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TOKYO, JAPAN

September 30, 2009

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-09465

Subject: **Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis and VIPRE-01M Input Comparison**

References:
1) Letter MHI Ref: UAP-HF-09425 from Y. Ogata (MHI) to U.S. NRC, "Additional Information Concerning Minor Safety Analysis Input/Code Errors in the US-APWR Design Certification Analysis," dated August 19, 2009.
2) Letter MHI Ref: UAP-HF-09434 from Y. Ogata (MHI) to U.S. NRC, "Input Manuals, Executable Files, and Sample Input Decks for MARVEL-M and VIPRE-01M US-APWR Non-LOCA Analysis Computer Programs," dated August 28, 2009.

Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") the document entitled "Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis and VIPRE-01M Input Comparison." Some minor input errors in the US-APWR DCD Chapter 15 non-LOCA analysis and the Chapter 6 steam line break mass and energy release analysis were discovered by MHI and reported to the NRC (Reference 1). As indicated in Reference 1, MHI committed to providing revised versions of the input affected by these minor input errors by the end of August 2009 and to providing the results of a sensitivity analysis of these minor input errors by the end of September 2009. MHI has already submitted the revised versions of the MARVEL-M and VIPRE-01M input files (Reference 2). Along with the actual input files, Reference 2 also included a detailed comparison of the original and revised variables for MARVEL-M. During the September 18, 2009 conference call between MHI and the NRC, a similar comparison of the original and revised variables for VIPRE-01M was requested by the NRC. The enclosed materials describe the sensitivity of the analyses presented in the DCD to the revised input and provide a comparison of the original and revised variables in the VIPRE-01M input files. The VIPRE-01M input comparison is included as a revised version of the VIPRE-01M Readme file that was previously provided in Reference 2. These materials, along with those transmitted in Reference 2, fulfill the commitments made by MHI in Reference 1. Any changes to the DCD needed to accurately reflect the revised input parameters and associated analyses will be provided in a future DCD revision, not in Revision 2 of the DCD which is scheduled for October 2009.

As indicated in the enclosed materials, these documents contain information that MHI considers proprietary, and therefore should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4) as trade secrets and commercial or financial information which is privileged or confidential. A non-proprietary version of one of the documents is also being submitted in this package (Enclosure 3). In the non-proprietary version, the proprietary information, bracketed

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in the proprietary version, is replaced by the designation "[ ]".

This letter includes a copy of the proprietary version of the sensitivity study (Enclosure 2), a copy of the non-proprietary version of the sensitivity study (Enclosure 3), the proprietary comparison of the VIPRE-01M input variables (Enclosure 4), and the Affidavit of Yoshiki Ogata (Enclosure 1) which identifies the reasons MHI respectfully requests that all material designated as "Proprietary" in Enclosures 2 and 4 be withheld from disclosure pursuant to 10 C.F.R. § 2.390 (a)(4).

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc., if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, Ltd.

Enclosures:

1. Affidavit of Yoshiki Ogata
2. Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis (proprietary)
3. Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis (non-proprietary)
4. Revised VIPRE-01M Readme with Input Comparison (proprietary)

CC: J. A. Ciocco
C. K. Paulson

Contact Information

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ENCLOSURE 1

Docket No. 52-021

MHI Ref: UAP-HF-09465

MITSUBISHI HEAVY INDUSTRIES, LTD.

AFFIDAVIT

I, Yoshiki Ogata, being duly sworn according to law, depose and state as follows:

1. I am General Manager, APWR Promoting Department, of Mitsubishi Heavy Industries, Ltd. ("MHI"), and have been delegated the function of reviewing MHI's US-APWR documentation to determine whether it contains information that should be withheld from disclosure pursuant to 10 C.F.R. § 2.390 (a)(4) as trade secrets and commercial or financial information which is privileged or confidential.

2. In accordance with my responsibilities, I have reviewed the enclosed document entitled "Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis and VIPRE-01M Input Comparison" dated September 30, 2009, and have determined that the document contains proprietary information that should be withheld from public disclosure. Those pages containing proprietary information are identified with the label "Proprietary" on the top of the page and the proprietary information has been bracketed with an open and closed bracket as shown here "[ ]". The first page of the document indicates that all information identified as "Proprietary" should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4).

3. The basis for holding the referenced information confidential is that it describes the unique design of the safety analysis, developed by MHI (the "MHI Information").

4. The MHI Information is not used in the exact form by any of MHI's competitors. This information was developed at significant cost to MHI, since it required the performance of research and development and detailed design for its software and hardware extending over several years. Therefore public disclosure of the materials would adversely affect MHI's competitive position.

5. The referenced information has in the past been, and will continue to be, held in confidence by MHI and is always subject to suitable measures to protect it from unauthorized use or disclosure.

6. The referenced information is not available in public sources and could not be gathered readily from other publicly available information.

7. The referenced information is being furnished to the Nuclear Regulatory Commission ("NRC") in confidence and solely for the purpose of supporting the NRC staff's review of MHI's application for certification of its US-APWR Standard Plant Design.

8. Public disclosure of the referenced information would assist competitors of MHI in their design of new nuclear power plants without the costs or risks associated with the design and testing of new systems and components. Disclosure of the information identified as

proprietary would therefore have negative impacts on the competitive position of MHI in the U.S. nuclear plant market.

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 30th day of September, 2009.

Y. Ogata

Yoshiki Ogata

ENCLOSURE 3

UAP-HF-09465
Docket No. 52-021

Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis

September 2009

(Non-Proprietary)

Results of Sensitivity Analysis of Minor Input Errors for US-APWR DCD Chapter 15 Non-LOCA Analysis and Chapter 6 Steam Line Break Mass and Energy Release Analysis

Background

In MHI letter UAP-HF-09425, dated August 19, 2009, MHI informed the NRC about minor input errors in the Chapter 15 non-LOCA safety analysis and the Chapter 6 steam line break mass and energy release analysis for the US-APWR DCD. In that letter, MHI described that minor input modifications were necessary for the initial fuel temperature data and the peripheral core geometry data used in some of the Chapter 15 non-LOCA safety analysis. In addition, input modifications were necessary for the thick metal heat capacity data used only in the Chapter 6 steam line break mass and energy release analysis. MHI made a commitment to submit the associated VIPRE-01M and MARVEL-M code input decks by the end of August 2009 and to submit a report documenting the results of the sensitivity analysis of these input modifications by the end of September 2009. The VIPRE-01M and MARVEL-M code input decks, as well as a detailed description of the revised input parameters, were submitted to the NRC by MHI letter UAP-HF-09434, dated August 28, 2009. A conference call was held between MHI and the NRC on September 18, 2009 to discuss the results of the sensitivity analysis. During this conference call, MHI and the NRC agreed upon the types of changes to the DCD that would necessary. The purpose of this report is to formally describe the results of the sensitivity analysis and define the changes that will be made to the DCD based on these results.

