REQUEST FOR ADDITIONAL INFORMATION 278-2250 REVISION 1

3/13/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.02.02 - Containment Heat Removal Systems
Application Section: 6.2.2

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

06.02.02-16

Background

As part of its review of the US-APWR design aspects that address GSI-191, the staff reviewed the applicant's coatings debris-generation evaluation to the applicable regulatory criteria (GDC 38 and 10 CFR 50.46(b)(5)) using the guidance of SRP Section 6.2.2. SRP Section 6.2.2 provides no specific guidance for debris-generation evaluations, but, rather, references RG 1.82 Rev. 3, the Nuclear Energy Institute (NEI) Guidance Report NEI 04-07 (Reference 1) and the associated NRC safety evaluation report (Reference 2) of the NEI guidance report as providing acceptable guidance for PWR sump debris evaluations.

NEI 04-07, as modified by the staff safety evaluation provides guidance acceptable to the NRC staff relative to generation of protective-coatings debris. RG 1.82 does not provide any detailed guidance on estimation of coatings debris generation.

On page 9 of the Sump Strainer Performance Report, MUAP-08001-P (Reference 3), the applicant states the following:

> "As for the coating debris of the US-APWR, the ZOI for qualified coatings is a sphere with a radius 10 times the MCP inner diameter, which generates largest amount of coating debris. In the evaluation, the volume of coating debris was calculated by multiplying the surface area of the ZOI sphere by the thickness of the coating film. The thickness of the coating film was defined based on the past experience, and was conservatively assumed to be 650 (μm). As a result, the maximum volume of coating debris was established as 0.51 (m^3)."

Use of a 10D ZOI (zone of influence) meets the guidance of the staff safety evaluation to NEI 04-07. However, the staff safety evaluation states that:

> "The analysis should also seek to accurately estimate the amount of coating on a plant specific basis within the ZOI. If a realistically conservative approach is taken, the basis and justification for why the method is realistically conservative should be provided."

In contrast, the applicant simply used the surface area of a sphere of diameter 10D as the coated surface area of components inside the ZOI. It is unclear why the applicant could not provide an estimate of surface area based on the actual coated components, which may include pipe, vessel, and support surfaces, that are within the postulated ZOI of the most limiting break.

Additional staff guidance with respect to addressing coatings related to GSI-191 is provided in "NRC Staff Review Guidance Regarding Generic Letter 2004-02 Closure in the Area of Coatings Evaluation (Reference 4)," which recommends that as part of the description of the coatings systems used in containment, licensees should provide dry-film thickness (DFT) for each coating system, and that DFT may come from plant records, manufacturer recommendations, or actual sample measurements on the existing coatings.

Requested Information

1. Provide the basis and justification for the use of the surface area of a 10D sphere as a conservative estimate of the coated surface area inside the zone of influence (ZOI), or provide an estimate of the coated surface area in the ZOI based on the actual coated systems, structures, and components located in the ZOI.

2. Describe in detail the past experience used to justify the assumed coatings thickness of 650 µm, such as actual measurements on similar coatings systems. Does the assumed thickness account for recoating during the life of the plant?

References

1. NEI 04-07 Pressurized Water Reactor Sump Performance Evaluation Methodology Revision 0 December 2004; ADAMS Accession No. ML050550138
2. Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To NRC Generic Letter 2004-02, Nuclear Energy Institute Guidance Report (Proposed Document Number NEI 04-07), "Pressurized Water Reactor Sump Performance Evaluation Methodology", Dated December 6, 2004, ADAMS Accession No. ML051460182
3. US -APWR Sump Strainer Performance, MUAP-080001-P (R2), December 2008; ADAMS Accession No. ML090050043
4. NRC Staff Review Guidance Regarding Generic Letter 2004-02 Closure in the Area of Coatings Evaluation, ADAMS Accession No. ML080230462, Enclosure 2 to letter from William H. Ruland, NRC, to Anthony Pietrangelo, NEI, dated March 28, 2008, Subject "Revised Guidance For Review Of Final Licensee Responses To Generic Letter 2004-02, "Potential Impact Of Debris Blockage on Emergency Recirculation During Design Basis Accidents At Pressurized-Water Reactors"," ADAMS Accession No. ML080230112