

## REVISED 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.: 299-8310  
SRP Section: 05.04.02.02 - Steam Generator Program  
Application Section: SRP 5.4.2.2  
Date of RAI Issue: 11/09/2015

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### **Question No. 05.04.02.02-5**

The 8/4/15 response (ML15216A456) to MCB Issue 5.4.2.2-11 (KHNP issue AI 5-6.29) proposes two COL items for describing the steam generator tube inservice inspection and preservice inspection in a COL applicant's table of operational programs. The staff considers a single COL item in Chapter 5 would provide the information required with less potential for confusion. The staff requests that the applicant revise the FSAR to include a single COL item in Subsection 5.4 that requires the COL applicant to provide the implementation milestones for the Steam Generator Program preservice inspection and inservice inspection and list them in the table of operational programs. This information is needed for the staff to determine that the design will include requirements for implementing the preservice and inservice inspection requirements in accordance with the ASME Code and NEI 97-06.

### **Response – (Rev.1)**

KHNP revised the previously submitted markups response to MCB Issue 5.4.2.2-11 ( AI 5-6.29) and RAI(299-8310) Question No. 05.04.02.02-5 to include a single COL item in Subsection 5.4.2.2.2.2, 5.4.16, 13.4.1, and Ch.1 Table 1.8-2 as shown in Attachment.

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### **Impact on DCD**

FSAR Subsection 5.4.2.2.2.2, 5.4.16, 13.4.1, and Ch.1 Table 1.8-2.

### **Impact on PRA**

There is no impact on the PRA.

### **Impact on Technical Specifications**

There is no impact on Technical Specifications.

**Impact on Technical/Topical/Environmental Reports**

There is no impact on any Technical, Topical, or Environment Report.

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repairs, primary-to-secondary leak monitoring, maintenance of secondary-side integrity, secondary-side water chemistry, primary-side water chemistry, foreign material exclusion, contractor oversight, self-assessment, and reporting.

#### 5.4.2.2.2.1 Degradation Assessment

A degradation assessment is performed prior to the preservice inspection (PSI) and planned ISI for SGs during commercial operation to address the RCPB integrity within the SG (e.g., plugs, sleeves, tubes, and components that support the pressure boundary such as secondary-side components).

~~The assessment determines the size and location of existing and potential degradations that are likely to become harmful cracks.~~

The assessment considers operating experience and provides reasonable assurance that appropriate inspections are performed during the upcoming outage and that the requisite information for integrity assessment is provided.

Some of the important features of the degradation assessment are:

- a. Identifying existing and potential degradation mechanisms
- b. Choosing techniques to test for degradation based on the probability of detection and sizing capability
- c. Establishing the number of tubes to be inspected
- d. Establishing the tube integrity limits for condition monitoring and operational assessment

#### 5.4.2.2.2.2 Inspection

SG tube inspections based on degradation assessments are conducted and follow the inspection guidance in the EPRI PWR Steam Generator Examination Guidelines (Reference 12).

The COL applicant is to prepare PSI and ISI program of the SG tubes.

Note) The change in this item was cancelled.

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COL 5.4(5) The COL applicant is to verify the as-built RV support material properties and 60-year neutron fluence.

COL 5.4 (6)

The COL applicant is to prepare PSI and ISI programs of the SG tubes.

5.4.17 References

Note) The change in this item was cancelled.

1. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Facility Components," The American Society of Mechanical Engineers, the 2007 Edition with the 2008 Addenda.
2. 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants." U.S. Nuclear Regulatory Commission.
3. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity," Rev. 1, U.S. Nuclear Regulatory Commission, August 1975.
4. APR1400-A-M-NR-14001-P, "KHNP APR1400 Flywheel Integrity Report," KHNP, November 2014.
5. ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components, The American Society of Mechanical Engineers, the 2007 Edition with the 2008 Addenda.
6. ASME PTC 8.2, "Centrifugal Pumps," The American Society of Mechanical Engineers, 1990.
7. NEMA MG-1, "Motors and Generators," National Electrical Manufacturers Association, 2009 (with 2010 Revision 1).
8. Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," Revision 0, U.S. Nuclear Regulatory Commission, August 1976.
9. ASME Section III, Appendix N, "Dynamic Analysis Methods," The American Society of Mechanical Engineers, the 2007 Edition with the 2008 Addenda.
10. Bulletin 79-13, "Cracking in Feedwater System Piping," Rev. 1, U.S. Nuclear Regulatory Commission, August 30, 1979.
11. NEI 97-06, "Steam Generator Program Guidelines," Rev. 3, Nuclear Energy Institute, January 2011.

