for GE14C extends the Reference 4 analysis to EPU. Reference 2 for GE14C extends the Reference 4 analysis to MELLLA+. These analyses indicate that plant operation up to 376 MWt with the RHR intertie line open is acceptable from an ECCS performance standpoint, provided a MAPLHGR multiplier of 0.75 is implemented or that the peak bundle power does not exceed 3.9 MWt.

In addition to the power and flow dependent multipliers, Monticello also requires an ECCS MAPLHGR multiplier of 0.9908 for operation at or below 99% core flow. This multiplier ensures that the off-rated limits assumed in the EPU ECCS-LOCA analyses bound the cycle-specific off-rated limits calculated for MELLLA+ operation.

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<sup>16</sup> Lattice numbers are defined in the Fuel Bundle Information Report, 0000-0092-5748-FBIR.

For GE14C, the large break Appendix K ECCS-LOCA result at EPU power and rated core flow is 2119°F and the large break Appendix K ECCS-LOCA result at EPU power and MELLLA+ core flow is 2119°F.

## 16.2 10CFR50.46 Error Evaluation

The 10CFR50.46 errors applicable to the Licensing Basis PCT are shown in the following table.

**Table 16.2-1 Impact on Licensing Basis Peak  
Cladding Temperature for GE14C**

10CFR50.46 Error Notifications		
Number	Subject	PCT Impact (°F)
2011-02	Heat Deposition Parameter	+0
2011-03	Heat Deposition Parameter	+0
Total PCT Adder (°F)		+0

The error has no impact on LBPCT due to the implementation of additional LHGR and MAPLHGR setdown. The Licensing Basis PCT is below the 10CFR50.46 limit of 2200°F, the Local Oxidation is below the 10CFR50.46 limit of 17%, and the Core-Wide Metal-Water Reaction is below the 10CFR50.46 limit of 1.0% with a LHGR and MAPLHGR setdown of 13.3%.

## 16.3 ECCS-LOCA Operating Limits

The ECCS-LOCA composite MAPLHGR operating limits for the fuel bundles in this cycle are shown in the following tables.

**Table 16.3-1 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB393-17GZ-100T-145-T6-2599 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 5719	Lat. 5720	Lat. 5721	Lat. 5726	Lat. 5727	Lat. 5724	Lat. 5725
0.00 ( 0.00)	9.41	8.38	8.58	8.59	8.53	9.81	10.65
0.22 ( 0.20)	9.32	8.43	8.62	8.65	8.58	9.75	10.63
1.10 ( 1.00)	9.12	8.52	8.71	8.77	8.71	9.61	10.55
2.20 ( 2.00)	9.06	8.64	8.82	8.94	8.89	9.58	10.54
3.31 ( 3.00)	9.08	8.76	8.93	9.10	9.09	9.61	10.56
4.41 ( 4.00)	9.11	8.89	9.05	9.24	9.28	9.65	10.59
5.51 ( 5.00)	9.15	9.02	9.17	9.39	9.45	9.70	10.61
6.61 ( 6.00)	9.19	9.15	9.28	9.53	9.59	9.74	10.64
7.72 ( 7.00)	9.23	9.29	9.40	9.69	9.76	9.78	10.66
8.82 ( 8.00)	9.25	9.41	9.52	9.85	9.93	9.81	10.68
9.92 ( 9.00)	9.28	9.53	9.66	10.01	10.10	9.83	10.69
11.02 (10.00)	9.29	9.66	9.79	10.16	10.18	9.85	10.70
12.13 (11.00)	9.30	9.78	9.91	10.29	10.23	9.86	10.70
13.23 (12.00)	9.28	9.87	9.99	10.38	10.28	9.86	10.70
14.33 (13.00)	9.24	9.93	10.04	10.36	10.27	9.82	10.70
15.43 (14.00)	9.20	9.98	10.06	10.28	10.21	9.78	10.66
16.53 (15.00)	9.16	10.02	10.07	10.25	10.19	9.73	10.61
18.74 (17.00)	9.06	10.06	10.07	10.14	10.08	9.64	10.52
22.05 (20.00)	8.92	10.06	10.06	9.97	9.91	9.49	10.37
27.56 (25.00)	8.68	10.04	10.04	9.68	9.63	9.24	10.13
33.07 (30.00)	8.24	9.76	9.84	9.42	9.37	8.95	9.91
38.58 (35.00)	7.58	9.46	9.49	9.18	9.14	8.29	9.43
38.85 (35.24)	7.55	9.44	9.46	9.15	9.11	8.26	9.40
44.09 (40.00)	6.86	8.93	8.94	8.64	8.59	7.64	8.78
49.60 (45.00)	5.68	8.38	8.40	8.08	8.04	6.65	8.14
54.78 (49.70)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.30	7.32	7.21	7.15	5.20	7.04
55.50 (50.35)	--	7.20	7.22	7.13	7.06	5.07	6.93
58.14 (52.75)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.83	5.86	5.97	5.88	--	5.53
63.50 (57.61)	--	4.92	4.95	5.16	5.14	--	4.59
63.55 (57.65)	--	--	--	--	--	--	4.57

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 5719	Lat. 5720	Lat. 5721	Lat. 5726	Lat. 5727	Lat. 5724	Lat. 5725
63.59 (57.68)	--	4.89	--	--	--	--	--
63.72 (57.81)	--	--	4.88	--	--	--	--
64.46 (58.48)	--	--	--	--	4.90	--	--
64.49 (58.50)	--	--	--	4.89	--	--	--

**Table 16.3-2 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB392-16GZ-100T-145-T6-2824 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 6817	Lat. 6818	Lat. 6819	Lat. 6820	Lat. 6821	Lat. 6822	Lat. 6823
0.00 ( 0.00)	9.41	8.50	8.72	8.81	8.76	9.81	10.43
0.22 ( 0.20)	9.33	8.54	8.75	8.85	8.80	9.75	10.41
1.10 ( 1.00)	9.12	8.61	8.81	8.93	8.91	9.61	10.34
2.20 ( 2.00)	9.06	8.71	8.90	9.03	9.03	9.58	10.34
3.31 ( 3.00)	9.08	8.81	8.98	9.13	9.15	9.61	10.37
4.41 ( 4.00)	9.11	8.91	9.07	9.24	9.27	9.65	10.41
5.51 ( 5.00)	9.15	9.01	9.16	9.33	9.39	9.70	10.46
6.61 ( 6.00)	9.19	9.11	9.23	9.41	9.50	9.74	10.50
7.72 ( 7.00)	9.23	9.20	9.31	9.52	9.61	9.78	10.53
8.82 ( 8.00)	9.25	9.29	9.41	9.65	9.74	9.81	10.55
9.92 ( 9.00)	9.28	9.39	9.52	9.80	9.90	9.83	10.57
11.02 (10.00)	9.29	9.51	9.64	9.96	10.06	9.85	10.59
12.13 (11.00)	9.31	9.63	9.76	10.11	10.05	9.86	10.60
13.23 (12.00)	9.28	9.73	9.86	9.95	9.78	9.86	10.60
14.33 (13.00)	9.24	9.81	9.93	9.84	9.69	9.82	10.60
15.43 (14.00)	9.20	9.88	9.98	9.83	9.69	9.78	10.56
16.53 (15.00)	9.16	9.94	10.02	9.81	9.67	9.73	10.51
18.74 (17.00)	9.06	10.02	10.06	9.72	9.59	9.64	10.41
22.05 (20.00)	8.92	9.97	10.02	9.58	9.45	9.49	10.27
27.56 (25.00)	8.68	9.71	9.74	9.35	9.23	9.25	10.02
33.07 (30.00)	8.24	9.43	9.46	9.14	9.04	8.95	9.79
38.58 (35.00)	7.58	9.17	9.19	8.89	8.84	8.29	9.28
38.85 (35.24)	7.55	9.15	9.17	8.87	8.82	8.26	9.25
44.09 (40.00)	6.87	8.71	8.71	8.38	8.35	7.64	8.64
49.60 (45.00)	5.68	8.14	8.14	7.82	7.81	6.66	7.99
54.79 (49.71)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.30	7.32	6.91	6.88	5.21	6.83
55.50 (50.35)	--	7.20	7.22	6.82	6.78	5.08	6.72
58.16 (52.77)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.85	5.87	5.60	5.45	--	5.25
62.85 (57.01)	--	--	--	--	--	--	4.53
63.16 (57.30)	--	--	--	--	4.68	--	--

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 6817	Lat. 6818	Lat. 6819	Lat. 6820	Lat. 6821	Lat. 6822	Lat. 6823
63.50 (57.61)	--	4.92	4.96	4.80	--	--	--
63.59 (57.68)	--	4.90	--	--	--	--	--
63.72 (57.81)	--	--	4.89	--	--	--	--
63.76 (57.85)	--	--	--	4.73	--	--	--

**Table 16.3-3 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB392-16GZ-100T-145-T6-2931 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 7357	Lat. 7358	Lat. 7359	Lat. 7360	Lat. 7361	Lat. 7362	Lat. 7363
0.00 ( 0.00)	9.41	8.49	8.71	8.80	8.75	9.81	10.43
0.22 ( 0.20)	9.33	8.53	8.74	8.83	8.79	9.75	10.41
1.10 ( 1.00)	9.12	8.60	8.80	8.91	8.88	9.61	10.34
2.20 ( 2.00)	9.06	8.70	8.88	9.01	8.99	9.58	10.34
3.31 ( 3.00)	9.08	8.80	8.97	9.12	9.11	9.61	10.37
4.41 ( 4.00)	9.11	8.90	9.06	9.23	9.24	9.65	10.41
5.51 ( 5.00)	9.15	9.00	9.14	9.31	9.36	9.70	10.46
6.61 ( 6.00)	9.19	9.10	9.21	9.40	9.48	9.74	10.50
7.72 ( 7.00)	9.23	9.19	9.30	9.50	9.59	9.78	10.53
8.82 ( 8.00)	9.25	9.28	9.39	9.64	9.73	9.81	10.55
9.92 ( 9.00)	9.28	9.38	9.51	9.79	9.88	9.83	10.57
11.02 (10.00)	9.29	9.50	9.63	9.94	10.05	9.85	10.59
12.13 (11.00)	9.31	9.62	9.75	10.10	10.04	9.86	10.60
13.23 (12.00)	9.28	9.71	9.85	9.94	9.78	9.86	10.60
14.33 (13.00)	9.24	9.80	9.92	9.84	9.69	9.82	10.60
15.43 (14.00)	9.20	9.87	9.97	9.83	9.69	9.78	10.56
16.53 (15.00)	9.16	9.93	10.01	9.80	9.66	9.73	10.51
18.74 (17.00)	9.06	10.01	10.05	9.72	9.58	9.64	10.41
22.05 (20.00)	8.92	9.97	10.02	9.57	9.44	9.49	10.27
27.56 (25.00)	8.68	9.70	9.74	9.35	9.22	9.25	10.02
33.07 (30.00)	8.24	9.42	9.46	9.13	9.04	8.95	9.79
38.58 (35.00)	7.58	9.17	9.19	8.89	8.84	8.29	9.28
38.85 (35.24)	7.55	9.14	9.17	8.86	8.82	8.26	9.25
44.09 (40.00)	6.87	8.71	8.71	8.37	8.35	7.64	8.64
49.60 (45.00)	5.68	8.14	8.13	7.81	7.81	6.66	7.99
54.79 (49.71)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.30	7.32	6.90	6.87	5.21	6.83
55.50 (50.35)	--	7.20	7.22	6.81	6.77	5.08	6.72
58.16 (52.77)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.84	5.86	5.59	5.44	--	5.25
62.85 (57.01)	--	--	--	--	--	--	4.53
63.13 (57.27)	--	--	--	--	4.68	--	--



Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 7357	Lat. 7358	Lat. 7359	Lat. 7360	Lat. 7361	Lat. 7362	Lat. 7363
63.50 (57.61)	--	4.92	4.95	4.79	--	--	--
63.54 (57.65)	--	4.90	--	--	--	--	--
63.68 (57.77)	--	--	4.89	--	--	--	--
63.73 (57.82)	--	--	--	4.73	--	--	--

