ATTACHMENT 6

GE-NE-0000-0024-6517-R0 (NON-PROPRIETARY), SAFER/GESTER LOSS-OF-COOLANT ACCIDENT ANALYSIS FOR GE14 FUEL

Certain information, considered proprietary by GEH, has been deleted from this Attachment. The deletions are identified by double square brackets.

ENCLOSURE 2

GE-PPO-1GYEF-KG1-498

GE-NE-0000-0024-6517-R0, non-proprietary version

NON-PROPRIETARY NOTICE

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Non-Proprietary Information

Project Task Report

Constellation Energy

Nine Mile Point-2

SAFER/GESTR Loss-of-Coolant Accident Analysis for GE14 Fuel

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INFORMATION NOTICE

This is a non-proprietary version of the document GE-NE 0000-0024-6517, Revision 0, which has the proprietary information removed. Portions of the document that have been removed are indicated by an open and closed bracket as shown here [[ ]].

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1.0 INTRODUCTION

The purpose of this document is to supplement the ECCS-LOCA evaluation results for Nine Mile Point-2 documented in the Reference 1 analysis. Specifically, using the limiting cases as defined in Reference 1, results are provided for GE14 fuel. The plant ECCS parameters and analysis methodology are consistent with those defined in Reference 1.

2.0 DESCRIPTION OF MODELS

Consistent with Reference 1, the ECCS-LOCA results are generated using the standard four GE-NE computer models. These models are LAMB, TASC, SAFER and GESTR-LOCA. See Reference 1 for further details.

3.0 ANALYSIS PROCEDURE

3.1. LICENSING CRITERIA

Consistent with Reference 1, the acceptance criteria for the ECCS-LOCA results are based on the Code of Federal Regulations, 10 CFR 50.46 (Reference 2). See Reference 1 for further details.

3.2. SAFER/GESTR-LOCA LICENSING METHODOLOGY

Consistent with Reference 1, the ECCS-LOCA analysis was generated using the SAFER/GESTR-LOCA licensing methodology (References 3 and 4) as approved by the NRC (References 5 and 6).

3.3. GENERIC ANALYSIS

The generic ECCS-LOCA analysis for the BWR/5-6 product line is described in Reference 3.

3.4. NINE MILE POINT-2 SPECIFIC ANALYSIS

The Nine Mile Point-2 specific analysis in Reference 1 demonstrated that the nominal and Appendix K PCT trends as a function of break size were consistent with one another and with the generic BWR/5-6 results. In the current GE14 large break analysis, the DBA recirculation suction break with [[

]]

4.0 INPUT TO ANALYSIS

The Operating Parameters List 4/5 (OPL4/5) parameters used in this analysis are given in Appendix A. The plant heat balance conditions utilized in this analysis are presented in Table 1. The GE14 fuel parameters are given in Table 2.

[[ ]]

Table 1
Plant Operational Parameters

Plant Parameters	Nominal	Appendix K
Core Thermal Power (MWt)	3467	3536
Core Thermal Power (% of Licensed Thermal Power)	100.0	102.0
Core Flow (Mlb/hr)	108.5	108.5
Core Flow (% rated)	100.0	100.0
Vessel Steam Dome Pressure (psia)	1055	1055

Table 2
GE14 Fuel Parameters

Fuel Parameter		**Analysis Value**
PLHGR (kW/ft)	-LOCA Analysis Limit -Appendix K -Nominal	[[
MAPLHGR (kW/ft)	-LOCA Analysis Limit -Appendix K -Nominal	
Radial Peaking Factor[1]		
Worst Case Pellet Exposure for ECCS Evaluation (MWd/MTU)		
LHGR – Exposure Limit Curve (kW/ft vs. MWd/MTU)[2]		
Initial Operating MCPR	-LOCA Analysis Limit -Appendix K -Nominal	
Axial Peaking Factor[1]		
Number of Fuel Rods per Bundle		]]

[1] Peaking Factors used in the rated Appendix K case.
[2] *The curve shown corresponds to the UO_2 rod.*

5.0 RESULTS

5.1. LARGE RECIRCULATION LINE BREAKS

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]] Several large recirculation suction line breaks were analyzed for GE14 with Nominal and Appendix K assumptions to confirm the limiting break and single failure combination. These analyses include dryout times from LAMB/TASC calculations that determined early boiling transition occurs in the top four axial fuel nodes. For all two-loop large break cases, a more conservative assumption of early boiling transition at the hot node (early dryout of the top 5 axial fuel nodes) was used. This resulted in a nominal PCT for the limiting two-loop case that was higher than the nominal SLO PCT (with an acceptable SLO MAPLHGR / PLHGR multiplier). The limiting nominal two-loop PCT must exceed the nominal SLO PCT in order to ensure that the SLO condition is bounded by the two-loop condition. The results of these analyses are given in Table 4 and Figures 1 and 2. [[

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For the maximum recirculation suction line break with HPCS-D/G failure and nominal assumptions, there is a rapid vessel depressurization due to vessel inventory loss through the break (Figure 1b). This mass loss causes core uncovery beginning at approximately 26 seconds into the event (Figure 1a). Before core uncovery there is an early bundle heatup due to the stored energy in the bundle (Figure 1c) caused by early dryout of the upper axial nodes in the bundle (Figure 1d) which is a result of the rapid core flow coastdown. As the saturation pressure drops due to vessel depressurization the nodes rewet (Figure 1d) causing a temperature decrease. The LPCS begins injection after the pressure permissive is reached and the injection valve opens. This occurs at approximately 68 seconds into the event (Figure 1e). The LPCI begins injection after the pressure permissive is reached and the discharge valve closes. This occurs at approximately 73 seconds into the event (Figure 1e). When the core uncovers, there is a second bundle heatup until the level in the core fully recovers at approximately 100 seconds (Figure 1a).

The system response to a maximum recirculation suction line break with HPCS-D/G failure and Appendix K assumptions is similar to the case with nominal assumptions. There is a rapid vessel depressurization due to vessel inventory loss through the break (Figure 2b) but is slightly faster due to higher break flow from the Appendix K Moody Slip Flow Model. This higher mass loss also causes an earlier core uncovery beginning at approximately 20 seconds into the event (Figure 2a). Before core uncovery there is an early bundle heatup due to the stored energy in the bundle (Figure 2c) caused by early dryout of the upper axial nodes in the bundle that is a result of the rapid core flow coastdown. The rods remain in film boiling for a longer time than the nominal case because of the more restrictive Appendix K assumptions, which do not allow the bundle to change from film boiling to transition boiling until the cladding superheat falls below 300°F. The LPCS and LPCI begin injection following the same timing as for that with nominal conditions. The temperature decreases as the saturation pressure drops due to vessel depressurization until the core uncovers. Then there is a second bundle heatup, which lasts until the heat transfer regime in the hot rod fully recovers at approximately 140 seconds into the event (Figure 2d). Overall the bundle heatup for the Appendix K case is higher than the nominal case due to higher bundle power and decay heat.

5.2. SMALL RECIRCULATION LINE BREAKS

The most limiting single failure for small recirculation line breaks is the HPCS-D/G. The small break cases were reanalyzed for GE14 with Nominal and Appendix K assumptions assuming 6 ADS valves available in addition to the postulated single failure to determine the small break with the highest PCT. The results of these analyses are given in Table 4 and Figures 3 and 4. [[

]] The Appendix K small recirculation break is less limiting than the large recirculation line breaks. Although the nominal small break is more limiting than the large recirculation line break, the large break Licensing Basis PCT bounds the small break Licensing Basis PCT.

For the 0.08 ft^2 recirculation line break case with HPCS-D/G failure and nominal assumptions, scram is assumed to occur at the start of the event on high drywell pressure and the vessel pressure falls to the pressure regulator setpoint (Figure 3b). When the main steamline isolation valves close on low water level, the vessel pressure begins to rise until the Automatic Depressurization System (ADS) actuation occurs (Figure 3b) at 342 seconds, 120 seconds after the low water level signal. Continued vessel inventory loss through the break and the ADS cause core uncovery (Figure 3a) and bundle heatup (Figure 3c). Once the vessel pressure has dropped below the injection valve permissive pressure and the injection valve opens, the LPCS starts to inject, followed by LPCI injection (Figure 3e). The level is rapidly recovered in the bundle and terminates the bundle heatup (Figure 3c).

The accident progression for the 0.07 ft^2 recirculation line break case with HPCS-D/G failure and Appendix K assumptions is similar to the nominal case. Due to higher bundle power and decay heat the pressurization is faster following MSIV closure and the Safety/Relief Valves (SRV) setpoint is reached. Pressure is maintained at the SRV setpoints until the ADS system actuates at 232 seconds (Figure 4b). Continued vessel inventory loss through the break and the ADS cause core uncovery and bundle heatup (Figures 4a and 4c). Once the vessel pressure has dropped below the injection valve permissive pressure and the injection valve opens, the LPCS begins injection, followed by LPCI injection (Figure 4e). After ECCS injection the level is rapidly recovered in the bundle and terminates the bundle heatup.

5.3. NON-RECIRCULATION LINE BREAKS

The analysis in Reference 1 demonstrated that the non-recirculation line break cases are clearly non-limiting. With the introduction of GE14 fuel, non-recirculation line break cases will not become limiting. Non-recirculation line breaks cases have not been re-analyzed for

GE14 fuel.

5.4. ALTERNATE OPERATING MODES

The limiting large break, the maximum recirculation suction line break, was reanalyzed for the ELLLA, FFWTR, Increased Core Flow (ICF) and Single-Loop Operation (SLO) operating modes.

For the ELLLA condition (100% of rated power and 87% of rated flow), the LAMB/TASC calculations have determined that early boiling transition (EBT) occurs in the top four axial fuel nodes. The same conservative assumption regarding the early boiling transition at the hot node was made for ELLLA and the early transition boiling was imposed on the top five nodes. [[

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For the FFWTR condition (120°F reduction in initial feedwater temperature from the rated feedwater temperature of 425°F), the LAMB/TASC calculations have determined that early boiling transition (EBT) also occurs in the top four axial fuel nodes. The same conservative assumption regarding the early boiling transition at the hot node was made for FFWTR and the early transition boiling was imposed on the top five nodes. [[

]] Again, as expected, these results are similar to the rated case that also has EBT occurring in the top five axial fuel nodes.

The analysis in Reference 1 demonstrated that the effect on the LOCA results of ICF operation up to 105% of rated core flow is negligible. The LOCA results at ICF conditions are bounded by the LOCA results at rated conditions for all fuel types. Therefore the PCTs for the limiting large break cases given in Section 5.1 are applicable to the ICF condition.

The SLO analysis conservatively assumes the simultaneous dryout of all axial fuel nodes almost immediately following the initiation of the event. The SLO analysis results are shown in Table 7. [[

]] The SLO condition with Appendix K assumptions results in a PCT of 1093 °F, which is well below the 2200°F licensing limit.

A separate analysis has been performed with 5 ADS valves available. The additional valve out-of-service does not impact the large break cases because significant vessel depressurization is realized through the break. The impact on small breaks of 5 ADS valves available is shown in Table 5. These results compared to Table 4 show that the impact on one ADS out-of-service increases the calculated PCT for small breaks by 196 °F with

Nominal assumptions and by 194 °F with Appendix K assumptions. However, the Appendix K PCTs with 5 ADS valves available remain well below licensing limits.

A separate analysis has been performed with all 7 ADS valves available. The results are shown in Table 6.

Since the ECCS-LOCA analysis does not specifically model the individual steamlines, one Main Steam Isolation Valve (MSIV) out-of-service has no impact on the LOCA response. This has previously been demonstrated in Reference 9.

COMPLIANCE EVALUATIONS

5.4.1. Licensing Basis PCT Evaluation

The Appendix K results confirm that the limiting break is the maximum recirculation suction line break (DBA). This is consistent with the BWR-5 generic conclusion. [[

]] The Licensing Basis PCT for Nine Mile Point-2 is calculated for GE14 fuel based on the above Appendix K PCT and the use of SAFER/GESTR-LOCA licensing methodology approved by NRC (Reference 5). Nine Mile Point-2 unique variable uncertainties, including backflow leakage, ECCS signal, stored energy, gap pressure, and ADS time delay, were evaluated specifically for GE14 fuel to determine plant-specific adders. [[
]]

The licensing basis PCT was estimated for ELLLA and FFWTR. This evaluation was performed to assure conformance with 10 CFR50.46 acceptance criteria and NRC SER requirements for SAFER/GESTR methodology for all the operating points. All 10 CFR50.46 acceptance criteria and NRC requirements were met.

5.4.2. Removal of the Current Requirement for Evaluation of Upper Bound PCT

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Table 3
Single Failure Sensitivity Study for Large Recirculation Line Breaks

Break Size and Location	Failure	Nominal Peak Cladding Temperature		Appendix K Peak Cladding Temperature	
		First Peak (°F)	Second Peak (°F)	First Peak (°F)	Second Peak (°F)
DBA, Suction	HPCS-D/G	[[			
DBA, Suction	LPCI-D/G				
DBA, Suction	LPCS-D/G				
80% DBA, Suction	HPCS-D/G				
60% DBA, Suction	HPCS-D/G				
DBA, Suction (ELLLA)	HPCS-D/G				
DBA, Suction (SLO)	HPCS-D/G				
DBA, Suction (FFWTR)	HPCS-D/G				]]

Table 4
Break Area Sensitivity Study for Small Recirculation Line Breaks with HPCS-D/G with 6ADS Available

Break Area (ft^2)	Nominal Peak Cladding Temperature (°F)	Appendix K Peak Cladding Temperature (°F)
0.06	[[	
0.07		
0.08		
0.09		
0.10		]]

Table 5
Break Area Sensitivity Study for Small Recirculation Line Breaks with HPCS-D/G with 5ADS Available

Break Area (ft^2)	Nominal Peak Cladding Temperature (°F)	Appendix K Peak Cladding Temperature (°F)
0.06	[[	
0.07		
0.08		
0.09		
0.10		]]

Table 6
Break Area Sensitivity Study for Small Recirculation Line Breaks with HPCS-D/G with 7ADS Available

Break Area (ft^2)	Nominal Peak Cladding Temperature (°F)	Appendix K Peak Cladding Temperature (°F)
0.06	[[	
0.07		
0.08		
0.09		
0.10		]]

Table 7
SLO Analysis – HPCS-D/G Failure

Analysis Basis	SLO Multiplier	PCT (°F)
Nominal		
Two-Loop	[[	
Single-Loop		]]
Appendix K		
Two-Loop	[[	
Single-Loop		]]

6.0 CONCLUSIONS

The analysis contained in this report demonstrates that for GE14 fuel, the limiting break and single failure combination is the maximum recirculation suction line break with HPCS-D/G failure for both Nominal and Appendix K assumptions.

Based on the limiting large and small breaks and applying the SAFER/GESTR ECCS-LOCA methodology, the Nine Mile Point-2 ECCS-LOCA analysis was performed for the limiting LOCA event for GE14 fuel with an analytical PLGHR of 13.40 kW/ft. [[ ]] The analyses demonstrate that the limiting Licensing Basis PCT occurs for the maximum recirculation suction line break. As shown in Table 8 below, these results meet all licensing and SAFER/GESTR methodology analysis limits. The ECCS-LOCA analysis results for all alternate modes (ELLLA, ICF, SLO, and FFWTR) also meet all licensing limits.

The thermal limits applied to the GE14 fuel in the ECCS-LOCA evaluation are summarized in Table 9.

