**MITSUBISHI HEAVY INDUSTRIES, LTD.**
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TOKYO, JAPAN

November 20, 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-09531

**Subject:** MHI's Response to US-APWR DCD RAI No.475-3780 Revision 1

**References:** 1) "Request for Additional Information No.475-3780 Revision 1, SRP Section: 09.04.01 – Control Room Area Ventilation System, Application Section: DCD Section 9.4.1" dated October 14, 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.475-3780 Revision 1".

Enclosed are the responses to 3 RAIs 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,

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

Enclosure:

1. Response to Request for Additional Information No. 475-3780, Revision 1

CC: J. A. Ciocco
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Docket No. 52-021
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# Enclosure 1

## UAP-HF-09531
## Docket Number 52-021

## Response to Request for Additional Information
## No. 475-3780, Revision 1

November, 2009

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**11/20/2009**

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

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|---|---|
| **RAI NO.:** | **NO. 475-3780 REVISION 1** |
| **SRP SECTION:** | **09.04.01 - CONTROL ROOM AREA VENTILATION SYSTEM** |
| **APPLICATION SECTION:** | **DCD SECTION 9.4.1** |
| **DATE OF RAI ISSUE:** | **10/14/2009** |

**QUESTION NO. : 09.04.01-12**

The staff finds the MHI response to RAI No. 327-2401, Question 09.04.01-8 (UAP-HF-09323, dated June 19, 2009, ML091751095) to be incomplete.

While MHI appears to be agreeing with the staff's position, it has failed to amend the SR 3.7.10.5 TS Bases description (DCD Chapter 16, page B 3.7.10-10) and the associated discussion to clearly indicate how the test will be conducted to ensure that each possible pair of the four 50% redundant trains are capable of removing the heat load assumed in the safety analysis on a 24-month surveillance frequency (e.g., testing of all possible combinations of two fans running, on a STAGGERED TEST BASIS).

The staff requests that the applicant provide justifications for the requirements specified in SR 3.7.10.5 and revise the US-APWR TS (DCD Chapter 16, page 3.7.10-4) and Bases, as appropriate.

**ANSWER**

Testing of the Main Control Room (MCR) HVAC system is performed in accordance with the requirements of Technical Specification Surveillance Requirements as described in DCD Chapter 16. SR 3.7.10.5, as amended by the response to RAI No. 63, Question 09.04.01-28, provides the requirement to verify two MCRATCS trains have the capacity to remove the design heat load on a 24-month surveillance frequency. Each MCRATCS train consists of a MCR HVAC system 50% capacity air handling unit, instrumentation, and controls to provide for control room temperature control.

This surveillance requirement is satisfied by verifying that the heat removal capability of the system is sufficient to remove the heat load assumed for the control room through a combination of testing and calculations as described in SR 3.7.10.5 Bases. This is accomplished through performance testing of the MCR air handling unit and comparing test parameter values to the performance requirements for the system based on the design heat load. Since all potential worst-case conditions that are inputs to the design heat load cannot readily be simulated under

normal operation, calculations are performed to evaluate the performance of the MCR HVAC system based on the test results.

To ensure that the MCR HVAC is capable of removing the required heat load under the required assumption of a single active failure coincident with a loss of offsite power, all potential configurations of two 50% capacity MCR air handling units operation are tested on a staggered test basis. The SR 3.7.10.5 (DCD Chapter 16, page B 3.7.10-4) and SR 3.7.10.5 Bases description (DCD Chapter 16, page B 3.7.10-10) will be revised to clarify the test requirements.

**Impact on DCD**

DCD Chapter 16, Technical Specifications, SR 3.7.10.5, will be revised as follows:

For the FREQUENCY, "24 months" will be changed to "24 months **on a STAGGERED TEST BASIS**".

DCD Chapter 16, Technical Specifications, Bases SR 3.7.10.5, will be revised as follows:

"This SR verifies that the heat removal capability of ~~the system~~ **all potential operating configurations of two trains of 50% capacity MCRATCS air handling units** is sufficient to remove the heat load assumed in the safety analyses in the control room. This SR consists of a combination of testing and calculations.
[The 24 month Frequency is appropriate since significant degradation of the MCRATCS is slow and is not expected over this time period. OR The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.]"

**Impact on COLA**

There are impacts on the COLA to incorporate the DCD changes.

**Impact on PRA**

There is no impact on the PRA

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**11/20/2009**

**US-APWR Design Certification**

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| **RAI NO.:** | **NO. 475-3780 REVISION 1** |
| **SRP SECTION:** | **09.04.01 - CONTROL ROOM AREA VENTILATION SYSTEM** |
| **APPLICATION SECTION:** | **DCD SECTION 9.4.1** |
| **DATE OF RAI ISSUE:** | **10/14/2009** |

**QUESTION NO. : 09.04.01-13**

The following is a follow-up request for additional information based on the applicant's response to Question 09.04.01-3 (MHI RAI # 327-2401; MHI Ref: UAP-HF-09323, dated June 19, 2009, ML091751095).