Input Modifications

The revised VIPRE-01M and MARVEL-M code input decks were electronically provided as enclosures to MHI letter UAP-HF-09434, dated August 28, 2009. Also included in the enclosure to that letter were readme files that described each of the electronic files. The MARVEL-M readme file included a side-by-side comparison of the original and revised input files so that the differences could be easily determined. For VIPRE-01M, no side-by-side comparison of the original and revised input was provided. For ease of review and in response to a request by the NRC during the September 18, 2009 conference call, a side-by-side comparison of the VIPRE-01M input is provided in Enclosure 4 to the letter transmitting the results of the sensitivity study.

Sensitivity Analysis Results

Chapter 15 Non-LOCA Analyses

MHI performed a sensitivity analysis to determine the effect of the modifications that were made to the MARVEL-M and VIPRE-01M input files for representative Chapter 15 non-LOCA events. The events analyzed were the main steam system piping failure (15.1.5), the complete loss of forced reactor coolant flow (15.3.1.2), the reactor coolant pump rotor seizure (15.3.3), and the rod ejection accident (15.4.8). These events were chosen since they were the limiting events in their event group with respect to DNBR and fuel performance acceptance criteria. No events were analyzed for Section 15.2 because they are heatup events which are focused on primary and secondary pressure and are not limiting with respect to DNBR and other fuel performance parameters affected by the input revisions.

The steam system piping failure for the hot standby, double-ended rupture with offsite power available case was re-analyzed using the modified input (sensitivity case) and the results were compared to the DCD case (DCD Subsection 15.1.5, Case A). Table 1-1 compares the time sequence of events for the DCD case (DCD Table 15.1.5-1) and the sensitivity case. As shown in the table, all of the time values are identical except for a small change in the time that the peak core heat flux occurs (indicated in italics and underlined). While the time is slightly different, the numerical value of the peak core heat flux is identical for the two cases. Figures 1-1 and 1-2 show the core reactivity and core heat flux, respectively, versus time for the DCD case (DCD Figures 15.1.5-1 and 15.1.5-3, respectively) and the sensitivity case. As shown in the figures, the two cases are indistinguishable. Figure 1-2 confirms that the numerical value of the peak core heat flux is identical.

MHI also re-analyzed the steam system piping failure for the spectrum of breaks from power with offsite power available (DCD Subsection 15.1.5, Case C). The limiting case for the spectrum of breaks is presented here. Figures 1-3 and 1-4 show the reactor power and DNBR, respectively, versus time for the minimum DNBR DCD case (transient plots were not provided in the DCD, but the DNBR plot was provided as part of the response to Question 15.1-1 of RAI 301-2324, submitted by MHI letter UAP-HF-09299, dated June 16, 2009) and the sensitivity case. As shown in the figures, the two cases are indistinguishable. In addition, Figure 1-4 shows that the numerical value of the minimum DNBR, which is not reported in the DCD, is identical for the two cases.

MHI concluded that based on the negligible sensitivity of the limiting DCD Section 15.1 events to the input changes (DCD Subsection 15.1.5, Cases A and C), the other non-limiting events in DCD Section 15.1 are not affected by the input changes, have not been re-analyzed, and do not require any DCD changes.

The complete loss of flow was re-analyzed using the modified input (sensitivity case) and the results were compared to the DCD case (DCD Subsection 15.3.1.2). Table 2-1 compares the time sequence of events for the DCD case (DCD Table 15.3.1.2-1) and the sensitivity case. As shown in the table, there is no change to any of the time values. Figure 2-1 shows the DNBR versus time for the DCD case (DCD Figure 15.3.1.2-6) and the sensitivity case. As shown in the figure, the two cases are identical. Figure 2-1 also confirms that the numerical value of the minimum DNBR, which is not reported in the DCD, is identical for the two cases.

The reactor coolant pump rotor seizure was analyzed with the modified input and the results were compared to the DCD case (DCD Subsection 15.3.3). Table 3-1 compares the time sequence of events for the DCD case (DCD Table 15.3.3-1) and the sensitivity case. As shown in the table, there is no change to any of the time values. Figure 3-1 shows the cladding inside temperature versus time for the DCD case (DCD Figure 15.3.3-5) and the sensitivity case. As shown in the figure, the two cases are nearly identical. However, Figure 3-1 shows that the numerical value of the peak cladding inside temperature for the sensitivity case is slightly higher than that for the DCD case, which is reported in DCD Subsection 15.3.3.3.3 and Table 15.3.3-3.

MHI concluded that based on the negligible sensitivity of the limiting DCD Section 15.3 events to the input changes (DCD Subsections 15.3.1.2 and 15.3.3), the other non-limiting events in DCD Section 15.3 are not affected by the input changes, have not been re-analyzed, and do not require any DCD changes.