Table 8
ECCS-LOCA Analysis Results for GE14

Parameter	Analysis Result	10CFR50.46 Acceptance Criteria
1. Licensing PCT	1370 °F	≤ 2200 °F*
2. Maximum Local Oxidation	< 1.0 %	≤ 17 %*
3. Core-Wide Metal-Water Reaction	< 0.1 %	≤ 1.0 %*
4. Coolable Geometry	See results from Items 1 and 2 above	Maintain coolable geometry which is satisfied by meeting PCT ≤2200 °F and Maximum Local Oxidation ≤ 17 %.
5. Core Long-Term Cooling	Satisfied by either: (1) core reflooded above TAF or (2) core reflooded to elevation of jet pump suction and one core spray system in operation	Core Temperature acceptably low and long-term decay heat removed

* 10 CFR 50.46 ECCS-LOCA Analysis Acceptance Criteria

Table 9
Thermal Limits for GE14

PARAMETER	ANALYSIS LIMIT	
PLHGR – Exposure Limit Curve	GWd/MTU	kW/ft
	0.0	13.40
	16.0	13.40
	63.5	8.00
	70.0	5.00
	GWd/MTU	kW/ft
MAPLHGR – Exposure Limit Curve	0.0	12.82
	16.0	12.82
	21.09	12.82
	63.5	8.00
	70.0	5.00
Initial Operating MCPR		1.25
R-factor		0.954
Off-rated Thermal Limits: Core Power, % of Rated Core Flow, % of Rated K(f) Power Peaking Limit	(ELLLA)	 100 87 (Note 1) (Note 1)
SLO Multiplier on PLHGR and MAPLHGR		0.78

(1) In the ELLLA LOCA evaluation, the rated power condition is bounding due to the off-rated restrictions applied by the K(f) curve (Reference 11) and the excessive power peaking limit (Reference 12, Section 3.2.4).

REFERENCES

1. NEDC-31830P, "Nine Mile Point Nuclear Power Station Unit 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," Revision 1, November 1990.

2. 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors."

3. NEDC-23785PA, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident, Volume III, SAFER/GESTR Application Methodology," Revision 1, General Electric Company, October 1984.

4. NEDE-23785P-A, Vol. III, Supplement 1, Revision 1, "GESTR-LOCA and SAFER Models for Evaluation of Loss-of Coolant Accident Volume III, Supplement 1, Additional Information or Upper Bound PCT Calculation," March 2002.

5. Letter, C.O. Thomas (NRC) to J.F. Quirk (GE), *Acceptance for Referencing of Licensing Topical Report NEDE-23785P, Revision 1, Volume III (P), "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident,"* June 1, 1984.

6. Letter, S.A. Richards (NRC) to J.F. Klapproth (GENE), *Review of NEDE-23785P, Vol. III, Supplement 1, Revision 1, "GESTR-LOCA and SAFER Models for Evaluation of Loss-of Coolant Accident Volume III, Supplement 1, Additional Information for Upper Bound PCT Calculation," (TAC No. MB2774),* February 1, 2002.

7. Letter, S.A. Richards (NRC) to J.F. Klapproth (GE), "Review of NEDC-32084P, 'TASC-03A, A Computer Program for Transient Analysis of a Single Fuel Channel' (TAC No. MB0564)," March 13, 2002.

8. NEDC-32084P, "TASC-03A, A Computer Program for Transient Analysis of a Single Fuel Channel," Revision 2, General Electric Company, October 2000.

9. MDE-287-1285, "One Main Steamline Isolation Valve Out of Service for Nine Mile Point Nuclear Power Station Unit 2," General Electric Company, January 1986.

10. GE-NE-J1103938-07-02P, "Nine Mile Point Unit 2 ECCS-LOCA Evaluation Update for GE11," January 2002.

11. J11–03938-ER, "Engineering Report for Nine Mile Point Nuclear Station Unit 2 Reload 8, Cycle 9," Revision 0, March 2002.

12. Nine Mile Point Unit 2 Improved Technical Specifications.

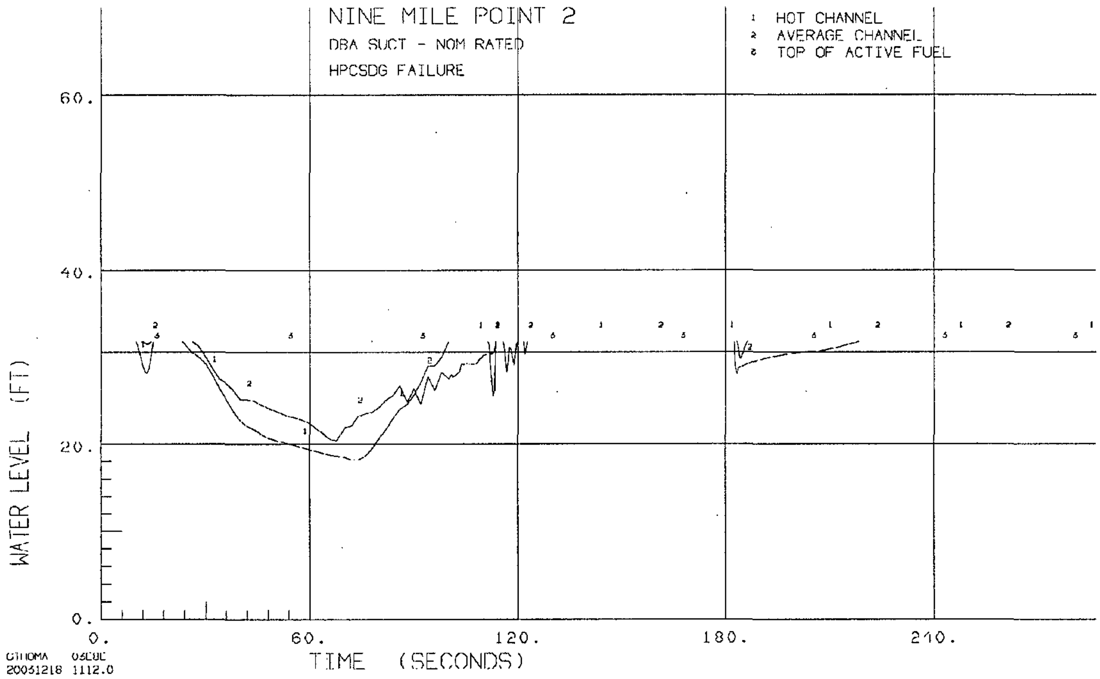

Figure 1-a Water Level in Hot and Average Channels. Maximum Recirculation Line Suction Break, HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available) [Nominal Assumptions]

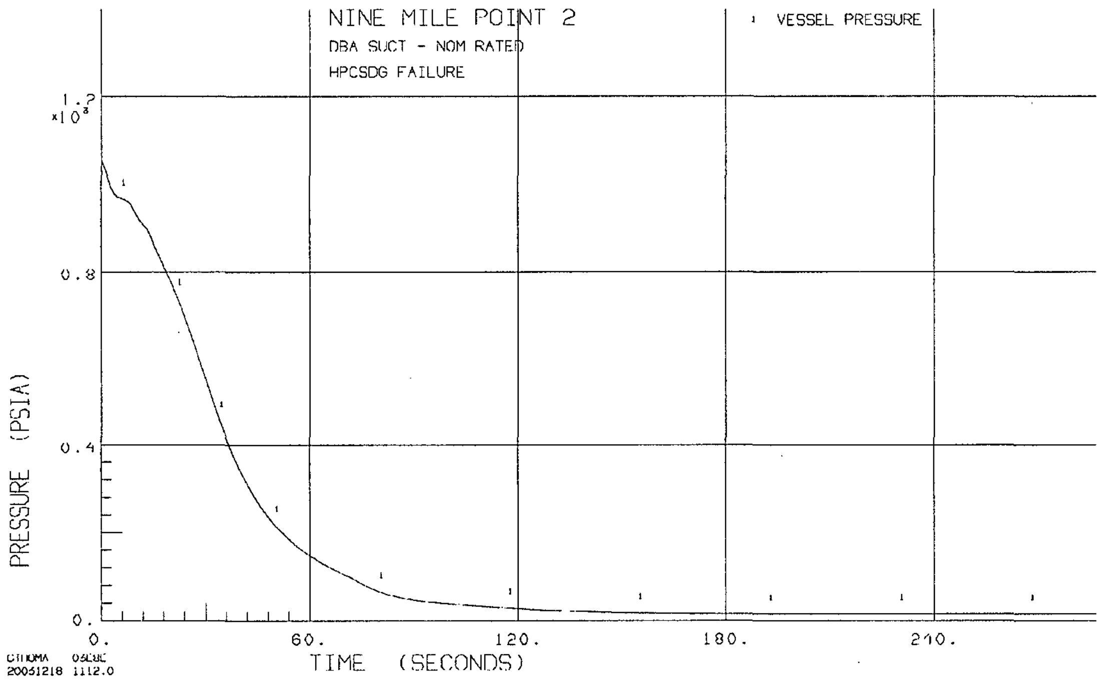

Figure 1-b Reactor Vessel Pressure.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

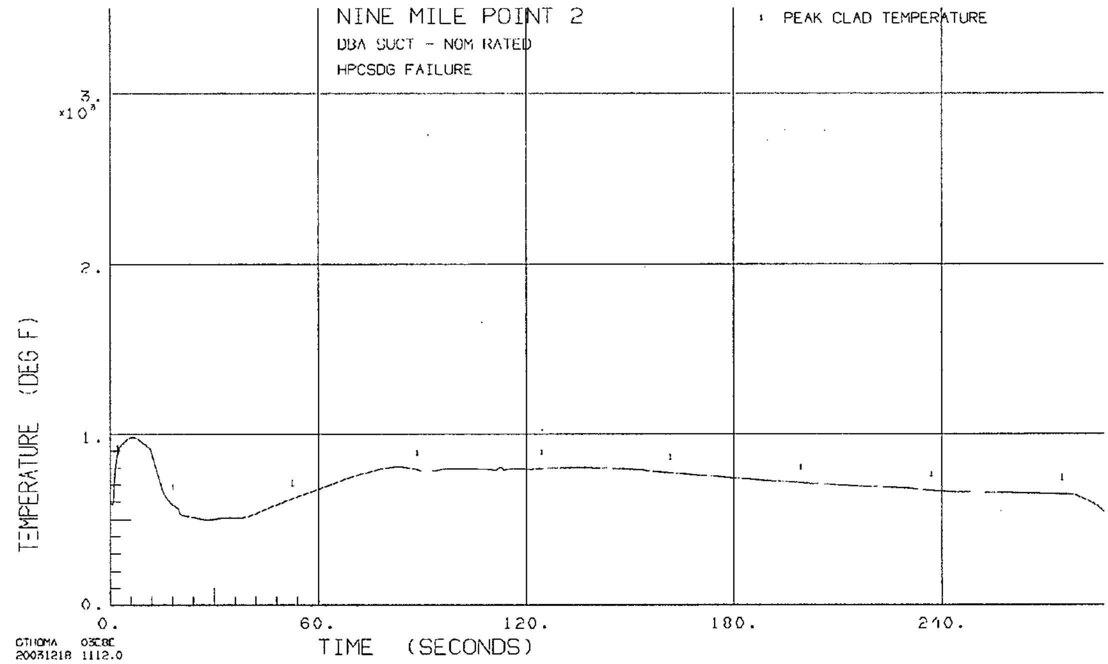

Figure 1-c Peak Cladding Temperature.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

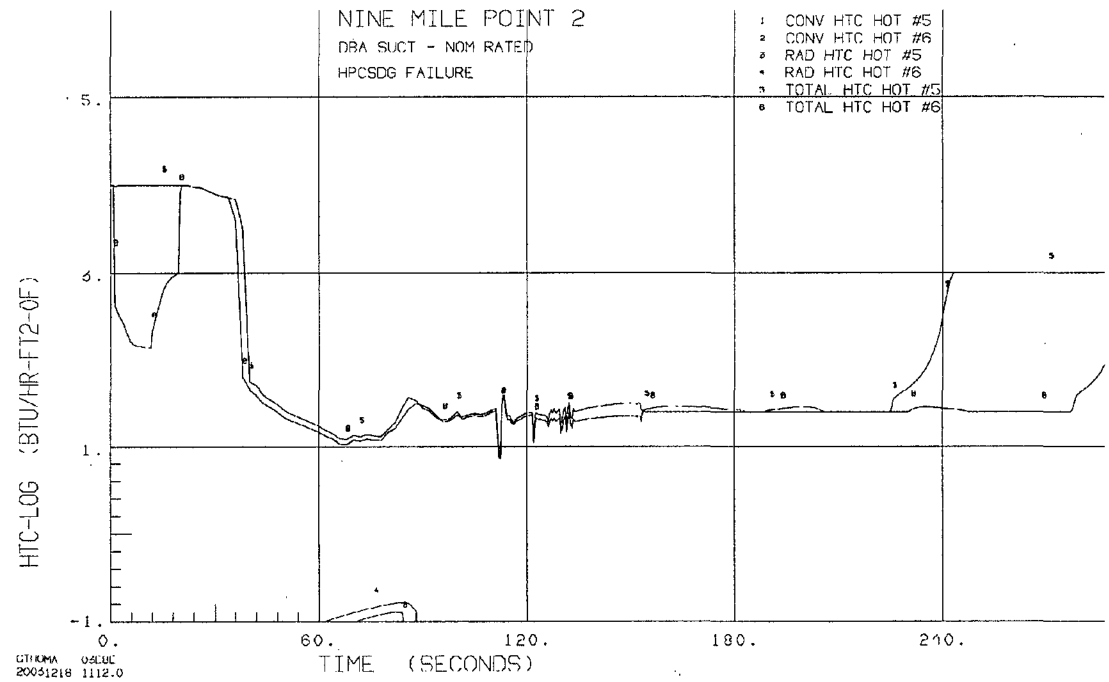

Figure 1-d Heat Transfer Coefficients.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