**Table 16.3-4 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB424-14GZ-100T-145-T6-3100 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8483	Lat. 8484	Lat. 8485	Lat. 8486	Lat. 8487	Lat. 8488
0.00 ( 0.00)	9.41	7.87	7.91	7.89	7.80	9.81	10.49
0.22 ( 0.20)	9.33	7.93	7.97	7.96	7.87	9.76	10.46
1.10 ( 1.00)	9.12	--	--	8.06	7.97	9.61	10.38
2.20 ( 2.00)	9.06	8.11	8.16	8.18	8.10	9.58	10.36
3.31 ( 3.00)	9.07	--	--	--	8.23	9.61	10.38
4.41 ( 4.00)	9.10	--	8.38	8.43	8.36	9.65	10.41
5.51 ( 5.00)	9.13	8.42	8.50	8.57	8.50	9.69	10.44
6.61 ( 6.00)	9.17	8.53	8.61	8.70	8.64	9.73	10.47
7.72 ( 7.00)	9.20	8.64	8.73	8.85	8.79	9.77	10.50
8.82 ( 8.00)	9.23	8.75	8.85	8.99	8.95	9.80	10.52
9.92 ( 9.00)	9.25	8.86	8.98	9.15	9.12	9.82	10.54
11.02 (10.00)	9.27	8.98	9.10	9.31	9.30	9.84	10.55
12.13 (11.00)	9.28	9.08	9.20	9.45	9.46	9.85	10.56
13.23 (12.00)	9.26	9.16	9.23	9.50	9.56	9.86	10.56
14.33 (13.00)	9.22	9.20	9.27	9.56	9.62	9.82	10.56
15.43 (14.00)	9.18	9.23	9.31	--	9.69	9.77	10.52
16.53 (15.00)	9.14	9.26	--	9.68	9.75	9.73	10.47
17.64 (16.00)	9.09	9.30	9.39	9.73	9.80	9.68	10.42
18.74 (17.00)	9.05	--	9.43	9.77	9.83	9.63	10.37
19.84 (18.00)	9.00	9.39	9.46	9.79	9.81	9.58	--
20.94 (19.00)	8.95	9.43	9.49	9.81	9.78	--	--
22.05 (20.00)	--	9.46	9.50	9.82	--	--	--
23.15 (21.00)	8.85	9.48	9.52	9.82	9.69	9.43	10.18
24.25 (22.00)	--	9.50	9.53	9.77	--	--	--
25.35 (23.00)	8.76	9.52	9.53	--	--	9.34	10.08
26.46 (24.00)	8.71	9.53	--	--	--	9.29	10.03
27.56 (25.00)	8.66	9.54	9.54	9.63	9.50	9.24	9.98
33.07 (30.00)	8.22	9.42	9.43	9.41	9.29	8.94	9.75
38.58 (35.00)	7.56	9.01	9.02	9.23	9.12	8.28	9.24
38.85 (35.24)	7.53	8.99	9.00	9.20	9.09	8.25	9.20
44.09 (40.00)	6.84	8.56	8.57	8.76	8.63	7.63	8.59
49.60 (45.00)	5.65	7.80	7.82	8.26	8.13	6.64	7.94

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8483	Lat. 8484	Lat. 8485	Lat. 8486	Lat. 8487	Lat. 8488
54.68 (49.61)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	6.66	6.68	7.23	7.26	5.19	6.77
55.50 (50.35)	--	6.54	6.56	7.12	7.16	5.06	6.66
58.10 (52.71)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	4.93	4.95	5.63	5.76	--	5.16
60.90 (55.25)	--	4.85	--	--	--	--	--
60.96 (55.30)	--	--	4.85	--	--	--	--
62.63 (56.82)	--	--	--	--	--	--	4.51
62.80 (56.97)	--	--	--	4.93	--	--	--
63.16 (57.30)	--	--	--	--	4.95	--	--

**Table 16.3-5 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB375-16GZ-100T-145-T6-3101 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8489	Lat. 8490	Lat. 8491	Lat. 8492	Lat. 8493	Lat. 8494
0.00 ( 0.00)	9.41	8.40	8.40	8.45	8.35	9.81	10.35
0.22 ( 0.20)	9.33	8.43	8.45	8.50	8.40	9.76	10.33
1.10 ( 1.00)	9.12	8.48	8.53	8.59	8.49	9.61	10.26
2.20 ( 2.00)	9.06	--	8.60	--	8.62	9.58	10.26
3.31 ( 3.00)	9.07	--	--	8.82	8.74	9.61	10.29
4.41 ( 4.00)	9.10	--	8.72	8.88	8.87	9.65	10.33
5.51 ( 5.00)	9.13	8.75	8.78	8.95	9.01	9.69	10.38
6.61 ( 6.00)	9.17	8.82	8.86	9.04	9.12	9.73	10.42
7.72 ( 7.00)	9.20	8.89	8.95	9.16	9.24	9.77	10.45
8.82 ( 8.00)	9.23	8.97	9.05	9.30	9.38	9.80	10.48
9.92 ( 9.00)	9.25	9.07	9.17	9.44	9.53	9.82	10.50
11.02 (10.00)	9.27	9.18	9.29	9.59	9.68	9.84	10.51
12.13 (11.00)	9.28	9.29	9.41	9.74	9.68	9.85	10.52
13.23 (12.00)	9.26	9.37	9.49	9.62	9.45	9.86	10.52
14.33 (13.00)	9.22	9.45	9.56	9.54	9.40	9.82	10.52
15.43 (14.00)	9.18	9.52	9.62	9.55	9.41	9.77	10.47
16.53 (15.00)	9.14	9.58	9.67	--	9.39	9.73	10.43
17.64 (16.00)	9.09	9.63	9.71	9.50	9.36	9.68	10.38
18.74 (17.00)	9.05	9.67	9.74	9.47	9.33	9.63	10.33
19.84 (18.00)	9.00	9.70	9.76	9.43	9.30	9.58	--
20.94 (19.00)	8.95	9.66	9.73	9.39	--	--	10.23
22.05 (20.00)	--	9.62	9.68	--	--	--	--
23.15 (21.00)	8.85	9.57	9.63	--	--	9.43	10.13
24.25 (22.00)	--	9.53	--	9.26	9.13	--	--
25.35 (23.00)	8.76	9.48	--	9.21	--	9.34	10.03
26.46 (24.00)	8.71	--	--	9.17	9.05	9.29	--
27.56 (25.00)	8.66	9.38	9.42	9.13	9.01	9.24	9.93
33.07 (30.00)	8.22	9.13	9.16	8.95	8.84	8.94	9.70
38.58 (35.00)	7.56	8.91	8.94	8.73	8.60	8.28	9.17
38.85 (35.24)	7.53	8.89	8.91	8.70	8.58	8.25	9.14
44.09 (40.00)	6.84	8.40	8.40	8.21	8.13	7.63	8.52
49.60 (45.00)	5.65	7.86	7.86	7.71	7.57	6.64	7.85

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8489	Lat. 8490	Lat. 8491	Lat. 8492	Lat. 8493	Lat. 8494
54.68 (49.61)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	6.96	6.90	6.70	6.58	5.19	6.68
55.50 (50.35)	--	6.84	6.79	6.60	6.47	5.06	6.56
58.10 (52.71)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.28	5.31	5.24	5.02	--	5.04
61.88 (56.14)	--	--	--	--	4.64	--	--
61.93 (56.19)	--	4.86	--	--	--	--	--
62.00 (56.24)	--	--	4.87	--	--	--	--
62.29 (56.51)	--	--	--	--	--	--	4.49
62.53 (56.72)	--	--	--	4.67	--	--	--

**Table 16.3-6 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB392-16GZ-100T-145-T6-3102 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8495	Lat. 8496	Lat. 8497	Lat. 8498	Lat. 8499	Lat. 8500
0.00 ( 0.00)	9.41	8.50	8.71	8.79	8.75	9.81	10.43
0.22 ( 0.20)	9.33	8.54	8.74	8.83	8.79	9.76	10.40
1.10 ( 1.00)	9.12	8.61	8.80	8.91	--	9.61	10.33
2.20 ( 2.00)	9.06	8.71	8.88	9.00	8.98	9.58	10.33
3.31 ( 3.00)	9.07	--	--	9.10	9.10	9.61	10.36
4.41 ( 4.00)	9.10	8.90	9.05	9.21	9.21	9.65	10.40
5.51 ( 5.00)	9.13	9.01	9.12	9.28	9.33	9.69	10.44
6.61 ( 6.00)	9.17	9.10	9.19	9.36	9.44	9.73	10.48
7.72 ( 7.00)	9.20	9.18	9.27	9.47	9.55	9.77	10.51
8.82 ( 8.00)	9.23	9.27	9.36	9.59	9.68	9.80	10.54
9.92 ( 9.00)	9.25	9.37	9.47	9.74	9.83	9.82	10.55
11.02 (10.00)	9.27	9.49	9.58	9.89	9.99	9.84	10.57
12.13 (11.00)	9.28	9.61	9.70	10.03	9.95	9.85	10.58
13.23 (12.00)	9.26	9.70	9.79	9.87	9.70	9.86	10.58
14.33 (13.00)	9.22	9.78	9.86	9.78	9.63	9.82	10.58
15.43 (14.00)	9.18	9.85	9.91	9.78	9.64	9.77	10.53
16.53 (15.00)	9.14	9.91	9.95	9.76	9.62	9.73	10.49
17.64 (16.00)	9.09	9.96	9.98	9.73	9.59	9.68	10.44
18.74 (17.00)	9.05	9.99	10.00	9.70	9.56	9.63	10.39
19.84 (18.00)	9.00	10.01	10.02	9.66	9.52	9.58	--
20.94 (19.00)	8.95	10.01	10.03	9.61	9.48	--	--
22.05 (20.00)	--	9.96	10.00	--	--	--	--
23.15 (21.00)	8.85	9.91	--	--	--	9.43	10.19
24.25 (22.00)	--	--	--	9.48	9.34	--	--
25.35 (23.00)	8.76	--	--	--	--	9.34	10.09
26.46 (24.00)	8.71	--	9.79	--	9.26	9.29	10.05
27.56 (25.00)	8.66	9.70	9.73	9.35	9.22	9.24	10.00
33.07 (30.00)	8.22	9.43	9.46	9.15	9.03	8.94	9.77
38.58 (35.00)	7.56	9.17	9.19	8.95	8.82	8.28	9.25
38.85 (35.24)	7.53	9.14	9.17	8.93	8.80	8.25	9.22
44.09 (40.00)	6.84	8.71	8.71	8.45	8.33	7.63	8.60
49.60 (45.00)	5.65	8.13	8.12	7.89	7.85	6.64	7.96

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8495	Lat. 8496	Lat. 8497	Lat. 8498	Lat. 8499	Lat. 8500
54.68 (49.61)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.27	7.28	7.01	6.84	5.19	6.79
55.50 (50.35)	--	7.16	7.18	6.92	6.74	5.06	6.68
58.10 (52.71)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.79	5.81	5.64	5.39	--	5.19
62.69 (56.87)	--	--	--	--	--	--	4.52
63.00 (57.16)	--	--	--	--	4.67	--	--
63.41 (57.53)	--	4.90	--	--	--	--	--
63.50 (57.61)	--	--	4.89	4.77	--	--	--
63.52 (57.62)	--	--	4.89	--	--	--	--
63.66 (57.75)	--	--	--	4.72	--	--	--

**Table 16.3-7 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB391-12GZ-100T-145-T6-3103 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8501	Lat. 8502	Lat. 8503	Lat. 8504	Lat. 8505	Lat. 8506
0.00 ( 0.00)	9.41	8.90	8.90	9.03	8.96	9.81	10.15
0.22 ( 0.20)	9.33	8.92	8.92	9.06	8.99	9.76	10.12
1.10 ( 1.00)	9.12	8.97	8.97	9.11	9.08	9.61	10.02
2.20 ( 2.00)	9.06	9.03	9.03	9.19	9.20	9.58	10.02
3.31 ( 3.00)	9.07	9.09	--	9.27	9.32	9.61	10.05
4.41 ( 4.00)	9.10	9.16	9.17	--	9.42	9.65	10.10
5.51 ( 5.00)	9.13	9.23	9.24	9.44	9.52	9.69	10.15
6.61 ( 6.00)	9.17	9.30	9.30	9.50	9.58	9.73	10.19
7.72 ( 7.00)	9.20	9.37	9.35	9.57	9.66	9.77	10.23
8.82 ( 8.00)	9.23	9.42	9.43	9.68	9.76	9.80	10.25
9.92 ( 9.00)	9.25	9.49	9.52	9.79	9.89	9.82	10.27
11.02 (10.00)	9.27	9.56	9.62	--	10.02	9.84	10.29
12.13 (11.00)	9.28	9.65	9.72	10.05	9.92	9.85	10.30
13.23 (12.00)	9.26	9.73	9.81	9.85	9.69	9.86	10.30
14.33 (13.00)	9.22	--	9.87	9.78	9.63	9.82	10.29
15.43 (14.00)	9.18	9.85	9.91	9.78	9.64	9.77	10.24
16.53 (15.00)	9.14	9.91	9.95	9.77	9.63	9.73	10.19
17.64 (16.00)	9.09	9.95	9.98	9.74	9.60	9.68	10.14
18.74 (17.00)	9.05	9.98	10.00	9.70	9.57	9.63	10.10
19.84 (18.00)	9.00	10.00	10.01	9.66	9.52	9.58	--
20.94 (19.00)	8.95	10.01	10.02	9.62	--	--	--
22.05 (20.00)	--	9.96	10.01	--	--	--	--
23.15 (21.00)	8.85	9.91	--	--	9.39	9.43	9.89
24.25 (22.00)	--	--	--	9.48	--	--	9.84
25.35 (23.00)	8.76	--	--	9.44	9.30	9.34	--
26.46 (24.00)	8.71	9.75	9.79	9.39	--	9.29	9.75
27.56 (25.00)	8.66	9.70	9.74	9.35	9.22	9.24	9.70
33.07 (30.00)	8.22	--	9.47	9.16	9.03	8.94	9.46
38.58 (35.00)	7.56	9.17	9.19	8.95	8.83	8.28	8.87
38.85 (35.24)	7.53	9.15	9.17	8.93	8.80	8.25	8.84
44.09 (40.00)	6.84	8.72	8.71	8.45	8.33	7.63	8.22
49.60 (45.00)	5.65	8.14	8.13	7.89	7.85	6.64	7.44



Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 8482	Lat. 8501	Lat. 8502	Lat. 8503	Lat. 8504	Lat. 8505	Lat. 8506
54.68 (49.61)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.28	7.29	7.02	6.84	5.19	6.26
55.50 (50.35)	--	7.18	7.19	6.92	6.74	5.06	6.13
58.10 (52.71)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.81	5.82	5.64	5.39	--	4.47
60.86 (55.21)	--	--	--	--	--	--	4.40
62.99 (57.14)	--	--	--	--	4.67	--	--
63.50 (57.61)	--	4.90	4.91	4.77	--	--	--
63.60 (57.70)	--	4.87	--	--	--	--	--
63.61 (57.71)	--	--	4.87	--	--	--	--
63.64 (57.73)	--	--	--	4.73	--	--	--

