REQUEST FOR ADDITIONAL INFORMATION 866-6149 REVISION 0

11/14/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.02.06 - Containment Leakage Testing
Application Section: 6.2.6

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

06.02.06-34

QUESTION NO.: 6.2.6-34
In US-APWR DCD Revision 3 Tier 2 Section 6.2.6.5 you state the following in regards to special testing requirements for containment leakage testing:
"The US-APWR does not have a secondary containment or as sub-atmospheric primary containment, therefore, there are no special testing requirements in addition to the requirements of Subsections 6.2.6.1 through 6.2.6.4 above"
SRP Section 6.2.6, "Containment Leakage Testing", section III.3, states that special testing procedures for dual-type containments should be identified.
In addition to dual containment plants SRP section 6.2.3, "Secondary Containment Functional Design", applies to those designs that utilize outer containment structures and systems that mitigate the radiological consequences of postulated accidents. In this SRP section, the secondary containment structure and systems is defined as those structures and systems that collect and process radioactive material that may leak from the primary containment following a design basis accident. Among other areas of review, SRP section 6.2.3 section 1 calls for a review of the design provisions for periodic leakage testing of secondary containment bypass leakage paths.
10 CFR Part 50, Appendix J part IV B. states that multiple barrier containments shall be subject to individual leakage rate tests in accordance with procedures specified in the Technical Specifications and Associated Bases. SRP section 6.2.3 states that primary containment bypass leakage paths are to be identified and associated bypass leakage rates are to be determined.
Based on a review of Tier 2 sections 6.2.6, 6.2.3, 6.5.3.2, and the chapter 15 accident analyses, the staff determined that some credit is taken for the action of the Annulus Emergency Exhaust System in concert with the annulus and containment penetration areas to capture and process fifty percent of the assumed DBA primary containment leakage through an ESF filter system prior to release to the environment. The remaining fifty percent of the assumed primary containment leakage (0.15% of containment volume per day) is assumed to be released directly to the environment. Therefore, the staff needs the following information in order to evaluate special testing requirements that may be needed to support assumptions used in the chapter 15 accident analyses on secondary containment performance:

1) Clarify US-APWR DCD Revision 3 Tier 2 Section 6.2.6.5, to be consistent with DCD sections 6.2.3, 6.5.3.2, and the chapter 15 accident analyses, as they apply to the SSCs outside of the primary containment structures that function to collect and process assumed primary containment leakage. Justify why special containment leakage testing requirements are or are not required for the annulus

and the containment penetration areas, to justify the accident analysis assumptions.

2) Address SRP 6.2.3 Acceptance Criterion #4A and 4B:

In meeting GDC 43 and 10 CFR Part 50, Appendix J, requirements for secondary containment system testing the following criteria apply:

A. The fraction of primary containment leakage bypassing the secondary containment and escaping directly to the environment should be specified. BTP 6-3 provides guidance for detecting leakage paths to the environment which may bypass the secondary containment. The periodic leakage rate testing program for measuring the fraction of primary containment leakage that may directly bypass the secondary containment and other contiguous areas served by ventilation and filtration systems should be described. Individual tests should be according to procedures from technical specifications or their bases.

With regard to the above criterion, please quantify the bypass leakage paths in the secondary containment design in section 6.2.3. Ensure this description is consistent with the description of the secondary containment in DCD section 6.5.3.2. In DCD section 6.2.6.5, describe the periodic leakage rate testing program for measuring the fraction of primary containment leakage that may directly bypass the containment penetration areas and annulus, served by the annulus emergency exhaust system. Describe how this portion of the containment leakage test program is described in DCD chapter 16, section 5.5.16.

B. There should be provisions in the design of the secondary containment system for inspections and monitoring of the functional capability. Preoperational and periodic test programs determine the depressurization time, the secondary containment in-leakage rate, the uniformity of negative pressure throughout the secondary containment and other contiguous areas, and the potential for ex-filtration.

With regard to the above criterion, please describe the provisions for secondary containment functional capability as they relate to the containment penetration areas and annulus, served by the annulus emergency exhaust system, in section 6.2.3 of the DCD; or describe where in the DCD these design provisions are described.

3) Revise DCD sections 6.2.3 and 6.2.6, and chapter 16 section 5.5.16 and associated bases, as necessary to document the response to #2 above in the DCD.