REQUEST FOR ADDITIONAL INFORMATION 581-4582 REVISION 2

5/10/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.02.01 - Seismic Classification
Application Section: 3.2.1

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

03.02.01-15

RAI 03.02.01-12 requested clarification on the application of safety-related and important to safety in order to meet the requirements of GDC 2. The response to the RAI clarified the seismic classifications of the SSCs and their relationships to safety-related and important to safety SSCs. The response stated that safety-related SSCs are Seismic Category I SSCs (RG 1.29, position C.1) and non safety-related SSCs are either Seismic Category II or non-seismic SSCs (RG 1.29, positions C.2 and C.4). The response also indicated that important to safety SSCs include safety-related SSCs and additional non safety-related SSCs, and referred to Table 3.2-3 in the DCD for the definition of the requirements. The response also indicated that the fire protection systems are designed to RG 1.189 (RG 1.29 position C.5), radioactive waste management systems designed to RG 1.143, and safety related instrumentation sensing lines designed to RG 1.151. The response indicated that no changes were required to Section 3.2.1 of the DCD.

However, the response does not address seismic requirements for risk-significant nonsafety-related SSCs that are important to safety or include a DCD revision to replace the term “safety-related” with the more comprehensive term “important to safety” in satisfying GDC 2. The guidance in the memo from Denton clarifies that important to safety SSCs that require special treatment are not limited to safety-related SSCs. Supplemental seismic requirements for important to safety SSCs depend on the safety function and the reliability and integrity assumed in the PRA in response to an earthquake. Enclosure 3 to MHI letter dated 7/14/08 and the response to RAI 17.04-19 identify a list of risk-significant SSCs, but it is not clear if seismic requirements are applied to all nonsafety-related risk-significant SSCs that are considered important to safety. For example, Quality Group D piping in the refueling water storage system is identified as risk-significant, but it is classified as NS (Non-Seismic). Important to safety SSCs are to include not only safety-related SSCs, but also nonsafety-related SSCs that are risk-significant. The applicant is requested to clarify if all risk-significant nonsafety-related SSCs are classified as Seismic Category I or II such that they are designed to withstand earthquakes consistent with GDC 2. If that is the case, the applicant is requested to identify those nonsafety-related or risk-significant SSCs that are designed to withstand earthquakes and confirm that the seismic classification is consistent with assumptions used in the PRA. Also, the term “safety-related” should be replaced with the term “important to safety” in DCD 3.2.1 and 3.1.1.2 in order to satisfy GDC 2.

References:

MHI's Response to US-APWR DCD RAI No. 287-2041; MHI Ref: UAP-HF-09244; Dated May 21, 2009; ML091480481.
MHI's Response to US-APWR DCD RAI No. 150-1635; MHI Ref: UAP-HF-09080; Dated March 10, 2009; ML090710453.
Memorandum from Harold Denton to NRC Staff, dated November 20, 1981, accession numbers 8201200446 and 8201200448.
Additional Information for Design Completion Plan of US-APWR Piping Systems and Components; MHI Ref: UAP-HF-08123; Dated July 14, 2008; not publicly available.
Generic Letter 84-01; NRC Use of the Terms, "Important to Safety" and "Safety Related"; dated January 5, 1984; ML031150515.

03.02.01-16

DCD Subsection 3.2.2, COL 3.2(4) refers only to safety-related systems and components that are to be identified by the COL applicant. The COL applicant should identify all site-specific SSCs including nonsafety-related SSCs that are not included in the DCD. For example, if the applicant adds a non-safety related site-specific SSC that should be seismic category II, than that item should be included in the COLA. Provide additional information to explain how the COL applicant will be required to identify the seismic classification for all site-specific SSCs, including nonsafety-related SSCs.

03.02.01-17

RAI 03.02.01-5 requested further information regarding the application of risk insights regarding the leak detection system (LDS) for the reactor coolant pressure boundary (RCPB). The response noted the RCBP LDS is not listed in Table 17.4-1 and indicates that the risk significance of SSCs in the LDS was not considered since the system has a small effect on the probability of a large break LOCA. The response clarified that the RCPB LDS, which is non safety-related but has the important function of monitoring RCBP integrity, is designed to be qualified in accordance with RG 1.45. Section 5.2.5 of the DCD provides a discussion of the Leak Monitoring System (LMS). The LMS consists of several “subsystems” focused on the identification of both identified and unidentified leakage from various SSCs. Section 5.2.5.1 states the LMS is designed in accordance with the requirements of GDC 30 and the guidance of R.G. 1.45, “Reactor Coolant Pressure Boundary Leakage Detection Systems” and R.G. 1.29, “Seismic Design Classification.” Section 5.2.5.5 states the LMS has no safety function but the containment airborne particulate radioactivity monitor subsystem of the LMS is Seismic Category I. There are some non-specific seismic qualification statements in section 5.2.5.5 for the containment airborne gaseous radioactivity monitor, the containment air cooler condensate flow rate monitoring subsystem and the containment sump level and flow monitoring subsystem of the LMS. Table 1.9.1-1 of the DCD also indicates that no exceptions to R.G. 1.45 and 1.29 are identified.

Since the response identified that the LMS has no safety function, additional information is needed to (1) describe what criteria of R.G. 1.29 is being met by the LMS design and function, (2) provide additional information regarding the seismic classification of (a) the containment airborne gaseous radioactivity monitor, (b) the containment air cooler condensate flow rate monitoring subsystem and (c) the containment sump level and flow

monitoring subsystem with regard to the statement these three subsystems are "qualified for seismic events not requiring a plant shutdown", and (3) clarify how the Seismic Category I classification of the containment airborne particulate radioactivity monitor subsystem satisfies any supplemental design requirements for the high risk-significant LMS.

Reference: MHI's Response to US-APWR DCD RAI No. 287-2041; MHI Ref: UAP-HF-09223; Dated May 8, 2009; ML091320436.

03.02.01-18

The response to RAI 03.02.01-13 clarified that ITAAC are needed for non-seismic Category I SSCs to verify that their failure will not impair safety-related SSCs. DCD 3.2.1.1.2 states that seismic category II applies to SSCs which perform no safety-related function, and whose continued function is not required, but whose structural failure or interaction could degrade the functioning or integrity of a seismic category I SSC to an unacceptable level, or could result in incapacitating injury to occupants of the control room. Seismic category II SSCs are designed so that the SSE could not cause unacceptable structural interaction or failure with seismic category I SSCs. DCD 3.2.1.1.3 also identifies that NS SSCs are primarily located outside of safety-related buildings or segregated from seismic category I SSCs so that the failure of their structural integrity would not impact the seismic category I SSCs and cause adverse system interactions. If it is determined that a SSC would cause an adverse impact on a seismic category I SSC, then it is designed and/or mounted in accordance with seismic category II requirements to withstand an SSE event so that it could not fail and cause an adverse impact or interaction with the seismic category I SSC. Further, DCD 3.7.2.8 identifies that the COL applicant is to assure that the design or location of any site-specific seismic category I SSCs, for example pipe tunnels or duct banks, will not expose those SSCs to possible impact due to the failure or collapse of non-seismic category I structures, or with any other SSCs that could potentially impact, such as heavy haul route loads, transmission towers, non safety-related storage tanks, etc. Alternately, site-specific seismic category I SSCs are designed for impact loads due to postulated failure of the non-seismic category I SSCs. The applicant is requested to clarify which specific ITAAC is used to verify completion of a systems interaction review.

References: MHI's Response to US-APWR DCD RAI No. 287-2041; MHI Ref: UAP-HF-09223; Dated May 8, 2009; ML091320436.