ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Wednesday, December 09, 2009 3:34 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); DUNCAN Leslie E (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 7
Attachments: RAI 131 Supplement 7 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No. 131 on January 14, 2009. AREVA NP submitted Supplement 1 to the response on February 19, 2009 to address 1 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on March 20, 2009 to address 5 of the remaining 15 questions. AREVA NP submitted Supplement 3 to the response on March 31, 2009 to address 3 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on May 12, 2009 to address 5 of the remaining 7 questions. AREVA NP submitted Supplement 5 to the response on June 25, 2009 to address 1 of the remaining 2 questions. Supplement 6 revised the schedule for response to the remaining question. The attached file, "RAI 131 Supplement 7 Response US EPR DC.pdf" provides a technically correct and complete response to the remaining question.

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 131 Question 09.01.04-9.

The following table indicates the respective page in the response document, "RAI 131 Supplement 7 Response US EPR DC.pdf," that contains AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 131 — 9.01.04-9	2	2

This concludes the formal AREVA NP response to RAI 131, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

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

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, November 20, 2009 7:03 PM
To: 'Tesfaye, Getachew'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) is unable to provide a response to the remaining question at this time. As discussed with the NRC staff, several fuel rack related RAIs are being deferred due to the time required to process the required FSAR changes in Chapter 9 to include the new and spent fuel rack designs.

The revised schedule for a technically correct and complete response to the remaining question is provided below:

Question #	Response Date
RAI 131 —9.01.04-9	December 9, 2009

Sincerely,

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

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Thursday, June 25, 2009 4:28 PM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No. 131 on January 14, 2009. AREVA NP submitted Supplement 1 to the response on February 19, 2009 to address 1 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on March 20, 2009 to address 5 of the remaining 15 questions. AREVA NP submitted Supplement 3 to the response on March 31, 2009 to address 3 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on May 12, 2009 to address 5 of the remaining 7 questions. The attached file, "RAI 131 Supplement 5 Response US EPR DC.pdf" provides technically correct and complete responses to one of the remaining 2 questions.

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 131 Question 09.01.04-7.

The following table indicates the respective pages in the response document, "RAI 131 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 131 —9.01.04-7	2	3

RAI 131 —9.01.04-9	4	4

AREVA NP is unable to respond to one question at this time. The schedule for a technically correct and complete response to the remaining question is revised and provided below:

Question #	Response Date
RAI 131 —9.01.04-9	November 20, 2009

Sincerely,

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

From: WELLS Russell D (AREVA NP INC)
Sent: Tuesday, May 12, 2009 3:22 PM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No. 131 on January 14, 2009. AREVA NP submitted Supplement 1 to the response on February 19, 2009 to address 1 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on March 20, 2009 to address 5 of the remaining 15 questions. AREVA NP submitted Supplement 3 to the response on March 31, 2009 to address 3 of the remaining 10 questions. The attached file, "RAI 131 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to 5 of the remaining 7 questions, as committed.

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 131 Questions 09.01.04-3, 09.01.04-5, 09.01.04-6, 09.01.04-11 and 09.01.04-13.

The following table indicates the respective pages in the response document, "RAI 131 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 131 —9.01.04-3	2	5
RAI 131 —9.01.04-5	6	7
RAI 131 —9.01.04-6	8	8
RAI 131 —9.01.04-11	9	9
RAI 131 —9.01.04-13	10	10

The schedule for technically correct and complete responses to the remaining 2 questions is unchanged and provided below:

Question #	Response Date

RAI 131 —9.01.04-7	June 25, 2009
RAI 131 —9.01.04-9	June 25, 2009

Sincerely,

(Russ Wells on behalf of)

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

From: Pederson Ronda M (AREVA NP INC)
Sent: Tuesday, March 31, 2009 8:07 PM
To: Getachew Tesfaye
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No. 131 on January 14, 2009. AREVA NP submitted Supplement 1 to the response on February 19, 2009 to address 1 of the remaining 16 questions. AREVA NP submitted Supplement 2 to the response on March 20, 2009 to address 5 of the remaining 15 questions. The attached file, "RAI 131 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 3 of the remaining 10 questions.

