MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

April 21, 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-09183

Subject: MHI's Response to US-APWR DCD RAI No. 126-1558 Revision 0

Reference: 1) "Request for Additional Information No. 126-1558 Revision 0, SRP Section: 06.02.01, Application Section: 6.2.1" dated December16, 2008.
2) Letter MHI Ref: UAP-HF-09022 from Y. Ogata (MHI) to U.S. NRC, "MHI's Response to US-APWR DCD RAI No. 126-1558 Revision 0" dated January 29, 2009
3) Letter MHI Ref: UAP-HF-09102 from Y. Ogata (MHI) to U.S. NRC, "MHI's Response to US-APWR DCD RAI No. 126-1558 Revision 0" dated March 19, 2009

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 126-1558 Revision 0."

Enclosed are the responses to RAIs contained within Reference 1. Of these RAIs, 06.02.01-2 was answered in Reference 2, and 06.02.01-3, 06.02.01-4 and 06.02.01-5 were answered in Reference 3.

As indicated in the enclosed materials, this document contains 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 the document is also being submitted with the information identified as proprietary redacted and replaced by the designation "[ ]".

This letter includes a copy of the proprietary version (Enclosure 2), a copy of the non-proprietary version (Enclosure 3), and the Affidavit of Yoshiki Ogata (Enclosure 1) which identifies the reasons MHI respectfully requests that all materials designated as "Proprietary" in Enclosure 2 be withheld from public 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 the submittals. His contact information is below.

D081
NRO

Sincerely,

Y. Ogata

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

Enclosure:

1 - Affidavit of Yoshiki Ogata

2 - Response to Request for Additional Information No. 126-1558 Revision 0 (proprietary)

3 - Response to Request for Additional Information No. 126-1558 Revision 0 (non-proprietary)

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

Contact Information
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ENCLOSURE 1

Docket No. 52-021
MHI Ref: UAP-HF-09183

MITSUBISHI HEAVY INDUSTRIES, LTD.

AFFIDAVIT

I, Yoshiki Ogata, 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 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.

2. In accordance with my responsibilities, I have reviewed the enclosed document entitled "Response to Request for Additional Information No. 126-1558 Revision 0" dated April 2009, and have determined that portions of the document contain 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 information identified as proprietary in the enclosed document has in the past been, and will continue to be, held in confidence by MHI and its disclosure outside the company is limited to regulatory bodies, customers and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and is always subject to suitable measures to protect it from unauthorized use or disclosure.

4. The basis for holding the referenced information confidential is that it describes the unique design of the safety analysis developed by MHI and 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 the performance of detailed hardware design and software development extending over several years.

5. The referenced information is being furnished to the Nuclear Regulatory Commission ("NRC") in confidence and solely for the purpose of information to the NRC staff.

6. The referenced information is not available in public sources and could not be gathered readily from other publicly available information. Other than through the provisions in paragraph 3 above, MHI knows of no way the information could be lawfully acquired by organizations or individuals outside of MHI.

7. Public disclosure of the referenced information would assist competitors of MHI in their design of new nuclear power plants without incurring the costs or risks associated with the design and testing of the subject systems. Therefore, disclosure of the information contained in the referenced document would have the following negative impacts on the

competitive position of MHI in the U.S. nuclear plant market:

A. Loss of competitive advantage due to the costs associated with development of the unique plant design of the safety analysis. Providing public access to such information permits competitors to duplicate or mimic the methodology without incurring the associated costs.

B. Loss of competitive advantage of the US-APWR created by benefits of enhanced plant safety analysis costs.

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 21st day of April, 2009.

Y. Ogata

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

Enclosure 3

UAP-HF-09183
Docket Number 52-021

Response to Request for Additional Information
No. 126-1558 Revision 0

April 2009
(Non-Proprietary)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

4/21/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 126-1558 REVISION 0**
SRP SECTION:	**06.02.01 - CONTAINMENT FUNCTIONAL DESIGN**
APPLICATION SECTION:	**6.2.1**
DATE OF RAI ISSUE:	**12/16/2008**

QUESTION NO. : 06.02.01-6

Provide all of the LOCA and MSLB DBA long term calculations to determine the containment pressure at 24 hours into the accident.

ANSWER:

Calculated results at 24 hours are presented in the following table for both of LOCA and MSLB. For all cases, the containment pressure at 24 hours is less than one-half of the peak containment pressure.

For all of the LOCA calculations presented in this RAI response, the following model modifications were applied:

(1) The employed methodology for the mass and energy release evaluation was revised as shown in the latest topical report MUAP-07012-P and MUAP-07012-NP Revision 2 "LOCA Mass and Energy Release Analysis Code Applicability Report for US-APWR".

(2) Subcooled spillage during reflood is released as continuous liquid flow to conservatively minimize steam condensation in the containment.

In addition, the description for a double-ended hot leg guillotine (DEHLG) break is written in page 6.2-23 of the DCD Revision 1 as follows:

"A double-ended hot leg guillotine (DEHLG) break potentially results in the highest blowdown mass and energy release rates, because it results in the largest heat transfer from the core due to the minimum flow resistance between core outlet and the break location. Although the core flooding rate also would be highest for this break location, the amount of energy released from the steam generator secondary side is minimal because the majority of the fluid which exits the core bypasses the steam generators in venting to the containment. As a result, the reflood mass and energy releases are reduced significantly as compared to either the pump suction or pump discharge cold leg break locations, where the core exit mixture must pass through the steam generators before venting through the break. Therefore the reflood and subsequent post-reflood releases are not typically calculated for a hot leg break for plants similar to the US-APWR. The mass and energy releases for the hot leg break blowdown phase are included in the scope of the containment integrity analysis."

In the reflood and post-reflood phase calculations for the DEHLG break in this RAI response, the following are assumed:

Table 1 Summary of LOCA Transients Evaluated

Break Location	Cold Leg (Pump Suction)	Cold Leg (Pump Suction)	Cold Leg (Pump Suction)	Hot Leg
Break Size and Type	C_D=1.0 Double Ended Guillotine	C_D=0.6 Double Ended Guillotine	3ft^2 Split	C_D=1.0 Double Ended Guillotine
Offsite Power	Lost	Lost	Lost	Lost
Assumption for Out of service*	1 Emergency Generator	1 Emergency Generator	1 Emergency Generator	1 Emergency Generator
Single Failure	1 Emergency Generator	1 Emergency Generator	1 Emergency Generator	1 Emergency Generator
Safety Injection	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard
Peak Pressure, psia (psig)	74.2 (59.5)	73.9 (59.2)	73.9 (59.2)	70.5 (55.8)
Peak Atmospheric Temperature, °F	284	284	284	280
Peak RWSP Water Temperature, °F	249	250	256	233
24 hours Pressure, psia (psig)	25.7 (11.0)	25.7 (11.0)	22.2 (7.5)	26.2 (11.5)
Containment Pressure vs. Time	Figure 2	Figure 3	Figure 4	Figure 5

