ArevaEPRDCPEm Resource

From: McLellan, Judith
Sent: Friday, March 07, 2014 9:34 AM
To: ArevaEPRDCPEm Resource
Cc: Gleaves, Bill; Goel, Raj
Subject: FW: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 7
Attachments: RAI 511 Supplement 7 Response US EPR DC.pdf

From: WILLIFORD Dennis (AREVA) [mailto:Dennis.Williford@areva.com]
Sent: Tuesday, July 02, 2013 10:17 AM
To: Gleaves, Bill
Subject: FW: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 7

FYI….as you requested.

From: RYAN Tom (RS/NB)
Sent: Friday, May 10, 2013 9:47 AM
To: Amy.Snyder@nrc.gov
Cc: DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); ANDERSON Katherine (External AREVA NP INC.); LENTZ Tony (External RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 7

Amy,

AREVA NP provided a schedule for responding to the six questions in RAI No. 511 on October 21, 2011. Supplement 1 response was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions. Supplement 2, Supplement 3 and Supplement 4 responses to RAI No. 511 were sent on December 13, 2011, January 20, 2012, and February 24, 2012, respectively, to provide a revised schedule for the remaining five questions. Supplement 5 response to RAI No. 511 was sent on March 29, 2013 to provide technically correct and complete final responses to 3 (06.02.02-125, 06.02.02-126 and 06.04-11) of the remaining 5 Questions. Supplement 6 response to RAI No. 511 was sent on May 3, 2013 to provide a revised schedule for the remaining two questions.

The attached file, "RAI 511 Supplement 7 Response US EPR DC.pdf," provides a technically correct and complete final response to Question 06.04-10. 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 511.

The following table indicates the respective pages in the response document, "RAI 511 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 511 — 06.04-10	2	4

The schedule for technically correct and complete response to the remaining question remains unchanged as provided below.

Question #	Response Date
RAI 511 — 06.04-9	**May 17, 2013**

Sincerely,

Tom Ryan for
Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Friday, May 03, 2013 4:31 PM
To: Amy.Snyder@nrc.gov
Cc: bill.gleaves@nrc.gov; ANDERSON Katherine (External AREVA NP INC.); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 6

Amy,

AREVA NP provided a schedule for responding to the six questions in RAI No. 511 on October 21, 2011. Supplement 1 response was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions. Supplement 2, Supplement 3 and Supplement 4 responses to RAI No. 511 were sent on December 13, 2011, January 20, 2012, and February 24, 2012, respectively, to provide a revised schedule for the remaining five questions. Supplement 5 response to RAI No. 511 was sent on March 29, 2013 to provide technically correct and complete final responses to 3 (06.02.02-125, 06.02.02-126 and 06.04-11) of the remaining 5 Questions.

NRC staff review comments on advanced responses to Questions 06.04-9 and 06.04-10 were discussed during a telecon on March 14, 2013 and clarified in an e-mail received on March 20, 2013. Additional discussion and clarification occurred during subsequent telecons on April 8, 2013 and April 22, 2013. NRC staff comments will be considered and incorporated into the final responses to these two questions.

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

Question #	Response Date
RAI 511 — 06.04-9	**May 17, 2013**
RAI 511 — 06.04-10	**May 17, 2013**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Friday, March 29, 2013 3:23 PM
To: Amy.Snyder@nrc.gov
Cc: bill.gleaves@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); HONMA George (EXT); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 5
Importance: High

Amy,

AREVA NP provided a schedule for responding to the six questions in RAI No. 511 on October 21, 2011. Supplement 1 response was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions. Supplement 2, Supplement 3 and Supplement 4 responses to RAI No. 511 were sent on December 13, 2011, January 20, 2012, and February 24, 2012, respectively, to provide a revised schedule for the remaining five questions.

The attached file, "RAI 511 Supplement 5 Response US EPR DC.pdf," provides a technically correct and complete final response to Questions 06.02.02-125, 06.02.02-126 and 06.04-11. 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 511 Questions 06.02.02-125, 06.02.02-126 and 06.04-11.

