US-APWRRAIsPEm Resource

From: Buckberg, Perry
Sent: Monday, November 25, 2013 11:56 AM
To: 'us-apwr-rai@mhi.co.jp'; US-APWRRAIsPEm Resource
Cc: Dixon-Herrity, Jennifer; Galvin, Dennis; Shams, Mohamed; Valentin, Milton
Subject: Non-PROP US-APWR Design Certification Application RAI 1062-7296 (Section 3.8.3)
Attachments: Non-PROP US-APWR DC RAI 1062 SEB1 7296.pdf

MHI,

The Non-PROP attachment contains the redacted subject request for additional information (RAI). This RAI was sent to you in draft form on November 20, 2013.

The attached version of the RAI will be made publicly available.

Please submit your RAI response to the NRC Document Control Desk.

Thanks,

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REQUEST FOR ADDITIONAL INFORMATION 1062-7296

Issue Date: 11/25/2013

Application Title: US-APWR Design Certification - Docket Number 52-021

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

Review Section: 03.08.03 – Concrete and Steel Internal Structures of Concrete Containment

QUESTION:

03.08.03-16

The staff reviewed MUAP-12006-P, “Steel Concrete (SC) Wall Fabrication, Construction and Inspection," Revision 0, dated February 28, 2013, hereinafter referred to as 'the report'. The staff found that the technical information provided in the report addressed most of the request for additional Information (RAI) questions regarding steel-concrete (SC) wall fabrication, construction and inspection. However, additional information needs to be provided as discussed below to ensure the construction adequacy of the US-APWR SC walls.

1. A mockup program is important to demonstrate the adequacy of fabrication, concrete placement and inspection. However, the report provided no mockup information other than stating that the contractor (for the COLA) shall be responsible to use mockups as necessary. Therefore, the staff requests that the applicant provide details of the mockup program, such as objectives, mockup locations, post construction mockup inspections, and training for construction crew to implement the program.

2. For post-construction inspection of the concrete, no non-destructive evaluation (NDE) method except visual testing (VT) is discussed in the report. Considering the unique features of the SC walls, the staff requests that the applicant describe NDE methods, such as ultrasonic testing (UT), that will be used for post-construction concrete inspection to detect critical defects of the concrete. This should include the NDE methods to be used, critical areas to be inspected, sampling approach, the need for mockup testing, types of critical defects of the concrete, the acceptance criteria for each defect and the corresponding engineering basis. This should be considered to be part of the mockup program.

3. Because construction tolerances are important in controlling additional stresses in structural components induced by construction, the staff requests that the applicant provide the construction tolerances for the offset of the two half-length pieces of a tie bar, and the construction tolerances for the alignment of the faceplates in two adjacent SC module blocks. Also provide the bases for the tolerances.

4. Section 2.2, “Applicable Codes and Standards,” of the report lists applicable codes and standards for the construction of the US-APWR SC walls. In addition to those codes and standards listed, the staff requests that the applicant explain why the following codes and standards are not included: ACI 301-05 - Specifications for Structural Concrete for Buildings, ACI 305.1 - Hot-Weather Concreting, ACI 306R- Cold-Weather Concreting, ACI 306.1-Standard Specification for Cold Weather Concreting, ACI 308R - Guide to Curing Concrete, ACI 308.1-Standard Specification for Curing Concrete, ANSI/AWS D1.4 - Structural Welding Code - Reinforcing Steel, and ANSI/AWS D1.8 - Structural Welding Code – Seismic Supplement.

5. Correct the following inconsistencies in the report:

- The stud layout shown in Figure 3.1-3, “Conceptual Basemat Anchorage for SC Structure Wall,” on Page 3-4, and the stud spacing/dimension and the use of the web plate/round tie bars shown in Figure 3.5-5, “Example of Concrete Placement in the SC Structure: General Section,” on Page 3-20 are

- inconsistent with the corresponding details shown in MUAP-11019-P, “Containment Internal Structure: Design Criteria for SC Walls,” Revision 1. This also applies to some other figures in the report which the applicant should confirm.
- In Figure 3.4-2, “Typical SC Structure Anchorage to Basemat,” on Page 3-12, both construction steps B and F are labeled as installation of temporary structure for SC module Tier 0. The staff requests that the applicant correct the inconsistency; otherwise, provide an explanation for the inconsistency.
- The example of concrete placement demonstrated in Figure 3.5-3, “Example of Placement of Fresh Concrete on Hardened Concrete,” on Page 3-18 shows a concrete pour height of 20'-4". The example of concrete placement presented in Section 3.5.4.3.3, “Concrete Placement procedure Taking Concrete Lateral pressure into Account,” assumes a concrete pour height of 14'-5". However, in the response to RAI 905-6311, Question 03.08.03-71, dated May 16, 2012, the applicant indicated that the maximum wet concrete height of 10 ft would be specified to limit additional stresses/forces in steel faceplates and tie bars due to concrete placement in the SC walls. The staff requests that the applicant correct the inconsistency; otherwise, provide an explanation for the inconsistency.
- Section 3.5.4.3.1, “Standard Practice,” Page 3-19, states that the free-fall height of concrete placement should not be greater than **{ }** to avoid segregation. However, in the response to RAI 322-1999, Question 03.08.03-10, dated September 17, 2009, the free-fall height limit is specified as **{ }**. The staff requests that the applicant correct the inconsistency and provide the basis for the height.