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.:	**86-8003**
SRP Section:	**10.04.09 – Auxiliary Feedwater System**
Application Section:	**10.4.9**
Date of RAI Issue:	**07/16/2015**

Question No. 10.04.09-4

In accordance with SRP 10.4.9 Section III, Item 3, the AFWS design should have features to meet the generic recommendations of NURE-0611 and NUREG-0635. SRP 10.4.9 Section III, Item 3, also indicates that a 48-hour test is acceptable rather than the 72-hour test.

In NUREG 0611 and NUREG-0635 additional short-term recommendation 2 states that a 72-hour endurance test should be performed on all AFWS pumps. Following the 72-hour pump run, the pumps should be shut down and cooled down and then restarted for one hour. Test acceptance criteria should include demonstrating that the pump remains within the design limits with respect to bearing/bearing oil temperatures and vibration, and that pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety-related equipment in the room.

While the applicant makes reference to a 48-hour endurance test in section 10.4.9 of the DCD, the staff was unable to find any information on the requirements of the endurance test in DCD Tier 2, Section 14.2.12.1.34, “Auxiliary Feedwater System Test.”

The applicant is required to specify the requirements for the AFWS pump endurance test, including specifying the required test duration in DCD Tier 2, Section 14.2.12.1.34.

Response

In accordance with the recommendations of NUREG-0635, a 48-hour endurance test on the AFW pumps will be performed. Therefore, DCD Tier 2, 10.4.9.4.2 and 14.2.12.1.34 will be revised.

Impact on DCD

DCD Tier 2, 10.4.9.4.2 and 14.2.12.1.34 will be revised as indicated on the attached 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 Environment Report.

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In accordance with the recommendations of NUREG-~~0611~~, a 48-hour endurance test is to be performed on the AFW pumps to demonstrate that the pumps have the capability for continuous operation over an extended time period without failure.

10.4.9.5 Instrumentation Requirements

Sufficient instrumentation and controls are provided to adequately monitor and control the AFWS. Appropriate methods are employed to provide reasonable assurance of independent operation of the instrumentation and control channels to prevent any adverse and undesirable interaction between the AFW lines. All non-safety-related instrumentation and controls are designed so that any failure will not cause degradation of any safety-related equipment function. All valve and pump controls, and status and parameter indications, are listed in Table 10.4.9-4. The emergency power train designations for instrumentation and controls are given in Table 10.4.9-2. All AFWS parameter measurements and indication instrumentation are described below.

10.4.9.5.1 Pressure Instrumentation

a. Auxiliary feedwater pump discharge pressure

The MCR and RSR are provided with a discharge pressure indication downstream of each of motor-driven AFW pump and turbine-driven AFW pump.

b. Auxiliary feedwater pump suction pressure

The MCR and RSR are provided with a suction pressure indication and low-pressure alarm upstream of each of motor-driven AFW pump and turbine-driven AFW pump.

c. Auxiliary feedwater pump turbine inlet pressure

The MCR and RSR are provided with inlet pressure indication for AFW pump turbines.

d. Local pressure indications

5.0 ACCEPTANCE CRITERIA

5.1 The fuel handling and storage system performs as described in Section 9.1.

14.2.12.1.34 Auxiliary Feedwater System Test

1.0 OBJECTIVE

1.1 To demonstrate the ability of the auxiliary feedwater system (AFWS) to supply feedwater to the steam generators for design emergency conditions

1.2 To verify endurance of the auxiliary feedwater pump for a 48-hour test

2.0 PREREQUISITES

2.1 Construction activi

2.2 Permanently installed instrumentation is operable and calibrated.

2.3 Test instrumentation is available and calibrated.

2.4 Plant systems required to support testing are operable, or temporary systems are installed and operable.

3.0 TEST METHOD

3.1 Verify all control logic.

3.2 Verify head and flow characteristics of motor-driven auxiliary feedwater pumps.

3.3 Verify the starting time and head and flow characteristics of the turbine-driven auxiliary feedwater pump at the full design range of steam pressures (hot functional test / power ascension test [HFT/PAT]).

4.5 Response of auxiliary feedwater pumps to engineering safety features actuation system (ESFAS) signals

4.6 Pump start times

4.7 Position response of valves to loss of motive power

5.0 ACCEPTANCE CRITERIA

5.1 The AFWS performs as described in Subsections 7.3.1.9 e and 10.4.9.

14.2.12.1.35 Reactor Coolant System Hydrostatic Test

1.0 OBJECTIV

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2.0 PREREQU

5.2 48-hour endurance test is performed on all AFWS pumps. Following the 48-hour run, the pumps are shut down and cooled down and then restarted for one hour. It is confirmed that the pump remains within the design limits with respect to bearing/bearing oil temperatures and vibration, and that pump room ambient conditions(temperature and humidity)do not exceed environmental qualification limits for safety-related equipment in the room.

2.1 The RCS is filled, vented, and at the required temperature.

2.2 The reactor coolant pumps are operable.

2.3 Test pump is available.

2.4 Pressurizer pilot-operated safety relief valves are removed or valve opening set pressures are changed.

2.5 Permanently installed instrumentation necessary for testing is operable and calibrated.

2.6 Test instrumentation is available and calibrated.