The rod ejection accident for the hot full power and hot zero power cases at both beginning of cycle and end of cycle were re-analyzed using the modified input (sensitivity case) and the

results were compared to the DCD case (DCD Subsection 15.4.8, Cases 1-4). Table 4-1 compares the time sequence of events for the DCD case (DCD Table 15.4.8-1) and the sensitivity case. As shown in the table, all of the time values are identical. Figures 4-1 and 4-2 show the HFP BOC temperature and fuel enthalpy, respectively, versus time for the DCD case (DCD Figures 15.4.8-3 and 15.4.8-4, respectively) and the sensitivity case. Similar results for the temperature and fuel enthalpy for the HFP EOC, HZP BOC, and HZP EOC are shown in Figures 4-3 though 4-8, respectively (corresponding to DCD Figures 15.4.8-6 to 15.4.8-7, 15.4.8-9 to 15.4.8-10, and 15.4.8-12 to 15.4.8-13, respectively). As shown in the figures, the two cases are nearly identical for each of the different conditions. The figures also indicate the numerical values of the peak fuel centerline temperature and peak fuel enthalpy; these values are summarized in Table 4-2 (with differences indicated in italics and underlined). As indicated in Table 4-2 for all four conditions, the peak fuel centerline temperatures for the sensitivity case are slightly different than those for the DCD case. The HFP BOC and HFP EOC sensitivity values are slightly less than the DCD values, which are reported in DCD Subsection 15.4.8.3.3. On the other hand, the HZP BOC and HZP EOC sensitivity values are slightly greater than the DCD values, which are not reported in the DCD. However, all of the peak fuel centerline temperatures remain well below the fuel pellet melting temperature (the melting temperature is 5072°F for un-irradiated uranium dioxide fuel, and decreases with burnup by 58°F per 10 GWD/MTU as described in DCD Subsection 4.2.1.2.1). For the peak fuel enthalpies, the HZP BOC and HZP EOC sensitivity values are identical to the DCD values, which are reported in DCD Subsection 15.4.8.3.3. On the other hand, the HFP BOC and HFP EOC sensitivity values are slightly higher than those for the DCD case, although these values are not reported in the DCD. However, all of the peak fuel enthalpies remain well below the acceptance limit of 230 cal/g.

MHI concluded that based on the negligible sensitivity of the limiting DCD Section 15.4 events to the input changes (DCD Subsection 15.4.8, Cases 1 through 4), the other non-limiting events in DCD Section 15.4 are not affected by the input changes, have not been re-analyzed, and do not require any DCD changes.

Chapter 6 Steam Line Break Mass and Energy Release Analysis

MHI performed a sensitivity analysis to determine the effect of the modifications that were made to the MARVEL-M input file for the steam line break mass and energy release analysis (DCD Subsection 6.2.1.4). The mass and enthalpy of the break flow, which are used as input for the highest containment pressure analysis, for the DCD case (DCD Table 6.2.1-26) were compared to the sensitivity case, as shown in Table 5-1 (with differences indicated in italics and underlined). The mass and enthalpy for the break flow downstream of the break are identical for the two cases. For the enthalpy of the break flow upstream of the break, there are only a few negligible differences. For the mass of the break flow upstream of the break, there are many small differences. However, most of the differences are negligible, except at the very end of the transient when the break flow goes to zero. The mass and enthalpy of the break flow, which are used as input for the highest containment temperature analysis, for the DCD case (DCD Table 6.2.1-27) were compared to the sensitivity case, as shown in Table 5-2 (with differences indicated in italics and underlined). The differences in Table 5-2 were similar to those seen in Table 5-1.

While there are many small differences in Tables 5-1 and 5-2, these mass and enthalpy values are not an acceptance criteria, but instead are used as input to calculate the containment temperature and pressure. To judge the true impact of these differences, the containment pressure and temperature were re-analyzed using the revised values in Tables 5-1 and 5-2 and

compared to the DCD results for the highest containment pressure (Case 5) and the highest containment temperature (Case 1). Tables 5-3 and 5-4 compare the time sequence of events for the DCD case (Tables 6.2.1-15 and 6.2.1-16, respectively) and the sensitivity case for the highest containment pressure (Case 5) and temperature (Case 1), respectively. As shown in the tables, all of the time values are identical except for a small change in the time at which the high-3 containment pressure setpoint is reached (indicated in italics and underlined). For the highest containment pressure (Case 5), Figures 5-1 and 5-2 show the containment pressure and temperature, respectively, versus time for the DCD case (DCD Figures 6.2.1-51 and 6.2.1-52, respectively) and the sensitivity case. For the highest containment temperature (Case 1), Figures 5-3 and 5-4 show the containment pressure and temperature, respectively, versus time for the DCD case (DCD Figures 6.2.1-39 and 6.2.1-40, respectively) and the sensitivity case. As shown in each of the figures, the DCD case and the sensitivity case are indistinguishable. In addition, the numerical values of the peak pressure and temperature for the sensitivity case are identical to those for the DCD, which are provided in DCD Table 6.2.1-8. So while there are some minor differences in the mass and enthalpy values, there is no effect on the peak containment pressure and temperature.

Incorporation of Changes into DCD Chapters 6 and 15

During the September 18, 2009 conference call, MHI and the NRC discussed whether or not the DCD would be revised, either in Revision 2 or future revisions, to address any of the differences indicated by the results of this sensitivity study. The following description of MHI's plan to revise the DCD is consistent with the conclusion discussed during the conference call.

The results of this report show that there are no discernible differences between the DCD cases and the sensitivity cases in any of the figures. Therefore, as agreed upon during the September 18, 2009 conference call between MHI and the NRC, MHI will not revise any of the figures in DCD Chapters 6 and 15 as a result of these input modifications. However, there were some minor differences in numerical values that were reported in the text and/or tables in DCD Chapters 6 and 15. These numerical values will be revised in the DCD to maintain consistency between the DCD and the analysis of record, as controlled by the MHI Nuclear Center QA program. Based on the negligible sensitivity of limiting events to the input changes described above, less limiting events have not been re-analyzed and are not considered for DCD changes.

Conclusion

MHI has performed a sensitivity analysis to modifications in the VIPRE-01M and MARVEL-M code input decks for representative limiting events. The sensitivity analysis demonstrates that the effects of these minor input changes are negligible. The NRC review of DCD Chapters 6 and 15 will not be impacted since there are only minor differences in the values of parameters that are compared to acceptance criteria, and in each of these cases, the limiting analysis value remains well below the limit. It is not necessary to update any of the graphical results (figures) shown in DCD Chapters 6 or 15; however, some numerical values in text and/or tables in Chapters 6 and 15 will be revised in the future.

