ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Monday, January 18, 2010 4:08 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 334, FSARCh. 9
Attachments: RAI 334 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 334 Response US EPR DC," provides a schedule since technically correct and complete responses to the 23 questions are not provided.

The following table indicates the respective pages in the response document, "RAI 334 Response US EPR DC," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 334 — 09.02.02-56	2	2
RAI 334 — 09.02.02-57	3	3
RAI 334 — 09.02.02-58	4	4
RAI 334 — 09.02.02-59	5	5
RAI 334 — 09.02.02-60	6	6
RAI 334 — 09.02.02-61	7	8
RAI 334 — 09.02.02-62	9	9
RAI 334 — 09.02.02-63	10	10
RAI 334 — 09.02.02-64	11	11
RAI 334 — 09.02.02-65	12	13
RAI 334 — 09.02.02-66	14	14
RAI 334 — 09.02.02-67	15	16
RAI 334 — 09.02.02-68	17	17
RAI 334 — 09.02.02-69	18	18
RAI 334 — 09.02.02-70	19	19
RAI 334 — 09.02.02-71	20	20
RAI 334 — 09.02.02-72	21	21
RAI 334 — 09.02.02-73	22	22
RAI 334 — 09.02.02-74	23	23
RAI 334 — 09.02.02-75	24	24
RAI 334 — 09.02.02-76	25	25
RAI 334 — 09.02.02-77	26	26
RAI 334 — 09.02.02-78	27	27

A complete answer is not provided for 23 of the 23 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 334 — 09.02.02-56	March 12, 2010
RAI 334 — 09.02.02-57	March 12, 2010
RAI 334 — 09.02.02-58	March 12, 2010
RAI 334 — 09.02.02-59	March 12, 2010
RAI 334 — 09.02.02-60	March 12, 2010
RAI 334 — 09.02.02-61	March 12, 2010

RAI 334 — 09.02.02-62	March 12, 2010
RAI 334 — 09.02.02-63	March 12, 2010
RAI 334 — 09.02.02-64	March 12, 2010
RAI 334 — 09.02.02-65	March 12, 2010
RAI 334 — 09.02.02-66	March 12, 2010
RAI 334 — 09.02.02-67	March 12, 2010
RAI 334 — 09.02.02-68	March 12, 2010
RAI 334 — 09.02.02-69	March 12, 2010
RAI 334 — 09.02.02-70	March 12, 2010
RAI 334 — 09.02.02-71	March 12, 2010
RAI 334 — 09.02.02-72	March 12, 2010
RAI 334 — 09.02.02-73	March 12, 2010
RAI 334 — 09.02.02-74	March 12, 2010
RAI 334 — 09.02.02-75	March 12, 2010
RAI 334 — 09.02.02-76	March 12, 2010
RAI 334 — 09.02.02-77	March 12, 2010
RAI 334 — 09.02.02-78	March 12, 2010

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Saturday, December 05, 2009 6:32 AM
To: ZZ-DL-A-USEPR-DL
Cc: Wheeler, Larry; Eul, Ryan; Segala, John; Lee, Samuel; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 334 (4035), FSARCh. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on November 20, 2009, and on November 30, 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, excluding the time period of **December 25, 2009 thru January 3, 2010, to account for the holiday season** as discussed with AREVA NP Inc. For any RAIs that cannot be answered **within 40 days**, it is expected that a date for receipt of this information will be provided to the staff within the 40-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
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Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1092

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Response to

Request for Additional Information No. 334 (4035), Revision 0

12/05/2009

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.02.02 - Reactor Auxiliary Cooling Water Systems
Application Section: Chapter 9

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.02.02-56:

Follow-up to RAI 174, Question No. 9.2.2-7

The applicant replied to RAI 9.2.2-07 on May 20, 2009 in Supplement 3 to RAI 174, Revision 0. In this reply the applicant referred to the collective responses provided to RAIs 9.2.2-08 to 9.2.2-34 and stated that where necessary, the U.S. EPR FSAR as it relates to the component cooling water system (CCWS) in Tier 1, Section 2.7.1 and Tier 2, Section 9.2.2 would be revised as indicated in the individual responses. Update your reply after you addressed all of the RAI sections in 9.2.2.

