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## 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.: 194-8172  
SRP Section: 14.02 – Initial Plant Test Program - Design Certification and New License Applicants  
Application Section: 14.2  
Date of RAI Issue: 09/01/2015

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### **Question No. 14.02-17**

10 CFR 50 Appendix I as it relates to the effluent releases to a member of the public, in being able to monitor and control effluent releases.

10 CFR 20 Appendix B as it relates to monitoring and complying with the effluent concentration limits specified.

Staff review of DCD Tier 2, Revision 0, Sections 11.2.1.2 and 14.2.12.1.103 found that information on the Test Method and Acceptance Criteria in the ITP for the LWMS was not fully described. Section 11.2.1.2 describes verification of manual and automatic system controls on key system alarms such as high-level alarms associated with liquid tanks simultaneously activated in the MCR, and verification of other alarms such as radiation monitor and dual isolation valves to monitor and control effluent discharge to the environment and other indications; however, verification of manual and automatic response to normal control, alarms, and indications are not identified in Section 14.2.12.1.103 Acceptance Criteria. Please revise the DCD to include this information and provide a markup.

### **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.

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**Response – (Rev. 1)**

The results of the upgrade effort to provide more detailed content of the Liquid Waste Management System (LWMS) Test plan, DCD Tier 2 Section 14.2.12.1.103, including, test objectives, prerequisites, test methods, data required and acceptance criteria were included in a draft revision of the APR1400 DCD Tier 2 Section 14.2 which was previously submitted to the NRC (ref. KHNP submittal MKD/NW-16-0156L “Submittal of Revised DCD Section 14.2 Initial Plant Test Program” dated February 24, 2016; ML16056A003). The LWMS test objectives have been expanded from one general objective to four, more detailed objectives and eight new acceptance criteria have been incorporated. Among various items included in the revised test plan is verification of manual and automatic system controls on key system alarms including high-level alarms associated with liquid tanks and other alarms such as radiation monitor and dual isolation valves.

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**Impact on DCD**

Section 14.2.12.1.103 will be changed as shown in the enclosure to KHNP letter, MKD/NW-16-0156L “Submittal of Revised DCD Section 14.2 Initial Plant Test Program” and is included in the attachment for information.

**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 Report.

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in a performance test apparatus and exposed to a known air/hydrogen sample. The test instrumentation is used to measure degradation in catalytic action.

**4.0 DATA REQUIRED**

4.1 Plant temperature

4.2 Depletion rate

**5.0 ACCEPTANCE CRITERIA**

5.1 The passive autocatalytic recombiners are verified to provide a hydrogen depletion rate of greater than or equal to the minimum depletion rate identified in Subsection 6.2.5. It is also verified that the required number of recombiners are installed at the locations defined in Subsection 6.2.5.

**14.2.12.1.103 Liquid Waste Management System Test****1.0 ~~OBJECTIVE~~OBJECTIVES**

1.1 To demonstrate the ~~operability~~manual/auto operation of ~~the~~liquid waste management system (~~LWMS~~) ~~for collection, processing~~equipment and ~~recycling of components including pumps, tanks, heater and valves~~

1.2 To demonstrate the operation of isolation function for liquid wastes, and for preparation of liquid waste for release to discharge line

1.3 To demonstrate the ~~environment~~operation of status lights and system alarms and instruments

1.4 To demonstrate the performance characteristics of R/O package

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## 2.0 PREREQUISITES

- 2.1 Construction activities on the LWMS have been completed.
- 2.2 LWMS instrumentation has been calibrated.
- 2.3 Support systems required for operation of the LWMS are completed and operational.
- 2.4 Test instrumentation is available and calibrated.

2.5 Proper types and amounts of filtration, membranes, and resins are loaded in the R/O package.

## 3.0 TEST METHOD

- 3.1 Operate control valves from all appropriate control positions. –Observe valve operation and position indication.– Measure opening and closing times, where required.
- 3.2 Verify the proper operation of the tank level alarms and interlocks.
- 3.3 Verify the proper operation of system pumps and valves.
- 3.4 Verify the proper operation of ~~high differential pressure alarms for the process vessel.~~
- ~~3.5—Verify the proper operation of~~ the tank mixers.
- ~~3.6—Verify the proper operation of the filtration unit.~~
- ~~3.7—~~3.5 Demonstrate ~~that discharge the~~ isolation features ~~and other system controls function~~ properly.– to discharge the liquid waste effluent.  
Simulate a high-radiation signal to the LWMS discharge radiation

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monitor. Discharge radiation monitors are tested as described in Section 14.2.12.1.106.

3.86 Verify alarms, ~~indicating~~ instruments, and status lights are functional. ~~Simulate a high radiation signal to the LWMS discharge radiation monitor and verify alarm actuation~~

3.7 Verify the process flow rate, filtration efficiency, and operability of R/O package.

#### 4.0 DATA REQUIRED

4.1 Waste pump operating data

4.2 Valve opening and closing times, where required

4.3 Valve position indication

4.4 Setpoints at which alarms and interlocks occur

4.5 Filtration unit operating data

#### 5.0 ACCEPTANCE CRITERIA

5.1 The LWMS operates as described in Section 11.2.

~~5.2 The LWMS discharge radiation monitor operates as described in Table 11.5-2.~~

5.2 The liquid waste management system pumps should be manually started and stopped by their respective control switches, and their status should be indicated on Radwaste Control Console.

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- 5.3 When the following tanks are "Lo" level, their respective pumps and cross-tied pumps should be stopped automatically, and their status should be indicated on radwaste control console.
- 5.4 The Caustic Storage Tank Heater should be manually operated by control switch on local panel and automatically started or stopped by Tank temperature "Lo" or "Hi" in AUTO mode.
- 5.5 Specified valves should be manually operated by their respective control switches on radwaste control console and their position lights should be illuminated on control switches.
- 5.6 Alarm, pump shutdown, and valve closure should be automatically operated upon detection of a high radiation signal.
- 5.7 Alarms should be annunciated at radwaste control console upon specified conditions.
- 5.8 When specified cross-tie valves are operated manually at local, their respective position lights should be indicated on radwaste control console.
- 5.9 The process flow rate, decontamination factor and filtration efficiency of major process components are equal to or greater than the design basis.

14.2.12.1.104 Solid Waste Management System Test1.0 ~~OBJECTIVE~~OBJECTIVES

- 1.1 To demonstrate the ~~operability~~operation of the ~~solid-waste management system (SWMS) to collect~~valves
- 1.2 To demonstrate the failed position of system valves