**Table 16.3-8 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB373-16GZ-100T-145-T6-3375 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9553	Lat. 9554	Lat. 9555	Lat. 9556	Lat. 9557	Lat. 9558
0.00 ( 0.00)	9.41	8.36	8.36	8.41	8.31	9.81	10.36
0.22 ( 0.20)	9.33	8.39	8.41	8.47	8.37	9.76	10.33
1.10 ( 1.00)	9.12	8.44	8.49	8.55	8.46	9.61	10.26
2.20 ( 2.00)	9.05	--	8.59	8.67	8.58	9.58	10.25
3.31 ( 3.00)	9.06	--	--	8.79	8.71	9.60	10.29
4.41 ( 4.00)	9.09	--	--	8.89	8.84	9.64	10.33
5.51 ( 5.00)	9.13	8.71	8.79	--	8.98	9.69	10.38
6.61 ( 6.00)	9.17	8.78	8.86	9.04	9.12	9.73	10.42
7.72 ( 7.00)	9.20	8.85	8.93	9.13	9.21	9.77	10.45
8.82 ( 8.00)	9.23	8.93	9.02	9.24	9.32	9.80	10.48
9.92 ( 9.00)	9.25	9.03	9.12	9.37	9.46	9.82	10.50
11.02 (10.00)	9.27	9.14	9.23	9.52	9.61	9.84	10.51
12.13 (11.00)	9.28	9.25	9.35	9.66	9.75	9.85	10.52
13.23 (12.00)	9.25	9.33	9.42	9.75	9.86	9.85	10.52
14.33 (13.00)	9.22	9.41	9.49	9.83	--	9.81	10.52
15.43 (14.00)	9.17	9.48	9.55	9.90	9.91	9.77	10.47
16.53 (15.00)	9.13	9.54	9.60	9.95	9.93	9.72	10.43
17.64 (16.00)	9.08	9.60	9.64	10.00	9.91	9.68	10.38
18.74 (17.00)	9.04	9.64	9.68	10.03	9.88	9.63	10.33
19.84 (18.00)	8.99	9.68	9.71	9.99	9.85	9.58	--
20.94 (19.00)	8.94	9.64	9.71	9.95	9.80	--	--
22.05 (20.00)	--	9.60	9.66	--	--	--	--
23.15 (21.00)	8.85	9.56	9.61	--	--	9.43	10.13
24.25 (22.00)	--	9.51	9.56	9.80	9.66	--	10.08
25.35 (23.00)	8.75	9.46	--	--	--	9.33	--
26.46 (24.00)	8.70	--	--	9.71	9.57	9.28	9.98
27.56 (25.00)	8.65	9.36	9.40	9.67	9.53	9.23	9.93
33.07 (30.00)	8.21	9.12	9.15	9.41	9.34	8.93	9.70
38.58 (35.00)	7.55	8.90	8.92	9.09	9.05	8.27	9.17
38.85 (35.24)	7.51	8.87	8.90	9.07	9.03	8.24	9.13
44.09 (40.00)	6.82	8.38	8.38	8.62	8.59	7.62	8.52
49.60 (45.00)	5.63	7.85	7.84	8.03	7.99	6.63	7.85

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9553	Lat. 9554	Lat. 9555	Lat. 9556	Lat. 9557	Lat. 9558
54.64 (49.57)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	6.94	6.89	7.13	7.14	5.17	6.67
55.50 (50.35)	--	6.82	6.77	7.03	7.03	5.04	6.56
58.07 (52.68)	--	--	--	--	--	4.20	--
60.63 (55.00)	--	5.22	5.25	5.62	5.62	--	5.03
61.77 (56.04)	--	4.86	--	--	--	--	--
61.83 (56.09)	--	--	4.86	--	--	--	--
62.29 (56.51)	--	--	--	--	--	--	4.49
63.07 (57.22)	--	--	--	--	4.85	--	--
63.11 (57.25)	--	--	--	4.84	--	--	--

**Table 16.3-9 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB391-16GZ-100T-145-T6-3376 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9559	Lat. 9560	Lat. 9561	Lat. 9562	Lat. 9557	Lat. 9563
0.00 ( 0.00)	9.41	8.51	8.74	8.74	8.65	9.81	10.40
0.22 ( 0.20)	9.33	8.55	8.77	8.77	8.69	9.76	10.37
1.10 ( 1.00)	9.12	8.62	--	8.85	8.77	9.61	10.30
2.20 ( 2.00)	9.05	8.70	8.90	8.96	8.88	9.58	10.29
3.31 ( 3.00)	9.06	8.78	8.97	9.07	9.01	9.60	10.33
4.41 ( 4.00)	9.09	8.87	9.05	9.16	9.14	9.64	10.37
5.51 ( 5.00)	9.13	8.96	9.12	9.25	9.27	9.69	10.41
6.61 ( 6.00)	9.17	9.05	9.20	9.35	9.42	9.73	10.45
7.72 ( 7.00)	9.20	9.14	9.29	9.45	9.55	9.77	10.49
8.82 ( 8.00)	9.23	9.24	--	9.56	9.66	9.80	10.51
9.92 ( 9.00)	9.25	9.33	9.46	9.66	9.76	9.82	10.53
11.02 (10.00)	9.27	9.41	9.53	9.75	9.86	9.84	10.55
12.13 (11.00)	9.28	9.51	9.61	--	9.97	9.85	10.55
13.23 (12.00)	9.25	--	9.68	9.97	10.09	9.85	10.56
14.33 (13.00)	9.22	9.65	9.74	10.06	10.13	9.81	10.56
15.43 (14.00)	9.17	--	9.80	10.13	10.09	9.77	10.51
16.53 (15.00)	9.13	9.80	9.86	10.20	10.13	9.72	10.46
17.64 (16.00)	9.08	9.87	9.91	10.17	10.12	9.68	10.42
18.74 (17.00)	9.04	9.93	9.95	10.09	10.07	9.63	10.37
19.84 (18.00)	8.99	9.97	9.98	--	--	9.58	--
20.94 (19.00)	8.94	10.00	10.00	9.98	9.95	--	--
22.05 (20.00)	--	9.97	9.97	--	--	--	--
23.15 (21.00)	8.85	9.93	9.92	--	--	9.43	10.17
24.25 (22.00)	--	9.88	--	9.80	9.76	--	--
25.35 (23.00)	8.75	--	--	9.74	--	9.33	10.07
26.46 (24.00)	8.70	--	9.77	9.68	9.64	9.28	10.02
27.56 (25.00)	8.65	9.72	9.72	9.62	9.59	9.23	9.97
33.07 (30.00)	8.21	9.48	9.48	9.36	9.32	8.93	9.74
38.58 (35.00)	7.55	9.22	9.22	9.16	9.12	8.27	9.22
38.85 (35.24)	7.51	9.19	9.20	9.14	9.10	8.24	9.19
44.09 (40.00)	6.82	8.78	8.79	8.75	8.70	7.62	8.57
49.60 (45.00)	5.63	8.19	8.20	8.27	8.22	6.63	7.92

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9559	Lat. 9560	Lat. 9561	Lat. 9562	Lat. 9557	Lat. 9563
54.64 (49.57)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.26	7.27	7.39	7.40	5.17	6.75
55.50 (50.35)	--	7.16	7.17	7.29	7.30	5.04	6.63
58.07 (52.68)	--	--	--	--	--	4.20	--
60.63 (55.00)	--	5.77	5.80	5.96	5.96	--	5.13
62.54 (56.74)	--	--	--	--	--	--	4.51
63.36 (57.48)	--	4.89	--	--	--	--	--
63.50 (57.61)	--	--	4.88	5.06	5.06	--	--
63.51 (57.62)	--	--	4.88	--	--	--	--
64.05 (58.11)	--	--	--	--	4.89	--	--
64.10 (58.15)	--	--	--	4.87	--	--	--

**Table 16.3-10 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB391-15GZ-100T-145-T6-3377 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9564	Lat. 9565	Lat. 9566	Lat. 9567	Lat. 9557	Lat. 9568
0.00 ( 0.00)	9.41	8.52	8.53	8.48	8.39	9.81	10.33
0.22 ( 0.20)	9.33	8.56	8.57	8.53	8.44	9.76	10.31
1.10 ( 1.00)	9.12	8.64	8.64	8.62	8.53	9.61	10.23
2.20 ( 2.00)	9.05	8.74	8.74	8.75	8.66	9.58	10.22
3.31 ( 3.00)	9.06	--	--	8.89	8.81	9.60	10.26
4.41 ( 4.00)	9.09	8.91	8.92	9.00	8.96	9.64	10.30
5.51 ( 5.00)	9.13	9.00	9.01	9.11	9.12	9.69	10.34
6.61 ( 6.00)	9.17	9.09	9.10	9.23	9.29	9.73	10.38
7.72 ( 7.00)	9.20	9.19	9.20	9.35	9.44	9.77	10.42
8.82 ( 8.00)	9.23	9.28	9.29	9.47	9.57	9.80	10.45
9.92 ( 9.00)	9.25	9.38	9.39	9.58	9.68	9.82	10.47
11.02 (10.00)	9.27	9.46	9.47	9.70	9.80	9.84	10.48
12.13 (11.00)	9.28	9.56	9.57	9.83	9.94	9.85	10.49
13.23 (12.00)	9.25	9.63	9.65	9.96	10.08	9.85	10.49
14.33 (13.00)	9.22	9.70	9.72	10.06	10.11	9.81	10.49
15.43 (14.00)	9.17	--	9.79	10.15	10.11	9.77	10.44
16.53 (15.00)	9.13	9.85	9.87	10.22	10.15	9.72	10.40
17.64 (16.00)	9.08	9.91	9.93	10.17	10.14	9.68	10.35
18.74 (17.00)	9.04	9.96	9.97	10.10	10.08	9.63	10.30
19.84 (18.00)	8.99	10.00	10.00	10.04	--	9.58	--
20.94 (19.00)	8.94	10.02	10.02	--	--	--	--
22.05 (20.00)	--	9.98	9.98	--	--	--	--
23.15 (21.00)	8.85	9.93	--	9.86	9.83	9.43	10.10
24.25 (22.00)	--	--	--	--	9.77	--	--
25.35 (23.00)	8.75	--	9.82	9.74	--	9.33	10.00
26.46 (24.00)	8.70	9.77	--	--	9.65	9.28	9.95
27.56 (25.00)	8.65	9.72	9.72	9.63	9.59	9.23	9.90
33.07 (30.00)	8.21	9.48	9.48	9.37	9.33	8.93	9.67
38.58 (35.00)	7.55	9.22	9.22	9.17	9.12	8.27	9.13
38.85 (35.24)	7.51	9.19	9.20	9.15	9.10	8.24	9.10
44.09 (40.00)	6.82	8.78	8.78	8.75	8.70	7.62	8.48
49.60 (45.00)	5.63	8.19	8.20	8.26	8.16	6.63	7.80

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9564	Lat. 9565	Lat. 9566	Lat. 9567	Lat. 9557	Lat. 9568
54.64 (49.57)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.26	7.26	7.38	7.38	5.17	6.62
55.50 (50.35)	--	7.15	7.16	7.28	7.28	5.04	6.51
58.07 (52.68)	--	--	--	--	--	4.20	--
60.63 (55.00)	--	5.77	5.78	5.94	5.94	--	4.97
62.11 (56.35)	--	--	--	--	--	--	4.48
63.41 (57.53)	--	4.88	--	--	--	--	--
63.42 (57.53)	--	--	4.88	--	--	--	--
63.50 (57.61)	--	--	--	5.04	5.04	--	--
63.99 (58.05)	--	--	--	--	4.89	--	--
64.04 (58.09)	--	--	--	4.87	--	--	--

