ArevaEPRDCPEm Resource

From: NOXON David (AREVA) [David.Noxon@areva.com]
Sent: Friday, May 24, 2013 5:57 PM
To: Snyder, Amy; Ford, Tanya
Cc: Hearn, Peter; ANDERSON Katherine (EXTERNAL AREVA); DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 14
Attachments: RAI 525 Supplement 14 Response US EPR DC.PDF

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38. Supplement 9 response was sent on March 14, 2013 to provide technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38. Supplement 10 and Supplement 11 responses were sent on April 30, 2013 to provide technically correct and complete final responses to Questions 09.01.04-27 and 09.01.04-29, respectively. Supplement 12 response was sent on April 30, 2013 to provide a revised final response to Question 09.01.04-23. Supplement 13 response was sent on May 15, 2013 to provide technically correct and complete final responses to Questions 09.01.04-24, 09.01.04-25, 09.01.04-26 and 09.01.04-30.

The attached file, "RAI 525 Supplement 14 Response US EPR DC.pdf," provides a technically correct and complete response to four of the remaining five questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the final responses to RAI 525 Questions 09.01.04-22, 09.01.04-33 and 09.01.04-37.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 14 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-22	2	4
RAI 525 — 09.01.04-33	5	6
RAI 525 — 09.01.04-36	7	7
RAI 525 — 09.01.04-37	8	11

The schedule for a technically correct and complete response to Question 09.01.04-31 has been revised as provided below.

Question #	Response Date
RAI 525 — 09.01.04-31	May 31, 2013

Sincerely,

David Noxon 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

David B. Noxon
AREVA Licensing
704-805-2232

From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, May 15, 2013 7:57 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@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. 525 (6194, 6154), FSAR Ch. 9, Supplement 13

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38. Supplement 9 response was sent on March 14, 2013 to provide technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38. Supplement 10 and Supplement 11 responses were sent on April 30, 2013 to provide technically correct and complete final responses to Questions 09.01.04-27 and 09.01.04-29, respectively.

Supplement 12 response was sent on April 30, 2013 to provide a revised final response to Question 09.01.04-23.

The attached file, "RAI 525 Supplement 13 Response US EPR DC.pdf," provides a technically correct and complete response to four of the remaining nine questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the final response to RAI 525 Questions 09.01.04-24, 09.01.04-25, 09.01.04-26 and 09.01.04-30.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 13 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-24	2	3
RAI 525 — 09.01.04-25	4	5
RAI 525 — 09.01.04-26	6	7
RAI 525 — 09.01.04-30	8	15

The schedule for a technically correct and complete response to Question 09.01.04-22 has been revised as provided below. The response schedule for the other 4 questions has not changed.

Question #	Response Date
RAI 525 — 09.01.04-22	**May 24, 2013**
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 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: Tuesday, April 30, 2013 11:28 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@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. 525 (6194, 6154), FSAR Ch. 9, Supplement 12

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38. Supplement 9 response was sent on March 14, 2013 to provide technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38. Supplement 10 and Supplement 11 responses were sent on April 30, 2013 to provide technically correct and complete final responses to Questions 09.01.04-27 and 09.01.04-29, respectively.

NRC staff written review comments on AREVA's final response to Question 09.01.04-23 were received on March 26, 2013 and clarified in a subsequent telecon on April 3, 2013. We have incorporated NRC staff comments in the revised final response to this question provided in this supplement. The attached file, "RAI 525 Supplement 12 Response US EPR DC - PUBLIC.pdf" provides a technically correct and complete final revised response to Question 09.01.04-23.

Because the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This e-mail does not contain any security-related information. The unredacted SUNSI version is provided under separate e-mail.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format, which support the revised final response to RAI 525 Question 09.01.04-23.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 12 Response US EPR DC - PUBLIC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 525 — 09.01.04-23	2	4

The schedule for technically correct and complete responses to the remaining 9 questions has not changed as provided below.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 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: Tuesday, April 30, 2013 5:58 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@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. 525 (6194, 6154), FSAR Ch. 9, Supplement 11

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38. Supplement 9 response was sent on March 14, 2013 to provide technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38. Supplement 10 response was sent on April 30, 2013 to provide a technically correct and complete final response to Question 09.01.04-27.

NRC staff written review comments on AREVA's advanced response to Question 09.01.04-29 were received on April 12, 2013, and also discussed with NRC staff during telecons on April 3, 2013, April 8, 2013, and April 22, 2013. We have incorporated NRC staff comments in the final response to this question provided in this supplement. The attached file, "RAI 525 Supplement 11 Response US EPR DC.pdf" provides a technically correct and complete final response to Question 09.01.04-29.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the final response to RAI 525 Question 09.01.04-29.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 11 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 525 — 09.01.04-29	2	5

The schedule for a technically correct and complete response to the remaining 9 questions has not changed as shown below.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 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: Tuesday, April 30, 2013 12:27 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@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. 525 (6194, 6154), FSAR Ch. 9, Supplement 10
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final

responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38. Supplement 9 response was sent on March 14, 2013 to provide technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38.

NRC staff review comments on our advanced response to Question 09.01.04-27 were received via e-mail on March 26, 2013 and clarified in a subsequent telecon on April 3, 2013. We have incorporated NRC staff comments in the final response to this question provided in this supplement. The attached file, "RAI 525 Supplement 10 Response US EPR DC.pdf" provides a technically correct and complete final response to Question 09.01.04-27.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the final response to RAI 525 Question 09.01.04-27.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 10 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 525 — 09.01.04-27	2	3

The schedule for a technically correct and complete response to Question 09.01.04-29 has been revised as provided below. The response schedule for the other 9 questions has not changed.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-29	**April 30, 2013**
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 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 3:45 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@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); GUCWA Len (External RS/NB); VANCE Brian (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Questions 09.01.04-27 and 09.01.04-29 - STATUS
Importance: High

Amy,
AREVA appreciates the NRC staff review comments received earlier this week on the Advanced RAI responses to Questions 09.01.04-27 and 09.01.04-29. We need and have requested a clarification telecon with NRC staff to review the comments. AREVA will provide a revised schedule for submittal of the final responses to these 2 questions after completion of the clarification telecon and evaluation of the additional comments received.

The schedule for a technically correct and complete final response to the other 9 questions remains unchanged as shown below.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-27	**TBD**
RAI 525 — 09.01.04-29	**TBD**
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 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: Thursday, March 14, 2013 1:44 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 9
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to Questions 09.01.04-32 and 09.01.04-35. Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34. Supplement 8 response was also sent on February 28, 2013 to provide a revised schedule for Questions 09.01.04-23 and 09.01.04-38.

The attached file, "RAI 525 Supplement 9 Response US EPR DC - PUBLIC.pdf," provides technically correct and complete final responses to Questions 09.01.04-23 and 09.01.04-38.

Because the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This e-mail does not contain any security-related information. The unredacted SUNSI version is provided under separate e-mail.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format, which support final responses to RAI 525 Questions 09.01.04-23 and 09.01.04-38.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 9 Response US EPR DC - PUBLIC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-23	2	3
RAI 525 — 09.01.04-38	4	7

The schedule for technically correct and complete responses to the remaining 11 questions has not changed and is provided below.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-27	March 29, 2013
RAI 525 — 09.01.04-29	March 29, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013

RAI 525 — 09.01.04-37	May 24, 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: Thursday, February 28, 2013 10:07 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 8
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to two questions (Questions 09.01.04-32 and 09.01.04-35). Supplement 7 response was sent on February 28, 2013 to provide technically correct and complete final responses to Questions 09.01.04-21 and 09.01.04-34.

The schedule for technically correct and complete responses to two questions (Questions 09.01.04-23 and 09.01.04-38) has been changed as provided below.