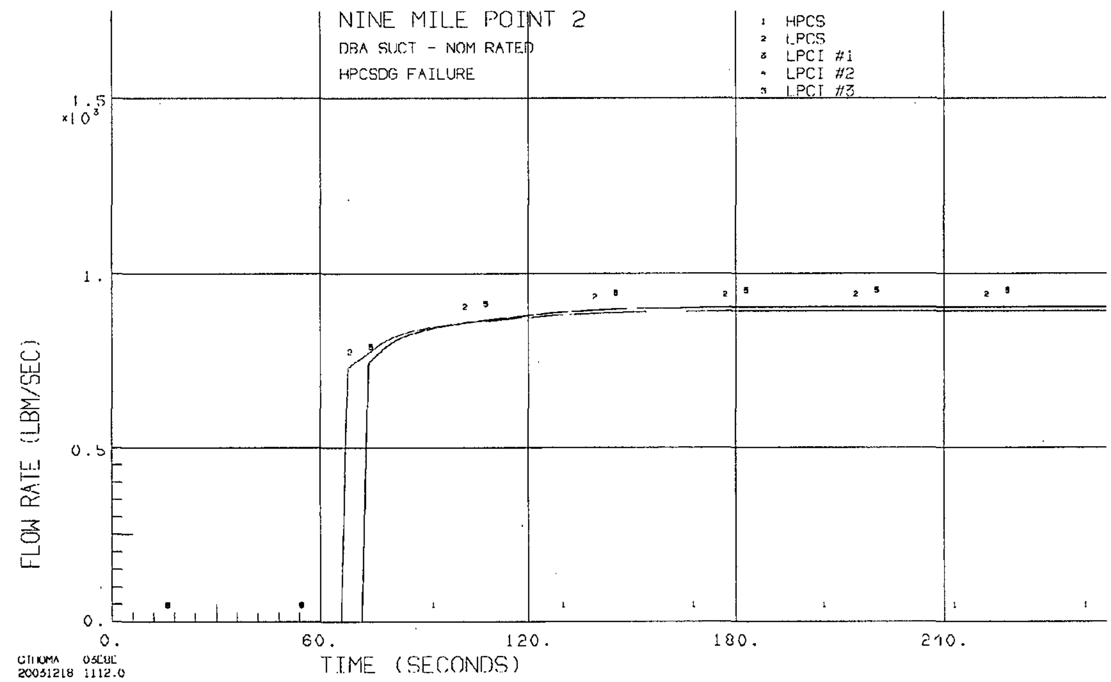

Figure 1-e ECCS Flows.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

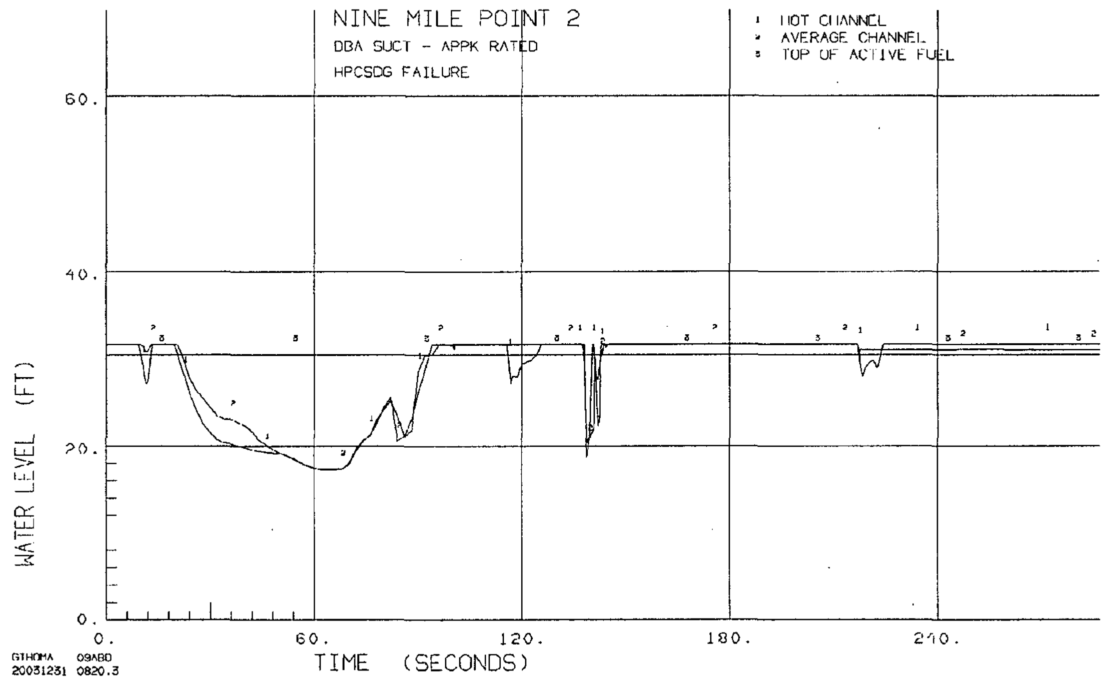

Figure 2-a Water Level in Hot and Average Channels. Maximum Recirculation Line Suction Break, HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available) [Appendix K Assumptions]

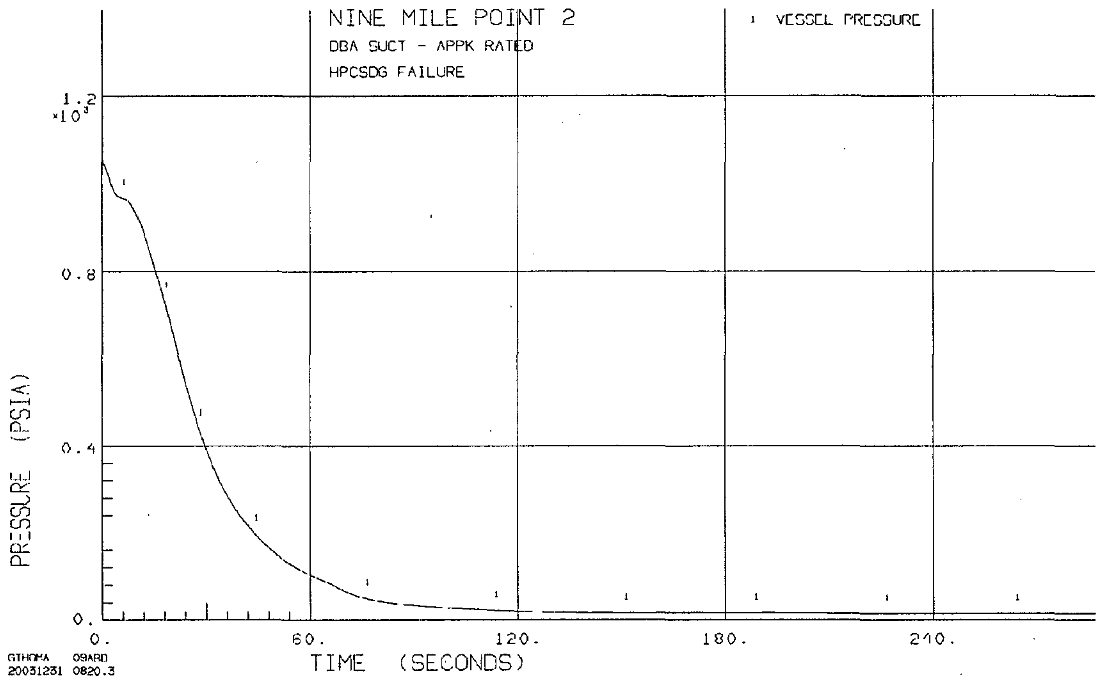

Figure 2-b Reactor Vessel Pressure.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

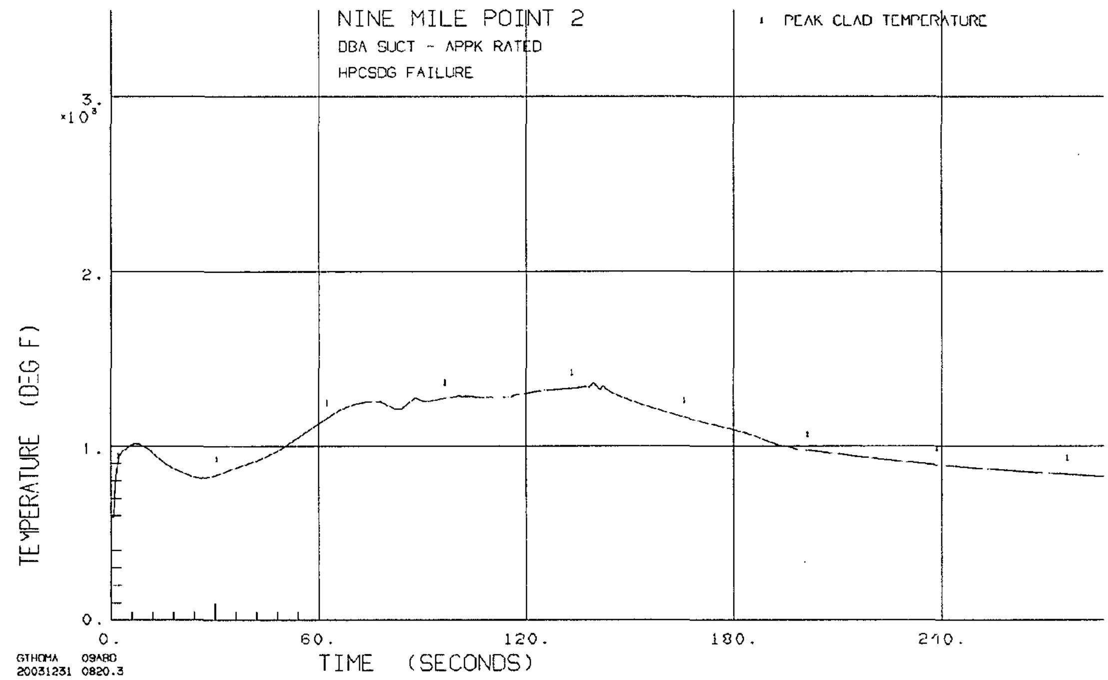

Figure 2-c Peak Cladding Temperature.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

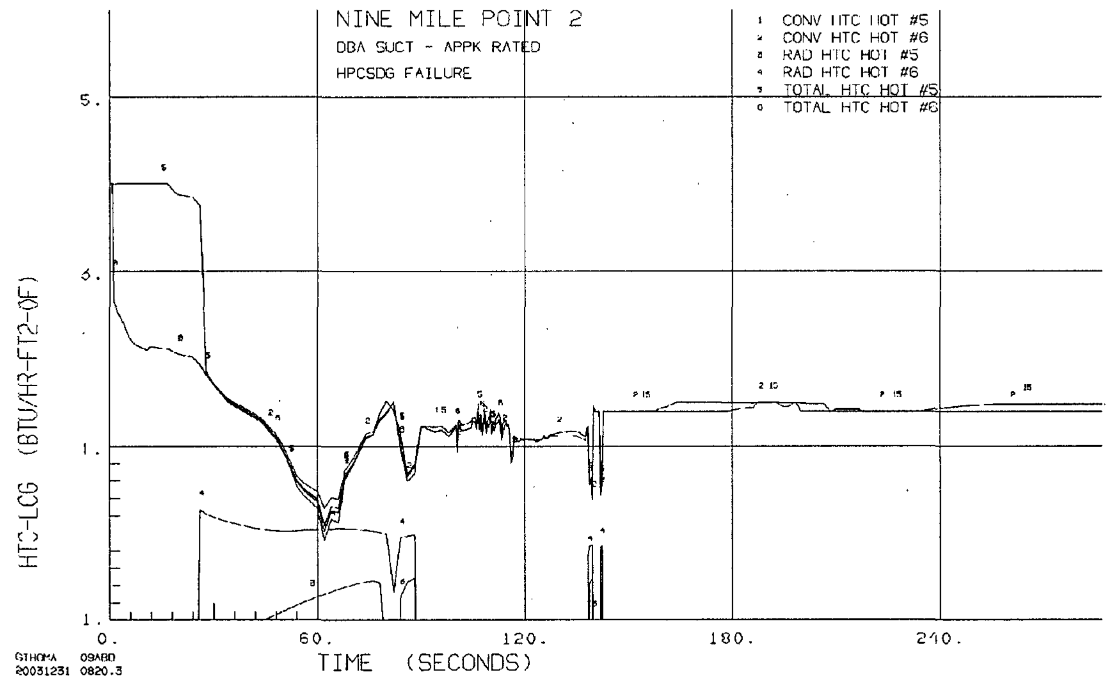

Figure 2-d Heat Transfer Coefficients. Maximum Recirculation Line Suction Break, HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available) [Appendix K Assumptions]

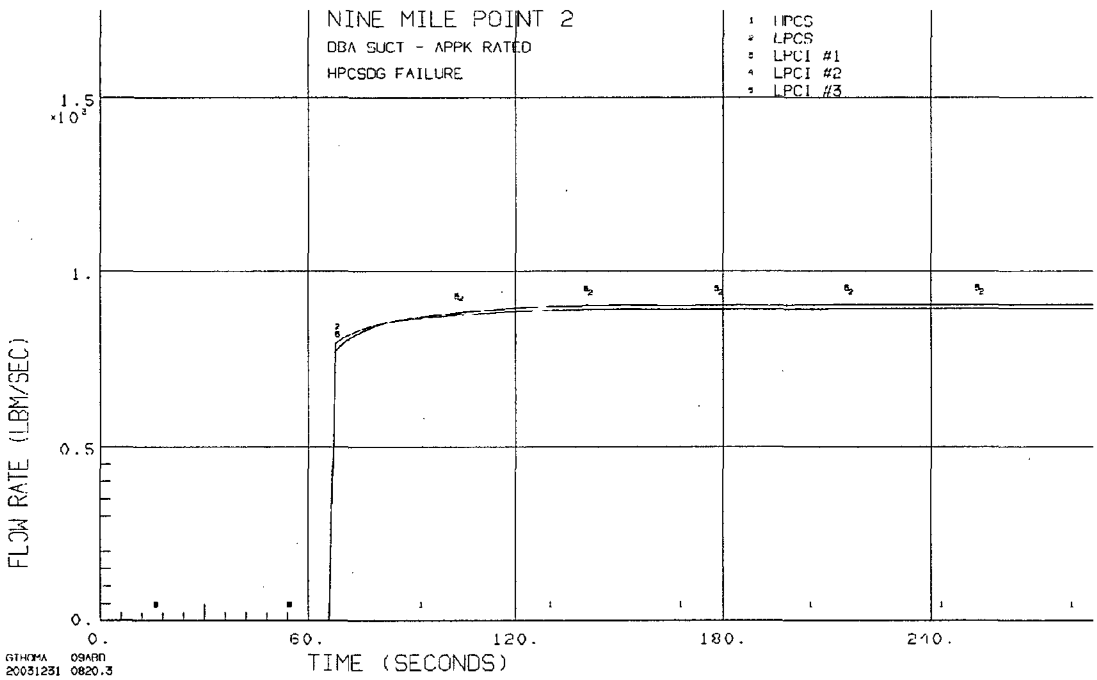

Figure 2-e ECCS Flows.
Maximum Recirculation Line Suction Break,
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

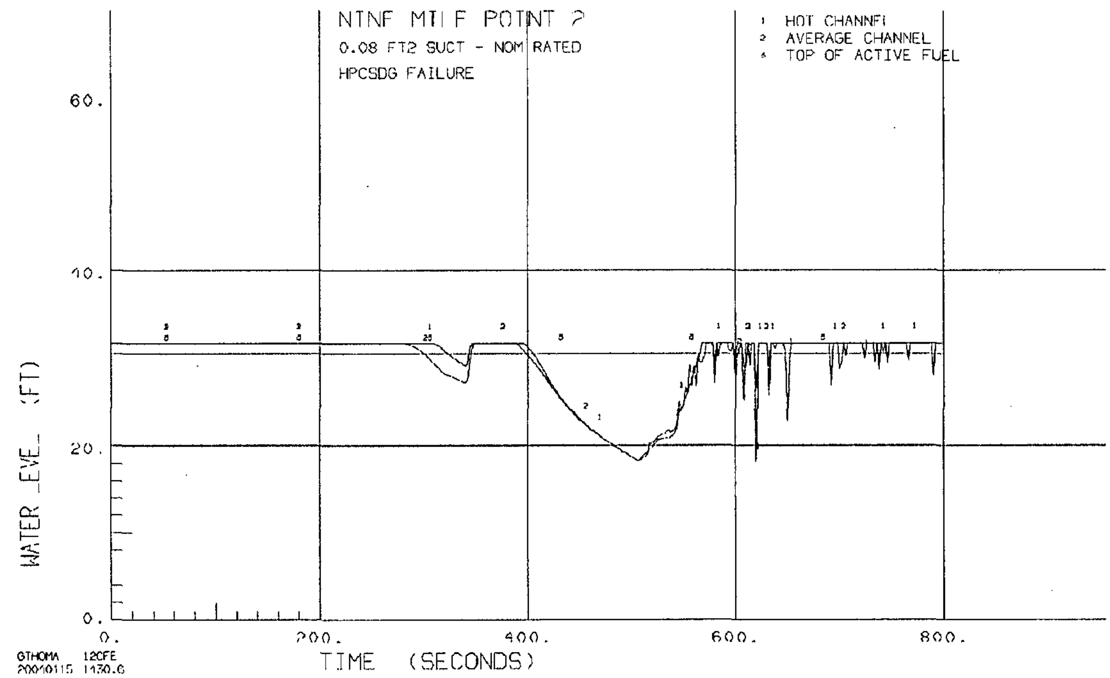

Figure 3-a Water Level in Hot and Average Channels. Limiting Small Recirculation Line Break ($0.08 ft^2$), HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available) [Nominal Assumptions]