The following table indicates the respective pages in the response document, "RAI 511 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 511 — 06.02.02-125	2	3
RAI 511 — 06.02.02-126	4	5
RAI 511 — 06.04-11	6	6

A new schedule for technically correct and complete responses to the remaining two questions is being evaluated and is contingent upon scheduling a clarification telecon with NRC staff to further discuss remaining issues and review comments.

Question #	Response Date
RAI 511 — 06.04-9	**TBD**
RAI 511 — 06.04-10	**TBD**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Friday, February 24, 2012 5:12 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB); GUCWA Len (External RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 4
Importance: High

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to the six questions of RAI No. 511 on October 21, 2011. Supplement 1 response was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions.
Supplement 2 and Supplement 3 responses to RAI No. 511 were sent on December 13, 2011 and January 20, 2012, respectively, to provide a revised schedule for the remaining five questions.

The schedule for technically correct and complete responses to the five questions has been changed as provided below. This schedule was transmitted to the NRC in AREVA NP letter NRC:12:008 dated February 21, 2012.

Question #	Response Date
RAI 511 — 06.02.02-125	**March 29, 2013**
RAI 511 — 06.02.02-126	**March 29, 2013**
RAI 511 — 06.04-9	**March 29, 2013**
RAI 511 — 06.04-10	**March 29, 2013**
RAI 511 — 06.04-11	**March 29, 2013**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Friday, January 20, 2012 2:31 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 3
Importance: High

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to the six questions of RAI No. 511 on October 21, 2011. Supplement 1 response was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions.
Supplement 2 response was sent on December 13, 2011 to provide a preliminary revised schedule for the remaining five questions.

The preliminary schedule for the response to the remaining five questions has been changed as provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by February 21, 2012.

Question #	Response Date
RAI 511 — 06.02.02-125	**February 21, 2012**
RAI 511 — 06.02.02-126	**February 21, 2012**
RAI 511 — 06.04-9	**February 21, 2012**
RAI 511 — 06.04-10	**February 21, 2012**
RAI 511 — 06.04-11	**February 21, 2012**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, December 13, 2011 4:26 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to the six questions of RAI No. 511 on October 21, 2011. Supplement 1 response to RAI No. 511 was sent on November 11, 2011 to provide a response to one (Question 06.02.02-124) of the six questions.

The preliminary schedule for the remaining five questions has changed from that provided in the November 11, 2011 response. The preliminary revised schedule is provided below. This schedule is being reevaluated and a new supplement with a revised schedule for the remaining five questions will be transmitted by January 25, 2012.

Question #	Response Date
RAI 511 — 06.02.02-125	**January 25, 2012**
RAI 511 — 06.02.02-126	**January 25, 2012**
RAI 511 — 06.04-9	**January 25, 2012**
RAI 511 — 06.04-10	**January 25, 2012**
RAI 511 — 06.04-11	**January 25, 2012**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: RYAN Tom (RS/NB)
Sent: Friday, November 11, 2011 11:37 AM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); GUCWA Len (External RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for responding to the six questions of RAI No. 511 on October 21, 2011. The attached file, "RAI 511 Supplement 1 Response US EPR DC.pdf," provides a technically correct and complete response to Question 06.02.02-124. The response references a revision to technical report, ANP-10293P, which is being provided by separate letter.

The following table indicates the respective pages in the response document, "RAI 511 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 511 — 06.02.02-124	2	2

The preliminary schedule for the remaining 5 questions is unchanged from that provided in the October 21, 2011 response. A new supplement with a revised schedule for these 5 questions will be transmitted by December 14, 2011.

