**REQUEST FOR ADDITIONAL INFORMATION 300-2288 REVISION 1**

4/1/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.05.01 - ESF Atmosphere Cleanup Systems
Application Section: Tier 2 DCD 9.4.6

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

06.05.01-3

***This is a follow-up a RAI***

**The staff finds the applicant's response to RAI #73 /06.05.01-1 RAI 6.5.1-4 as incomplete. This response was provided to the staff in a letter dated October 24, 2008 (Docket No. 52-021 MHI Ref: UAP-HF-021). NRC Original RAI #943**

**Figure 11.5-1b and Figure 9.4.6-1 collectively fail to allow the staff to determine where the "Containment Low Volume Purge Radiation Gas Monitor" (RMS-RE-23) is located within the Containment Purge Systems' HVAC system ductwork and with respect to the stack ventilation radiation monitors. Figure 9.4.6-1 should display both radiation monitors.**

**In addition, the relevant radiation monitor wording in DCD sections 9.4.6.5.4.1 and 9.4.6.5.4.2 reads "Alarm high radiation for the containment purge air" leads the reader to believe that only two radiation monitors (RMS-RE-40 & RMS-RE-41 are associated with the HVAC system operation. While these two radiation monitors can cause a CIS and the Containment Purge System shutdown, the "Containment Low Volume Purge Radiation Gas Monitor" (RMS-RE-23) will also alarm with subsequent operator action. From the DCD sections, figures and tables referred to in the applicant's response and reviewed by the staff, is not clear where RMS-RE-23 alarms at (i.e. local alarm or in the MCR)**

**The staff requests that the applicant revise the relevant sections of the DCD to add clarity for the issues identified in this follow-up RAI.**

06.05.01-4

***This is a follow-up a RAI***

**The staff finds the applicant's response to RAI #73 /06.05.01-1 RAI 6.5.1-12 as incomplete. This response was provided to the staff in a letter dated October 24, 2008 (Docket No. 52-021 MHI Ref: UAP-HF-021). NRC Original RAI #943**

**The staff finds the applicants response to RAI#73 /06.05.01-1, RAI 6.5.1-12 as acceptable with respect to the amendments for Revision 2 of DCD Section 9.4.6.3.1 through 9.4.6.3.3. These three section amendments are applicable to the fans within the Containment as displayed on DCD Figure 9.4.6-1 "Containment Ventilation System Flow Diagram (1 of 2)". However, the applicant does not make a similar amendment for the fans of the Containment Purge System as displayed on DCD Figure 9.4.6-1 "Containment Ventilation System Flow Diagram (2 of 2)". These fans are housed within the Seismic Category I Reactor Building and the Seismic Category II Auxiliary Building (Reference Table 3.2-2, System 31 and Table 3.2-4 of DCD Revision 2). Due to the seismic categories of these two buildings, the staff concludes that at least one these two buildings (i.e. Reactor Building) house safety related SSCs that require protection from the hazards of potential fan blade failure. The staff requests that the applicant amend DCD Section 9.4.6.3.4 "Containment Purge System" with similar words "…designed to resist penetration of internally generated missiles in the event of a fan blade failure."**

06.05.01-5

***This is a follow-up a RAI***

**The staff finds the applicant's response to RAI #73 /06.05.01-1 RAI 6.5.1-19 as incomplete. This response was provided to the staff in a letter dated October 24, 2008 (Docket No. 52-021 MHI Ref: UAP-HF-021). NRC Original RAI #943**

**The staff finds the applicants response to RAI#73 /06.05.01-1, RAI 6.5.1-19 as incomplete. From the applicants answer, it appears that the detailed design of the Containment Ventilation System has yet to be completed with respect to area heat loads, duct layout and sizing, and system plant configuration. The applicants response cited operating expeince to establish heat loads within containment. Therefore, the COLs will need to select components that fall within the reference bounds of the analysis. The applicant needs to add to the FSAR the specific design basis for the associated design comitments.**

**Additionally, please describe a start-up test in chapter 14.2 that would verify that the final design falls within the reference bounds of the anlaysis.**

