# ArevaEPRDCPEm Resource

From:	BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent:	Friday, November 12, 2010 2:48 PM
То:	Tesfaye, Getachew
Cc:	DELANO Karen (AREVA); ROMINE Judy (AREVA); SLAY Lysa (AREVA); KOWALSKI David (AREVA); HALLINGER Pat (EXTERNAL AREVA); RYAN Tom (AREVA); Miernicki, Michael; NOXON David (AREVA); PATTON Jeff (AREVA)
Subject: Attachments:	DRAFT Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9 RAI 277 Supplement 13 Response US EPR DC - DRAFT.pdf

#### Getachew,

Attached is a revised draft response for RAI 277 that addresses staff comments on the previous draft. Let me know if the staff has additional questions or if the response can be sent as a final response.

#### Thanks,

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 (External RS/NB)
Sent: Friday, November 12, 2010 2:26 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); 'Miernicki, Michael'
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 12

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10 and Supplement 11 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010, May 27, 2010, June 24, 2010, July 28, 2010, August 27, 2010, September 22, 2010 and October 25, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	December 10, 2010
RAI 277 — 09.04.02-1	December 10, 2010
RAI 277 — 09.04.03-1	December 10, 2010
RAI 277 — 09.04.03-3	December 10, 2010

December 10, 2010

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 (External RS/NB)
Sent: Monday, October 25, 2010 1:14 PM
To: 'Getachew.Tesfaye@nrc.gov'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 11

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9 and Supplement 10 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010, May 27, 2010, June 24, 2010, July 28, 2010, August 27, 2010, and September 22 respectively, to provide a revised schedule.

To provide additional time to process the response, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date	
RAI 277 — 09.04.01-1	November 12, 2010	
RAI 277 — 09.04.02-1	November 12, 2010	
RAI 277 — 09.04.03-1	November 12, 2010	
RAI 277 — 09.04.03-3	November 12, 2010	
RAI 277 — 09.04.05-2	November 12, 2010	

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 (External RS/NB)
Sent: Wednesday, September 22, 2010 2:38 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 10

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8 and Supplement 9 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010, May 27, 2010, June 24, 2010, July 28, 2010 and August 27, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	October 26, 2010
RAI 277 — 09.04.02-1	October 26, 2010
RAI 277 — 09.04.03-1	October 26, 2010
RAI 277 — 09.04.03-3	October 26, 2010
RAI 277 — 09.04.05-2	October 26, 2010

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 (External RS/NB)
Sent: Friday, August 27, 2010 11:57 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 9

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5, Supplement 6, Supplement 7 and Supplement 8 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010, May 27, 2010, June 24, 2010 and July 28, 2010, respectively, to provide a revised schedule.

On June 25, 2010, DRAFT responses to the remaining 5 questions were submitted to the NRC staff.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	September 24, 2010
RAI 277 — 09.04.02-1	September 24, 2010
RAI 277 — 09.04.03-1	September 24, 2010
RAI 277 — 09.04.03-3	September 24, 2010
RAI 277 — 09.04.05-2	September 24, 2010

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: Wednesday, July 28, 2010 5:16 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 8

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5, Supplement 6 and Supplement 7 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010, May 27, 2010 and June 24, 2010, respectively, to provide a revised schedule.

To allow time for interaction between AREVA and the NRC staff on the draft response submitted June 24, 2010, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	August 27, 2010
RAI 277 — 09.04.02-1	August 27, 2010
RAI 277 — 09.04.03-1	August 27, 2010
RAI 277 — 09.04.03-3	August 27, 2010
RAI 277 — 09.04.05-2	August 27, 2010

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, June 24, 2010 4:31 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 7

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4, Supplement 5 and Supplement 6 responses to RAI No. 277 were sent on April 14, 2010, May 6, 2010 and May 27, 2010, respectively, to provide a revised schedule.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below:

Question #	Response Date	
RAI 277 — 09.04.01-1	July 28, 2010	
RAI 277 — 09.04.02-1	July 28, 2010	
RAI 277 — 09.04.03-1	July 28, 2010	
RAI 277 — 09.04.03-3	July 28, 2010	
RAI 277 — 09.04.05-2	July 28, 2010	

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 Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4 and Supplement 5 responses to RAI No. 277 were sent on April 14, 2010 and May 6, 2010 to provide a revised schedule. Since additional time is needed for AREVA to discuss the responses to the questions with the NRC, an updated schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised as provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	June 24, 2010
RAI 277 — 09.04.02-1	June 24, 2010
RAI 277 — 09.04.03-1	June 24, 2010
RAI 277 — 09.04.03-3	June 24, 2010
RAI 277 — 09.04.05-2	June 24, 2010

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, May 06, 2010 3:59 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement , Supplement 5

# Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions. Supplement 4 response to RAI No. 277 was sent on April 14, 2010 to provide a revised schedule.

To allow time for AREVA to discuss the responses to the remaining questions with the NRC, a revised schedule is provided in this e-mail that has been agreed to by the NRC.