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 131 Questions 09.01.04-1, 09.01.04-4, and 09.01.04-8.

The following table indicates the respective pages in the response document, "RAI 131 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 131 — 9.01.04-1	2	2
RAI 131 — 9.01.04-4	3	4
RAI 131 — 9.01.04-8	5	5

The schedule for technically correct and complete responses to the remaining 7 questions is unchanged and provided below:

Question #	Response Date
RAI 131 — 9.01.04-3	May 13, 2009
RAI 131 — 9.01.04-5	May 13, 2009

RAI 131 — 9.01.04-6	May 13, 2009
RAI 131 — 9.01.04-7	June 25, 2009
RAI 131 — 9.01.04-9	June 25, 2009
RAI 131 — 9.01.04-11	May 13, 2009
RAI 131 — 9.01.04-13	May 13, 2009

Sincerely,

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

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, March 20, 2009 6:02 PM
To: 'Getachew Tesfaye'
Cc: WILLIFORD Dennis C (AREVA NP INC); HARRIS Carolyn A (AREVA NP INC); DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No. 131 on January 14, 2009. AREVA NP submitted Supplement 1 to the response on February 19, 2009 to address 1 of the remaining 16 questions. The attached file, "RAI 131 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to 5 of the remaining 15 questions. Since responses to 10 of the questions cannot be provided at this time, a revised schedule is provided in this email.

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 131 Questions 09.05.06-1, 09.05.06-2, 09.05.06-5, 09.05.06-7 and 09.05.06-8.

The following table indicates the respective page(s) in the response document, "RAI 131 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the 5 of the 15 questions.

Question #	Start Page	End Page
RAI 131 — 9.05.06-1	2	2
RAI 131 — 9.05.06-2	3	4
RAI 131 — 9.05.06-5	5	5
RAI 131 — 9.05.06-7	6	7

RAI 131 — 9.05.06-8	8	8

The schedule for technically correct and complete responses to the remaining 10 questions has been changed as provided below:

Question #	Response Date
RAI 131 — 9.01.04-1	March 31, 2009
RAI 131 — 9.01.04-3	May 13, 2009
RAI 131 — 9.01.04-4	March 31, 2009
RAI 131 — 9.01.04-5	May 13, 2009
RAI 131 — 9.01.04-6	May 13, 2009
RAI 131 — 9.01.04-7	June 25, 2009
RAI 131 — 9.01.04-8	March 31, 2009
RAI 131 — 9.01.04-9	June 25, 2009
RAI 131 — 9.01.04-11	May 13, 2009
RAI 131 — 9.01.04-13	May 13, 2009

Sincerely,

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

From: Pederson Ronda M (AREVA NP INC)
Sent: Thursday, February 19, 2009 6:53 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 5 of the 21 questions of RAI No.131 on January 14, 2009. The attached file, "RAI 131 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete response to 1 of the remaining 16 questions, as committed.

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 131 Question 09.02.01-25.

The following table indicates the respective pages in the response document, "RAI 131 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 131 — 9.02.01-25	2	3

The schedule for technically correct and complete responses to the remaining 15 questions is unchanged and provided below:

Question #	Response Date
RAI 131 — 9.01.04-1	March 20, 2009
RAI 131 — 9.01.04-3	March 20, 2009
RAI 131 — 9.01.04-4	March 20, 2009
RAI 131 — 9.01.04-5	March 20, 2009
RAI 131 — 9.01.04-6	March 20, 2009
RAI 131 — 9.01.04-7	March 20, 2009
RAI 131 — 9.01.04-8	March 20, 2009
RAI 131 — 9.01.04-9	March 20, 2009
RAI 131 — 9.01.04-11	March 20, 2009
RAI 131 — 9.01.04-13	March 20, 2009
RAI 131 — 9.05.06-1	March 20, 2009
RAI 131 — 9.05.06-2	March 20, 2009
RAI 131 — 9.05.06-5	March 20, 2009
RAI 131 — 9.05.06-7	March 20, 2009
RAI 131 — 9.05.06-8	March 20, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
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3315 Old Forest Road
Lynchburg, VA 24506-0935
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From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, January 14, 2009 2:48 PM
To: 'Getachew Tesfaye'
Cc: WILLIFORD Dennis C (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 131(1537,1510,1560), FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 131 Response US EPR DC.pdf" provides technically correct and complete responses to 5 of the 21 questions.

