

## 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.: 198-8208  
SRP Section: 14.02 - Initial Plant Test Program  
Application Section: 14.2 - Initial Test Program  
Date of RAI Issue: 09/04/2015

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### **Question No. 14.02-19**

Provide the acceptance criteria used to select plant features to be tested in the initial test program in order to meet Criterion XI of Appendix B to 10 CFR Part 50.

Criterion XI, "Test Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 states, in part, that a test program shall be established to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service is identified and performed in accordance with written test procedures, which incorporate the requirements and acceptance limits contained in applicable design requirements.

RG 1.68, "Initial Test Programs for Nuclear Power Plants" provides guidance on the initial test program. This regulatory guide states that "The [Initial Test Program] (ITP) should be designed to demonstrate the performance of SSCs and design features that will be used during normal facility operations, as well as the performance of standby systems and features that must function to maintain the plant in a safe condition in the event of malfunctions or accidents. The startup tests should be sequenced so that plant safety is never entirely dependent on the performance of untested SSCs." Further SRP Section 14.2, Acceptance Criteria, Item 1.B states that the ITP should describe the criteria for selection of plant features to be tested by the applicant. The staff cannot find the acceptance criteria the applicant used for the selection of plant features to be tested in APR1400 FSAR Tier 2, Section 14.2. As such, the staff requests the applicant to modify FSAR Tier 2, Section 14.2 to include this information.

### **Response**

KHNP has reviewed the subject question and understands the staff's request. KHNP is in the process of upgrading the test plans presented in Section 14.2 of the DCD. This effort is

focused on adding additional SSCs that are important to safety and risk significant as well as increasing the level of detail described in the DCD for test prerequisites, test methods and acceptance criteria for the various tests. It has been determined that the actions to be taken as a result of this question is within the scope of the upgrade effort. Therefore, KHNP will address the noted items in the upgrade effort, which is scheduled to be completed by February 1, 2016. A revised response to this question that incorporates the results of the upgrade effort will be submitted to the NRC after completion.

### **Response – (Rev. 1)**

To reflect the requirements of Criterion XI of Appendix B to 10 CFR Part 50 and RG 1.68, "Initial Test Programs for Nuclear Power Plants," the contents of the individual test plans, including the acceptance criteria in the APR1400 DCD Section 14.2, are to be updated as submitted to the NRC in letter MKD/NW-16-0156L, "Submittal of Revised DCD Section 14.2 Initial Plant Test Program," dated February 24, 2016.

As for selection of plant features to be tested, the APR1400 test plans were developed to demonstrate that the plant can be operated in accordance with design requirements important to safety. Since the reference plant for the APR1400, Shin Kori Unit 3, was being constructed and had developed a comprehensive test program using RG 1.68 as a guide and taking into consideration the lessons learned of previous test programs, that program was used as a model for selecting the SSCs to be included in the APR1400 program as well as establishing the content of the tests to be conducted. The scope of the testing program includes SSCs that meet one or more of the following criteria:

- SSCs used for shutdown and cool down of the reactor under normal plant conditions and for maintaining the reactor in a safe condition for an extended shutdown period
- SSCs used for shutdown and cool down of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions,
- SSCs used to establish conformance with safety limits or limiting conditions for operation that are included in the Technical Specifications,
- SSCs classified as engineered safety features or relied on to support or ensure the operation of engineered safety features within design limits,
- SSCs that function during a design basis event and are credited in the Chapter 15 accident analysis,
- SSCs that are used to process, store, control, or limit the release of radioactive materials,
- SSCs that are relied upon to maintain their structural integrity during normal operation, anticipated transients, simulated test parameters, and design-basis event conditions to avoid damage to safety-related SSCs

Clarification on the criteria used for selecting the components within the scope of the test program will be added to DCD Tier 2 Section 14.2.

**Impact on DCD**

DCD 14.2 will be updated as shown in the Attachment and as shown in letter, MKD/NW-16-0156L, "Submittal of Revised DCD Section 14.2 Initial Plant Test Program" (not attached).

**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 Environment Report.

**APR1400 DCD TIER 2****14.2 Initial Plant Test Program****14.2.1 Summary of Test Program and Objectives**

The purpose of this section is to describe the initial test program (ITP) that is performed during initial startup of the APR1400 plant.

The ITP includes testing activities commencing with the completion of construction and installation and ending with the completion of power ascension testing. The results of the testing demonstrate that components and systems operate in accordance with design requirements and meet the requirements of 10 CFR Part 50, Appendix B, Criterion XI (Reference 1). The results confirm that performance levels meet operational safety requirements and verify the adequacy of component and system design and system operability over their operating ranges. The program also aids in establishing baseline performance data and serves to verify that normal operating and emergency procedures accomplish their intended purposes. The ITP consists of operational tests and initial startup tests as the following four phases:

- a. Phase I: Preoperational testing
- b. Phase II: Fuel loading and post-core hot functional testing
- c. Phase III: Initial criticality and low-power physics testing
- d. Phase IV: Power ascension testing



The scope of the testing program includes SSCs that meet one or more of the following criteria:

- SSCs used for shutdown and cool down of the reactor under normal plant conditions and for maintaining the reactor in a safe condition for an extended shutdown period
- SSCs used for shutdown and cool down of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions,
- SSCs used to establish conformance with safety limits or limiting conditions for operation that are included in the Technical Specifications,
- SSCs classified as engineered safety features or relied on to support or ensure the operation of engineered safety features within design limits,
- SSCs that function during a design basis event and are credited in the Chapter 15 accident analysis,
- SSCs that are used to process, store, control, or limit the release of radioactive materials,
- SSCs that are relied upon to maintain their structural integrity during normal operation, anticipated transients, simulated test parameters, and design-basis event conditions to avoid damage to safety-related SSCs