ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, September 07, 2010 4:53 PM
To: Tesfaye, Getachew
Cc: ROMINE Judy (AREVA); BENNETT Kathy (AREVA); DELANO Karen (AREVA); WELLS Russell (AREVA); Miernicki, Michael
Subject: Response to U.S. EPR Design Certification Application RAI No. 388, Supplement 2, FSAR Ch. 3
Attachments: RAI 388 Supplement 2 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 335 on July 1, 2010. AREVA NP submitted Supplement 1 on August 5, 2010, which provided a technically correct and complete response to 1 of the remaining 3 questions. The attached file, "RAI 388 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining 2 questions (i.e., Questions 03.09.03-22 and 03.09.03-23), as committed.

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 Questions 03.09.03-22 and 03.09.03-23.

The following table indicates the respective pages in the response document, "RAI 388 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 388 — 03.09.03-22	2	3
RAI 388 — 03.09.03-23	3	3

This concludes the formal AREVA NP response to RAI 388 and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Thursday, August 05, 2010 5:43 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 388, Supplement 1, FSAR Ch. 3

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 335 on July 1, 2010. The attached file, "RAI 388 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete response to 1 of the remaining 3 questions, as committed. The responses to Questions 03.09.03-22 and 03.09.03-23 are deferred to allow additional time to address NRC comments.

The attached file, "RAI 388 Response US EPR DC.pdf" provides a technically correct and complete response to question 03.12-24. 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 388 Question 03.12-24.

The following table indicates the respective pages in the response document, "RAI 388 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 388 — 03.12-24	2	3

The schedule for technically correct and complete responses to the remaining 3 questions has been changed and is provided below.

Question #	Response Date
RAI 388 — 03.09.03-22	September 10, 2010
RAI 388 — 03.09.03-23	September 10, 2010

Sincerely,

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From: BRYAN Martin (EXT)
Sent: Thursday, July 01, 2010 4:42 PM
To: 'Tesfaye, Getachew'
Cc: ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 388, FSAR Ch. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 388 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the 3 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 388 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 388 — 03.09.03-22	2	2
RAI 388 — 03.09.03-23	3	3
RAI 388 — 03.12-24	4	4

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

Question #	Response Date
RAI 388 — 03.09.03-22	August 5, 2010
RAI 388 — 03.09.03-23	August 5, 2010
RAI 388 — 03.12-24	August 5, 2010

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, June 02, 2010 7:22 AM
To: ZZ-DL-A-USEPR-DL
Cc: Le, Tuan; Hsu, Kaihwa; Dixon-Herrity, Jennifer; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 388 (4601, 4586),FSAR Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 6, 2010, and discussed with your staff on May 28, 2010 and June 1, 2010. No changes were made to the draft RAI as a result of those discussions. 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: 1957

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB710776366E)

Subject: Response to U.S. EPR Design Certification Application RAI No. 388, Supplement 2, FSAR Ch. 3
Sent Date: 9/7/2010 4:52:43 PM
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From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

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MESSAGE	5796	9/7/2010 4:54:59 PM
RAI 388 Supplement 2 Response US EPR DC.pdf	115742	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 388(4601, 4586), Revision 0, Supplement 2

6/02/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.09.03 - ASME Code Class 1, 2, and 3 Components
SRP Section: 03.12 - ASME Code Class 1, 2, and 3 Piping Systems and Piping Components and Their Associated Supports

Application Section: FSAR Chapter 3

QUESTIONS for Engineering Mechanics Branch 1 (AP1000/EPR Projects) (EMB1)
QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

Question 03.09.03-22:

In EPR FSAR Tier 2, Section 3.9.3.1.1, AREVA indicated that the COL applicant referencing the US EPR design certification will examine the feedwater line welds after hot functional testing prior to fuel load in accordance with NRC Bulletin 79-13. Specifically, in Tier 2, Table 1.8-2, Item No. 3.9-3, AREVA stated that a COL Holder referencing the EPR design certificate will report the results of inspections to NRC, in accordance with NRC Bulletin 79-13. According to 10 CFR 52.47(b)(1), a DC application must contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations.