* Out of service basis for the limiting conditions (maintenance or operation surveillance)

Table 2 Summary of Sensitivity of ECCS Conditions on the Containment Pressure and Temperature

Case	Limiting Case	HHSI Max Safeguards	Accumulator Max Water	Accumulator Max Flow
Break Location	Pump Suction	Pump Suction	Pump Suction	Pump Suction
Break Size and Type	C_D=1.0 Double Ended Guillotine	C_D=1.0 Double Ended Guillotine	C_D=1.0 Double Ended Guillotine	C_D=1.0 Double Ended Guillotine
Offsite Power	Lost	Lost	Lost	Lost
Assumption for Out of service*	1 Emergency Generator	1 Containment Heat Removal System	1 Emergency Generator	1 Emergency Generator
Single Failure	1 Emergency Generator	1 Containment Heat Removal System	1 Emergency Generator	1 Emergency Generator
Safety Injection	2 SIP Operation Minimum Safeguard	4 SIP Operation Maximum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard
Accumulator Water Volume	Minimum	Minimum	Maximum	Minimum
Accumulator Pressure	Minimum	Minimum	Minimum	Maximum
Accumulator Line Resistance	Maximum	Maximum	Maximum	Minimum
Peak Pressure, psia (psig)	74.2 (59.5)	68.8 (54.1)	73.7 (59.0)	74.0 (59.3)
Peak Atmospheric Temperature, °F	284	278	284	284
Peak RWSP Water Temperature, °F	249	249	249	249
24 hours Pressure, psia (psig)	25.7 (11.0)	25.7 (11.0)	25.7 (11.0)	25.8 (11.1)
Containment Pressure vs. Time	Figure 2	Figure 6	Figure 7	Figure 8

* Out of service basis for the limiting conditions (maintenance or operation surveillance)

Table 3 Description and Summary Results For Evaluations of Various Pipe Sizes and Break Locations for Postulated Secondary Steam System Piping Failures (Includes Plant Power Levels) (Sheet 1 of 2)

Case	Case 1	Case 2	Case 3	Case 4	Case 5
Break Type	Double Ended	Double Ended	Double Ended	Double Ended	Double Ended
C_D or Area	1.0	1.0	1.0	1.0	1.0
Power Level	102%	75%	50%	25%	0%
Offsite Power	Available	Available	Available	Available	Available
Assumption for Out of service*	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System
Single Failure*	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System
Safety Injection	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard
Peak Pressure, psia (psig)	62.8 (48.1)	61.4 (46.7)	61.3 (46.6)	61.9 (47.2)	63.4 (48.7)
Peak Atmospheric Temperature, °F	355	349	348	348	347
24 hours Pressure, psia (psig)	15.4 (0.7)	15.4 (0.7)	15.4 (0.7)	15.4 (0.7)	15.4 (0.7)
Containment Pressure vs. Time	Figure 9	Figure 10	Figure 11	Figure 12	Figure 13

* Conditions for the single failure and out of service are described in the previously submitted RAI No. 114-787 Revison 0.

Table 3 Description and Summary Results For Evaluations of Various Pipe Sizes and Break Locations for Postulated Secondary Steam System Piping Failures (Includes Plant Power Levels) (Sheet 2 of 2)

Case	Case 6	Case 7	Case 8	Case 9
Break Type	Split	Split	Double Ended	Double Ended
C_D or Area	1.65 ft^2	1.71 ft^2	1.0	1.0
Power Level	102%	0%	102%	0%
Offsite Power	Available	Available	Lost	Lost
Assumption for Out of service*	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System
Single Failure*	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System	1 Containment Heat Removal System
Safety Injection	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard	2 SIP Operation Minimum Safeguard
Peak Pressure, psia (psig)	61.7 (47.0)	61.8 (47.1)	55.5 (40.8)	53.1 (38.4)
Peak Atmospheric Temperature, °F	328	324	355	347
24 hours Pressure, psia (psig)	15.4 (0.7)	15.4 (0.7)	15.4 (0.7)	15.4 (0.7)
Containment Pressure vs. Time	Figure 14	Figure 15	Figure 16	Figure 17

* Conditions for the single failure and out of service are described in the previously submitted RAI No. 114-787 Revison 0.

Figure 1 Noding Diagram of Simplified Model for DEHLG Break

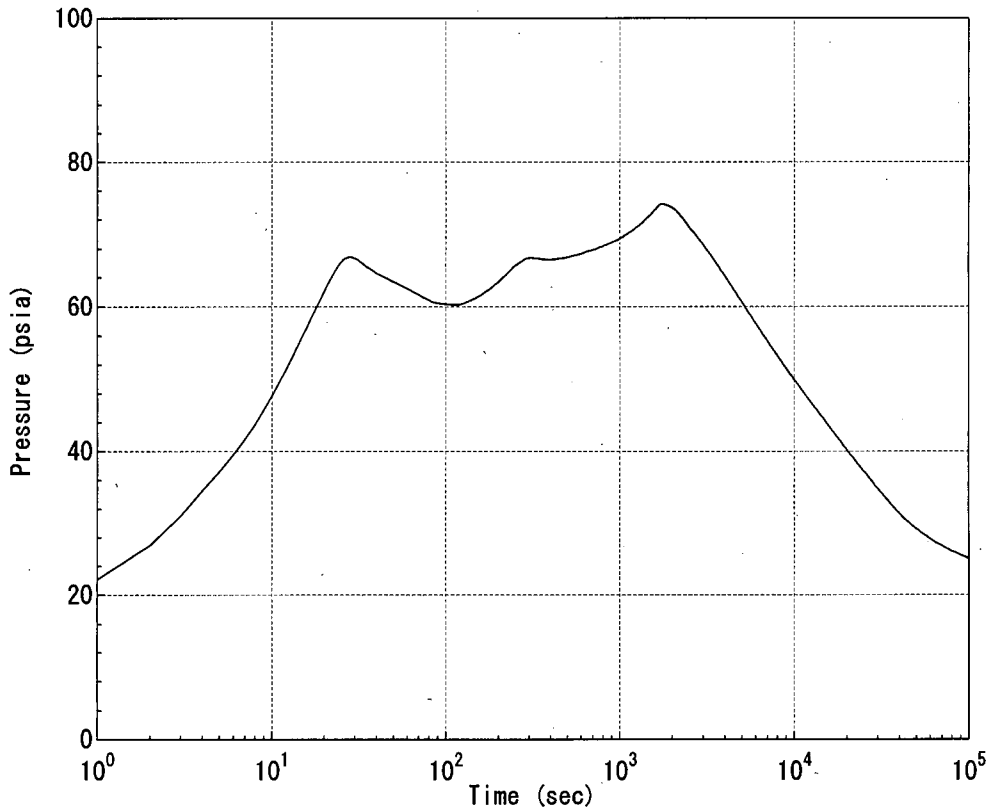

Figure 2 Containment Pressure vs. Time for DEPSG Break (C_D=1.0)