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 131, Questions 9.01.04-2, 9.01.04-12, 9.05.06-3, and 9.05.06-6.

The following table indicates the respective page(s) in the response document, "RAI 131 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 131 — 9.01.04-1	2	2
RAI 131 — 9.01.04-2	3	3
RAI 131 — 9.01.04-3	4	4
RAI 131 — 9.01.04-4	5	5
RAI 131 — 9.01.04-5	6	6
RAI 131 — 9.01.04-6	7	7
RAI 131 — 9.01.04-7	8	8
RAI 131 — 9.01.04-8	9	9
RAI 131 — 9.01.04-9	10	10
RAI 131 — 9.01.04-11	11	11
RAI 131 — 9.01.04-12	12	12
RAI 131 — 9.01.04-13	13	13
RAI 131 — 9.02.01-25	14	14
RAI 131 — 9.05.06-1	15	15
RAI 131 — 9.05.06-2	16	16
RAI 131 — 9.05.06-3	17	17
RAI 131 — 9.05.06-4	18	18
RAI 131 — 9.05.06-5	19	19
RAI 131 — 9.05.06-6	20	20
RAI 131 — 9.05.06-7	21	21
RAI 131 — 9.05.06-8	22	22

A complete answer is not provided for 16 of the 21 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 131 — 9.01.04-1	March 20, 2009
RAI 131 — 9.01.04-3	March 20, 2009
RAI 131 — 9.01.04-4	March 20, 2009
RAI 131 — 9.01.04-5	March 20, 2009
RAI 131 — 9.01.04-6	March 20, 2009
RAI 131 — 9.01.04-7	March 20, 2009
RAI 131 — 9.01.04-8	March 20, 2009
RAI 131 — 9.01.04-9	March 20, 2009
RAI 131 — 9.01.04-11	March 20, 2009
RAI 131 — 9.01.04-13	March 20, 2009
RAI 131 — 9.02.01-25	February 27, 2009
RAI 131 — 9.05.06-1	March 20, 2009
RAI 131 — 9.05.06-2	March 20, 2009
RAI 131 — 9.05.06-5	March 20, 2009

RAI 131 — 9.05.06-7	March 20, 2009
RAI 131 — 9.05.06-8	March 20, 2009

Sincerely,

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

From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, December 02, 2008 3:01 PM
To: ZZ-DL-A-USEPR-DL
Cc: Larry Wheeler; Gerard Purciarello; Stephen Campbell; John Segala; Peter Hearn; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 131(1537,1510,1560), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 29, 2008, and discussed with your staff on November 19, 2008. Draft RAI Question 09.01.04-10 was deleted as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs, excluding the time period of **December 20, 2008 thru January 1, 2009, to account for the holiday season** as discussed with AREVA NP Inc. For any RAIs that cannot be answered **within 45 days**, it is expected that a date for receipt of this information will be provided to the staff within the 45-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: 1019

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D3101767EFF)

Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 7
Sent Date: 12/9/2009 3:34:29 PM
Received Date: 12/9/2009 3:34:33 PM
From: Pederson Ronda M (AREVA NP INC)

Created By: Ronda.Pederson@areva.com

Recipients:
"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>
Tracking Status: None
"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>
Tracking Status: None
"DUNCAN Leslie E (AREVA NP INC)" <Leslie.Duncan@areva.com>
Tracking Status: None
"WILLIFORD Dennis C (AREVA NP INC)" <Dennis.Williford@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	18117	12/9/2009 3:34:33 PM
RAI 131 Supplement 7 Response US EPR DC.pdf	107985	

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

Response to

Request for Additional Information No. 131, Supplement 7

12/2/2008

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)
SRP Section: 09.02.01 - Station Service Water System
SRP Section: 09.05.06 - Emergency Diesel Engine Starting System
Application Section: FSAR Ch. 9