The schedule for technically correct and complete responses to the remaining questions has been revised as provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	May 27, 2010
RAI 277 — 09.04.02-1	May 27, 2010
RAI 277 — 09.04.03-1	May 27, 2010
RAI 277 — 09.04.03-3	May 27, 2010
RAI 277 — 09.04.05-2	May 27, 2010

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: Wednesday, April 14, 2010 3:51 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement , Supplement 4

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions. Supplement 3 response to RAI No. 277 was sent on March 11, 2010 to address 1 of the remaining 6 questions.

To allow time for AREVA to discuss the responses to the remaining questions with the NRC, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the remaining questions has been revised as provided below:

Question #	Response Date	
RAI 277 — 09.04.01-1	May 6, 2010	
RAI 277 — 09.04.02-1	May 6, 2010	
RAI 277 — 09.04.03-1	May 6, 2010	
RAI 277 — 09.04.03-3	May 6, 2010	
RAI 277 — 09.04.05-2	May 6, 2010	

Sincerely,

Martin (Marty) C. Bryan Licensing Advisory Engineer From: BRYAN Martin (EXT)
Sent: Thursday, March 11, 2010 4:11 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 3

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. Supplement 1 response to RAI No. 277 was sent on December 9, 2009 to provide a revised schedule for the remaining questions. Supplement 2 response to RAI No. 277 was sent on February 4, 2010 to address 1 of the remaining 7 questions.

The attached file, "RAI 277 Supplement 3 Response US EPR DC.pdf" provides a technically correct and complete response to 1 of the remaining 6 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 277 Question 09.02.05-21.

The following table indicates the respective pages in the response document, "RAI 277 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 277 — 09.02.05-21	2	3

The schedule for a technically correct and complete response to the remaining 5 questions is unchanged and provided below:

Question #	Response Date
RAI 277 — 09.04.01-1	April 14, 2010
RAI 277 — 09.04.02-1	April 14, 2010
RAI 277 — 09.04.03-1	April 14, 2010
RAI 277 — 09.04.03-3	April 14, 2010
RAI 277 — 09.04.05-2	April 14, 2010

Sincerely,

Martin (Marty) C. Bryan Licensing Advisory Engineer AREVA NP Inc. Tel: (434) 832-3016 Martin.Bryan.ext@areva.com Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. AREVA NP submitted Supplement 1 to the response on December 9, 2009 to provide a revised schedule. The attached file, "RAI 277 Supplement 2 Response US EPR DC.pdf" provides a technically correct and complete response to one of the remaining seven questions. The schedule for the remaining six questions has been revised.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 277 Question 09.04.03-2.

The following table indicates the respective pages in the response document, "RAI 277 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 277 — 09.04.03-2	2	2

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

Question #	Response Date
RAI 277 — 09.02.05-21	March 12, 2010
RAI 277 — 09.04.01-1	April 14, 2010
RAI 277 — 09.04.02-1	April 14, 2010
RAI 277 — 09.04.03-1	April 14, 2010
RAI 277 — 09.04.03-3	April 14, 2010
RAI 277 — 09.04.05-2	April 14, 2010

Sincerely,

Les Duncan Licensing Engineer **AREVA NP Inc.** An AREVA and Siemens Company Tel: (434) 832-2849 Leslie.Duncan@areva.com

From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, December 09, 2009 4:03 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 5 of the 12 questions of RAI No. 277 on October 16, 2009. AREVA NP also provided a schedule for technically correct and complete responses to the remaining 7 questions.

Since responses to the remaining questions remain in process, a revised schedule is provided in this email.

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

Question #	Response Date
RAI 277 — 09.02.05-21	February 4, 2010
RAI 277 — 09.04.01-1	February 4, 2010
RAI 277 — 09.04.02-1	February 4, 2010
RAI 277 — 09.04.03-1	February 4, 2010
RAI 277 — 09.04.03-2	February 4, 2010
RAI 277 — 09.04.03-3	February 4, 2010
RAI 277 — 09.04.05-2	February 4, 2010

Sincerely,

# Ronda Pederson

ronda.pederson@areva.com Licensing Manager, U.S. EPR Design Certification **AREVA NP Inc.** An AREVA and Siemens company 3315 Old Forest Road Lynchburg, VA 24506-0935 Phone: 434-832-3694 Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, October 16, 2009 5:33 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 277, FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 277 Response US EPR DC.pdf" provides technically correct and complete responses to 5 of the 12 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 277 Questions 09.04.02-2, 09.04.04-1, and 09.05.01-71.