The staff understands that AREVA is proposing to have COL applicants (or Holders in this case) address the final resolution of the issue. However, the staff concern is that COL applicants must address all COL Items whether final action is taken before or after the license is issued. If the information is not provided, COL applicants need to meet RG 1.206 and let the staff know when and how the information will be provided. Given that it is acknowledged that the action will occur during construction, to allow the staff to perform necessary inspection of the report results ensuring the feedwater line welds has been examined, the staff finds that an ITAAC in the FSAR is necessary. The staff requests the applicant to add an appropriate ITAAC in EPR FSAR Tier 1 to address the issue.

Response to Question 03.09.03-22:

Construction will be finished prior to completion of hot functional testing. Therefore, weld inspection after hot functional testing is not a construction issue. U.S. EPR FSAR Tier 2, Section 14.2 will be revised to include this inspection as part of the initial test program. U.S. EPR FSAR Tier 2, Section 14.2, Test #033 will be revised to also include the feedwater nozzle inspection in accordance with NRC Bulletin 79-13.

This inspection will remain a COL Item because the inspection during the first refueling outage will occur after the license is issued.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12.3.10 will be revised as described in the response and indicated on the enclosed markup.

Question 03.09.03-23:

In EPR FSAR Tier 2, Section 3.9.3.1.1, AREVA indicated that the COL applicant referencing the US EPR design certification will confirm that the thermal deflections do not create adverse conditions during hot functional testing. Specifically, in Tier 2, Table 1.8-2, Item No. 3.9-4, the applicant states that a COL Holder referencing the US EPR design certificate will confirm this issue. According to 10 CFR 52.47(b)(1), a DC application must contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations.

The staff understands that AREVA is proposing to have COL applicants (or Holders in this case) address the final resolution of the issue. However, the staff concern is that COL applicants must address all COL Items whether final action will be taken before or after the license is issued. If the information is not provided, COL applicants need to meet RG 1.206 and let the staff know when and how the information will be provided. Given that the action will occur during the construction period, to allow the staff to perform necessary review or inspection confirming that the thermal deflections do not create adverse conditions during hot functional testing, the staff finds that an ITAAC in the FSAR is necessary. The staff requests the applicant to add an appropriate ITAAC in EPR FSAR Tier 1 to address the issue.

Response to Question 03.09.03-23:

U.S. EPR FSAR Tier 1, Table 2.2.1-5, Item 3.9 is an existing ITAAC that verifies gaps during hot functional testing. U.S. EPR FSAR Tier 2, Section 14.2 will be revised to include this inspection as part of the initial test program. Specifically, U.S. EPR FSAR Tier 2, Section 14.2.12.13.1 will be revised to also include the feedwater line measurements.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 14.2.12.13.1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

2.8 Main steam piping has been determined to be capable of supporting water filled lines or temporary supports have been installed.

3.0 TEST METHOD

3.1 Fill and vent the SGs and chemically treat the water, as required.

3.2 Operate the RCS and associated systems as needed to operate the RCPs. Heat the RCS and SGs to the required temperature. The SGs must be sufficiently heated so that the temperature shall not fall below the minimum nil-ductility temperature during the required system hold or examination period.

3.3 Pressurize the primary side as required to maintain less than maximum secondary to primary differential pressure.

3.4 Pressurize the SG to the pressure required by the technical manual.

3.5 Perform an inspection of designated items and record any discrepancies.

4.0 DATA REQUIRED

4.1 Record SG pressure and temperatures during performance of the test.

4.2 Record the location of any observed leakage.

5.0 ACCEPTANCE CRITERIA

5.1 The SGs hydrostatic test meets the requirements as stated in the SG technical manual and the ASME, "Boiler and Pressure Vessel Code," Section III.

14.2.12.3.10 Steam Generator Downcomer Feedwater System Water Hammer (Test #033)

1.0 OBJECTIVE

1.1 To demonstrate the absence of any significant water hammer during SG water level recovery following the exposure of the downcomer feedwater sparger to a steam environment and to inspect the feedwater line welds in accordance with NRC Bulletin 79-13.

03.09.03-22

2.0 PREREQUISITES

2.1 Construction activities on the EFWS and those sections of the feedwater system (MFWS) that are affected have been completed.

2.2 The feedwater control instrumentation and other appropriate permanently installed instrumentation have been calibrated and are functioning satisfactorily.