Response to Question 09.02.02-56:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-57:

Follow-up to RAI 174, Question 9.2.2-8

The applicant replied to RAI 9.2.2-08 on May 20, 2009 in Supplement 3 to RAI 174, Revision 0. In this response the applicant stated that a fault in the component cooling water system (CCWS) piping will be recognized by redundant level indications on each CCWS surge tank. The applicant also referred to U.S. EPR FSAR Section 9.2.2.6.1 and pointed out that if tank level dropped to MIN2, the non-safety-related branches automatically isolate when a flow mismatch exists between the supply and the return for these users. The applicant concludes that isolation of the non-safety-related branches will have no impact on the control room and there are no radiological release considerations for this event. Furthermore, the applicant noted that the only potential for radioactive in-leakage was from the higher pressure chemical and volume control system (CVCS) and reactor coolant system (RCS) and there are additional indications and control functions that isolate the CCWS in the event of radioactive fluid in-leakage. The staff's review of the applicant's response and the supporting discussion found them to be unacceptable since all of the non-safety, non-seismic CCWS components was not discussed in the RAI response, including the dedicated CCWS train and no FSAR revision is proposed by the applicant. AREVA is requested to address all of the non-safety, non-seismic CCWS components.

Response to Question 09.02.02-57:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-58

Follow-up to RAI 174, Question 9.2.2-9

(a, c) The staff's review of this response and the associated markup of U.S.EPR FSAR Section 9.2.2.2.1 found them unacceptable since the applicant stated that some CCWS is Seismic Category II, but Figure 9.2.2-1 does not indicate any Seismic Category II equipment. AREVA is requested to indicate any Seismic Category II equipment on drawings.

(b) While the staff recognizes that certain information may not be available until later in the design process, the staff notes that leakage assumptions for CCWS boundary isolation valves should be a consideration for determination of surge tank sizing and makeup capabilities (**refer to RAI 9.2.2-18).** For example, the post seismic event surge tank makeup needs to provide sufficient capacity and volume to account for cross- train leakage through single closed supply/ return switchover valves (or any other closed boundary valves) in addition to external leakage from the system (e.g. seal leakage). While the staff found that CCWS boundary isolation and switchover valve seat leak testing is properly identified in FSAR Tier 2 Table 3.9.6-2, "Inservice Valve Testing Program Requirements," the applicant still needs to identify appropriate leakage acceptance criteria to support the CCWS system design. AREVA is requested to identify appropriate leakage acceptance criteria to support the CCWS system design and ensure all SR valves are included in Table 3.9.6-2, for example 30KAB50A006 30KAB80A015 were missing.

Response to Question 09.02.02-58:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-59:

Follow-up to RAI 174, Question 9.2.2-10

The staff's review of the applicant's response and the associated FSAR markup of Tier 1 Figure 2.7.1-1, Table 2.7.1-2 and Tier 2 Figure 9.2.2-1 and text in Section 9.2.2 and found them **incomplete for part a and d.**

(a) Related to part a, while valves 30KAA10/20/30/40 AA027 have been correctly identified as safety-related MOVs in some portions of the markup, the staff noted that no markup was provided by the applicant for FSAR Tier 1 Table 2.7.1-1, which currently lists the valves with no indication that they are "MOVs". The staff found this was inconsistent with other CCWS MOVs that also appear in Table 2.7.1-1 such as 10KAB10 AA134, AA051 and AA052. AREVA is requested to address the missing MOV label from Table 2.7.1-1 for the new noted MOVs.

