

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Tuesday, April 30, 2013 5:58 PM
To: Snyder, Amy
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 11
Attachments: RAI 525 Supplement 11 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 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

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
 Phone: 704-805-2223
 Email: Dennis.Williford@areva.com

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

Charlotte, NC 28262

Phone: 704-805-2223

Email: Dennis.Williford@areva.com

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.
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, 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
Phone: 704-805-2223
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: 4363

Mail Envelope Properties (554210743EFE354B8D5741BEB695E65614B66C)

Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Supplement 11
Sent Date: 4/30/2013 5:57:38 PM
Received Date: 4/30/2013 5:57:55 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@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

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	Size	Date & Time
MESSAGE	36353	4/30/2013 5:57:55 PM
RAI 525 Supplement 11 Response US EPR DC.pdf		957836

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 11

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 09.01.04-29:**OPEN ITEM**

The spent fuel cask transfer facility (SFCTF) includes two pieces of mechanical equipment which are 1) spent fuel transfer machine (SFCTM) and penetration assembly, to ensure safe transfer of spent fuel assemblies from the spent fuel pool into the spent fuel cask. US EPR FSAR Revision 4 Interim, Section 9.1.4.2 (August 31, 2011, Response to RAI 385) provides detailed description of the functional features of the SFCTF and stated that both pieces of the SFCTF equipment be designed as Seismic Category I. However, insufficient information is provided regarding the structural aspects of the SFCTF design. To facilitate the structural review of the SFCTF design, the applicant is requested to provided the following :

- a. Description of overall dimensions, structural elements (beams, girders, trusses, plates, etc.) and their connections for the SFCTM and the penetration assembly, including sketches.
- b. Description of the anti-seismic locking devices including their connections with the SFCTM and the structural walls (provide sketches).
- c. Overall dimensions and structural description of the loading hall (concrete walls and slabs) including sketches.

Response to Question 09.01.04-29:**Item a:**

The spent fuel cask transfer machine (SFCTM) and penetration assembly are procured components. Specific design details of the components and structural elements, and their connections for the SFCTM and penetration assembly, will be developed by the vendor during the procurement phase and are not needed for design certification.

Item b:

The lateral guiding devices and anti-seismic locking devices are fixed at two sides of the SFCTM frame structure. The SFCTM lateral guiding devices and anti-seismic locking devices are designed to Seismic Category I criteria.

The anti-seismic locking device consists of a movable part that engages inside the openings in the guiding rails at the handling opening, the lid lifting station, and the penetration station. The guiding rails are attached to the corbels of the loading hall. The movable part of the anti-seismic locking device is actuated by a screw/nut system connected to an electric motor, a reduction gear, and a torque limiter. The screw movement is not possible without an external action. The anti-seismic locking devices are also equipped with a manual backup for operation in case of a loss of electric power. The position of the moveable part (locked/unlocked) is detected by a sensor. The anti-seismic locking devices, when engaged in the openings in the guiding rails at the handling opening station, the lid handling station, or the penetration station, prevent any movement of the SFCTM in the event of a seismic event or spurious behavior of the SFCTM traveling drive system.

The lateral guiding devices slide along the guiding rails and prevent tilting of the SFCTM during a seismic event.

Figure 09.01.04-29-1—SFCTM Anti-Seismic Locking Device provides an overview of the SFCTM anti-seismic locking device.

Figure 09.01.04-29-2—Lateral Guiding Devices and Anti-Seismic Locking Devices on SFCTM shows the location of the lateral guiding devices and the anti-seismic locking devices on the SFCTM frame work and their interface with the guiding rails.

The general procedure for design of embedments in the Fuel Building (FB) is described in U.S. EPR FSAR Tier 2, Sections 3.8.4.4.1 and 9.1.4.2.

Seismic response spectra for FB elevations will be developed per procedures described in U.S. EPR FSAR Tier 2, Section 3.7.2. The SFCTM seismic analysis will follow methodology described in U.S. EPR FSAR Tier 2, Section 3.7.3 for U.S. EPR standard plant structural subsystems.

U.S. EPR FSAR Tier 2, Sections 9.1.4.2.2 and 9.1.4.3, will be revised to reflect this information.

Item c:

U.S. EPR FSAR Tier 2, Section 3.8.4.1.2, provides a description of the FB and includes figures that reflect structural dimensions. As shown on U.S. EPR FSAR Tier 2, Figure 3.8-41—Fuel Building Plan Elevation 0 Feet, the loading hall and cask loading pit are located internal to the FB concrete structure.

The dimensional arrangement drawings for Seismic Category I structures of the U.S. EPR are provided in U.S. EPR FSAR Tier 2, Appendix 3B. U.S. EPR FSAR Tier 2, Figure 3B-18—Fuel Building Dimensional Plan Elevation 0 m (0 ft) and Figure 3B-29—Fuel Building Dimensional Section C-C, show the overall dimensions of the FB loading hall.