Question #	Response Date
RAI 511 — 06.02.02-125	December 14, 2011
RAI 511 — 06.02.02-126	December 14, 2011
RAI 511 — 06.04-9	December 14, 2011
RAI 511 — 06.04-10	December 14, 2011
RAI 511 — 06.04-11	December 14, 2011

Sincerely,

Tom Ryan for
Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Friday, October 21, 2011 12:33 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 511 Response US EPR DC.pdf," provides a schedule since technically correct and complete responses to the six questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 511 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 511 — 06.02.02-124	2	2
RAI 511 — 06.02.02-125	3	3
RAI 511 — 06.02.02-126	4	4
RAI 511 — 06.04-9	5	6
RAI 511 — 06.04-10	7	8
RAI 511 — 06.04-11	9	9

The schedule for responding to Question 06.02.02-124 listed below is consistent with the commitment date for other GSI-191 questions that was provided in the GSI-191 Closure Plan letter (NRC:11:092) dated August 25, 2011. A preliminary schedule for technically correct and complete responses to the other 5 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule for these 5 questions will be transmitted by December 14, 2011.

Question #	Response Date
RAI 511 — 06.02.02-124	November 18, 2011
RAI 511 — 06.02.02-125	December 14, 2011
RAI 511 — 06.02.02-126	December 14, 2011
RAI 511 — 06.04-9	December 14, 2011
RAI 511 — 06.04-10	December 14, 2011
RAI 511 — 06.04-11	December 14, 2011

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, September 21, 2011 5:20 PM
To: ZZ-DL-A-USEPR-DL
Cc: Ashley, Clinton; ODriscoll, James; Jackson, Christopher; McKirgan, John; Scarbrough, Thomas; Terao, David; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 31, 2011, and discussed with your staff on September 21, 2011. Drat RAI Questions 06.04-9 was modified as a result of that discussion. 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: 4830

Mail Envelope Properties (A41C2340DAB39B44AD0B9623285CB333E5723EB921)

Subject: FW: Response to U.S. EPR Design Certification Application RAI No. 511 (6019,6020,6012), FSAR Ch. 6, Supplement 7
Sent Date: 3/7/2014 9:33:49 AM
Received Date: 3/7/2014 9:33:51 AM
From: McLellan, Judith

Created By: Judith.McLellan@nrc.gov

Recipients:
"Gleaves, Bill" <Bill.Gleaves@nrc.gov>
Tracking Status: None
"Goel, Raj" <Raj.Goel@nrc.gov>
Tracking Status: None
"ArevaEPRDCPEm Resource" <ArevaEPRDCPEm.Resource@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	17060	3/7/2014 9:33:51 AM
RAI 511 Supplement 7 Response US EPR DC.pdf	184071	

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

Response to

Request for Additional Information No. 511, Supplement 7

9/21/2011

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.02 - Containment Heat Removal Systems
SRP Section: 06.04 - Control Room Habitability System

Application Section: 6.3

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)
QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

Question 06.04-10:

Clarify the CRE ITAAC described in Tier 1 and CRACS Toxic Gas Design Features described in Tier 2.

Based on the staff's review of your responses and proposed Tier 1 and Tier 2 Markups to questions in RAI 277 (Supplement 18 response) and RAI 462 (Supplement 4 response), the staff requests the following information with regard to FSAR Section 6.4 Control Room Habitability:

a. The staff remains unclear on the method of testing that will be used to perform ITAAC item 6.4 in Tier 1 Table 2.6.1.3. The staff understands that periodic verification of the CRE unfiltered air in-leakage is as per the Control Room Habitability Program, as described in FSAR Tier 2 Chapter 16, section 5.5.17, "Control Room Envelope Habitability Program" and will be performed in accordance with the testing methods described in Section C.1 and C.2 of RG 1.197, "Demonstrating Control Room Envelope Integrity and Nuclear Power Reactors," Revision 0, May 2003. The staff needs assurance that the method of testing for the ITAAC will be the same as that used after the 10 CFR 52.103 (g) finding is made by the Commission. Therefore the staff requests AREVA to clarify the "Inspections Test, Analyses" section of ITAAC item 6.4 in Tier 1 Table 2.6.1.3, to indicate that tracer gas testing in accordance with ASTM E741 will be performed to measure the unfiltered air in-leakage into the CRE area with the CREF operating.

b. The staff noted that the FSAR Tier 2 mark-ups related to your response to RAI 462, Question 06.04-7 clarify the FSAR to leave the description of the sensors and features of the habitability systems required to mitigate a toxic gas event to the COL applicant that references the U.S. EPR standard design. The staff noted that several proposed FSAR mark ups seem inconsistent with the intent of the RAI response specifically:

   I. The staff noted that the Tier 1 description of the CRACS continues to describe functions for the CRACS to maintain CRE habitability in case of a toxic gas event. The staff requests you clarify Tier 1 Paragraph 2.6.1, (third subparagraph) to delete references to toxic gas.