(d) For part d, the staff found that neither the applicant's response or FSAR markup provided the justification requested for the use of a "manual" connection for emergency surge tank makeup. In addition the staff noted that the applicant's description of the emergency makeup connection as "seismic II" appeared to be inconsistent with "seismic I" which is identified on FSAR Figures Tier 1, 2.7.1-1 and Tier 2 Figure 9.2.2-1 for this connection. The staff noted that "seismic II" was typically associated with equipment that must maintain integrity to prevent damage to other nearby safety-related SSCs from a seismic event rather than equipment that must remain functional. Accordingly, the staff requests that the applicant provide justification for the use of "seismic II," in this application and correct the above noted system Figures and FSAR markup as appropriate. AREVA is requested to show open pipe of drawings for fire water to surge tank, to define manual operations basis and the time to rotate this spool peice. Procedures need to be developed and validated.

Response to Question 09.02.02-59:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-60:

Follow-up to RAI 174, Question 9.2.2-11

The applicant **did not specifically address two-phase** concerns which are addressed in GL 96-06. In addition, the applicant stated that the CCWS withstands “adverse transients” but does **not state how this** is accomplished. Also the applicant stated instruments and controls are incorporated into the design of the CCWS to avoid water hammer, **but no details are provided.** AREVA is requested to address two-phase flow and to explain in detail, how the CCWS withstands adverse transients and provide details on I&C design features to avoid water hammer.

Response to Question 09.02.02-60:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-61:

Follow-up to RAI 174, Question 9.2.2-12

For parts 1 to 5, the staff found that the proposed responses to this RAI do not adequately address the RAI questions. For example, the applicant stated that the FSAR would not be revised with no explanation as to when and in what form the requested information would be made available to the staff address pipe sizing/flow velocities, design parameters, I&C, setpoints, and valve positions. AREVA is requested to:

(1) Provide detail design for piping sizes.

(2) Provide detail design for pressure/temp.

(3) Provide detail design for I&C.

(4) Provide detail design for valve positions.

(5) Provide detail design for alarms and relief valve setpoints.

(6) The staff requests that the proposed text markup of FSAR Tier 1 Section 2.7.1 be expanded to make it clear that; (1) Thermal Barriers for all four RCPs are cooled by a single common header that must be supported by two operable CCWS trains, (2) Identify that CCWS train separation is maintained for this configuration by interlocks provided on the supply and return Thermal Barrier Containment Isolation Valves (CIVs) associated with each common header, and (3) The interlocks require that CIVs associated with one common header be closed before the other common header CIVs can be opened.

In addition, the staff requests that the 24 sheets that makeup the CCWS Tier 1 functional arrangement be simplified to be consistent with other DCD applications.

(7)(a) The applicant clarified all the hydraulic valves in Tier 1 and provided a FSAR markup of the proposed changes. The staff reviewed the Tier 1 and Tier 2 markup and found not all the hydraulic valves have been properly identified (KAA10AA033 on Table 2.7.1-2 still shows Div 1); however, valve 30KAB80 AA019 has been correctly shown of Tier 1 Figure 2.7.1-1 (sheet 11) and Tier 2 Figure 9.2.2-2 (sheet 1). The note added to Tier 1, Table 2.7.1-2 provides clarification to the power supplies for the pilot valves to provide redundancy from a different Class 1E uninterruptible power supply. AREVA is requested to prperly identify all hydraulic valves and to provide details of solenoid-operated pilot valves.

(7)(b) The staff found the applicant's response to part 7b unacceptable since the basis for the differences was not explained in the RAI response (energized to open vs de-energized to open). In addition, the FSAR states the differences between how the two valves operate. AREVA is requested to explain the differences between the two (energized to open vs de-energized to open) valves.

(7)(c) The staff found the applicant's response to part 7c to be unacceptable since the applicant has not provided a response (to be developed later). Spurious isolations would cause challenges to the power plant which may cause a plant trip or transients, thus challenges to

safety related equipment if the valves are not quickly re-aligned. AREVA is requested provide details related to spurious trips.

(7)(d) The staff found the applicant's response to part 7d referenced to the part 7a response. Once the staff has accepted part 7a, part 7d can be closed.

(8)(a - e) Table 3.9.6-2 is missing CCWS valves. AREVA is requested to revise FSAR markup for part 7 and 8 of RAI 9.2.2-12 to include FSAR Table 3.9.6-2.