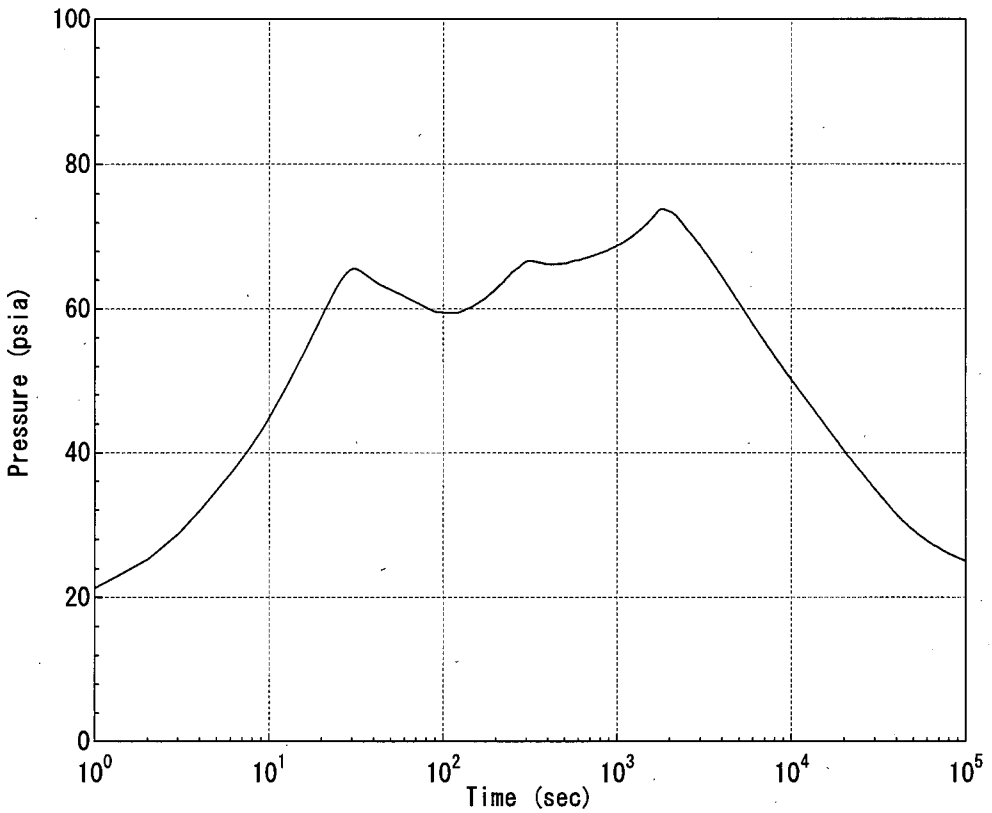

Figure 3 Containment Pressure vs. Time for DEPSG Break (C_D=0.6)