   II. The staff noted that Tier 2 chapter 16 section B 3.7.10, describe actions to be taken for toxic gas isolation: "[The actions taken in the toxic gas isolation state are the same, except that the control room operator switches the CREF to a filtration alignment to minimize any outside air from entering the CRE though the CRE boundary.]" This description details the response of the CREF to a toxic gas event in the standard design description that appears to be inconsistent with the RG 1.78 guidance quoted in RAI 462, Question 06.04-7. The staff believes it should be revised to be consistent with the reviewer's note that was added to the same paragraph: "The need for toxic gas isolation state will be determined by the COL applicant".

c. The staff noted that the FSAR Tier 2 mark-up related to your response to RAI 462, Question 06.04-7 include a change the capacity of the CRACS cooling unit cooling capacity that affect a previous RAI responses on this subject. Specifically, Tier 2, Chapter 16 section B 3.7.11 now states the following:

> *"During normal* and *emergency operation each CRACS cooling unit provides 50% of the normal and emergency cooling load to allow two CRACS air handling units to cool the CRE rooms during a station blackout (SBO) event. During an SBO event, the CRACS air handling units will prevent the CRE room temperature from exceeding 78°F."*

This markup text conflicts with the February 27, 2009 Supplement 1 response to RAI 135 Question 09.04.05-1 (#2 Item 3). The mark-up also conflicts with FSAR changes made to paragraph 9.4.2.1.1 (General Description- Recirculation Air Handling Subsystem).

I. Please provide more information as to why the CRACS cooling unit capacity is reduced. Specifically, please re-address your response to RAI 135 Question 09.04.05-1 (#2 Item 3)

II. The LCO to restore a single inoperable CRACS train to service is proposed to be 120 days. Include a discussion on the specific case of an SBO that occurs while one of the two AAC-Backed CRACS trains is out for maintenance, and the probability of an SBO event that occurs while this LCO applies. Provide further justification for the duration of this LCO period.

III. Clarify the FSAR as needed.

Response to Question 06.04-10:

Item a

The method of testing used to satisfy ITAAC Commitment Item 6.4 in U.S. EPR FSAR Tier 1, Table 2.6.1-3—Main Control Room Air Conditioning System ITAAC is described in U.S. EPR FSAR Tier 2, Section 6.4.5. The tracer gas testing is performed in accordance with ASTM E741 and is used to measure the unfiltered air in-leakage into the control room envelope (CRE) area with the control room emergency filtration operating. No changes to the U.S. EPR FSAR are required.

Item b

I. The intent of the response to RAI 462, Supplement 4, Question 06.04-7, was to revise the U.S. EPR FSAR to reflect that a toxic gas event is a site-specific event. The equipment used for the detection, measurement, and isolation associated with a toxic gas release is the responsibility of the COL applicant. The specific toxic gas design, which had been part of the design of the control room air conditioning system (CRACS) in the U.S. EPR standard design, was removed from the CRACS. In the response to RAI 462, Supplement 4, Question 06.04-7, applicable U.S. EPR FSAR Tier 1 and Tier 2 sections were revised to reflect this change.

   To be consistent with the response to RAI 462, Supplement 4, Question 06.04-7, U.S. EPR FSAR Tier 1, Section 2.6.1 and U.S. EPR FSAR Tier 2, Section 7.3.1.3.3 will be revised to delete references to a toxic gas event.

II. U.S. EPR FSAR Tier 2 Chapter 16 Section B 3.7.10 will be revised to clarify that complete control room isolation is performed in response to a high toxic gas signal, which is consistent with RG 1.78.

