
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.: 192-8180
SRP Section: 14.02 – Initial Plant Test Program - Design Certification and New License Applicants
Application Section: 14.2
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Question No. 14.02-15

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 and Criterion XI, "Test Control."

Staff review of DCD Tier 2, Revision 0, Sections 11.3, "Gaseous Waste Management System," (GWMS) and 14.2.12.1.105, "Gaseous Waste Management System Test," found that information on the Test Method and Acceptance Criteria for the GWMS was not fully described. Section 11.3 describes verification of manual and automatic system controls on key system alarms such as high-level alarms associated with the gaseous waste system simultaneously activated in the MCR, and verification of other alarms such as radiation monitor and 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 14.2.12.1.105 Acceptance Criteria. Please revise the DCD to include this information and provide a markup.

Response

The manual and automatic response to the system normal control, alarms, and indications will be verified by identifying that overall system operation including valve operation, alarms, indication, and status lights are functional as designed. Section 14.2.12.1.105 was recently expanded to include additional test methods and acceptance criteria that were not in the original ITP (Reference KHNP submittal MKD/NW-16-0156L, dated February 24, 2016). These additional test methods and acceptance criteria address the issue identified, (the attached markup corrects the numbering). However, an additional objective will be added that corresponds to the recently upgraded test methods and acceptance criteria.

Two of the proposed test methods, 3.4 and 3.5, will be modified. The automatic valve operation upon the receipt of a high-high oxygen concentration signal and high radiation signal described in DCD Tier 2, Table 11.3-8 will be verified.

The verification for radiation and oxygen concentration alarm actuation including associated monitoring is conducted with the Process and Effluent Radiological Monitoring System, as described in Section 14.2.12.1.106, and the Process and Primary Sampling System, as described in Section 14.2.12.1.83, respectively.

Impact on DCD

DCD Tier 2, Section 14.2.12.1.105 will be revised as indicated in the Attachment. For clarity, the proposed changes to Section 14.2.12.1.105 are shown using the previously submitted markup.

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.

APR1400 DCD TIER 2

gaseous radwaste subsystem

GRS

FSCEA	full-strength CEA
FWCS	feedwater control system
GCB	generator circuit breaker
GDC	general design criteria (of 10 CFR Part 50, Appendix A)
<u>GSERMS</u>	<u>gas stripper effluent radiation monitor subsystem</u>
GTG	gas turbine generator
GWMS	gaseous waste management system
HEPA	high efficiency particulate air
HFE	human factors engineering
HFT	hot functional test
HHAS	high humidity actuation signal
HMS	hydrogen mitigation system
HRAS	high radiation actuation signal
HVAC	heating, ventilation, and air conditioning
HVT	holdup volume tank
HX	heat exchanger
I&C	instrumentation and control
IEEE	Institute of Electrical and Electronics Engineers
<u>IFPD</u>	<u>information flat panel display</u>
IPS	information processing system
IRWST	in-containment refueling water storage tank
ITAAC	inspections, tests, analyses, and acceptance criteria
ITC	isothermal temperature coefficient
ITP	initial test program
<u>ITP</u>	<u>interface and test processor</u>
IVMS	internal vibration monitoring system
LBB	leak before break
<u>LC</u>	<u>load center</u>
LEL	lower electrical limit
<u>LHR</u>	<u>linear heat rate</u>
LOCA	loss of coolant accident

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5.0 ACCEPTANCE CRITERIA

- 5.1 ~~The SWMS operates as~~ Specified valves shall be manually opened and closed by their respective hand switches located at Information FPD on the radwaste control console and at local.
- 5.2 Specified valve strokes full open and full close in response to FIK-003 located at information FPD on the radwaste control console, and status is properly indicated.
- 5.3 System alarms shall be operated per design.
- 5.4 New resin tank shall be capable of charging the specified equipment with new resin.
- 5.5 Spent resin shall be transferred from specified equipment to low activity spent resin Tanks.
- 5.6 Specified valves fail in the required position on loss of control power and loss of air, and return to the connect position on restoration of air or control power. Inoperable status indicates properly.
- 5.7 Wet solid wastes shall be stabilized or dewatered and satisfied 10 CFR 61.56 in described in Section 11.4.1.4.
- 5.8 No leakage shall be satisfied in at where fluid carrying is proceed between mobile processing equipment and permanently installed plant subsystems.