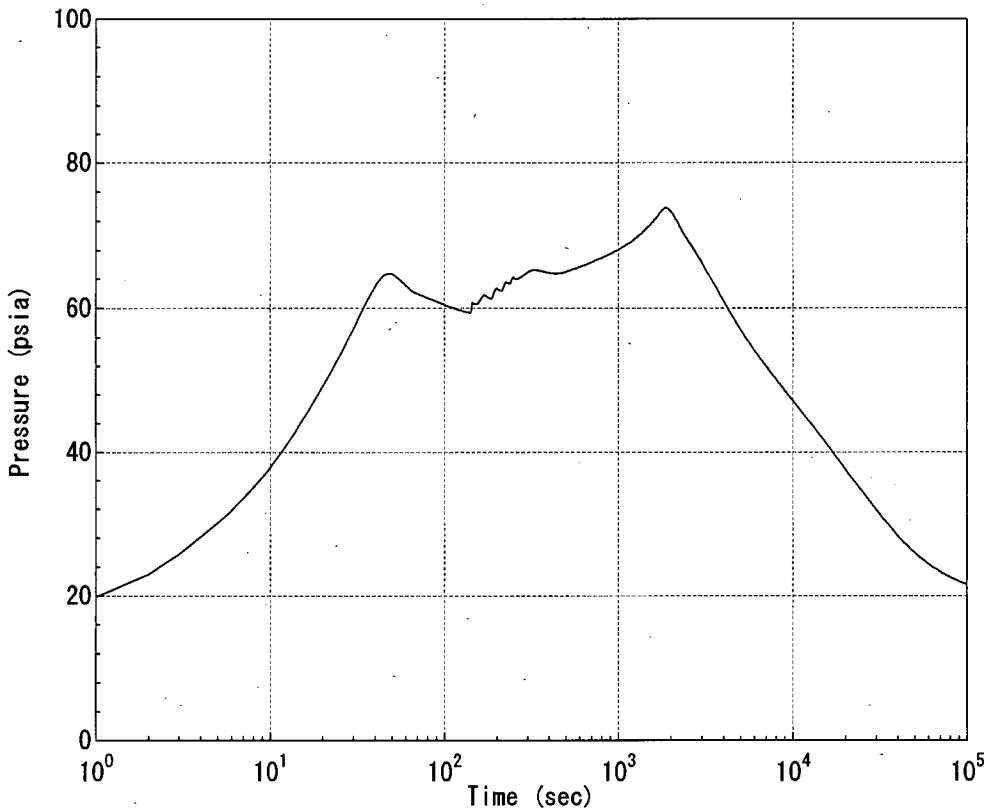

Figure 4 Containment Pressure vs. Time for 3ft^2 Pump Suction Break

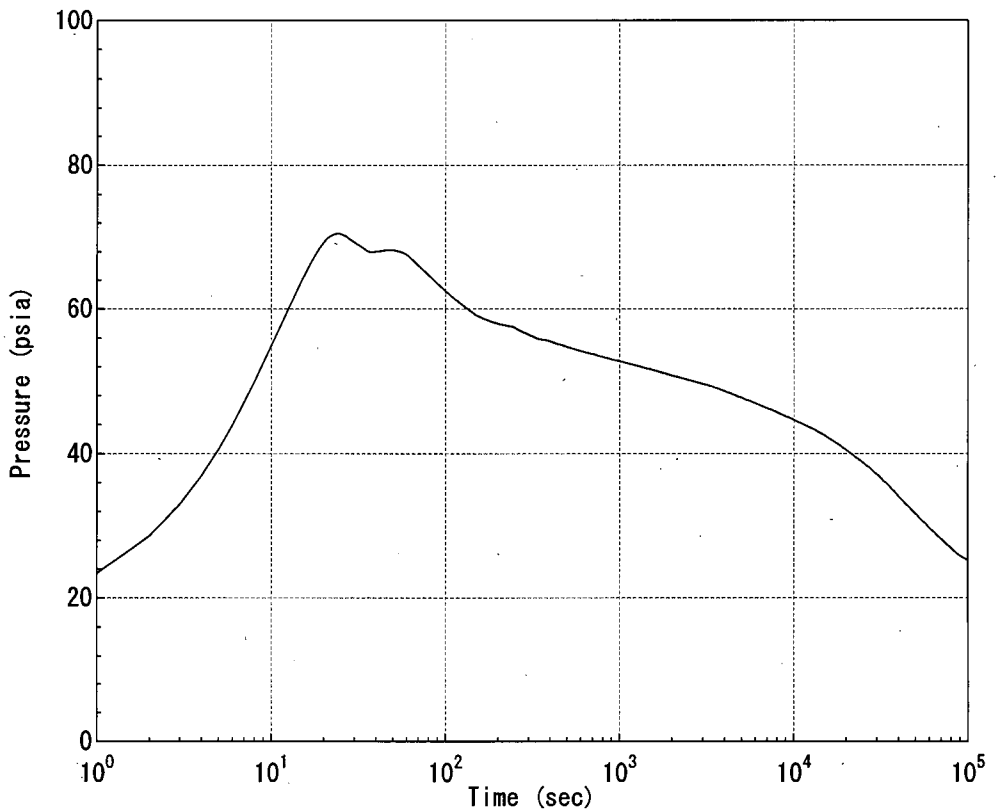

Figure 5 Containment Pressure vs. Time for DEHLG Break (C_D=1.0)

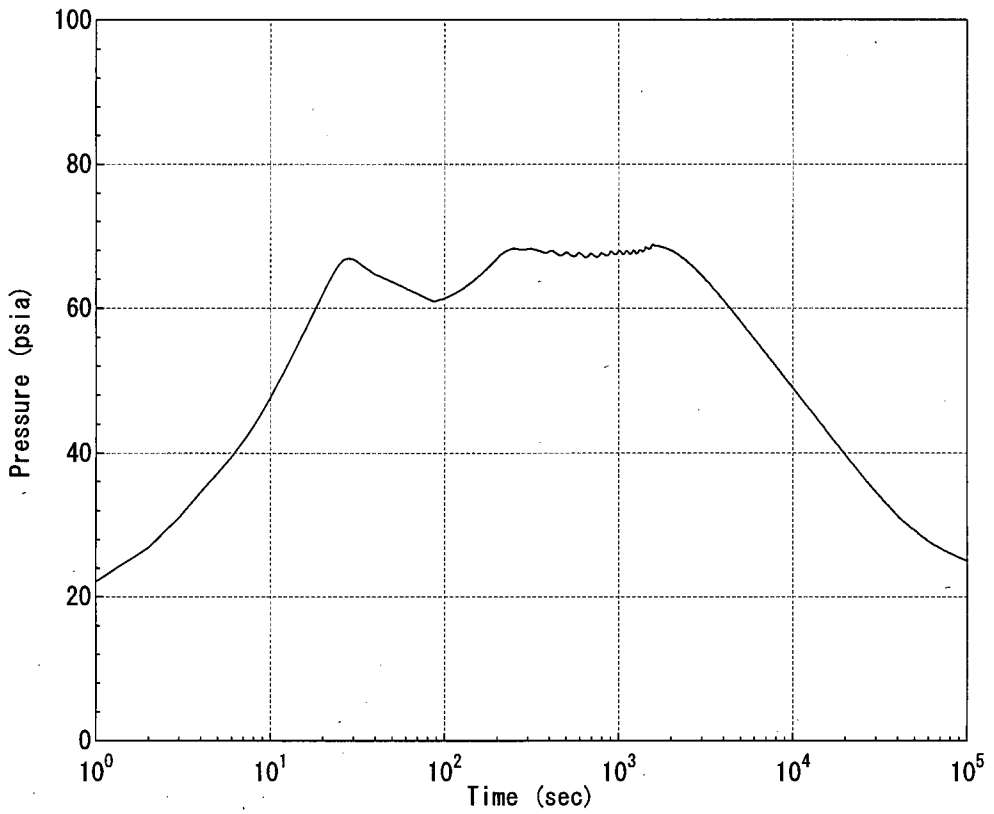

Figure 6 Containment Pressure vs. Time for DEPSG Break with Maximum Safety Injection

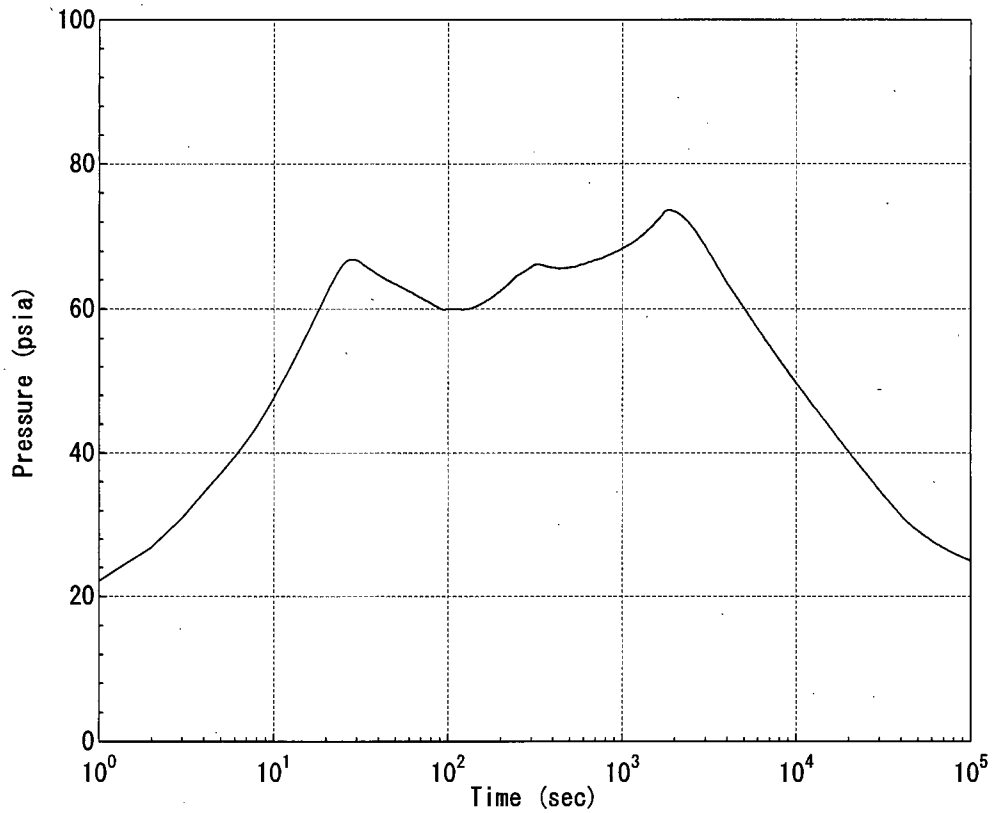

Figure 7 Containment Pressure vs. Time for DEPSG Break with Maximum Accumulator Water