Question #	Response Date
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-23	**March 14, 2013**
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-27	March 29, 2013
RAI 525 — 09.01.04-29	March 29, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013

RAI 525 — 09.01.04-37	May 24, 2013
RAI 525 — 09.01.04-38	**March 14, 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: Thursday, February 28, 2013 1:54 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 7
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions. Supplement 6 response was sent on February 25, 2013 to provide technically correct and complete final responses to two questions (Questions 09.01.04-32 and 09.01.04-35).

The attached file, "RAI 525 Supplement 7 Response US EPR DC.pdf," provides a technically correct and complete final response to two questions (Questions 09.01.04-21 and 09.01.04-34). Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the final responses to RAI 525 Questions 09.01.04-21 and 09.01.04-34.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-21	2	3
RAI 525 — 09.01.04-34	4	5

The schedule for technically correct and complete responses to the remaining 13 questions has not changed as provided below.

Question #	Response Date

RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-23	February 28, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-27	March 29, 2013
RAI 525 — 09.01.04-29	March 29, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 2013
RAI 525 — 09.01.04-38	February 28, 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: Monday, February 25, 2013 10:11 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 6
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions. Supplement 5 response was sent on January 8, 2013 to provide a revised schedule for 11 of the remaining 17 questions.

The attached file, “RAI 525 Supplement 6 Response US EPR DC.pdf” provides a technically correct and complete final response to two questions (Questions 09.01.04-32 and 09.01.04-35).

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 525 Questions 09.01.04-32 and 09.01.04-35.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 6 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-32	2	2
RAI 525 — 09.01.04-35	3	3

The schedule for a technically correct and complete response to the remaining 15 questions is unchanged as provided below.

Question #	Response Date
RAI 525 — 09.01.04-21	February 28, 2013
RAI 525 — 09.01.04-22	May 15, 2013
RAI 525 — 09.01.04-23	February 28, 2013
RAI 525 — 09.01.04-24	May 15, 2013
RAI 525 — 09.01.04-25	May 15, 2013
RAI 525 — 09.01.04-26	May 15, 2013
RAI 525 — 09.01.04-27	March 29, 2013
RAI 525 — 09.01.04-29	March 29, 2013
RAI 525 — 09.01.04-30	May 15, 2013
RAI 525 — 09.01.04-31	May 24, 2013
RAI 525 — 09.01.04-33	May 24, 2013
RAI 525 — 09.01.04-34	February 28, 2013
RAI 525 — 09.01.04-36	May 24, 2013
RAI 525 — 09.01.04-37	May 24, 2013
RAI 525 — 09.01.04-38	February 28, 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: Tuesday, January 08, 2013 3:40 PM
To: Amy.Snyder@nrc.gov
Cc: peter.hearn@nrc.gov; DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLS Tiffany (CORP/QP); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 5
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28. Supplement 4 response was sent on December 14, 2012 to provide a revised schedule for 6 of the remaining 17 questions.

The schedule for a technically correct and complete response to 11 of the remaining 17 questions has been revised as provided below.

Question #	Response Date
RAI 525 — 09.01.04-21	February 28, 2013
RAI 525 — 09.01.04-22	**May 15, 2013**
RAI 525 — 09.01.04-23	February 28, 2013
RAI 525 — 09.01.04-24	**May 15, 2013**
RAI 525 — 09.01.04-25	**May 15, 2013**
RAI 525 — 09.01.04-26	**May 15, 2013**
RAI 525 — 09.01.04-27	**March 29, 2013**
RAI 525 — 09.01.04-29	**March 29, 2013**
RAI 525 — 09.01.04-30	**May 15, 2013**
RAI 525 — 09.01.04-31	**May 24, 2013**
RAI 525 — 09.01.04-32	February 28, 2013
RAI 525 — 09.01.04-33	**May 24, 2013**
RAI 525 — 09.01.04-34	February 28, 2013
RAI 525 — 09.01.04-35	February 28, 2013
RAI 525 — 09.01.04-36	**May 24, 2013**
RAI 525 — 09.01.04-37	**May 24, 2013**
RAI 525 — 09.01.04-38	February 28, 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, December 14, 2012 4:58 PM
To: Amy.Snyder@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); peter.hearn@nrc.gov; KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 4
Importance: High

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response was sent on March 16, 2012 to provide a response to Question 09.01.04-28. Supplement 3 response was sent on May 30, 2012 to provide a revised final response to Question 09.01.04-28.

The schedule for a technically correct and complete response to 6 of the remaining 17 questions has been revised as provided below.

Question #	Response Date
RAI 525 — 09.01.04-21	**February 28, 2013**
RAI 525 — 09.01.04-22	June 28, 2013
RAI 525 — 09.01.04-23	**February 28, 2013**
RAI 525 — 09.01.04-24	June 28, 2013
RAI 525 — 09.01.04-25	June 28, 2013
RAI 525 — 09.01.04-26	June 28, 2013
RAI 525 — 09.01.04-27	June 28, 2013
RAI 525 — 09.01.04-29	June 28, 2013
RAI 525 — 09.01.04-30	June 28, 2013
RAI 525 — 09.01.04-31	June 28, 2013
RAI 525 — 09.01.04-32	**February 28, 2013**
RAI 525 — 09.01.04-33	June 28, 2013
RAI 525 — 09.01.04-34	**February 28, 2013**
RAI 525 — 09.01.04-35	**February 28, 2013**
RAI 525 — 09.01.04-36	June 28, 2013
RAI 525 — 09.01.04-37	June 28, 2013
RAI 525 — 09.01.04-38	**February 28, 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: Wednesday, May 30, 2012 11:38 AM
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)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 3
Importance: High

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response to RAI No. 525 was sent on February 24, 2012 to provide a revised schedule. Supplement 2 response to RAI No. 525 was sent on March 16, 2012 to provide a complete final response to Question 09.01.04-28.

The attached file, "RAI 525 Supplement 3 Response US EPR DC.pdf" provides a technically correct and complete revised final response to Question 09.01.04-28, which supersedes in its entirety the response to this question provided in Supplement 2.

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 525 Question 09.01.04-28.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 525 — 09.01.04-28	2	2

The schedule for a technically correct and complete response to the remaining 17 questions has not changed as provided below.

Question #	Response Date
RAI 525 — 09.01.04-21	June 28, 2013
RAI 525 — 09.01.04-22	June 28, 2013
RAI 525 — 09.01.04-23	June 28, 2013
RAI 525 — 09.01.04-24	June 28, 2013
RAI 525 — 09.01.04-25	June 28, 2013
RAI 525 — 09.01.04-26	June 28, 2013
RAI 525 — 09.01.04-27	June 28, 2013
RAI 525 — 09.01.04-29	June 28, 2013
RAI 525 — 09.01.04-30	June 28, 2013
RAI 525 — 09.01.04-31	June 28, 2013
RAI 525 — 09.01.04-32	June 28, 2013
RAI 525 — 09.01.04-33	June 28, 2013
RAI 525 — 09.01.04-34	June 28, 2013
RAI 525 — 09.01.04-35	June 28, 2013
RAI 525 — 09.01.04-36	June 28, 2013
RAI 525 — 09.01.04-37	June 28, 2013
RAI 525 — 09.01.04-38	June 28, 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
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From: WILLIFORD Dennis (RS/NB)
Sent: Friday, March 16, 2012 3:05 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)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012. Supplement 1 response to RAI No. 525 was sent on February 24, 2012 to provide a revised schedule.

The attached file, "RAI 525 Supplement 2 Response US EPR DC.pdf" provides a technically correct and complete final response to Question 09.01.04-28.

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 525 Question 09.01.04-28.

The following table indicates the respective pages in the response document, "RAI 525 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 525 — 09.01.04-28	2	2

The schedule for technically correct and complete responses to the remaining seventeen questions has not changed and is provided below.

