ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Friday, February 20, 2009 11:31 AM
To: Getachew Tesfaye
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DUNCAN Leslie E (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 176 (1883), FSARCh. 14
Attachments: RAI 176 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 176 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the 3 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 176 Question 14.02-94.

The following table indicates the respective pages in the response document, "RAI 176 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 176 — 14.02-92	2	2
RAI 176 — 14.02-93	3	3
RAI 176 — 14.02-94	4	4

A complete answer is not provided for 2 of the 3 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 176 — 14.02-92	May 20, 2009
RAI 176 — 14.02-93	May 20, 2009

Sincerely,

Ronda Pederson
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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, January 21, 2009 8:12 AM
To: ZZ-DL-A-USEPR-DL

Cc: Samantha Crane; Juan Peralta; Michael Miernicki; Joseph Colaccino; Meena Khanna; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 176 (1883), FSARCh. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 14, 2009, and on January 20, 2009, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 235

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Subject: Response to U.S. EPR Design Certification Application RAI No. 176 (1883), FSARCh. 14
Sent Date: 2/20/2009 11:30:30 AM
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From: Pederson Ronda M (AREVA NP INC)

Created By: Ronda.Pederson@areva.com

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RAI 176 Response US EPR DC.pdf	101660	

Options
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Response to

Request for Additional Information No. 176 (1883), Revision 0

1/21/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants
Application Section: 14.2

QUESTIONS for Quality and Vendor Branch 1 (AP1000/EPR Projects) (CQVP)

Question 14.02-92:

Applicants for standard plant design approval must provide plans for preoperational testing and initial operations in accordance with 10 CFR 50.34(b)(6)(iii) requirements. Tier 2 FSAR Section 14.2.12.5.5 (Test #046) describes the initial test program for the CCWS. The results of the CCWS test program are considered to be acceptable if the CCWS performs as described in Tier 2 FSAR Section 9.2.2. However, as noted in RAI 9.2.2-01 through -28, the design bases for the CCWS are not adequately described in Tier 2 FSAR Section 9.2.2. Consequently, until the CCWS design basis is adequately described, the acceptance criteria for the CCWS test program can not be established. Therefore, please provide the requisite information in Tier 2 FSAR Section 9.2.2 to adequately describe the CCWS design basis so that the acceptance criteria for the CCWS initial test program can be adequately established.

Response to Question 14.02-92:

A response to this question will be provided by May 20, 2009.

Question 14.02-93:

Final Safety Analysis Report (FSAR) Tier 2 Section 14.2 Test 46 provides the component cooling water system (CCWS) initial test. In this regard, the staff's review of test 46 found the following discrepancies that require resolution by the applicant:

a. FSAR Tier 1 Section 2.7.1 includes the fuel pool cooling system (FPCS) as one of the safety-related functions of the CCWS. Accordingly, the descriptions of FSAR Tier 2 Section 9.2.2.3 and Section 9.2.2.6 for the CCWS response to a safety injection signal do not mention automatic isolation of the FPCS heat exchangers. However, FSAR Tier 2 Section 14.2 CCWS Initial Test 46 Step 3.4a indicates that the FPCS heat exchangers are isolated on a safety injection signal. Please address this discrepancy and update the FSAR accordingly.

b. Initial Test 46 step 3.5 states “Verify the non-safety-related headers and RCP headers are isolated on a surge tank low-low level signal.” However, FSAR Tier 2 Section 9.2.2 uses different surge tank level terminology with automatic control actions that correspond to each (i.e. MIN1, MIN2, MIN3, MIN4). Clarify in the FSAR that low-low surge tank level corresponds to MIN3. Clarify in the FSAR that if the MIN3 set point automatically closes switchover valves that isolates common header supplied by the associated CCWS safety train and that only the non-safety loads will be isolated since the common header includes safety loads and non-safety loads (e.g. reactor coolant pumps (RCP) thermal barrier cooling, fuel pool cooling, safety chilled water etc.). Step 3.5 should be revised to be consistent with CCWS system terminology (for example, “low-low” or “MIN3” and “non-safety headers” or “common headers”).

c. Initial Test 46 step 3.6 states “Verify a low CCW pump differential pressure signal starts the idle pump in each division.” Since each U.S EPR safety related (SR) CCWS train contains only a single pump, please clarify the intent of this step and update the FSAR accordingly.

d. The automatic common header switchover function and the partial switchover function are not being tested in Initial Test 46. Please revise Initial Test 46 to include the testing of the automatic switchover function and the partial switchover function of the common headers in response to the various control signals or justify the exclusion of such testing.

e. FSAR Tier 2 Section 16 Technical Specification 3.7.7 Note A.1 discussed the switching of the RCP thermal barrier coolers normally supplied by one common header to the other common header. Testing of this feature is not included in Initial Test 46. Please revise Initial Test 46 to include the switching of the RCP thermal barrier coolers normally supplied by one common header to the other common header or justify its exclusion.

f. Please revise Initial Test 46 to ensure adequate flow rates from the fire protection water supply to the CCWS surge tanks, or justify the exclusion of such testing.

Response to Question 14.02-93:

A response to this question will be provided by May 20, 2009.