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

Question 09.01.04-9:

General Design Criteria (GDC) 62 required provisions to prevent criticality in spent fuel storage. The reactor cavity, the core internal storage compartment, and the reactor building pool transfer compartment are flooded with borated water during refueling operations so that spent fuel assemblies are handled with shielding and criticality prevention. The applicant states in FSAR Tier 2, Section 9.1.4.2.1 that "The boric acid concentration in the water is sufficient to preclude criticality." The applicant has stated in FSAR Tier 2, Section 9.1.4.2.1 under "Spent Fuel Storage and Activities During Plant Normal Operation," that a step in the procedure is "Verification of SFP boron concentration to maintain subcriticality of the fuel assemblies." The applicant has stated in FSAR Tier 2 Section 9.1.4.3 that the fuel handling systems is designed to maintain geometrically safe configurations in the fuel storage areas to prevent inadvertent criticality and that for defense in depth, additional margin to prevent criticality is provided by the borated water. These sections of the FSAR provide conflicting statements with respect to the need for borated water to prevent criticality. Explain if borated water is required to prevent criticality during refueling operations or is provided only for defense in depth and to make the FSAR consistent.

Response to Question 09.01.04-9:

Soluble boron is required in the spent fuel pool during refueling operations to prevent criticality, as addressed in the Response to RAI 84, Supplement 5, Question 09.01.02-17. The following statements in U.S. EPR FSAR Tier 2, Section 9.1.4.3 will be deleted: "The FHS is designed to prevent inadvertent criticality through the use of geometrically safe configurations in the fuel storage areas. Additional margin to sub criticality for defense in depth during storage of spent fuel is provided by boric acid in the fuel pool water."

FSAR Impact:

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

U.S. EPR Final Safety Analysis Report Markups

speed. Details regarding the specific assumptions, sequences, and analyses of fuel handling accidents are provided in Section 15.0.3.10.

- ~~The Spent fuel Cask Transfer Facility satisfies the single failure proof criteria for safety functions.~~

09.01.04-9 ~~The FHS is designed to prevent inadvertent criticality through the use of geometrically safe configurations in the fuel storage areas. Additional margin to sub-criticality for defense-in-depth during storage of spent fuel is provided by boric acid in the fuel pool water.~~ Details regarding criticality prevention measures for new and spent fuel storage are provided in Section 9.1.1.

The FHS is designed and arranged so that there are no loads which, if dropped, could result in damage leading to the release of radioactivity in excess of 10 CFR 100 guidelines, or impair the capability to safely shut down the plant. All spent fuel cask handling activities are performed below the SFP in the loading hall located at the ground elevation of the FB. Any lifting of a spent fuel cask is performed outside of the FB using appropriate handling equipment and lifting height limitations. At all times during ~~onsite spent fuel cask handling~~spent fuel cask handling inside the FB, the cask height will not exceed 30 feet based on the design of the FB. The cask drop accident is addressed in Section 15.0.3.10. Details regarding new and spent fuel storage are provided in Section 9.1.1 and Section 9.1.2. Details regarding the specific assumptions, sequences, and analyses of fuel handling accidents are provided in Section 15.0.3.10.

9.1.4.3.1 Safety Provisions for the Major Fuel Handling System Components

Refueling Machine

The refueling machine (RM) hoisting mechanism is equipped with an operational brake, an auxiliary brake, and a safety brake which acts on the drum in case of overspeed detection, chain failure, or reverse rotation. The brakes are designed to engage when de-energized. They engage in case of a malfunction of the loop drive train configuration.

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 its upper end position. A load cell measures the weight of the suspended load and control circuits associated with the load cell allow for the brake actuation.

A load limiting device protects the fuel assembly during normal lifting movements in the core when contact occurs between two fuel assemblies. It limits the loads applied to the grids of the fuel assemblies and to the nozzles of the fuel assemblies.

During normal operation, the refueling machine can only travel within a defined "travel route", thereby avoiding the possibility of inadvertent contacts. This route is determined by encoders and limit switches.