**Table 16.3-11 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB391-12GZ-100T-145-T6-3378 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9569	Lat. 9570	Lat. 9571	Lat. 9572	Lat. 9557	Lat. 9573
0.00 ( 0.00)	9.41	8.94	8.95	8.98	8.90	9.81	10.12
0.22 ( 0.20)	9.33	8.97	8.98	9.01	8.93	9.76	10.09
1.10 ( 1.00)	9.12	--	9.04	9.08	9.00	9.61	9.99
2.20 ( 2.00)	9.05	9.09	9.10	9.18	9.11	9.58	9.99
3.31 ( 3.00)	9.06	9.16	--	9.28	9.22	9.60	10.02
4.41 ( 4.00)	9.09	9.22	9.23	9.38	9.34	9.64	10.07
5.51 ( 5.00)	9.13	9.28	9.30	9.46	9.47	9.69	10.12
6.61 ( 6.00)	9.17	9.35	9.37	9.55	9.60	9.73	10.16
7.72 ( 7.00)	9.20	9.42	9.44	9.63	9.70	9.77	10.20
8.82 ( 8.00)	9.23	9.50	9.51	9.73	9.79	9.80	10.23
9.92 ( 9.00)	9.25	9.57	9.59	9.82	--	9.82	10.25
11.02 (10.00)	9.27	9.64	9.65	9.89	10.00	9.84	10.27
12.13 (11.00)	9.28	9.70	9.72	9.98	10.09	9.85	10.27
13.23 (12.00)	9.25	9.76	9.78	10.08	10.20	9.85	10.28
14.33 (13.00)	9.22	9.80	9.82	10.14	10.17	9.81	10.26
15.43 (14.00)	9.17	--	9.87	10.19	10.13	9.77	10.22
16.53 (15.00)	9.13	9.89	9.91	10.23	10.15	9.72	10.17
17.64 (16.00)	9.08	9.93	9.95	10.26	10.13	9.68	10.12
18.74 (17.00)	9.04	9.96	9.97	10.25	10.10	9.63	10.07
19.84 (18.00)	8.99	9.98	9.99	10.21	10.05	9.58	--
20.94 (19.00)	8.94	10.00	10.00	10.16	10.01	--	9.97
22.05 (20.00)	--	9.98	9.98	--	--	--	--
23.15 (21.00)	8.85	9.93	--	--	9.91	9.43	9.87
24.25 (22.00)	--	--	--	10.02	--	--	--
25.35 (23.00)	8.75	--	--	--	9.82	9.33	9.77
26.46 (24.00)	8.70	9.77	9.77	9.92	--	9.28	9.72
27.56 (25.00)	8.65	9.72	9.72	--	9.73	9.23	9.67
33.07 (30.00)	8.21	9.48	9.48	9.65	9.53	8.93	9.43
38.58 (35.00)	7.55	9.21	9.22	9.38	9.37	8.27	8.83
38.85 (35.24)	7.51	9.19	9.20	9.37	9.35	8.24	8.80
44.09 (40.00)	6.82	8.79	8.80	8.98	8.94	7.62	8.18
49.60 (45.00)	5.63	8.21	8.21	8.42	8.41	6.63	7.39



Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 9552	Lat. 9569	Lat. 9570	Lat. 9571	Lat. 9572	Lat. 9557	Lat. 9573
54.64 (49.57)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.28	7.29	7.39	7.40	5.17	6.21
55.50 (50.35)	--	7.18	7.18	7.29	7.30	5.04	6.08
58.07 (52.68)	--	--	--	--	--	4.20	--
60.63 (55.00)	--	5.81	5.82	5.97	5.97	--	--
60.70 (55.06)	--	--	--	--	--	--	4.38
63.50 (57.61)	--	4.90	4.91	5.06	5.06	--	--
63.64 (57.74)	--	4.85	--	--	--	--	--
63.66 (57.75)	--	--	4.86	--	--	--	--
64.05 (58.10)	--	--	--	--	4.89	--	--
64.09 (58.14)	--	--	--	4.88	--	--	--

**Table 16.3-12 MAPLHGR Limits**

Bundle Type: GE14-P10DNAB392-17GZ-100T-145-T6-2932 (GE14C)

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 7357	Lat. 7364	Lat. 7365	Lat. 7366	Lat. 7367	Lat. 7368	Lat. 7369
0.00 ( 0.00)	9.41	8.36	8.56	8.61	8.52	9.81	10.52
0.22 ( 0.20)	9.33	8.41	8.61	8.66	8.57	9.75	10.50
1.10 ( 1.00)	9.12	8.50	8.69	8.76	8.70	9.61	10.43
2.20 ( 2.00)	9.06	8.62	8.80	8.90	8.88	9.58	10.43
3.31 ( 3.00)	9.08	8.75	8.92	9.05	9.07	9.61	10.46
4.41 ( 4.00)	9.11	8.88	9.04	9.20	9.25	9.65	10.51
5.51 ( 5.00)	9.15	9.01	9.16	9.35	9.43	9.70	10.55
6.61 ( 6.00)	9.19	9.14	9.27	9.48	9.57	9.74	10.58
7.72 ( 7.00)	9.23	9.28	9.38	9.64	9.74	9.78	10.61
8.82 ( 8.00)	9.25	9.40	9.51	9.81	9.92	9.81	10.64
9.92 ( 9.00)	9.28	9.52	9.65	9.98	10.09	9.83	10.66
11.02 (10.00)	9.29	9.65	9.78	10.13	10.18	9.85	10.67
12.13 (11.00)	9.31	9.77	9.90	10.26	10.23	9.86	10.68
13.23 (12.00)	9.28	9.85	9.98	10.35	10.28	9.86	10.68
14.33 (13.00)	9.24	9.92	10.02	10.34	10.26	9.82	10.68
15.43 (14.00)	9.20	9.97	10.05	10.26	10.20	9.78	10.64
16.53 (15.00)	9.16	10.01	10.06	10.23	10.18	9.73	10.60
18.74 (17.00)	9.06	10.05	10.06	10.11	10.06	9.64	10.50
22.05 (20.00)	8.92	10.05	10.05	9.94	9.90	9.49	10.36
27.56 (25.00)	8.68	10.04	10.04	9.65	9.62	9.25	10.12
33.07 (30.00)	8.24	9.76	9.84	9.39	9.36	8.95	9.89
38.58 (35.00)	7.58	9.46	9.48	9.14	9.13	8.29	9.40
38.85 (35.24)	7.55	9.43	9.46	9.12	9.10	8.26	9.37
44.09 (40.00)	6.87	8.93	8.94	8.59	8.58	7.64	8.75
49.60 (45.00)	5.68	8.38	8.39	8.03	8.02	6.66	8.11
54.79 (49.71)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.30	7.32	7.14	7.13	5.21	7.00
55.50 (50.35)	--	7.19	7.22	7.05	7.04	5.08	6.89
58.16 (52.77)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.83	5.86	5.86	5.85	--	5.47
63.40 (57.52)	--	--	--	--	--	--	4.57
63.50 (57.61)	--	4.91	4.95	5.14	5.13	--	--

Average Planar Exposure	MAPLHGR Limit (kW/ft)						
GWd/MT (GWd/ST)	Lat. 7357	Lat. 7364	Lat. 7365	Lat. 7366	Lat. 7367	Lat. 7368	Lat. 7369
63.57 (57.67)	--	4.89	--	--	--	--	--
63.70 (57.79)	--	--	4.88	--	--	--	--
64.44 (58.46)	--	--	--	--	4.90	--	--
64.48 (58.50)	--	--	--	4.89	--	--	--

The core monitoring system monitors LHGR limits and ECCS-LOCA MAPLHGR limits separately; therefore, the new ECCS-LOCA MAPLHGR limits shown in Reference 3 for GE14C in Section 16.4 are unaffected by changes to the LHGR curve, and application of the GE14L-B36-G7-IMLTR LHGR curve is acceptable from the ECCS-LOCA perspective.

The single loop operation multiplier on MAPLHGR, and the ECCS analytical initial MCPR values applicable to each fuel type in the new cycle core, are shown in the following table.

**Table 16.3-13 Initial MCPR and Single Loop Operation Multiplier on MAPLHGR**

Fuel Type	Initial MCPR	Single Loop Operation Multiplier on MAPLHGR
GE14C	1.350	0.83

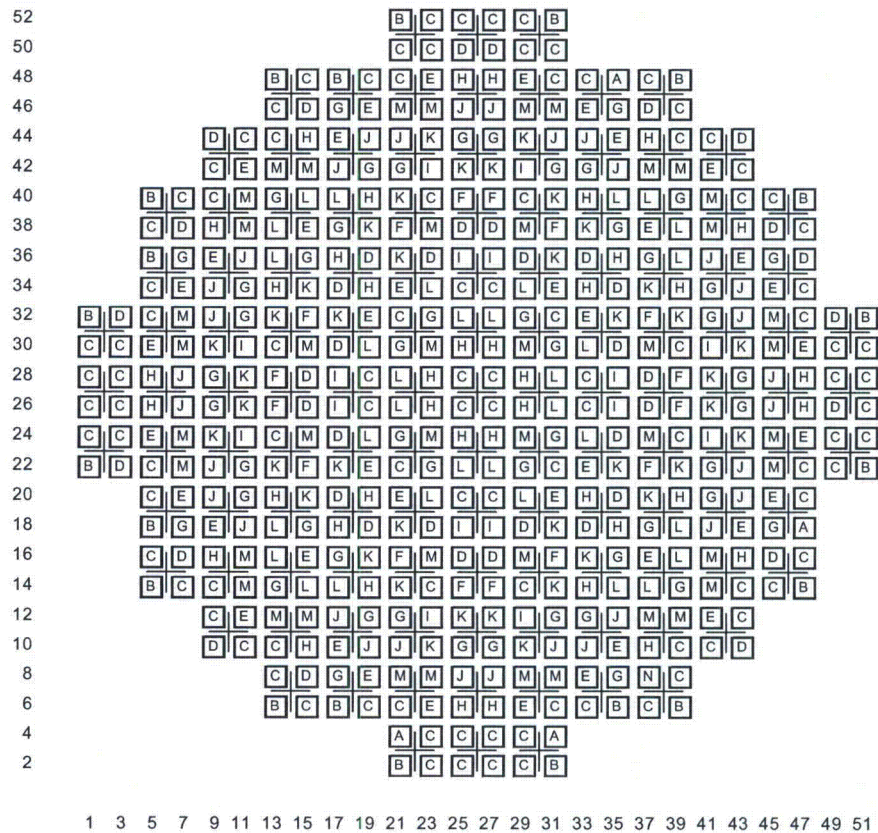
The GE14C SLO multiplier applies to the EPU operating domain only, and SLO operation in the MELLTA+ domain is not permitted.

## 16.4 References

The SAFER/GESTR-LOCA analysis base reports applicable to the new cycle core are listed below.

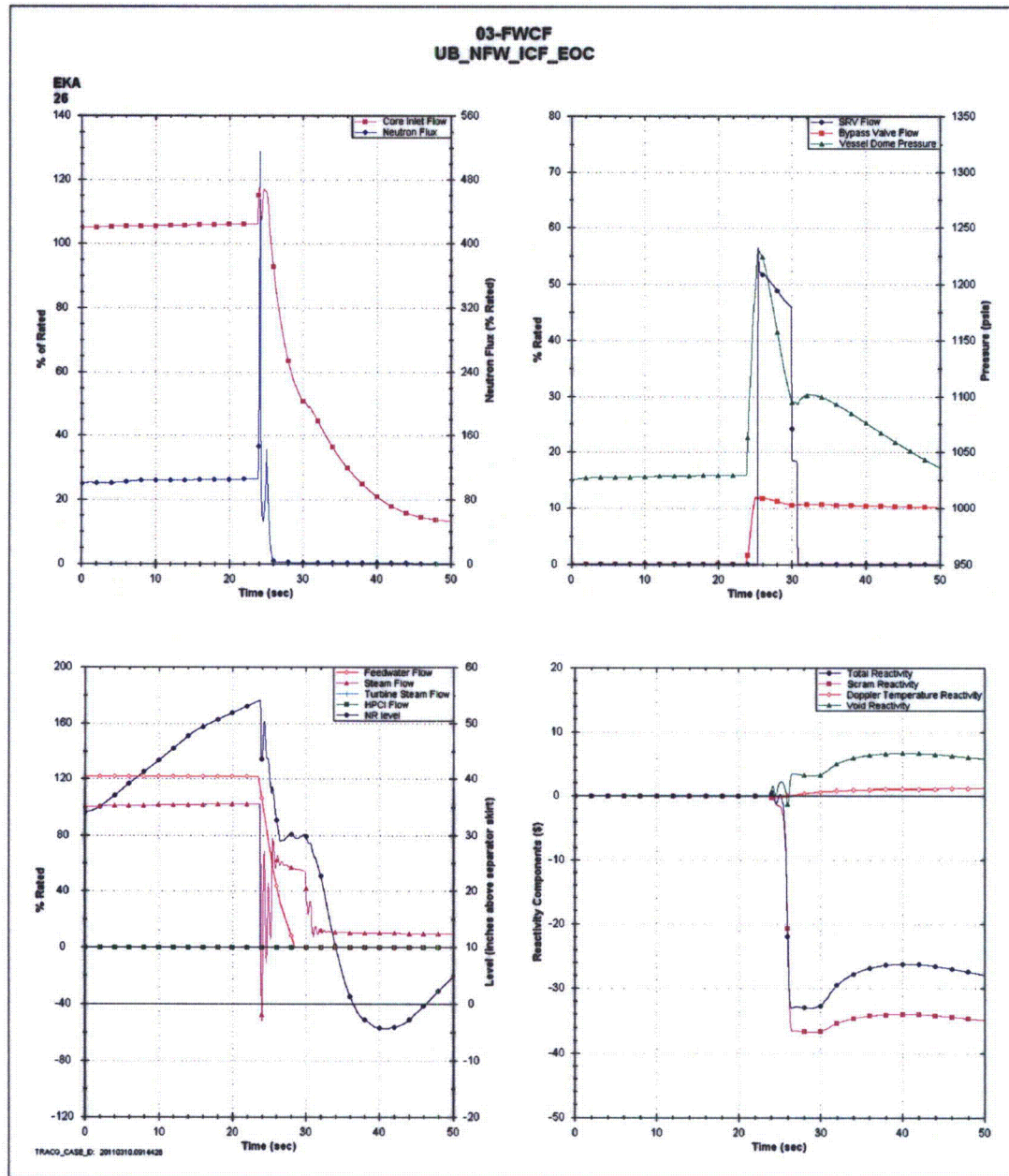
### References for GE14C

1. *Project Task Report Nuclear Management Company, LLC (NMC) Monticello Nuclear Generating Plant Extended Power Uprate Task T0407: ECCS-LOCA SAFER/GESTR*, GE-NE-0000-0060-9286-TR-R2, October 2011.
2. *Project Task Report Northern States Power - Minnesota (NSPM) Monticello Nuclear Generating Plant MELLLA+ Task T0407: ECCS-LOCA SAFER/GESTR*, 0000-0096-6889-TR-R1, October 2011.
3. *Monticello New MAPLHGR Curve Development for Error 2011-02 and 2011-03 Correction*, 0000-0139-2877-R0, Revision 0, September 2011.
4. *Monticello Nuclear Plant GE14 ECCS-LOCA Evaluation with the RHR Intertie Line Open*, NSA 01-459, October 10, 2001.



