REQUEST FOR ADDITIONAL INFORMATION 638-5032 REVISION 0

9/23/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 07.06 - Interlock Systems Important to Safety
Application Section: 7.6 - Interlock Systems Important to Safety

QUESTIONS for Instrumentation, Controls and Electrical Engineering 2 (ESBWR/ABWR Projects) (ICE2)

07.06-17

MHI is requested to clarify whether figure numbers referenced in third paragraph of Subsection 7.6.1.5 for MOV-020 and MOV-007 should be read as “Figure 9.2.2-1 (Sheet 1 of 9)”, and “Figure 9.2.2-1 (Sheet 2 of 9)” respectively. They currently read as (Sheet 1 of 7) and (2 of 7) respectively, and do not match up with the figure titles in Chapter 9.

07.06-18

MHI is requested to resolve the inconsistency between Table 7.1-2 and Subsection 7.6.2 with regard to regulatory requirements applicability for PCMS and Section 7.6. A list of regulation requirements applicability was added into Subsection 7.6.2 as the result of RAI 07.06-5, but this list is not consistent with Table 7.1-2. The following regulations need to be included in Subsection 7.6.2 to be consistent with Table 7.1-2:

- GDC 10, “Reactor Design”
- GDC 15, “Reactor Coolant System Design”
- GDC 16, “Containment Design”
- GDC 28, “Reactivity Limits”
- GDC 29, “Protection Against Anticipated Operational Occurrences”
- GDC 33, “Reactor Coolant Makeup”
- GDC 34, “Residual Heat Removal”
- GDC 35, “Emergency Core Cooling”
- GDC 38, “Containment Heat Removal”
- GDC 41, “Containment Atmosphere Cleanup”
- GDC 44, “Cooling Water”

07.06-19

MHI is requested to effectively demonstrate how independent and diverse interlock guidance in Position 2 of Section B in BTP 7-1, “Guidance on Isolation of Low Pressure Systems from the High Pressure Reactor Coolant Systems,” is met.

BTP 7-1 states, in part, that “For system interfaces where both valves are motor-operated, the valves should have <u>independent and diverse</u> interlocks to prevent both from opening unless the primary system pressure is below the subsystem design pressure.”

Section 7.6 does not address diversity interlocks. Subsection 7.6.2.3, “Independence,” states that “Redundancy and independent train assignments are specifically discussed for each interlock in the sections above.” However, neither the interlock signal path's descriptions nor interlock figures demonstrate the interlock independence.

07.06-20

MHI is requested to effectively demonstrate how the guidance in Position 4 of Section B in BTP 7-1, “Guidance on Isolation of Low Pressure Systems from the High Pressure Reactor Coolant Systems,” is met.

BTP 7-1 states, in part, that “Suitable valve position indication should be provided in the control room for the interface valves.” It is not clear how this guidance is met. MHI is requested to clarify how suitable valve position indication is provided in the control room for the interface valves, in accordance with the guidance of BTP 7-1, Seciton B, Postion 4.

07.06-21

MHI is requested to effectively demonstrate how to conform to guidance RG 1.206, “Combined License Applications for Nuclear Power Plants,” with regard to interlock to prevent overpressurization of the primary coolant system during low-temperature operations of the reactor vessel.

Subsection C.I.5.2.2.2 of RG 1.206 states that “Applicants should describe the design of overpressure protection during low-temperature operations, including the capability to relieve pressure during all overpressure events during startup and shutdown conditions at low temperatures, particularly during water-solid conditions. Applicants should provide the analysis that demonstrates how overpressure protection is achieved, assuming any single active component failure. This section should identify all overpressure events and, as a subset, identify the events that can be prevented by preventive interlocks or locking-out power. Applicants should describe how the overpressure protection system is enabled, the alarms and indications associated with the system, and the power source for the system.”

Subsection 7.6.3 of the DCD states that “There are no interlocks necessary to prevent overpressurization of the RCS during low-temperature operations of the RV. Refer to Subsection 5.2.2.”

Subsection 5.2.2 identifies overpressure events but instead of identifying the events that can be prevented by preventive interlocks or locking-out power as described in RG 1.206 above, this subsection further states that “An important aspect of RCS overpressure protection at low temperatures is the use of administrative controls which are discussed in paragraph 5.2.2.2.2.2, Administrative Controls. Although specific alarms do not exist to invoke specific administrative procedures, annunciation is provided to alert the operator to arm the cold overpressure mitigation system.”

It is not clear how the guidance in RG 1.206 with regard to interlock to prevent overpressurization of the primary coolant system during low-temperature operations of the reactor vessel is met.

07.06-22

MHI is requested to effectively demonstrate how to conform to guidance RG 1.206, “Combined License Applications for Nuclear Power Plants,” with regard to interlock required to preclude inadvertent inter-ties between redundant or diverse safety systems.

Subsection 7.6.3 states that “There are no interlocks required to preclude inadvertent inter-ties in the USAPWR” without further justification.

07.06-23

MHI is requested to clarify the statement “There is no manual bypass capacity for interlocks important to safety” in Subsection 7.6.1. Subsections 7.6.1.4 and 7.6.1.5 state otherwise.

07.06-24

MHI is requested to justify the statement in the first paragraph of Subsection 7.6.1.1 "The RHR system is able to withstand normal operating RCS pressure without rupture when both CS/RHR Pump Hot Leg Isolation Valves are inadvertently open, as explained in Subsection 5.4.7." This statement was added as the response to RAI 07.06-15. There is no information found in Subsection 5.4.7 supporting this statement. In the same paragraph of the above statement, Subsection 7.6.1.1 further states that "Over-pressurization could damage and disable the RHRS, and could lead to inter-system loss of reactor coolant." The latter conflicts the first. Also, the RCS and the RHR design pressures do not support the concerned statement.