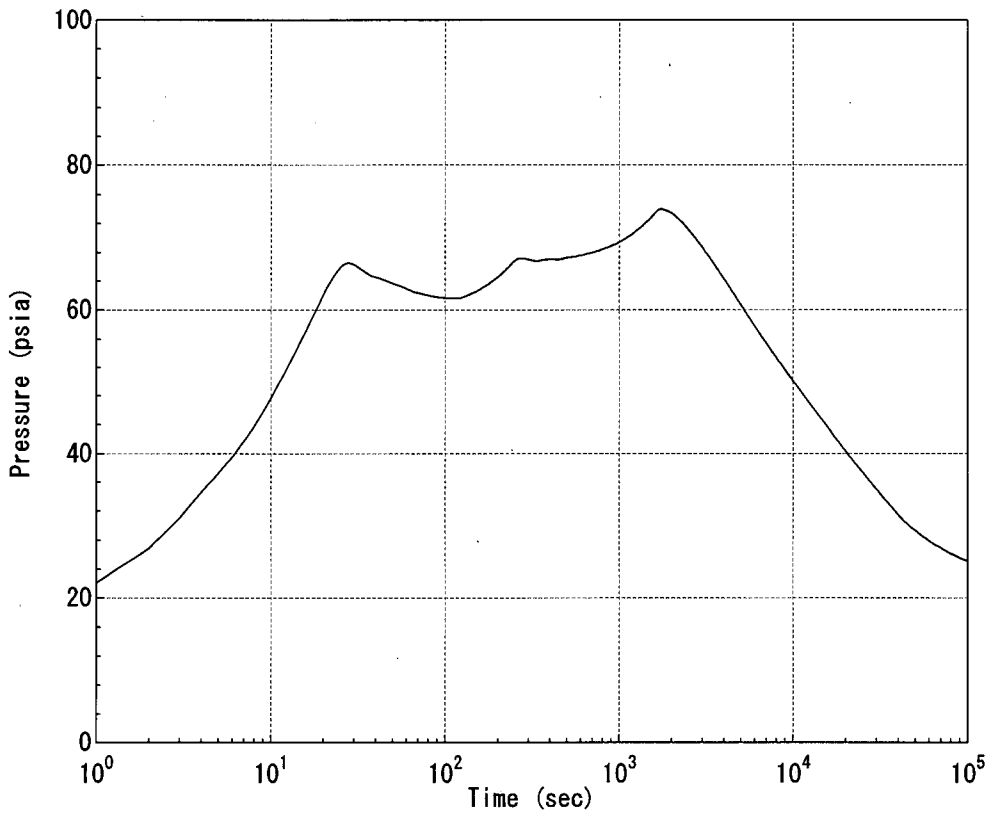

Figure 8 Containment Pressure vs. Time for DEPSG Break with Maximum Accumulator Flowrate

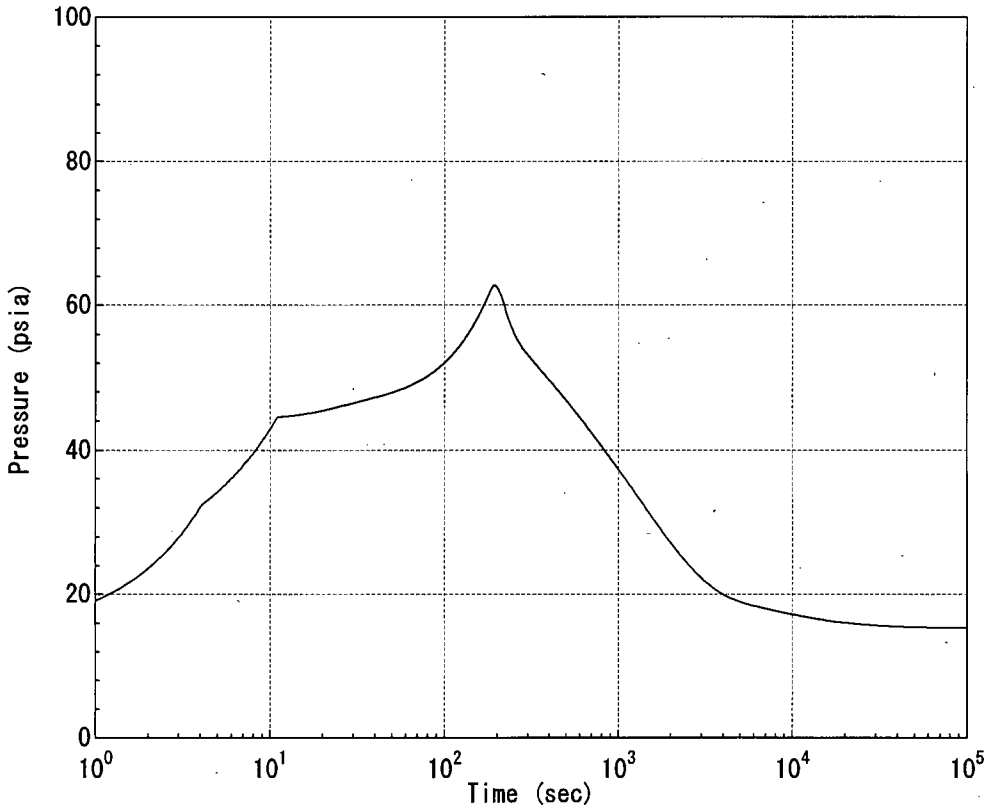

Figure 9 Containment Pressure vs. Time for MSLB Case 1 (Double Ended Break, Reactor Power Level 102%, Offsite Power Available)