Table 1-1 Time Sequence of Events for the Steam System Piping Failure (Case A)

Event Description	DCD* Time (sec)	Sensitivity Time (sec)
Steam pipe rupture occurs	0.0	
Low steamline pressure analytical limit reached	1.5	
MSIVs closed	10.0	
Safety injection pumps start	21.5	
Boron reaches core	44.9	
Automatic isolation of EFW to faulted SG (Case A)	51.7	
Peak core heat flux occurs	89.8	
Faulted SG water mass depleted	330	

*From DCD Table 15.1.5-1

Table 2-1 Time Sequence of Events for the Complete Loss of Flow

Event Description	DCD* Time (sec)	Sensitivity Time (sec)
RCPs trip (flow coastdown begins)	0.0	
Low reactor coolant pump speed analytical limit reached	0.5	
Reactor trip initiated (rod motion begins)	1.1	
Minimum DNBR occurs	3.5	

*From DCD Table 15.3.1.2-1

Table 3-1 Time Sequence of Events for the RCP Rotor Seizure

Event Description	DCD* Time (sec)	Sensitivity Time (sec)
Rotor on one pump locks	0.0	
Low reactor coolant flow analytical limit reached	0.1	
Reactor trip initiated (rod motion begins)	1.9	
Maximum cladding inside temperature occurs	4.6	

*From DCD Table 15.3.3-1

Table 4-1 Time Sequence of Events for the Rod Ejection Accident

Accident	Event Description	DCD* Time (sec)	Sensitivity Time (sec)
Case 1: HFP BOC	Rod ejection occurs	0.0	
	High power range neutron flux (high setpoint) analytical limit reached	0.07	
	Peak reactor power occurs	0.11	
	Reactor trip initiated (rod motion begins)	0.67	
	Maximum fuel temperature occurs	2.5	
	Maximum fuel enthalpy occurs	2.5	
Case 2: HFP EOC	Rod ejection occurs	0.0	
	High power range neutron flux (high setpoint) analytical limit reached	0.06	
	Peak reactor power occurs	0.11	
	Reactor trip initiated (rod motion begins)	0.66	
	Maximum fuel temperature occurs	2.6	
	Maximum fuel enthalpy occurs	2.5	
Case 3: HZP BOC	Rod ejection occurs	0.0	
	High power range neutron flux (low setpoint) analytical limit reached	0.24	
	Peak reactor power occurs	0.28	
	Reactor trip initiated (rod motion begins)	0.84	
	Maximum fuel enthalpy occurs	1.8	
Case 4: HZP EOC	Rod ejection occurs	0.0	
	High power range neutron flux (low setpoint) analytical limit reached	0.15	
	Peak reactor power occurs	0.16	
	Reactor trip initiated (rod motion begins)	0.75	
	Maximum fuel enthalpy occurs	1.2	

*From DCD Table 15.4.8-1

Table 4-2 Values of Key Parameters for the Rod Ejection Accident

Accident	Parameter	DCD	Sensitivity
Case 1: HFP BOC	Peak fuel centerline temperature (°F)	4220*	
	Peak fuel enthalpy (cal/g)	142.4	
Case 2: HFP EOC	Peak fuel centerline temperature (°F)	4325*	
	Peak fuel enthalpy (cal/g)	148.2	
Case 3: HZP BOC	Peak fuel centerline temperature (°F)	2804	
	Peak fuel enthalpy (cal/g)	97.5*	
Case 4: HZP EOC	Peak fuel centerline temperature (°F)	2096	
	Peak fuel enthalpy (cal/g)	72.7*	

*Numerical value given in DCD Subsection 15.4.8.3.3

Table 5-1 Comparison of the Steam Line Break Mass and Energy Release Data
Highest Containment Pressure (Case 5)

	DCD Case (Table 6.2.1-26)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
0.0	0.0	0.0	0.0	0.0				
0.1	3191.9	1189.2	21170.2	1184.7				
0.2	3173.7	1189.5	21109.5	1184.9				
0.3	3155.7	1189.7	21049.8	1185.0				
0.4	3138.0	1189.9	20991.0	1185.1				
0.5	3120.6	1190.2	20933.2	1185.2				
0.6	3103.4	1190.4	20876.3	1185.3				
0.7	3086.4	1190.6	20820.4	1185.3				
0.8	3069.8	1190.8	20765.4	1185.4				
0.9	3053.3	1191.0	20711.2	1185.5				
1.0	3037.1	1191.2	20658.0	1185.6				
1.2	3005.4	1191.6	20553.9	1185.8				
1.4	2974.6	1192.0	20453.0	1185.9				
1.6	2944.6	1192.4	20355.1	1186.1				
1.8	2915.4	1192.7	20260.0	1186.2				
2.0	2887.0	1193.1	20167.6	1186.3				
2.2	2859.3	1193.4	20077.7	1186.4				
2.4	2832.4	1193.7	19990.3	1186.5				
2.6	2806.2	1194.0	19905.2	1186.6				
2.8	2780.6	1194.3	19822.3	1186.7				
3.0	2755.7	1194.6	19741.5	1186.8				
3.2	2731.4	1194.9	19662.7	1186.9				
3.4	2707.8	1195.2	19586.0	1187.0				
3.6	2684.7	1195.4	19511.1	1187.1				
3.8	2662.2	1195.7	19438.0	1187.2				
4.0	2640.3	1195.9	19366.8	1187.2				
4.2	2618.9	1196.2	7697.2	1196.7				
4.4	2598.1	1196.4	7629.3	1197.0				
4.6	2577.8	1196.6	7562.9	1197.2				
4.8	2558.0	1196.8	7498.2	1197.4				
5.0	2538.7	1197.0	7435.0	1197.7				
5.2	2519.8	1197.2	7373.2	1197.9				
5.4	2501.5	1197.4	7312.8	1198.1				
5.6	2483.6	1197.6	7253.9	1198.3				
5.8	2466.1	1197.8	7196.2	1198.5				