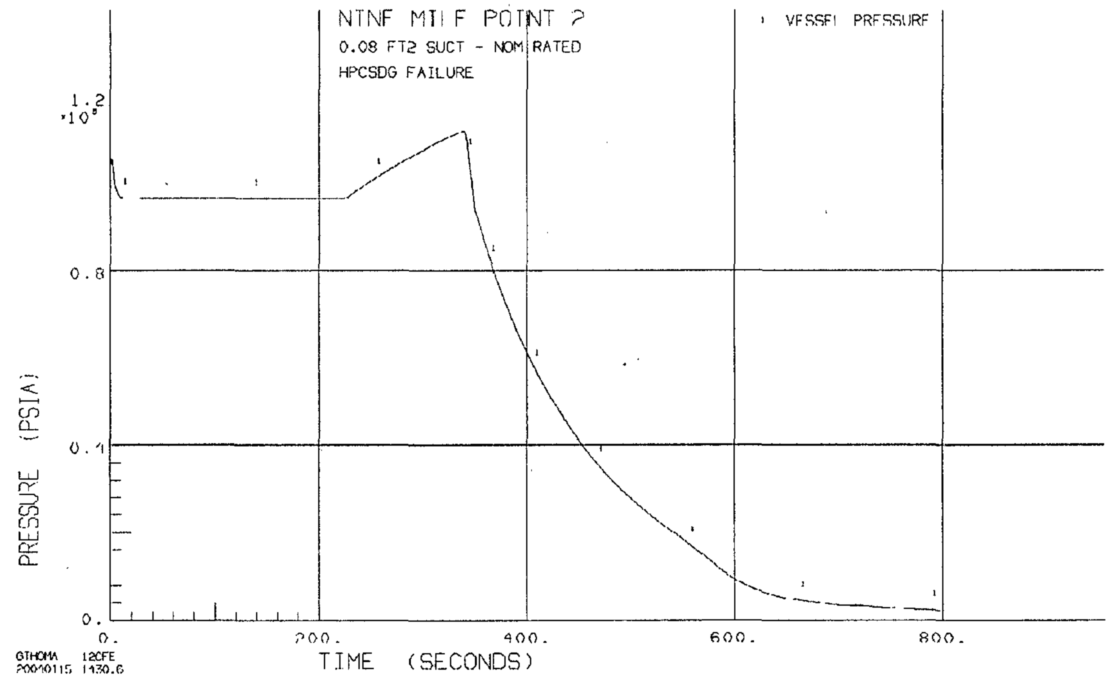

Figure 3-b Reactor Vessel Pressure.
Limiting Small Recirculation Line Break (0.08ft^2),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

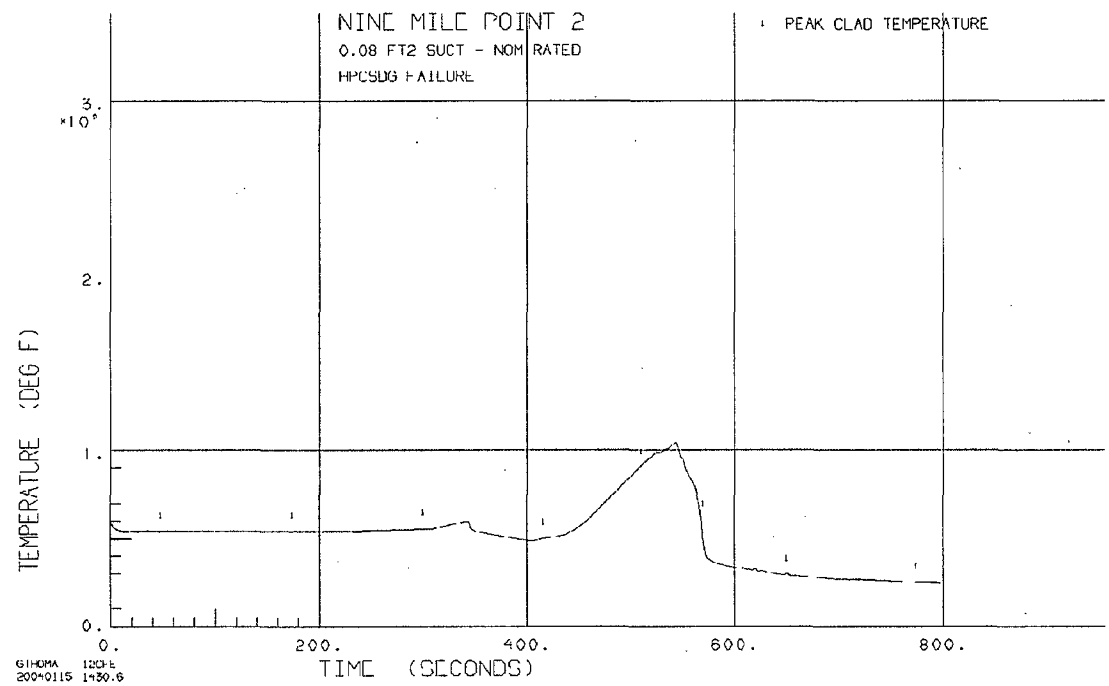

Figure 3-c Peak Cladding Temperature.
Limiting Small Recirculation Line Break (0.08ft^2),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

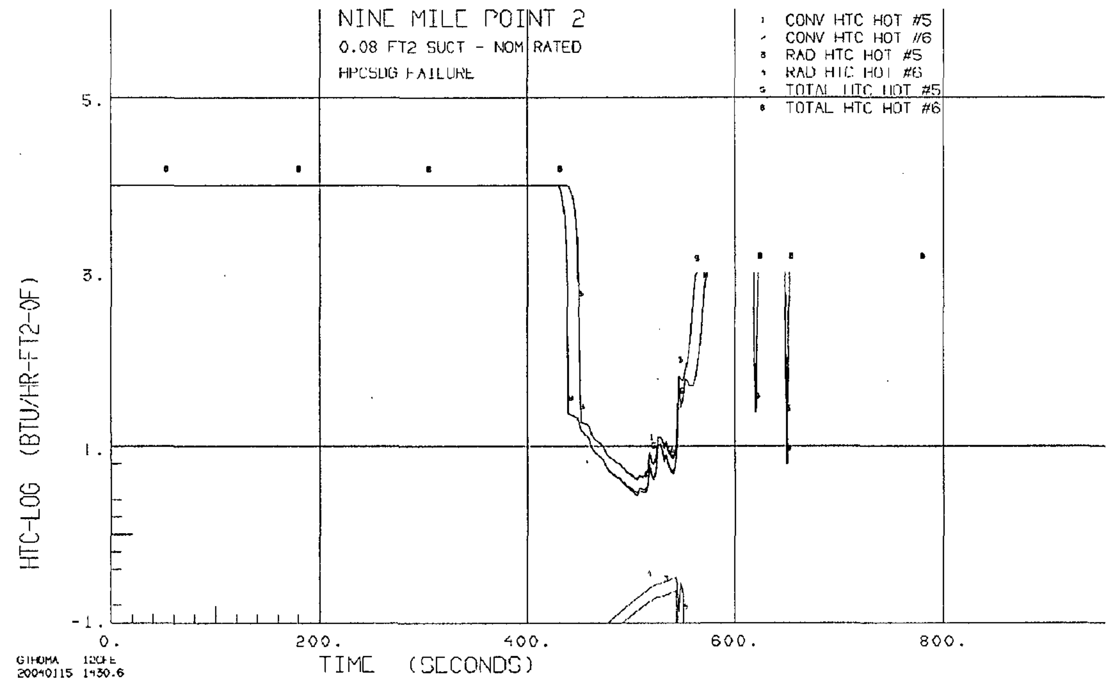

Figure 3-d Heat Transfer Coefficients.
Limiting Small Recirculation Line Break (0.08ft^2),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

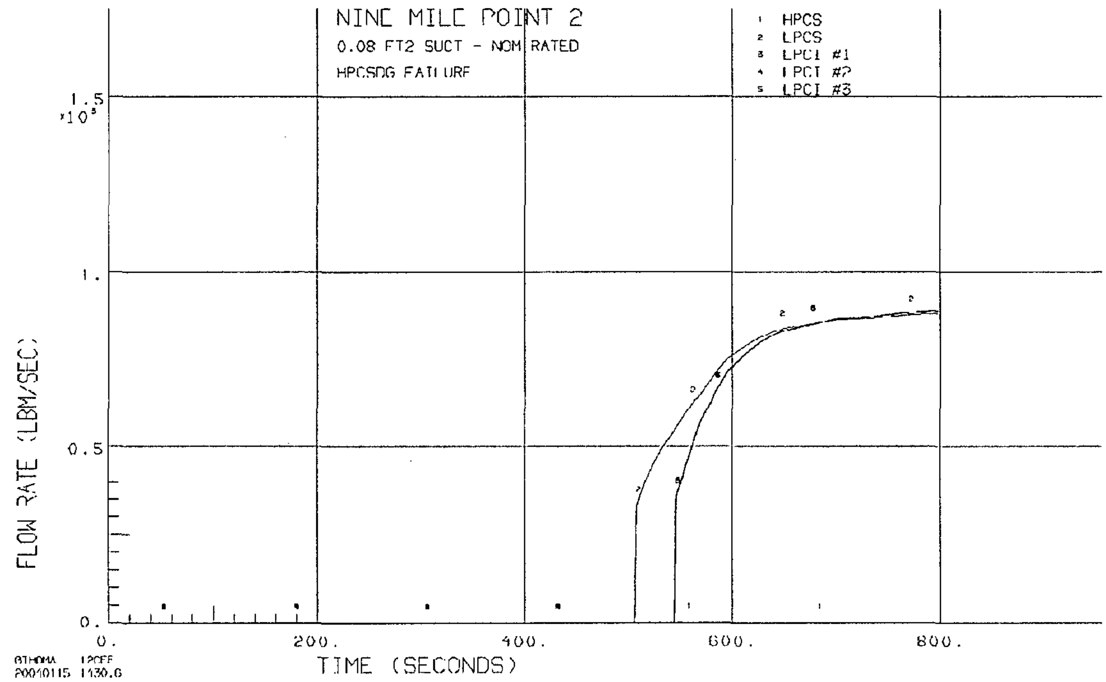

Figure 3-e ECCS Flows.
Limiting Small Recirculation Line Break (0.08ft^2),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Nominal Assumptions]

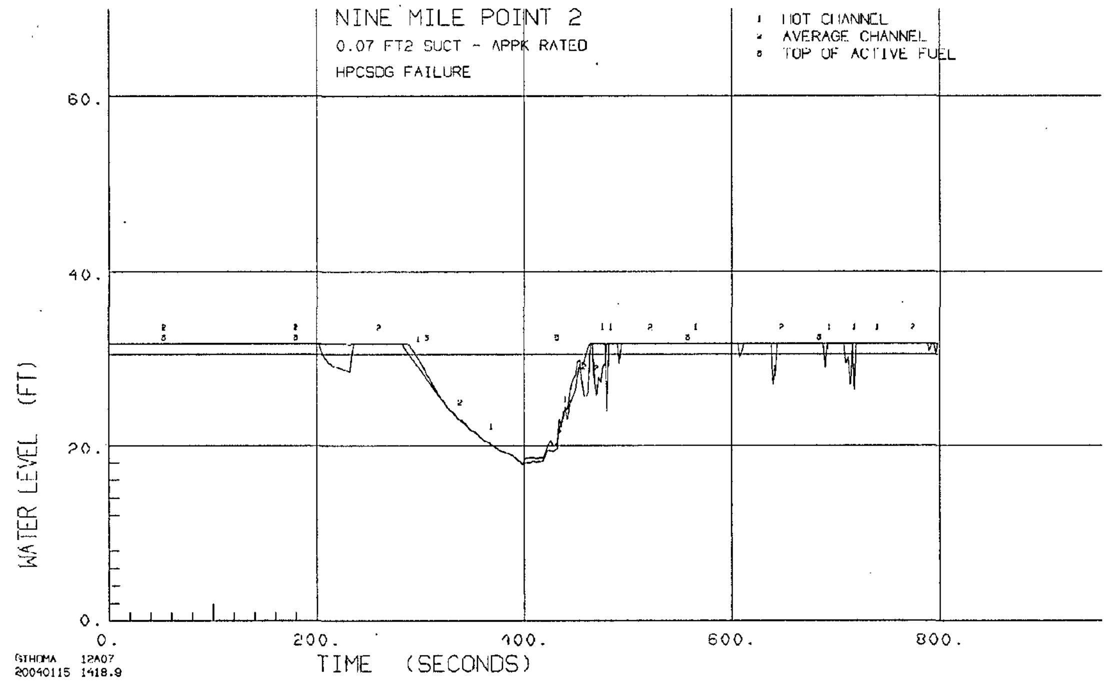

Figure 4-a Water Level in Hot and Average Channels. Limiting Small Recirculation Line Break (0.07ft^2), HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available) [Appendix K Assumptions]

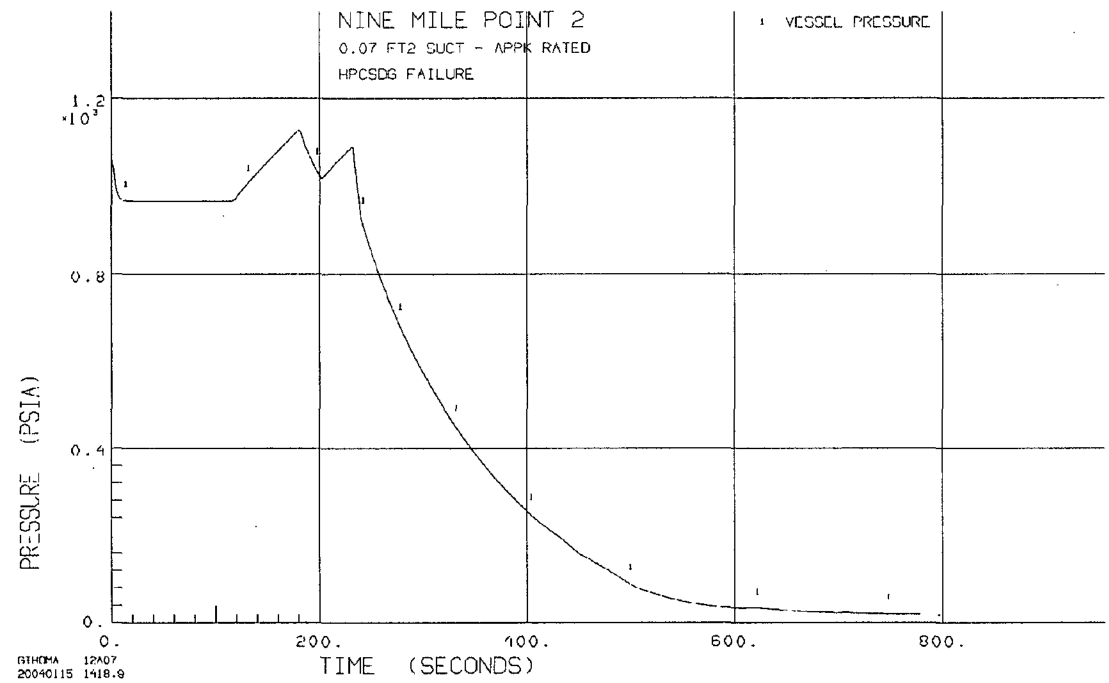

Figure 4-b Reactor Vessel Pressure.
Limiting Small Recirculation Line Break (0.07ft²),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