06.05.01-6

***This is a follow-up a RAI***

**The staff finds the applicant's response to RAI #73 /06.05.01-1 RAI 6.5.1-20 as incomplete. This response was provided to the staff in a letter dated October 24, 2008 (Docket No. 52-021 MHI Ref: UAP-HF-021). NRC Original RAI #943**

**The staff finds the applicants response to RAI#73 /06.05.01-1, RAI 6.5.1-20 as incomplete. Upon further review of DCD Section 9.4.6.2 "Power Generation Design Bases" for the four subsystems that comprise the Containment Ventilation System, the staff draws the conclusion (even though not specifically stated within the DCD) that the heat loads internal to the containment will be removed by the following three subsystems;**

**1) Containment Fan Cooler System;**
**2) Control Rod Drive Mechanism Cooling System Cooling System; and**
**3) Reactor Cavity Cooling System.**

**Revision 1 of the DCD Sections 9.4.6.2.4.1 and 9.4.6.2.4.2 for both the Containment (i.e. Low and High, respectively) Volume Purge Systems now includes the words "The COL Applicant is to determine the capacity of the cooling and heating coils that are affected by site specific conditions". Therefore, for the containment building itself, the cooling and ventilation fan design values currently contained in the DCD for these three in containment subsystems, become the values approved with design certification.**

**Based on the above and after reviewing the applicant's response, the staff has the following questions:**

**1) <u>For the containment fan cooler system</u>, a "Cooling Load" of 7,700.000 Btuh is assumed. Based on what information is this value assumed? What is the reason for assuming this value instead of using a value derived through quality controlled engineering calculations? The multiplier of 1.15 used in the equation appears to represent a engineering margin. What engineering standard is this marginal value based? The staff requests that the applicant provide design values based on engineering calculations and design based heat loads and not based on assumptions.**
**2) <u>For the CRDM Cooling System</u> the applicant responded that the total cooling load is again based on an assumed value (i.e. 4,000,000 Btuh) and includes the heat gain from the motor of the CRDM cooling fan. It appears that to be accurate, since the fans follow the coolers in the air stream, that the heat load from the fans will be dumped into the large volume of the containment. Therefore, the heat load from these fans will be principally removed by the coolers of the containment fan cooler system. What is the reason for assuming the assumed value instead of using a value derived through quality controlled engineering calculations?**

**3) <u>For the Reactor Cavity Cooling System</u> the applicant concludes with the fact that the fan air flow rates contained in the current revision of the DCD are assumptions based on Japanese PWR plants and that the actual airflow requirements will be updated based on the concrete temperature distribution analysis. The staff can not base its final SER approval on assumed values, but rather the staff requires the option of reviewing the actual DC plant engineering calculations or to have access to enough design basis information to perform its own independent confirmatory calculation. When will the actual airflow requirement engineering calculations (i.e. based on the final concrete temperature distribution analysis) be available for staff review.**
**4) <u>For the Containment High and Low Volume Purge systems</u> the applicant failed to provide the staff with sufficient information to satisfy the requests of the original RAI #73 /06.05.01-1, RAI 6.5.1-20.**

**The staff requests that the applicant provide the staff with sufficient information to overcome the RAI response deficiencies identified above .**

06.05.01-7

**The applicant indicates in its response to RAI#73 /06.05.01-1, RAI 6.5.1-9 that comprehensive instrumentation specifications will be implemented during the design phase. Given the significance of the subject instrumentation in monitoring the temperatures of these important structural members (i.e. to reduce the potential for member degradation over the 40 year licensed life of the plant) the staff believes that a COL action item is warranted that triggers the COL applicant to anticipate completing the design of these temperature recorders. Since this tracking issue is instrumentation related, the staff believes that the appropriate place for this COL action item would be against DCD Section 7.5.or Section 7.7. These two design base issues (i.e. reactor vessel support base plate and primary shield wall limiting temperatures) should also be discussed in Chapter 7, Section 7.5 "Information Systems Important to Safety" or Section 7.7 "Control Systems Not Required for Safety". The staff requests that the applicant amend the DCD accordingly.**