2.3 Main steam system (MSS) is available.

2.4 Appropriate AC and DC power sources are available.

2.5 RCS operating at nominal HZP (pressure and temperature) conditions.

3.0 TEST METHOD

3.1 Lower the SG water level below the feedwater sparger but within the narrow range (NR) level indication band for a period of 30 minutes (no feedwater shall be introduced into the generator through the sparger during this period).

3.2 Monitor for noise or vibration by stationing personnel as appropriate.

3.3 Initiate feedwater flow to restore SG level in a manner that simulates automatic EFWS actuation.

3.4 Repeat the test using the startup, standby pump to restore SG level in a manner that simulates automatic actuation.

4.0 DATA REQUIRED

03.09.03-22

4.1 Visually inspect the accessible portions of feedwater piping and piping supports following the performance of the test to verify operability and conformance to design.

4.2 Visual inspection of SG sparger shall be performed prior to core load.

4.3 Perform radiographic examination, supplemented by ultrasonic examination as necessary to evaluate indications, of all feedwater nozzle-to-pipe welds and of adjacent pipe and nozzle areas (a distance equal to at least two wall thicknesses).

5.0 ACCEPTANCE CRITERIA

5.1 Perform a visual inspection consisting of both a quantitative and qualitative evaluation of feedwater piping, supports, and sparger and determine if the integrity of components has not been violated with performance of EFWS initiation testing.

5.1.1 The quantitative component of the evaluation is a post-test evaluation of the SG sparger for visual damage. The inspection will look for cracked welds and inspect the sparger by comparing as-built dimensions to post-test dimensions. Any dimensional differences will be evaluated. The specific allowable dimensional differences are not typically specified in the SG design package and are evaluated on a case-by-case basis if differences are noted.

5.1.2 The qualitative component evaluation consists of noise and vibration analysis. The source of noise and vibration may be indicative of EFW line voiding or two phase flow and can lead to future sparger degradation if not corrected.

03.09.03-22

5.2 Evaluation shall be in accordance with ASME Section III, Subsection NC, Article NC-5000. Radiography shall be performed to the 2T penetrameter sensitivity level, in lieu of Table NC-5111-1, with systems void of water.

03.09.03-22

5.2.1 In the event cracking is identified during examination of the nozzle-to-pipe weld, all feedwater line welds up to the first piping support or snubber outboard of the nozzle shall be volumetrically examined in accordance with the requirements of Section 4.3 and 5.2 of this test.

14.2.12.3.11 Balance of Plant Piping Thermal Expansion Measurement (Test #034)

1.0 OBJECTIVE

1.1 To demonstrate that the balance of plant (BOP) components are free to expand thermally as designed during initial plant heatup and return to their baseline cold position after the initial cooldown to ambient temperatures.

2.0 PREREQUISITES

2.1 This test is carried out in conjunction with the initial RCS heatup; prerequisite conditions for initial heatup of the RCS must be established.

2.2 Construction activities are complete on the pipes to be measured.

2.3 Adjustment, setting and marking of initial positions of spring hangers, hydraulic restraints, and special devices of the systems have been completed.

2.4 Temporary scaffolding and ladders are installed as required to make observations and record data.

3.0 TEST METHOD

3.1 Perform a visual inspection during HFT and precritical heatup for power escalation to verify that spring supports are within design range (i.e., indicator within spring scale) and recorded.

3.2 Perform a visual inspection of snubbers to verify they have not contacted either stop and are within expected travel range.

3.3 Perform a visual inspection of snubber piston scales to verify acceptance criteria for piston to stop gap is met. Hot displacement measurements of snubbers shall be obtained and motion shall be compared with predicted values.

3.4 Perform system walkthroughs during HFT to visually verify that piping and components are unrestricted from moving within their range.

3.5 Verify by observation or calculation (or both) that the snubbers shall accommodate the predicted thermal movement for systems that do not attain design operating temperature.

3.6 Inspect small pipe in the vicinity of connections to large pipe to verify that sufficient clearance and flexibility exists to accommodate thermal movements of the large pipe.

5.0 ACCEPTANCE CRITERIA

5.1 The pressurizer level and pressure control setpoints have been configured in the PAS software.

5.2 The pressurizer level controls respond as designed to simulated high and low signals by repositioning the letdown control valves.