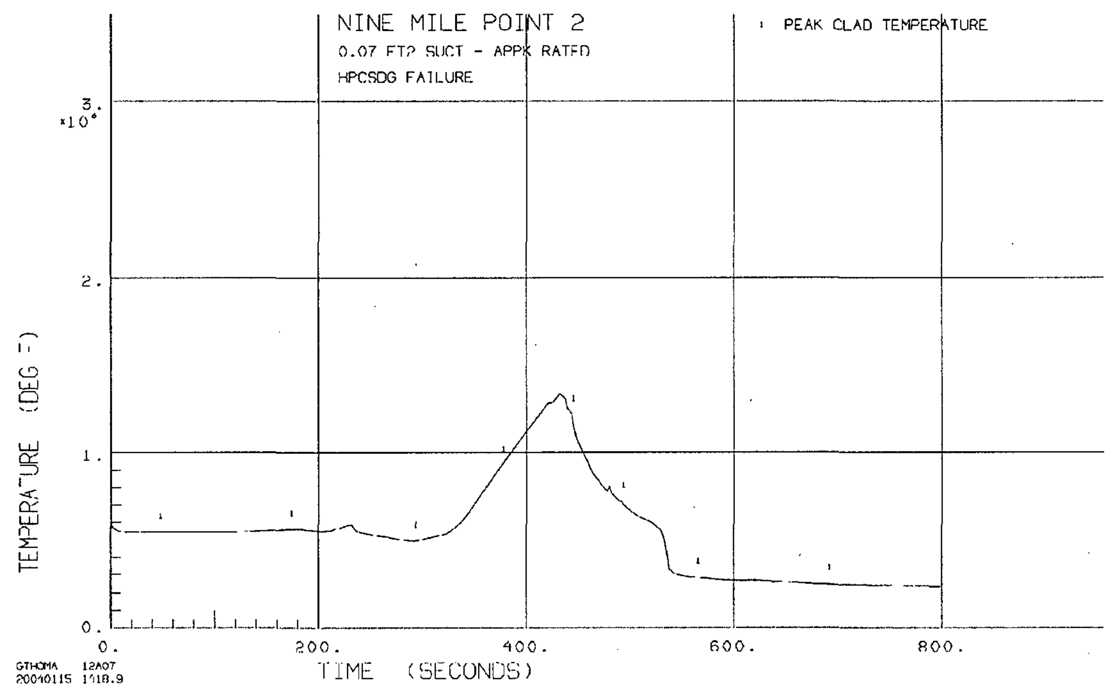

Figure 4-c Peak Cladding Temperature.
Limiting Small Recirculation Line Break (0.07ft^2),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

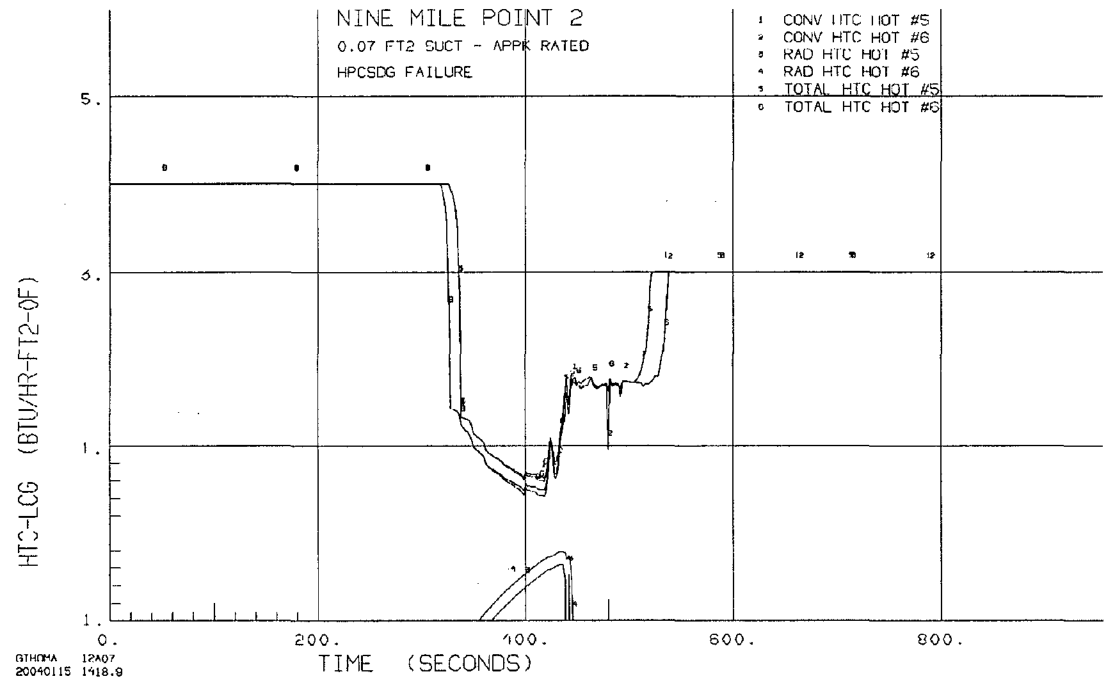

Figure 4-d Heat Transfer Coefficients.
Limiting Small Recirculation Line Break ($0.07ft^2$),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

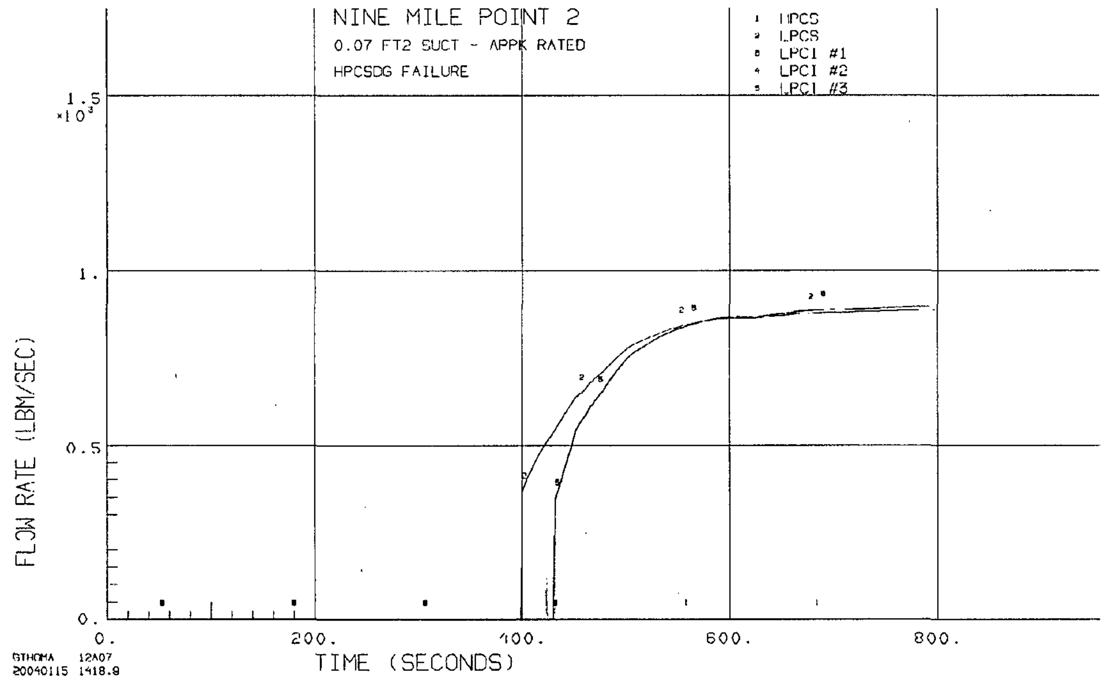

Figure 4-e ECCS Flows.
Limiting Small Recirculation Line Break ($0.07ft^2$),
HPCS-D/G Failure (1 LPCS + 3 LPCI + ADS Available)
[Appendix K Assumptions]

Appendix A
Operating Plant Licensing Parameters (OPL-4/5)

OPL-4/5 FORMS FOR NINE MILE POINT UNIT 2

(SEE NOTES C, D, E, F)

OPL-4 for Cycle 9

1. Plant Operational Parameters

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References (2)
A. Operational Parameters-Rated conditions						
1. Core thermal power-Nominal	MWt	3467	✓	3467	_	_
2. Core thermal power-Appendix K	MWt	3536	✓	3536	_	_
3. Vessel steam dome pressure-Nominal	psia	1055	✓	1055	_	_
4. Vessel steam dome pressure-Appendix K	psia	1055	✓	1055	_	_
5. Vessel steam output-Nominal	Mlbm/hr	15.00	✓	15.00	_	_
6. Vessel steam output-Appendix K	Mlbm/hr	15.35	✓	15.35	_	_
7. Core flow	Mlbm/hr	108.5	✓	108.5	_	_
8. Recirculation drive flow-Loop A	Mlbm/hr	16.25	✓	16.25	_	_
9. Recirculation drive flow-Loop B	Mlbm/hr	16.25	✓	16.25	_	_
10. Feedwater temperature-Nominal	°F	425.1	423	403	_	_
11. Feedwater temperature-Appendix K	°F	426.6	425	405	_	_

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References (2)
B. Alternate Operation Mode Parameters–[Single Loop]						
1. Core thermal power-Nominal	MWt	2842.9	2843	2843	–	–
2. Core thermal power-Appendix K	MWt	2899.8	2900	2900	–	–
3. Vessel steam dome pressure-Nominal	psia	1055	✓	1055	–	–
4. Vessel steam dome pressure-Appendix K	psia	1055	✓	1055	–	–
5. Vessel steam output-Nominal	Mlbm/hr	11.949	✓	11.949	–	–
6. Vessel steam output-Appendix K	Mlbm/hr	12.222	✓	12.222	–	–
7. Core flow	Mlbm/hr	65.10	✓	65.10	–	–
8. Recirculation drive flow-Loop A	Mlbm/hr	19.5	✓	19.5	–	–
9. Recirculation drive flow-Loop B	Mlbm/hr	0	✓	0	–	–
10. Feedwater temperature-Nominal	°F	403.6	403	383	–	–
11. Feedwater temperature-Appendix K	°F	405.7	405	385	–	–

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References (2)
C. Alternate Operation Mode Parameters–[ELLLA]						
1. Core thermal power-Nominal	MWt		3467	3467	_	_
2. Core thermal power-Appendix K	MWt		3536	3536	_	_
3. Vessel steam dome pressure-Nominal	psia		1055	1055	_	_
4. Vessel steam dome pressure-Appendix K	psia		1055	1055	_	_
5. Vessel steam output-Nominal	Mlbm/hr		15.00	15.00	_	_
6. Vessel steam output-Appendix K	Mlbm/hr		15.35	15.35	_	_
7. Core flow	Mlbm/hr		94.4	94.4	_	_
8. Recirculation drive flow-Loop A	Mlbm/hr		14.1	14.1	_	_
9. Recirculation drive flow-Loop B	Mlbm/hr		14.1	14.1	_	_
10. Feedwater temperature-Nominal	°F		423	403	_	_
11. Feedwater temperature-Appendix K	°F		425	405	_	_

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References (2)
D. Alternate Operation Mode Parameters–[ICF]						
1. Core thermal power-Nominal	MWt		3467	3467	–	–
2. Core thermal power-Appendix K	MWt		3536	3536	–	–
3. Vessel steam dome pressure-Nominal	psia		1055	1055	–	–
4. Vessel steam dome pressure-Appendix K	psia		1055	1055	–	–
5. Vessel steam output-Nominal	Mlbm/hr		15.00	15.00	–	–
6. Vessel steam output-Appendix K	Mlbm/hr		15.35	15.35	–	–
7. Core flow - 105% of Rated - AL	Mlbm/hr		113.9	113.9	–	–
8. Recirculation drive flow-Loop A	Mlbm/hr		17.05	17.05	–	–
9. Recirculation drive flow-Loop B	Mlbm/hr		17.05	17.05	–	–
10. Feedwater temperature-Nominal	°F		423	403	–	–
11. Feedwater temperature-Appendix K	°F		425	405	–	–

OPL-4 for Cycle 9

2. LPCI & LPCS Emergency Diesel Generators (EDGs)

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	1	✓	1	–	–
2. High drywell pressure	Yes/No	Yes	✓	Yes	–	–
B. Delay time to process initiation signal (T_{SPD} on Fig. 1, 2)	seconds	–	1.0	1.0	–	–
C. Maximum delay time from EDG start signal until bus is at rated voltage (T_{DG} on Fig. 1, 2)	seconds	–	30.0	30.0	–	–

OPL-4 for Cycle 9

2. HPCS Emergency Diesel Generator (EDG)

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	1	2	2	_	_
2. High drywell pressure	Yes/No	Yes	✓	Yes	_	_
B. Delay time to process initiation signal (T_{SPD} on Fig. 1, 2)	seconds	_	1.0	1.0	_	_
C. Maximum delay time from EDG start signal until bus is at rated voltage (T_{DG} on Fig. 1, 2)	seconds	_	30.0	30.0	_	_

OPL-4 for Cycle 9

3. Low Pressure Coolant Injection (LPCI) System

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	1	✓	1	–	–
2. High drywell pressure	Yes/No	Yes	✓	Yes	–	–
3. Low vessel pressure permissive	psig	–	✓	N/A	–	–
4. Timer delay for sustained low water level (T_{SLL} on Fig. 1)	minutes	–	✓	N/A	–	–
B. Delay time to process initiation signal (T_{SPD} on Fig. 1)	seconds	–	1.0	1.0	–	–
C. Maximum vessel pressure at which pumps can inject flow (pressure associated with T_{CIPH} on Fig. 1)	psid (vessel to drywell)	225 (See Table 1)	See Table 1	See Table 1	–	–
D. Minimum flow delivered to vessel						
1. Vessel pressure at which flow rates listed below are quoted	psid (vessel to drywell)	20 (See Table 1)	See Table 1	See Table 1	–	–
2. One LPCI pump into shroud	gpm	6280 (See Table 1)	See Table 1	See Table 1	–	–
E. Minimum flow at 0 psid (vessel-to-drywell)			See Table 1	See Table 1		

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
1. One LPCI pump into shroud	gpm	6576 (See Table 1)	See Table 1	See Table 1	—	—
F. Maximum delay time from bus at rated voltage until power available for pump start. (T_{CIPA} on Fig. 1)	seconds	—	7.3	7.3	—	—
G. Maximum delay time from pump start until pump is at rated speed (T_{CIPR} on Fig. 1)	seconds	—	3.0	3.0	—	—
H. LPCI Injection Valves						
1. Maximum delay time from bus at rated voltage until power available at injection valve (T_{CIPV} on Fig. 1)	seconds	—	0	0	—	—
2. Pressure at which injection valve may open (pressure permissive associated with T_{CIPP} on Fig. 1)	psig (vessel)	225	✓	225	A	—
3. Maximum injection valve stroke time – opening (T_{CIIV} on Fig. 1)	seconds	25	✓	25	—	—

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
4. Minimum differential pressure at which injection valve may open (corresponding to the RPV pressure in variable 3.H.2)	psid (across injection valve)	8	✓	8	—	—
I. Minimum flow bypass (MFB) valve						
1. Normal position of MFB valve at system startup	Open/ Closed	—	Open	Open	—	—
2. System flow at which MFB valve is signaled to close	gpm	—	1050	1050	—	—
3. MFB valve stroke time	seconds	—	12	12	—	—
4. MFB flow rate	gpm	—	1100	1100	—	—

4. Core Spray (CS)/Low Pressure Core Spray (LPCS) System

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	1	✓	1	–	–
2. High drywell pressure	Yes/No	Yes	✓	Yes	–	–
3. Low vessel pressure permissive	psig	–	NA	NA	–	–
4. Timer delay for sustained low water level (T_{SLL} on Fig. 2)	minutes	–	NA	NA	–	–
B. Delay time to process initiation signal (T_{SPD} on Fig. 2)	seconds	–	1.0	1.0	–	–
C. Maximum vessel pressure at which pumps can inject flow (pressure associated with T_{CSPH} on Fig. 2)	psid (vessel to drywell)	289 (See Table 2)	See Table 2	See Table 2	–	–
D. Minimum flow delivered to vessel						
1. Vessel pressure at which flow rate listed below is quoted	psid (vessel to drywell)	30 (See Table 2)	See Table 2	See Table 2	–	–
2. Minimum flow at vessel pressure	gpm	6150 (See Table 2)	See Table 2	See Table 2	–	–
E. Minimum flow at 0 psid (vessel to drywell)	gpm	6494 (See Table 2)	See Table 2	See Table 2	–	–