Response to Question 09.02.02-61:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-62:

Follow-up to RAI 174, Question 9.2.2-13

The applicant stated that specific details about CCWS minimum heat transfer and flow requirements for the various plant operating modes and accident conditions will **be identified later** in the design process and that the FSAR will not be changed as a result of this question. The staff finds this response inadequate to support determination of compliance with GDC 44. AREVA is requested to determine CCWS minimum heat transfer and flow requirements for the various plant operating modes and accident conditions.

Response to Question 09.02.02-62:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-63:

Follow-up to RAI 174, Question 9.2.2-14

The applicant stated that specific details about CCWS pump sizing will be **identified later in the design process**. The final pump sizing determination depends on a number of factors. CCW user flow requirements will form the basis for the CCW pump sizing. Based on these calculations, the required pump size will be adjusted to account for pump degradation, grid frequency deviation and pipe degradation. The CCWS pumps will be sized to satisfy the minimum flow requirements for each user under plant operating scenarios. The applicant also stated that the FSAR would not be changed as a result of this question. The staff finds this response inadequate to enable determination of compliance with GDC 44. AREVA is requested to determine the CCWS pump sizing.

Response to Question 09.02.02-63:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-64:

Follow-up to RAI 174, Question 9.2.2-15

(a – d) The applicant's response states that "specific details about CCWS pump and heat exchanger sizing will **be identified later in the design process** and the final equipment sizing determination depends on a number of factors, including detailed design calculations for safety-related and non-safety-related components cooled by the CCWS." The applicant further states that "based on these calculations, the CCWS pumps and heat exchangers will be sized to satisfy the minimum flow requirements and maximum heat transfer requirements for each user under plant operating scenarios." The staff finds this response **inadequate** to support determination of compliance with GDC 44. AREVA is requested to determine the CCWS pump and HX sizing.

Response to Question 09.02.02-64:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-65:

Follow-up to RAI 174, Question 9.2.2-16

(a) The staff determined the applicant's response to be **unacceptable** since complete information was not provided. For example, the reference to this information is presently in Tier 2 Section 9.2.2.6.1, which is complex plus the switchover discussion is not clear since partial switchover is also discussed in this section. The staff does not understand what "handle valve" is and the setpoint and logic was not provided. AREVA is requested to provide complete information.

(b) The staff determined the applicant's response to be **unacceptable** since the automatic start of the CCWS, which also automatically starts the associated ESWS train, is not specially described in detail in either Tier 2 Section 9.2.1 or 9.2.2. AREVA is requested to describe, in detail, the automatic start of the CCWS.

(c) AREVA is requested to explain how the CCWS pump continues to run without the associated ESWS cooling medium for the CCWS pump motor cooler.

(d) The staff determined the applicant's response to be **unacceptable** since specific details of the switchover sequence were not provided. AREVA is requested to provide the following details:

1. Describe any other mode of switchover operations since only 'semi-automatic normal' switchover sequences were provided.

2. Since there are a total of 16 switchover valves (4 per train), describe if these valves are individually operated or are they operated in pairs/gangs.

3. Describe if these switchover valves on closure permissive for the opposite train to open is by valve limit switches, pilot valve position, or other signal.

(e) The staff determined the applicant's response to be **unacceptable** since further clarification was necessary in regard to whether fuel pool cooling (supplied by the common 1.a or 2.a headers) is subject to automatic switchover. This question was based on U.S. EPR FSAR Tier 2 Section 9.2.2.6.1, which states that "automatic switchover of the common "a" sub-header is not necessary since the inertia of the Spent Fuel Pool (SFP) allows adequate time for manual actuation." The applicant's response simply stated that in case of loss of one CCWS or ESWS train, an automatic switchover is performed to allow the cooling of the common headers ("a" and/or "b") with the available CCWS train. AREVA is requested to clarify under what conditions fuel pool cooling (1.a or 2.a header) would be subject to automatic versus manual switchover. This question also requires clarification in the FSAR.