Fuel Type			
A=GE14-P10DNAB393-17GZ-100T-145-T6-2599	(Cycle 23)	H=GE14-P10DNAB392-16GZ-100T-145-T6-3102	(Cycle 25)
B=GE14-P10DNAB392-16GZ-100T-145-T6-2824	(Cycle 23)	I=GE14-P10DNAB391-12GZ-100T-145-T6-3103	(Cycle 25)
C=GE14-P10DNAB392-16GZ-100T-145-T6-2931	(Cycle 24)	J=GE14-P10DNAB373-16GZ-100T-145-T6-3375	(Cycle 26)
D=GE14-P10DNAB392-17GZ-100T-145-T6-2932	(Cycle 24)	K=GE14-P10DNAB391-16GZ-100T-145-T6-3376	(Cycle 26)
E=GE14-P10DNAB392-16GZ-100T-145-T6-2931	(Cycle 25)	L=GE14-P10DNAB391-15GZ-100T-145-T6-3377	(Cycle 26)
F=GE14-P10DNAB424-14GZ-100T-145-T6-3100	(Cycle 25)	M=GE14-P10DNAB391-12GZ-100T-145-T6-3378	(Cycle 26)
G=GE14-P10DNAB375-16GZ-100T-145-T6-3101	(Cycle 25)	N=GE14-P10DNAB392-17GZ-100T-145-T6-2932	(Cycle 24)

Figure 1 Reference Core Loading Pattern



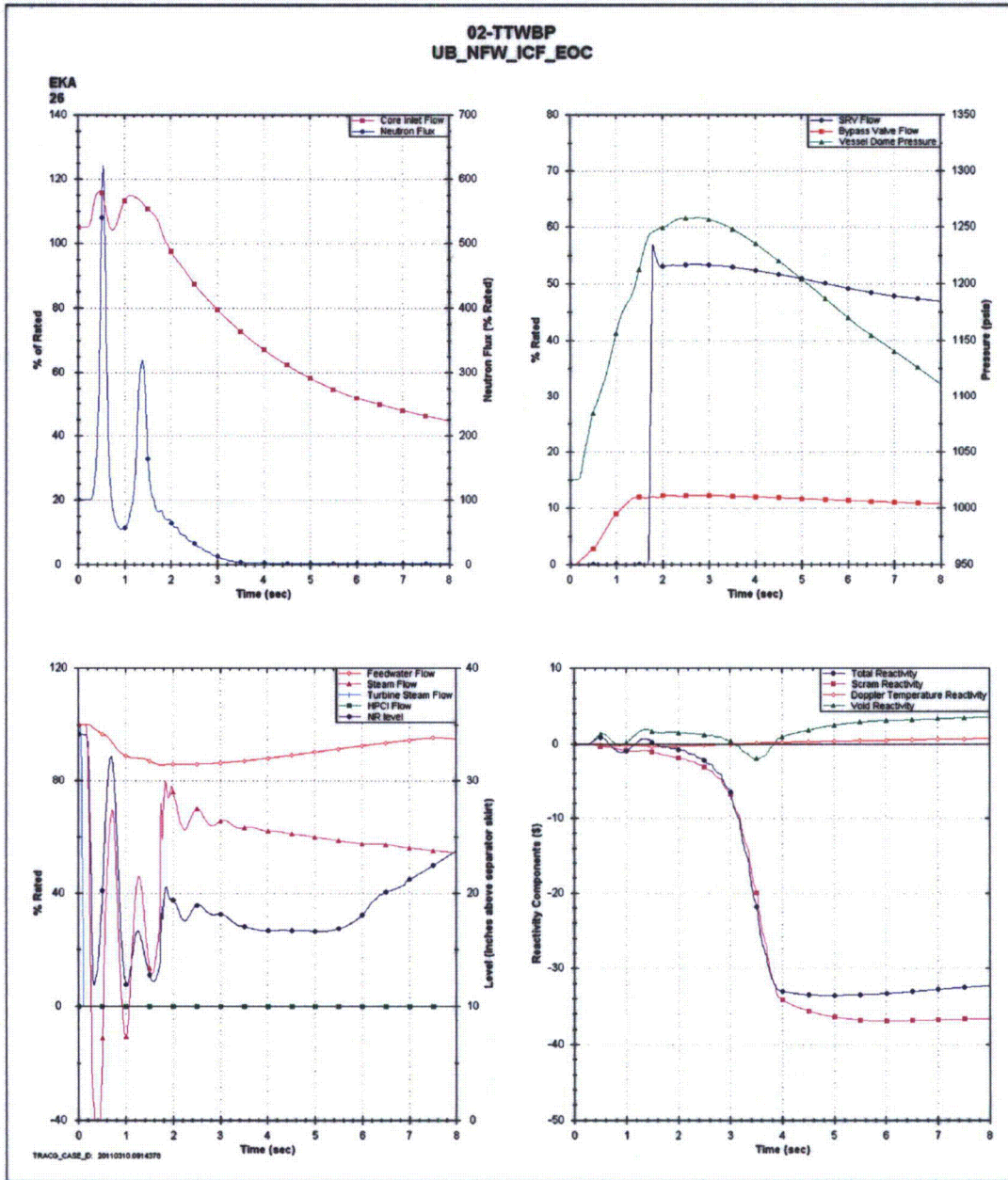


Figure 3 Plant Response to Turbine Trip with Bypass  
( EOC ICF (UB) )



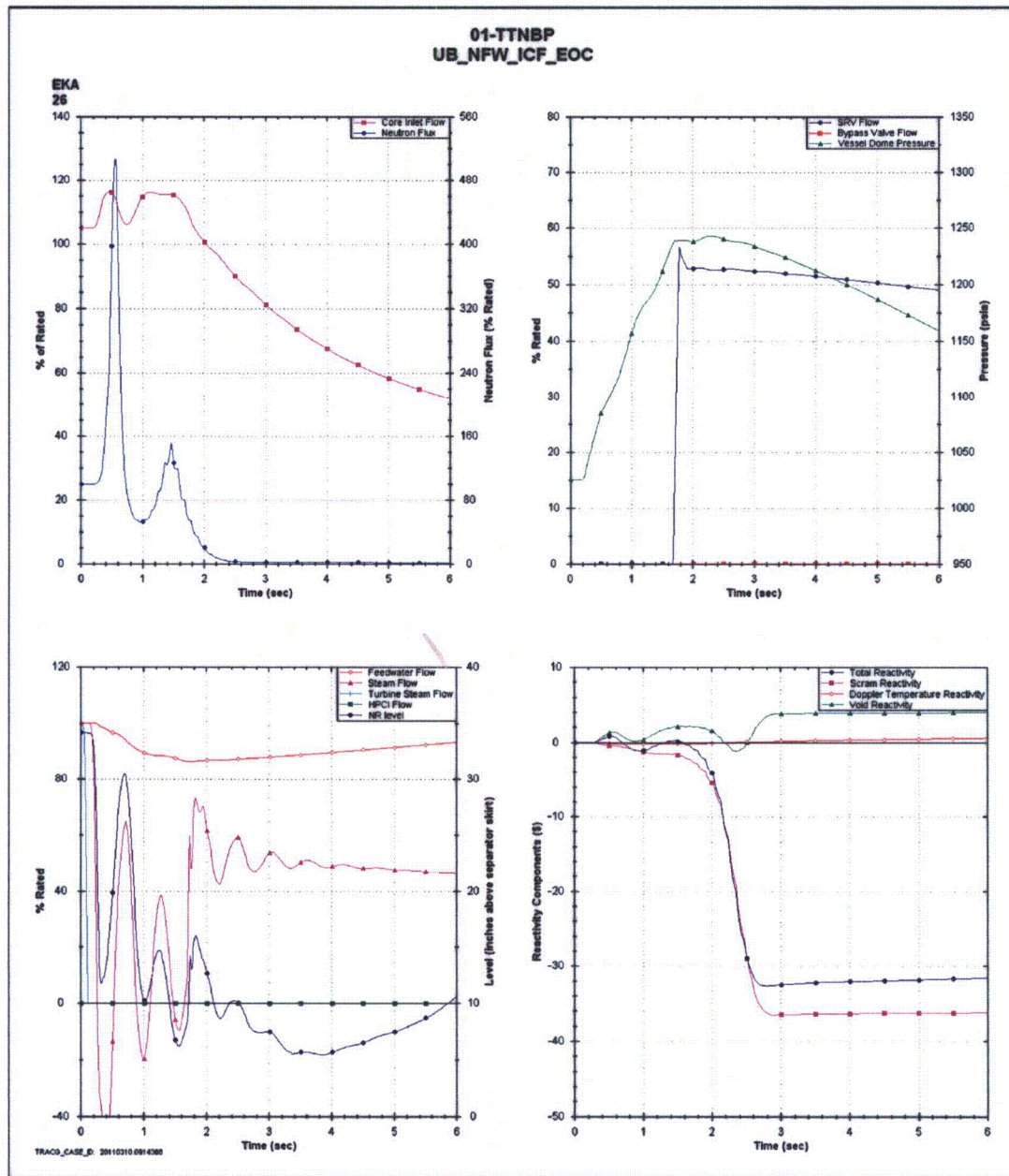


Figure 4 Plant Response to Turbine Trip w/o Bypass  
( EOC ICF (UB) )



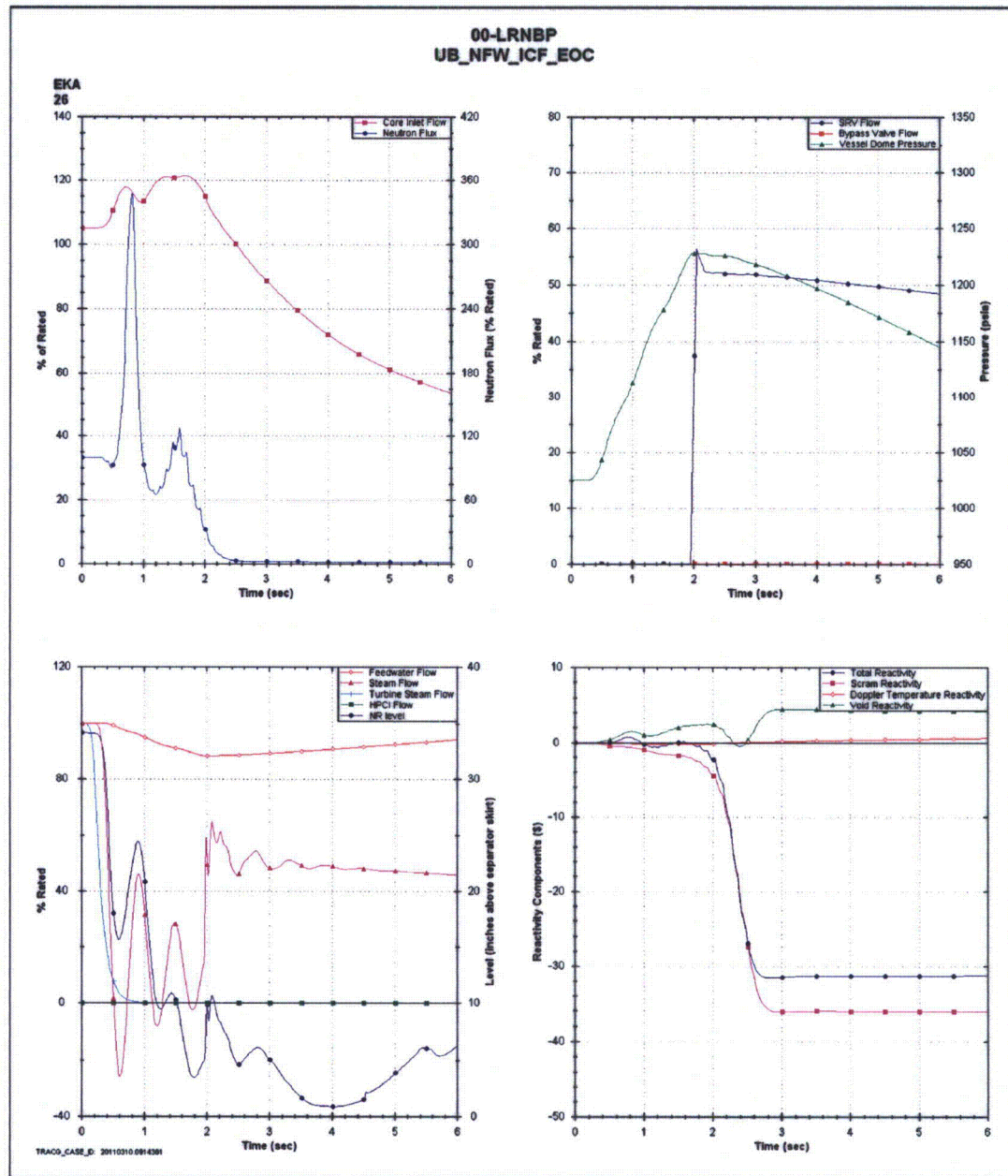


Figure 5 Plant Response to Load Rejection w/o Bypass  
(EOC ICF (UB))

