ArevaEPRDCPEm Resource

From: NOXON David (AREVA) [David.Noxon@areva.com]
Sent: Friday, March 15, 2013 1:47 PM
To: Snyder, Amy
Cc: DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); TOLLEY Tracey (AREVA); VANCE Brian (AREVA); WELLS Russell (AREVA); WILLS Tiffany (AREVA); WILLIFORD Dennis (AREVA); GUCWA Len (EXTERNAL AREVA); KOWALSKI David (AREVA)
Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Questions 09.01.04-22, -24, -25, -26 & -30
Attachments: Advanced Response to RAI No. 525, Questions 09.01.04-22, -24, -25, -26 and -30 US EPR DC.pdf

Amy,

Attached is an Advanced Response to RAI No. 525, Questions 09.01.04-22, -24, -25, -26 and -30 in advance of the final response date of May 15, 2013.

To keep our commitment to send a final response to these questions by the commitment date, we need to receive all NRC staff feedback and comments no later than **May 1, 2013**.

Please let me know if NRC staff has any questions or if this response can be sent as final.

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: 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
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
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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,

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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: 4285

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Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9, Questions 09.01.04-22, -24, -25, -26 & -30
Sent Date: 3/15/2013 1:47:05 PM
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Advanced Response to

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

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:

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. Some of these interlocks are designed for Tier 2*. 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.

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 09.01.04-24:

OPEN ITEM

The SFM is designed to hold its load during and after a SSE, but is not qualified to operate under seismic conditions. In response to RAI 9.1.4-15, it was indicated that in the event of an earthquake, a fuel assembly in transit may be suspended in the CLP or partially inserted into the penetration. In this configuration, the penetration cover could not be closed and the applicant credits operator action for closure of the swivel gate and manual operation of FHM to move fuel element to a safe location. However, the applicant does not provide any input on the time required to complete these manual actions or any recovery plan. The staff requests the applicant to justify how it intends to credit manual actions of potentially failed equipment to recovery from SSE with suspended fuel assembly and justify the safe use of the FHM as seismic Category II.

Response to Question 09.01.04-24:

During a safe shutdown earthquake (SSE), when the cask loading pit (CLP) gates and penetration assembly upper cover are open, the extended boundary of the spent fuel pool (SFP) is established and maintained by implementing the necessary isolation design features. Refer to the response to RAI 526, Question 09.01.02-40. The use of the spent fuel machine (SFM) is not required to isolate the extended boundary of the SFP during an SSE. The spent fuel cask transfer machine (SFCTM) remains secured by anti-seismic locking devices and lateral guiding devices during movement of the fuel assembly.

As part of recovery operations after an SSE, an operator can close the swivel gate, which isolates the SFP from the CLP. As discussed in U.S. EPR FSAR Tier 2, Section 9.1.2.2.2, the swivel gate is designed to Seismic Category I criteria. Also, as part of recovery operations after an SSE, an operator uses the manual features of the SFM to lower the fuel assembly into the cask, or return it to the SFP and clear the loading penetration assembly. The components that may be required for taking the non-credited actions do not need to be qualified to Seismic Category I criteria.

The SFM is designed to Seismic Category II criteria, and based on its definition, the SFM cannot be credited for operation after an SSE. However, the SFM is designed to hold the load during and following an SSE. The SFM has provisions to manually move a fuel assembly in the event of an SFM malfunction, or loss of power. These provisions are evaluated to provide a reasonable expectation that they will be functional for manual recovery operations, after an SFM inspection and repair, if necessary, subsequent to an SSE. As described in the response to RAI 526, Question 09.01.02-40, the extended boundary of the SFP is established and maintained by carrying out the necessary isolation provisions to avoid draining the SFP to an unacceptable level during and following an SSE. Manual operability of the SFM immediately after an SSE is not essential.

The abnormal condition described in this RAI question was addressed in the Response to RAI 385, Supplement 22, Question 09.01.04-16, Item 7(a), which evaluated potential failure scenarios during cask loading operations. The Response to Question 09.01.04-16 demonstrated that adequate water inventory remains available above the fuel assembly for shielding and cooling during and following an SSE. The Response to Question 09.01.04-16 also described a beyond design basis scenario of a failure of two concentric seals located at the

leak tightness interfaces of the penetration assembly. The operator actions described during the recovery operation are for the condition that could only result from a beyond design basis failure of both seals.

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised to state that the SFM has provisions to manually move a fuel assembly in the event of an SFM malfunction, or loss of power.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-25:

OPEN ITEM

Current ITAAC in Section 2.2.8 are provided to verify the seismic classification and the location of the Table 2.2.8-1 components. However, verification of the safety-related SFCTF should demonstrate that the system is built and will operate in accordance with the FSAR. System ITAAC should be developed based on latest design of SFCTF (such as, single failure proof design, dual loading components, etc...). The ITAAC should demonstrate that the safety and operating features credited for safe handling and operation are included to validate that the design of components and mechanisms to withstand earthquakes and interlocks and design features ensure that the SFCTF will perform fuel handling within acceptable limits. In addition, the staff noted an inconsistency between Tier 2, Table 3.2.2-1 and Tier 1, Table 2.2.8-1 for the SFM. Table 2.2.8 indicates seismic Category as "N/A" and Table 3.2.2-1 classifies FHM as seismic Category II.

