RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**115-8066**
SRP Section:	**03.11 - Environmental Qualification of Mechanical and Electrical Equipment**
Application Section:	**3.11**
Date of RAI Issue :	**07/27/2015**

Question No. 03.11-7

Maintenance and surveillance programs, in conjunction with preventive maintenance programs, provide assurance that the environmental design and qualification status of mechanical equipment will be maintained during the operational life of the plant. These programs are the responsibility of the COL applicants. APR1400 DCD Tier 2, Section 3.11.2.2, “Environmental Qualification during and after a Design Basis Accident,” states that the COL applicant is to address aspects for maintaining the environmental qualification status of components after initial qualification. However, this COL item is not listed in APR1400 DCD Tier 2, Section 3.11.7, “Combined License Information.” For completeness and consistency within the DCD, the staff requests the applicant to address this COL item in DCD Tier 2, Section 3.11.7.

In addition, the SRM dated September 11, 2002, for Commission paper SECY-02-0067, “Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for Operational Programs (Programmatic ITAAC),” stated that ITAAC for an operational program are unnecessary if the program and its implementation are fully described in a COL application and found to be acceptable by the NRC. To facilitate the full description of the environmental qualification program by COL applicants referencing the APR1400 design, the staff suggests that the DCD and technical report be revised to specify that this COL item includes the following aspects for the COL applicant to address development of the operational program to maintain the environmental qualification status of components, consistent with SRP Section 3.11:

- evaluation of environmental qualification results throughout design life to establish activities that support continued environmental qualification
- determination of surveillance and preventive maintenance activities based on environmental qualification results and operating experience
- consideration of environmental qualification maintenance recommendations from equipment vendors

- evaluation of operating experience in updating surveillance and preventive maintenance activities for specific equipment

- development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications

- development of plant procedures for reviewing equipment performance and environmental qualification operational activities, trending the results, and incorporating lessons learned through appropriate modifications to the environmental qualification operational program

- development of plant procedures for the control and maintenance of environmental qualification records

Response

KHNP will add a new COL item 3.11(5) that COL applicant is to address aspects for maintaining the environmental qualification status of components after initial qualification. This will be added to DCD Tier 2, sections 3.11.2.2 and 3.11.7.

Furthermore, the statement below will be added to DCD Tier 2, Section 3.11.2.2 as indicated in the attachment.

“The operational aspects to address development of the operational program to maintain the environmental qualification status of components, consistent with SRP Section 3.11 will include the following:

- evaluation of environmental qualification results throughout design life to establish activities that support continued environmental qualification

- determination of surveillance and preventive maintenance activities based on environmental qualification results and operating experience

- consideration of environmental qualification maintenance recommendations from equipment vendors

- evaluation of operating experience in updating surveillance and preventive maintenance activities for specific equipment

- development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications

- development of plant procedures for reviewing equipment performance and environmental qualification operational activities, trending the results, and incorporating

lessons learned through appropriate modifications to the environmental qualification operational program

- development of plant procedures for the control and maintenance of environmental qualification records.”

Impact on DCD

DCD sections 3.11.7, 3.11.2.2 and Table 1.8.2 will be revised as indicated in the Attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

Nonmetallic parts mainly consist of seals, gaskets, and lubricants whose failure of leakage, interception or wear could lead to hindrance of the safety function in the equipment in which they are installed. The safety-related active mechanical equipment that may contain such nonmetallic parts is qualified to ASME QME-1-2007 and specified in Table 3.11-3.

3.11.7 Combined License Information

COL 3.11(1) The COL applicant is to identify and qualify the site-specific mechanical, electrical, I&C, and accident monitoring equipment specified in RG 1.97.

COL 3.11(2) The COL applicant is to document the qualification test results and qualification status in an auditable file for each type of equipment in accordance with the requirements 10 CFR 50.49(j).

COL 3.11(3) The COL applicant is to describe the EQP implementation milestones based on the APR1400 EQP.

COL 3.11(4) The COL applicant is to identify the nonmetallic parts of mechanical equipment in procurement process.

3.11.8 References

1. APR1400-E-X-NR-14001-P, “Equipment Qualification Program,” Rev. 0, KEPCO & KHNP, September 2014.
2. Regulatory Guide 1.89, “Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Power Plants,” Rev. 1, U.S. Nuclear Regulatory Commission, June 1984.
3. IEEE Std. 323-2003, “IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers, 2003.
4. Regulatory Guide 1.40, “Qualification of Continuous Duty Safety-Related Motors for Nuclear Power Plants,” Rev. 1, U.S. Nuclear Regulatory Commission, February 2010.