Question 14.02-94:

Final Safety Analysis Report (FSAR) Tier 2 Section 14.2.12.5.8 describes initial test for the UHS (Test #49). The NRC staff identified the following issues with test abstract #49:

1. Section 14.2.12.5.8.4.1, "Data Required," includes "UHS makeup, blowdown air flowrates." Blowdown air flowrates are not described in the FSAR. Please clarify what is meant by blowdown air flowrates.
2. The following design features and functions identified in Section 9.2.5 of the EPR FSAR are not included in test abstract #49. Please revise the abstract to include the following tests or justify their exclusion:
    a. Confirmation that "normal and emergency" makeup flowrate meets design flow
    b. Confirmation that chemical injection meets design flow
    c. Confirmation that cooling tower fan performance at various speeds (including the reverse direction for cold weather deicing purposes) is satisfactory
    d. Confirmation that the cooling tower flow bypass functions properly (also for cold weather protection)

Response to Question 14.02-94:

1. The phrase "UHS makeup, blowdown air flowrates" should be "UHS makeup and blowdown flow rates." U.S. EPR FSAR Tier 2, Section 14.2, Test #049 will be revised to delete "air."
2. U.S. EPR FSAR Tier 2, Section 14.2, Test #049 will be revised to include the following:

    a. Confirmation that "normal and emergency" makeup flow rate meets design flow.

    b. Confirmation that chemical injection meets design flow.

    c. Confirmation that cooling tower fan performance at various speeds (including the reverse direction for cold weather deicing purposes) is satisfactory.

    d. Confirmation that the cooling tower flow bypass functions properly (also for cold weather protection).

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

5.1.5 Verify alarms, interlocks, indicating instruments, and status lights perform as designed.

5.1.6 Verify head versus flow characteristics for the ESWS water pumps meets design requirements.

5.1.7 Verify that system valves meet design requirements.

5.1.8 Verify system baseline performance during HFT (with RHRS in service).

5.2 Verify that safety-related components meet electrical independence and redundancy requirements.

14.2.12.5.8 Ultimate Heat Sink (Test #049)

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1.0 OBJECTIVE

1.1 To ~~verify~~demonstrate that the UHS is maintained by its associated support systems.

1.2 To demonstrate electrical independence and redundancy of power supplies.

2.0 PREREQUISITES

2.1 Construction activities on the UHS have been completed.

2.2 UHS makeup source available, as required.

2.3 UHS blowdown path available, as required.

2.4 The UHS system instrumentation has been calibrated and is functional for performance of the following test.

2.5 Test instrumentation available and calibrated per applicable procedures.

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3.0 TEST METHOD

3.1 ~~Simulate a range of temperature inputs and verify UHS response.~~Demonstrate operation of the UHS tower over the design range of operation.

3.1.1 Simulate a UHS operating temperature that corresponds to the lower range of operation.

3.1.2 Demonstrate that fans operate in the reverse direction.

3.1.3 Demonstrate that tower bypass paths realign to mitigate ice formation.

3.1.4 Simulate a gradual increase in ambient UHS temperature and terminate the ambient temperature increase at the upper end of the design operation band.

3.1.5 Record changes to tower fans and critical component operation during temperature increase.

3.2 ~~Verify that control logic starts forced draft fans and aligns critical components for UHS operation.~~Perform valve performance tests (e.g., valve position response of valves to loss of motive power, thrust, stroke time).

3.3 Demonstrate that UHS makeup ~~flowrate~~flow rate meets design flow requirements.

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3.3.1 During normal operation.

3.3.2 During emergency operation.

3.4 Demonstrate that UHS blowdown ~~flowrate~~flow rate meets design flow requirements.

3.4.1 During normal operation.

3.4.2 During emergency operation.

3.5 Demonstrate the operation of UHS level and temperature instruments and alarms.

3.6 Check electrical independence and redundancy of power supplies for safety-related functions by selectively removing power and determining loss of function.

3.7 Demonstrate that the chemical treatment system functions as designed.

3.7.1 Injection flow rate to UHS.

3.7.2 Interlocks with UHS blowdown.

4.0 DATA REQUIRED

4.1 UHS makeup~~,~~ and blowdown ~~air~~ flow rates. 14.02-94

4.2 Valve performance data, where required.

4.3 Valve position indication.

4.4 Temperature and relative humidity trend data.

4.5 Setpoints at which alarms and interlocks occur.

5.0 ACCEPTANCE CRITERIA

5.1 The UHS ~~performs as~~ meets design requirements ~~described in~~(refer to Section 9.2.5).

5.1.1 Verify that control logic starts forced draft fans and aligns critical components for UHS operation for the entire design range.

5.1.2 Verify that valve performance tests (e.g., valve position response of valves to loss of motive power, thrust, stroke time) meet design requirements.

5.1.3 Verify that UHS makeup flow rate meets design flow requirements.

5.1.4 Verify that UHS blowdown flow rate meets design flow requirements.

5.1.5 Verify that the operation of UHS level and temperature instruments and alarms meet design requirements.

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5.1.6 Verify that the UHS tower bypass function meets design requirements.

5.1.7 Verify that the chemical treatment system meets design requirements.

5.2 Verify that safety-related components meet electrical independence and redundancy requirements.

14.2.12.5.9 Reserved (Test #050)

14.2.12.6 General Supply Systems

14.2.12.6.1 Reserved (Test #051)

14.2.12.6.2 Safety Chilled Water (Test #052)

1.0 OBJECTIVE

1.1 To demonstrate proper operation of the safety chilled water system (SCWS).

1.2 To demonstrate electrical independence and redundancy of power supplies.

2.0 PREREQUISITES

2.1 Construction activities on the SCWS have been completed.

2.2 SCWS instrumentation has been calibrated and is functional for performance of the following test.

2.3 Test instrumentation available and calibrated per applicable procedures.

2.4 The CCWS is available for chiller operation, where necessary.

2.5 Appropriate AC and DC power sources are available.

3.0 TEST METHOD

3.1 Verify pump performance characteristics (e.g., head versus flow, motor current) for the SCWS pumps.

3.2 Demonstrate that each SCWS division can be operated from its local and remote manual control station.