

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

November 5, 2010

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-10302

**Subject: MHI's Response to US-APWR DCD RAI No.642-4770 Revision 2 (SRP 09.04.01)**

**References:** 1) "Request for Additional Information No. 642-4770 Revision 2, SRP Section: 09.04.01 – Control Room Area Ventilation System Application Section: DCD Tier 2 sections 9.4.1" dated October 4, 2010.

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.642-4770 Revision 2".

Enclosed is the response to one RAI 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,

*Atsushi Kumaki for*

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

Enclosure:

1. Response to Request for Additional Information No. 642-4770, Revision 2

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

Contact Information

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*DOB /  
NRO*

Docket No. 52-021  
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Enclosure 1

UAP-HF-10302  
Docket Number 52-021

Response to Request for Additional Information  
No. 642-4770, Revision 2

November, 2010

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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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11/05/2010

**US-APWR Design Certification  
Mitsubishi Heavy Industries  
Docket No. 52-021**

**RAI NO.:** NO.642-4770 REVISION 2  
**SRP SECTION:** 09.04.01 - CONTROL ROOM AREA VENTILATION SYSTEM  
**APPLICATION SECTION:** DCD Sections 9.4.1  
**DATE OF RAI ISSUE:** 10/04/2010

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**QUESTION NO. : 09.04.01-24**

The staff performed an audit of MNES calculations that support the design information contained in DCD section 9.4.1, reference Accession No.: ML101370265. The staff invoked the review requirements of SRP 9.4.1, Section IV.1.C which requires the NRC staff to review calculations in support of its conclusions that the equipment capacities are of adequate design.

During the staff's audit of MNES Calculation N0-EE23101 "US-APWR Standard Design - Main Control Room HVAC System (MCRVS) Calculations" the staff observed that the system configuration used to determine the most limiting design heat load, was not the configuration that yields the highest heat load for the system.

The staff identified this observation to the applicant at the time of discovery and during the audit's exit briefing. The applicant concurred with this observation and agreed to revise MNES Calculation N-EE23101 to derive a new design heat load value for the USAPWR plant. The applicant acknowledged the need to revise DCD Table 9.4.1-1 based on the value obtained from the revised MNES Calculation N-EE23101.

This RAI serves as a tracking tool to ensure these changes occur.

The staff notes that since Calculation N0-EE23101 serves as the bases of safety related parameters and values found in the DCD Section 9.4.1, the staff requests that the applicant include MNES Calculation N0-EE23101 "US-APWR Standard Design – Main Control Room HVAC System (MCRVS) Calculations" as a Reference in DCD subsection 9.4.8.

**References:**

Sections 9.4.1 and 9.4.5 Audit Plan, dated 5/18/2010, ML101370265.  
MHI's Responses to US-APWR DCD RAI No. 64-735; MHI Ref: UAP-HF-08216; dated 10/6/2008; ML082830021.  
MHI's Responses to US-APWR DCD RAI No. 356-2549; MHI Ref: UAP-HF-09386; dated 7/17/2009; ML092030375.

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**ANSWER:**

The Main Control Room HVAC System (MCRVS) operates during normal operating mode, emergency pressurization mode, and emergency isolation mode. The MCRVS is designed to remove the heat loads during all operation modes. The heat load items during each operating mode are as follows:

**Normal operating mode**

- Outdoor air
- Air Handling Unit fan motors
- Room internal load
- Humidification

**Emergency pressurization mode**

- Outdoor air
- Air Handling Unit fan motors
- Emergency Filtration Unit fan motors
- Emergency Filtration Unit electric heating coils
- Room internal load

**Emergency isolation mode**

- Air Handling Unit fan motors
- Room internal load

When the MCRVS operates during emergency pressurization mode, the heat loads of the Emergency Filtration Unit (EFU) fan motors, MCR EFU electric heating coils are added as compared with the heat load during normal operating mode. However, the heat load of outdoor air decreases as compared with the heat load during normal operating mode because outdoor air intake flow rate decreases. Also, the heat load of humidification does not need to be considered because humidifier is not operated during emergency pressurization mode. Therefore, the heat load during normal operating mode bounds the heat load during emergency pressurization mode. For emergency isolation mode, the heat load of the outdoor air does not need to be considered because emergency isolation mode establishes full recirculation by isolating the system from the outdoor air. Also, the heat load of humidification does not need to be considered because humidifier is not operated during emergency isolation mode. Therefore, the heat load during the normal operating mode bounds the heat load during the emergency isolation mode.

As stated above, the MCR Air Handling Unit (AHU) cooling coil capacity is decided based on the heat loads during normal operating mode. Therefore, DCD Revision 2 Table 9.4.1-1 does not need to be revised.

Technical Report "Safety-Related Air Conditioning, Heating, Cooling, and Ventilation Systems Calculations" (MUAP-10020) summarizing the safety-related HVAC system calculations will be submitted to the NRC in place of Calculation N0-EE23101. The detailed heat load calculation information is included in the technical report. The technical report will be included as a reference in DCD subsection 9.4.8.

**Impact on DCD**

DCD Subsection 9.4.8 will be revised to add the technical report as a reference.

**Impact on COLA**

There is no impact on the COLA.

**Impact on PRA**

There is no impact on the PRA.