The staff requests the applicant to review all components for consistency between classifications in Tier 1 and Tier 2 to ensure consistency. The staff also requests the applicant to provide ITAAC for the SFCTF and address the inconsistency.

Response to Question 09.01.04-25:

Inspections, tests, analyses, and acceptance criteria (ITAAC) for heavy lifting components is given in U.S. EPR FSAR Tier 1, Table 2.10.1-1—Cranes Equipment Mechanical Design. This includes the cask loading penetration upper cover hoist and the biological lid handling station.

To be consistent with the seismic category classification listed in U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary, the seismic category designation for the new fuel elevator, spent fuel machine and fuel transfer tube facility will be changed from "N/A" to "II" in U.S. EPR FSAR Tier 1, Table 2.2.8-1—FHS Equipment Mechanical Design.

To also be consistent with U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary, the classification of the transfer tube and blind flange will be changed to ASME Code Section III, Class MC and the classification of the transfer tube gate valve and expansion joints will be changed to ASME Code Section III, Class 3 in U.S. EPR FSAR Tier 1, Table 2.2.8-1—FHS Equipment Mechanical Design.

A description of the interlocks associated with the spent fuel cask transfer facility (SFCTF) equipment is given in the Response to Question 09.01.04-22.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.2.8-1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-26:

OPEN ITEM

Based on the portions of the SFCTF being heavy loads and SFCTM complex attachment and operation of heavy load casks, the applicant must address potential causes for error including operator error, rigging failures, lack of adequate inspection and inadequate procedures for heavy load handling to address NUREG-0612 and RIS 2005-25. The staff requests the applicant to address the guidelines of SRP Section 9.1.5.III.3 for safe movement of cask and heavy loads and movement of heavy loads during the SFCTF operation.

Response to Question 09.01.04-26:

The equipment used for the handling of heavy loads associated with the operation of the spent fuel cask transfer facility (SFCTF) is subject to the same set of requirements as for other heavy load handling equipment used for the U.S. EPR. To maintain a high level of confidence and provide a defense-in-depth methodology to mitigate occurrences involving human performance, the design and use of this equipment meets the recommended guidelines given in standard review plan (SRP) Section 9.1.5.III.3. This includes the specification of safe load paths, use of plant procedures to ensure proper equipment operation, testing and inspection, assurance that operators are trained and qualified, and that equipment is provided has been specified and designed in accordance with the governing standards.

The heavy load handling aspects for the other portions of the SFCTF, namely, the biological lid handling station and upper penetration cover hoists are addressed in the Response to RAI 530, Question 09.01.05-24. The guidelines of SRP Section 9.1.5.III.3, with respect to the safe movement of casks and heavy loads involving the spent fuel cask transfer machine (SFCTM), are satisfied as follows:

- The safe load path for the operation of the SFCTM is defined by the track system on which the machine travels. Since the machine is a rail-mounted device, the safe load path is defined by the runway on which it travels. The length of travel is defined on the plant layout drawings.

- The operation of the SFCTM is described in U.S. EPR FSAR Tier 2, Section 9.1.4. Procedures for load handling operations, as well as the training and qualification of operators for these devices, will be the same as for other heavy load handling components and will be addressed by U.S. EPR COL Information Item 9.1-1 in U.S. EPR FSAR Tier 2, Section 9.1.5.2.5. Operator training and procedures are developed by the COL applicant, as described in U.S. EPR FSAR Tier 2, Sections 13.2 and 13.5.

- Per NUREG-1774, “A Survey of Crane Operating Experience at U.S. Nuclear Power Plants from 1968 through 2000,” the leading cause of incidents involving crane mishaps has not been due to improper equipment design or operation, but rather from the use of equipment in ways that demonstrate inattention to detail; i.e., issues with human performance. Therefore, operators are trained in accordance with the safety standards outlined in Chapter 2-3.1 of ASME B30.2-2005.

- To demonstrate reliable and safe operation of equipment, inspection, testing and maintenance of the SFCTM is performed in accordance with Chapter 2-2 of ASME B30.2-2005.

- The SFCTM does not involve hoisting a cask and does not require special lifting devices; therefore, ANSI N14.6 is not applicable to cask handling. Similarly, the use of slings for lifting is not required for the operation of the SFCTM; therefore, ASME B30.9 does not apply.

- Selection of equipment is based on the design in accordance with ASME NOG-1. Since the equipment is designed as single failure proof, the equipment will maintain the supported loads in a safe configuration during design basis events. Provisions are also in place to allow placement of the loads in a safe configuration following a design basis event. The equipment is designed with manual backup capabilities. Use of ASME NOG-1 demonstrates a conservative design, when compared to the requirements specified by CMAA-70-2000 or ASME B30.2-2005.

U.S. EPR FSAR Tier 2, Section 9.1.5 will be revised to reflect this information.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.5 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-30:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that the SFCTM is designed in accordance with the applicable portions of ASME NOG-1-2004. Since ASME NOG-1-2004 is specific to overhead and gantry cranes while the SFCTM is described as a trolley in the FSAR, the applicant is requested to provide the following:

a. Description of how specific provisions of ASME NOG-1-2004 are applied to the structural design of the SFCTM.

b. Description of how the seismic Category I requirements for the SFCTM would be met through the Code provisions.