The following table indicates the respective page(s) in the response document, "RAI 277 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 277 — 09.02.05-21	2	2
RAI 277 — 09.04.01-1	3	3
RAI 277 — 09.04.02-1	4	4

RAI 277 — 09.04.02-2	5	5
RAI 277 — 09.04.03-1	6	6
RAI 277 — 09.04.03-2	7	7
RAI 277 — 09.04.03-3	8	8
RAI 277 — 09.04.04-1	9	10
RAI 277 — 09.04.04-2	11	11
RAI 277 — 09.04.05-2	12	12
RAI 277 — 09.05.01-71	13	13
RAI 277 — 09.05.06-12	14	14

A complete answer is not provided for 7 of the 12 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 277 — 09.02.05-21	December 10, 2009
RAI 277 — 09.04.01-1	December 10, 2009
RAI 277 — 09.04.02-1	December 10, 2009
RAI 277 — 09.04.03-1	December 10, 2009
RAI 277 — 09.04.03-2	December 10, 2009
RAI 277 — 09.04.03-3	December 10, 2009
RAI 277 — 09.04.05-2	December 10, 2009

Sincerely,

# Ronda Pederson

#### ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification **AREVA NP Inc.** An AREVA and Siemens company 3315 Old Forest Road Lynchburg, VA 24506-0935 Phone: 434-832-3694 Cell: 434-841-8788

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, September 16, 2009 12:52 PM
To: ZZ-DL-A-USEPR-DL
Cc: Wheeler, Larry; Segala, John; ODriscoll, James; Jackson, Christopher; Snodderly, Michael; McCann, Edward; Radlinski, Robert; Wolfgang, Robert; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 277(3538,3371,3372,3376,3374,3375,3399,2995)), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 17, 2009, and discussed with your staff on August 31, 2009. Draft RAI Questions 09.05.01-70 was deleted 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: 2255

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7108425A41)

Subject: FSAR Ch. 9	DRAFT Response to U.S. EPR Design Certification Application RAI No. 277,
Sent Date:	11/12/2010 2:47:37 PM
Received Date:	11/12/2010 2:50:18 PM
From:	BRYAN Martin (EXTERNAL AREVA)

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

**Recipients:** 

"DELANO Karen (AREVA)" <Karen.Delano@areva.com> Tracking Status: None "ROMINE Judy (AREVA)" <Judy.Romine@areva.com> **Tracking Status: None** "SLAY Lysa (AREVA)" <Lysa.Slay@areva.com> Tracking Status: None "KOWALSKI David (AREVA)" <David.Kowalski@areva.com> Tracking Status: None "HALLINGER Pat (EXTERNAL AREVA)" <Pat.Hallinger.ext@areva.com> Tracking Status: None "RYAN Tom (AREVA)" <Tom.Ryan@areva.com> Tracking Status: None "Miernicki, Michael" < Michael.Miernicki@nrc.gov> Tracking Status: None "NOXON David (AREVA)" <David.Noxon@areva.com> **Tracking Status: None** "PATTON Jeff (AREVA)" < Jeff.Patton@areva.com> Tracking Status: None "Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov> Tracking Status: None

Post Office:

AUSLYNCMX02.adom.ad.corp

 Files
 Size
 Date & Time

 MESSAGE
 24955
 11/12/2010 2:50:18 PM

 RAI 277 Supplement 13 Response US EPR DC - DRAFT.pdf
 1055533

OptionsPriority:StandardReturn Notification:NoReply Requested:NoSensitivity:NormalExpiration Date:Recipients Received:

# **Response to**

**Request for Additional Information No. 277, Supplement 13** 

9/16/2009

U.S. EPR Standard Design Certification AREVA NP Inc. Docket No. 52-020 SRP Section: 09.02.05 - Ultimate Heat Sink SRP Section: 09.04.01 - Control Room Area Ventilation System SRP Section: 09.04.02 - Spent Fuel Pool Area Ventilation System SRP Section: 09.04.03 - Auxiliary and Radwaste Area Ventilation System SRP Section: 09.04.03 - Auxiliary and Radwaste Area Ventilation System SRP Section: 09.04.05 - Engineered Safety Feature Ventilation System SRP Section: 09.05.01 - Fire Protection Program SRP Section: 09.05.06 - Emergency Diesel Engine Starting System

**Application Section: 9.2.9** 

QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB) QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV) QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

# Question 09.04.01-1:

Discuss method by which the capability of the safety-related ventilation systems will be verified.

The applicant has provided the performance requirements for the various safety-related ventilation systems (Described in FSAR sections 9.4.1,2,5,6,9,11) but has not provided detailed design information related to the sizing of the ventilation systems. Adequate sizing of the system is assured through the surveillance requirements (for example SR 3.7.11.1) which verifies the capability or the system to remove the design heat load.