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
F. Maximum delay time from bus at rated voltage until power available for pump start (T_{CSPA} on Fig. 2)	seconds	–	7.3	7.3	–	–
G. Maximum delay time from pump start until pump is at rated speed (T_{CSPR} on Fig. 2)	seconds	–	4.5	4.5	–	–
H. CS/LPCS Injection Valve(s)						
1. Maximum delay time from bus at rated voltage until power available at injection valve (T_{CSPV} on Fig. 2)	seconds	–	0	0	–	–
2. Pressure at which injection valve may open (pressure permissive associated with T_{CSPP} on Fig. 2)	psig (vessel)	305	✓	305	B	–
3. Maximum injection valve stroke time – opening (T_{CSIV} on Fig. 2)	seconds	25	✓	25	–	–
4. Minimum differential pressure at which injection valve may open (corresponding to the RPV pressure in variable 4.H.2)	psid (across injection valve)	0	✓	0	–	–

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
I. Minimum flow bypass (MFB) valve						
1. Normal position of MFB valve at system startup	Open/ Closed	–	Open	Open	–	–
2. System flow at which MFB valve is signaled to close	gpm	–	1550	1550	–	–
3. MFB valve stroke time	seconds	–	6	6	–	–
4. MFB flow rate	gpm	–	1208	1208	–	–

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5. High Pressure Core Spray (HPCS) System

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	2	✓	2	_	_
2. High drywell pressure	Yes/No	Yes	✓	Yes	_	_
B. Delay time to process initiation signal (T_{SPD})	seconds	_	1	1	_	_
C. Maximum vessel pressure at which pumps can inject flow (pressure associated with T_{CSPH})	psid (vessel to source)	1175 (See Table 3)	See Table 3	See Table 3	_	_
D. Minimum flow delivered to vessel						
1. Vessel pressures at which flow rates listed below are quoted	psid (vessel to source)	1175.3 1175 1030 100 (See Table 3)	See Table 3	See Table 3	_ _ _ _	_ _ _ _
2. Minimum flows at vessel pressure	gpm	0 509 1525 6150 (See Table 3)	See Table 3	See Table 3	_ _ _ _	_ _ _ _
E. Minimum flow at 0 psid (vessel to source)	gpm	6250 (See Table 3)	See Table 3	See Table 3	_	_

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
F. Maximum delay time from bus at rated voltage until power available for pump start (T_{CSPA})	seconds	_	0	0	_	_
G. Maximum delay time from pump start until pump is at rated speed (T_{CSPR})	seconds	_	12	12	_	_
H. HPCS Injection Valve						
1. Maximum delay time from bus at rated voltage until power available at injection valve (T_{CSPV})	seconds	_	0	0	_	_
2. Maximum injection valve stroke time – opening (T_{CSIV})	seconds	_	22	22	_	_
I. Minimum flow bypass (MFB) valve						
1. Normal position of MFB valve at system startup	Open/ Closed	_	Close	Close	_	_
2. System flow at which MFB valve is signaled to close	gpm	_	900	900	_	_
3. MFB valve stroke time	seconds	_	10	10	_	_
4. MFB flow rate	gpm	_	1000	1000	_	_

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7. Automatic Depressurization System (ADS)

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Initiating signals						
1. Low water level	Level #	1	✓	1	_	_
2. High drywell pressure	Yes/No	No	✓	No	_	_
3. High drywell pressure bypass timer delay for sustained low water level (T_{BT} on Fig. 3)	minutes	N/A	✓	N/A	_	_
4. ECCS ready permissive	Yes/No	Yes	✓	Yes	_	_
B Delay time to process initiating signal (T_{SPD} on Fig. 3)	seconds	_	1	1	_	_
C. Total number of relief valves with ADS function		7	✓	7	_	_
D. Total number of relief valves with ADS function assumed in analysis		5	✓	5	_	_
E. Pressure at which flow capacity listed below is quoted	psig (vessel)	1080	✓	1080	_	_
F. Minimum flow rate for one valve open at above listed pressure	lbm/hr	8.162×10^5	816000	816000	_	_

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
G. ADS timer delay from initiating signal completed to the time valves are opened (T_{ST} on Fig. 3)	seconds	120	✓	120	–	–

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8. In-Vessel Leakage Rates

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. LPCI leakage (One Pump)						
1. Leakage flow	gpm	80	✓	80	–	–
2. Pressure at which leakage flow is defined	psid	20	✓	20	–	–
B. CS leakage (principally through vent hole of T-joint)						
1. Leakage flow	gpm	100	✓	100	–	–
2. Pressure at which leakage flow is defined (CS/LPCS)	psid	122	30	30	–	–
3. Pressure at which leakage flow is defined (HPCS)	psid	200	100	100	–	–
C. Leakage allowance for shroud cracks						
1. Leakage flow	gpm	–	150	150	–	–
2. Core flow at which leakage flow is defined	% of rated	–	105	105	–	–
3. Elevation of core shroud cracks	inches AVZ	–	294	294	–	–
D. Leakage allowance for access hole cover cracks						
1. Leakage flow	gpm	–	80	80	–	–

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
2. Core flow at which leakage flow is defined	% of rated	—	105	105	—	—
E. Leakage allowance for LPCI-related cracks		N/A		N/A		
1. Leakage flow	gpm	—	✓	0	—	—
2. Pressure at which leakage flow is defined	psid	—	✓		—	—
F. Leakage allowance for CS header and riser cracks		N/A		N/A		
1. Leakage flow	gpm	—	✓	0	—	—
2. Pressure at which leakage flow is defined	psid	—	✓		—	—
G. Leakage allowance for internal modifications and shroud repairs						
1. Leakage flow	gpm	—	350	350	—	—
2. Core flow at which leakage flow is defined	% of rated	—	105	105	—	—
3. Elevation of leakage path	inches AVZ	—	294	294	—	—
H. Leakage allowance for access hole cover repairs		N/A		N/A		
1. Leakage flow	gpm	—	✓	0	—	—

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
2. Core flow at which leakage flow is defined	% of rated	—	✓		—	—
I. Leakage allowance for LPCI-related repairs		N/A		N/A		
1. Leakage flow	gpm	—	✓	0	—	—
2. Pressure at which leakage flow is defined	psid	—	✓		—	—
J. Leakage allowance CS repairs		N/A		N/A		
1. Leakage flow	gpm	—	✓	0	—	—
2. Pressure at which leakage flow is defined	psid	—	✓		—	—

9. Miscellaneous Inputs

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
A. Normal water level at rated power (indicated level)	inches AVZ	563.5	✓	563.5	_	_
B. Water level setpoints						
1. Level 8-High Level	inches AVZ	587.6	588.4	588.4	_	_
2. Level 7-High Level Alarm (indicated level)	inches AVZ	_	568	568	_	_
3. Level 4-Low Level Alarm (indicated level)	inches AVZ	559.0	✓	559.0	_	_
4. Level 3-Low Level (indicated level)	inches AVZ	535.0	511	511	_	_
5. Level 2-Low Low Level	inches AVZ	453.5	457.5	457.5	_	_
6. Level 1-Low Low Low Level	inches AVZ	366.3	366.5	366.5	_	_
C. Steam dryer pressure drop	psid	0.374	✓	0.374	_	_
D. MSIV isolation-initiation signal						
1. Low water level	Level #	1	✓	1	_	_
2. Low steam line pressure	psig	720	✓	720	_	_
3. High steam line flow	% of rated	140	130-140	130-140	_	_

OPL-4 for Cycle 9

Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
E. MSIV signal delay (from initiating event to start of valve motion)	seconds	0.5	✓	0.5	–	–
F. MSIV closure time						
1. Minimum closing time	seconds	3	✓	3	–	–
2. Maximum closing time	seconds	5	✓	5	–	–
G. Feedwater pump coastdown (from initial value to zero flow)	seconds	5	.001	.001	–	–
H. Time constant for recirculation pump coastdown	seconds	4	✓	4	–	–
I. Number of pilot-actuated Safety/Relief Valves (SRVs) in group						
1. Group A		2	✓	2	–	–
2. Group B		4	✓	4	–	–
3. Group C		4	✓	4	–	–
4. Group D		4	✓	4	–	–
5. Group E		4	✓	4	–	–
J. Opening/closing setpoints of pilot-actuated SRVs						
1. Group A	psig	1103/1003	✓	1103/1003	–	–
2. Group B	psig	1113/1013	✓	1113/1013	–	–

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
3. Group C	psig	1123/1023	✓	1123/1023	_	_
4. Group D	psig	1133/1033	✓	1133/1033	_	_
5. Group E	psig	1143/1043	✓	1143/1043	_	_
K. Low-low set logic	Yes/No	_	NA	NA	_	_
L. Number of low-low set SRVs in Group						
1. Group A		_	NA	NA	_	_
2. Group B		_	NA	NA	_	_
3. Group C		_	NA	NA	_	_
M. Opening/closing pressure setpoints of low-low set SRVs			NA	NA		
1. Group A	psig	_	✓	N/A	_	_
2. Group B	psig	_	✓	N/A	_	_
3. Group C	psig	_	✓	N/A	_	_
N. Pilot-actuated SRV capacity						
1. SRV capacity at (100+ACC)% of reference pressure	lbm/hr	890,371	800000	800000	_	_
2. Reference pressure	psig	1145	1080	1080	_	_
3. Overpressure Accumulation Factor (ACC)	%	3	0	0	_	_

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
O. Additional Pilot-actuated SRV opening/closing parameters						
1. Time delay before opening of pilot-actuated SRVs	seconds	0.3	✓	0.3	–	–
2. Time constant of SRV opening/closing	seconds	0.3	✓	0.3	–	–
P. Number of Spring Safety Valves (SSVs)						
1. Group A		2	✓	2	–	–
2. Group B		4	✓	4	–	–
3. Group C		4	✓	4	–	–
4. Group D		4	✓	4	–	–
5. Group E		4	✓	4	–	–
Q. Opening/closing setpoint of SSVs						
1. Group A	psig	1165/1065	1165/1089	1165/1089	–	–
2. Group B	psig	1175/1075	1175/1099	1175/1099	–	–
3. Group C	psig	1185/1085	1185/1108	1185/1108	–	–
4. Group D	psig	1195/1095	1195/1117	1195/1117	–	–
5. Group E	psig	1205/1105	1205/1127	1205/1127	–	–
R. SSV capacity at opening setpoint						
1. Group A	lbm/hr	905,726	905000	905000	–	–
2. Group B	lbm/hr	913,404	913000	913000	–	–
3. Group C	lbm/hr	921,081	921000	921000	–	–

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Variable	Units	GE Proposed Value	Utility Proposed Value	Resolved Value	Notes	References
4. Group D	lbm/hr	928,759	928000	928000	_	_
5. Group E	lbm/hr	936,437	936000	936000	_	_
S. ECCS make-up water temperature	°F	120	✓	120	_	_
T. Operator action time	seconds	_	600	600	_	_
U. High drywell pressure setpoint	psig	_	2.0	2.0	_	_

10. Notes

A. The LPCI injection valve open permissive will not be granted (even when the vessel pressure falls below 225 psig) prior to 41.3 seconds into the LOCA. The LPCI pumps will be at rated speed (operating on min flow) at 41.3 seconds due to various time delays (EDG start time delay, motor loading time delay, motor acceleration time). GE is to provide validation of this assumption.

B. The LPCS injection valve open permissive will not be granted (even when the vessel pressure falls below 305 psig) prior to 42.8 seconds into the LOCA. The LPCS pump will be at rated speed (operating on min flow) at 42.8 seconds due to various time delay (EDG start time delay, motor loading time delay, motor acceleration time). GE is to provide validation of this assumption.

C. The LOCA analysis is done in such a manner that it is reflective of the ECCS equipment out-of-service options presently allowed by the Technical Specifications:

Out-of-Service	LPCS	LPCI A	LPCI B	LPCI C	HPCS	1 Req'd ADS
LPCS	7 days	72 hours	72 hours	72 hours	Not Allowed	72 hours
LPCI A	72 hours	7 days	72 hours	72 hours	72 hours	72 hours
LPCI B	72 hours	72 hours	7 days	72 hours	72 hours	72 hours
LPCI C	72 hours	72 hours	72 hours	7 days	72 hours	72 hours
HPCS	Not Allowed	72 hours	72 hours	72 hours	14 days with RCIC operable	Not Allowed
1 Req'd ADS	72 hours	72 hours	72 hours	72 hours	Not Allowed	14 days

D. The LOCA analysis for off-normal conditions (one MSIV out-of-service) is bounded by the LOCA analyses that corresponds to the plant operation at the rated power, extended load line limit point, increased core flow point, or single loop operation point. GE is to provide validation of this assumption.

E. The LOCA analysis for main steam line break and other smaller breaks (LPCI, HPCS, feedwater, etc) is bounded by the recirculation pump suction line break LOCA analysis. GE is to provide validation of this assumption.

F. The input parameters (e.g., ECCS injection flow rates, vessel initial pressure, core flow rate, etc.) other than those associated with automatic trips or corrective actions, labeled as Analytical Limit (AL) in the OPL 4/5 Design Guide do not include measurement uncertainties even though the OPL 4/5 Design Guide seems to require the uncertainties to be included. This deviation is acceptable based on the conclusion of the BWROG report, Safety Analysis Evaluations Relative to Measurement

Uncertainties for the BWR/4 Improved Standard Technical Specification. The BWROG in the report concluded that this is acceptable because "*of the substantial amount of conservatism in the safety analysis process*".

11. References

1. not used

2. References for OPL are contained in Nine Mile Point Nuclear Station Unit 2 Calculation #A10.1-AE-002 Rev. 0.

MAXIMUM BREAK AREAS FOR LOCA EVALUATION

Break Location	Break Area (ft^2)
Recirculation Suction Line	3.131

The maximum break area for each break location is calculated using the minimum flow (cross-sectional) area in each possible flow path from the point of the break to inside the vessel. The maximum design tolerances are used in the calculation of the minimum flow area in order to ensure conservative values.

The recirculation suction line break area is comprised of the minimum flow areas of the recirculation suction line nozzle/safe end, the jet pump nozzles, the bottom head drain line, and the recirculation cross-tie drain line.

