

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.: 221-8248
SRP Section: 05.04.07 - Residual Heat Removal System
Application Section: DCD Section 5.4.7
Date of RAI Issue: 09/23/2015

Question No. 05.04.07-1

10 CFR Part 50, Appendix A, GDC 34 requires the capability to transfer decay heat and other residual heat from the reactor such that fuel and pressure boundary design limits are not exceeded. In addition, the system must be designed with sufficient redundancy and isolation capability to ensure that the safety function can be accomplished assuming a single failure of an active component with or without a coincident loss of offsite power. BTP 5-4 provides an acceptable approach to ensure compliance with GDC 34 with regard to accomplishing the RHR system safety functions assuming a single failure. Compliance with GDC 34 enhances plant safety by providing assurance that decay and RHR will be accomplished and the RCS pressure boundary and fuel cladding integrity will be maintained, thereby minimizing the potential for the release of fission products to the environment.

In DCD subsection 5.4.7.4.1.2 “Heat Removal Capability,” the applicant states, “A test is performed on SDCHXs during pre-core hot functional testing. Shutdown cooling and component cooling water flow rates to each heat exchanger, reactor coolant temperatures at SDCHX inlet and outlet, and component cooling water temperature at SDCHX inlet are measured. Test results are used to verify that the heat removal capability of each SDCHX meets the heat removal capability required to achieve a safe cold shutdown.”

The preoperational test described above is 14.2.12.1.46 “Pre-Core Hot Functional Test Controlling Document.” Under the test method section, the applicant states, “Specify plant conditions and coordinate the execution of the related pre-core hot functional test appendices.” However, the staff was unable to locate the appendix for the shutdown cooling system in applicable reports including the DCD.

Also, during Phase II, Fuel loading and post-core hot functional testing per subsection 14.2.12.2.1, “Post-Core Hot Functional Test Controlling Document,” the applicant refers to “post-core hot functional test appendices.”

In order to complete the evaluation of the SCS functional design testing, please provide the precore hot functional test appendices and post-core hot functional test appendices.

Response

Test plans for 14.2.12.1.46, “Pre-Core Hot Functional Test Controlling Document,” and 14.2.12.2.1, “Post-Core Hot Functional Test Controlling Document” are the controlling documents for all the pre-core and post-core test schedule and sequences. Therefore, these two procedures do not include the system specific test plan.

The meaning of the word “appendices” is the list of each individual test plan that is summarized in Table 14.2-1 and Table 14.2-2. We will revise DCD 14.2.12.1.46 and 14.2.12.2.1 to provide a clearer understanding for where to find these test plans.

The detailed test for the Heat Removal Capacity of SDCHX during pre-core hot functional testing is described in DCD section 14.2.12.1.20.

Impact on DCD

DCD 14.2.12.1.46 and 14.2.12.2.1 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 Specification.

Impact on Technical/Topical/Environmental Report

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

APR1400 DCD TIER 2

2.6 Reactor internals, as appropriate for pre-core hot functional testing, have been installed.

3.0 TEST METHOD

3.1 Specify plant conditions and coordinate the execution of the related pre-core hot functional test appendices. ← listed in Table 14.2-1

4.0 DATA REQUIRED

4.1 As specified by the individual pre-core hot functional test appendices.

5.0 ACCEPTANCE CRITERIA

5.1 The operations of the reactor coolant system (RCS), secondary systems, and related auxiliary systems are integrated in accordance with design criteria.

5.2 RCS temperature and pressure can be lowered to permit operation of the shutdown cooling system.

5.3 The shutdown cooling system is used to achieve cold shutdown at a cooldown rate not in excess of Technical Specification limits.

5.4 The turbine bypass valves can be operated to control RCS temperature.

5.5 Criteria as specified by the individual pre-core hot functional test procedures are met.

14.2.12.1.47 Pre-Core Instrument Correlation**1.0 OBJECTIVE**

1.1 To demonstrate that the inputs and appropriate outputs between the plant protection system (PPS), process instrumentation, qualified

APR1400 DCD TIER 2

2.6 Steam generators are in wet layup in accordance with the nuclear steam supply system (NSSS) chemistry manual.

2.7 The reactor coolant system (RCS) has been borated to the proper concentration.

3.0 TEST METHOD

3.1 Determine the plant conditions and coordinate the execution of the related post-core hot functional test appendices. listed in Table 14.2-2

4.0 DATA REQUIRED

4.1 As specified by the individual post-core hot functional test appendices

5.0 ACCEPTANCE CRITERIA

5.1 Integrated operation of the primary, secondary, and related auxiliary systems is in accordance with the system descriptions.

14.2.12.2.2 Loose Parts Monitoring System**1.0 OBJECTIVE**

1.1 To obtain baseline data on the loose parts monitoring system (LPMS)

1.2 To adjust LPMS alarm setpoints as necessary

2.0 PREREQUISITES

2.1 Preoperational tests of the LPMS have been completed.

2.2 All LPMS instrumentation has been calibrated and is operable.