Item c

I. In the original CRACS design of the U.S. EPR standard design, the CRACS cooling coils for Division 1 and 4 were sized for 75 percent capacity. In this design configuration, only Division 1 and 4 fans were powered by the two station blackout (SBO) diesels. In the event of an SBO diesel generator (DG) failure, the 75 percent capacity accommodated the SBO load using one set of fan and cooling coils. During normal or emergency operation (excluding SBO), any combination of two CRACS cooling units could be used. The 75 percent capacity units were over-sized and there was the potential for unbalanced air flow and cooling when a 75percent unit was operating with a 50 percent unit.

   A design change has been implemented to reduce the size of the Division 1 and 4 CRACS cooling coils to 50 percent capacity, which is equivalent to the Division 2 and 3 CRACS cooling coils. Power for the Division 2 and 3 CRACS supply fans has been moved to new buses, which can receive alternate power and are backed by SBO DGs. If a loss of a single SBO DG occurs, an operator can utilize a second CRACS supply fan and associated cooling coil using power from the remaining operating SBO DG to provide additional cooling to the main control room (MCR), if needed. An SBO event is mitigated by operator actions from the MCR and the additional CRACS supply fan will only be loaded on the remaining SBO DG if the SBO DG has adequate load margin at the time in the SBO event the additional CRACS supply fan is needed. During an SBO event, two 50 percent CRACS cooling units are available to maintain the MCR temperature below 104°F.

II. The 120-day completion time specified in U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Bases Section B3.7.11, Action A.1, is based on the assumption that one CRACS train is out of service for maintenance, leaving three trains available. The Technical Specifications limiting conditions for operation (LCOs) address and are consistent with assumptions in the U.S. EPR FSAR Tier 2, Chapter 15 safety analyses. CRACS is included in the Technical Specifications and satisfies the requirements of 10 CFR 50.36(c)(2)(ii). The Technical Specifications are not intended to address beyond design basis events.

III. U.S. EPR FSAR Tier 1, Table 2.6.1-2—CRACS Equipment I&C and Electrical Design, and Tier 2, Sections 9.4.1.2.1 and 9.4.1.2.3 will be revised to reflect the change to 50 percent capacity cooling coils and the new power source for operation during an SBO event.

   U.S. EPR FSAR Tier 2 Chapter 16, Section B3.7.11 will be revised to reflect the removal of station blackout from the scope of Technical Specifications.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.6.1 and Table 2.6.1-2 and U.S. EPR FSAR Tier 2, Section 7.3.1.3.3, Section 9.4.1.2.1, Section 9.4.1.2.3, Section 16 B3.7.10, and Section 16 B3.7.11 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

2.6 HVAC Systems

2.6.1 Main Control Room Air Conditioning System

Design Description

1.0 System Description

The main control room air conditioning system (CRACS) supplies air to the control room envelope (CRE) area which includes the main control room (MCR) and associated rooms.

The CRACS controls the CRE area temperature and air change rate for personnel comfort, personnel safety, and equipment protection during normal plant operation. The CRACS provides cooling, heating, and ventilation for the CRE area to remove equipment heat, and heat generated from other sources. The CRACS also provides heat to maintain a minimum temperature in the CRE area. The CRACS provides a minimal air change rate for the CRE area and controls building pressurization to reduce spreading of contamination.

06.04-10

The CRACS maintains habitability of the CRE area in case of radioactive ~~or toxic gas~~ contamination of the environment. The CRACS also maintains a positive pressure in the CRE area to prevent infiltration of contaminated outside air. The CRACS operates in recirculation mode with fresh air makeup.

The CRACS provides the following safety-related functions:

- Maintains ambient temperature conditions inside the CRE area.
- Provides ~~carbon~~ filtration of outside air and recirculated air from within the CRE area.
- Maintains a positive pressure in the CRE area relative to the adjacent areas to prevent unfiltered in-leakage, upon receipt of a containment isolation signal (CIS) or high radiation alarm signal in the air intake ducts.