(g) The staff determined the applicant's response to be **unacceptable** since part of the question was not provided related to the impact on the common loads during the switchover process. AREVA is requested to provide the impact on the common loads during the switchover process.

(h) The staff determined the applicant's response to be **unacceptable** since the header switchover isolation valve leak tightness is an important consideration for the design of the U.S. EPR CCW system and the valve seat leakage will be identified later in the design process. For example, excessive switchover valve leakage in the post seismic event period to an inoperable safety train would be a concern for the operable train surge tank volume and makeup capability. Switchover valve leakage may require consideration in determination of the surge tank capacity. The staff also noted that U.S. EPR FSAR Tier 2 Table 3.9.6-2 (Valve IST Requirements) does properly specify quarterly leak tests (LT) for the CCWS header switchover valves with no specific acceptance criteria. Where specific leakage criteria are not identified, the staff noted that the application of criteria from ASME OM Code, subparagraph ISTC-3630(e) would result in leakage as high as 5 gpm for each closed valve. AREVA is requested to provide additional information on the acceptable level of switchover valve seat leakage and a discussion of how this leakage is accounted for by the system design.

Response to Question 09.02.02-65:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-66:

Follow-up to RAI 174, Question 9.2.2-17

The staff's review of the applicant's response found that the FSAR markup was incomplete in that it did not fully address the basis and requirements for the special single failure requirements applied for RCP Thermal Barrier Cooling. AREVA is requested to expand the proposed FSAR markup to address at least the following key points:

1. Since all four RCP thermal barriers are cooled by one of two common headers, describe how train separation is maintained for this configuration. Failure-modes and effects analysis have not been provided in the FSAR for any CCWS active failures, in particular the common thermal barrier cooling headers. Single failure includes, but not limited to, operator errors, spurious activation of a valve operator and loss of a cooling water pump.
2. Describe in the FSAR, in order to maintain this protective feature, upon system equipment degraded performance of one of the two trains capable of feeding the common header supporting the thermal barriers, how operators must transfer thermal barrier cooling within a predetermined time to a common header that is supported by two operable CCWS trains. Describe in the FSAR for an event of an automatic system transfer, the time delays involved and the time duration in which thermal barrier cooling is re-established and the any negative effects to the RCPs.

Response to Question 09.02.02-66:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-67:

Follow-up to RAI 174, Question 9.2.2-18

(a) The staff determined that the information supplied by the applicant is not sufficient to provide the staff with an understanding of the adequacy of the pump design as it relates to CCW system overall functions. The staff also noted that several detailed parameters necessary to support the determination of NPSH adequacy are currently provided in FSAR tier 2 and therefore if they are final design values additional supporting information should be available to permit staff review. Examples of this information include; (1) CCWS pump flow/ head, surge tank volume (FSAR Tier 2 Table 9.2.2-1), (2) pipe sizes (FSAR Tier 2 Figure 9.2.2-1) and (3) building arrangements with surge tank elevation (FSAR Tier 2 Figure 3.8-85 is typical). AREVA is requested to provide sufficient information to assure CCWS pump NPSH requirements are satisfied.

(b) The design of the surge tank I&C will be provided later. AREVA is requested to address when this material will be available for the staff to review.

(c) The staff determined the applicant's response and FSAR markup were incomplete for the following reasons:

1. The bases of the leakage rate 3.8 Li/min (1 gpm) was not justified plus the assumed leak rate does not account for potential volume lost to a redundant CCWS train due to leakage through closed switchover valves or provide justification for not including this leakage. AREVA to define basis.
2. No basis was provided for the conclusion that 28 hours was available for spoolpiece makeup if MIN 1 level was reached. Further the applicant's initial estimate of 28 hours provides little value to the description since it assumes nominal tank level when the guidance in SRP 9.2.2 paragraph III.3C states that 'time zero starts at the low level alarm'. Procedures development for a maintenance crew for spool piece swap-out needs to be a COL Information Item. AREVA to define basis.
3. Justification was not provided for the seismic/ safety classification for the makeup water source (Fire Water Distribution System) other than the statement in the RAI 9.2.2-10 markup of FSAR Tier 2 paragraph 9.2.2.6.1, which implies that seismic category II is sufficient. Piping classification (seismic classification) is missing from Tier 2 FSAR Figure 9.2.2-1 and Tier 1 FSAR Figure 2.7.1-1 and break flanges are not shown. AREVA to provide justification.
4. Justification was not provided that the available volume and rate of makeup water is sufficient from the selected source and that the source will be available if offsite power is lost as a result of the seismic event. AREVA to provide justification.
5. Indications and alarms were not available for the staff to review for the MCR and the Remote Shutdown Station. These will **be identified later in the design process**. AREVA is requested to address when this material will be available for the staff to review.