OPL-4 for Cycle 9

Table 1. LPCI Pump Characteristics Used in LOCA Analysis (One Pump)

Vessel to Drywell Pressure (psid)	Pump Flow into Vessel* (gpm)
0	6660
20	6360
45	5960
67	5570
90	5160
112	4710
135	4210
150	3600
190	2200
190.1	1000
210	0

* For leakage into the downcomer region see OPL-4 Item 8

Table 2. LPCS Pump Characteristics Used in LOCA Analysis (One Pump)

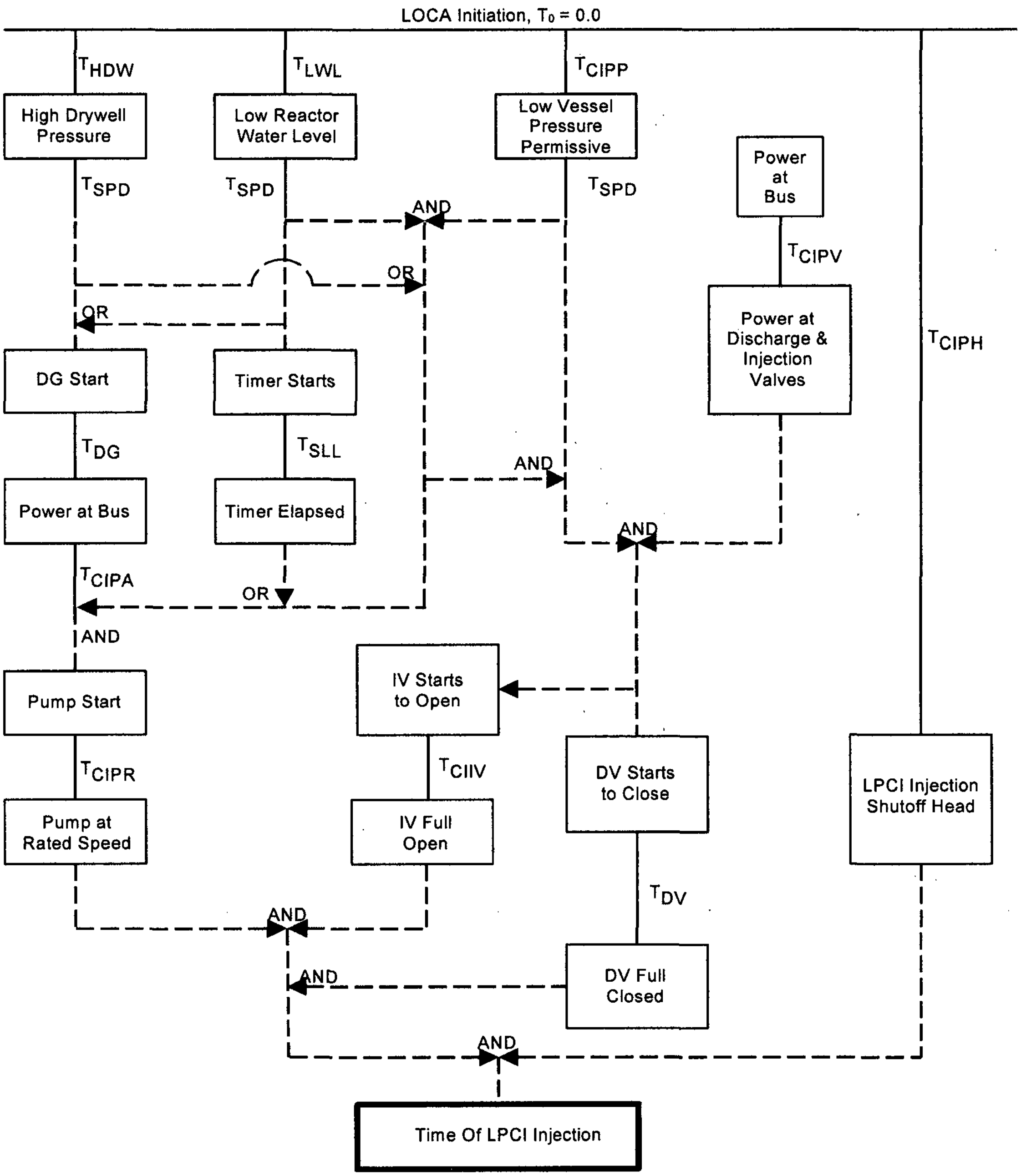
Vessel to Drywell Pressure (psid)	Pump Flow into Vessel* (gpm)
0	6600
30	6250
58	5900
87	5520
116	5110
144	4660
173	4170
202	3610
231	2950
260	2080
289	0

* For leakage into the downcomer region see OPL-4 Item 8

Table 3. HPCS Pump Characteristics Used in LOCA Analysis

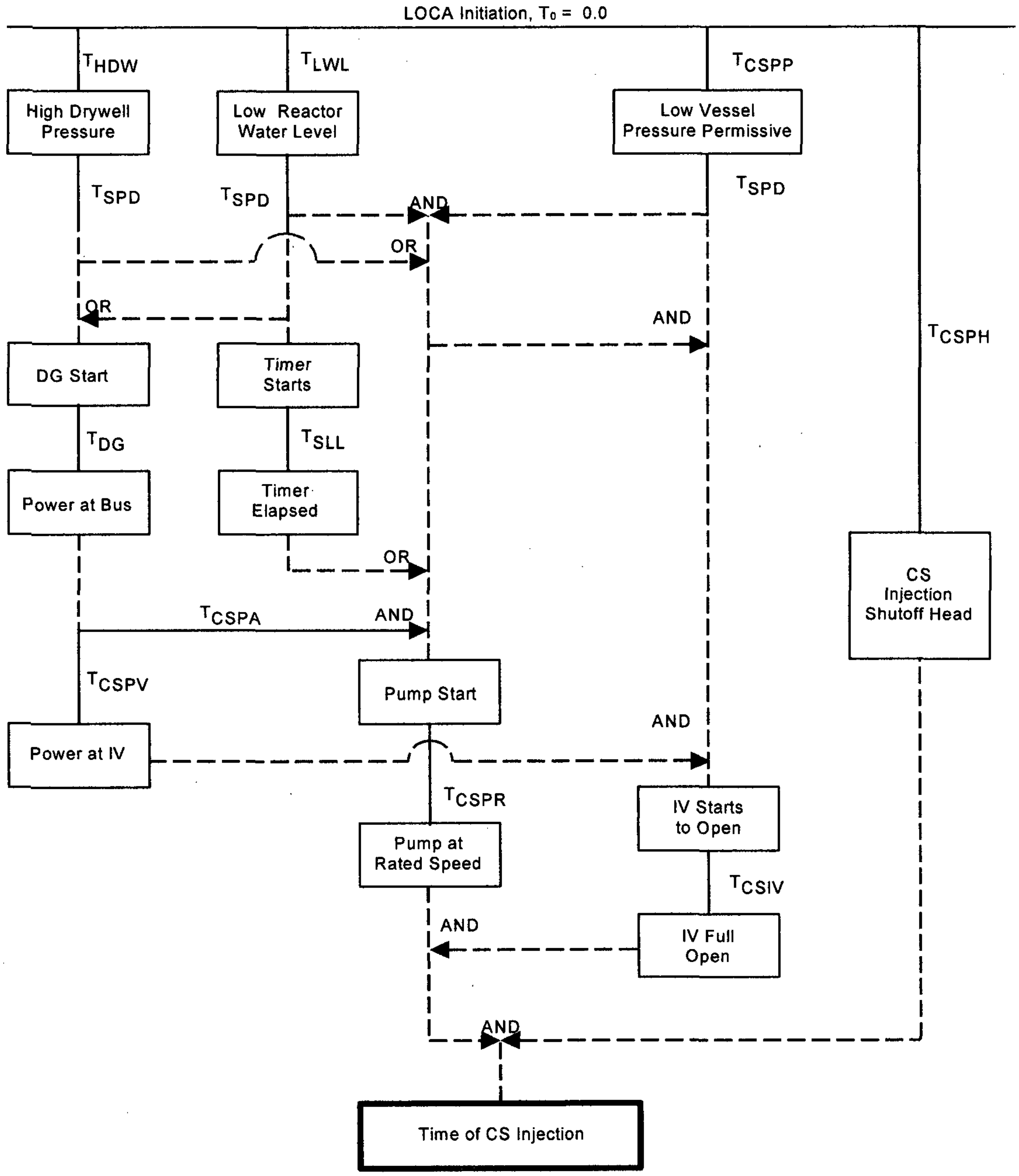
Vessel to Drywell Pressure (psid)	Pump Flow into Vessel* (gpm)
0	6250
100	6250
980	1800
1080	0

* For leakage into the downcomer region see OPL-4 Item 8



Note: Delay times refer to solid lines between events. Dotted lines show logic without time delay.

Figure 1. Initiation Logic Diagram for Low Pressure Coolant Injection (LPCI) System



Note: Delay times refer to solid lines between events. Dotted lines show logic without time delay.

Figure 2. Initiation Logic Diagram for Low Pressure Core Spray (LPCS) System

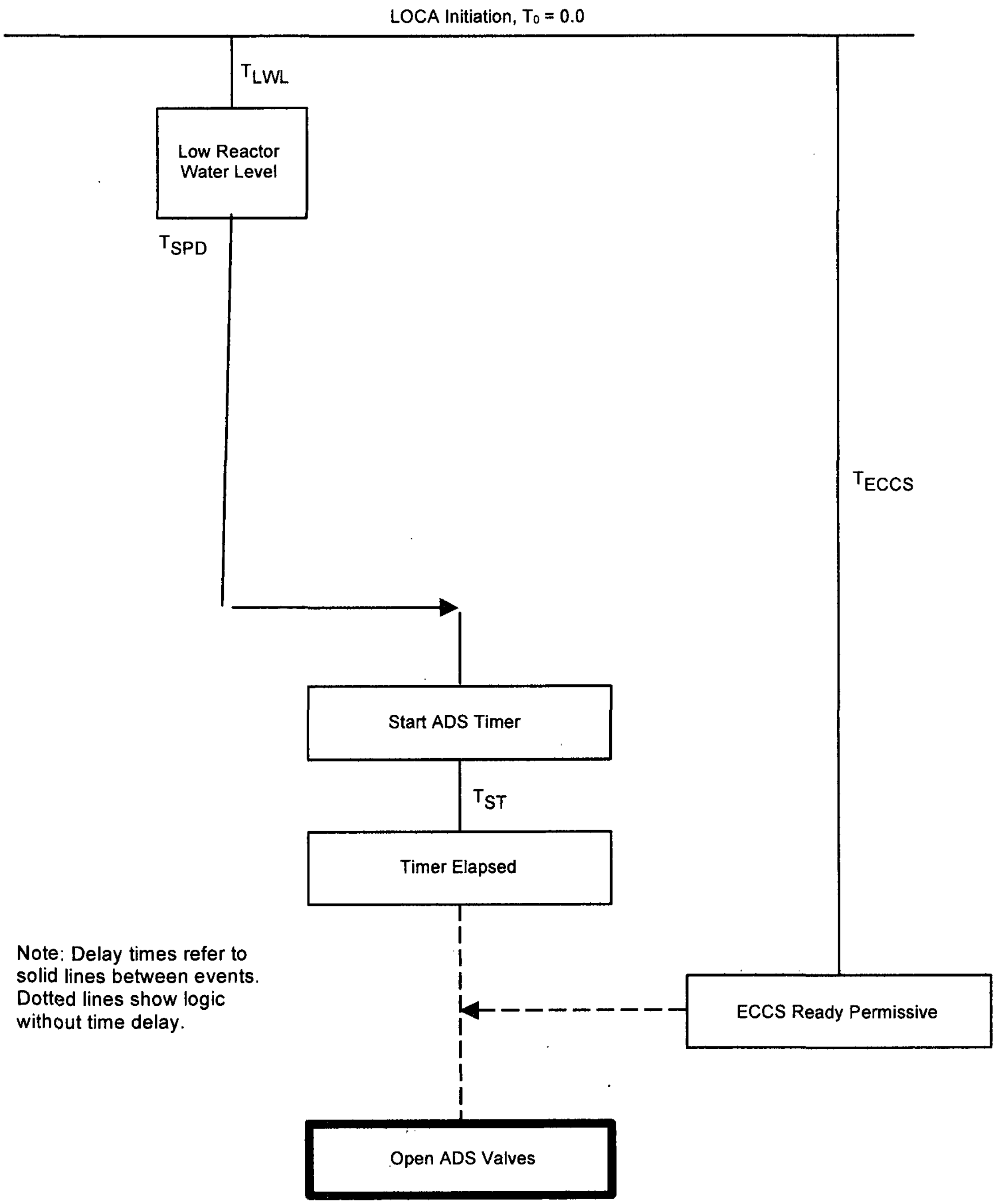


Figure 3. Initiation Logic Diagram for Automatic Depressurization System (ADS)

GE Nuclear Energy

NMP2
Rev. 0

OPL-5 for Cycle 9

VERIFICATION OF EMERGENCY CORE COOLING SYSTEM
SINGLE FAILURE EVALUATION FOR SAFER/GESTR ANALYSIS(1)

The table below shows the various combinations of Automatic Depressurization System (ADS), High Pressure Core Spray (HPCS) System, Low Pressure Core Spray (LPCS) System, and Low Pressure Coolant Injection (LPCI) System which might be operable in an assumed design basis accident situation.

The following single, active failures will be considered in the ECCS performance evaluation:

Assumed Failure	Recirculation Line Break Systems Remaining(2)
HPCS Diesel Generator	ADS(3), LPCS, 3 LPCI
LPCS Diesel Generator	ADS(3), HPCS, 2 LPCI
LPCI Diesel Generator	ADS(3), HPCS, LPCS, 1 LPCI

Notes for OPL-5

(1) Other postulated failures are not specifically considered because they all result in at least as much ECCS capacity as one of the above assumed failures.

(2) Systems remaining, as identified in this table, are applicable to all non-ECCS line breaks. For a LOCA from an ECCS line break, the systems remaining are those listed, less the ECCS system in which the break is assumed.

(3) The ECCS-LOCA analysis conservatively assumes only 5 ADS valves available

OPL-5 for Cycle 9

NMP2 SAFER/GESTR-LOCA Analysis Operating Plant Licensing (OPL) 4/5 Forms–Resolution of Emergency Core Cooling System Parameters as Inputs to the SAFER/GESTR Analysis

The OPL-4/5 forms represent a confirmation by NMP2 of the Emergency Core Cooling System parameters which are to be used as inputs to the SAFER/GESTR computer code in the NMP2 SAFER/GESTR-LOCA analysis.

Prepared by: _____ **Date**: __
Carl Lepine
Fuels / NMP

Verified by: _____ **Date**: __
Jeff Winklebleck
Fuels / NMP

ATTACHMENT 7

REPLACEMENT PAGES FOR NEDO-33351, REVISION 0, "SAFETY ANALYSIS REPORT FOR NINE MILE POINT NUCLEAR STATION UNIT 2 CONSTANT PRESSURE POWER UPRATE" (LAR ATTACHMENT 3)

Nine Mile Point Nuclear Station, LLC
December 23, 2009

Table 1-1 Computer Codes Used For EPU

Task	Computer Code*	Version or Revision	NRC Approved	Comments
Nominal Reactor Heat Balance	ISCOR	09	Y(2)	NEDE-24011-P Rev. 0 SER
Reactor Core and Fuel Performance	TGBLA PANACEA ISCOR	06 11 09	Y Y Y(2)	NEDE-30130-P-A (4) NEDE-30130-P-A (4) NEDE-24011P Rev. 0 SER
Thermal Hydraulic Stability	ISCOR PANACEA ODYSY OPRM TRACG	09 11 05 01 04	Y(2) Y Y Y(15) Y(16)	NEDE-24011-P Rev. 0 SER NEDE-30130-P-A (4) NEDC-32992P-A, Class III, July 2001 NEDO-32465-A
RPV Fluence	TGBLA DORTG01V	06 01	Y N	See note 14 See notes 12 and 13
RPV Internals Structural Integrity Evaluation	SAP4G07V	01	NA	NEDO-10909 (1)
Reactor Internal Pressure Differences	ISCOR LAMB TRACG	09 07 02	Y(2) (3) Y	NEDE-24011P Rev. 0 SER NEDE-20566-P-A NEDE-32176P Rev. 2 NEDC-32177P Rev. 2 NRC TAC No. M90270
Transient Analysis	PANACEA ISCOR ODYN SAFER	11 09 09 04	Y Y(2) Y (5)	NEDE-30130-P-A (4) NEDE-24011-P Rev. 0 SER NEDO-24154-A NEDC-32424P-A, NEDC-32523P-A (8) (9) (10)
Anticipated Transient Without Scram	ODYN STEMP PANACEA ISCOR	09 04 11 09	Y (6) Y Y(2)	NEDE-24154P-A Supp. 1, Vol. 4 NEDE-30130-P-A NEDE-24011-P Rev. 0 SER
Containment System Response	SHEX M3CPT LAMB	05 05 08	Y Y (3)	(7) NEDO-10320, Apr. 1971 NEDE-20566-P-A September 1986
Appendix R Fire Protection	GESTR SAFER SHEX	08 04 04	(5) (5) Y	NEDE-23785-1-PA Rev. 1 (8) (9) (10) (7)
Reactor Recirculation System	BILBO	04V	NA	NEDE-23504, February 1977 (1)

(GE), "Review of NEDE-23785-1 (P), "GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident, Volumes I and II," August 29, 1983.) In addition, the use of SAFER in the analysis of long term Loss-of-Feedwater (LOFW) events is specified in the approved LTRs for power uprate: "Generic Guidelines for General Electric Boiling Water Reactor Extended Power Uprate," NEDC-32424P-A, February 1999 and "Generic Evaluations of General Electric Boiling Water Reactor Extended Power Uprate," NEDC-32523P-A, February 2000. The Appendix R events are similar to the loss of FW and small break LOCA events.