2.0 Arrangement

2.1 The functional arrangement of the CRACS is as described in the Design Description of Section 2.6.1, Tables 2.6.1-1—Main Control Room Air Conditioning System Equipment Mechanical Design and 2.6.1-2—Main Control Room Air Conditioning System Equipment I&C and Electrical Design, and as shown on Figures 2.6.1-1—Control Room Air Intake and CREF (Iodine Filtration) Train Subsystem Functional Arrangement, 2.6.1-2—Control Room Air Conditioning and Recirculation Air Handling Subsystem Functional Arrangement, and 2.6.1-3—CRE Air Supply and Recirculation Subsystem Functional Arrangement.

2.2 Deleted.

Table 2.6.1-2—CRACS Equipment I&C and Electrical Design
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Description	Tag Number(1)	Location	IEEE Class 1E (2)	PACS	MCR / RSS Displays	MCR / RSS Controls
Motor Operated Damper	30SAB14AA003	Safeguard Building 2	Division 4^{N} Division 3^{A}	Yes	Position / Position	Open-Close / Open-Close
Supply Air Fan	30SAB14AN001	Safeguard Building 3	Division 4^{N} Division 3^{A}	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Recirculation and Air Conditioning Train 30SAB01						
Supply Air Fan	30SAB01AN001	Safeguard Building 2	Division 1^{N} Division 2^{A}	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Recirculation and Air Conditioning Train 30SAB02						
Supply Air Fan	30SAB02AN001	Safeguard Building 2	Division 2^{N} Division 1^{A}	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Recirculation and Air Conditioning Train 30SAB03						
Supply Air Fan	30SAB03AN001	Safeguard Building 3	Division 3^{N} Division 4^{A}	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Recirculation and Air Conditioning Train 30SAB04						
Supply Air Fan	30SAB04AN001	Safeguard Building 3	Division 4^{N} Division 3^{A}	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Kitchen and Sanitary Exhaust 30SAB45						

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7.3.1.3.3 Main Control Room Air Conditioning System

The main control room air conditioning system (CRACS) is designed to maintain design temperature conditions for rooms within the Control Room Envelope (CRE) during normal and accident conditions. The CRACS also maintains the habitability of the MCR and associated rooms even in the case of radioactive contamination of the environment. See Section 9.4.1 for more information about the CRACS.

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Iodine Filtration Train Heater Control

The ~~main control room air conditioning system (~~CRACS~~)~~ has an safety-related function to preheat the inlet air in order to reduce the airborne moisture prior to entry into the carbon bed within the filter unit. The relative humidity is limited to a maximum of 70% in order to maintain the capability of the carbon filters to remove iodine from the annulus supply air. Carbon filter heaters shut down when the respective inlet or outlet dampers are not fully open. The heaters will turn off if the carbon filtration unit fan stops, the carbon filter inlet isolation damper is not open or the carbon filter outlet isolation damper is not open. The functional logic is shown in Figure 7.3-42—CRACS Iodine Filtration Train Heater Control.

Heater Control for Outside Inlet Air

The CRACS has an safety-related function to preheat the outside air to verify that the inlet air temperature is not less than 37°F (GDC 19). The heaters are designed to heat the outside air during cold weather conditions and to preheat the cold outside air to prevent the CRACS air handling unit chilled water cooling coils from freezing. Inlet air that bypasses the iodine filtration unit is heated by an electric heater for temperature control. Heating of the outside air is performed by multi-stage heaters located in each outside air intake duct. The functional logic is shown in Figure 7.3-43—CRACS Heater Control for Outside Inlet Air.

Pressure Control

The CRACS has a safety-related function to verify the MCR is maintained at a positive pressure with respect to the ambient air pressure in adjacent areas to prevent unfiltered in-leakage into the MCR and associated rooms (GDC 19). Differential pressure sensors sense the pressure difference between the MCR and the pressure in a reference areas. The functional logic is shown in Figure 7.3-44—CRACS Pressure Control.