5.3 The pressurizer pressure controls respond as designed to simulated low and high pressurizer pressure.

5.4 The pressurizer pressure and level control systems function as described in Section 5.4.10.

14.2.12.13 Hot Functional Tests

14.2.12.13.1 Hot Functional Sequencing Document (Test #161)

1.0 OBJECTIVE

1.1 To demonstrate the proper integrated operation of plant systems when in simulated or actual operating configurations.

1.2 To demonstration that RCS temperature and pressure can be lowered to permit operation of the RHRS, and the RHRS can be used to achieve cold shutdown.

1.3 The residual heat removal (RHR) cooldown rate shall not exceed Technical Specification limits.

03.09.03-23

1.4 Demonstrate operation of the steam bypass valves to perform a controlled plant cooldown~~Demonstrations of the operation of the steam bypass valves~~.

1.5 To verify electrical distribution system voltages per BTP 8-6.

1.6 Verify that secondary systems impacted by hot functional test conditions meet design assumptions with respect to thermal growth. Piping and components are free to expand thermally as designed during initial plant heatup and return to their baseline cold position after the initial cooldown to ambient temperatures.

2.0 PREREQUISITES

2.1 Construction activities on the systems to be tested are completed.

2.2 Permanently installed instrumentation on systems to be tested has been calibrated and is functional.

2.3 Necessary test instrumentation is available and calibrated.

2.4 Hydrostatic testing of the primary and secondary systems has been completed.

2.5 SGs are in wet lay-up in accordance with the secondary water chemistry program.

2.6 Reactor internals, as appropriate for pre-core HFT, have been installed.

2.7 Full flow debris filters, dummy fuel assemblies, or equivalents have been installed in the internals to simulate the flow resistance of the fuel assemblies.

03.09.03-23

2.8 Adjustment, setting, and marking of initial positions of fixed supports, hydraulic restraints, whip restraints, and special devices of the secondary systems have been completed.

2.9 Locations for thermal displacement measurements (horizontal and vertical) along the secondary systems have been clearly identified and spreadsheets have been prepared to record predicted and as-measured displacement valves.

2.10 Temporary scaffolding and ladders are installed as required to make observations and record data.

3.0 TEST METHOD

3.1 Specify plant conditions and coordinate the execution of the related pre-core HFT test abstracts.

03.09.03-23

3.1.1 Check clearances at snubbers spring can supports and selected hangers at 50°F increments during heatup and recorded at least 100°F increments.

3.1.2 Record the following displacements, and selected clearances at 50°F increments during heatup and at stabilized HZP (pressure and temperature) conditions:

- Steam generator blowdown.
- Emergency feedwater.
- Main feedwater.
- Main steam.

4.0 DATA REQUIRED

4.1 As specified by the individual pre-core HFT ~~appendices~~test procedures.

4.2 Plant conditions.

4.3 Piping displacement measurements at selected points.

4.4 Clearances at test points after cooldown.

5.0 ACCEPTANCE CRITERIA

5.1 Integrated operation of the RCS, secondary, and related auxiliary systems perform in accordance with design criteria.

5.2 RCS temperature and pressure can be lowered in a controlled manner to permit operation of the RHRS.

5.3 The RHRS 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.

03.09.03-23

5.5 The RCPs can be secured one at a time at HZP conditions and the standstill seal can be verified to limit RCS leakage within design limits.

5.6 Unrestricted expansion for selected points on piping systems and components as designed.~~As specified by the individual pre-core HFT procedures~~.

5.7 Verification that components return to their baseline ambient position as designed.

5.8 Verification that as designed gaps exist for selected piping systems and components as designed.

14.2.12.13.2 Pre–Core Instrument Correlation (Test #162)

1.0 OBJECTIVE

1.1 To demonstrate that the inputs and appropriate outputs between the following safety-related digital systems are in agreement:

1.1.1 Plant Protection system.

1.1.2 Process instrumentation.

1.1.3 Discrete indication and alarm system.

1.1.4 DPS.

1.2 To verify safety-related temperature and pressure instrumentation accuracy and operation by comparing similar channels of instrumentation.

2.0 PREREQUISITES

2.1 Instrumentation has been calibrated and is functional.

3.0 TEST METHOD

3.1 Record safety-related wide range instrumentation readings as directed by the pre-core HFT.

3.2 Record safety-related narrow range instrumentation readings as directed by the pre-core HFT.

4.0 DATA REQUIRED

4.1 PICS and SICS readings.

4.2 DAS readings.

4.3 DPS readings.