The applicant did not verify the capability of the systems. For each safety related ventilation system, provide the following:

- Provide a description in the FSAR that verifies the capability of the system to remove the design heat load. The applicant should describe the method for verification (by testing and/or analysis) as well as a description of the methods for determining the design heat loads including the limiting or bounding assumptions for all modes of operation including normal and outage, and during all anticipated occurrences including postulated accident events.
- 2. Include this demonstration as part of ITAAC. Existing ITAAC (e.g., Reference Section Number 6.1 in Tier 1 Table 2.6.1-3) acceptance criteria is not adequate to verify the system's capability to maintain ambient temperature conditions in the Control Room Envelope for all modes of operation.
- 3. The staff noted that the CRACS space heaters are non-safety augmented quality (NS-AQ) and Seismic Category II. The staff has also noted that the heaters associated with the control room air intake and iodine filtration system are safety related. Please describe the analysis that demonstrates the failure of the CRACS space heaters would not challenge the operability of MCR equipment, adversely affect human performance in the MCR, or would still allow the minimum MCR temperature of 68°F to be met, for all outside temperature ranges stated in FSAR Table 2.1-1. Alternatively, designate the heaters safety-related and include the design basis for the heaters in the FSAR.
- 4. This is SER/OI Open Item 9.4.1-1

# Response to Question 09.04.01-1:

- 1. The following U.S. EPR FSAR Tier 1 and Tier 2 sections were revised in U.S. EPR FSAR, Revision 2 to provide design information for determining design heat loads for various modes of operation for sizing of the system and ITAAC testing data:
  - U.S. EPR FSAR Tier 1, Table 2.6.1-3—Main Control Room Air Conditioning System ITAAC.
  - U.S. EPR FSAR Tier 1, Section 2.6.6 and Table 2.6.6-3—Safeguard Building Controlled-Area Ventilation System ITAAC.
  - U.S. EPR FSAR Tier 1, Table 2.6.7-3—Electrical Division of Safeguard Building Ventilation System ITAAC.
  - U.S. EPR FSAR Tier 1, Section 2.6.9 and Table 2.6.9-3—Emergency Power Generating Building Ventilation System ITAAC.

- U.S. EPR FSAR Tier 1, Section 2.6.13 and Table 2.6.13-3—Essential Service Water Pump Building Ventilation System ITAAC.
- U.S. EPR FSAR Tier 2, Sections 9.4.1.1, 9.4.1.6, 9.4.2.1, 9.4.2.2.1, 9.4.2.6, 9.4.5.1, 9.4.5.6, 9.4.6.1, 9.4.6.6, 9.4.9.1, 9.4.9.6, 9.4.11.1 and 9.4.11.6.
- 2. U.S. EPR FSAR Tier 1, Table 2.6.1-3—Main Control Room Air Conditioning System ITAAC, Item 6.1 was revised in U.S. EPR FSAR, Revision 2 to verify the system capability to maintain ambient temperature.
- 3. The main control room air conditioning system (CRACS) space heaters (supply air duct heaters) were reclassified in U.S. EPR FSAR, Revision 2 as safety-related and Seismic Category I.

U.S. EPR FSAR Tier 1, Figure 2.6.1-3—CRE Air Supply and Recirculation Subsystem Functional Arrangement, U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary, Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment, and Figure 9.4.1-3—Control Room Envelope Air Supply and Recirculation Subsystem were revised in U.S. EPR FSAR, Revision 2 to reflect this change in classification.

4. Refer to Parts 1, 2, and 3 of this response.

U.S. EPR FSAR Tier 1, Figure 2.6.1-3—CRE Air Supply and Recirculation Subsystem Functional Arrangement and U.S. EPR FSAR Tier 2, Sections 9.4.5.1 and 9.4.6.1 and Figure 9.4.1-3—Control Room Envelope Air Supply and Recirculation Subsystem, will be revised to eliminate inconsistencies and provide additional description of non-safety-related heaters.

#### **FSAR Impact:**

U.S. EPR FSAR Tier 1, Figure 2.6.1-3 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 2, Section 9.4.5.1, 9.4.6.1 and Figure 9.4.1-3 will be revised as described in the response and indicated on the enclosed markup.

# Question 09.04.02-1:

Heating is defined as a safety related function in tier 1 (para 2.6.4.1)- Tier 2 has heating listed as both a safety and non safety function. Confirm that Tier 1 drawing on SFP system be revised to include heaters. If heaters are safety related, they should be listed in Tier 1 table 2.6.4.2 I&C sheets for displays and controls. If the heaters are not safety-related, an explanation should be provided justifying the heaters non safety related status.

# Response to Question 09.04.02-1:

U.S. EPR FSAR Tier 1, Table 2.6.4-1—Fuel Building Ventilation System Equipment Mechanical Design and Table 2.6.4-2—Fuel Building Ventilation System Equipment I&C and Electrical Design were revised in U.S. EPR FSAR, Revision 2 to include safety-related heaters.

U.S. EPR FSAR Tier 1, Figure 2.6.4-1—Fuel Building Ventilation System Functional Arrangement was revised in U.S. EPR FSAR, Revision 2 to reflect safety-related heaters.

U.S. EPR FSAR Tier 2, Sections 9.4.2.1, 9.4.2.2.3 and 9.4.2.3 were revised in U.S. EPR FSAR, Revision 2 to clarify the safety-related and non-safety-related functions of the heaters.