Response to Question 09.01.04-30:

Item a:

The spent fuel cask transfer machine (SFCTM) is similar to a trolley of a crane considering that it moves on rails provided on the Fuel Building (FB) floor and outside the FB and transports a spent fuel cask. However, the SFCTM does not involve hoisting a cask like a conventional trolley of an overhead crane. The SFCTM transports the cask in a vertical position. Absent industry codes and standards specifically applicable to the design of the SFCTM, the guidance of ASME NOG-1- 2004 and other codes and standards are used for the design of the SFCTM parts. The application of specific provisions of these codes and standards for the structural design of the SFCTM is described below.

The SFCTM is described in U.S. EPR FSAR Tier 2, Section 9.1.4.2.2 and shown in U.S. EPR FSAR Tier 2, Figure 9.1.4-7—Spent Fuel Cask Transfer Facility.

As shown in Figure 09.01.04-30-1 Spent Fuel Cask Transfer Machine-Main Structural Assemblies, and as described below, the SFCTM has three main structural assemblies:

- The traveling platform assembly, which comprises two structural parts, a traveling platform and a cask support and leveling system. The traveling platform consists of a lower platform, carriages, bogie chassis, axles, and wheels.
- The framework fixed to the traveling platform which is equipped with a structure, an upper platform, lateral guiding devices, anti-seismic locking devices, and an elevator for hoisting lower cover of the penetration, a support for the biological lid and fluid systems with their supports.
- The supporting shell fixed on the upper part of the framework which comprises the penetration docking device, the cask upper trunions blocking device and the upper biological protection.

Figure 09.01.04-30 will be added as a new figure to U.S EPR FSAR Tier 2, Section 9.1.4.2.2 as U.S. EPR FSAR Tier 2, Figure 9.1.4-13 Spent Fuel Cask Transfer Machine-Main Structural Assemblies.

I. Structural Design Requirements

Traveling Platform Assembly

The traveling platform is a fabricated platform structure that supports the cask. The cask support and leveling system includes an adjustable plate and screw jacks on which the cask rests when it is placed on the SFCTM. Screw jacks are used for the horizontal positioning of the cask on the SFCTM.

The design criteria, design, materials and fabrication procedure for load bearing structural parts of the traveling platform and adjustable plate of the cask support and leveling system are in accordance with the requirements of Section 4000, ASME NOG-1-2004 for Type I crane trolleys. The screw jacks are designed in accordance with the guidance of ANSI N14.6-1993.

Framework

The design criteria, design, materials and fabrication procedure for load bearing structural parts of the framework such as the structure, upper platform, lateral guiding devices, anti-seismic locking devices and the support for the biological lid are per the requirements of Section 4000, ASME NOG-1-2004 for Type I crane trolleys.

The grapple and screw/nut system for the elevator are designed per guidance of ANSI N14.6-1993 to minimize the possibility of a structural failure.

Supporting Shell

The material, design, fabrication, examination, and installation of the supporting shell are per guidance of ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

The structural parts of the docking device that are in the load path, such as the screw assemblies, are designed per guidance of ANSI N14.6-1993 to minimize the possibility of a structural failure.

The structural parts of the cask upper trunions blocking device are designed in accordance with guidance of ANSI N14.6-1993 to minimize the possibility of a structural failure.

The material, design, fabrication, examination, and installation of the supports for the upper biological protection plates are in accordance with guidance of ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

The runway rails, as well as guiding rails for the SFCTM, are designed in accordance with requirements of paragraph 4460, ASME NOG-1-2004 for Type I cranes.

Loads, Load Combinations and Seismic Analysis of the SFCTM and SFCTM Parts

The specific loads described in Paragraph 4130 of ASME NOG-1-2004, as applicable for the trolley, are used for the analysis and design of the load bearing structural parts of the

SFCTM, except for the supporting shell, the docking device and the supports for the upper biological protection plates.

The specific loads and load combinations, acceptance limits, and design and analysis procedures for the supporting shell, the docking device and the supports for the upper biological protection plates are in accordance with guidance of Appendix D of Standard Review Plan (SRP), Section 3.8.4.

The loads imposed on the SFCTM through supporting structures, due to normal operation of the plant equipment, are considered for the analysis and design of the load bearing structural parts of the SFCTM, per Paragraph 4135, ASME NOG-1-2004, except for the supporting shell, docking device and the supports for the upper biological protection plates. The loads for the supporting shell, docking device and supports for the upper biological protection plates are in accordance with Paragraph NF-3110, ASME BPVC Section III, Division 1, Subsection NF. The SFCTM is considered not operating according to the guidance provided in Paragraph 4135, ASME NOG-1-2004.

Load transmission through different parts of the SFCTM, as applicable for the particular design, is considered in analysis and design of the SFCTM parts.

The SFCTM design and analysis considers all operating configurations.

Seismic loads associated with a safe shutdown earthquake (SSE) are considered in the analysis and design of the SFCTM in accordance with paragraph 4136, ASME NOG-1-2004 and SRP Section 3.8.4.

The operating basis earthquake (OBE) for the U.S. EPR is defined as one-third the standard SSE. Hence, no explicit design or analysis for the OBE is required for the SFCTM in accordance with guidelines of Appendix S of 10 CFR50.

Abnormal event loads associated with postulated drop of a fuel assembly from the maximum handling height in the cask loading pit (CLP) are considered in the analysis and design of the SFCTM in accordance with Paragraph 4136, ASME NOG-1-2004.