	DCD Case (Table 6.2.1-26)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
6.0	2449.0	1198.0	7139.9	1198.6				
6.2	2432.4	1198.1	7084.8	1198.8				
6.4	2416.1	1198.3	7031.0	1199.0				
6.6	2400.3	1198.4	6978.4	1199.2				
6.8	2384.8	1198.6	6926.9	1199.3				
7.0	2369.7	1198.7	6876.5	1199.5				
7.2	2354.9	1198.9	6827.3	1199.6				
7.4	2340.4	1199.0	6779.1	1199.8				
7.6	2326.3	1199.2	6731.9	1199.9				
7.8	2312.5	1199.3	6685.8	1200.0				
8.0	2299.0	1199.4	6640.6	1200.2				
8.2	2285.8	1199.5	6596.3	1200.3				
8.4	2272.9	1199.7	6553.0	1200.4				
8.6	2260.2	1199.8	6510.5	1200.6				
8.8	2247.8	1199.9	6468.9	1200.7				
9.0	2235.6	1200.0	6428.1	1200.8				
9.2	2223.7	1200.1	6388.1	1200.9				
9.4	2212.1	1200.2	6348.8	1201.0				
9.6	2200.6	1200.3	6310.3	1201.1				
9.8	2189.4	1200.4	6272.6	1201.2				
10.0	2178.3	1200.5	6235.5	1201.3				
10.2	2168.8	1200.6	0.0	0.0				
10.4	2159.4	1200.6	0.0	0.0				
10.6	2150.2	1200.7	0.0	0.0				
10.8	2141.1	1200.8	0.0	0.0				
11.0	2132.1	1200.9	0.0	0.0				
11.5	2109.9	1201.1	0.0	0.0				
12.0	2088.3	1201.2	0.0	0.0				
12.5	2067.2	1201.4	0.0	0.0				
13.0	2046.4	1201.6	0.0	0.0				
13.5	2025.9	1201.7	0.0	0.0				
14.0	2005.7	1201.9	0.0	0.0				
14.5	1985.7	1202.0	0.0	0.0				
15.0	1965.9	1202.1	0.0	0.0				
15.5	1946.3	1202.3	0.0	0.0				
16.0	1926.7	1202.4	0.0	0.0				
16.5	1907.3	1202.5	0.0	0.0				
17.0	1888.0	1202.7	0.0	0.0				

	DCD Case (Table 6.2.1-26)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
17.5	1868.8	1202.8	0.0	0.0				
18.0	1849.7	1202.9	0.0	0.0				
18.5	1830.8	1203.0	0.0	0.0				
19.0	1812.3	1203.1	0.0	0.0				
19.5	1794.3	1203.2	0.0	0.0				
20.0	1776.8	1203.3	0.0	0.0				
20.5	1759.8	1203.4	0.0	0.0				
21.0	1743.3	1203.5	0.0	0.0				
21.5	1727.2	1203.6	0.0	0.0				
22.0	1711.6	1203.7	0.0	0.0				
22.5	1696.3	1203.8	0.0	0.0				
23.0	1680.9	1203.8	0.0	0.0				
23.5	1666.2	1203.9	0.0	0.0				
24.0	1651.6	1204.0	0.0	0.0				
24.5	1637.3	1204.0	0.0	0.0				
25.0	1623.2	1204.1	0.0	0.0				
25.5	1609.3	1204.1	0.0	0.0				
26.0	1595.6	1204.2	0.0	0.0				
26.5	1582.0	1204.2	0.0	0.0				
27.0	1568.7	1204.3	0.0	0.0				
27.5	1555.5	1204.3	0.0	0.0				
28.0	1542.6	1204.4	0.0	0.0				
28.5	1529.9	1204.4	0.0	0.0				
29.0	1517.4	1204.5	0.0	0.0				
29.5	1505.1	1204.5	0.0	0.0				
30.0	1493.1	1204.5	0.0	0.0				
30.5	1481.3	1204.5	0.0	0.0				
31.0	1469.7	1204.6	0.0	0.0				
31.5	1458.3	1204.6	0.0	0.0				
32.0	1447.1	1204.6	0.0	0.0				
32.5	1436.2	1204.7	0.0	0.0				
33.0	1425.5	1204.7	0.0	0.0				
33.5	1415.0	1204.7	0.0	0.0				
34.0	1404.7	1204.7	0.0	0.0				
34.5	1394.6	1204.7	0.0	0.0				
35.0	1384.8	1204.7	0.0	0.0				
35.5	1375.1	1204.7	0.0	0.0				
36.0	1365.6	1204.8	0.0	0.0				

	DCD Case (Table 6.2.1-26)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
36.5	1356.3	1204.8	0.0	0.0				
37.0	1347.2	1204.8	0.0	0.0				
37.5	1338.2	1204.8	0.0	0.0				
38.0	1329.5	1204.8	0.0	0.0				
38.5	1320.9	1204.8	0.0	0.0				
39.0	1312.4	1204.8	0.0	0.0				
39.5	1304.1	1204.8	0.0	0.0				
40.0	1296.0	1204.8	0.0	0.0				
40.5	1288.4	1204.8	0.0	0.0				
41.0	1281.1	1204.8	0.0	0.0				
41.5	1273.9	1204.8	0.0	0.0				
42.0	1266.8	1204.8	0.0	0.0				
42.5	1259.8	1204.8	0.0	0.0				
43.0	1252.9	1204.8	0.0	0.0				
43.5	1246.1	1204.8	0.0	0.0				
44.0	1239.4	1204.8	0.0	0.0				
44.5	1232.9	1204.8	0.0	0.0				
45.0	1226.4	1204.8	0.0	0.0				
45.5	1220.0	1204.7	0.0	0.0				
46.0	1213.8	1204.7	0.0	0.0				
46.5	1207.6	1204.7	0.0	0.0				
47.0	1201.5	1204.7	0.0	0.0				
47.5	1195.5	1204.7	0.0	0.0				
48.0	1189.6	1204.7	0.0	0.0				
48.5	1183.7	1204.7	0.0	0.0				
49.0	1178.0	1204.7	0.0	0.0				
49.5	1172.3	1204.7	0.0	0.0				
50.0	1166.7	1204.6	0.0	0.0				
55.0	1114.9	1204.5	0.0	0.0				
60.0	1068.6	1204.3	0.0	0.0				
65.0	1024.5	1204.1	0.0	0.0				
70.0	987.5	1203.9	0.0	0.0				
75.0	956.9	1203.7	0.0	0.0				
80.0	931.4	1203.5	0.0	0.0				
85.0	909.9	1203.3	0.0	0.0				
90.0	891.5	1203.2	0.0	0.0				
95.0	875.9	1203.1	0.0	0.0				
100.0	862.4	1202.9	0.0	0.0				