(d, e) AREVA is requested to provide a description of the necessary operator actions to transfer thermal barrier cooling to the common header that remains operable, the time available to complete these actions before overheating and to address the impact on continued plant

operation due to loss of CCWS cooling to other important common header loads that may impact continued plant operation (e.g. RCP motor and bearing oil coolers etc) and cannot be switched to the other common header.

Response to Question 09.02.02-67:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-68:

Follow-up to RAI 174, Question 9.2.2-19

(a) AREVA is requested to modify the FSAR markup related to this RAI to clearly recognize that valves on both the CCWS inlet and outlet of the thermal barrier are automatically isolated with reference to the appropriate RCS P&ID where these valves are shown. Additionally, FSAR Section 9.2.2.6.1 should identify that high outlet temperature in addition to high flow will initiate automatic isolation of the thermal barriers and that high radiation does not initiate automatic isolation. In addition, instrumentation (set points/logic/permissives/time delays) was not provided in the response.

(b) The FSAR markup was not provided for clarification to Section 9.2.2.3.1 specifically addressing the valves that close on this logic. The bases for the 15 minute time delay was not described and these was no discussion if this CCWS cooling water flow to the thermal barrier logic has a manual override for the operators to restore flow in the event of a RCP seal concern. AREVA is requested to describe the thermal barrier isolation for dilution.

(c) Clarification is necessary in the FSAR to clearly discuss the differences between the containment isolation valves (no automatic closure) that provide cooling through a common header that then splits to four separate thermal barrier cooling lines (which has logic to close based on a sensed thermal barrier breach. AREVA is requested to clarify the TB lines and containment valves.

(d) The FSAR markup also needs to include paragraphs that provide a description of the components supplied by common 1b and common 2b headers. These paragraphs are located on FSAR Tier 2 page 9.2-21 in the markup and presently state that common header 1b cools RCPs 1 and 2 while common header 2b cools RCPs 3 and 4. While these statements are correct for other CCWS cooling loads on the RCPs, they also require modification to exclude the thermal barriers. AREVA is to clarify 1b and 2b header loads for RCPs (except the TB).

(e) The applicant was asked to revise the FSAR to address the requirements of Technical Specification 3.7.7 that the RCP thermal barriers must be supplied by a common header that is capable of being supplied by two operable CCWS trains. It should be noted that additional clarification of this subject has been requested by the staff for the FSAR markup associated with RAI 9.2.2-17.

(f) The applicant stated that thermal barrier cooling would be aligned to the 2.b header. However, the applicant did not state how this manual alignment would be achievable since MOV KAB30AA049, which is powered from Division 1, would have failed ‘as-is’ and the manual alignment to the 2.b header would be locked out.

AREVA is requested to describe how this manual alignment would be achievable, how MCR operators would prioritize the re-establish of the RCP seal cooling during a LOOP, and the expected duration to re-establish without seal damage. Also describe if this is a time critical step for the plant operators.

Response to Question 09.02.02-68:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-69:

Follow-up to RAI 174, Question 9.2.2-20

The staff's review of the response confirmed that the U.S. EPR CCWS thermal barrier cooling design did not specifically met the all the requirements from SRP 9.2.2 Section II 4.G ii. For example, future seal SBO testing was not noted in the FSAR, and a statement in the FSAR Section 9.2.2 did not specifically state the CCWS to the RCP pumps can withstand a single, active failure or a moderate-energy crack as defines in Branch Technical Position ASB 3-1 and to seismic Category I, Quality Group C, and ASME Section III Class 3 requirements. AREVA is to define the CCWS thermal barrier cooling design.