COL 3.11(5) The COL applicant is to address operational aspects for maintaining the environmental qualification status of components after initial qualification.

k. Regulatory Guide 1.209, Guidelines for Environmental Qualifications of Safety-Related Computer-Based Instrumentation and Control Systems in Nuclear Power Plants

l. Regulatory Guide 1.210, Qualification of Safety-Related Battery Chargers and Inverters for Nuclear Power Plants

m. Regulatory Guide 1.211, Qualification of Safety-Related Cables and Field Splices for Nuclear Power Plants

n. Regulatory Guide 1.213, Qualification of Safety-Related Motor Control Centers for Nuclear Power Plants

o. General Design Criteria 1, 2, 4, and 23 of 10 CFR Part 50, Appendix A

p. Quality assurance in accordance with 10 CFR Part 50, Appendix B

The COL applicant is to address operational aspects for maintaining the environmental qualification status of components after initial qualification. (ref. COL 3.11(5))

Passive pressure boundary components inside the containment are designed for the appropriate temperature and pressure environment in accordance with the applicable code to which the component is constructed. The environmental qualification testing is not necessary for such components.

The materials used in the fabrication of mechanical and structural components inside the containment are selected to minimize corrosion and hydrogen generation resulting from contact with spray solutions. The use of aluminum and zinc is minimized in these components.

Insert

The operational aspects to address development of the operational program to maintain the environmental qualification status of components, consistent with SRP Section 3.11 will include the following:
- evaluation of environmental qualification results throughout design life to establish activities that support continued environmental qualification
- determination of surveillance and preventive maintenance activities based on environmental qualification results and operating experience
- consideration of environmental qualification maintenance recommendations from equipment vendors
- evaluation of operating experience in updating surveillance and preventive maintenance activities for specific equipment
- development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications
- development of plant procedures for reviewing equipment performance and environmental qualification operational activities, trending the results, and incorporating lessons learned through appropriate modifications to the environmental qualification operational program
- development of plant procedures for the control and maintenance of environmental qualification records

Table 1.8-2 (6 of 29)

Item No.	Description
COL 3.10(1)	The COL applicant is to provide documentation that the designs of seismic Category I SSCs are analyzed for OBE, if OBE is higher than 1/3 SSE.
COL 3.10(2)	The COL applicant is to investigate if site-specific spectra generated for the COLA exceed the APR1400 design spectra in the high-frequency range. Accordingly, the COL applicant is to provide reasonable assurance of the functional performance of vibration-sensitive components in the high-frequency range.
COL 3.10(3)	The COL applicant is to develop the equipment seismic qualification files that summarize the component's qualification, including a list of equipment classified as seismic Category I in Table 3.2-1 and seismic qualification summary data sheets (SQSDS) for each piece of safety-related seismic Category I equipment.
COL 3.10(4)	The COL applicant is to perform equipment seismic qualification for seismic Category I equipment and provide milestones and completion dates of equipment seismic qualification program.
COL 3.11(1)	The COL applicant is to identify and qualify the site-specific mechanical, electrical, I&C, and accident monitoring equipment specified in RG 1.97.
COL 3.11(2)	The COL applicant is to document the qualification test results and qualification status in an auditable file for each type of equipment in accordance with the requirements 10 CFR 50.49(j).
COL 3.11(3)	The COL applicant is to describe the EQP implementation milestones based on the APR1400 EQP.
COL 3.11(4)	The COL applicant is to identify the nonmetallic parts of mechanical equipment in procurement process.
COL 3.12(1)	The COL applicant is to prepare design reports for ASME Class 1, 2, and 3 piping system in accordance with ASME Section III.
COL 3.12(2)	The COL applicant is to design the piping exposed to wind and/or tornado, if any, to the plant design basis loads.
COL 3.12(3)	The COL applicant is to perform fatigue evaluations of ASME Class 1 piping.
COL 3.12(4)	The COL applicant is to perform stress evaluations for ASME Class 2 and 3 piping.
COL 3.12(5)	The COL applicant is to perform fatigue evaluations of environmental impact on ASME Class 1 piping, except for the RCS primary loop, using methods acceptable to the NRC at the time of evaluation.

COL applicant is to address aspects for maintaining the environmental qualification status of components after initial qualification.