Question #	Response Date
RAI 525 — 09.01.04-21	June 28, 2013
RAI 525 — 09.01.04-22	June 28, 2013
RAI 525 — 09.01.04-23	June 28, 2013
RAI 525 — 09.01.04-24	June 28, 2013
RAI 525 — 09.01.04-25	June 28, 2013
RAI 525 — 09.01.04-26	June 28, 2013
RAI 525 — 09.01.04-27	June 28, 2013
RAI 525 — 09.01.04-29	June 28, 2013
RAI 525 — 09.01.04-30	June 28, 2013
RAI 525 — 09.01.04-31	June 28, 2013
RAI 525 — 09.01.04-32	June 28, 2013
RAI 525 — 09.01.04-33	June 28, 2013

RAI 525 — 09.01.04-34	June 28, 2013
RAI 525 — 09.01.04-35	June 28, 2013
RAI 525 — 09.01.04-36	June 28, 2013
RAI 525 — 09.01.04-37	June 28, 2013
RAI 525 — 09.01.04-38	June 28, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
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From: WILLIFORD Dennis (RS/NB)
Sent: Friday, February 24, 2012 5:21 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)
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the eighteen questions in RAI No. 525 on January 25, 2012.

The schedule for technically correct and complete responses to the eighteen 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 525 — 09.01.04-21	**June 28, 2013**
RAI 525 — 09.01.04-22	**June 28, 2013**
RAI 525 — 09.01.04-23	**June 28, 2013**
RAI 525 — 09.01.04-24	**June 28, 2013**
RAI 525 — 09.01.04-25	**June 28, 2013**
RAI 525 — 09.01.04-26	**June 28, 2013**
RAI 525 — 09.01.04-27	**June 28, 2013**
RAI 525 — 09.01.04-28	**June 28, 2013**
RAI 525 — 09.01.04-29	**June 28, 2013**
RAI 525 — 09.01.04-30	**June 28, 2013**
RAI 525 — 09.01.04-31	**June 28, 2013**
RAI 525 — 09.01.04-32	**June 28, 2013**
RAI 525 — 09.01.04-33	**June 28, 2013**
RAI 525 — 09.01.04-34	**June 28, 2013**
RAI 525 — 09.01.04-35	**June 28, 2013**

RAI 525 — 09.01.04-36	**June 28, 2013**
RAI 525 — 09.01.04-37	**June 28, 2013**
RAI 525 — 09.01.04-38	**June 28, 2013**

Sincerely,

Dennis Williford, P.E.
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From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, January 25, 2012 4:06 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB); Michael.Miernicki@nrc.gov; peter.hearn@nrc.gov
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 525 Response US EPR DC.pdf," provides a preliminary schedule since a technically correct and complete response to these eighteen questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 525 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 525 — 09.01.04-21	2	2
RAI 525 — 09.01.04-22	3	3
RAI 525 — 09.01.04-23	4	4
RAI 525 — 09.01.04-24	5	5
RAI 525 — 09.01.04-25	6	6
RAI 525 — 09.01.04-26	7	7
RAI 525 — 09.01.04-27	8	8
RAI 525 — 09.01.04-28	9	9
RAI 525 — 09.01.04-29	10	10
RAI 525 — 09.01.04-30	11	11
RAI 525 — 09.01.04-31	12	12
RAI 525 — 09.01.04-32	13	13
RAI 525 — 09.01.04-33	14	14
RAI 525 — 09.01.04-34	15	15
RAI 525 — 09.01.04-35	16	16
RAI 525 — 09.01.04-36	17	17

RAI 525 — 09.01.04-37	18	18
RAI 525 — 09.01.04-38	19	19

A preliminary schedule for technically correct and complete responses to these questions is 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 525 — 09.01.04-21	February 21, 2012
RAI 525 — 09.01.04-22	February 21, 2012
RAI 525 — 09.01.04-23	February 21, 2012
RAI 525 — 09.01.04-24	February 21, 2012
RAI 525 — 09.01.04-25	February 21, 2012
RAI 525 — 09.01.04-26	February 21, 2012
RAI 525 — 09.01.04-27	February 21, 2012
RAI 525 — 09.01.04-28	February 21, 2012
RAI 525 — 09.01.04-29	February 21, 2012
RAI 525 — 09.01.04-30	February 21, 2012
RAI 525 — 09.01.04-31	February 21, 2012
RAI 525 — 09.01.04-32	February 21, 2012
RAI 525 — 09.01.04-33	February 21, 2012
RAI 525 — 09.01.04-34	February 21, 2012
RAI 525 — 09.01.04-35	February 21, 2012
RAI 525 — 09.01.04-36	February 21, 2012
RAI 525 — 09.01.04-37	February 21, 2012
RAI 525 — 09.01.04-38	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
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Email: Dennis.Williford@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, December 19, 2011 4:19 PM
To: ZZ-DL-A-USEPR-DL
Cc: Curran, Gordon; McKenna, Eileen; Xu, Jim; Thomas, Brian; Hearn, Peter; Segala, John; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on November 11, 2011, and discussed with your staff on December 2, 2011. Draft RAI Questions 09.01.04-24, 09.01.04-31, and 09.01.04-33 were 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, excluding the time period of **December 24, 2011 thru January 2, 2012, to account for the holiday season** as discussed with AREVA NP Inc. For any RAIs that cannot be answered **within 40 days**, it is expected that a date for receipt of this information will be provided to the staff within the 40-day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4501

Mail Envelope Properties (47A0F4DB5FF7324BA4BE270D3C6CA7780E1E52)

Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 14
Sent Date: 5/24/2013 5:56:40 PM
Received Date: 5/24/2013 5:56:51 PM
From: NOXON David (AREVA)

Created By: David.Noxon@areva.com

Recipients:
"Hearn, Peter" <Peter.Hearn@nrc.gov>
Tracking Status: None
"ANDERSON Katherine (EXTERNAL AREVA)" <katherine.anderson.ext@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"LEIGHLITER John (AREVA)" <John.Leighliter@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"KOWALSKI David (AREVA)" <David.Kowalski@areva.com>
Tracking Status: None
"Snyder, Amy" <Amy.Snyder@nrc.gov>
Tracking Status: None
"Ford, Tanya" <Tanya.Ford@nrc.gov>
Tracking Status: None

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	47648	5/24/2013 5:56:51 PM
RAI 525 Supplement 14 Response US EPR DC.PDF	237843	

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

Response to

Request for Additional Information No. 525 (6194, 6154), Supplement 14

12/19/2011

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.01.04 - Light Load Handling System (Related to Refueling)
Application Section: 09.01.04

QUESTIONS for Balance of Plant Branch 1 (SBPA)
QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

Question 09.01.04-22:

OPEN ITEM

The staff asked the applicant in RAI 385, Question 9.1.4-15 to provide a description of interlock protection used with the SFCTF. In the response to RAI 9.1.4-15, the applicant provided Table 09.01.04-15-6 which contains an extensive list of operation and required conditions to satisfy prior to performing various operations. Although these are presented in the RAI response as interlocks, it is not clear to the staff how these features will be provided and initiated to prevent damage to fuel units or control components and provide for personnel safety. To minimize the potential for operator error, the staff requests the applicant to describe any mechanical stops or electric interlocks included with the equipment to prevent movement in an unsafe manner in the FSAR. In addition, the applicant is requested to describe how Table 09.01.04-15-6 items will be monitored and controlled (i.e. physical limitations, procedurally, etc…) and justify not including this table in the FSAR.

Response to Question 09.01.04-22:

The general operation of the spent fuel cask transfer facility (SFCTF) is described in U.S. EPR FSAR Tier 2, Section 9.1.4.2.1, and the instrumentation and controls (I&C) interlocks and mechanical stops are described in U.S. EPR FSAR Tier 2, Section 9.1.4.2.2.

In the Response to RAI 385, Question 09.01.04-15, the non-safety-related internal interlocks in the SFCTF I&C design are shown in Table 09.04.01-15-6—SFCTF Non-Safety-Related I&C Interlocks. These interlocks are described in U.S. EPR FSAR Tier 2, Sections 9.1.4.2.1 and 9.1.4.2.2, excluding those items that are procedurally controlled.