Response to Question 09.02.02-69:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-70:

Follow-up to RAI 174, Question 9.2.2-22

(a) AREVA is requested to clarify the sequence presented in both Sections 9.2.2.3.1 and 9.2.2.6.1 such that the appropriate sequence and 'basis' for this sequence is provided to address both previously running and previously not running pumps.

(b) The staff could not verify on the FSAR Figures the loads that are listed are in fact isolated with the SI signal and what valves get this isolation signals and the list provided is not included in the FSAR. AREVA is requested to address this issue.

Response to Question 09.02.02-70:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-71:

Follow-up to RAI 174, Question 9.2.2-23

(a)(1) AREVA is requested to clarify whether normal operator adjustment is 'local manual' or 'remote manual from the MCR'.

(a)(2) AREVA is requested to describe in the FSAR how the high and low MCR alarms are provided when the temperature is near the MIN 2 and MAX 2 temperature limits.

(b) AREVA is requested to describe in the FSAR how the bypass valves will be automatically "Stepped Open" at MIN 1 and "Stepped Closed" at MAX 1 temperature thresholds, respectively.

(c)(1) AREVA is requested to describe in the FSAR how automatic controls are functional in all plant modes and following a safety injection signal.

(c)(2) AREVA is requested to determine if the following sentence from FSAR Tier 2 Section 9.2.2.6.1 describes a control feature that is different than that of the part 'c'. "In the event of a CCWS HX high outlet temperature condition combined with a bypass valve open signal, which indicates the bypass valve has <u>failed open</u>, the bypass valve automatically closes." The conflicting words are; "failed open" vs. "open signal" as they related to actual valves position from limit switches or process signal to open.

Response to Question 09.02.02-71:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-72:

Follow-up to RAI 174, Question 9.2.2-24

The CCWS description does not adequately consider and address water hammer vulnerabilities in the FSAR and does not explain how system design features, operating procedures, and periodic surveillance tests provide adequate assurance that the CCWS safety functions will not be compromised by water hammer events. AREVA is requested to:

1. Specifically address two-phase concerns, which are addressed in GL 96-06.

2. State how that the CCWS withstands “adverse transients” is accomplished.

3. Provide details on how instruments and controls are incorporated into the design of the CCWS to avoid water hammer.

Response to Question 09.02.02-72:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-73:

Follow-up to RAI 174, Question 9.2.2-25

AREVA is requested to describe non-destructive examinations (NDE) in the determination of the pipe wall condition, during the life of the plant.

Response to Question 09.02.02-73:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-74:

Follow-up to RAI 174, Question 9.2.2-27

AREVA is requested to include the following information in Table 3.9.6-1 of the FSAR:

- 30KAB80AA015 (as shown on Figure 9.2.2-2, Sheet 1 of 7)
- 30KAB50AA006 (as shown on Figure 9.2.2-3, Sheet 6 of 8)
- 30KAB20AA193 (as shown on Figure 9.2.2-3, Sheet 1 of 8)
- 30KAB10AA193, listed on Table 2.9.6-2, page 48 of 91 could not be located on a FSAR figure (maybe a typo with 30KAB20AA193).
- 30KAB70AA116 (as shown on Figure 9.2.2-3, Sheet 2 of 8)
- 30KAB60AA116 (as shown on Figure 9.2.2-2, Sheet 2 of 8)

Response to Question 09.02.02-74:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-75:

Follow-up to RAI 174, Question 9.2.2-29

(a) AREVA is requested to discuss in the FSAR that <20 seconds is an acceptable time frame in which cooling flow is interrupted to the CWS users.

(b) AREVA is requested to discuss in the FSAR that <20 seconds is an acceptable time frame in which cooling flow is interrupted to the CWS users (including the thermal barrier/RCP loads).

