

# REQUEST FOR ADDITIONAL INFORMATION 800-5879 REVISION 3

8/5/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.07.02 - Seismic System Analysis

Application Section: 3.7.2

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)

03.07.02-86

In MUAP-10024 (R0), Section 1.0 "Introduction" (page 2) the second paragraph states "As a nuclear NS structure, the AC/B is not required to satisfy the requirements of 10 CFR Part 50, Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants." Instead, the AC/B is designed to meet the seismic requirements of the International Building Code (IBC) (Reference 7-2). This document summarizes the requirements for the stress analyses and sizing of the building structure to satisfy the requirements of the DCD (Reference 7-1)."

The reference to US-APWR DCD requirements is non-specific. In order for the staff to evaluate the report and its conclusions, the staff needs to know the specific design requirements that govern the design of the access building (AC/B). The Applicant is, therefore, requested to provide the staff with the specific requirements stated in the US-APWR DCD that are to be satisfied.

03.07.02-87

In, MUAP 10024 (R0), subsection 4.1, "General Description", the 4<sup>th</sup> paragraph (page 9) states "Refer to Figures 1-1 through 1-7 for a general layout of the AC/B. The west wall of the AC/B is adjacent to a portion of the east wall of the auxiliary building (A/B). The AC/B and adjoining A/B, including basemats, are structurally separated by a seismic gap of at least 4 inches at and below the grade."

It is not clear to the staff from the report as to how the adequacy of the 4 inch gap is evaluated for the AC/B to demonstrate that this gap is sufficient to avoid collision of the AC/B foundation with the foundations of adjacent buildings. The Applicant is requested to describe the analyses performed and provide the numerical results of such analyses.

03.07.02-88

In MUAP 10024 (R0), subsection 4.2 "Structural Geometry", the 4<sup>th</sup> sentence in the 3<sup>rd</sup> paragraph (page 9) states "The locations of any safety-related SSCs in the plant yard adjacent to the AC/B, including those which may be field routed, are reviewed prior to installation to ensure that their distances away from the AC/B and/or burial depths are sufficient to prevent potential failure effects that could jeopardize their function and integrity."

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The staff is unable to find any specific COL action item that requires a review of the location of safety-related SSCs in the plant yard in relation to the AC/B. COL 3.7 (9) in the US-APWR DCD (R3) addresses the location of seismic Category I SSCs with respect to seismic loadings, but there are no action items in the DCD addressing the effects of tornado missiles or other effects of failure of the AC/B on the integrity of safety-related SSCs. The Applicant is requested to include a COL action item that assures the appropriate location of any safety-related SSCs in the plant yard.

03.07.02-89

In MUAP 10024 (R0), subsection 5.2, "Reinforcement" (page 10) states "Concrete reinforcement shall be deformed bars conforming to ASTM A 615, Grade 60, or ASTM A 706, Grade 60. These bars possess the properties given in Table 5-2. Reinforcement splices shall comply with ACI 318, Chapter 12 (Reference 7-3). Welding of reinforcing steel is not anticipated, however is to be performed in accordance with American Welding Society (AWS) D1.4 (Reference 7-13) if applicable."

The last sentence in the above quoted paragraph is confusing. It states that welding of rebar splices is not anticipated, but if welding is done it must meet the specified AWS code. It is not clear whether or under what conditions welding of the splices would be performed. The Applicant is requested to provide information that shows under what circumstances welded rebar splices are used, and why welding is necessary.

03.07.02-90

In reviewing MHI's technical report MUAP-10024(R0), the staff found several areas that lacked clarity and/or specificity. The Applicant is requested to provide the following clarifications:

- (1) Subsection 2.3 of MUAP-10024(R0), "Governing Codes and Design Standards," it states in part, "The following industry codes and standards are applicable for the structural design and analysis of the AC/B."
  - ACI 318-08, Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute, 2008 (Reference 7-3)"

Under References (page 13) item 7-3 reads "ACI 318-05, 'Building Code Requirements for Structural Concrete and Commentary,' American Concrete Institute, 2005." The Applicant is requested to specify which edition of the ACI Code applies, 2005 or 2008, and correct this discrepancy.

- (2) In subsection 6.3.1 of MUAP-10024(R0), "Calculations," the 4<sup>th</sup> bullet (page 11) states "Identification of any computer calculation, including computer type, computer program name, revision identification, inputs, outputs, evidence of or reference to computer program verification, and the bases (or reference thereto) supporting application of the computer program to the specific physical problem."

The Applicant is requested to specify what computer programs are to be used in the design and analysis of the AC/B.

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(3) Subsection 6.3.2 of MUAP-10024(R0) lists the various structural elements that will be included in the structural drawings of the AC/B. There is no entry for a structural framing plan and elevation for the structural steel portion of the AC/B.

The Applicant is requested add a structural framing plan and an elevation for the structural steel portion of the AC/B.

(4) Tables 5-1 and 5-2 in MUAP-10024(R0) give detailed material properties for the concrete and concrete steel reinforcing bars used in the AC/B. However, no such information is presented for the structural steel used in a portion of the AC/B.

The Applicant is requested to include a table in the MUAP-10024(R0) for the detailed material properties of the structural steel used in the AC/B.