As described in U.S. EPR FSAR Tier 2, Section 9.1.4.2.1, SFCTF operations are performed per approved plant procedures, which address administrative, operating, emergency, testing and maintenance aspects.

A summary of the I&C interlocks and mechanical stops is provided below:

- The spent fuel cask transfer machine (SFCTM) is interlocked with the loading hall door so that the SFCTM cannot move unless the door is closed to protect against radiological releases. (CF26)

- The SFCTF has an interlock to confirm the iodine extracting ventilation system is operational prior to opening the biological lid to prevent contamination of air in Fuel Building and an increase in dose rates. (CF28)

- The spent fuel machine (SFM) is interlocked with the swivel gate and penetration upper cover so that the SFM cannot enter the cask loading pit (CLP) unless the swivel gate and penetration upper cover are open to prevent equipment damage. (CF7)

- The penetration upper cover is interlocked with the SFM in order to prevent the penetration upper cover from moving when the SFM is in the CLP to prevent equipment damage (Refer to FSAR Section 9.1.4.2.2). (CF8)

- The SFCTF has an interlock to prevent opening the penetration upper cover unless the cask is properly docked, the anti-seismic devices on the SFCTM are locked, and the correct water level is in the cask to prevent water from leaking from the CLP and water contamination in the Fuel Building. (CF 16 & 17)

- The SFCTF has an interlock to prevent movement of the SFCTM when it is located at the penetration station (i.e., the anti-seismic locking devices are locked) to prevent equipment damage. (CF12)

- The SFCTF has an interlock to prevent the SFCTM from moving within the loading hall, unless the gripper of the biological lid handling station is in the upper position, the anti-seismic locking devices are unlocked, the penetration docking device is in the lower position, and the penetration assembly is in the upper position (for movements to/from the penetration station) and the handling area opening is closed (movements to and from the handling opening station) to prevent damage to equipment. (Refer to FSAR Section 9.1.4.2.2). CF19 & 21)

- The SFCTF has an interlock to prevent undocking of the cask unless the penetration upper cover is closed to prevent water from leaking from the CLP and water contamination in the Fuel Building. (CF15)

- The SFCTF is equipped with an emergency stop button in the loading hall and in the SFCTF control room to stop electrical devices and isolate the fluid circuits, to place the SFCTF in a safe condition. (CF2, CF3, CF10)

- The SFCTF is equipped with two redundant Seismic Category I accelerometers that trip the main circuit breakers, placing the electrically controlled equipment in a safe de-energized condition. Either one of the redundant Seismic Category I accelerometers is fully capable of tripping all power to the SFCTF equipment. (CF27)

- Mechanical stops limit the travel of the SFCTM to prevent inadvertent contact of the SFCTM with the loading hall door or wall.

- The penetration upper cover is designed so that it cannot be opened unless the pressure on either side of the cover is equalized, thus preventing inadvertent opening before the penetration is filled.

- Anti-seismic locking devices prevent movement of the SFCTM during an SSE.

A new table and text will be added to the U.S. EPR FSAR that provides a description of the interlock and emergency stop protection associated with the SFCTF equipment. U.S. EPR FSAR Tier 2, Section 9.1.4.5 will be revised to include a new U.S. EPR FSAR Tier 2, Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops. The control functions are sequentially numbered by type (i.e., interlock, emergency stop, operational).

The implementation of ITAAC related to leak-tightness and instrumentation is not considered necessary since these items are addressed in U.S. EPR FSAR Tier 2, Chapter 14. U.S. EPR FSAR Tier 2, Section 14.2.12.3.17 describes testing of the SFCTF to verify permanently installed instrumentation is functional and calibrated, including I&C interlocks.

In addition to the testing described in U.S. EPR FSAR Tier 2, Section 14.2.12.3.17, ITAAC related to leak-tightness and instrumentation is also not considered necessary because of the following:

- In the Response to RAI 525, Question 09.01.04-25, the capability of the CLP slot and swivel gates, and penetration assembly upper and lower covers to each provide a Seismic Category I barrier between the SFCTF opening to the loading hall and spent fuel pool (SFP) was added to U.S. EPR FSAR Tier 1, Section 2.2.8. This ITAAC will provide additional assurance that these barriers will be available to isolate the penetration assembly from the SFP should a leak develop at the docking device.

- In the Response to RAI 526, Question 09.01.02-41, the U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, were revised to add a new Limiting Conditions for Operation (LCO) 3.7.23 for the SFCTF Barriers to impose the requirement that two Seismic Category I barriers be in place while there is no cask attached to the SFCTF and fuel is in the SFP. This new Technical Specification will prevent leakage from the SFP when the cask is not attached to the penetration assembly.

- Three of the interlocks (CF12, CF26 and CF27) in U.S. EPR FSAR Tier 2, Table 9.1.4-2 are designed for Tier 2*. Interlocks CF12 and CF27 prevent movement of the SFCTM when it is docked to the penetration assembly, which could damage the penetration docking device causing leakage from the penetration assembly. CF 26 prevents movement of the SFCTM when the loading hall door is open to protect against radiation releases.

These items provide assurance that the safety-related fluid boundary of the SFP is maintained.

U.S. EPR FSAR Tier 2, Table I-1—Summary of Tier 2* Information will be revised to reflect the designation of the SFCTF interlocks as Tier 2*.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table I-1 and Section 9.1.4.5 will be revised; and a new Table 9.1.4-2 added as described in the response and indicated on the enclosed markup.

Question 09.01.04-33:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that both SFCTM and the penetration assembly are designed as seismic Category I but provided insufficient details with respect to the loads and load combinations considered for the design/analysis of these equipment. The applicant is requested to provide the following:

a. Description of various loads applied to the SFCTM, the penetration assembly, the loading hall structure, and the cask loading pit, including dead, live, fluid, seismic, accidental drop of fuel assembly, etc.

b. Description of specific load combinations used for their designs and associated technical bases.

Response to Question 09.01.04-33:

Items (a) and (b) of the question involve loads and load combinations related to the penetration assembly, spent fuel cask transfer machine (SFCTM), cask loading pit (CLP) and loading hall structure. These items are addressed collectively in the response below.

1. Loads and Load Combinations for the SFCTM

   Loads and load combinations for analysis and design of the load bearing structural parts of the SFCTM are described in the response to RAI 525, Question 09.01.04-30.

2. Loads and Load Combinations for the Penetration Assembly

   Loads and load combinations for the analysis and design of different parts of the penetration assembly are described below:

   Maneuvering and Pressurization Device of Upper Cover

   The design and analysis of the maneuvering and pressurization device of the upper cover considers guidance of Appendix D to Standard Review Plan (SRP) Section 3.8.4 for the specific loads and load combinations, acceptance limit, and design and analysis procedures.

   Hoist of Upper Cover

   Structural and seismic analysis of the hoist of the upper cover of the loading penetration meets the requirements of ASME NOG-1-2004 for Type I hoists.

   Penetration

   The codes and standards used in the analysis and design of the penetration are described in the response to RAI 525, Question 09.01.04-31. The loads, load combinations and service level limits for the fluid boundary components of the penetration shall follow the guidance of the ASME Boiler and Pressure Vessel Code Section III, Division 1 – Subsection ND. The loads, load combinations and service level limits for the penetration supports shall

follow the guidance of the ASME Boiler and Pressure Vessel Code Section III, Division 1 – Subsection NF for Class 3 component supports. The design of the penetration assembly fluid boundary parts and supports satisfies Level B (Upset) Service Limit for all Level C (Emergency) and Level D (Faulted) Service Loadings.