(c) The applicant stated that “here are no time requirements associated with the opening or closing of these valves”. This statement is misleading since TS will require these valves be re-opened in this abnormal condition. AREVA is requested to further address this statement and discuss the manual isolation valves in the FSAR.

Response to Question 09.02.02-75:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-76:

Follow-up to RAI 174, Question 9.2.2-31

(a) AREVA is requested to revise the 24 sheets of CCWS to allow the staff construction inspector to be able to walk-down the system without difficulties or creating supplemental drawings that are not controlled.

(d) AREVA is requested to provide a markup of U.S. EPR FSAR Tier 2 Section 9.2.2, Figure 9.2.2-1 and Tier 1 Figure 2.7.1-1, to add a note in this regard related to the removal of the filter and delta pressure instrumentation after commissioning. Also describe if the filter located on Figure 9.2.2-4 for the dedicated CCWS train is similar.

(g) AREVA is requested to address means of assuring proper flow to individual users in FSAR Tier 2 Section 9.2.2.

(i) AREVA is requested to:

1. Provide the explanation for the power source being downgraded in the markup from class '1E' to 'NA' for CVCS HP Cooler outlet control valves KAB60/70 AA116. These MOVs automatically isolate if an elevated radiation signal is sensed. Describe the impact of loss of power to these valves.

2. Provide an explanation for the markup showing alternate feed 1E power for most of the valves associated with the dedicated train but not for either the dedicated pump or the dedicated train makeup pump.

3. Provide an explanation for why most of the CCWS dedicated train components are provided with an alternate feed 1E power source while dedicated ESWS train components identified only the SBO EDG (see Tier 1, FSAR Table 2.7.11-2, "Essential Service Water System Equipment I&C and Electrical Design," as an alternate feed source in response to ESWS Question 19 of RAI 9.2.1-21.

4. Correctly show KAB10/20-AA134 on the Tier 2 Figure 9.2.2-3 (sheet 1) as a motor operated control valve.

5. Specifically describe the basis for all of the CCWS component and valves having alternate power supplies in Tier 2, Section 9.2.2.

(m) AREVA is requested to define the ESWS/CCWS design heat loads in Tier 1. For example, Tier 1, Section 2.11.3 of the ABWR, (RBCWS) has references to actually Hx removal capacities. Tier 1, Section 2.6.2 or ESBWR, (FACPS) has references to actually HX removal capacities.

Response to Question 09.02.02-76:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-77:

Follow-up to RAI 174, Question 9.2.2-32

(1)(b) AREVA is requested to provide specific run-out flow rates along with surge tank level (value was missing) in the U.S. EPR FSAR Table 2.7.1-3.

(2)(d) AREVA is requested to adequately confirm flow to be available to each RCPs thermal barrier from each of the common headers. Furthermore, AREVA is requested to add confirmation of surge tank capacity to FSAR Tier 1 Section 2.7.1 and corresponding ITAAC.

(3)(e) AREVA is requested to describe in FSAR Tier 2 Section 9.2.2.6.1 of the conditions where full (rather than partial) automatic switchover of the common header applies (both .a and .b sub headers).

(4)(a) AREVA is requested to revise FSAR Section 14.2 test #046 to address waterhammer performance before it can be considered as an alternative to the ITAAC requested by the staff in Question (4)a of RAI 9.2.2-32. Additionally, the key actions identified by the applicant that remain include completion of a transient analysis, application of high point vents, location of surge control devices and identification of any required operational procedures.

(4)(d) AREVA is requested to address Tier 1 ITAACs for radiation monitors in RCCWS.

Response to Question 09.02.02-77:

A response to this question will be provided by March 12, 2010.

Question 09.02.02-78:

Follow-up to RAI 174, Question 9.2.2-33

(a) AREVA is requested to provide markup of FSAR Tier 1 Figure 2.7.1-1 or Tier 2 Figure 9.2.2-3 to correct the subject valves from manual to motor operated.

(b) AREVA is requested to address the fuel pool cooling flow rates to support the determination of compliance with GDC 44.

Response to Question 09.02.02-78:

A response to this question will be provided by March 12, 2010.