	DCD Case (Table 6.2.1-26)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
105.0	850.6	1202.8	0.0	0.0				
110.0	840.1	1202.7	0.0	0.0				
115.0	830.8	1202.6	0.0	0.0				
120.0	822.2	1202.5	0.0	0.0				
125.0	814.4	1202.4	0.0	0.0				
130.0	807.1	1202.3	0.0	0.0				
135.0	800.2	1202.2	0.0	0.0				
140.0	793.6	1202.2	0.0	0.0				
145.0	787.3	1202.1	0.0	0.0				
150.0	781.2	1202.0	0.0	0.0				
155.0	775.3	1201.9	0.0	0.0				
160.0	769.5	1201.8	0.0	0.0				
165.0	763.7	1201.8	0.0	0.0				
170.0	758.1	1201.7	0.0	0.0				
175.0	752.5	1201.6	0.0	0.0				
180.0	747.0	1201.5	0.0	0.0				
185.0	741.5	1201.4	0.0	0.0				
190.0	736.1	1201.4	0.0	0.0				
195.0	730.6	1201.3	0.0	0.0				
200.0	725.2	1201.2	0.0	0.0				
205.0	719.9	1201.1	0.0	0.0				
210.0	714.5	1201.0	0.0	0.0				
215.0	709.1	1201.0	0.0	0.0				
220.0	703.8	1200.9	0.0	0.0				
225.0	698.5	1200.8	0.0	0.0				
230.0	693.2	1200.7	0.0	0.0				
235.0	687.9	1200.6	0.0	0.0				
240.0	682.6	1200.5	0.0	0.0				
245.0	677.3	1200.4	0.0	0.0				
250.0	672.1	1200.3	0.0	0.0				
255.0	666.8	1200.2	0.0	0.0				
260.0	661.6	1200.1	0.0	0.0				
265.0	656.4	1200.0	0.0	0.0				
270.0	651.2	1199.9	0.0	0.0				
275.0	646.0	1199.8	0.0	0.0				
280.0	640.9	1199.7	0.0	0.0				
285.0	635.7	1199.6	0.0	0.0				
290.0	630.6	1199.5	0.0	0.0				

	DCD Case (Table 6.2.1-26)					Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)			Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)		Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
295.0	625.5	1199.4	0.0	0.0					
300.0	620.4	1199.3	0.0	0.0					
305.0	615.3	1199.2	0.0	0.0					
310.0	610.3	1199.1	0.0	0.0					
315.0	605.2	1199.0	0.0	0.0					
320.0	600.2	1198.9	0.0	0.0					
325.0	595.3	1198.8	0.0	0.0					
330.0	590.3	1198.7	0.0	0.0					
335.0	585.4	1198.5	0.0	0.0					
340.0	580.5	1198.4	0.0	0.0					
345.0	575.6	1198.3	0.0	0.0					
350.0	570.7	1198.2	0.0	0.0					
355.0	565.9	1198.1	0.0	0.0					
360.0	561.1	1198.0	0.0	0.0					
365.0	556.3	1197.8	0.0	0.0					
370.0	551.6	1197.7	0.0	0.0					
375.0	546.9	1197.6	0.0	0.0					
380.0	542.2	1197.5	0.0	0.0					
385.0	537.6	1197.3	0.0	0.0					
390.0	533.0	1197.2	0.0	0.0					
395.0	528.4	1197.1	0.0	0.0					
400.0	468.9	1195.3	0.0	0.0					
405.0	292.0	1187.1	0.0	0.0					
410.0	163.3	1175.9	0.0	0.0					
415.0	0.0	0.0	0.0	0.0					
420.0	0.0	0.0	0.0	0.0					
460.0	0.0	0.0	0.0	0.0					
500.0	0.0	0.0	0.0	0.0					

Table 5-2 Comparison of the Steam Line Break Mass and Energy Release Data
Highest Containment Temperature (Case 1)

	DCD Case (Table 6.2.1-27)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
0.0	0.0	0.0	0.0	0.0				
0.1	2736.0	1194.9	17704.9	1197.6				
0.2	2727.0	1195.0	17674.9	1197.7				
0.3	2718.2	1195.1	17645.4	1197.7				
0.4	2709.6	1195.2	17616.5	1197.8				
0.5	2701.1	1195.3	17588.1	1197.8				
0.6	2692.8	1195.4	17560.3	1197.9				
0.7	2684.5	1195.4	17533.0	1197.9				
0.8	2676.5	1195.5	17506.2	1198.0				
0.9	2668.5	1195.6	17479.9	1198.0				
1.0	2660.7	1195.7	17454.0	1198.1				
1.2	2645.4	1195.9	17403.5	1198.2				
1.4	2630.6	1196.0	17354.8	1198.3				
1.6	2616.2	1196.2	17307.6	1198.4				
1.8	2602.2	1196.3	17261.8	1198.4				
2.0	2588.6	1196.5	17217.5	1198.5				
2.2	2575.4	1196.6	17174.4	1198.6				
2.4	2562.6	1196.8	17132.6	1198.7				
2.6	2550.1	1196.9	17092.0	1198.7				
2.8	2537.9	1197.0	17052.5	1198.8				
3.0	2526.0	1197.2	17014.1	1198.8				
3.2	2514.5	1197.3	16976.8	1198.9				
3.4	2503.2	1197.4	16940.4	1199.0				
3.6	2492.3	1197.5	16905.0	1199.0				
3.8	2481.6	1197.6	16870.5	1199.1				
4.0	2471.2	1197.7	16836.9	1199.1				
4.2	2461.1	1197.8	7304.1	1198.1				
4.4	2451.2	1197.9	7272.2	1198.2				
4.6	2441.5	1198.0	7241.2	1198.3				
4.8	2432.1	1198.1	7210.9	1198.4				
5.0	2423.0	1198.2	7181.3	1198.5				
5.2	2414.0	1198.3	7152.5	1198.6				
5.4	2405.3	1198.4	7124.5	1198.7				
5.6	2396.8	1198.5	7097.1	1198.8				
5.8	2388.5	1198.6	7070.4	1198.9				