3. Loads and Load Combinations for the Loading Hall Structure and Cask Loading Pit

   U.S. EPR FSAR Tier 2, Section 3.8.4.3 describes the design loads for other Seismic Category I structures, which includes the Fuel Building loading hall structure and cask loading pit. The design loads include the following:

   – Normal loads (dead, live, hydrostatic and thermal).
   – Severe environmental loads.
   – Extreme environmental loads (seismic).
   – Abnormal loads (accident pressure, thermal, pipe reactions and pipe breaks).

   An accidental drop of a fuel assembly in the Fuel Building loading hall or cask loading pit is not considered to be a postulated event.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.2.2 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-36:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) does not provide description of any acceptance limits for the SFCTF equipment and associated structures. Therefore, the applicant is requested to provide the description of applicable acceptance limits in terms of allowable stresses, strains, deformation and other design criteria for the SFCTM, penetration assembly components, seals, and loading hall and cask loading pit structures.

Response to Question 09.01.04-36:

1. Spent Fuel Cask Transfer Machine (SFCTM)

   The codes and standards and requirements for the structural design and analysis of parts of the SFCTM are described in the response to RAI 525, Question 09.01.04-30. The acceptance limits, in terms of allowable stresses, strains and deformation for the SFCTM parts, are in accordance with applicable codes and standards.

2. Penetration Assembly

   The codes and standards for the design of parts of the penetration assembly (including seals) are described in the response to RAI 525, Question 09.01.04-31. The specific loads, load combinations and acceptance limits for the penetration assembly parts are described in the response to RAI 525, Question 09.01.04-33.

3. Loading Hall and Cask Loading Pit Structures

   The loading hall and cask loading pit are integral to the Fuel Building concrete structure. U.S. EPR FSAR Tier 2, Section 3.8.4.1 defines the Fuel Building as an “Other Seismic Category I Structure.” The general procedures applicable to other Seismic Category I structures are given in U.S. EPR FSAR Tier 2, Section 3.8.4.4.1.

FSAR Impact:

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

Question 09.01.04-37:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) does not provide description of materials for the SFCTF equipment and the quality control procedures to ensure adequate designs. Therefore, the applicant is requested to provide the following:

a. Description of materials used for the SFCTM, penetration assembly components, seals, and loading hall and cask loading pit structures.

b. Description of quality control procedures in place to ensure adequate designs.

c. Description of special construction techniques if used.

Response to Question 09.01.04-37:

a. Material Requirements

1) Spent Fuel Cask Transfer Machine (SFCTM)

The response to RAI 525, Question 09.01.04-30, contains Figure 09.01.04-30-1, Spent Fuel Cask Transfer Machine - Main Structural Assemblies, which provides an overview of the spent fuel cask transfer machine (SFCTM) main structural assemblies. The material requirements for the load bearing structural parts of the assemblies are described in the response to RAI 525, Question 09.01.04-30, and the material requirements for SFCTM mechanical parts are described in this response. Materials will be selected by the manufacturer of the components.

The SFCTM mechanical parts include the SFCTM traveling mechanism (travel drive, wheels, axles, drive shaft, coupling and bearing) and the drive mechanisms for the elevator, docking device, upper biological protection arrangement and anti-seismic locking devices.

The materials for the SFCTM mechanical parts meet the requirements of Section 5000 of ASME NOG-1-2004. The wheels and axles, considered structural parts, also meet requirements of Section 4000 of ASME NOG-1-2004 for Type I crane trolleys. The applicable paragraphs of Section 5000 of ASME NOG-1-2004 that provide significant requirements for SFCTM materials are discussed below:

- Per requirements of paragraph 5210 of ASME NOG-1-2004, materials with less than 15% elongation are not used for any mechanical component, except electrical motors and hydraulic components, for Type I crane trolleys.

- The materials for SFCTM couplings, wheels, axles, drive shaft, bearings, bumpers and stops meet requirements of paragraph 5450 of ASME NOG-1-2004 for Type I crane trolleys.

- The materials for SFCTM runway wheels meet the requirements of paragraph 5452.2 of ASME NOG-1-2004 for Type I crane trolleys.

- The materials for fasteners for SFCTM mechanical parts meet the requirements of paragraph 5456 of ASME NOG-1-2004 for Type I crane trolleys.

- The SFCTM travel gearing is designed and manufactured in accordance with the requirements of paragraph 5432 of ASME NOG-1-2004 for Type I crane trolleys.

Electrical components of the SFCTM will be selected by the SFCTM manufacturer and will meet the requirements of Section 6000 of ASME NOG-1-2004 for Type I cranes.

2) Penetration Assembly Components

The penetration assembly is described in U.S. EPR FSAR Tier 2, Section 9.1.4.2.2. U.S. EPR FSAR Tier 2, Figure 9.1.4-8-Cask Loading Pit Penetration Assembly, and provides an overview of the penetration assembly.

Maneuvering and Pressurization Device of Upper Cover

Materials, including welding materials, for the structural parts of the maneuvering and pressurization device of the upper cover of the loading penetration assembly comply with the requirements of Article NF-2000, ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

Hoist of Upper Cover

Structural and welding materials for the hoist of the upper cover of the loading penetration assembly comply with the requirements of Section 4000 of ASME NOG-1-2004 for Type I hoists. Examination and testing of base materials for the hoist comply with the requirements of Paragraph 7200 of NOG-1-2004 for Type I hoists. Testing of welding materials for the hoist complies with the requirements of Paragraph 4230 of ASME NOG-1-2004 for Type I hoists.

Materials for mechanical parts of the hoist of the upper cover of the loading penetration assembly meet the requirements of Section 5000 of ASME NOG-1-2004 for Type I hoists.

Materials for electrical components of the hoist of the upper cover of the loading penetration assembly meet the requirements of Section 6000 of ASME NOG-1-2004 for Type I hoists.

Penetration

The codes and standards used in the analysis and design of the penetration assembly parts are described in the response to RAI 525, Question 09.01.04-31. The materials, including welding materials, for the fluid boundary parts of the penetration comply with the requirements of Article ND-2000, ASME BPVC Section III, Division 1, Subsection ND for Class 3 components. The materials, including

welding materials, for the structural parts of the penetration comply with the requirements of Article NF-2000, ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports. The material of the O-ring type seals is described in U. S. EPR FSAR Tier 2, Section 9.1.4.2.2. The O-rings will be environmentally-qualified in accordance with the requirements in U.S. EPR FSAR Tier 2, Table 3.10-1 and Section 3.11.2.2.

3) Loading Hall and Cask Loading Pit Structures

The loading hall and cask loading pit are integral to the Fuel Building concrete structure. U.S. EPR FSAR Tier 2, Section 3.8.4.1 defines the Fuel Building as an "Other Seismic Category I Structure." The materials for other Seismic Category I structures are given in U.S. EPR FSAR Tier 2, Section 3.8.4.6. The loading hall is a reinforced concrete structure and the cask loading pit is a steel-lined, reinforced concrete structure.

b. Quality Control Procedures

1) Spent Fuel Cask Transfer Machine (SFCTM)

In accordance with the guidance of Standard Review Plan (SRP) Section 9.1.5, the manufacturer's quality assurance program for the SFCTM is consistent with Paragraph 10 of NUREG-0554. The manufacturer's quality assurance program for the SFCTM also meets the requirements of Section 2000 (Quality Assurance) of ASME NOG-1-2004 for Type I cranes.

For those parts of the SFCTM that perform a safety-related function, the manufacturer's quality assurance program conforms to the quality assurance program requirements of 10 CFR 50 Appendix B. The manufacturer's quality assurance program for Supplemented Grade (NS-AQ) parts of the SFCTM also meets those requirements of 10 CFR 50 Appendix B that are pertinent based on the potential effect of the parts on safety-related functions of the SFCTM.

2) Penetration Assembly Components

Maneuvering and Pressurization Device of Upper Cover

For those parts of the maneuvering and pressurization device that perform a safety-related function, the manufacturer's quality assurance program conforms to the quality assurance program requirements of 10 CFR 50 Appendix B.

