DRAFT REQUEST FOR ADDITIONAL INFORMATION EEB 738 REVISION 0

July 14, 2008

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021
SRP Section: 14.03 - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: 14.3.6

QUESTIONS

14.03-***

1. SRP 14.3-01& GDC 17: The staff notes that ITAAC Screening Summary Table 14.3.5 of the USAPWR Design Control Document (DCD) does not include a site-specific ITAAC entry for the transmission switchyard and offsite power system. RG 1.206, CIII.7.2, Site-Specific ITAAC, recommends that applicants develop ITAAC for the site-specific systems that are designed to meet the significant interface requirements of the standard certified design, that is, the site-specific systems that are needed for operation of the plant (e.g., offsite power). RG 1.206, C.II.1.2.6, ITAAC for Electrical Systems (SRP Section 14.3.6) states that applicants should develop ITAAC for the Offsite Power to verify by inspection and/or test the direct connection of offsite power sources to the class 1E divisions including the adequacy of voltage, capacity, independence/separation and stability of frequency of the offsite sources. Provide an interface requirement in the US-APWR DCD for the COL applicant to develop a Site-Specific ITAAC for the switchyard and offsite power system to address the following:

   a. A minimum of two independent offsite transmission circuits from the transmission network (TN) to the safety buses with no intervening non-safety buses (direct connection).
   b. Voltage variations of the offsite TN during steady-state operation shall not cause voltage variations at the loads of more than plus or minus 10 percent of the loads' nominal ratings.
   c. The normal steady state frequency of the offsite TN shall be within plus or minus 2 Hz of 60 Hz during recoverable periods of system instability.
   d. The capacity and capability of each circuit to power the required loads during steady state, transient, and postulated events and accident conditions. This should include proper operation and load carrying capability of breakers, switchgear buses, transformers, and cables.
   e. The independence and separation of the offsite circuits and offsite circuits and onsite class 1E electrical system and components.
   f. The appropriate lightning protection and grounding features for the system and components of the offsite circuits from the transmission network (TN) to the safety buses.
   g. Operation of instrumentation and control alarms used to monitor switchyard equipment status.
   h. The proper operation of the automatic fast transfer capability of the preferred power supply to the non-preferred power supply, i.e., from the

reserve auxiliary transformer (RAT) to the unit auxiliary transformer (UAT).

i. Switchyard interface agreement and protocols with the TN system operator/owner in accordance with the guidance given in GL 2006-2.

j. Because of its importance to safety, provide ITAAC or interface requirements (such as transient stability analysis) for the offsite power system (switchyard) to assess minimizing the probability of losing electric power from any of the remaining supplies as a result of or coincident with, the loss of power generated by the nuclear unit, the loss of power from the TN, or the loss of the largest load.

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2.SRP 14.2-02: Provide interface requirements in the US-APWR DCD for the transmission switchyard and onsite power system in accordance with 10 CFR 52.79(b) under Tier 2 interface requirements. Specifically, "Plant Interfaces with the Remainder of Plant," of Tier 2 requires the COL applicant to address offsite AC requirements for steady-state load, inrush kVA for motors, nominal voltage, allowable voltage regulation, nominal allowable frequency fluctuation, maximum frequency decay rate, and limiting under-frequency value for the reactor coolant pump (RCP). It further requires the offsite transmission system analysis for loss of the unit or the largest unit, for voltage operating range, for maintaining transient stability, and for the RCP bus voltage to remain above the voltage required to maintain the flow assumed in Chapter 15 analyses following a turbine trip. Discuss how the ITAAC for electrical systems listed under US-APWR, Section 14.3.4.6 verify all requirements cited in 8.2 and 8.3 of US-APWR DCD Tier 2.

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3. GDC 2 & 10 CFR 50.49: Tables 2.6.1-1 and 2.6.2-1 of the US-APWR DCD shows electrical and seismic classification of major class 1E ac electrical power distribution equipment and dc power system equipment respectively. Under the third column of these tables, titled "Class 1E/Qual. For Harsh Environ," all ac and dc distribution equipment are listed as "Yes/No." It is not clear to the staff what is meant by "Yes/No," label. Correct these tables to indicate whether all of the equipment listed is qualified for seismic category 1 and for harsh environment.

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4. GDC 17 & 18: Table 2.6.1-3 of the US-APWR DCD describes the ITAAC for the onsite electric power system. Under Column 1 of this table, item 9 addresses periodic inspection and testing to assess the system continuity, availability and condition of system components. However, under Column 2, no tests are listed or described for assessing the system continuity, availability and condition of system components. Provide a description of the applicable tests and acceptance criteria for the tests that will be conducted for the onsite electric

power system to assess its continuity, availability and condition of system components.

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5. RG 1.206: Appendix A to RG 1.206, (pages C.II.1-A-19 - C.II.1-A-22) lists ITAAC for ac distribution equipment in items A through P. Table 2.6.1-1 of the US-APWR DCD does not include some of the ac distribution equipment as required by the RG 1.206. Revise the Table 2.6.1-1 to include ITAAC for the following ac distribution equipment and system.

   a. Emergency onsite power sources (GTGs), including load sequencing and GTG support systems.
   b. Alternate ac (AAC) Power sources for SBO and recovery of ac power following an SBO event.
   c. Containment electrical penetration.
   d. Lightning protection and grounding for both lightning and system grounding.
   e. Safety-significant operating experience problems that have been identified via functional inspections, generic letters, circulars, RISs, NRC bulletins and INs. Some examples in the ac distribution systems are breaker coordination, short circuit protection, medium voltage cables susceptible to moisture (GL 2007-1), etc.
   f. Design and operational features resulting from solutions identified to resolve GSIs, such as resolution of GI-48/49 and GL 91-11 which identified interlocks and LCOs of tie breakers and LCOs for class 1E vital instrument buses. Include ITAAC for tiebreakers in the 6.9 kV and 480 volt systems and vital instrument buses.
   g. Post TMI requirements such as power to the power-operated relief valve, block valve, and pressurizer heaters.
   h. Postfire safe shutdown circuit analysis and supporting breaker coordination including a testing program to for the protective devices credited in the safe shutdown circuit analysis.
   i. Sensing instrumentation and logic.
   j. Connection of non-class 1E loads on class 1E buses because of the potential degradation of class 1E sources and fire-induced cable damage. Provide ITAAC to verify independence between the class 1E sources and non-class loads.
   k. Harmonics introduced by non-linear loads (speed controllers and the like) and their potential effects on class 1E equipment.