The SFCTM design and analysis consider test load cases, including a full-load test and rated load test, as required by Section 7000, ASME NOG-1-2004.

The load combinations described in Paragraph 4140 of ASME NOG-1-2004 are used for the analysis and design of the load bearing structural parts of the SFCTM, except for the supporting shell, the docking device and the supports for the upper biological protection plates. The load combinations for the supporting shell, the docking device and the supports for the upper biological protection plates are in accordance with guidance of Appendix D to SRP Section 3.8.4.

Seismic analysis, as a complete SFCTM assembly, will be performed in accordance with guidance of Paragraph 4150, ASME NOG-1-2004 for Type I crane trolleys and will also include the supporting shell, the docking device and the supports for the upper biological protection plates.

Seismic analysis for the supporting shell, the docking device and the supports for the upper biological protection plates will also be performed as an individual component per guidance of Appendix D to SRP Section 3.8.4.

II. Material Requirements

The SFCTM parts, designed in accordance with the guidance of ASME NOG-1, comply with the requirements of Section 4000 for structural and welding materials for Type I cranes. Examination and testing of base materials for the parts designed in accordance with guidance of ASME NOG-1 complies with the requirements of Paragraph 7200, NOG-1 for Type I cranes. Testing of welding materials for the parts designed in accordance with guidance of ASME NOG-1 complies with the requirements of Paragraph 4230, ASME NOG-1 for Type I cranes.

The structural materials and welding materials for the SFCTM parts designed in accordance with guidance of ANSI N14.6 comply with the requirements of Article NF-2000, ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

The structural materials and welding materials for the SFCTM parts designed in accordance with guidance of ASME BPVC Section III, Division 1, Subsection NF comply with the requirements of Article NF-2000, ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

III. Fabrication and Welding Requirements

Fabrication and welds for structural parts designed in accordance with guidance of ASME NOG-1 comply with the requirements of Sub-section 4200, ASME NOG-1 for Type I cranes.

Fabrication and welds for parts designed in accordance with guidance of ANSI N14.6-1993 comply with the requirements of Section 5 of ANSI N14.6-1993.

The fabrication and welds for parts designed in accordance with guidance of ASME BPVC Section III, Division 1, Subsection NF complies with the requirements of Article NF-4000, ASME BPVC Section III, Division 1, Subsection NF.

IV. Examination, Inspection and Testing Requirements

Manufacturing examination, inspection and testing of welds for parts designed in accordance with guidance of ASME NOG-1-2004 are in accordance with requirements of Paragraph 7100 and Paragraph 7200, NOG-1 for Type I cranes. The inspections and tests for welds are in accordance with Table 7200-1, ASME NOG-1. The extent of testing and acceptance criteria is in accordance with Paragraph 7100, ASME NOG-1.

Manufacturing examination, inspection and testing of welds for the parts designed in accordance with guidance of ANSI N14.6 are in accordance with relevant requirements of Article NF-5000 of ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports.

Manufacturing examination, inspections and testing of welds of the parts designed in accordance with guidance of ASME BPVC Section III, Division 1, Subsection NF are in

accordance with relevant requirements of Article NF-5000 of this code for Class 3 component supports.

The no-load test of the SFCTM as an assembly, as well as of the elevator for the lower cover and loading penetration docking device, are performed in accordance with relevant requirements of paragraph 7250, ASME NOG-1-2004.

The SFCTM as an assembly, as well as the elevator for lower cover and loading penetration docking device, are subjected to full-load test and rated load test in accordance with requirements of Paragraph 7422 and 7423 of ASME NOG-1-2004.

Assurance of implementation of the manufacturing examination, inspection and testing requirements is in accordance with Section 2000, ASME NOG-1.

V. Quality Assurance

The Manufacturer's Quality Assurance Program for Safety Related (S) structural parts of the SFCTM conforms to the quality assurance program requirements of 10 CFR 50 Appendix B.

The Manufacturer's Quality Assurance Program for Supplemented Grade (NS-AQ) structural parts of the SFCTM meets the requirements of the pertinent sections of 10 CFR 50 Appendix B.

A certified Quality Assurance Program meets the requirements of Section 2000, ASME NOG-1 for Type I cranes, which refers to ASME NQA-1.

VI. Documentation

The documentation applicable to procurement, design, manufacture, shipment, receipt, storage, installation, and startup of the SFCTM meet the requirements of Paragraph 7600, ASME NOG-1-2004.

Item b:

In accordance with the definition of a Type I crane, ASME NOG-1-2004, the Type I crane is designed and constructed so that it will remain in place and support the critical load during and after a seismic event, but it does not have to be operational after this event.

The SFCTM is designed in accordance with ASME NOG-1-2004 as a Type I crane trolley, as mentioned in Item (a) of this response. Some of the parts of the SFCTM are designed in accordance with guidance of ANSI N14.6-1993 and ASME BPVC Section III, Division 1, Subsection NF as mentioned in Item (a). The SFCTM is classified as Seismic Category I.

The safety-related function of the SFCTM is to serve as part of the CLP and spent fuel pool (SFP) fluid boundary structural support, when the cask is docked to the CLP penetration, in order to prevent draining the SFP during and following a design basis earthquake.