Hoist of Upper Cover

In accordance with the guidance of Standard Review Plan (SRP) Section 9.1.5, the manufacturer's quality assurance program for the hoist of the upper cover of the loading penetration is consistent with Paragraph 10 of NUREG-0554. The manufacturer's quality assurance program for the hoist of the upper cover of the loading penetration also meets the requirements of Section 2000 (Quality Assurance) of ASME NOG-1-2004 for Type I cranes. As specified in U.S. EPR FSAR Tier 2, Table 3.2.2-1-Classification Summary, the safety classification of the

hoist of the upper cover of the loading penetration is Supplemented Grade (NS-AQ). Thus, the manufacturer's quality assurance program for the hoist of the upper cover meets those requirements of 10 CFR 50 Appendix B that are pertinent based on the potential effect of the hoist on safety-related functions of the loading penetration.

Penetration

In accordance with U.S. EPR FSAR Tier 2, Table 3.2.2-1-Classification Summary, penetration fluid boundary parts and structural supports are classified safety related. The manufacturer's quality assurance program for these parts (safety related portions) meets the requirements of 10 CFR 50 Appendix B.

3) Loading Hall and Cask Loading Pit Structures

U.S. EPR FSAR Tier 2, Section 3.8.4.1 defines the Fuel Building as an "Other Seismic Category I Structure." U.S. EPR FSAR Tier 2, Section 3.8.4.6.2 states that "quality control procedures for other Seismic Category I structures are the same as described in Section 3.8.3.6 (GDC-1)." This includes quality control procedures used for the Fuel Building concrete structure.

The Quality Control Program for the U.S. EPR is described in U.S. EPR FSAR Tier 2, Chapter 17.

c. Special Construction Techniques

1) Spent Fuel Cask Transfer Machine (SFCTM)

The SFCTM and upper cover hoist will be constructed employing conventional fabrication techniques used for other heavy load handling components; they do not require any special fabrication techniques.

2) Penetration Assembly Components

The loading penetration assembly is comparable to a large diameter piping and/or equipment penetration. The construction of the loading penetration assembly does not require any special fabrication techniques.

3) Loading Hall and Cask Loading Pit Structures

U.S. EPR FSAR Tier 2, Section 3.8.4.1 defines the Fuel Building as an "Other Seismic Category I Structure." U.S. EPR FSAR Tier 2, Section 3.8.4.6.3 states "Other Seismic Category I structures are constructed using proven methods common to heavy industrial construction. No special, new, or unique construction techniques are used."

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.2.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR
Final Safety Analysis Report

MARKUPS

Table I-1—Summary of Tier 2* Information
(Sheet 5 of 5)

09.01.04-22

Location	Description of Tier 2* Information	Expiration at First Full Power
9.1.4	SFCTF Non-Safety Related Interlocks and Emergency Stops	No
18.1.6	Human Factors Engineering Program Management Plan	Yes
18.2.4	Human Factors Operating Experience Review Implementation Plan	Yes
18.3.5	Functional Requirements and Functional Allocation Implementation Plan, HFE Program Management Plan	Yes
18.4.4	Task Analysis Implementation Plan	Yes
18.5.4	Task Analysis Implementation Plan, HFE Program Management Plan	Yes
18.6.4	Implementation Plan for the Integration of Human Reliability Analysis (HRA) with Human Factors Engineering Program	Yes
18.7.9	Human Factors Operating Experience Review Implementation Plan, Human System Interface Design Implementation Plan, Functional Requirements and Functional Allocation Implementation Plan, Human Factors V and V Plan	Yes
18.10.4	Human System Interface Design Implementation Plan, Human Factors V and V Plan	Yes
18.11.5	HFE Program Management Plan, Human Factors Engineering Design Implementation Plan	Yes
18.12.4	HFE Program Management Plan, Human Performance Monitoring Implementation Plan	Yes

The lower cover is bolted to the leak-tight flange of the penetration assembly. It is equipped with a nozzle for the recovery of drip-offs. The lower cover is designed to support the weight of the water in the loading pit in the event of an inadvertent opening of the upper cover of the penetration. The lower cover is manually unbolted and removed by the operators using the elevator of the SFCTM when performing cask loading operations.

RAI 525, Question 09.01.04-37

The penetration assembly is equipped with dual seals at the interface locations shown in Figure 9.1.4-9—Loading Pit Penetration Assembly Seals. Theses are O-ring type seals made from EPDM rubber or other equivalent material and are designed to resist high levels of ionizing radiation. The O-rings will be environmentally-qualified in accordance with the requirements given in Table 3.10-1 and Section 3.11.2.2.

RAI 525, Question 09.01.04-37

The integrity of the penetration seals is tested before loading the fuel assemblies. During the seal test and the loading of fuel assemblies, seal leaks between the cask and the docked penetration or of the bellows is detected by a pressure decrease of the compressed air enclosed between the two barriers. The compressed air pressure between the barriers is greater than the water column pressure in the loading pit. The leak-tightness of the penetration vent mechanism is tested separately. Maintenance and replacement of the seals is performed when the loading pit is empty and at intervals recommended by the seal manufacturer.

Two concentric seals on the upper part of the supporting structure maintain double barrier leak-tightness to the upper cover of the penetration when the upper cover is closed. The space between the two seals is pressurized with compressed air at a pressure greater than the loading pit water column pressure to avoid any concern of water leakage due to a seal failure. It also monitors the leak-tightness of the upper cover of the penetration in the main control room when the SFCTF is not in use. An alarm is generated in the SFCTF control room upon detection of a leak.

The internal and external shells are fixed to the supporting structure and provide protection for the bellows. The internal shell directs the flow of water and air in the penetration and the external shell guides the docking flange.

The double-walled bellows are provided with a flange at each end. The lower flange is connected to the docking flange and leak-tight flange, while the upper flange is connected to the supporting structure. The upper flange connection is equipped with two seals and the capability to monitor the space between the seals for leak-tightness.

The leak-tight flange is connected to the docking flange and the double-walled bellows flange at the upper end. The lower end of the leak-tight flange contacts the mating surface of the cask when the cask is docked to the penetration assembly. When the SFCTM is not in place under the penetration, the leak-tight flange is bolted with the lower cover of the penetration. The leak-tight flange is equipped with two

seals each at the upper and the lower end and the capability to monitor the space between the seals for leak-tightness.

The docking flange is hung from the supporting structure by an arrangement that keeps the bellows in the upper position when it is in the storage position.

The penetration assembly maintains a leak tight boundary of the loading pit when the penetration is closed, and when the penetration is open and connected to a cask. The boundary serves as part of the safety-related cask loading pit fluid boundary to prevent drainage from the SFP and is maintained during and following an SSE to prevent a loss of water from the loading pit that could result in potential offsite exposures. A brief unseating of the normally leak-tight connection at the mating surface of the cask may occur during the SSE resulting in some seepage around the seals, but does not result in any significant loss of water inventory from the cask loading pit or SFP.

An interlock precludes opening the penetration upper cover before the correct docking of the cask is checked, the anti-seismic locking of the SFCTM, and the correct cask water level. Likewise, an interlock prevents undocking the cask from the penetration unless the upper cover is closed.

To prevent damage to equipment or fuel in transit, the spent fuel machine is prevented, by interlock, from entering the loading pit unless the gates are open and the penetration upper cover is open. The upper cover is prevented from moving if the spent fuel machine is in the loading pit.

The penetration assembly is shown in Figure 9.1.4-8—Cask Loading Pit Penetration Assembly.

ANSI/ANS-57.2-1983 provides design requirements for light water reactor spent fuel storage facilities at nuclear power plants. The design requirement presented in this standard is for a cask handling pool of a specific design configuration, wherein a penetration assembly design, similar to the one used in the U.S. EPR spent fuel cask transfer facility (SFCTF) used for fuel assembly loading, is not specifically addressed. However, Sections 6.1 and 6.2 of ANSI/ANS-57.2-1983 contain codes and standards that allow an acceptable level of oversight in the design and construction of spent fuel storage and cask handling pools, and spent fuel cask handling systems, respectively.

