US-APWRRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, July 08, 2013 8:38 AM
To: us-apwr-rai@mhi.co.jp; US-APWRRAIsPEm Resource
Cc: Thomas, Vaughn; Ma, John; Shams, Mohamed; Galvin, Dennis; Lee, Samuel
Subject: With Attachment...RE: US-APWR Design Certification Application RAI 1044-7140 (3.8.4)
Attachments: US-APWR DC RAI 1044 SEB1 7140.pdf

With attachment.

Jeff Ciocco
US-APWR Projects
New Nuclear Reactor Licensing
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jeff.ciocco@nrc.gov

From: Ciocco, Jeff
Sent: Monday, July 08, 2013 8:18 AM
To: us-apwr-rai@mhi.co.jp; US-APWRRAIsPEm Resource
Cc: Thomas, Vaughn; Ma, John; Shams, Mohamed; Galvin, Dennis; Lee, Samuel
Subject: US-APWR Design Certification Application RAI 1044-7140 (3.8.4)

MHI,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. MHI requests, and we grant, 60 days to respond to this RAI. The schedule will be adjusted accordingly.

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

Thank you,

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Hearing Identifier: Mitsubishi_USAPWR_DCD_eRAI_Public
Email Number: 111

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Subject: With Attachment...RE: US-APWR Design Certification Application RAI 1044-7140 (3.8.4)
Sent Date: 7/8/2013 8:37:43 AM
Received Date: 7/8/2013 8:37:46 AM
From: Ciocco, Jeff

Created By: Jeff.Ciocco@nrc.gov

Recipients:
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Tracking Status: None
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MESSAGE	1064	7/8/2013 8:37:46 AM
US-APWR DC RAI 1044 SEB1 7140.pdf	66259	
image001.jpg	3989	

Options
Priority: Standard
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Reply Requested: No
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REQUEST FOR ADDITIONAL INFORMATION 1044-7140

Issue Date: 7/8/2013

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

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

Review Section: 03.08.04 - Other Seismic Category I Structures
Application Section: 3.8.4

QUESTIONS

03.08.04-53

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.1, “Description of Structures,” the first paragraph (Page 3.8-61) states, “The R/B [reactor building] complex superstructure is separated from the T/B [turbine building] by approximately 16 in. at the closest interface point. The R/B complex basemat, discussed in Subsection 3.8.5 (page 3.8-94) , is horizontally separated from the T/B basemat by approximately 20 ft. 6 in.”

In MUAP-11002, Revision 2, "Turbine Building Model Properties, SSI Analyses, and Structural Integrity Evaluation," Figure 1.1.1-1 shows a gap of 13’-2” between the T/B and R/B complex. The applicant is requested to address these apparent discrepancies.

03.08.04-54

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.3.4.6, “Construction Loads,” the first paragraph (page 3.8-70) states, “In the load combination for the construction case, the live load is defined as the additional construction loads produced by cranes, trucks, or any type of vehicle with its pick-up load, as required by construction. ASCE 37-02 (Reference 3.8-36) provides additional guidance. For steel beams supporting concrete floors, the weight of the concrete plus 100 lb/ft2 uniform load or 5,000 pounds concentrated load, distributed near points of maximum shear and moment, are applied. A one third increase in allowable stress is permitted in this case.”

The staff was not able to locate the provision in ASCE 37-02, “Design Loads on Structures during Construction,” that allows a one third increase in allowable stress. Therefore, the applicant is requested to provide the referenced section of the ASCE standard that allows the one third increase in allowable stress.

03.08.04-55

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide

updated information related to a seismic design change.

In Subsection 3.8.4.4.1, “R/B [reactor building],” the second paragraph (page 3.8-75) states, “The fuel handling area is a reinforced concrete structure supported by structural steel framing. The new fuel is stored in racks in a dry, unlined pit. The spent fuel pit is lined with stainless steel and is normally flooded to an elevation 1 ft, 2 in. below the operating floor deck.”

The applicant is requested to provide figures depicting the desigh for the areas of the fuel handling, the new and spent fuel storages, and the structural steel framing supporting system to the areas; and describe how the loads from these areas are transferred down to the basemat during an earthquake.

03.08.04-56

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.4.1, “R/B [reactor building],” the fourth paragraph (page 3.8-75) states, “The design considers normal loads (including construction, dead, live, and thermal), and the SSE [safe shutdown earthquake]. Seismic forces are obtained from the dynamic analysis described in Subsection 3.7.2. These loads are applied to the linear elastic FE [finite element] model. The design of the R/B complex is performed considering a fixed base condition at the top of the basemat. Loads and load combinations are given in Subsection 3.8.4.3.” Also, the sixth paragraph states, “The R/B is analyzed using a three-dimensional FE model with the ANSYS computer codes.”

The staff notices that a 3D FE model of R/B complex is used in Subsection 3.7.2 for the soil-structure interaction (SSI) analysis using the ACS-SASSI computer code. The ACS-SASSI code does not consider a fixed base condition at the top of the basemat. The displacements, forces and moments for the R/B complex should be available from the SSI analysis of the ACS-SASSI model. The staff requests the SASSI results be compared with those obtained from the ANSYS model to assess the accuracy of the analyses performed in this section.

The applicant is requested to provide a table which lists the results obtained from the ANSYS analysis including the displacements at the four corners of the top of the R/B complex and the top-center of the prestressed concrete containment vessel (PCCV) dome in the x, y, and z directions. Also, the table should list the maximum forces (axial, shear, and torsion) and moments at the four sections listed in Subsection 3.8.4.4.1.1, “Structural Design of Structural Elements.”

03.08.04-57

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.4.1.1, “Structural Design of Structural Elements,” the description for “Section 4” (Page 3.8-76) states, “South exterior wall of R/B [reactor building], elevation 3 ft, 7 in. to elevation 115 ft, 6 in. This exterior wall is subjected to typical loads such as temperature gradients, seismic, hydrodynamic pressure, tornado missile, and hurricane missile.”
The staff notices that the hydrostatic pressure is not included in the loads listed in the above

quoted paragraph. The applicant is requested to include the hydrostatic pressure in the load combinations for the design, or provide a rationale for not including the hydrostatic pressure.

03.08.04-58

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.4.1.4, “Below Grade Exterior Walls” (Page 3.8-78), a surcharge of 450 psf (Page 3.8-79) is included in the calculation of the lateral earth pressure.

The applicant is requested to address whether the 450 psf surcharge load include the weight of the nearby building such as the turbine building (T/B) and the access building (AC/B).


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