KHNPDCDRAIsPEm Resource

From:	Ciocco, Jeff
Sent:	Thursday, July 16, 2015 7:07 AM
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Cc:	Wong, Yuken; Clark, Theresa; Betancourt, Luis; Lee, Samuel
Subject:	APR1400 Design Certification Application RAI 81-8000 (03.10 - Seismic and Dynamic Qualification of Mechanical and Electrical Equipment)
Attachments:	APR1400 DC RAI 81 MEB 8000.pdf; image001.jpg

KHNP,

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.

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

Thank you,

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Request for Additional Information 81-8000

Issue Date: 07/16/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 03.10 - Seismic and Dynamic Qualification of Mechanical and Electrical Equipment
Application Section: 3.10

QUESTIONS

03.10-1

DCD Tier 2, Rev. 0, Section 3.10.1.3 states that with the elimination of operating basis earthquake ground motion (OBE), analysis checks for fatigue effects can be performed at a fraction of the safe shutdown earthquake (SSE) (such as 50 cycles at one-half of the SSE peak amplitude, or 150 cycles at one-third of the SSE peak amplitude). In KHNP letter dated June 1, 2015, the applicant references SECY-93-087 (dated April 2, 1993) and IEEE Std 344 as the basis for this approach. The NRC staff recognizes that SECY-93-087 discusses this approach as one of the alternatives; however in Staff Requirement Memorandum (SRM) for SECY-93-087 (dated July 21, 1993), the NRC does not specifically approve this alternative. The approved alternatives for equipment qualification are (1) five one-half SSE events followed by one full SSE event, and (2) a number of fractional peak cycles equivalent to the maximum peak cycle for five one-half SSE events may be used in accordance with Appendix D to IEEE Std 344-1987 when followed by one full SSE. SRP Section 3.10 Section III.3.C also states the same guidance for equipment qualification. In a public meeting on June 23, 2013, the applicant indicated its intent to follow the approved alternatives in the SRM. Therefore, the NRC staff requests that the applicant revise the DCD and reference the specific alternative selected, with reference to the SRM on SECY-93-087.

03.10-2

SRP Section 3.8.3 endorses American National Standards Institute/American Institute of Steel Construction (ANSI/AISC) N690-1994 including Supplement 2 (2004), “Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities.” In addition, DCD Tier 2, Rev. 0, Table 3.2-1 references ANSI/AISC N690-1994 including supplement 2 (2004). However, DCD Tier 2, Rev. 0, Section 3.10.6 and Technical Repot APR1400-E-X-NR-14001-P, Rev. 0, Part 2 reference ANSI/AISC-N690-1994 without stating Supplement 2 (2004). For consistency, the staff requests that the applicant revise the DCD and the Technical Report to reference ANSI/AISC N690-1994 including Supplement 2 (2004), or justify using this earlier version of the ANSI/AISC standard in DCD Tier 2, Section 3.10 and the Technical Report.

03.10-3

SRP Section 3.10 Section II.1.A.ii states that equipment should be tested in the operational condition. Technical Report APR1400-E-X-NR-14001-P, Rev. 0, Part 2, Section 5.7 states that active equipment should be tested under operating conditions in accordance with the provisions in NRC RG 1.100 and IEEE Std 344. The section goes on to state that equivalent operating loads should be simulated to act on passive equipment, but the equipment itself need not be under an operating condition. The NRC staff requests that the applicant provide the justification for not testing the passive equipment under operating conditions.

03.10-4

SRP Section 3.10 indicates that the following mechanical and electrical equipment should be seismically qualified: equipment associated with systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling, containment and reactor heat removal or are otherwise essential in preventing significant release of radioactive material to the environment, and instrumentation that is needed to assess plant and environmental conditions during and after an accident, as described in RG 1.97. Also covered by SRP Section 3.10 is equipment (1) that performs the above functions automatically, (2) that is used by the operators to perform these functions manually, and (3) whose failure can prevent the satisfactory accomplishment of one or more of the above safety functions. The NRC staff recognizes that these equipment within the scope of seismic qualification may contain more than the safety-related equipment as defined in 10 CFR 50.2. As an example, the instrumentation that is needed to assess plant and environmental conditions during and after an accident may not be included in the safety-related equipment as defined in 10 CFR 50.2. In DCD Tier 2, Rev. 0, Section 3.10, the applicant refers to the equipment within the scope of seismic qualification as safety-related equipment. In DCD Tier 2, Rev. 0, Section 3.10.4.1, COL Item 3.10(3), the applicant refers to the equipment within the scope of seismic qualification as safety-related seismic Category I equipment. The NRC staff requests that the applicant update the DCD to refer to the equipment included in the scope of SRP 3.10 as “seismic Category I equipment,” “equipment as defined in DCD Tier 2, Section 3.10,” or other alternative terminologies. The NRC staff also requests that the applicant review Technical Report, APR1400-E-X-NR-14001-P, Rev. 0, Part 2 and apply the updated terminology consistently.

03.10-5

Technical Report APR1400-E-X-NR-14001-P, Rev. 0, Part 2, Section 6.1 states that the dynamic qualification reports should include information suggested in IEEE Std 344-2004, Section 10.3. However, IEEE Std 344-2004, Section 10.3 discusses test experience data. The NRC staff requests that the applicant verify the IEEE Std 344-2004 section number.

03.10-6

Table 3.9-6, “Stress Criteria for ASME Section III Class 2 and 3 Inactive Pumps,” in DCD Tier 2 provides a list of stress limits for various plant conditions to be applied to ASME Boiler and Pressure Vessel Code, Section III, Class 2 and 3 “inactive” pumps. The NRC staff requests that the applicant revise Section 3.9, “Mechanical Systems and Components” in DCD Tier 2 to clarify its definition of “inactive” components and to identify any “inactive pumps” for the APR1400 design in the DCD.


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