To satisfy the safety function of the SFCTM, only the structural members of the SFCTM in which the induced stress is directly affected by weight of the cask or weight of the penetration and the structural members that take part in maintaining leak-tight docking with the loading penetration

need to satisfy Seismic Category I criteria. Docking or undocking is not required during an SSE; however, to meet the safety function of the SFCTM, the docking device shall maintain docking during and following an SSE if it is already established at the time of an SSE. Also, the operation of an anti-seismic locking device drive mechanism which engages or dis-engages the pin is not required during an SSE. However, to meet the safety function of the SFCTM, the anti-seismic locking devices are required to maintain their status (locked/unlocked) during and after an SSE. To satisfy the safety function of the SFCTM during an SSE, operation of the drive mechanisms installed on the SFCTM is not required.

The results of the SFCTM seismic analysis demonstrate that the integrity of the SFCTM is not compromised and deflections of the trolley structural members are within limits specified by ASME NOG-1. From these results, it can be concluded that docking of the cask is maintained during and after an SSE. The results may show a brief unseating of the normally leak-tight connection at the mating surface of the cask during an SSE resulting in some seepage around the seals, but will not result in significant loss of water inventory from the CLP.

After collectively using seismic analysis results of the SFCTM and parts such as the penetration assembly, bellow, and fluid system isolations, it can be concluded that docking of the cask as well as the isolation provisions for the penetration, cask and seismically qualified fluid circuits connected to the cask are not affected during and after an SSE. This means that the SFCTM maintains its safety function during and after an SSE, and meets Seismic Category I criteria.

The following structural design and analysis requirements have been imposed in the design of the SFCTM and parts to meet the above-mentioned seismic criteria:

- Structural and seismic analysis of the SFCTM, along with all the parts, for operating conditions with the cask docked to the loading penetration, shall demonstrate that the fluid boundary between the loading penetration and connected cask is maintained and isolation provisions for the penetration, cask and seismically qualified fluid circuits connected to the cask are not affected during and after an SSE as well as after the postulated drop of a fuel assembly from the maximum handling height in the loading pit (LP) to preclude the loss of significant inventory in the SFP. The analysis and/or test shall also demonstrate that the features provided on the SFCTM for various manual operations remain functional after these events.
- Structural and seismic analysis of the SFCTM, along with all the parts and seismically qualified fluid circuits connected to the cask, for operating conditions with cask not docked to the penetration, shall demonstrate that the SFCTM maintains structural integrity, does not topple in the Fuel Building or allow load drop, and does not affect the cask isolation provisions and loading penetration isolation provisions during and after an SSE to avoid damage to the safety-related structures and fuel assemblies loaded in the cask, and to avoid cask draining.
- Structural and seismic analysis of the anti-seismic locking devices as individual parts shall demonstrate that they maintain their status (locked/unlocked) during and after an SSE as well as after the postulated drop of a fuel assembly from the maximum handling height in the CLP and retain their operability for manual operation after these events.
- Structural and seismic analysis of the elevator shall demonstrate that it avoids a drop of the lower cover during and after an SSE, as well as after the postulated drop of a fuel assembly from the maximum handling height in the CLP.

- Structural and seismic analysis of the supporting shell with the docking device as an individual component shall demonstrate that the fluid boundary between the penetration and connected cask is maintained during and after an SSE, as well as after the postulated drop of a fuel assembly from the maximum handling height in the CLP to preclude the loss of significant inventory in the SFP.

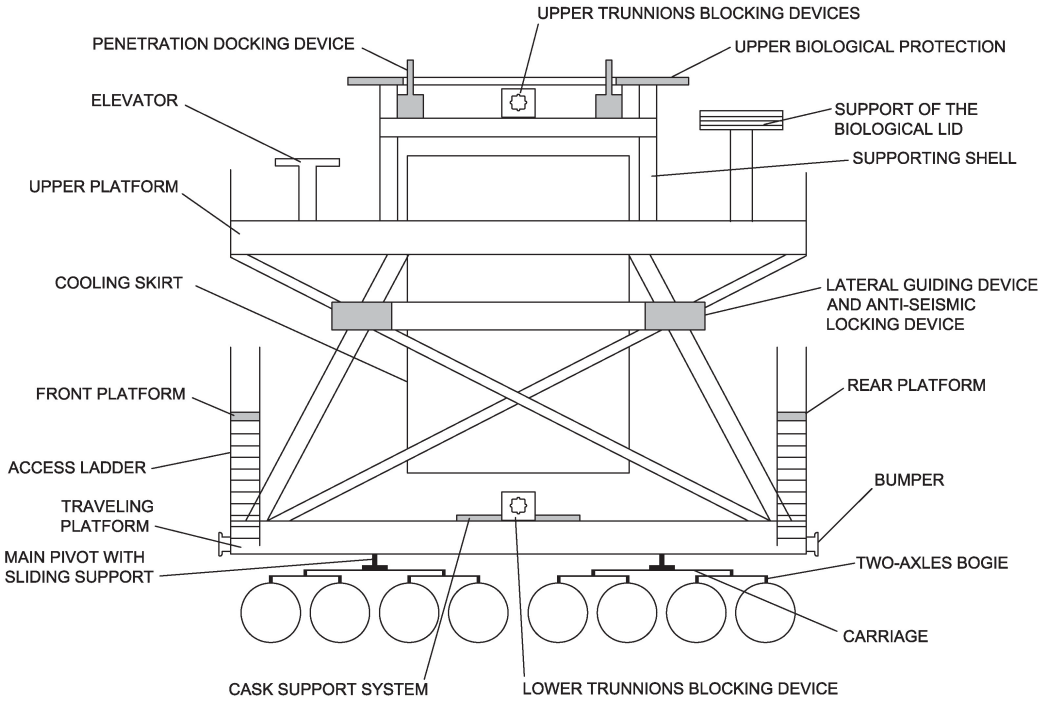
The specific loads and load combinations considered in the design and analysis including seismic analysis of the SFCTM and its parts are described in Item (a) of this response. The SFCTM and parts are procured components and the manufacturer will create Finite Element Models for use in the analyses.