The design of the penetration fluid boundary parts satisfy the general design criteria specified in ND-3300 of the ASME Boiler and Pressure Vessel Code Section III, Division I - Subsection ND. The design of the penetration bellows meet the general design criteria specified in ND-3366, "Bellows Expansion Joint." In addition, ASME Boiler and Pressure Vessel Code Section III, Division I - Appendices, mandatory Appendix XI, "Rules for Bolted Flange Connections for Class 2 and 3 Components and Class MC Vessels" and mandatory Appendix XII, "Article XII-1000, Design

Consideration for Bolted Flange Connections" apply to the design of the penetration assembly.

Safety-related supports of the penetration fluid boundary parts meet the intent of the ASME Boiler and Pressure Vessel Code Section III, Division 1- Subsection NF. This includes Subsection NF rules for the material, design, fabrication, examination, installation, and certification document (certificate of conformance) for supports, which are intended to conform to the requirements for ASME Class 3 supports. The design of the penetration assembly fluid boundary parts and supports satisfies Level B (Upset) Service Limit for all Level C (Emergency) and Level D (Faulted) Service Loadings.

RAI 525, Question 09.01.04-33

~~The penetration assembly is designed in accordance with ANSI/ANS-57.2-1983: "Design Requirements for Light-Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants," ANSI/ANS, 1983.~~ The piping connected with the penetration assembly and cask up to and including the first valve (if a normally closed valve), or up to and including a second isolation valve (if a normally open valve with auto close or remote close capability) are designed in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 1, "Rules for Construction of Nuclear Facility Components," The American Society of Mechanical Engineers, 2004 Edition. The process systems beyond the second isolation provision from the cask and the loading penetration are designed consistent with the design codes for the respective plant systems.

The hoist for the penetration assembly upper cover is a stationary lifting device and is designed in accordance with the applicable portions of ASME NOG-1 as a single failure-proof hoist (Type1).

The structural parts of the maneuvering and pressurization device are designed per guidance of ASME Section III, Division 1, Subsection NF for Class 3 component supports.

SFCTF Fluid and Pneumatic Systems

Fluid and pneumatic systems are provided in the SFCTF for filling, draining, and drying the cask and penetration assembly. These SFCTF systems are connected with the respective plant systems: compressed air system, demineralized water system, nuclear island drain/vent system, and fuel pool cooling and purification system.

These systems consist of process modules installed in a room adjacent to the SFCTF control room, on the SFCTM, and associated piping installed in the loading hall, and flexible hoses to connect the systems to the SFCTM. The process modules consist of pipes, valves, and process sensors. The process modules installed in the room check and monitor the seals and provide connections for the water supply to fill and drain the spent fuel cask and cask loading pit penetration assembly. The process module

emergency stops to stop cask movement and send hardwired alarm indications to the operator.

The following description identifies the priorities and interactions between the operational PLC, equipment protection PLC and the hardwired logic:

The operational PLC and equipment protection PLC both acquire SFCTF sensor signals. If the operational PLC fails or if sensor inputs are found to be invalid or failed, the equipment protection PLC assumes control of operation and initiates shutdown of the SFCTF machinery by applying the brakes and shutting off power to all motors. The equipment protection PLC always has priority over the operational PLC.

If the equipment protection PLC fails, the operational PLC is blocked and has no capability to move any parts of the SFCTF system. If the SFCTF machinery is still moving, the hardwired interlock logic takes over and stops the SFCTF machinery by removing power at the appropriate limit setting. The hardwired logic has priority over the operational PLC and the equipment protection PLC. The emergency stop switch is wired to the hardwired logic.

The hardwired logic has monitoring contacts wired such that if the hardwired logic fails, the brakes are applied and power is shut off to all motors.

The two redundant, Seismic Category I accelerometers have priority over all I&C devices, including both PLCs, and are wired to circuit breakers which remove the power to the SFCTF machinery when an SSE is detected. The circuit breakers are configured in series, so that either can remove power to the SFCTF machinery. These two circuit breakers will also be classified Seismic Category I.

In addition, the two accelerometers and the main circuit breakers are designed to the following standard:

- IEEE Std. 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

The SFCTF interlocks and emergency stops are described in Table 9.1.4-2-SFCTF Non-Safety Related Interlocks and Emergency Stops.

Section 14.2.12.3.17 describes the preoperational test of the SFCTF and demonstrates the performance of I&C devices of the SFCTF during normal operation.

~~Operation of the SFCTF is controlled by a non-safety-related operating programmable logic controller (PLC) based on information from the control devices, encoders, load cells, mechanical sensors, and pressure, level and flow sensors. Movements and process status are monitored by a second monitoring PLC. Both PLCs are connected via a network, allowing data transfer from monitoring PLC to operating PLC.~~

RAI 525, Question 09.01.04-22

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 1 of 13

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 7	Interlock	Interlock of the penetration upper cover with SFM and the swivel gate.	The interlock prevents the movement of the upper cover of the penetration, when the SFM is in the loading pit and the swivel gate is open to prevent equipment damage.	• PLC and HSI display. • Limit switches.	• Switch 'off' the motor of the upper cover hoist. • Switch 'off' the operational and auxiliary brakes of the upper cover hoist.	Automatic – Alarm on SFCTF HSI display when the limit switches trip on 'open'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the limit switches trip on not 'open'.
CF 8	Interlock	Interlock of SFM with the upper cover.	This interlock prevents the movement of the SFM when the upper cover of the penetration is closed or partially opened to prevent equipment damage.	• PLC and HSI display. • Position switches. • Relays.	• Switch 'off' the SFM motor.	Automatic – Alarm on SFCTF HSI display when the position switches trip on 'open'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the position switches trip on not 'open'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 2 of 13

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 12	Interlock	[*Interlock the of the anti-seismic locking devices when the SFCTM is at the penetration station.*]*	This interlock prevents movement of the SFCTM during loading operations in the event of an SSE in order to prevent equipment damage.	• PLC and HSI display. • Limit switches. • Position switches.	• Switch 'off' the motor to the anti-seismic locking devices.	Automatic – Alarm on SFCTF HSI display when the position switches trip on 'open'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the position switches trip on not 'open'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 3 of 13

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 15	Interlock	Interlock of the penetration until upper cover is closed and the water level in the cask is within required range.	This interlock prevents undocking of the cask when the penetration upper cover is open and the water level in the cask is outside the required range to prevent water from leaking from the cask loading pit and water contamination in the Fuel Building..	• PLC and HSI display. • Limit switches. • Position switches. • Level sensors.	• Switch 'off' the undocking screw motors . • Switch 'off' the undocking screw electric brake.	Automatic – Alarm on SFCTF HSI display when the level sensor trips on 'high' or 'low' and position switches trip on 'open'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the level sensor trips on not 'high' or not 'low' and position switches trip on not 'open'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 4 of 13

