MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
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-09467

Subject: MHI's Responses to US-APWR DCD RAI No.451-3588 Revision 0

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION 451-3588 REVISION 0, SRP Section: 06.02.04 – Containment Isolation System Application Section: 6.2.4, QUESTIONS for Containment and Ventilation Branch (AP1000/EPR Projects) (SPCV)" dated September 1, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No.451-3588 Revision 0".

Enclosed are the responses to Questions 06.02.04-51 and 06.02.04-52 that are contained within Reference 1.

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.

Sincerely,

Y. Ogata

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

Enclosure:

1. Responses to Request for Additional Information No.451 Revision 0

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

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NRO

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

Docket No. 52-021
MHI Ref: UAP-HF-09467

Enclosure 1

UAP-HF-09467
Docket No. 52-021

Responses to Request for Additional Information No.451-3588
Revision 0

September 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

9/29/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 451-3588 REVISION 0**
SRP SECTION:	**06.02.04 – CONTAINMENT ISOLATION SYSTEM**
APPLICATION SECTION:	**6.2.4**
DATE OF RAI ISSUE:	**9/1/2009**

QUESTION NO.: 06.02.04-51
RAI 6.2.4-51:

Clarify use of Low Volume Purge System for cooling or heating containment.

The staff requested in RAI 6.2.4-50 that the applicant clarify the use of the Low Volume Purge system for cooling and heating the containment.

In a letter dated June 16, 22, 2009, Mitsubishi responded to RAI 6.2.4-50 that
1) The low volume purge system is not used for containment cooling or heating.
2) TS Bases section 3.6.3 will be revised to remove the description of the LV purge system HVAC function.
3) Tier 2 Table 9.4-1, "Area Design Temperature and Relative Humidity will be revised to remove the tilde (~)" in front of the value for the maximum containment temperature under normal conditions for containment. ("~120°F").
4) DCD Tier 2 Table 14.3-1 will be revised to include the containment air temperature as key design feature with appropriate ITAAC.

The staff has reviewed the response and has identified that the following needs to be addressed by the applicant:

1) In addition to your proposed DCD changes described in RAI-6.2.4-50 response, further clarify Tier 2 table 9.4-1, which still lists the Low volume purge system as a HVAC service system for Containment. The table still seems to communicate the intention of the use of the low volume purge system as a HVAC system for containment during normal operation.
The intent of use of LV purge as a HVAC system during normal operation is not in agreement with Branch Technical Position 6-4 guidance. The revised table should clearly state (via a footnote or other revision) the modes at which the Low Volume purge system is permitted to be used as a containment HVAC service system.

ANSWER:

MHI will revise to clearly state the modes at which the Low Volume Purge System is permitted to be used in DCD Tier 2 Table 9.4-1.

Refer to MHI's response to RAI 449, question 06.05.01-8. MHI will add design information to clarify the containment low volume purge system operation and design criteria.

Impact on DCD

DCD Tier 2 Table 9.4-1 will be revised as follows:

Table 9.4-1 Area Design Temperature and Relative Humidity (Sheet 1 of 4)

Area	Location Note2	Service System Note1		Normal condition				Abnormal Condition Note3			
				Temperature °F		Relative Humidity %		Temperature °F		Relative Humidity %	
		Normal	Abnormal	Min	Max	Min	Max	Min	Max	Min	Max
Containment	PC CV	Containment Fan Cooler System		-	≃120°F	-	-	-	≃ 150°F Note5 ~~(LOOP)~~	-	-
		Containment Purge System(b)	-	65°F Note4 ~~(Refueling)~~	85°F Note4 ~~(Refueling)~~	-	-	-	-	-	-
Main Control Room	RB	Main Control Room HVAC System (a)		73°F	78°F	25%RH	60%RH	73°F	78°F	-	-
Class 1E I&C Room	RB	Class 1E Electrical Room HVAC System (a)		68°F	79°F	-	-	68°F	79°F	-	-
Class 1E Electrical Room	RB			50°F	95°F	-	-	50°F	95°F	-	-
Class 1E UPS Room	RB			50°F	95°F	-	-	50°F	95°F	-	-
Emergency Filtration Unit Room	RB			50°F	105°F	-	-	50°F	130°F	-	-
Remote Shutdown Console Room	RB			73°F	78°F	25%RH	60%RH	73°F	78°F	-	-
Class 1E Battery Room	PSB			65°F	77°F	-	-	65°F	77°F	-	-
Class 1E Battery Charger Room	PSB			50°F	95°F	-	-	50°F	95°F	-	-
MCR/Class 1E Electrical Room HVAC equipment Room	RB			50°F	105°F	-	-	50°F	130°F	-	-
CRDM Panel Room	RB			50°F	95°F	-	-	-	-	-	-
M-G Set and M-G Set Panel Room	RB			50°F	95°F	-	-	-	-	-	-
Leak Rate Testing Room	RB			50°F	95°F	-	-	-	-	-	-
Reactor Trip Breaker Room	RB			50°F	95°F	-	-	-	-	-	-