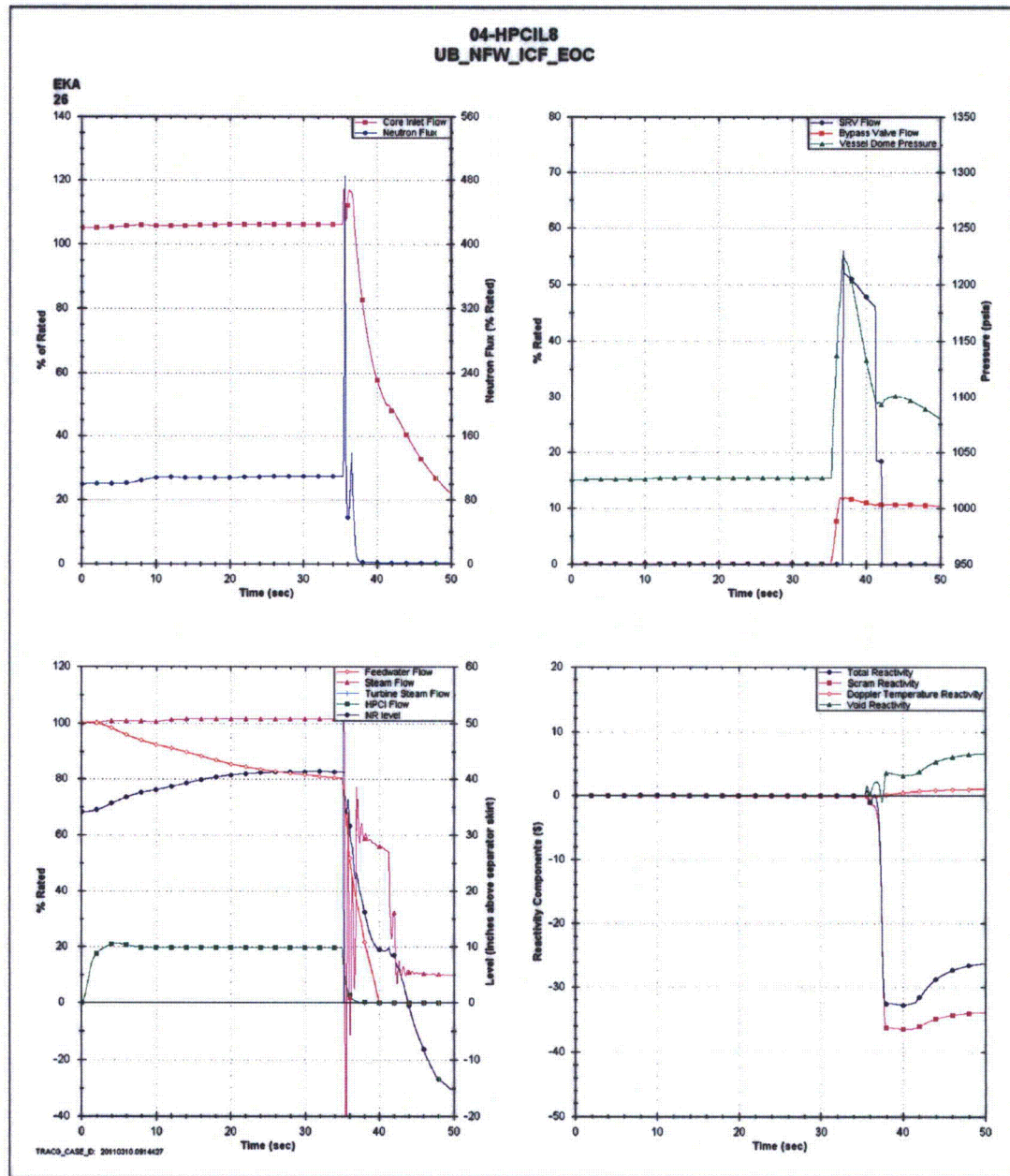


Figure 6 Plant Response to Inadvertent HPCI /L8  
(EOC ICF (UB) )

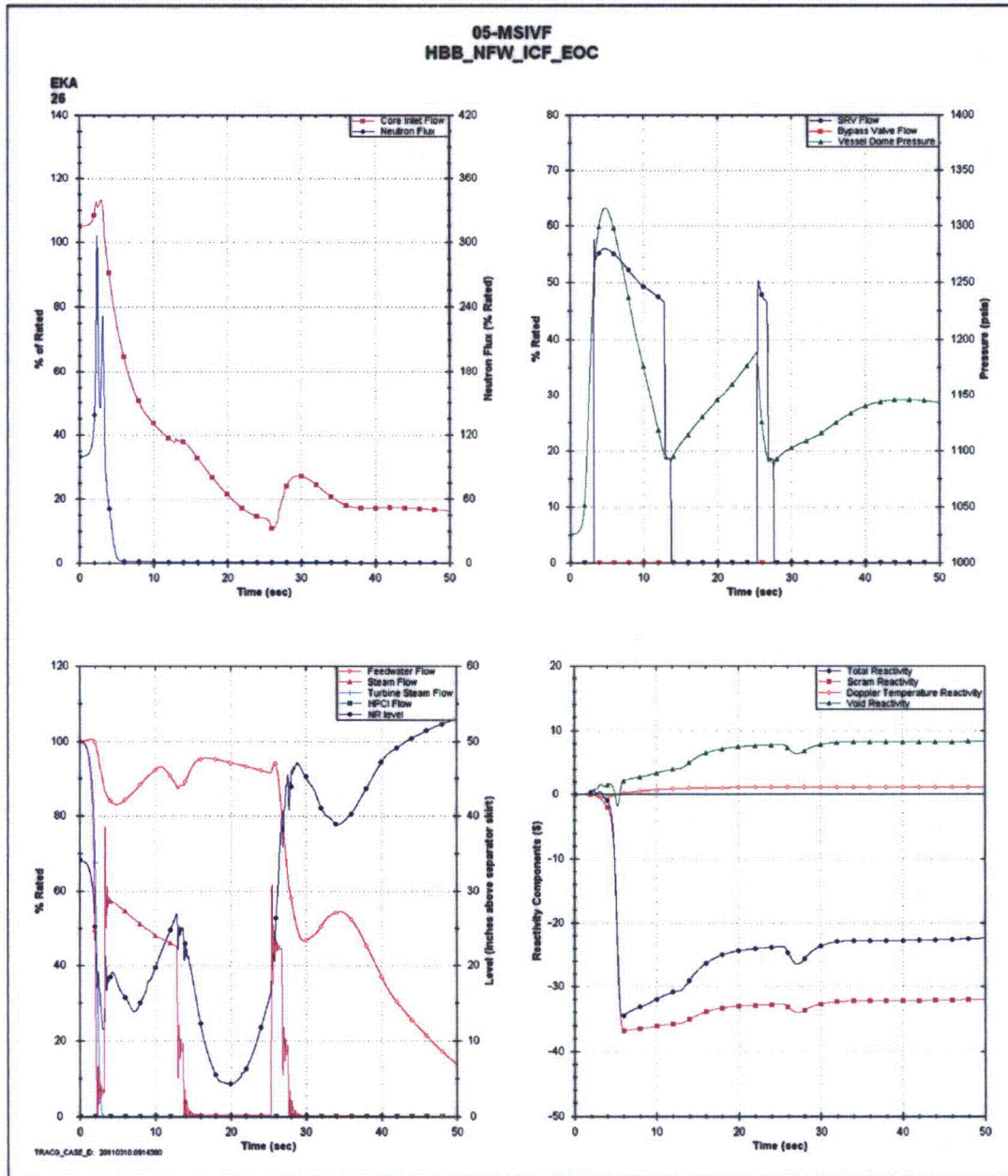


Figure 7 Plant Response to MSIV Closure (Flux Scram) – ICF (HBB)

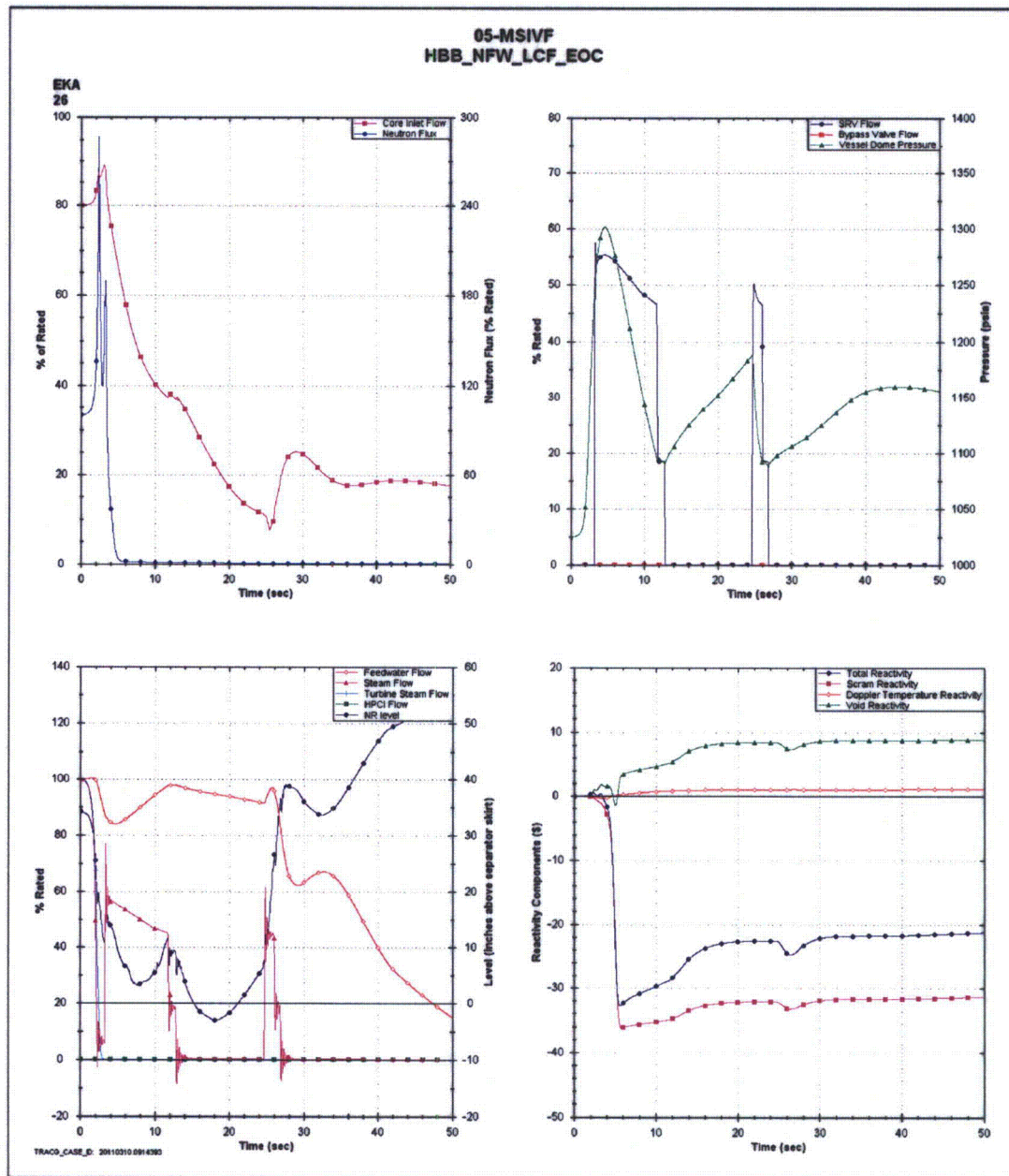
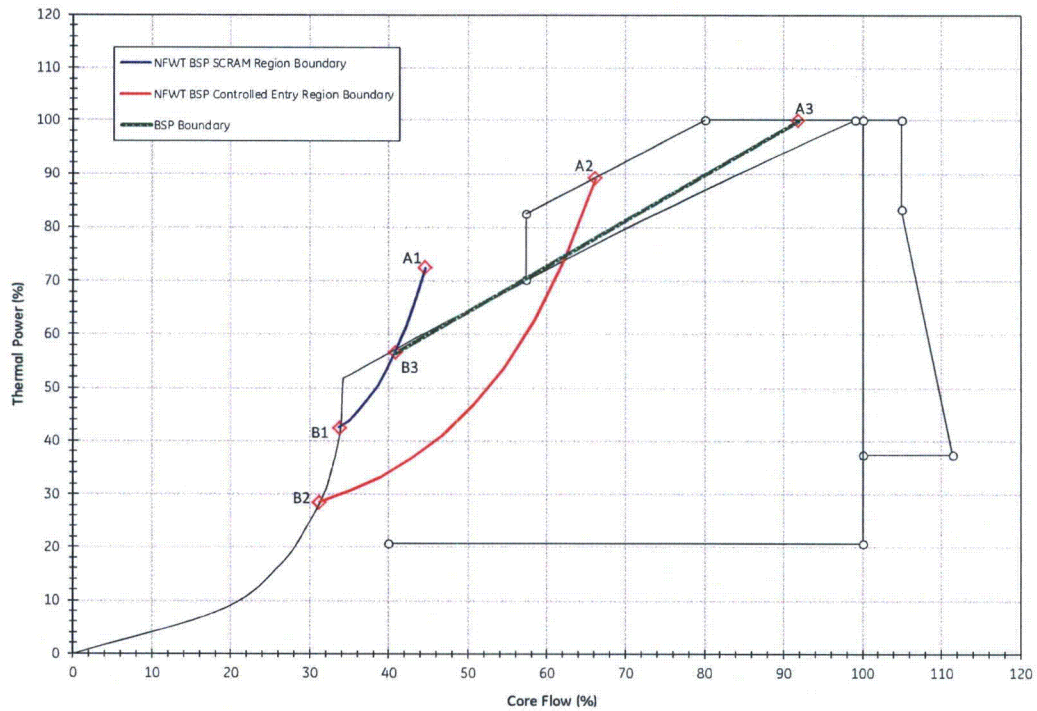


Figure 8 Plant Response to MSIV Closure (Flux Scram) – LCF (HBB)





**Figure 9 Manual BSP Regions and BSP Boundary for Normal Feedwater Temperature Operation**

## Appendix A Analysis Conditions

The reactor operating conditions used in the reload licensing analysis for this plant and cycle are presented in Table A-1. The pressure relief and safety valve configuration for this plant are presented in Table A-2. Additionally, the operating flexibility options listed in Section 8 are supported by the reload licensing analysis.