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Table 1.8-2 (8 of 29)

Item No.	Description
COL 5.2(8)	The COL applicant is to provide and develop the implementation milestones for the inservice inspection and testing program for the RCPB, in accordance with ASME Code Section XI and 10 CFR 50.55a.
COL 5.2(9)	The COL applicant is to address the provisions to accessibility of Class 1 components for ISI if the design of the APR1400 Class 1 component is changed from the DCD design.
COL 5.2(10)	The COL applicant is to provide the list of Code exemptions in the ISI program of the specific plants, if it exists.
COL 5.2(11)	The COL applicant is to prepare and provide any requests for relief from the ASME Code requirements that are impracticable as a result of limitations of component design, geometry, or materials of construction for the specific plants, if necessary. The request will contain the information on applicable Code requirements, alternative ISI method, and justification.
COL 5.2(12)	The COL applicant may invoke ASME Code Cases listed in NRC RG 1.147 for the ISI program.
COL 5.2(13)	The COL applicant is to prepare and implement a boric acid corrosion (BAC) prevention program compliant with Generic Letter 88-05.
COL 5.2(14)	The COL applicant is to prepare the preservice inspection and testing program.
COL 5.2(15)	The COL applicant is to address and develop milestones for preparation and implementation of the procedure for operator responses to prolonged low level leakage.
COL 5.3(1)	The COL applicant is to provide a reactor vessel material surveillance program for a specific plant.
COL 5.3(2)	The COL applicant is to develop P-T limit curves based on plant-specific data.
COL 5.3(3)	The COL applicant is to verify the $RT_{PTS}$ value and the USE at EOL based on plant-specific material property and neutron fluences.
COL 5.3(4)	The COL applicant is to provide and develop the inservice inspection and testing program for the RCPB, in accordance with ASME Section XI and 10 CFR 50.55a.
COL 5.4(1)	The COL applicant is to prepare operational procedures and maintenance programs as related to leak detection and contamination control of RCS.
COL 5.4(2)	The COL applicant is to maintain complete documentation of system design, construction, design modifications, field changes, and operations of RCS.
COL 5.4(3)	The COL applicant is to prepare operational procedures and maintenance programs as related to leak detection and contamination control of SCS.
COL 5.4(4)	The COL applicant is to maintain complete documentation of system design, construction, design modifications, field changes, and operations of SCS.
COL 5.4(5)	The COL applicant is to verify the as-built RV support material properties and 60-year neutron fluence.
COL 5.4(6)	The COL applicant is to prepare PSI and ISI programs of the steam generator tubes.



Note) The change in this item was cancelled.

**APR1400 DCD TIER 2****13.4 Operational Program Implementation**

The COL applicant is to develop a list of operational programs, a description of the operational programs, and the associated implementation milestones (COL 13.4(1)).

**13.4.1 Combined License Information**

COL 13.4(1) The COL applicant is to develop operational programs and provide schedules for implementation of the programs, as defined in SECY-05-0197 (Reference 1). The COL applicant is to provide commitments for the implementation of operational programs that are required by regulation. In some instances, the programs may be implemented in phases, where practical, and the applicant is to include the phased implementation milestones.

COL 13.4(2) The COL applicant is responsible for developing a leakage monitoring and prevention program for the systems, as specified in Subsection 5.5.2 in Chapter 16 Technical Specifications. The leakage monitoring and prevention program is to provide suitable methods and acceptance criteria as defined in NUREG-0737 Item III.D.1.1 (Reference 2).

Deleted

~~COL 13.4(3)~~

13.4.2 Reference

~~The COL applicant is to develop an implementation plan of PSI and ISI programs of the steam generator tubes. The COL applicant is to provide a commitment for the implementation plan of PSI and ISI programs of the steam generator tubes.~~

1. Staff Requirements Memorandum to SECY-05-0197, "Staff Requirements-SECY-05-0197-Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," U.S. Nuclear Regulatory Commission, February 2006.
2. NUREG-0737, "Clarification of TMI Action Plan Requirements," U.S. Nuclear Regulatory Commission, November 2006.

AI 5-6.29\_5.4.2.2\_#11

Attachment 4 (1/1)

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13.4 Operational Program Implementation

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Deleted

~~COL 13.4(3)~~13.4.2 References

~~The COL applicant is to develop an implementation plan of PSI and ISI programs of the steam generator tubes. The COL applicant is to provide a commitment for the implementation plan of PSI and ISI programs of the steam generator tubes.~~

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