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 16	Interlock	Interlock of the penetration until cask is correctly docked and monitoring the force on the seals between the penetration and the cask.	This interlock ensures correct docking of the cask to the penetration, the anti-seismic devices on the SFCTM are locked, and the seals between the penetration and cask are leak tight before filling the penetration to prevent water from leaking from the cask loading pit and water contamination in the Fuel Building.	• PLC and HSI display. • Limit switches. • Position switches. • Pressure sensor. • Relay. • Torque switches.	• 'Close' the valve used to perform leak tightness check.	Automatic – Alarm 'on' SFCTF HSI display when the torque switches trip on 'high', pressure sensor trips on 'high', and anti-seismic position switches trip on 'close'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the torque switches trip on not 'high', pressure sensor trips on not 'high', and anti-seismic position switches trip on not 'close'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF17	Interlock	Interlock the motion of the upper cover of the penetration with the cask water level.	This interlock ensures the correct water level is in the cask before opening the penetration upper cover to prevent water from leaking from the cask loading pit and water contamination in the Fuel Building.	• PLC and HSI display. • Temperature sensor. • Relay.	• Switch 'off' the motor of the upper cover hoist. • Switch 'off' the operational and auxiliary brakes of the upper cover hoist.	Automatic – Alarm on SFCTF HSI display when temperature sensor trips on 'high' or 'low'.	Alarm 'off' on the SFCTF HSI display (operator acknowledgement required) when temperature sensor trips on not 'high' or not 'low'.
CF 26	Interlock	[*Interlock of the SFCTM with loading hall door.*]*	This interlock prevents movement of the SFCTM when the loading hall door is open to protect against radiological releases.	• PLC and HSI display. • Limit switches.	N/A.	Automatic – Alarm on SFCTF HSI display when SFCTM electric brake limit switches trip on 'off' and loading hall door limit switch trips on 'open'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when SFCTM electric brake limit switches trip on 'on' and loading hall door limit switch trips on not 'open'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 2	Emergency Stop	Emergency stop in the loading hall.	After detecting an emergency stop push-button actuation in the loading hall, the SFCTM and associated fluid circuits are placed in a safe condition.	• PLC and HSI display. • Limit switches. • Position switches. • Relays.	• Switch 'off' the motor of the SFCTM. • Switch 'off' the electric brake of the SFCTM. • 'Close' the fluid circuit isolation valves.	Alarm on SFCTF HSI and MCR PICS displays when an emergency stop push-button is manually pressed.	Alarm 'off' on SFCTF HSI and MCR PICS displays (operator acknowledgement required) when the emergency stop-clear function button is pressed.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 3	Emergency Stop	General emergency stop in the SFCTF Control Room.	After detecting an emergency stop push-button actuation in the SFCTF control room, all electrically controlled equipment is placed in a safe condition.	• PLC and HSI display. • Limit switches. • Position switches. • Relays.	• Switch 'off' the motor of the SFCTM. • Switch 'off' the electric brake of the SFCTM. • Switch 'off' the motor of the upper cover hoist. • Switch 'off' the operational and auxiliary brakes of the upper cover hoist. • Switch 'off' the motor to the anti-seismic locking devices. • Switch 'off' all other electrical devices. • 'Close' the fluid circuit isolation valves.	Alarm on SFCTF HSI and MCR PICS displays when an emergency stop push-button is manually pressed.	Alarm 'off' on SFCTF HSI and MCR PICS displays (operator acknowledgement required) when the emergency stop-clear function button is pressed.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 10	Emergency Stop	Emergency stop of the upper cover penetration hoist.	After detecting an emergency stop push-button actuation for the upper cover penetration hoist, the upper cover hoist is placed in a safe position.	• PLC and HSI display. • Limit switches. • Position switches. • Relays.	• Switch 'off' the motor of the upper cover hoist. • Switch 'off' the operational and auxiliary brakes of the upper cover hoist. • Switch 'off' the motor to the anti-seismic locking device for the upper cover.	Alarm on SFCTF HSI and MCR PICS display when an emergency stop push-button is manually pressed.	Alarm 'off' on SFCTF HSI and MCR PICS displays (operator acknowledgement required) when the emergency stop-clear function button is pressed.
CF 5	Operational	Monitor cask water temperature.	The cask water temperature is monitored to prevent the fuel assemblies from overheating.	• PLC and HSI display. • Temperature sensor. • Relay.	N/A.	Automatic – Alarm on SFCTF HSI and MCR PICS displays when temperature sensor trips on 'high'.	Alarm 'off' on SFCTF HSI and MCR PICS displays (operator acknowledgement required) when moisture sensor trips on not 'high'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 18	Operational	Monitor leak tightness of upper cover.	The leak tightness of the upper cover is monitored to prevent fuel assembly overheating, water contamination in the Fuel Building, and increased dose rates.	• PLC and HSI display. • Level sensor.	N/A.	Automatic – Alarm on SFCTF HSI and MCR PICS displays when moisture sensor trips on 'high'.	Alarm 'off' on SFCTF HSI and MCR PICS displays (operator acknowledgement required) when level sensor trips on not 'high'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 19	Operational	Check the position of the upper biological protection plates and service elevator before travel of the SFCTM from the handling opening station to the lid handling station.	These conditions ensure the SFCTM has a clear path to move between the handling opening station and the lid handling station to prevent equipment damage.	• PLC and HSI display. • Limit switches. • Position switches.	• Switch 'off' the motor of the SFCTM. • Switch 'off' the electric brake of the SFCTM.	Automatic – Alarm on SFCTF HSI displays when SFCTM position switch trips on 'open', upper biological protection plate position switches trip on 'open', high-speed limit switch trips on 'on', and the service elevator position switch trips on 'low'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when SFCTM position switch trips on 'close', biological protection plate position switches trip on not 'open', high-speed limit switch trips on 'off', and the service elevator position switch trips on not 'low'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 21	Operational	Check position of the service elevator, of the lower plate, of the docking screws, if the upper biological protection plates, and of the penetration before travel of SFCTM from the lid handling station to penetration station and from the penetration to the lid handling station.	These conditions ensure the SFCTM has a clear path to move between the lid handling station and the penetration to prevent equipment damage.	• PLC and HSI display. • Limit switches. • Position switches. • Torque switches.	• Switch 'off' the motor of the SFCTM. • Switch 'off' the electric brake of the SFCTM.	Automatic – Alarm on SFCTF HSI displays when the SFCTM and lower plate limit switches trip on 'on', screw torque switches trip on 'low', upper biological protection plate limit switches trip on 'close', service elevator position switch trips on 'low', and high-speed limit switch trips on 'on'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the SFCTM and lower plate limit switches trip on 'off', screw torque switches trip on not 'low', upper biological protection plate limit switches trip on not 'close', service elevator position switch trips on 'high', and high-speed limit switch trips on 'off'.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF 27	Operational	[*Confirm SFCTM is placed in safe condition if an earthquake is detected.*]*	When the Seismic Category I accelerometers detect an earthquake, the main SFCTF circuit breakers are tripped, placing the electrically controlled equipment in a safe de-energized condition.	• PLC and HSI display. • Limit switches. • Position switches. • Accelerometers • Relays.	• Switch 'off' the motor of the SFCTM. • Switch 'off' the electric brake of the SFCTM. • Switch 'off' the motor of the upper cover hoist. • Switch 'off' the operational and auxiliary brakes of the upper cover hoist. • Switch 'off' the motor to the anti-seismic locking devices. • Switch 'off' all other electrical devices. • 'Close' the fluid circuit isolation valves.	Automatic – Alarm on SFCTF HSI displays when the accelerometers' limit switches trip on 'high'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) and hard-wired panel light when operator clears the alarm.

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
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Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)**
CF28	Operational	Ensure the iodine extracting ventilation is operational prior to opening the biological lid.	This ensures the iodine extracting ventilation system is operational prior to opening the biological lid, preventing air contamination in the Fuel Building and increased dose rates.	• PLC and HSI display. • Limit switches. • Position switches.	N/A.	Automatic – Alarm on SFCTF HSI displays when the iodine extracting ventilation damper position sensor trips on 'off.'	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when the iodine extracting ventilation damper position sensor trips on 'on.'
CF 29	Operational	Monitor the leak tightness of the penetration assembly during cask loading operations.	The leak tightness of the penetration assembly is monitored to prevent water contamination in the Fuel Building and increased dose rates.	• PLC and HSI display. • Pressure sensor.	N/A.	Automatic – Alarm on SFCTF HSI displays when pressure sensor trips on 'high'.	Alarm 'off' on SFCTF HSI display (operator acknowledgement required) when pressure sensor trips on not 'high'.

**The alarms are displayed on the SFCTF HSI when the SFCTF is operational. The alarms are displayed on the MCR PICS during all modes of operation.