Table 9.4-1 Area Design Temperature and Relative Humidity (Sheet 2 of 4)

Area	Location Note2	Service System Note1		Normal condition				Abnormal Condition Note3			
				Temperature °F		Relative Humidity %		Temperature °F		Relative Humidity %	
		Normal	Abnormal	Min	Max	Min	Max	Min	Max	Min	Max
Penetration Area	RB	Auxiliary Building HVAC System (b)	Safety Related Component Area HVAC System (a)	50°F	105°F	-	-	50°F	130°F	-	-
Safeguard Component Area (CS / RHR Pump Area, SIP Area, CS / RHR Hx Area)	RB	Auxiliary Building HVAC System (b)	Safeguard Component Area HVAC System (a)	50°F	105°F	-	-	50°F	130°F	-	-
B,C-EFW Pump Area	RB	Auxiliary Building HVAC System (b)	Emergency Feed Water Pump (M/D) Area HVAC System (a)	50°F	105°F	-	-	50°F	105°F	-	-
A,D-EFW Pump Area	RB	Emergency Feed Water Pump (T/D) Area HVAC System (a)		50°F	105°F	-	-	50°F	105°F	-	-
Safety Related Component Area (CCW Pump Area, Essential Chiller Unit Area, Charging Pump Area, Annulus Emergency Exhaust Filtration Unit Area, Penetration Area)	RB/ PSB	Auxiliary Building HVAC System (b)	Safety Related Component Area HVAC System (a)	50°F	105°F	-	-	50°F	130°F	-	-
Gas Turbine Area	PSB	Auxiliary Building HVAC System (b)	N/A (Gas-Turbine unit)	50°F Note6 ~~(off operation)~~	105°F Note6 ~~(off operation)~~	-	-	-	-	-	-
Fuel Handling Area	RB	Auxiliary Building HVAC System (b)	-	50°F	105°F	-	-	-	-	-	-
Sampling/Laboratory Room	ACB	Auxiliary Building HVAC System (b)	-	73°F	78°F	35%RH	50%RH	-	-	-	-
Access Control Area	ACB	Auxiliary Building HVAC System(b)	-	73°F	78°F	35%RH	50%RH	-	-	-	-
General Area (R/B, A/B,PS/B,AC/B)	-	Auxiliary Building HVAC System (b)	-	50°F	105°F	-	-	-	-	-	-

Table 9.4-1 Area Design Temperature and Relative Humidity (Sheet 3 of 4)

Area	Location Note2	Service System Note1		Normal condition				Abnormal Condition Note3			
				Temperature °F		Relative Humidity %		Temperature °F		Relative Humidity %	
		Normal	Abnormal	Min	Max	Min	Max	Min	Max	Min	Max
Main Steam/Feedwater Piping Area	RB	Main Steam / Feedwater Piping Area HVAC System (b)	-	50°F	130°F	-	-	-	-	-	-
Computer Room	AB	Non-Class 1E Electrical Room HVAC System(b)		68°F	79°F	-	-	68°F Note5 ~~(LOOP)~~	79°F Note5 ~~(LOOP)~~	-	-
Non Class 1E I&C Room	AB			68°F	79°F	-	-	68°F Note5 ~~(LOOP)~~	79°F Note5 ~~(LOOP)~~	-	-
Non Class 1E Battery Room	AB			65°F	77°F	-	-	65°F Note5 ~~(LOOP)~~	77°F Note5 ~~(LOOP)~~	-	-
Non Class 1E Electrical Room	AB			50°F	95°F	-	-	50°F Note5 ~~(LOOP)~~	95°F Note5 ~~(LOOP)~~	-	-
Communication System Equipment Room	AB			68°F	79°F	-	-	68°F Note5 ~~(LOOP)~~	79°F Note5 ~~(LOOP)~~	-	-
Radwaste Control Room	AB			68°F	79°F	-	-	68°F Note5 ~~(LOOP)~~	79°F Note5 ~~(LOOP)~~	-	-
Technical Support Center	AB	Technical Support Center HVAC System(b)		73°F	78°F	25%RH	60%RH	73°F Note6 ~~(LOOP)~~	78°F Note6 ~~(LOOP)~~	-	-
General Mechanical Area	TB	Turbine Building Area Ventilation System(General Mechanical Areas Ventilation System) (c)	-	50°F	105°F	-	-	-	-	-	-
General Mechanical Area (Sampling Room)	TB	Turbine Building Area Ventilation System (Sampling Room HVAC system) (c)	-	73°F	78°F	35%RH	50%RH	-	-	-	-
Electrical Equipment Area (including electrical room and non Class 1E Battery Room	TB	Turbine Building Area Ventilation System (Electrical Equipment Areas HVAC system) (c)		65°F	85°F	-	-	65°F Note7 ~~(SBO and LOOP)~~	85°F Note7 ~~(SBO and LOOP)~~	-	-

Table 9.4-1 Area Design Temperature and Relative Humidity (Sheet 4 of 4)

Notes

Note1: Outside air ambient design temperature condition is as follows:

(a) 0% exceedance dry bulb and wet bulb temperature of site ambient temperature condition (See Chapter 2)

(b) 1% exceedance dry bulb and wet bulb temperature of site ambient temperature condition (See Chapter 2)

(c) -5°F (minimum) to 95°F dry bulb / 77°F coincident wet bulb (maximum)

Note2: Location: PCCV, Prestressed concrete containment vessel; RB, Reactor building; AB, Auxiliary building; ACB, Access building; PSB, Power source building; TB, Turbine building.