In the Response to RAI 525, Question 09.01.04-32, U.S. EPR FSAR Tier 2, Section 9.1.4.2, was revised to include a reference to U.S. EPR FSAR Tier 2, Sections 3.8.4.1 and 3.8.4.2.

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 9.1.4.2.2 and 9.1.4.3, will be revised as described in the response and indicated on the enclosed markup.

Figure 09.01.04-29-1
SFCTM Anti-Seismic Locking Device

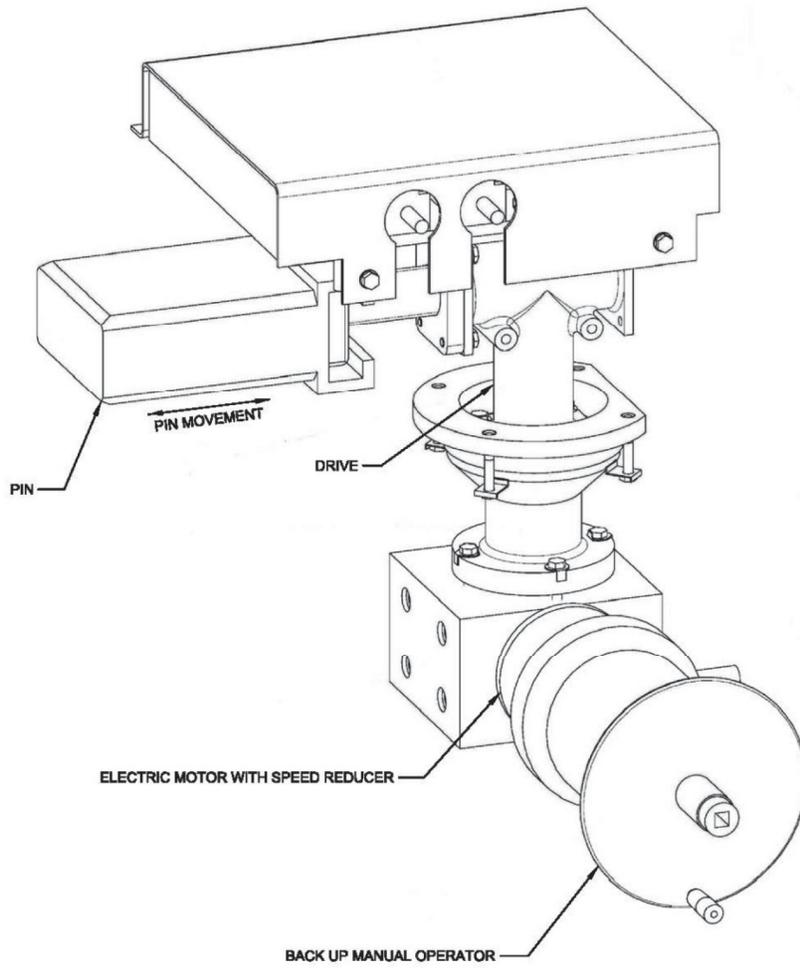
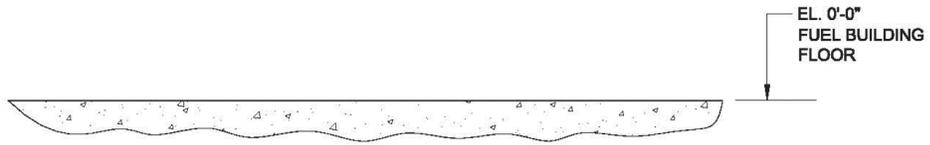
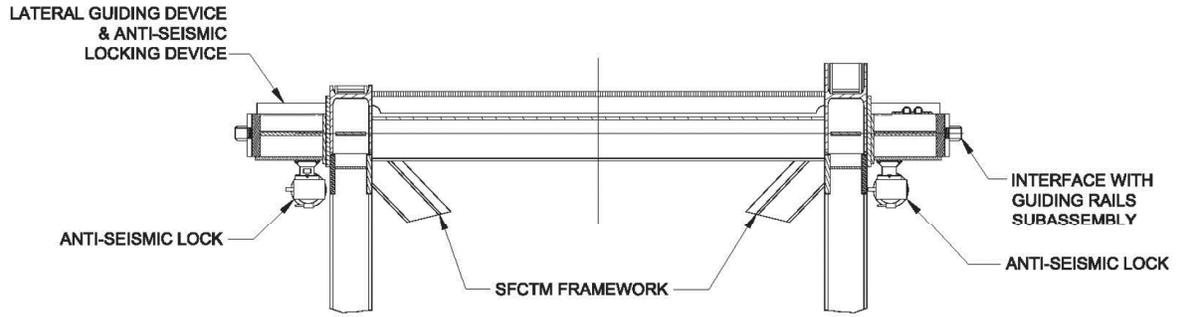


Figure 09.01.04-29-2
Lateral Guiding Devices and Anti-Seismic Locking Devices on SFCTM



U.S. EPR Final Safety Analysis Report Markups



Fuel Racks

The fuel racks are located underwater for irradiated fuel storage, and above water for new fuel storage. The racks are designed to store fuel in a manner that precludes criticality and maintains the irradiated fuel in a coolable geometry. Refer to Section 9.1.2 for the design of the new and spent fuel storage racks.