	DCD Case (Table 6.2.1-27)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
6.0	2380.4	1198.6	7044.3	1199.0				
6.2	2372.5	1198.7	7018.9	1199.0				
6.4	2364.8	1198.8	6994.2	1199.1				
6.6	2357.3	1198.9	6970.0	1199.2				
6.8	2349.9	1198.9	6946.4	1199.3				
7.0	2342.7	1199.0	6923.4	1199.3				
7.2	2335.7	1199.1	6901.0	1199.4				
7.4	2328.9	1199.1	6879.1	1199.5				
7.6	2322.2	1199.2	6857.7	1199.5				
7.8	2315.6	1199.3	6836.9	1199.6				
8.0	2309.2	1199.3	6816.5	1199.7				
8.2	2303.0	1199.4	6796.7	1199.7				
8.4	2296.9	1199.4	6777.2	1199.8				
8.6	2290.9	1199.5	6758.3	1199.8				
8.8	2285.0	1199.5	6739.7	1199.9				
9.0	2279.3	1199.6	6721.5	1199.9				
9.2	2273.6	1199.6	6703.7	1200.0				
9.4	2268.1	1199.7	6686.2	1200.0				
9.6	2262.6	1199.7	6668.9	1200.1				
9.8	2257.3	1199.8	6651.9	1200.1				
10.0	2252.0	1199.8	6635.1	1200.2				
10.2	2246.8	1199.9	6618.5	1200.2				
10.4	2241.6	1199.9	6602.0	1200.3				
10.6	2236.5	1200.0	6585.5	1200.3				
10.8	2231.4	1200.0	6569.0	1200.4				
11.0	2226.3	1200.1	6552.4	1200.4				
11.5	2218.0	1200.1	0.0	0.0				
12.0	2209.2	1200.2	0.0	0.0				
12.5	2199.7	1200.3	0.0	0.0				
13.0	2189.2	1200.4	0.0	0.0				
13.5	2177.7	1200.5	0.0	0.0				
14.0	2165.1	1200.6	0.0	0.0				
14.5	2151.4	1200.7	0.0	0.0				
15.0	2136.6	1200.8	0.0	0.0				
15.5	2120.9	1201.0	0.0	0.0				
16.0	2104.3	1201.1	0.0	0.0				
16.5	2086.9	1201.2	0.0	0.0				
17.0	2068.8	1201.4	0.0	0.0				

	DCD Case (Table 6.2.1-27)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
17.5	2050.1	1201.5	0.0	0.0				
18.0	2030.9	1201.7	0.0	0.0				
18.5	2011.4	1201.8	0.0	0.0				
19.0	1991.6	1202.0	0.0	0.0				
19.5	1971.6	1202.1	0.0	0.0				
20.0	1951.6	1202.2	0.0	0.0				
20.5	1931.6	1202.4	0.0	0.0				
21.0	1911.7	1202.5	0.0	0.0				
21.5	1891.9	1202.6	0.0	0.0				
22.0	1872.4	1202.8	0.0	0.0				
22.5	1853.2	1202.9	0.0	0.0				
23.0	1834.2	1203.0	0.0	0.0				
23.5	1815.7	1203.1	0.0	0.0				
24.0	1797.5	1203.2	0.0	0.0				
24.5	1779.8	1203.3	0.0	0.0				
25.0	1762.4	1203.4	0.0	0.0				
25.5	1745.5	1203.5	0.0	0.0				
26.0	1729.0	1203.6	0.0	0.0				
26.5	1712.9	1203.7	0.0	0.0				
27.0	1697.2	1203.8	0.0	0.0				
27.5	1681.5	1203.8	0.0	0.0				
28.0	1666.6	1203.9	0.0	0.0				
28.5	1652.1	1204.0	0.0	0.0				
29.0	1638.0	1204.0	0.0	0.0				
29.5	1624.3	1204.1	0.0	0.0				
30.0	1610.9	1204.1	0.0	0.0				
30.5	1597.9	1204.2	0.0	0.0				
31.0	1585.2	1204.2	0.0	0.0				
31.5	1572.8	1204.3	0.0	0.0				
32.0	1560.8	1204.3	0.0	0.0				
32.5	1549.1	1204.4	0.0	0.0				
33.0	1537.7	1204.4	0.0	0.0				
33.5	1526.6	1204.4	0.0	0.0				
34.0	1515.8	1204.5	0.0	0.0				
34.5	1505.3	1204.5	0.0	0.0				
35.0	1495.1	1204.5	0.0	0.0				
35.5	1485.2	1204.5	0.0	0.0				
36.0	1475.6	1204.6	0.0	0.0				

	DCD Case (Table 6.2.1-27)				Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)		Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
36.5	1466.3	1204.6	0.0	0.0				
37.0	1457.2	1204.6	0.0	0.0				
37.5	1448.4	1204.6	0.0	0.0				
38.0	1439.9	1204.6	0.0	0.0				
38.5	1431.6	1204.7	0.0	0.0				
39.0	1423.6	1204.7	0.0	0.0				
39.5	1415.8	1204.7	0.0	0.0				
40.0	1408.3	1204.7	0.0	0.0				
40.5	1401.0	1204.7	0.0	0.0				
41.0	1393.9	1204.7	0.0	0.0				
41.5	1387.1	1204.7	0.0	0.0				
42.0	1380.4	1204.7	0.0	0.0				
42.5	1374.0	1204.7	0.0	0.0				
43.0	1367.8	1204.7	0.0	0.0				
43.5	1361.8	1204.8	0.0	0.0				
44.0	1355.9	1204.8	0.0	0.0				
44.5	1350.3	1204.8	0.0	0.0				
45.0	1344.9	1204.8	0.0	0.0				
45.5	1339.6	1204.8	0.0	0.0				
46.0	1334.5	1204.8	0.0	0.0				
46.5	1329.6	1204.8	0.0	0.0				
47.0	1324.9	1204.8	0.0	0.0				
47.5	1320.4	1204.8	0.0	0.0				
48.0	1316.0	1204.8	0.0	0.0				
48.5	1311.7	1204.8	0.0	0.0				
49.0	1307.7	1204.8	0.0	0.0				
49.5	1303.7	1204.8	0.0	0.0				
50.0	1299.9	1204.8	0.0	0.0				
55.0	1270.6	1204.8	0.0	0.0				
60.0	1249.9	1204.8	0.0	0.0				
65.0	1235.1	1204.8	0.0	0.0				
70.0	1224.0	1204.7	0.0	0.0				
75.0	1215.2	1204.7	0.0	0.0				
80.0	1208.5	1204.7	0.0	0.0				
85.0	1203.4	1204.7	0.0	0.0				
90.0	1199.2	1204.7	0.0	0.0				
95.0	1195.8	1204.7	0.0	0.0				
100.0	1193.0	1204.7	0.0	0.0				