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

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.2.2, will be revised; and a new Figure 9.1.4-13 added as described in the response and indicated on the enclosed markup.

Figure 09.01.04-30-1
Spent Fuel Cask Transfer Machine- Main Structural Assemblies



U.S. EPR Final Safety Analysis Report Markups

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

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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

Table 2.2.8-1—FHS Equipment Mechanical Design

Description	Tag Number(1)	Location	ASME Code Section III	Function	Seismic Category
New Fuel Elevator	FCD10	Fuel Building	N/A	N/A	II~~N/A~~
Spent Fuel Machine	FCD01	Fuel Building	N/A	N/A	II~~N/A~~
Fuel Transfer Tube - Tube and Blind Flange ~~(Fuel Transfer Tube Facility)~~	FCJ05	Fuel Building and Reactor Building	Yes, Class MC	Leak tightness	I
Fuel Transfer Tube - FB gate valve and expansion joints	FCJ05	Fuel Building and Reactor Building	Yes, Class 3	Leak tightness	I
~~Mechanism (~~Fuel Transfer Tube Facility (except FCJ05)	FCJ01	Fuel Building and Reactor Building	N/A	N/A	II~~N/A~~
Refueling Machine	FCB01	Reactor Building	N/A	N/A	II
Spent Fuel Cask Transfer Facility Penetration Assembly	FCJ12	Fuel Building	N/A	Leak tightness	I
New Fuel Storage Racks	FAA01	Fuel Building	N/A	Fuel storage	I
Spent Fuel Storage Racks	FAB02	Fuel Building	N/A	Fuel storage	I
Spent Fuel Cask Transfer Machine	FCJ10	Fuel Building	N/A	Prevent tipping or dropping of spent fuel cask	I
SFCTF isolation valves connected to the spent fuel cask and Penetration Assembly	FCJ15/16	Fuel Building	Yes, Class 3	Isolation	I

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1. Equipment tag numbers are provided for information only and are not part of the certified design.

To prevent damage to the penetration assembly seal, the SFCTM is interlocked to prevent moving within the loading hall. Unless the gripper of the biological lid handling station is in the upper position, the anti-seismic devices are unlocked, the penetration docking device is in the lower position, the penetration assembly is in the upper position (movements to and from the penetration station), and the handling area opening is closed (movements to and from the handling station).

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The main structural assemblies of the SFCTM are shown in Figure 9.1.4-13—Spent Fuel Cask Transfer Machine - Main Structural Assemblies. The SFCTM is designed in accordance with the applicable portions of ASME NOG-1-2004 (Reference 5) as a single failure-proof Type I crane trolley. The structural parts of the SFCTM which are considered similar to component supports, such as the supporting shell and supports for the upper biological protection plates, are designed per guidance of ASME BPVC Section III, Division 1, Subsection NF for Class 3 component supports (Reference 4). The parts of the SFCTM which are considered similar to special lifting devices, such as the structural parts of the docking device and the grapple and screw/nut system for the elevator, as well as the cask upper trunions blocking device, are designed per guidance of ANSI N14.6. The elevator vertical motorization for moving the screw is designed per guidance of ASME NOG-1, and it includes single failure-proof features to provide assurance that any credible failure of a single component would not result in the loss of capability to stop and hold the lower cover.

The SFCTM is shown in Figure 9.1.4-7—Spent Fuel Cask Transfer Facility.

Penetration Assembly

The penetration assembly provides a leaktight connection between the loading pit and the internal cavity of the cask, an upper cover at the bottom of the loading pit, and a lower cover at the lower end of the penetration. The penetration assembly consists of a supporting structure, internal and external shells, double walled bellows, a leak-tightness flange, and a docking flange.

The upper cover of the penetration is equipped with a mechanism to maneuver and set the cover on the supporting structure seals, and a hoist for operation of the maneuvering mechanism. The hoist is a stationary lifting device and is provided above the loading pit. With the upper cover in the closed position, it forms a leak-tight closure of the penetration assembly. In the open position, it allows the loading of fuel assemblies into a connected cask.

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

The gripper mast assembly is suspended via two cables with an equalizing system and break detector. A limit switch stops the lifting movement when the telescopic gripper mast reaches the upper end position. A load cell prevents hoisting operation in the event of overload.

The spent fuel machine travel is limited to avoid a fuel assembly contacting the SFP walls, the FB transfer pit walls, and the loading pit walls.

The limit switch prevents further lifting such that personnel exposure from an irradiated fuel assembly will not be >2.5 mrem/hour. The SFM is also provided with a dose rate measurement device and the lifting is stopped in case of exceeding the allowable dose rate limit.

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The SFM has provisions to manually move a fuel assembly in the event of an SFM malfunction or loss of power.