**Table A-1 Reactor Operating Conditions<sup>17</sup>**

Parameter	Analysis Value	
	ICF NFWT	LCF NFWT
Thermal power, MWt	2004.0	2004.0
Core flow, Mlb/hr	60.5	46.1
Reactor pressure (core mid-plane), psia	1041.0	1036.3
Inlet enthalpy, Btu/lb	524.2	516.4
Non-fuel power fraction	NA	NA
Steam flow, Mlb/hr	8.34	8.33
Dome pressure, psig	1010.6	1010.1
Turbine pressure, psig	937.8	937.5

**Table A-2 Pressure Relief and Safety Valve Configuration**

Valve Type	Number of Valves	Lowest Setpoint (psig)
Safety/Relief Valve	8	1170 (Relief Mode)

<sup>17</sup> The non-fuel power fraction is not available from TRACG04.

## **Appendix B**

### **Thermal-Mechanical Compliance**

A thermal-mechanical compliance check is performed to assure that the fuel will operate without violating the thermal-mechanical design limits. These limits are designed such that reactor operation within these limits provides assurance that the fuel will not exceed any thermal-mechanical design or licensing limits during all modes of operation. The fuel thermal-mechanical limits are met for the current cycle.

## **Appendix C**

### **Decrease in Core Coolant Temperature Event**

The Loss-of-Feedwater Heating event was analyzed at 100% rated power using the BWR Simulator Code. The use of this code is consistent with the approved methodology. The transient plots, neutron flux and heat flux values normally reported in Section 9 are not an output of the BWR Simulator Code; therefore, those items are not included in this document. The OLMCPR result is shown in Section 11.



## Appendix D Off-Rated Limits

### Off-Rated Power Dependent Limits

ARTS power dependent thermal limits have been developed for operation with all Equipment In-Service and a Pressure Regulator Out-Of-Service (PROOS) in Reference D-1.

The MCPRp limits provided in Reference D-1 are based on a SLMCPR of 1.15.

MCPRp Limits for: Base Case			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit <i>MCPR<sub>p</sub></i>	Power (%)	Limit <i>MCPR<sub>p</sub></i>
25.0	3.62	25.0	2.83
40.0	2.91	40.0	2.37
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit <i>K<sub>p</sub></i>	
40.0		1.323	
60.0		1.150	
90.0		1.056	
100.0		1.000	

MCPRp Limits for: Pressure Regulator Out-of-Service			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit <i>MCPRp</i>	Power (%)	Limit <i>MCPRp</i>
25.0	3.62	25.0	2.83
40.0	2.91	40.0	2.37
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit <i>Kp</i>	
40.0		1.550	
60.0		1.460	
85.0		1.240	
85.0		1.072	
90.0		1.056	
100.0		1.000	

LHGRFACp Limits for: Base Case			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit	Power (%)	Limit
25.0	0.496	25.0	0.522
40.0	0.519	40.0	0.638
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit	
40.0		0.687	
100.0		1.000	

LHGRFACp Limits for: Pressure Regulator Out-of-Service			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit	Power (%)	Limit
25.0	0.496	25.0	0.522
40.0	0.519	40.0	0.638
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit	
40.0		0.645	
85.0		0.825	
85.0		0.894	
100.0		1.000	

MAPFACp Limits for: Base Case			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit	Power (%)	Limit
25.0	0.496	25.0	0.522
40.0	0.519	40.0	0.638
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit	
40.0		0.687	
100.0		1.000	

MAPFACp Limits for: Pressure Regulator Out-of-Service			
<i>Limits for Power &lt; 40.0%</i>			
Flow > 50.0%		Flow ≤ 50.0%	
Power (%)	Limit	Power (%)	Limit
25.0	0.496	25.0	0.522
40.0	0.519	40.0	0.638
<i>Limits for Power ≥ 40.0%</i>			
Power (%)		Limit	
40.0		0.645	
85.0		0.825	
85.0		0.894	
100.0		1.000	

### Off-Rated Flow Dependent Limits

The flow dependent ARTS thermal limits are documented in Reference D-1. The off-rated flow dependent limits provided in Reference D-1 have been validated for this cycle. The flow dependent LHGRFAC/MAPFAC limits include an ECCS-LOCA MAPLHGR limit for core flow ≤99.0% rated flow.

The MCPPrf limits provided in Reference D-1 are based on a SLMCPR of 1.15.

MCPPrf Limits for: Base Case	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit MCPPrf
30.0	1.64
94.4	1.23
107.0	1.23

MCPRf Limits for: Pressure Regulator Out-of-Service	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit <i>MCPRf</i>
30.0	1.64
94.4	1.23
107.0	1.23

LHGRFACf Limits for: Base Case	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit
30.0	0.660
78.6	0.991
99.0	0.991
99.0	1.000
107.0	1.000

LHGRFACf Limits for: Pressure Regulator Out-of-Service	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit
30.0	0.660
78.6	0.991
99.0	0.991
99.0	1.000
107.0	1.000

MAPFACf Limits for: Base Case	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit
30.0	0.660
78.6	0.991
99.0	0.991
99.0	1.000
107.0	1.000

MAPFACf Limits for: Pressure Regulator Out-of-Service	
<i>Limits for a Maximum Runout Flow of 107.0%</i>	
Flow (%)	Limit
30.0	0.660
78.6	0.991
99.0	0.991
99.0	1.000
107.0	1.000

#### Reference

- D-1 *Monticello Nuclear Generating Plant Offrated Limits and Pressure Regulator Downscale Failure Analysis at MELLLa+, 0000-0131-4356-R1, Revision 1, January 2012.*

## Appendix E

### Mislocated Fuel Loading Error

The Monticello Nuclear Generating Plant Cycle 26 Mislocated Fuel Loading Error analysis was evaluated. The event is non-limiting for fuel types through GE14 if the following condition is satisfied:

$$OLMCPR_{plant/cycle} \geq 1.28 \times (SLMCPR_{plant/cycle} / 1.07)$$

This criterion has been demonstrated to be generically applicable to GE14 reloads.

The minimum OLMCPR calculated for Monticello Cycle 26 is 1.61 (shown in Section 11 for GE14 fuel from BOC to EOC) while the plant/cycle specific SLMCPR is 1.15. Using 1.15 in the equation yields 1.38 on the right side.

Using these values the above equation would yield  $1.61 \geq 1.38$ .

Therefore, the Mislocated Fuel Loading Error is non-limiting for Monticello Cycle 26.

## Appendix F

### Turbine Trip with Bypass and Degraded Scram

The Turbine Trip with Bypass (TTWBP) event was analyzed with the postulated Option A degraded scram and an OLMCPR value was determined. No Option B analysis was performed for the TTWBP. The Option A calculated OLMCPR for the TTWBP is used for Option B and this value sets the OLMCPR limit for Option B because it is higher than the most limiting OLMCPR calculated for a pressurization event. Therefore, if the cycle average scram time does not satisfy the criterion provided in Reference F-1 and Monticello Nuclear Generating Plant decides to interpolate between Option A and Option B scram times, this can be accomplished by using the procedure provided in Reference F-1 with the following modification to Equation 4 of Reference F-1:

The modified equation to establish the new operating limit for pressurization events is given below:

$$OLMCPR_{New} = MAX \left( OLMCPR_{Option\ B} + \frac{\tau_{ave} - \tau_B}{\tau_A - \tau_B} \Delta OLMCPR, OLMCPR_{TTWBP} \right) \quad (4)$$

where:  $\tau_{ave}$  and  $\tau_B$  are defined in Equations 1 and 3 of Reference F-1, respectively;

$\tau_A$  = the technical specification limit on core average scram time to the 20 percent insertion position

OLMCPR Option B = the most limiting OLMCPR calculated for a pressurization event actually analyzed for Option B

$\Delta OLMCPR$  = the difference between OLMCPR Option A and OLMCPR Option B

For Monticello Cycle 26 the OLMCPRs for the HPCIL8 event are 1.72 for Option A and 1.52 for Option B. Therefore, the  $\Delta OLMCPR$  for the HPCIL8 event is 0.20. The OLMCPR for the TTWBP event is 1.61.

This approach is cycle independent with the TTWBP analyzed in this manner as long as the cycle specific OLMCPR Option B and  $\Delta OLMCPR$  values are used in the calculation.

#### Reference

- F-1 *Monticello Option B Licensing Basis*, LRC03.040, March 24, 2003 from L. R. Conner to Rick Rohrer.

## Appendix G

### Monticello Non-Standard SRLR Items

This appendix contains Monticello non-standard SRLR items that are being provided at the request of Xcel Energy.

#### Additional Section 9 Information

For the inadvertent HPCI event, the level 8 trip was modeled as the OPL-3 setpoint value. The turbine trip signal is initiated manually after the narrow-range water level has reached equilibrium. This was done since confirmation could not be obtained that during this event a level 8 trip would not occur.

#### Additional Section 11 Information

The following table summarizes the cycle rated power and flow MCPR values for the events reported in this SRLR. If the event's Option A or Option B limit are merged together in a single column, then the event cannot be interpolated based on scram times. For a description of how to implement Option B scram times see Appendix F.

<b>Cycle MCPR values</b> <b>Exposure range: BOC to EOC</b>		
	<b>Option A</b>	<b>Option B</b>
	<b>GE14C</b>	<b>GE14C</b>
FW Controller Failure	Not Limiting	Not Limiting
Load Reject w/o Bypass	Not Limiting	Not Limiting
Turbine Trip w/o Bypass	Not Limiting	Not Limiting
Inadvertent HPCI /L8 Turbine Trip	1.72	1.52
Loss of Feedwater Heating	1.32	
Fuel Loading Error (misoriented)	1.36	
Fuel Loading Error (mislocated)	Determined to be non-limiting	
SLO Pump Seizure	1.45	
Turbine Trip with Bypass	1.61	
Control Rod Withdrawal Error (RBM setpoint at 114%)	1.40	
Load Rejection with Bypass <sup>18</sup>	Determined to be non-limiting	
LOCA Analysis Limit MCPR	1.35	

<sup>18</sup> This event corresponds to "Single Turbine Control Valve Slow Closure (GESIL 502)". Since Cycle 22 results for this event were far from limiting and no significant changes have occurred that would significantly increase this event's results for this cycle, this event was determined to be non-limiting.



Additional Section 12 Information

The Dome Pressure Safety Limit, provided via the OPL-3, of 1332.0 psig is satisfied.

Additional Section 16 Information

These analyses indicate that plant operation up to 376 MWt with the RHR intertie line open is acceptable from an ECCS performance standpoint, provided a MAPLHGR multiplier of 0.75 is implemented or that the peak bundle power does not exceed 3.9 MWt.

In addition to the power and flow dependent multipliers, Monticello also requires an ECCS MAPLHGR multiplier of 0.9908 for operation at or below 99% core flow.

No single-loop operation multiplier on PLHGR is required.

Maximum Subcritical Banked Withdrawal Position (MSBWP)

The Maximum Subcritical Banked Withdrawal Position analysis confirmed that the reference core loading pattern satisfied cold shutdown margin requirements including bank position 04.

## Appendix H

### TRACG04 AOO Supplementary Information

Reference H-1 provides the results of the evaluations supporting the application of TRACG04 for AOO analyses for Monticello. Section 11 of this report presents the MCPR limits based on the TRACG04 methodology of Reference H-2.

The safety evaluation report for licensing topical report NEDE-32906P (Reference H-2) concluded that the application of TRACG04 methods to AOO and overpressure transient analyses were acceptable subject to certain limitations and conditions. Several of these conditions request that additional, application-specific information be provided. The information provided below responds to these requests for the identified items.

#### **Limitation/Condition 23 (Transient LHGR Limitation 3)**

The Transient LHGR Limitation 3 specified in Reference H-2 requires that in order to account for the impact of void history bias, plant-specific EPU and MELLLA+ applications using either TRACG04 or ODYN will demonstrate an equivalent to 10 percent margin to the fuel centerline melt and the 1 percent cladding circumferential plastic strain acceptance criteria due to pellet-cladding mechanical interaction for all of the limiting AOO transient events, including equipment out-of-service. Limiting transients in this case, refers to transients where the void reactivity coefficient plays a significant role (such as pressurization events).

The analyses for Monticello Cycle 26 met the conditions of the Void Reactivity Coefficient Correction Model Condition (Limitation 21 of Reference H-2) and the Void Reactivity Coefficient Correction Model Basis Condition (Limitation 22 of Reference H-2); and therefore per Limitation 23 of Reference H-2, the pressurization transient events are not required to demonstrate 10 percent margin to the fuel centerline melt and the 1 percent cladding circumferential plastic strain acceptance criteria.