Justification for assigning a safety-related or non-safety-related classification to the heaters is provided as follows:

- Safety-related heaters are provided for heating the extra borating system (EBS) pump rooms and EBS pipe chase to maintain a minimum temperature of 68°F in the rooms and surrounding areas. This action is required to prevent boron crystallization and is a safety-related functional requirement.
- Non-safety-related heaters are provided to maintain a minimum required ambient temperature. Non-safety-related heaters, which are non-seismically supported, are located in such a way that they do not damage safety-related equipment in the event of a safe shutdown earthquake (SSE). Non-safety-related heaters that are required to be located in the proximity of safety-related equipment and could damage this equipment in the event of an SSE are classified as NS-AQ Seismic II.

U.S. EPR FSAR Tier 2, Figure 9.4.2-1—Fuel Building Ventilation System was revised in U.S. EPR FSAR, Revision 2 to include safety-related and non-safety-related heaters.

U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary was revised in U.S. EPR FSAR, Revision 2 to clarify the description and identification of safety-related heating units and supplemented grade heating units, and provide a description and identification of non-safetyrelated space heating units that serve various spaces within the Fuel Building to provide the minimum required ambient temperature. This table was revised to include the manual dampers for the supply and exhaust air.

U.S. EPR FSAR Tier 2, Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment and U.S. EPR FSAR Tier 2, Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment were revised in U.S. EPR FSAR, Revision 2 to reflect this change.

Response to Request for Additional Information No. 277, Supplement 13 U.S. EPR Design Certification Application

U.S. EPR FSAR Tier 2, Section 9.4.2.1 will be revised to provide additional description of non-safety-related heaters.

# FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.4.2.1 will be revised as described in the response and indicated on the enclosed markup.

Response to Request for Additional Information No. 277, Supplement 13 U.S. EPR Design Certification Application

# Question 09.04.03-1:

To ensure reliable in-place testing, Regulatory Guide 1.140, Position C3.2, states that the volumetric air-flow rate of a single cleanup unit should be limited to approximately 30,000 cfm. RAI No. 135, Question 09.04.05-1 (#8) requested the applicant to provide data indicating that the maximum flow rate for a single cleanup unit would not exceed 30,000 cfm or multiple units should be selected. While the low flow purge subsystem flowrate of 3,000 cfm was provided, the response did not specify that the maximum flowrates for single cleanup unit would not exceed 30,000 cfm or require multiple units for the internal filtration subsystem, the containment building cooling subsystem and the service and equipment compartment cooling subsystem. The open item can be resolved by providing a statement indicating that the volumetric air-flow rate of a single cleanup unit will not exceed 30,000 cfm or multiple units will be selected for the internal filtration subsystem, the containment building cooling subsystem. The open item can be resolved by providing a statement indicating that the volumetric air-flow rate of a single cleanup unit will not exceed 30,000 cfm or multiple units will be selected for the internal filtration subsystem, the containment building cooling subsystem and the service and equipment compartment cooling subsystem. If the applicant elects not to follow the recommendation of Regulatory Guide 1.140, Position C3.2; then an alternative approach demonstrating compliance with GDC 60 should be provided.

A normal atmosphere cleanup system housings and ductwork should be designed to exhibit, on test a maximum total leakage rate as defined in Article SA-4500 of ASME AG-1-1997 Ref. 3, Regulatory Guide 1.140, Position C3.6. The applicant did indicate in FSAR Tier 2, Section 9.4.7.2.1 that the containment purge subsystem is designed in accordance with ASME AG-1-2003. However, the applicant did not provide information indicating that the internal filtration subsystem, the containment building cooling subsystem and the service and equipment compartment cooling subsystem are designed to ASME AG-1-2003. The applicant should state that the above systems are designed in accordance with ASME AG-1-2003. If the applicant elects not to follow the recommendation of Regulatory Guide 1.140, Position C3.6; then provide an alternative approach demonstrating compliance with GDC 60.

#### Response to Question 09.04.03-1:

The internal filtration subsystem has a nominal flow rate of 4,120 cfm. This flow rate complies with RG 1.140, Position C3.2, which specifies that the volumetric air flow rate of a single cleanup unit be limited to approximately 30,000 cfm.

The 30,000 cfm limit supports the performance of reliable in-place testing of the cleanup units. The containment building cooling subsystem and the service compartments cooling subsystem are air cooling systems and do not include cleanup units. These subsystems are not required to comply with Position C3.6 of RG 1.140.

The containment building cooling subsystem and service compartments cooling subsystem are designed to the applicable sections of ASME AG-1 that address ventilation air conditioning systems. The corresponding subsections in U.S. EPR FSAR Tier 2, Section 9.4.7.2.1 were revised in U.S. EPR FSAR, Revision 2 to reflect this change.

U.S. EPR FSAR Tier 2, Table 1.9-2—U.S. EPR Conformance with Regulatory Guides was revised in U.S. EPR FSAR, Revision 2 to include U.S. EPR FSAR Tier 2, Section 9.4.7.2.1.

# **FSAR Impact:**

The U.S. EPR FSAR will not be changed as a result of this question.