Spent Fuel Cask Transfer Facility

The SFCTF is functionally separated into four major parts: the SFCTM, the penetration assembly, the SFCTF fluid and pneumatic systems, and the biological lid handling station.

Spent Fuel Cask Transfer Machine

The SFCTM is a trolley that moves on rails and transports the spent fuel cask vertically within the stations of the SFCTF. Motive force is provided by an onboard electric motor. The SFCTM is designed to carry a maximum load of 253,530 lb (115,000 Kg). Instrumentation and controls (I&C) are provided to support safe operation, as described in Section 9.1.4.5. The SFCTM interfaces with the plant fluid systems that are required to support cask operations, such as filling and draining.

The SFCTM is designed to remain in place and support the cask while the cask is attached to the loading pit penetration and prevent a loss of water from the SFP during an SSE that could result in potential offsite exposures. The SFCTM also provides structural support to a cask containing spent fuel to preclude fuel damage or a criticality accident.

The SFCTM is equipped with lateral guiding devices and anti-seismic locking devices. The lateral guiding device slides along the guiding rails, which are placed on the corbels of the loading hall.

During normal operation, the lateral guiding device along with the guiding rails and the sliding support of the traveling platform facilitates the limited lateral adjustment of the SFCTM. During an SSE, the lateral guiding device prevents tilting of the SFCTM when it is not positioned at the handling opening station, the lid handling station, or the penetration station.

The anti-seismic locking devices ~~consist of movable parts~~ fixed on two sides each side of the SFCTM structure ~~consist of movable parts~~ that engage in the openings in the guiding rails notches attached to fixed on the corbels of the loading hall. The movable parts are actuated by an irreversible screw/nut system connected to an electric motor, a reduction gear, and a torque limiter. The screw movement is not possible without an external action. The anti-seismic locking devices are also equipped with a manual backup for operation in case of loss of power. Sensors detect the position of the



New Fuel Handling Tool

The new fuel handling tool performs handling of a new fuel assembly in air with or without a fuel assembly insert between the new fuel container, new fuel examination area, new fuel storage racks, and new fuel elevator.

Spent Fuel Handling Manual Tool

The spent fuel handling manual tool performs underwater handling of a fuel assembly with or without a fuel assembly insert for positions of the underwater fuel storage racks, which are not accessible by the spent fuel machine and in case of a spent fuel machine failure. The spent fuel handling manual tool can be handled by the polar crane for underwater handling of fuel assemblies in the RB. The spent fuel handling manual tool performs underwater handling of a fuel assembly with sufficient water cover to provide adequate shielding.

Fuel Assembly Insert Handling Manual Tool

The fuel assembly insert handling manual tool performs underwater handling of fuel assembly insert in the spent fuel storage pool in case of a spent fuel machine failure. The fuel assembly insert handling manual tool is designed to handle different types of inserts, such as the rod cluster control assembly, thimble plug assembly, and neutron sources. The fuel assembly insert handling manual tool performs underwater handling of a fuel assembly insert with sufficient water cover to provide adequate shielding.

9.1.4.3

Safety Evaluation

- The safety-related portions of the FHS are located in the RB and FB. These buildings are designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other similar natural phenomena. Section 3.3, Section 3.4, Section 3.5, Section 3.7, and Section 3.8 provide the bases for the adequacy of the structural design of these buildings.
- The safety-related portions of the FHS are designed to remain intact after an SSE. Section 3.7 provides the design loading conditions that were considered. [Section 3.7.2 describes procedures used for developing seismic response spectra and Section 3.7.3 describes seismic analysis methodology.](#) Section 3.5, Section 3.6, and Appendix 9A provide the required hazards analysis. The refueling machine, fuel transfer tube facility, NFE, SFM, SFCTM, penetration upper cover handling hoist, and biological lid handling hoist are designed to hold their maximum load during an SSE. See Section 9.1.5.2.3 for auxiliary crane design requirements.
- The portions of the FHS that provide containment boundary and containment isolation functions are safety-related. The fuel transfer tube penetrates the primary containment and is equipped with a blind flange in the RB that is closed during power operations. The leak-tight function of the fuel transfer tube is tested in accordance with 10 CFR 50, Appendix J programmatic requirements (refer to Section 6.2.6).