The SFM is provided with interlocks related to:

- Traveling or traversing.
- Lowering or lifting.
- Engaging or disengaging of the latches.
- Functioning of the FTTF, auxiliary crane, and NFE.
- Access to the fuel pool transfer pit.

New Fuel Elevator

The NFE hoisting mechanism is equipped with an operational brake, and a safety brake on the drum. The brakes are designed to be engaged when de-energized. The hoisting mechanism is provided with a cable equalizing system and a cable break detector. The movement is stopped if a cable break is detected. The hoisting mechanism is equipped with a load detection device and the movement is stopped in the event of a threshold overrun.

The NFE is designed to accommodate only one fuel assembly at a time and is provided with a radiation monitor that stops the NFE in the event of exceeding the radiation limits.

The NFE is provided with interlocks related to:

- Lowering or lifting.
- Functioning of the SFM.

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."

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The following 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.~~

Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 1 of 8

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)
CF 7	Interlock	[*Interlock of penetration upper cover with SFM and swivel gate*]*	Prevent the movement of the upper cover of the penetration, when the SFM is in the loading pit and the swivel gate is open.	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 upper cover*]*	Prevent the movement of the SFM when the upper cover of the penetration is closed or partially opened.	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'.
CF 12	Interlock	[*Interlock of anti-seismic locking devices when SFCTM is at penetration station*]*	Prevent spurious movement of the SFCTM during loading operations.	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'.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 2 of 8

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)
CF 15	Interlock	Interlock of penetration until upper cover is closed water level in cask is within required range	Prevent undocking of the cask when the penetration upper cover is open and the water level in the cask is outside the required range.	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 senor trips on 'high' or 'low' and position switches trip on 'open'.	Alarm off on SFCTF HSI display (operator acknowledgement required) when the level senor trips on not 'high' or not 'low' and position switches trip on not 'open'.
CF 16	Interlock	Interlock of penetration until cask is correctly docked and monitoring the force on the seals of penetration	Ensure 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.	PLC and HSI display Limit switches Position switches Pressure sensor Relay Torque switches	• 'Close' valve AA013 (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'.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 3 of 8

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)
CF 26	Interlock	[*Interlock of SFCTM with loading hall door*]*	Prevent movement of the SFCTM when the loading hall door is open.	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'.
CF 2	Emergency Stop	Emergency stop in loading hall	After detecting an emergency stop push-button actuation, the SFCTM is stopped and the fluid circuit isolation valves are closed.	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.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 4 of 8

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 SFCTF control room	After detecting an emergency stop push-button actuation, the SFCTM and the upper cover hoist are stopped, the anti-seismic locking devices are locked, and fluid circuit isolation valves are closed.	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 • '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.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 5 of 8

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 upper cover penetration hoist	After detecting an emergency stop push-button actuation, the motor and brakes of the upper cover hoist are switched off.	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 hoist	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	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'.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 6 of 8

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	Prevent fuel assembly overheating, water contamination in the Fuel Building, and increased dose rate.	PLC and HSI display Moisture 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 moisture sensor trips on not 'high'.
CF 19	Operational	Check position of biological protections and service elevator before travel of SFCTM from handling opening station to lid handling station	Prevent water contamination in the Fuel Building.	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 display when SFCTM position switch trips on 'open', biological protection 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 position switches trip on not 'open', high-speed limit switch trips on 'off', and the service elevator position switch trips on not 'low'.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 7 of 8

Control Function	Control Type	Description	Function	I&C Components	Mechanical/ Electrical Actuations	Alarms (Initiation)	Alarms (Means of Clearance)
CF 21	Operational	Check position of service elevator, lower plate, docking screws, biological protections and penetration before travel of SFCTM from lid handling station to penetration station	Prevent water contamination in the Fuel Building and increased dose rates.	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 display when the SFCTM and lower plate limit switches trip on 'on', screw torque switches trip on 'low', biological protection 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', biological protection limit switches trip on not 'close', service elevator position switch trips on 'high', and high-speed limit switch trips on 'off'.

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Table 9.1.4-2—SFCTF Non-Safety Related Interlocks and Emergency Stops
Sheet 8 of 8

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	After detecting an earthquake, the SFCTM and the upper cover hoist are stopped, the anti-seismic locking devices are locked, and fluid circuit isolation valves are closed.	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 • 'Close' the fluid circuit isolation valves	Automatic – Alarm on SFCTF HSI display when the accelerometers' limit switches trip on 'high'.	Alarm off on SFCTF HSI display (operator acknowledgement required) and hardwired panel light when operator clears the alarm.

