

April 5, 2013

**UNITED STATES – ADVANCED PRESSURIZED WATER REACTOR
INTERNAL FLOOD ANALYSES AUDIT PLAN**

April 17, 2013

**US-APWR DESIGN CERTIFICATION
Mitsubishi Heavy Industries, Ltd.
Docket No. 52-021**

Location: Mitsubishi Nuclear Energy Systems, Inc.
1001 19th Street North
7th Floor
Arlington, VA 22209

Purpose:

The purpose of the audit is to review the basis, assumptions and results of the United States - Advanced Pressurized Water Reactor (US-APWR) internal flood protection analysis. Some of the specific items to be reviewed include potential flood sources considered (non-seismically qualified piping, firefighting equipment, tanks, etc), how the evaluation addressed the potential for cross divisional flooding, and the appropriateness of the assumptions used in estimating the water discharge rate into the area, and the duration of the discharge.

Background:

Mitsubishi Heavy Industries, Inc. (MHI) has submitted to the U.S. Nuclear Regulatory Commission (NRC), a design certification document (DCD) for its application of the US-APWR in December 2007. The staff is currently conducting its design certification review of the application. DCD Tier 2, Section 3.4.1, provides a description of features incorporated in the design of the plant to protect against internal flooding. It also identifies structures, systems, and components (SSCs) important to safety that require protection from internal flooding, and describes measures used to protect those SSC's from internal flooding. In many cases, protection is achieved by locating the SSCs above the flood level for the worst case flooding of an area. To support the flood level used, MHI performed flood evaluations to determine the max flood level for each area, taking into account flooding sources, such as high energy line breaks, moderate energy line breaks, fire fighting operations, etc.

The staff has reviewed the information in the DCD which provided the flooding evaluation results applicable to the flood protection measures used by the applicant to ensure adequate protection of the SSCs. However, in order to verify the information in the DCD, the staff is proposing this audit. The purpose of the audit is to review the basis, assumptions and results of

the US-APWR internal flood protection analysis. Some of the specific items to be reviewed include potential flood sources considered (i.e. non-seismically qualified piping, firefighting equipment, tanks, etc), possibilities for cross divisional flooding, and flooding resulting from water entering the area from flooding outside the area. The assumptions used will also be reviewed to verify that they are conservative and appropriate.

Audit Scope and Approach:

The audit team will review documents, analysis, drawings and other relative design information used to support the US-APWR internal flood evaluation results contained in DCD Tier 2, Section 3.4.1, and DCD Tier 2, Appendix 3K. The primary focus of the audit will be to validate the technical information provided in Section 3.4.1 of the DCD, and to check the methodology and assumptions used in the analysis to make sure that they are appropriate, and that the results provided in the DCD are conservative.

To achieve the review goals in an efficient manner, the staff assembled an audit team consisting of professionals with expertise in balance of plant, plant hazards, and reactor system review areas. The audit team will consist of staff from the NRC's balance-of-plant branch. To facilitate and expedite the work, it is foreseen that the audit will be attended by representatives from MHI who will also introduce the documents available for the staff to review and indicate documents which are classified as proprietary or have trade secrets along with the supporting documents and technical evidence to the reviewers. The staff will document the audit findings in an audit report and may identify new supplemental requests for additional information (RAIs).

Audit activities and Schedule:

The NRC staff will conduct the audit in the MHI offices located in Arlington, Virginia for one business day, April 17, 2013, starting at 9:00 a.m. The audit will include the review of technical documents and an interview with MHI engineers. The NRC staff requests MHI to briefly describe the available documents and drawings. The NRC staff also requests space to be able to conduct internal staff caucuses. Any follow-up actions in response to the audit will be discussed at the end of the day.

The staff plans on preparing an audit report with specific findings and proposed supplemental RAIs (if necessary) within 45 days of the completion of this audit.

Audit Team:

Angelo Stubbs, NRC (Senior Reactor Systems Engineer, Lead)
Ryan Nolan, NRC (Reactor Systems Engineer)
Tarico Sweat, NRC (General Engineer)
Robert Vettori, NRC (Fire Protection Engineer)
Dennis Galvin, NRC (Project Manager)

Information and Other Materials Needed for the Audit:

The NRC staff requests MHI to provide the documents discussed in the audit scope. MHI is also requested to identify other documents, which it deems as necessary to support the NRC

staff's audit, outlined under audit activities and any documents or calculations referenced by them. MHI is also requested to prepare a list of the documents made available, including the document titles, identifying numbers, and dates.

References:

1. NRO Office Instruction NRO-REG-108 (Revision 0), "Regulatory Audits."
2. SRP Section 3.4.1, "Internal Flood Protection for Onsite Equipment Failures."
3. US-APWR DCD, Revision 3.
4. MHI's Response to US-APWR DCD RAI 841-6055, Revision 3: MHI Ref: UAP-HF-12283, (ML12296A449), dated October 19, 2012.
5. MHI's Revised Response to US-APWR DCD RAI 841-6055, Revision 3: MHI Ref: UAP-HF-12331, (ML13002A103) dated December 26, 2012

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