The staff notes that DCD Table 3.2-2 does not list the MCR HVAC humidifier nor is this humidifier shown on DCD Figure 9.4.1-1. In addition, DCD subsection 9.4.1 and in particular the System Description (subsection 9.4.1.2) does not include any reference or description of the MCR humidifier.

The staff notes that the second sentence of the third paragraph of the applicant's response reads "The minimum relative humidity in the MCR is controlled by the humidifier that is designed as non-safety related and Seismic Category II."

Based on this revelation (i.e. the existence of a MCR humidifier in the US-APWR design), the staff asks the following questions:

(1) What is the basis for designing the MCR humidifier as a non-safety related component?

(2) Will safety-related equipment within the CRE be qualified for all humidity ranges?

The staff requests that the applicant provide comprehensive answers to the above questions and to revise the DCD to reflect the existence of the humidifier in the USAPWR design (e.g. Figure 9.4.1-1, Table 3.2-2, Table 9.4.1-1, subsection 9.4.1.2, etc.).

**ANSWER**

1. As described in DCD Section 9.4.1.1.2, Power Generation Design Basis, the MCR HVAC System is designed to maintain the CRE ambient conditions to assure personnel comfort during normal operations. As part of this design, the MCR HVAC System humidifier is installed in the supply air duct to the MCR to provide humidification of the MCR environment for personnel comfort purposes. However, the failure of the humidifier to operate will not prevent the safe

shutdown of the plant nor is it used to mitigate the consequences of an accident. Therefore, as described in 10 CFR 50.2, the humidifier is not required to be safety related. As indicated the response to RAI # 327-2401 Question 09.04.01-3, the second paragraph of DCD Revision 2 Subsection 9.4.1.2 will be revised as follows:

"Non-safety related electric in-duct heaters **and a humidifier that are designed as Seismic Category II** are located in the duct branches leading to the MCR."

Table 3.2-2 (under Item 36, Sheets 46) "Classification of Mechanical and Fluid Systems, Components, and Equipment" is revised to add the following information on the main control room HVAC system in DCD Revision 2.

| System and Components | Equipment Class | Location | Quality Group | 10 CFR 50 Appendix B (Reference 3.2-8) | Codes and Standards (3) | Seismic Category | Notes |
|---|---|---|---|---|---|---|---|
| Humidifier | 5 | R/B | N/A | N/A | 5 | II | |

Figure 9.4.1-1 "MCR HVAC System Flow Diagram" will be revised to show the humidifier and the associated humidity instrument on DCD Revision 2.

Since the humidifier is located in a duct branch, non safety-related equipment and not risk-significant component, DCD Table 9.4.1-1, Equipment Design Data, will not be required to be revised.

2. Safety related electrical equipment and instrumentation in the MCR are qualified for maximum 95% (non-condensing).

**Impact on DCD**

DCD Subsection 9.4.1.2.1 will be revised to add a bullet that reads as follows:

"The non-safety in-duct humidifier is controlled by a humidity instrument located in the Main Control Room."

**Impact on COLA**

There is no impact on the COLA.

**Impact on PRA**

There is no impact on the PRA.

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**11/20/2009**

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| **APPLICATION SECTION:** | **DCD SECTION 9.4.1** |
| **DATE OF RAI ISSUE:** | **10/14/2009** |

**QUESTION NO. : 09.04.01-14**

The following is the staff's follow-up request based on the applicant's response to Question 09.04.01-6 (MHI RAI # 327-2401; MHI Ref: UAP-HF-09323, dated June 19, 2009, ML091751095).

The staff finds MHI's the RAI response and resolution as fundamentally acceptable. However, the use of the term "analysis" in the ITA in ITAAC Table 2.6.5-1 is too vague and analysis alone is not sufficient.

The staff's requests that the applicant change the ITA for line item 7 of ITAAC Table 2.6.5-1, from "An analysis of the reliability of the as-built AAC power sources will be performed" to read "Through testing and analyses the reliability of the as-built AAC power source will be demonstrated".

**ANSWER**

RG 1.155 requires that the reliability of the AAC power system should meet or exceed 95 percent, as determined in accordance with NSAC-108 or equivalent methodology. NSAC-108 indicates that a survey of the emergency diesel generator (EDG) reliability and the methodology of determinating EDG reliability should be by using the experience data for starts and load-run reliability. Similarly, MHI plans to evaluate gas turbine generator reliability with experience data of starting and load-run of gas turbine generators.

**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