	DCD Case (Table 6.2.1-27)					Sensitivity Case			
	Break Flow (upstream of break)		Break Flow (downstream of break)			Break Flow (upstream of break)		Break Flow (downstream of break)	
Time (sec)	Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)		Mass (lbm/sec)	Enthalpy (BTU/lbm)	Mass (lbm/sec)	Enthalpy (BTU/lbm)
105.0	1190.5	1204.7	0.0	0.0					
110.0	1188.3	1204.7	0.0	0.0					
115.0	1186.4	1204.7	0.0	0.0					
120.0	1184.7	1204.7	0.0	0.0					
125.0	1183.1	1204.7	0.0	0.0					
130.0	1181.7	1204.7	0.0	0.0					
135.0	1180.4	1204.7	0.0	0.0					
140.0	1179.2	1204.7	0.0	0.0					
145.0	1178.2	1204.7	0.0	0.0					
150.0	1177.2	1204.7	0.0	0.0					
155.0	1176.4	1204.7	0.0	0.0					
160.0	1175.6	1204.7	0.0	0.0					
165.0	1174.9	1204.7	0.0	0.0					
170.0	1174.3	1204.7	0.0	0.0					
175.0	1173.8	1204.7	0.0	0.0					
180.0	1165.6	1204.7	0.0	0.0					
185.0	1080.9	1204.4	0.0	0.0					
190.0	928.4	1203.5	0.0	0.0					
195.0	455.8	1194.8	0.0	0.0					
200.0	236.4	1183.1	0.0	0.0					
205.0	0.0	0.0	0.0	0.0					
210.0	0.0	0.0	0.0	0.0					
215.0	0.0	0.0	0.0	0.0					
220.0	0.0	0.0	0.0	0.0					
225.0	0.0	0.0	0.0	0.0					
230.0	0.0	0.0	0.0	0.0					
235.0	0.0	0.0	0.0	0.0					
240.0	0.0	0.0	0.0	0.0					
245.0	0.0	0.0	0.0	0.0					
250.0	0.0	0.0	0.0	0.0					
300.0	0.0	0.0	0.0	0.0					
350.0	0.0	0.0	0.0	0.0					
400.0	0.0	0.0	0.0	0.0					
450.0	0.0	0.0	0.0	0.0					
500.0	0.0	0.0	0.0	0.0					

Table 5-3 Time Sequence of Events for the SLB M&E Case 5 - Highest Containment Pressure

Event Description	DCD* Time (sec)	Sensitivity Time (sec)
Steam Pipe Rupture occurs	0.0	
Low Steamline Pressure Analysis Limit reached	1.5	
High Containment Pressure setpoint reached	1.9	
High-High Containment Pressure setpoint reached	7.0	
Main steam isolation valves closed	10.0	
Main feedwater isolation complete	10.0	
Peak Temperature occurs	10.0	
Automatic Isolation of EFW to Faulted SG	62.9	
High-3 Containment Pressure setpoint reached	134	
Containment Spray start	253	
Faulted SG Water Mass Depleted	404	
Peak Pressure occurs	404	

*From DCD Table 6.2.1-15

Table 5-4 Time Sequence of Events for the SLB M&E Case 1 - Highest Containment Temperature

Event Description	DCD* Time (sec)	Sensitivity Time (sec)
Steam Pipe Rupture occurs	0.0	
High Containment Pressure setpoint reached	2.1	
Low Steamline Pressure Analysis Limit reached	2.5	
High-High Containment Pressure setpoint reached	8.2	
Main steam isolation valves closed	11.0	
Main feedwater isolation complete	11.0	
Peak Temperature occurs	11.0	
Automatic Isolation of EFW to Faulted SG	68.7	
High-3 Containment Pressure setpoint reached	91.5	
Faulted SG Water Mass Depleted	192	
Peak Pressure occurs	194	
Containment Spray start	210	

*From DCD Table 6.2.1-16

Figure 1-1 Core Reactivity versus Time (Steam System Piping Failure – Case A)

Figure 1-2 Core Heat Flux versus Time (Steam System Piping Failure – Case A)

Figure 1-3 Reactor Power versus Time (Steam System Piping Failure – Case C)
Limiting case for spectrum of breaks at 100% power

Figure 1-4 DNBR versus Time (Steam System Piping Failure – Case C)
Limiting case for spectrum of breaks at 100% power

Figure 2-1 DNBR versus Time (Complete Loss of Flow)

Figure 3-1 Cladding Inside Temperature versus Time (RCP Rotor Seizure)

Figure 4-1 Temperature versus Time (Rod Ejection – HFP BOC)

Figure 4-2 Fuel Enthalpy versus Time (Rod Ejection – HFP BOC)

Figure 4-3 Temperature versus Time (Rod Ejection – HFP EOC)

Figure 4-4 Fuel Enthalpy versus Time (Rod Ejection – HFP EOC)

Figure 4-5 Temperature versus Time (Rod Ejection – HZP BOC)

Figure 4-6 Fuel Enthalpy versus Time (Rod Ejection – HZP BOC)

Figure 4-7 Temperature versus Time (Rod Ejection – HZP EOC)

Figure 4-8 Fuel Enthalpy versus Time (Rod Ejection – HZP EOC)

Figure 5-1 Containment Pressure versus Time (SLB M&E Release – Case 5)

Figure 5-2 Containment Atmospheric Temperature versus Time (SLB M&E Release – Case 5)

Figure 5-3 Containment Pressure versus Time (SLB M&E Release – Case 1)

Figure 5-4 Containment Atmospheric Temperature versus Time (SLB M&E Release – Case 1)