# Question 09.04.03-3:

#### Clarify the role of the CBVS in meeting GDC 41 and GDC 42

The FSAR in section 9.4.7.1 states "The containment purge subsystems remove radioactive materials via iodine filtration trains prior to release to the atmosphere (GDC 41)." However, the containment building ventilation system does not meet the requirements for General Design Criterion 41, because it is not designated as a safety system. Although these systems are designed to Seismic Category I requirements, it is not designated as a safety system. The FSAR in section 9.3.7.3 states, "The CBVS is not an engineered safety feature and has no safety-related function except the containment isolation and low-flow purge." This is inconsistent with crediting it as the system designed to meet GDC 41 which requires a safety system capable of performing the safety function assuming a single failure and loss of offsite power. The applicant needs to clarify the role of the CBVS in meeting GDC 41. The applicant needs to state how GDC 41 is met (this is typically described in FSAR section 6.2.5 and 6.5). If the CBVS system is credited the applicant needs to describe the meeting of the requirements of GDC 41.

The containment building ventilation system has not been shown to meet the requirements of GDC 41. As a result, the staff is unable to determine if the requirements for General Design Criterion 42 are met until it can determine if the requirements of GDC 41 are met.

#### **Response to Question 09.04.03-3:**

The containment building ventilation system is composed of separate subsystems and is described in U.S. EPR FSAR Tier 2, Section 9.4.7.2.1. The containment low-flow purge exhaust subsystem is designated as a safety-related, Seismic Category I, engineered safety features ventilation system and meets the requirements of GDC 41. U.S. EPR FSAR Tier 2, Section 6.5 describes the compliance of the low-flow purge exhaust subsystem with GDC 41.

The internal filtration subsystem is considered a normal atmosphere cleanup system and is designed to RG 1.140 and ASME AG-1.

U.S. EPR FSAR Tier 2, Section 9.4.7.1 was revised in U.S. EPR FSAR, Revision 2 to provide clarification.

#### FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

#### Question 09.04.05-2:

GDC 2 requires the Engineered Safety Function Ventilation System being capable of withstanding the effects of earthquakes. SRP 9.4.5 includes GDC 2 as specific acceptance criteria. FSAR Tier 2 Section 9.4.5.1 indicates that the Safeguard Building Controlled Area Ventilation system is designed to Seismic Category I except for the following:

- a. Supply air ductwork which is classified as supplemented grade safety (NS-AQ) and designed to Seismic Category II requirements.
- b. Electric air heating convectors which are non-safety-related and Non-Seismic.

FSAR Table 3.2.2-1 indicates that the fire dampers are supplemented grade safety (NS-AQ) and designed to Seismic Category II requirements.

Since the SBVS fire dampers are classified as Seismic Category II (FSAR Tier 2 Table 3.2.2-1), they are not expected to function after an SSE (RG 1.29 Position C.2). The fire dampers after an SSE can be assumed to fail closed, thereby isolating the SB rooms from the normal and accident exhaust trains in each of the four SBVS divisions. Additionally, Seismic Category II ductwork can be assumed to deform (restricting airflow) but not impact or cause harm to a Seismic Category I SSC. Finally any nonsafety-related active component can be assumed to fail when challenged during any accident.

The applicant is requested to either show that potential failure of these components will not reduce the safety function of the SBVS or classify the components as Seismic Category I.

#### Response to Question 09.04.05-2:

a) The safeguard building controlled area ventilation system (SBVS) supply ventilation ductwork has been reclassified as safety-related, Quality Group C and Seismic Category I.

U.S. EPR FSAR Tier 1, Figure 2.6.6-1—Safeguard Building Controlled-Area Ventilation System Air Supply Functional Arrangement was revised in U.S. EPR FSAR, Revision 2 to reflect this change in classification.

U.S. EPR FSAR Tier 2, Section 9.4.5.1 was revised in U.S. EPR FSAR, Revision 2 to reflect this change. Refer to the Response to Question 09.04.01-1, Part 1.

U.S. EPR FSAR Tier 2, Figure 9.4.5-1—Safeguard Building Controlled-Area Ventilation System Air Supply Subsystem and Figure 9.4.5-2—Safeguard Building Controlled-Area Ventilation System Exhaust Air Subsystem were revised in U.S. EPR FSAR, Revision 2 to reflect this change in classification. Refer to the Response to Question 09.04.01-1, Part 1.

b) Electric air heating convectors, such as wall- or ceiling-mounted electric unit heaters for the SBVS, provide personnel comfort heating only for stairwells and access areas during normal plant operation. These non-safety-related, non-seismic heaters are not required to maintain the minimum ambient design temperature (50°F) for the Safeguard Building controlled area. Non-safety-related heaters, which are non-seismically-supported, are located such that they do not damage safety-related equipment in the event of an SSE. Non-safety-related heaters that are required to be located in the proximity of safety-related equipment and could damage this equipment in the event of an SSE are classified as NS-AQ Seismic II.

The SBVS fire dampers were reclassified in U.S. EPR FSAR, Revision 2 as safety-related, Quality Group C and Seismic Category I.

U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary and Table 3.10-1—List of Seismically and Dynamically Qualified Mechanical were revised in U.S. EPR FSAR, Revision 2 to reflect this change.