14.2.12.1.105 Gaseous Waste Management System Test1.0 ~~OBJECTIVE~~ OBJECTIVES

- 1.1 To demonstrate the ~~ability~~ manual/auto operation of GRS equipment and components including valves
- ← 1.2 To demonstrate the verification of manual and automatic response to the system normal control, alarms, and indications.

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1.3 → ~~1.2~~ To demonstrate the capability of the controlling the explosive gas mixture

1.4 → ~~1.3~~ To demonstrate the operation of isolation function for gaseous waste management system (GWMS) to collect and process radioactive gases vented from plant equipmenteffluent discharge line

2.0 PREREQUISITES

2.1 Construction activities on the ~~GWMS~~GRS have been completed.

2.2 ~~GWMS~~Initial loading of the charcoal into the charcoal beds has been completed, and types and actual amounts of charcoal have been verified before the initial loading to ensure that the gaseous releases are within the regulatory limits.

2.3 GRS instrumentation has been calibrated.

~~2.34~~ Support systems required for operation of the ~~GWMS~~GRS are completed and operational.

~~2.45~~ Test instrumentation is available and calibrated.

3.0 TEST METHOD

~~3.1~~ ~~Verify flow paths.~~

~~3.2~~ ~~Demonstrate that discharge isolation features and other system controls function properly. Simulate a high radiation signal to the GWMS discharge radiation monitor.~~

~~3.3~~ ~~Verify alarms, indicating instruments, and status lights are functional. Simulate a high radiation signal to the GWMS discharge radiation monitor and verify alarm actuation in the main control room.~~

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~~3.4 Demonstrate the operation of the gas drying equipment.~~

~~3.5 Demonstrate proper holdup time of gas through the charcoal adsorbers.~~

~~3.6 Demonstrate the operation of the system gas analyzers.~~

~~3.7 Operate control valves from all appropriate control positions. Observe valve operation and position indication. Measure opening and closing times, where required.~~

3.2 Verify that alarms, indicating instruments, and status lights are functional.

3.3 Verify that operations of equipment in gaseous radwaste system package are functional.

3.4 The automatic nitrogen injection operation upon the receipt of high oxygen concentration signal is verified.

high-high

3.5 The automatic discharge isolation valve operation upon the receipt of high radiation condition is verified with simulated signal, RMS test will be performed as described in Section 14.2.12.1.106.

signal is verified.

4.0 DATA REQUIRED

~~4.14.1~~ The properties and verification data for loaded charcoal in charcoal beds.

4.2 Setpoints of alarms, interlocks, and controls

~~4.2 Gas dryer operating data~~

~~4.3 Gas analyzer operating~~ Gaseous radwaste system package design data

~~4.4 Gas transport times~~

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5.0 ACCEPTANCE CRITERIA

5.1 The ~~GWMS~~GRS operates as described in Section 11.3.

5.2 → 5.5 GRS valves are opened and closed by their respective handswitches and by each setpoint as designed.

5.3 → 5.8 The GRS alarms, indicating instruments, and status lights are functional as designed.

5.4 → 5.2 The ~~GWMS~~GRS discharge valves are closed automatically upon receipt of high radiation ~~monitor-operates~~signal. The verification for high radiation alarm actuation in main control room is conducted as described in ~~Table 11.5~~Section 14.2.12.1.106.

5.5 → 5.3 The nitrogen injection valves are opened automatically upon receipt of high oxygen concentration signal. The verification for high oxygen concentration alarm actuation in main control room is conducted as described in Section 14.2.12.1.83.

5.6 → 5.4 Containment isolation valves are closed automatically upon receipt of a CIAS signal.

14.2.12.1.106 Process and Effluent Radiological Monitoring System Test1.0 ~~OBJECTIVE~~OBJECTIVES

1.1 To verify that the ~~process and effluent radiological monitoring system (PERMS)~~ can detect and record specific radiation levels, and to verify all alarms and interlocks

1.2 To verify the power status of RMS computer, SRDC, Local units

1.3 To verify the Rate-meter Communication conditions