Cooler Temperature Control

The CRACS has safety-related functions that verify that the air supply temperature is maintained within the preset temperature range (GDC 19). A control signal is developed when the supply air temperature exceeds a preset temperature set point of

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~~a single~~ two CRACS air handling units to cool the CRE rooms during a station blackout (SBO) event. During an SBO, ~~the single~~ two CRACS air handling units prevent~~s~~ the CRE room temperature from exceeding 104°F.

The air conditioning system for the CRE area operates in the recirculation mode with fresh air makeup. The fresh air flow rate corresponds to the exhaust of kitchens and restrooms and the leakage rate in the CRE area due to controlled overpressure. The exhaust from the kitchen and restrooms is directed to the electrical division of the SB ventilation system (SBVSE) air outlet duct (refer to Section 9.4.6).

CRE Air Supply and Recirculation Subsystem

The CRE air supply and recirculation subsystem is illustrated in Figure 9.4.1-3—Control Room Envelope Air Supply and Recirculation Subsystem.

The common supply air plenum receives air from the operating CRACS air handling units and provides conditioned air to the CRE areas through the duct distribution network. Electric air heaters are installed in the supply air ducts to maintain individual room temperatures. The exhaust air from the CRE area, except from the kitchen and restrooms, flows through the recirculation air handling units. The exhaust from kitchen and restrooms is separated from the recirculated return air and is processed separately through the SBVSE.

9.4.1.2.2 Component Description

The major components of the CRACS are listed below, along with the applicable codes and standards. Table 3.2.2-1 provides the seismic design and other design classifications for components in the CRACS.

Ductwork and Accessories

The main supply and exhaust air plenums are constructed of concrete with painted surfaces. The air supply and exhaust duct branches for each area are fed from the main supply and exhaust air plenum. These ducts are constructed of galvanized sheet steel and are structurally designed for fan shutoff pressures. The ductwork meets the design, testing and construction requirements per ASME AG-1 (Reference 1).

Electric Heaters (Duct Heaters)

The electric heaters (duct heaters) are installed in the supply duct to maintain room ambient conditions. These are controlled by local room temperature sensors and control circuits. The heaters meet the requirements of Reference 1.

During LOOP, the CREF (iodine filtration) train electrical components located inside the SB division two receive power from the EDGs of division one. The electrical components located inside the SB division three receive power from the EDGs of division four.

Station Blackout

- In the event of station blackout (SBO), the electrical components which receive power from the EDGs of divisions one and two are backed-up by alternate AC (AAC) power from ~~the~~ an SBO diesel generators (SBODG) of ~~division~~ train one. The electrical components which receive power from the EDGs of divisions three and four are backed up by the AAC power from ~~the~~ an SBODGs of ~~division~~ train four.

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- In the event of a simultaneous SBO and site radiological event, the CRE area is isolated and CRACS is maintained in a full recirculation mode through the CREF (iodine filtration) train until site power is restored or EDGs are started. Power restoration is assumed to occur within eight hours following the occurrence of a SBO event.

Loss of Ultimate Heat Sink

The conditioned air supply is cooled by chilled water provided by the SCWS. Two water-cooled chillers are located in SB divisions two and three, and two air-cooled chillers are located in SB divisions one and four. In case of loss of ultimate heat sink (LUHS), the water-cooled chillers are not available. The safety chilled water is then supplied by air-cooled chillers which provide the cooling function for the filtration trains located in divisions one and four, which also include both CREF (iodine filtration) trains. The cooling function for any two of the four CRACS cooling units in divisions 1, 2, 3, and 4 will continue to be available.

Operation During Radiological Site Contamination

During a site radiological contamination event, the fresh air supply is automatically redirected through the CREF (iodine filtration) trains, instead of the normal intake air supply, by closing and opening the associated dampers. When one CREF (iodine filtration) train operates, the outside fresh airflow rate of 1000 cfm and CRE recirculation airflow rate of 3000 cfm (a total flow rate of 4000 cfm) provides an unlimited stay by the CRE personnel.