(6) The STEMP code uses fundamental mass and energy conservation laws to calculate the suppression pool heatup. The use of STEMP was noted in NEDE-24222, "Assessment of BWR Mitigation of ATWS, Volume I & II (NUREG-0460 Alternate No. 3) December 1, 1979." The code has been used in ATWS applications since that time. There is no formal NRC review and approval of STEMP.

(7) The application of the methodology in the SHEX code to the containment response is approved by NRC in the letter to G. L. Sozzi (GE) from A. Thadani (NRC), "Use of the SHEX Computer Program and ANSI/ANS 5.1-1979 Decay Heat Source Term for Containment Long-Term Pressure and Temperature Analysis," July 13, 1993 (Reference 7).

(8) Letter, J.F. Klapproth (GE) to NRC, Transmittal of GE Proprietary Report NEDC-32950P "Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model," dated January 2000 by letter dated January 27, 2000.

(9) Letter, S.A. Richards (NRC) to J.F. Klapproth, "General Electric Nuclear Energy (GENE) Topical Reports GENE (NEDC)-32950P and GENE (NEDC)-32084P Acceptability Review," May 24, 2000.

(10) "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants," NEDE-30996P-A, General Electric Company, October 1987.

(11) The NRC approved the TASC-03A code by letter from S. A. Richards, NRC, to J. F. Klapproth, GE Nuclear Energy, Subject: "Review of NEDC-32084P, TASC-03A, A Computer Code for Transient Analysis of a Single Fuel Channel," TAC NO. MB0564, March 13, 2002. The acceptance version has not yet been published.

(12) CCC-543, "TORT-DORT Two-and Three-Dimensional Discrete Ordinates Transport Version 2.8.14," Radiation Shielding Information Center (RSIC), January 1994.

(13) Letter, H. N. Berkow (NRC) to G. B. Stramback (GE), "Final Safety Evaluation Regarding Removal of Methodology Limitations for NEDC-32983P-A, General Electric Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations (TAC No. MC3788)," November 17, 2005.

(14) Letter, S.A. Richards (NRC) to G. A. Watford (GE), "Amendment 26 to GE Licensing Topical Report NEDE-24011-P-A, GESTAR II – Implementing Improved GE Steady-State Methods (TAC No. MA6481)," November 10, 1999.

(15) The OPRM code is not Level 2. However, the methodology as implemented in the OPRM code has been approved by the NRC.

(16) TRACG02 has been approved in NEDO-32465-A by the US NRC for the stability DIVOM analysis. The CLTP stability analysis is based on TRACG04, which has been shown to provide essentially the same or more conservative results in DIVOM applications as the previous version, TRACG02.

Limitation Number from NRC SER	Limitation Title	Limitation Description	Disposition	Section of NMP2 PUSAR which addresses the Limitation
9.16	Void Reactivity 2	A supplement to TRACG /PANAC11 for AOO is under NRC staff review (Reference A-4). TRACG internally models the response surface for the void coefficient biases and uncertainties for known dependencies due to the relative moderator density and exposure on nodal basis. Therefore, the void history bias determined through the methods review can be incorporated into the response surface "known" bias or through changes in lattice physics/core simulator methods for establishing the instantaneous cross-sections. Including the bias in the calculations negates the need for ensuring that plant-specific applications show sufficient margin. For application of TRACG to EPU and MELLLA+ applications, the TRACG methodology must incorporate the void history bias. The manner in which this void history bias is accounted for will be established by the NRC staff SE approving NEDE-32906P, Supplement 3, "Migration to TRACG04/PANAC11 from TRACG02/PANAC10," May 2006 (Reference A-4). This limitation applies until the new TRACG/PANAC methodology is approved by the NRC staff.	Not Applicable	The limitation is not applicable to NMP2 EPU application because it is not based on Supplement 3 to NEDE-32906P.

Limitation Number from NRC SER	Limitation Title	Limitation Description	Disposition	Section of NMP2 PUSAR which addresses the Limitation
9.19	Void-Quality Correlation 1	For applications involving PANACEA/ODYN/ISCOR/TASC for operation at EPU and MELLLA+, an additional 0.01 will be added to the OLMCPR, until such time that GE expands the experimental database supporting the Findlay-Dix void-quality correlation to demonstrate the accuracy and performance of the void-quality correlation based on experimental data representative of the current fuel designs and operating conditions during steady-state, transient, and accident conditions.	Comply	Section 2.8.5.8 and Section 2.8.3.1
9.20	Void-Quality Correlation 2	The NRC staff is currently reviewing Supplement 3 to NEDE-32906P, "Migration to TRACG04/PANAC11 from TRACG02/PANAC10," dated May 2006 (Reference A-4). The adequacy of the TRACG interfacial shear model qualification for application to EPU and MELLLA+ will be addressed under this review. Any conclusions specified in the NRC staff SE approving Supplement 3 to LTR NEDC-32906P (Reference A-4) will be applicable as approved.	Not Applicable	The limitation is not applicable to NMP2 EPU application because it is not based on Supplement 3 to NEDE-32906P.

ATTACHMENT 8

REPLACEMENT PAGES FOR NEDO-33351P, REVISION 0, "SAFETY ANALYSIS REPORT FOR NINE MILE POINT NUCLEAR STATION UNIT 2 CONSTANT PRESSURE POWER UPRATE" (LAR ATTACHMENT 11)

Table 1-1 Computer Codes Used For EPU

Task	Computer Code*	Version or Revision	NRC Approved	Comments
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RPV Fluence	TGBLA DORTG01V	06 01	Y N	See note 14 See notes 12 and 13
RPV Internals Structural Integrity Evaluation	SAP4G07V	01	NA	NEDO-10909 (1)
Reactor Internal Pressure Differences	ISCOR LAMB TRACG	09 07 02	Y(2) (3) Y	NEDE-24011P Rev. 0 SER NEDE-20566-P-A NEDE-32176P Rev. 2 NEDC-32177P Rev. 2 NRC TAC No. M90270
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Anticipated Transient Without Scram	ODYN STEMP PANACEA ISCOR	09 04 11 09	Y (6) Y Y(2)	NEDE-24154P-A Supp. 1, Vol. 4 NEDE-30130-P-A NEDE-24011-P Rev. 0 SER
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(14) Letter, S.A. Richards (NRC) to G. A. Watford (GE), "Amendment 26 to GE Licensing Topical Report NEDE-24011-P-A, GESTAR II – Implementing Improved GE Steady-State Methods (TAC No. MA6481)," November 10, 1999.

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9.16	Void Reactivity 2	A supplement to TRACG /PANAC11 for AOO is under NRC staff review (Reference A-4). TRACG internally models the response surface for the void coefficient biases and uncertainties for known dependencies due to the relative moderator density and exposure on nodal basis. Therefore, the void history bias determined through the methods review can be incorporated into the response surface "known" bias or through changes in lattice physics/core simulator methods for establishing the instantaneous cross-sections. Including the bias in the calculations negates the need for ensuring that plant-specific applications show sufficient margin. For application of TRACG to EPU and MELLLA+ applications, the TRACG methodology must incorporate the void history bias. The manner in which this void history bias is accounted for will be established by the NRC staff SE approving NEDE-32906P, Supplement 3, "Migration to TRACG04/PANAC11 from TRACG02/PANAC10," May 2006 (Reference A-4). This limitation applies until the new TRACG/PANAC methodology is approved by the NRC staff.	Not Applicable	The limitation is not applicable to NMP2 EPU application because it is not based on Supplement 3 to NEDE-32906P.

Limitation Number from NRC SER	Limitation Title	Limitation Description	Disposition	Section of NMP2 PUSAR which addresses the Limitation
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9.20	Void-Quality Correlation 2	The NRC staff is currently reviewing Supplement 3 to NEDE-32906P, "Migration to TRACG04/PANAC11 from TRACG02/PANAC10," dated May 2006 (Reference A-4). The adequacy of the TRACG interfacial shear model qualification for application to EPU and MELLLA+ will be addressed under this review. Any conclusions specified in the NRC staff SE approving Supplement 3 to LTR NEDC-32906P (Reference A-4) will be applicable as approved.	Not Applicable	The limitation is not applicable to NMP2 EPU application because it is not based on Supplement 3 to NEDE-32906P.

ATTACHMENT 9

AFFIDAVIT JUSTIFYING WITHHOLDING PROPRIETARY INFORMATION IN GE-HITACHI NUCLEAR ENERGY AMERICAS LLC DOCUMENT GE-NE-0000-0024-6517-R0, SAFER/GESTER LOSS-OF-COOLANT ACCIDENT ANALYSIS FOR GE14 FUEL

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Edward D. Schrull, state as follows:

(1) I am Vice President, Regulatory Affairs, Services Licensing, GE Hitachi Nuclear Energy Americas LLC ("GEH"), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GEH letter, GE-PPO-1GYEF-KG1-498, G. Carlisle, GEH, to M. Gorski, Constellation Energy Nuclear Group, "Transmittal of GE-NE-0000-0024-6517-R0," dated December 9, 2009. The proprietary information contained in Enclosure 1, which is entitled "Project Task Report, Constellation Energy, Nine Mile Point 2, SAFER/GESTR Loss-of-Coolant Accident Analysis for GE14 Fuel," is identified by a double underline inside double square brackets, [[This sentence is an example.{3}]]. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. above.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GEH. Access to such documents within GEH is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) above is classified as proprietary because it contains the GEH analysis methodology for an analysis performed in support of the Nine Mile Point-2 Extended Power Uprate (EPU) license application. Development of the EPU methodology and the supporting analysis techniques and information, and their application to the design, modification, and processes were achieved at a significant cost to GEH.

The development of the evaluation methodology along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 11th day of December 2009.

Edward D. Schrull
Vice President, Regulatory Affairs
Services Licensing
GE-Hitachi Nuclear Energy Americas LLC
3901 Castle Hayne Rd.
Wilmington, NC 28401
edward.schrull@ge.com

ATTACHMENT 10

AFFIDAVIT JUSTIFYING WITHHOLDING PROPRIETARY INFORMATION IN GE-HITACHI NUCLEAR ENERGY AMERICAS LLC DOCUMENT RAI RESPONSES B2, E1, F1 THROUGH F9, AND SNPB-1

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Edward D. Schrull, state as follows:

(1) I am Vice President, Regulatory Affairs, Services Licensing, GE-Hitachi Nuclear Energy Americas LLC ("GEH"), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GEH letter, GE-PPO-1GYEF-KG1-499, G. Carlisle, GEH to M. Gorski, Constellation Energy Nuclear Group, "NMP2 EPU Round 1 RAI Responses," dated December 10, 2009. The proprietary information contained in Enclosure 1, which is entitled " RAI Responses to B2, E1, F1 through F9 Proprietary, and Enclosure 3, which is entitled "RAI Response to SNPB-1 Proprietary," is identified by a dark red font and dotted underline placed within double square brackets, [[This sentence is an example.{3}]]. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. above.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GEH. Access to such documents within GEH is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) above is classified as proprietary because it contains results of an analysis performed by GEH to support Nine Mile Point-2 Extended Power Uprate (EPU) license application. This analysis is part of the GEH EPU methodology. Development of the extended power uprate methodology and the supporting analysis techniques and information, and their application to the design, modification, and processes were achieved at a significant cost to GEH.

The development of the evaluation methodology along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply

the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 11th day of December 2009.

Edward D. Schrull
Vice President, Regulatory Affairs
Services Licensing
GE-Hitachi Nuclear Energy Americas LLC
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Wilmington, NC 28401
edward.schrull@ge.com

ATTACHMENT 11

AFFIDAVIT JUSTIFYING WITHHOLDING PROPRIETARY INFORMATION IN RAI RESPONSE A2, CDI TECHNICAL NOTE NO. 09-17P, REV. 0, CDI REPORT 08-08P, REV. 3, AND CDI REPORT 08-24P, REV. 2

Nine Mile Point Nuclear Station, LLC
December 23, 2009

Continuum Dynamics, Inc.
(609) 538-0444 (609) 538-0464 fax 34 Lexington Avenue Ewing, NJ 08618-2302

AFFIDAVIT

Re: C.D.I. Report 08-08P "Acoustic and Low Frequency Hydrodynamic Loads at CLTP Power Level on Nine Mile Point Unit 2 Steam Dryer to 250 Hz," Revision 3; C.D.I. Technical Note 09-17P "Limit Curve Analysis with ACM Rev. 4 for Power Ascension at Nine Mile Point Unit 2," Revision 0; C.D.I. Report 09-26P "Stress Assessment of Nine Mile Point Unit 2 Steam Dryer at CLTP and EPU Conditions," Revision 1; and Nine Mile Point Mechanical and Civil Engineering Steam Dryer Evaluation Question No. A2

I, Barbara A. Agans, being duly sworn, depose and state as follows:

1. I hold the position of Director, Business Administration of Continuum Dynamics, Inc. (hereinafter referred to as C.D.I.), and I am authorized to make the request for withholding from Public Record the Information contained in the documents described in Paragraph 2. This Affidavit is submitted to the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 2.390(a)(4) based on the fact that the attached information consists of trade secret(s) of C.D.I. and that the NRC will receive the information from C.D.I. under privilege and in confidence.

2. The Information sought to be withheld, as transmitted to Constellation Energy Group as attachments to C.D.I. Letter No. 09184 dated 10 December 2009, C.D.I. Report 08-08P "Acoustic and Low Frequency Hydrodynamic Loads at CLTP Power Level on Nine Mile Point Unit 2 Steam Dryer to 250 Hz," Revision 3; C.D.I. Technical Note 09-17P "Limit Curve Analysis with ACM Rev. 4 for Power Ascension at Nine Mile Point Unit 2," Revision 0; C.D.I. Report 09-26P "Stress Assessment of Nine Mile Point Unit 2 Steam Dryer at CLTP and EPU Conditions," Revision 1; and Nine Mile Point Mechanical and Civil Engineering Steam Dryer Evaluation Question No. A2.

3. The Information summarizes:

   (a) a process or method, including supporting data and analysis, where prevention of its use by C.D.I.'s competitors without license from C.D.I. constitutes a competitive advantage over other companies;
   (b) Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
   (c) Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 3(a), 3(b) and 3(c) above.

4. The Information has been held in confidence by C.D.I., its owner. The Information has consistently been held in confidence by C.D.I. and no public disclosure has been made and it is not available to the public. All disclosures to third parties, which have been limited, have been made pursuant to the terms and conditions contained in C.D.I.'s Nondisclosure Secrecy Agreement which must be fully executed prior to disclosure.

5. The Information is a type customarily held in confidence by C.D.I. and there is a rational basis therefore. The Information is a type, which C.D.I. considers trade secret and is held in confidence by C.D.I. because it constitutes a source of competitive advantage in the competition and performance of such work in the industry. Public disclosure of the Information is likely to cause substantial harm to C.D.I.'s competitive position and foreclose or reduce the availability of profit-making opportunities.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to be the best of my knowledge, information and belief.

Executed on this 18th day of December 2009.

Barbara A. Agans
Continuum Dynamics, Inc.

Subscribed and sworn before me this day: Dec 18 2009

Eileen P. Burmeister, Notary Public

EILEEN P. BURMEISTER
NOTARY PUBLIC OF NEW JERSEY
MY COMM. EXPIRES MAY 6, 2012