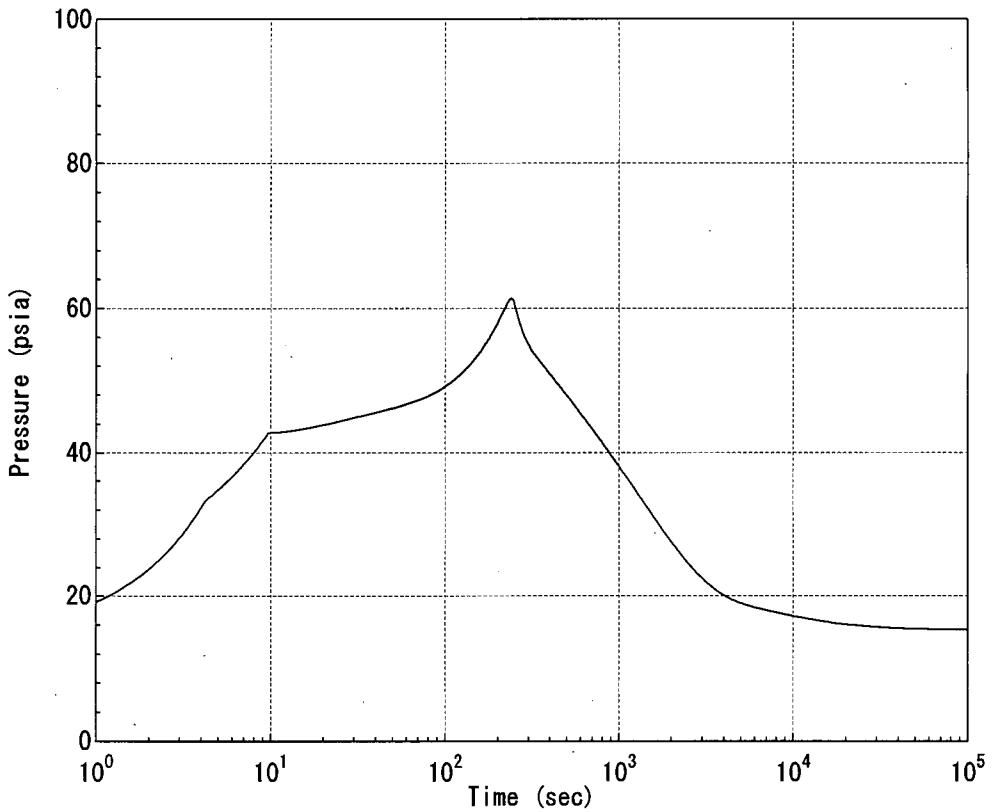

Figure 10 Containment Pressure vs. Time for MSLB Case 2 (Double Ended Break, Reactor Power Level 75%, Offsite Power Available)

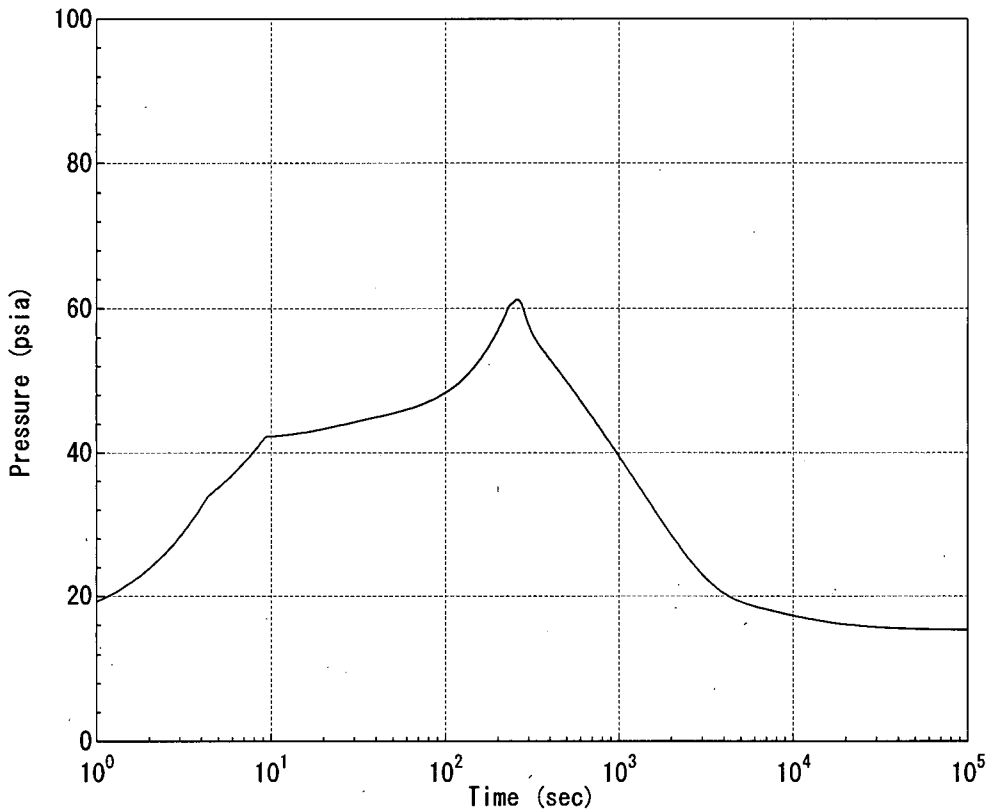

Figure 11 Containment Pressure vs. Time for MSLB Case 3 (Double Ended Break, Reactor Power Level 50%, Offsite Power Available)

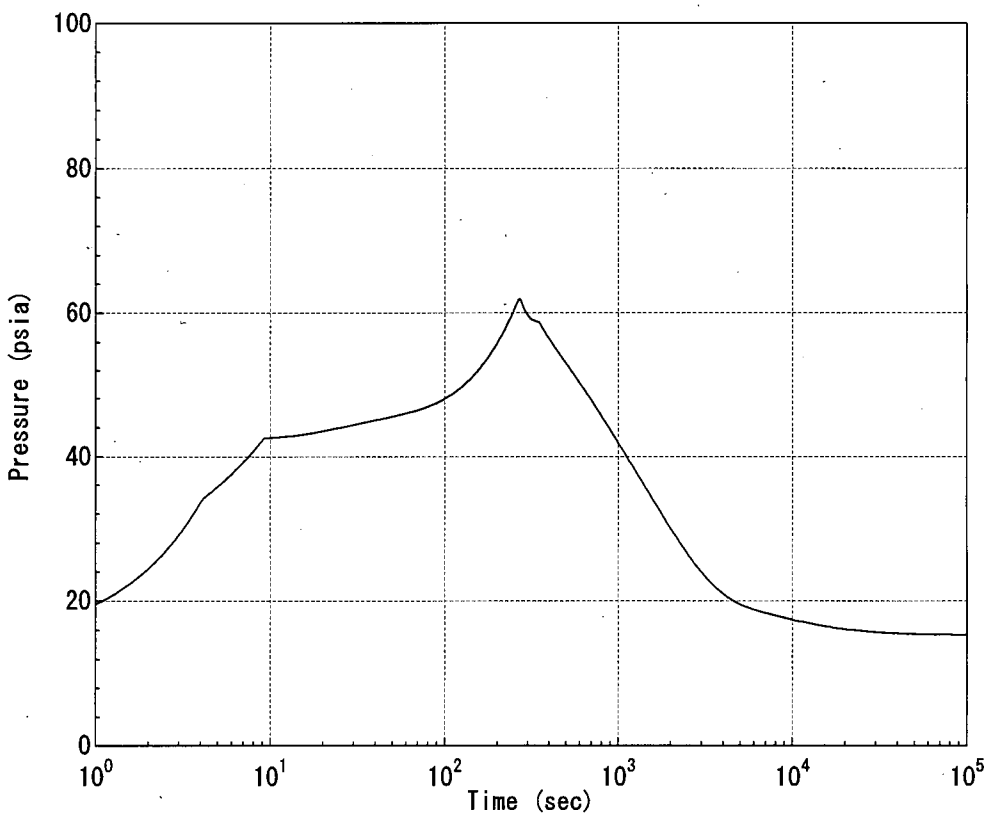

Figure 12 Containment Pressure vs. Time for MSLB Case 4 (Double Ended Break, Reactor Power Level 25%, Offsite Power Available)