Exhaust from the kitchen and restrooms is stopped and all other exhaust air is recirculated.

The operation of CRACS creates an minimum pressure of 0.125 inches of water gauge inside the CRE area with respect to the surrounding area. This limits unfiltered incoming air leakage into these areas.

BASES

BACKGROUND (continued)

The CREF is an emergency system, parts of which may also operate during normal unit operations in the standby mode of operation. Upon receipt of the actuating signal(s), normal air supply to the CRE is isolated, and the stream of ventilation air is recirculated through the system filter trains. The prefilters remove large particles in the air to prevent excessive loading of the HEPA filters and carbon adsorbers.

----------REVIEWER'S NOTE----------
The need for toxic gas isolation state will be determined by the COL applicant.

Actuation of the CREF places the system in [either of two separate states (emergency radiation state or toxic gas isolation state) of] the emergency mode of operation[, depending on the initiation signal]. Actuation of [the system to the emergency radiation state of] the emergency mode of operation closes the unfiltered outside air intake and unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and carbon filters, and initiates control room pressurization and filtered ventilation of the air supply to the CRE.

Outside air is mixed with recirculated air from the CRE. This air flows through the CREF unit into a common recirculation plenum where it mixes with air pulled from the CRE rooms. Pressurization of the CRE minimizes infiltration of unfiltered air through the CRE boundary from all the surrounding areas adjacent to the CRE boundary. [The actions taken in the toxic gas isolation state are more restrictive. ~~the same, except that the control room operator switches the CREF to a filtration alignment to minimize any outside air from entering the CRE through the CRE boundary.~~ Upon detection of a toxic gas, the toxic gas detector will initiate complete closure of intake dampers to the control room.]

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The outside air entering the CRE is continuously monitored by radiation [and toxic gas] detectors. One detector output above the setpoint will cause actuation of the emergency mode [, either the emergency radiation state or toxic gas isolation state, as required]. [The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.]

B 3.7 PLANT SYSTEMS

B 3.7.11 Control Room Air Conditioning System (CRACS)

BASES

BACKGROUND

The CRACS provides temperature control for the control room envelope (CRE) following isolation of the control room.

The CRACS operates in the recycling mode with fresh outside air makeup. There are two 100% capacity identical fresh air intake trains. Train 1 is located in Safeguard Building 2 and train 4 is located in Safeguard Building 3. For each intake train, the fresh air is taken from outside environment through a motor-operated inlet isolation damper, and a pressure control damper. If operating in the unfiltered bypass alignment (intake air bypasses the CREF), outside air flows through a prefilter and duct heater. The fresh outside air then goes to the common recirculation plenum and mixes with CRE recycled air. The mixed air is then directed through two of the four air conditioning trains.

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During normal and emergency operation each CRACS cooling unit provides 50% of the cooling for the rooms within the CRE. Each CRACS air handling unit is capable of cooling up to 50% of the normal and emergency cooling load to allow two CRACS air handling units to cool the CRE rooms ~~during a station blackout (SBO) event. During an SBO event, the CRACS air handling units will prevent the CRE room temperature from exceeding 78°F~~.

Each air conditioning train consists of a final filter, cooling coil, moisture separator, fan suction and discharge silencers, supply air fan, and backdraft damper. The conditioned air is supplied to the control room envelope (CRE) areas. Electric heaters are installed in the supply air ducts to maintain individual room temperature. The air is pulled from the CRE areas into a common recirculation air plenum and then recycled through the air conditioning units for each train. Upon receipt of a high radiation alarm or upon receipt of a containment isolation alarm, the CREF unit operates in the filtered alignment. Operation of either CREF unit or closure of either outside inlet air isolation damper will shut down the normal kitchen or restroom exhaust fan and close isolation dampers in ducting routed to the safeguard building ventilation system (SBVS) where it is exhausted to the outside environment.

During normal operation, the CREF units operate in the bypass alignment (air bypasses the iodine filtration unit). CRE room exhaust from clean areas continues to recycle back to the recirculation plenum and CRACS air conditioning units.