U.S. EPR FSAR Tier 2, Section 9.4.5.1 was revised in U.S. EPR FSAR, Revision 2 to reflect this change. Refer to the Response to Question 09.04.01-1, Part 1.

U.S. EPR FSAR Tier 2, Figure 9.4.5-1—Safeguard Buildings Air Supply Subsystem and Figure 9.4.5-2—Safeguard Buildings Exhaust Air Subsystem were revised in U.S. EPR FSAR, Revision 2 to reflect this change.

U.S. EPR FSAR Tier 1, Figure 2.6.7-4—Electrical Division of Safeguard Building Ventilation System Division 2 and Division 3 Air Supply and Exhaust Functional Arrangement and U.S. EPR FSAR Tier 2, Figure 9.4.6-4—Safeguard Building Electrical Divisions 2 and 3 Air Supply and Exhaust, will be revised to eliminate inconsistencies and provide additional description of non-safety-related heaters.

#### **FSAR Impact:**

U.S. EPR FSAR Tier 1, Figure 2.6.7-4 and U.S. EPR FSAR Tier 2, Figure 9.4.6-4 will be revised as described in the response and indicated on the enclosed markup.

# U.S. EPR Final Safety Analysis Report Markups







Next File Page 2.6-22

Revision 3—Interim

EPR)

Tier 1





Figure 2.6.74—Electrical Division of Safeguard Building Ventilation System Division 2 and Division 3 Air Supply and Exhaust Functional Arrangement

E2)

Tier 1

Revision 3—Interim

Next File

Page 2.6-103





Next File Page 9.4-16

Revision 3—Interim

Tier 2



# 9.4.2 Fuel Building Ventilation System

The fuel building ventilation system (FBVS) is designed to maintain acceptable ambient conditions in the Fuel Building (FB), to permit personnel access, and to control airborne radioactivity in the area during normal operation, anticipated occurrences, and following fuel handling accidents.

The conditioned air supply to the FB is provided by the nuclear auxiliary building ventilation system (NABVS) (refer to Section 9.4.3). The exhaust from the building is also processed by the NABVS through a filtration train, and the exhaust air is directed to the vent stack (refer to Section 9.4.3).

# 9.4.2.1 Design Bases

The following components are safety-related and designed to Seismic Category I requirements:

- Fuel handling hall isolation dampers.
- Isolation dampers for the fuel handling hall located in front of the equipment hatch.
- Isolation dampers for the room located in front of the emergency airlock.
- NABVS supply and exhaust isolation dampers to and from FBVS.
- FB isolation dampers to safeguard building ventilation system (SBVS).
- Electric <u>fan</u> heaters for heating <u>of rooms that have safety-related systems</u>, <u>structures or components containing borated fluid and the rooms surrounding the</u> <u>extra borating system tanks.of the extra borating system pump room and pipe</u> <del>chase.</del>
- Recirculation cooling units in the extra borating system pump rooms, and fuel pool cooling system pump rooms.
- FBVS exhaust duct.

The FBVS air supply duct and other components of the FBVS are designated as Supplemental Grade (NS-AQ) safety class and Seismic Category II.

The FBVS components are located inside the FB structure, which is designed to withstand the effects of natural phenomena, such as earthquake, tornados, hurricanes, floods and external missiles (GDC-2).

The safety functions of the FB ventilation system can be performed assuming a single active component failure coincident with the loss of offsite power (LOOP).

09.04.02-1



- A. Minimum temperature: 50°F.
- B. Maximum temperature: 113°F.
- C. Humidity: 25 to 70 percent.

The following ambient conditions are maintained in the fuel pool area:

- D. Minimum temperature: 68°F.
- E. Maximum temperature: 104°F.
- F. Humidity: 25 to 70 percent.

# 09.04.02-1

- Provides heating via air supply duct heaters and fan heaters to maintain minimum ambient room temperature. Electric heaters in the fuel pool rooms prevent
   condensation on the walls. Non-safety-related heaters, which are non-seismically. supported, are located in such a way that they do not damage safety-related equipment in the event of a safe shutdown earthquake (SSE). Non-safety-related heaters that are required to be located in the proximity of safety-related equipment and could damage this equipment in the event of an SSE are classified as NS-AQ Seismic Category II.
- Maintains the airborne radioactivity levels within the FB below the maximum permissible concentrations limits of 10CFR20 and consistent with the as low as reasonably achievable (ALARA) dose objectives of 10CFR50, Appendix I (refer also to Section 12.1 and Section 12.3.3).

# 9.4.2.2 System Description

A simplified diagram of the FBVS is shown in Figure 9.4.2-1—Fuel Building Ventilation System.

Refer to Section 12.3.6.5.6 for ventilation system design features which demonstrate compliance with the requirements of 10 CFR 20.1406.