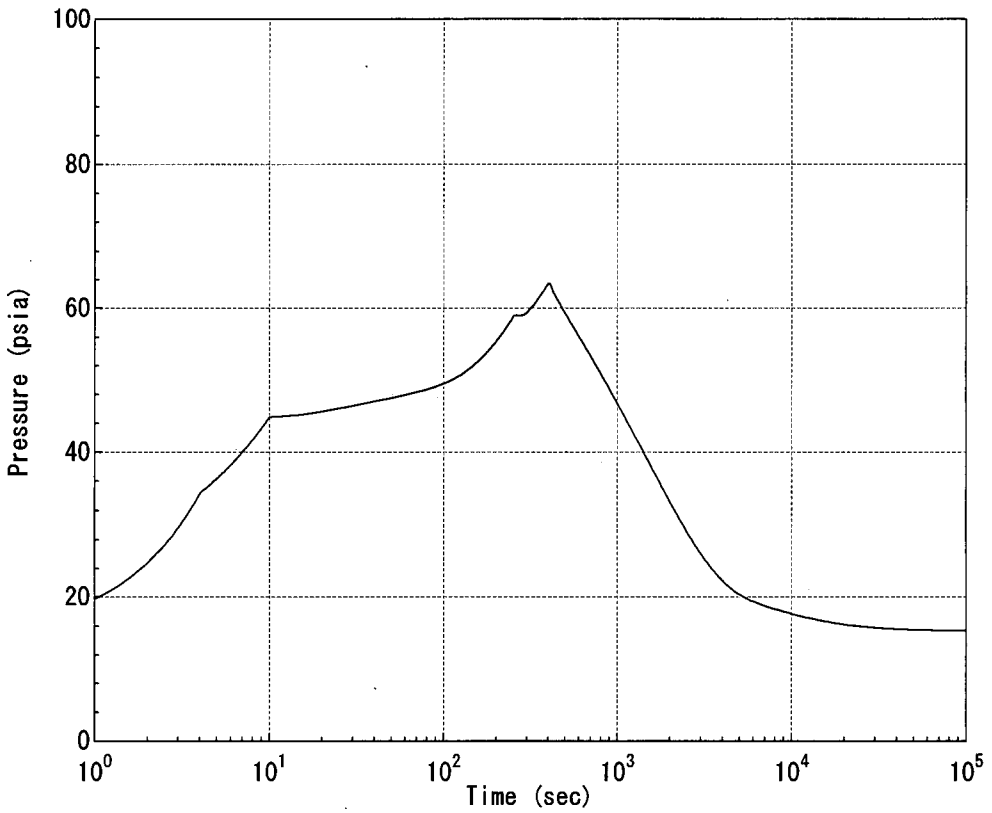

Figure 13 Containment Pressure vs. Time for MSLB Case 5 (Double Ended Break, Reactor Power Level 0%, Offsite Power Available)

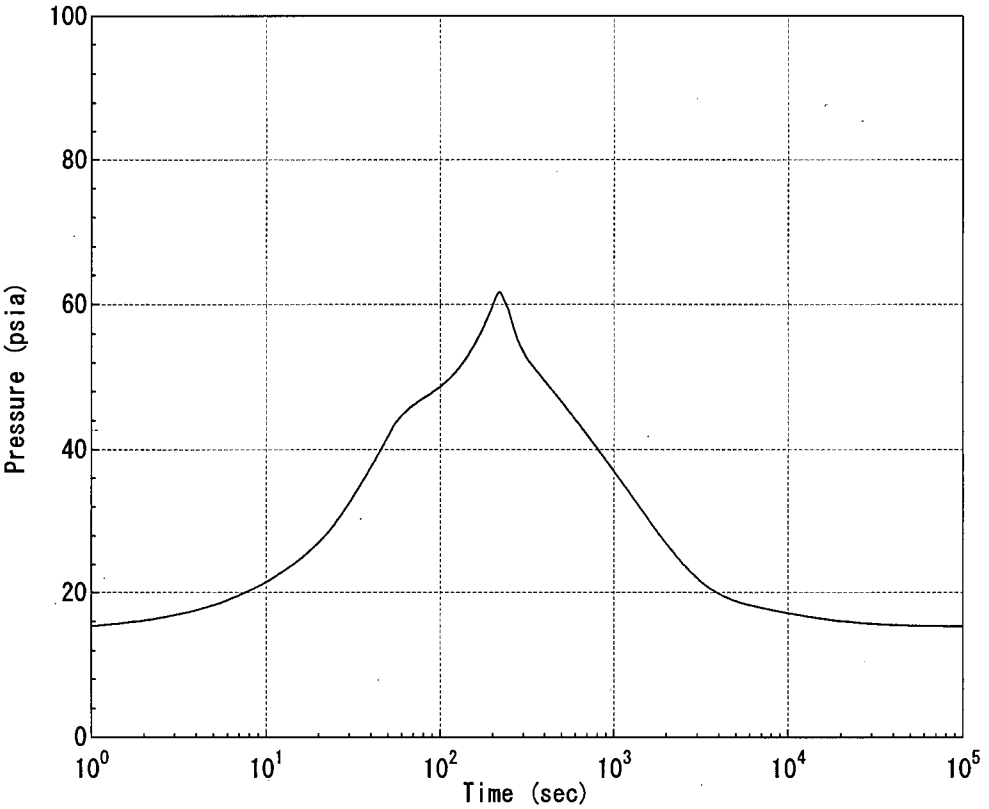

Figure 14 Containment Pressure vs. Time for MSLB Case 6 (1.65ft^2 Split Break, Reactor Power Level 102%, Offsite Power Available)