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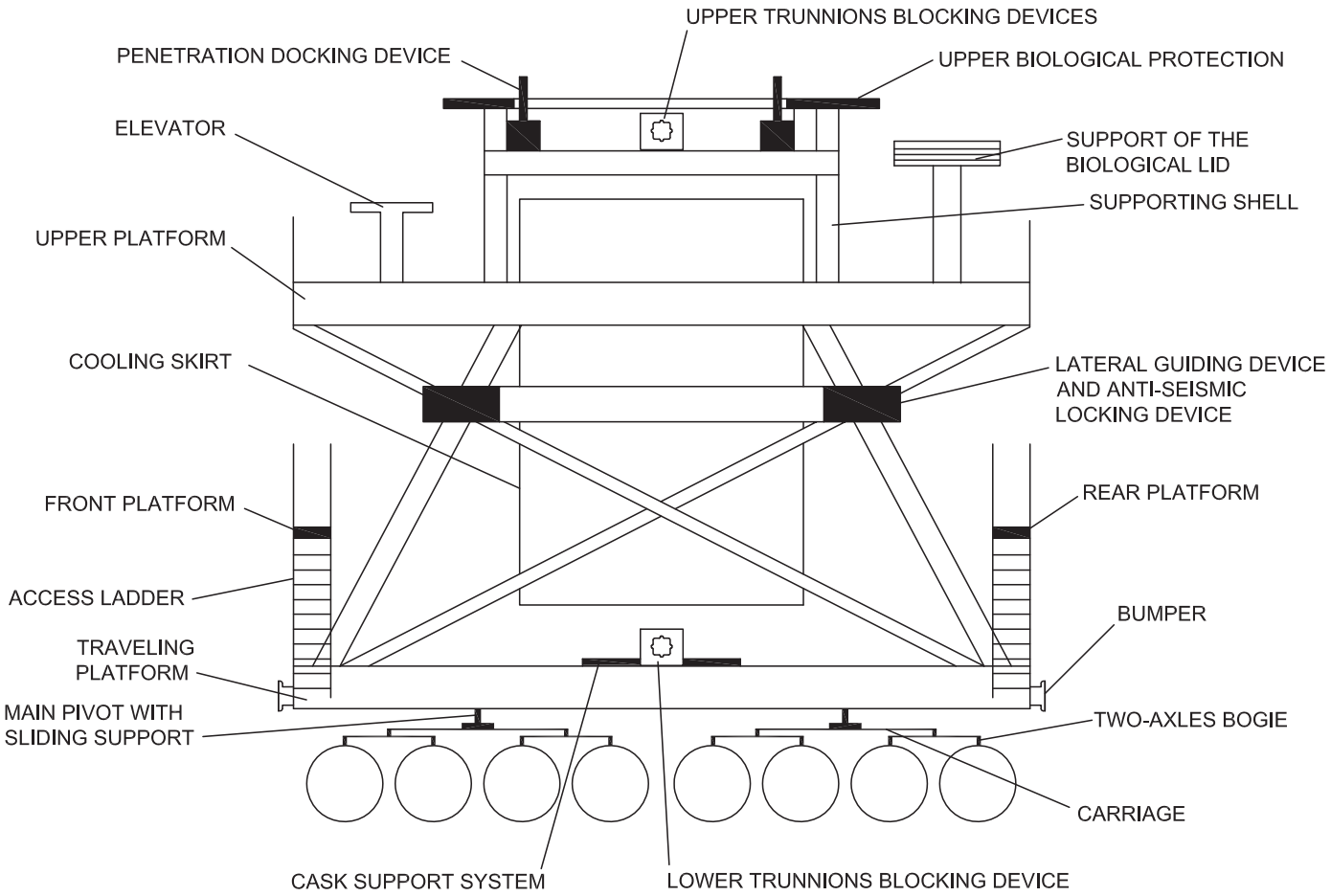
Figure 9.1.4-13—Spent Fuel Cask Transfer Machine - Main Structural Assemblies



equipment hatch level. These cranes are located in areas remote from the spent fuel pool such that movement of loads in the vicinity of the spent fuel pool by these cranes is not possible.

The Fuel Building also contains lifting devices that are used in conjunction with movement of the spent fuel casks in the spent fuel cask transfer facility (SFCTF). These are designated the cask loading penetration upper cover hoist and the biological lid handling station. The cask loading penetration upper cover hoist is located on the spent fuel pool operating floor. The biological lid handling station is located adjacent to the cask loading pit. The biological lid handling station's functions are to remove the cask lid to allow loading the spent fuel into the cask and then return the lid onto the loaded cask. The cask loading penetration upper cover hoist assists in opening the penetration upper cover to allow loading spent fuel into the cask and closing the penetration upper cover once the cask has been loaded. Additional details regarding the design, function and operation of the SFCTF are given in Section 9.1.4. These lifting devices are not conventional cranes, but components of these devices are designed per the guidance of ASME NOG-1 for Type I cranes and ANSI N14.6 (Reference 9).

These lifting devices also meet the recommended guidance specified in Section 5.0 of NUREG-0612 and SRP 9.1.5 for the handling of heavy loads. Since these lifting devices are stationary units, the safe load path is defined as the area directly below the device. Since these lifting devices do not require the use of special below the hook lifting devices, the criteria of ANSI N14.6 and ASME 30.9, for below the hook lifting devices, do not apply. Design of these devices, in accordance with ASME NOG-1, ensures that the criteria specified in CMAA-70 and ASME B30.2 is satisfied.

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The spent fuel cask transfer machine (SFCTM) is used for moving fuel casks into and out of the Fuel Building. A description of the SFCTM and its operation is given in Section 9.1.4.

While not a conventional crane supporting a suspended load, the SFCTM is designed using the same design requirements of ASME NOG-1 for Type I equipment. Since the equipment is designed as single failure proof, the equipment will maintain the supported loads in a safe configuration during design basis events. Provisions are also in place to allow placement of the loads in a safe configuration following a design basis event. The equipment is designed with manual backup capabilities.

In addition to the design of the equipment, the requirements specified by NUREG 0612 pertaining to the establishment of safe load paths, procedures for load handling operations, training and qualification of operators, inspection, testing and maintenance of the equipment, are also incorporated into the design and operation of the SFCTM.