Note3: Smoke purge mode is not required the temperature and humidity condition.

Note4: The Containment High Volume Purge System maintains proper environmental condition at the design temperature range during refueling condition. The Containment Low Volume Purge System is not mean to be used for containment cooling and heating (See Subsection 9.4.6.2.4.1.).

Note5: During LOOP condition.

Note6: During the gas turbine generator stop condition.

Note7: During LOOP and SBO condition.

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

9/29/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 451-3588 REVISION 0
SRP SECTION:	06.02.04 – CONTAINMENT ISOLATION SYSTEM
APPLICATION SECTION:	6.2.4
DATE OF RAI ISSUE:	9/1/2009

QUESTION NO.: 06.02.04-52

RAI 6.2.4-52:

Clarify test, vent and drain connections on figure 6.2.4-1 such that an evaluation can be made if each connection can be leak rate tested in accordance with RG-1.163.

The staff requested in RAI 6.2.4-31 and RAIs 6.2.6-4,5,7,8 that the applicant clarify Figure 6.2.4-1 and associated Piping and instrumentation Diagrams to show the required test, vent and drain connections needed to perform containment isolation valve local leak rate testing in accordance with RG 1.163.

Subsequently the applicant issued DCD Tracking report Revision 3, which included an updated Figure 6.2.4-1.

The NRC staff has reviewed a small sample of sheets from the revised figure in tracking report and in a phone conversation held on 8/19/2009, discussed the results of the review. The following information is still needed:

1) There is some new notation for the added connections: namely, TC and TV. TC is defined on the Symbols page (sheet 1, page 6.2-276) as a test connection. Is there a difference between T.C and TC, as both are used on the Figure sheets? TV is not defined but in the 8/19 phone call, MHI stated that it is a test vent. Please add this to the notes on Sheet 1 of 51.

2) During the call MHI stated that the line size of the TC and TV connections was ¾" . Please add this to the notes on Sheet 1 of 51.

3) The drain connections are still not clearly identified or discussed. During the 8/19 phone call, MHI stated that system valves, not shown on Figure 6.4.2-1, would be used to drain the piping for normal maintenance and also for leak rate testing. Please add such a statement to Chapter 6, either with Figure 6.4.2-1 or in Section 6.2.6 and clarify that system piping design will allow full draining of fluids from the CIV valve seats.

4) The staff noted that the P&IDs have not yet been updated to show the test, vent and drain (TVD) connections. During the call MHI stated that would take a longer time and would not be part of Rev. 3 to the DCD. When will this be done?

5) The staff noted that one P&ID was checked for a test boundary valve for the leak testing of the inboard CIV (CVS-AOV-005) for penetration 277, sheet 5 of 51, CVCS. MHI stated that there was no one boundary valve and that the large portion of the CVCS system shown on DCD

Figure 9.3.4-1 would be pressurized as part of the Type C leak rate test. It was stated that this would probably be the case for other penetrations as well. This raises questions as to the practicality of this approach:

- Are there problems with pressurizing such a large portion of the system with air, including HX tubes and relief valves?
- Will multiple valves, 5 in this example, be sufficiently leak tight to allow the test of the CIV to be completed effectively?
- Will the program count leakage out of these 5 boundary valves as part of the leakage for valve CVS-AOV-005 and the Type C test total for Tech Spec purposes?

ANSWER:

1) There is no meaning difference between T.C and TC. To avoid confusion, only TC will be used in Figure 6.2.4-1 and notation will be revised. TV will be added to the notes of Figure 6.2.4-1.

2) The line size of TC and TV will be added as a note of Figure 6.2.4-1.

3) Description regarding the drain connections will be added as a note of Figure 6.2.4-1.

4) P&ID will be updated in DCD revision 2.

5) MHI recognizes it is not desirable that a large portion is pressurized for Type C test. Therefore an isolation valve for reducing pressurized volume may be added. This will be determined after piping layout is fixed. If multiple valves are used as boundary for Type C test, these valves are designed to be sufficiently leak tight and the program will count leakage out of these valves as part of the leakage for containment isolation valve.

Impact on DCD

The following notes will be added in Figure 6.2.4-1.

All line size of test connections and vents are 3/4".
Drain connections are omitted in this Figure to simplify the figure, as all systems shown in this Figure are designed to install drain connections to allow fully draining of fluids.

TC test connection
TV test vent

Impact on COLA

There are no impacts on the COLA.

Impact on PRA

There is no impact on the PRA.