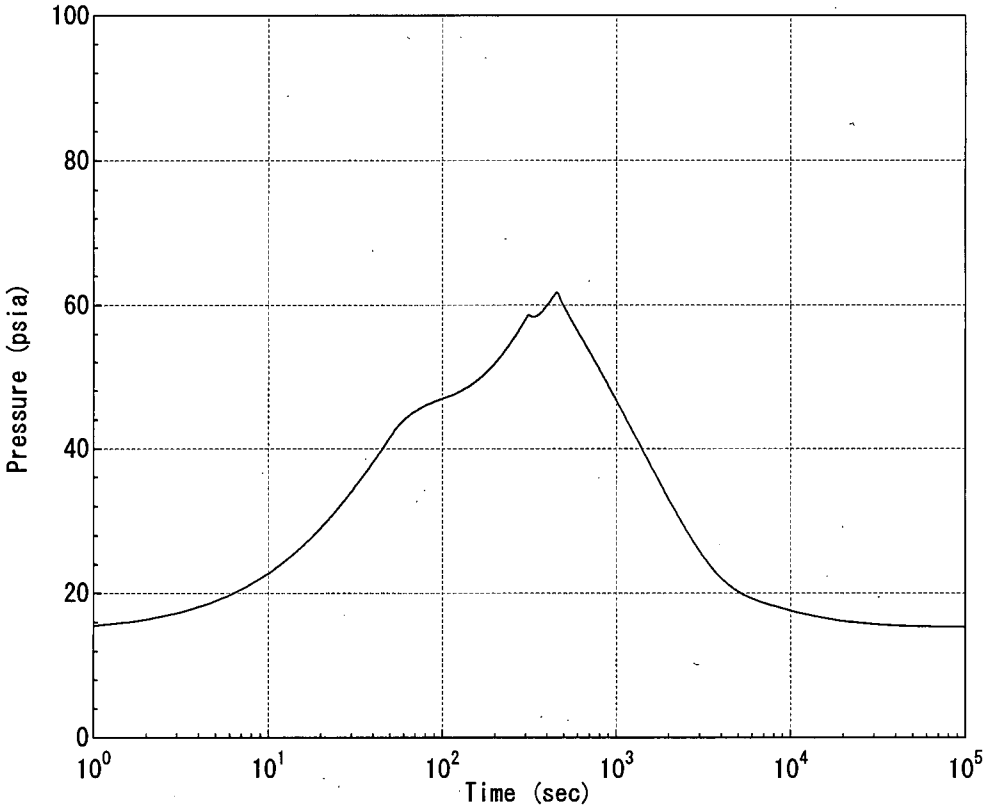

Figure 15 Containment Pressure vs. Time for MSLB Case 7 (1.71ft^2 Split Break, Reactor Power Level 0%, Offsite Power Available)

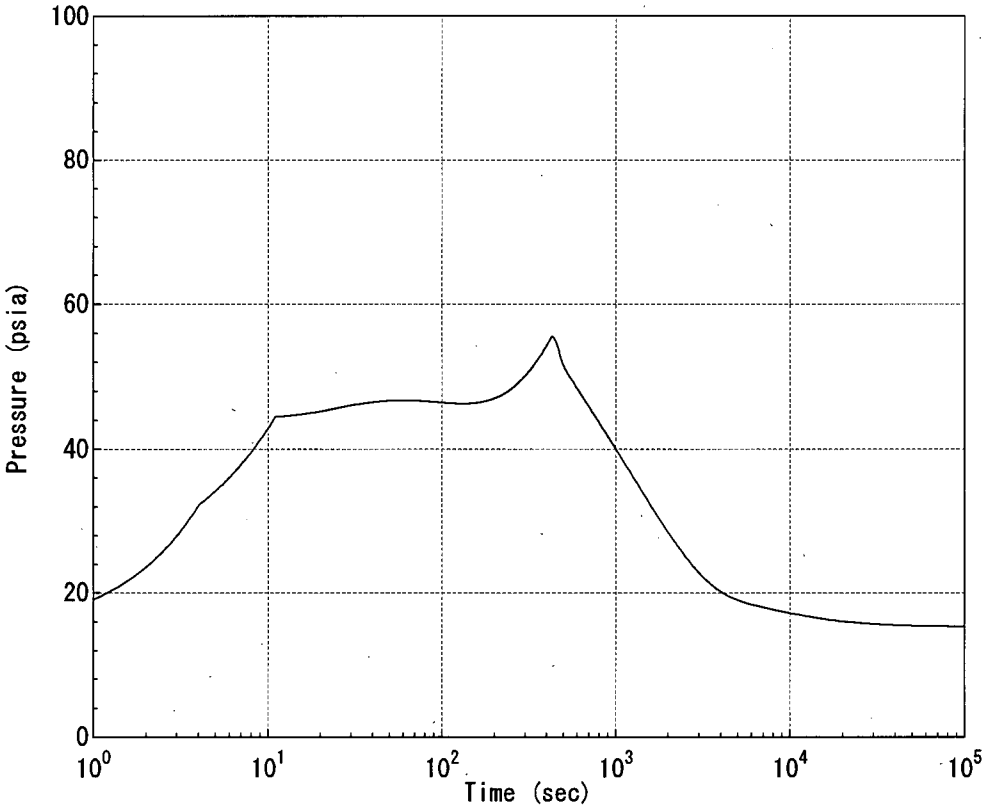

Figure 16 Containment Pressure vs. Time for MSLB Case 8 (Double Ended Break, Reactor Power Level 102%, Loss of Offsite Power)

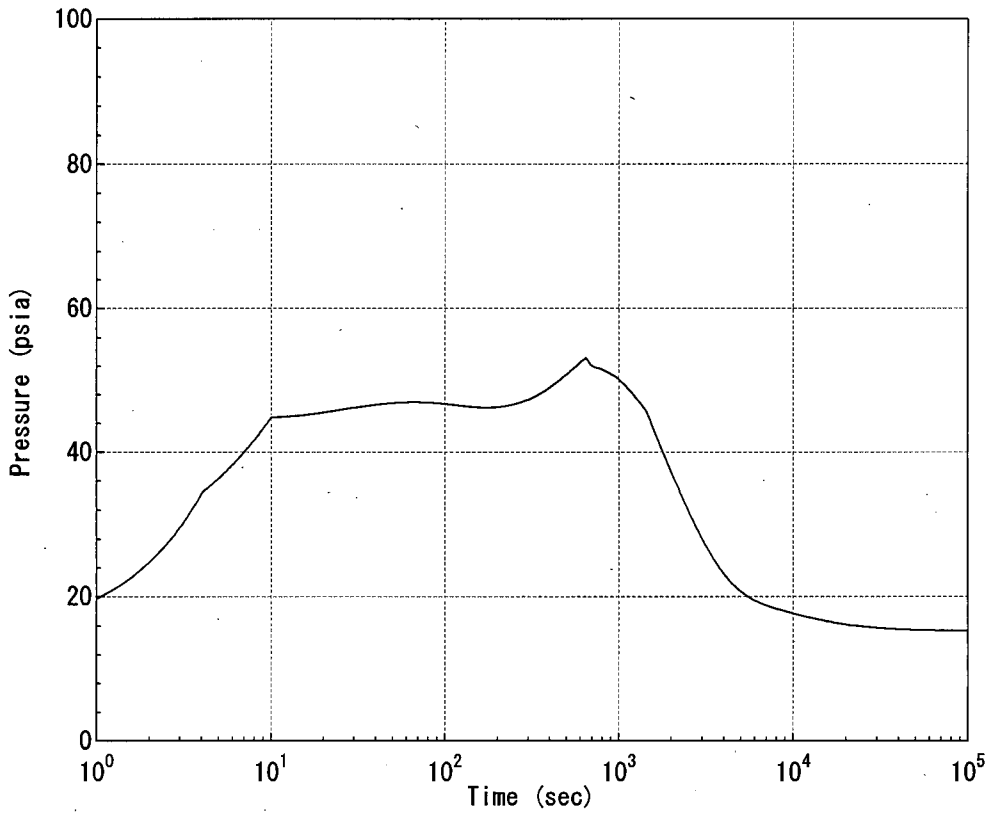

Figure 17 Containment Pressure vs. Time for MSLB Case 9 (Double Ended Break, Reactor Power Level 0%, Loss of Offsite Power)

Impact on DCD

There is no impact on the DCD

Impact on COLA

There is no impact on the COLA

Impact on PRA

There is no impact on the PRA

This completes MHI's responses to the NRC's questions.