#### **References**

- H-1 *Monticello TRACG Implementation for Reload Licensing Transient Analysis*, 0000-0082-0062-R1, Revision 1, May 2010.
- H-2 *Migration to TRACG04/PANAC11 from TRACG02/PANAC10 for TRACG AOO and ATWS Overpressure Transients*, NEDE-32906P, Supplement 3-A, Revision 1, April 2010.

## Appendix I

### NEDC-33173P-A Supplementary Information

The safety evaluation for licensing topical report NEDC-33173P-A (Reference I-1) concluded that the application of GEH/GNF methods to expanded operating domains was acceptable subject to certain limitations and conditions. Several of these conditions request that additional, application-specific information be provided. The information provided below responds to these requests for the identified items.

#### **Limitation/Condition 6 (R-factor)**

The plant specific R-factor calculation at a bundle level was performed consistent with lattice axial void conditions expected for the hot channel operating state applicable to this cycle of operation. For Monticello Cycle 26 at the EPU licensed power level, a 60% void profile was used for the calculation of bundle R-factors.

#### **Limitation/Condition 10 (Transient LHGR 2)**

The Transient LHGR 2 limitation specified in Reference I-1 requires each EPU and MELLRA+ fuel reload to document the calculation results of the analyses demonstrating compliance to transient T-M acceptance criteria. Table I-1 summarizes the percent margin to the Thermal Overpower and Mechanical Overpower limits.

**Table I-1 Margin to the Thermal Overpower and Mechanical Overpower Limits**

Criteria	GE14C
Thermal Overpower	3.22%
Mechanical Overpower	9.22%

#### **Limitation/Condition 11 (Transient LHGR 3)**

The Transient LHGR 3 limitation specified in Reference I-1 requires that in order to account for the impact of the void history bias, plant-specific EPU and MELLRA+ applications using either TRACG04 or ODYN will demonstrate an equivalent to 10 percent margin to the fuel centerline melt and the 1 percent cladding circumferential plastic strain acceptance criteria due to pellet-cladding mechanical interaction for all of the limiting AOO transient events, including equipment out-of-service. Limiting transients in this case, refers to transients where the void reactivity coefficient plays a significant role (such as pressurization events).

However, as stated in Appendix H the void history bias was incorporated into the transient model within the TRACG04 code, and therefore the 10 percent margin to the fuel centerline melt and the 1 percent cladding circumferential plastic strain acceptance criteria is no longer required.

**Limitation/Condition 14 (Part 21 Evaluation of GESTR-M Fuel Temperature Calculation)**

The GE14 TMOL which addresses the NRC Staff penalty as documented in Appendix F of the NRC SE for NEDC-33173P-A (Reference I-1) has been applied to the core design for this reload. This TMOL is illustrated in the FBIR (Reference I-3) and is documented in Appendix C of the GE14 Compliance Report NEDC-32868P, Revision 3, "GE14 Compliance With Amendment 22 of NEDE-24011-P-A (GESTAR II), April 2009."

**Limitation/Condition 17 (Steady State 5 Percent Bypass Voiding)**

The bypass voiding condition was evaluated for the licensed core loading and confirmed that the bypass void fraction remained below 5 percent at all LPRM levels when operating at steady-state conditions within the licensed upper boundary. For a power/flow condition that conservatively bounded the licensed power/flow upper boundary, the bypass void fraction at the D level LPRM location was calculated to be 1.1%.

**Limitation/Condition 19 (Void-Quality Correlation 1)**

The OLMCPR limitation requiring an additional 0.01 adder on the OLMCPR does not apply to EPU or MELLLA+ licensing calculations when TRACG04 methods are used (Reference I-2). Therefore, the OLMCPR adder is not applied to Monticello Cycle 26.

**NEDC-33006P-A Supplementary Information**

The safety evaluation for licensing topical report NEDC-33006P-A (*General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus*) approved the operation of GE BWRs in the MELLLA+ expanded operating domain, subject to certain limitations and conditions. One of these conditions requested that additional, application-specific information be provided as part of the SRLR. The information provided below responds to this request.

**Limitation/Condition 12.6 (SLMCPR Statepoints)**

As requested in Limitation/Condition 12.6, the SLMCPR calculated results at specified off-rated power/flow conditions are reported in Table I-2 below.

**Table I-2 Two-Loop SLMCPR Results for MELLLA+ Conditions**

Power (% Rated)	Flow (%Rated)	SLMCPR
100	100	1.10
100	80	1.11
82.5	57.4	1.12
100	105	1.11

**References**

- I-1 *Applicability of GE Methods to Expanded Operating Domains, NEDC-33173P-A, Revision 1, September 2010.*
- I-2 *Final Safety Evaluation of GE Hitachi Nuclear Energy Americas, LLC Licensing Topical Report NEDE-32906P, Supplement 3-A, "Migration to TRACG04/PANAC11 from TRACG02/PANAC10 for TRACG AOO and ATWS Overpressure Transients", Revision 1, April 2010.*
- I-3 *Fuel Bundle Information Report for Monticello Reload 25 Cycle 26 Extended Power Uprate (EPU), 0000-0092-5748-FBIR, Revision 0, April 2011.*

## **Appendix J**

### **MELLLA+ Supplementary Information**

The pressurization transients are generally limiting at high core flow conditions. However, the transients were performed at both the minimum MELLLA+ flow (80%) and the maximum ICF flow (105%). This ensures that the pressurization transient results bound MELLLA, MELLLA+ and ICF operating conditions. Additionally, the loss of feedwater heating (LFWH) transient, which is more limiting at low core flow, was performed at the minimum MELLLA+ flow. Therefore, the limiting subcooling transient bounds MELLLA, MELLLA+ and ICF operating conditions. Single loop operation (SLO) will not be allowed in conjunction with operation in the MELLLA+ domain.

#### **NEDC-33173P-A Limitations/Conditions**

The safety evaluation for licensing topical report NEDC-33173P-A (*Applicability of GE Methods to Expanded Operating Domains*) concluded that the application of GEH/GNF methods to expanded operating domains was acceptable subject to certain limitations and conditions. Several of these conditions request that additional, application-specific information be provided. The limitations/conditions for MELLLA+ have already been addressed in Appendix I.

#### **NEDE-32906P Supplement 3 Limitations/Conditions**

The safety evaluation for licensing topical report NEDE-32906P Supplement 3 (*Migration to TRACG04/PANAC11 from TRACG02/PANAC10 for TRACG AOO and ATWS Overpressure Transients*) concluded that the application of TRACG04 methods to AOO and overpressure transient analyses were acceptable subject to certain limitations and conditions. The limitations/conditions for MELLLA+ have already been addressed in Appendix I.

#### **NEDC-33006P-A Revision 3 Limitations/Conditions**

The safety evaluation for licensing topical report NEDC-33006P-A Revision 3 (*General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus*) concluded that plant-specific MELLLA+ applications were acceptable subject to certain limitations/conditions. All limitations/conditions were met, none of which require additional application-specific information.

## Appendix K

### List of Acronyms

Acronym	Description
$\Delta$ CPR	Delta Critical Power Ratio
$\Delta k$	Delta k-effective
2RPT	Two Recirculation Pump Trip
ABSP	Automated Backup Stability Protection
ADS	Automatic Depressurization System
ADSOOS	Automatic Depressurization System Out of Service
AOO	Anticipated Operational Occurrence
APRM	Average Power Range Monitor
ARTS	APRM, Rod Block and Technical Specification Improvement Program
BOC	Beginning of Cycle
BSP	Backup Stability Protection
Btu	British thermal unit
BWROG	Boiling Water Reactor Owners Group
CDA	Confirmation Density Algorithm
COLR	Core Operating Limits Report
CPR	Critical Power Ratio
DIRPT	Delta MCPR over Initial MCPR for a two-Recirculation Pump Trip
DIVOM	Delta CPR over Initial MCPR vs. Oscillation Magnitude
DR	Decay Ratio
DSS-CD	Detect and Suppress Solution-Confirmation Density
DS/RV	Dual Mode Safety/Relief Valve
ECCS	Emergency Core Cooling System
ELLLA	Extended Load Line Limit Analysis
EOC	End of Cycle (including all planned cycle extensions)
EOR	End of Rated (All Rods Out 100%Power / 100%Flow / NFWT)
EPU	Extended Power Uprate
ER	Exclusion Region
FBIR	Fuel Bundle Information Report
FFWTR	Final Feedwater Temperature Reduction
FMCPR	Final MCPR
FOM	Figure of Merit
FWCF	Feedwater Controller Failure
FWHOOS	Feedwater Heaters Out of Service
FWTR	Feedwater Temperature Reduction
GDC	General Design Criterion
GESTAR	General Electric Standard Application for Reactor Fuel
GETAB	General Electric Thermal Analysis Basis
GSF	Generic Shape Function
HAL	Haling Burn
HBB	Hard Bottom Burn

Acronym	Description
HBOM	Hot Bundle Oscillation Magnitude
HCOM	Hot Channel Oscillation Magnitude
HFCL	High Flow Control Line
HPCI	High Pressure Coolant Injection
HTSP	High Trip Set Point
ICA	Interim Corrective Action
ICF	Increased Core Flow
IMCPR	Initial MCPR
ITSP	Intermediate Trip Set Point
IVM	Initial Validation Matrix
Kf	Off-rated flow dependent OLMCPR multiplier
Kp	Off-rated power dependent OLMCPR multiplier
L8	Turbine Trip on high water level (Level 8)
LCF	Low Core Flow
LHGR	Linear Heat Generation Rate
LHGRFACf	Off-rated flow dependent LHGR multiplier
LHGRFACp	Off-rated power dependent LHGR multiplier
LOCA	Loss of Coolant Accident
LPRM	Local Power Range Monitor
LRHBP	Load Rejection with Half Bypass
LRNBP	Load Rejection without Bypass
LTR	Licensing Topical Report
LTSP	Low Trip Set Point
MAPFACf	Off-rated flow dependent MAPLHGR multiplier
MAPFACp	Off-rated power dependent MAPLHGR multiplier
MAPLHGR	Maximum Average Planar Linear Heat Generation Rate
MCPR	Minimum Critical Power Ratio
MCPRf	Off-rated flow dependent OLMCPR
MCPRp	Off-rated power dependent OLMCPR
MELLLA	Maximum Extended Load Line Limit Analysis
MELLLA+	MELLLA Plus
MOC	Middle of Cycle
MRB	Maximal Region Boundaries
MSIV	Main Steam Isolation Valve
MSIVOOS	Main Steam Isolation Valve Out of Service
MSR	Moisture Separator Reheater
MSROOS	Moisture Separator Reheater Out of Service
MTU	Metric Ton Uranium
MWd	Megawatt day
MWd/ST	Megawatt days per Standard Ton
MWd/MT	Megawatt days per Metric Ton
MWt	Megawatt Thermal
N/A	Not Applicable
NBP	No Bypass
NCL	Natural Circulation Line



Acronym	Description
NFWT	Normal Feedwater Temperature
NOM	Nominal Burn
NRC	Nuclear Regulatory Commission
NTR	Normal Trip Reference
OLMCPR	Operating Limit MCPR
OOS	Out of Service
OPRM	Oscillation Power Range Monitor
Pbypass	Reactor power level below which the TSV position and the TCV fast closure scrams are bypassed
Pdome	Peak Dome Pressure
Psl	Peak Steam Line Pressure
Pv	Peak Vessel Pressure
PCT	Peak Clad Temperature
PHE	Peak Hot Excess
PLHGR	Peak Linear Heat Generation Rate
PLU	Power Load Unbalance
PLUOOS	Power Load Unbalance Out of Service
PRFDS	Pressure Regulator Failure Downscale
PROOS	Pressure Regulator Out of Service
Q/A	Heat Flux
RBM	Rod Block Monitor
RC	Reference Cycle
RCF	Rated Core Flow
RDF	Rated Drive Flow
RFWT	Reduced Feedwater Temperature
RPS	Reactor Protection System
RPT	Recirculation Pump Trip
RPTOOS	Recirculation Pump Trip Out of Service
RTP	Rated Thermal Power
RV	Relief Valve
RVM	Reload Validation Matrix
RWE	Rod Withdrawal Error
S <sub>AD</sub>	Amplitude Discriminator Setpoint
SC	Standard Cycle
SE	Safety Evaluation
SL	Safety Limit
SLMCPR	Safety Limit Minimum Critical Power Ratio
SLO	Single Loop Operation
SRLR	Supplemental Reload Licensing Report
S/RV	Safety/Relief Valve
SRVOOS	Safety/Relief Valve(s) Out of Service
SS	Steady State
SSV	Spring Safety Valve
STP	Simulated Thermal Power
STU	Short Tons (or Standard Tons) of Uranium

Acronym	Description
TBV	Turbine Bypass Valve
TBVOOS	Turbine Bypass Valves Out of Service
TCV	Turbine Control Valve
TCVOOS	Turbine Control Valve Out of Service
TCVSC	Turbine Control Valve Slow Closure
T <sub>FW</sub>	Temperature of Feedwater
TLO	Two Loop Operation
TMOL	Thermal-Mechanical Operating Limit
TRF	Trip Reference Function
TSIP	Technical Specifications Improvement Program
TSV	Turbine Stop Valve
TSVOOS	Turbine Stop Valve Out of Service
TT	Turbine Trip
TTHBP	Turbine Trip with Half Bypass
TTNBP	Turbine Trip without Bypass
UB	Under Burn