# 9.4.2.2.1 General Description

The FBVS provides air distribution for ventilation of the FB. The air supply to, and exhaust from, each room of the FB is provided by a network of supply and exhaust ducts which are connected to the NABVS. The conditioned air is supplied to all levels of the building through a duct distribution network. The flow rate to each room is calculated based on the minimum air renewal rate, equipment heat loads, and heat balance between the rooms. This maintains ambient conditions during normal operation within prescribed limits for operation of equipment and personnel safety and comfort.



# 9.4.5 Safeguard Building Controlled-Area Ventilation System

Each of the four safeguard divisions is separated into two functional areas:

- Hot mechanical area serviced by the safeguard building controlled-area ventilation system (SBVS).
- Electrical, instrumentation and control (I&C) and heating, ventilation and air conditioning (HVAC) area serviced by the electrical division of the safeguard building ventilation system (SBVSE). Refer to Section 9.4.6.

The SBVS provides a suitable and controlled environment, in the mechanical areas of the Safeguard Buildings (SB) where engineered safety feature components are located, for personnel access and to allow safe operation of the equipment during normal plant operation, outages, under anticipated operational occurrences, and postulated accidental events.

The SBVS, through its interconnections to the SBVSE and the nuclear auxiliary building ventilation system (NABVS), provides conditioned air for ventilation to the mechanical part of the SBs. The conditioned air supply to all four divisions of SB is provided independently for each division by the SBVSE (refer to Section 9.4.6). The exhaust air (normal exhaust) from the four divisions of the SB is processed by the NABVS (refer to Section 9.4.3).

# 9.4.5.1 Design Bases

# 09.04.01-1

The SBVS is safety-related and designed to Seismic Category I requirements, except the following:

Electric air heating convectors (<u>fan</u>unit heaters) which are non-safety\_-related and <u>nNon-s</u>Seismic. These heaters are located in stairwell and service access areas and are used for personnel comfort only. <u>Non-safety-related heaters are provided to</u> maintain a minimum required ambient temperature. Non-safety-related heaters, which are non-seismically supported, are located in such a way that they do not damage safety-related equipment in the event of a safe shutdown earthquake (SSE). Non-safety-related heaters that are required to be located in the proximity of safety-related equipment and could damage this equipment in the event of an SSE are classified as NS-AQ Seismic Category II.

The safety-related components of the SBVS are located inside the SB that is designed to withstand the effect of natural phenomena, such as earthquake, tornados, hurricanes, floods and external missiles (GDC 2). The SBVS vents and louvers are supplied by the SBVSE for supply and the NABVS for exhaust air.

The safety-related components of the SBVS are appropriately protected against dynamic effects and designed to accommodate the effects of, and to be compatible with, the environmental conditions associated with normal operation, maintenance,



• 10CFR 50.63, as it relates to the SBSVE because during a station blackout (SBO), two of the four SBs are backed up by the SBO diesel generators alternate AC (AAC) power. An analysis to determine capability for withstanding or coping with a station blackout event as described by RG 1.155, position C.3.2.4, will be performed. The safety chilled water system (SCWS) chillers which provide cooling to the division 1 and 4 SBVSE air coolers and recirculation units are also powered by the SBO diesels and are available.

The SBVSE maintains acceptable ambient conditions in the SB during SBO conditions. It also ventilates the battery rooms and SCWS rooms in the SB during SBO conditions to maintain the hydrogen concentration and refrigerant concentration below the maximum allowable limits.

The SCWS chillers which provide cooling to the division 1 and 4 SBVSE air coolers and recirculation units are also powered by the SBO diesels and are available.

Air conditioning and heating loads for the SBVSE rooms are calculated using methodology identified in ASHRAE Handbook (Reference 3).

- Summer air conditioning loads will be calculated with a maximum outside air design temperature 0 percent exceedance value, using U.S. EPR Site Design Envelope Temperature (See Table 2.1-1). The analysis will be completed for both a normal and accident plant alignment configuration.
- The cooling supply units are designed to provide cooling as required to prevent the SBVSE room temperatures from exceeding their maximum design temperature.
- Winter heating loads will be calculated with the plant operating in an outage alignment configuration. Winter heat loads will be calculated with a minimum outside air design temperature 0 percent exceedance value, using U.S. EPR Site Design Envelope Temperature (See Table 2.1-1).
- The SBVSE supply air duct heaters are designed to operate as required when the supply air temperature is less than the minimum set point value.

With outside air ambient design temperature conditions of -40°F to 115°F, the SBVSE maintains the following temperature and humidity ranges for the areas serviced.

	Room	Temperature	Humidity
09.04.01-1	Rest Rooms, changing rooms	65°F - 78°F	30 - 60%
	I&C and Computer Room, RSS	65°F - 78°F	30 - 60%
	Switchgearboard Rooms	59°F - 104°F	30 - 60%
	Cable Floor	41°F - 95°F	30 - 60%

U.S. EPR FINAL SAFETY ANALYSIS REPORT



Figure 9.4.6-4—Safeguard Building Electrical Divisions 2 and 3 Air Supply and Exhaust

E2)

Tier 2

Revision 3—Interim

Next File Page 9.4-73