ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
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
Attachments: RAI 131 Supplement 4 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. 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

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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
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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

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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,

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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,

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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: 475

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD410176B31F)

Subject: Response to U.S. EPR Design Certification Application RAI No. 131, FSAR Ch 9, Supplement 4
Sent Date: 5/12/2009 3:21:49 PM
Received Date: 5/12/2009 3:21:55 PM
From: WELLS Russell D (AREVA NP INC)

Created By: Russell.Wells@areva.com

Recipients:
"Pederson Ronda M (AREVA NP INC)" <Ronda.Pederson@areva.com>
Tracking Status: None
"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
"Getachew Tesfaye" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	12785	5/12/2009 3:21:55 PM
RAI 131 Supplement 4 Response US EPR DC.pdf	210916	

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

Response to

Request for Additional Information No. 131, Supplement 4

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 09.01.04-3:

Acceptance criteria for meeting the relevant requirements of GDC 61 and GDC 62 are based on meeting the guidelines of American National Standards Institute/American Nuclear Society (ANSI/ANS)-57.1-1992; R1998; R2005 (R=Reaffirmed), "Design Requirements for Light Water Reactor Fuel Handling Systems." Table 1 in ANSI/ANS-57.1 provides interlock protection requirements for each component of the Fuel Handling System (FHS).

The staff finds that the description of the interlocks in the application do not account for all the interlocks specified in Table 1 of ANSI/ANS 57.1. Therefore, the applicant needs to describe in the FSAR how each required interlock specified in Table 1 of ANSI/ANS 57.1 is applied for each of the FHS components listed in Table 1. Provide FSAR markup showing the above requested information.

Response to Question 09.01.04-3:

U.S. EPR FSAR Tier 2, Section 9.1.4.2.2 states that the fuel handling system (FHS) is designed in accordance with ANS 57.1, ANS 57.2, and ANS 57.3. Specifically, with regard to the FHS interlocks, the following statements in U.S. EPR FSAR Tier 2, Section 9.1.4.5 provide a commitment that the interlocks listed in Table 1 of ANS 57.1 will be provided:

> "In general, mechanical or electrical interlocks are provided, when required, to provide reasonable assurance of the proper and safe operation of the fuel handling equipment. The intent is to prevent a situation which could endanger the operator or damage the fuel assemblies and control components. The interlocks, setpoints, rules for handling fuel assemblies, and other devices that restrict undesired or uncontrolled movement are incorporated in the design. . . As a minimum, the interlocks specified in Table 1 of Reference 1 (ANS 57.1) will be provided."

In addition, the safety provisions for the major FHS components in U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 include a summary of interlocks for the refueling machine (RM), Fuel Transfer Tube Facility (FTTF), spent fuel machine (SFM), and new fuel elevator (NFE). However, the statement in U.S. EPR FSAR Tier 2, Section 9.1.4.5 indicates that the U.S. EPR FHS design will provide, at a minimum, the interlocks listed in Table 1 of ANS 57.1. The correlation of U.S. EPR FSAR information on the interlocks to the relevant interlocks in Table 1 of ANS 57.1 is shown in this RAI response with more detailed information on the interlocks.

Refueling Machine

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 states:

> **"**The RM is provided with interlocks related to:
>
> - Traveling or traversing.
> - Lowering or lifting.
> - Engaging or disengaging of the latches.
> - Simultaneous horizontal movement.
> - Travel from one compartment of the pool to another.

- Preventing interference with the FTTF."

The interlocks related to "traveling or traversing" refer to the interlocks for Bridge Travel, Trolley Travel, End-Travel (hard stop), Non-simultaneous Motion, and Translation Inhibit in Table 1 of ANS 57.1.

The interlocks related to "lowering or lifting" refer to the interlocks for Up-Position, Down-Position, Up-Limit, Slow Zone, Overload, Underload, Slack Cable, and Non-simultaneous Motion in Table 1 of ANS 57.1.

The interlocks related to "engaging or disengaging of the latches" refer to the interlocks for Grapple Release in Table 1 of ANS 57.1.

The interlock related to "simultaneous horizontal movement" will be deleted from the U.S. EPR FSAR because predefined simultaneous horizontal movements of bridge and trolley are allowed.

The interlock related to "travel from one compartment of the pool to another" refers to the interlocks with the dams (gates) in the refueling cavity. The RM is interlocked with the dams to avoid a hitting risk between the RM and the dams.

The interlock related to "preventing interference with the FTTF" refers to the interlocks for preventing interference between the RM, its load, and the FTTF.

The interlocks for Bridge Travel and Trolley Travel, Overload and Underload listed in Table 1 of ANS 57.1 are described in the existing text for the Refueling Machine in U.S. EPR FSAR Tier 2, Section 9.1.4.3.1:

> Bridge Travel and Trolley Travel - "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."
>
> Underload and Overload - "A load cell measures the weight of the suspended load and control circuits associated with the load cell allow for the brake actuation."

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised to include the following safety provision for the RM:

> "The RM is provided with a dose rate measurement device, and lifting is stopped in case of exceeding the allowable dose rate limit."

Fuel Transfer Tube Facility

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 states:

> "In addition to limit switches, the fuel transfer tube facility is provided with the following interlocks related to:
>
> - Automatic movement of the FTTF conveyor car.
> - Horizontal movement of the FTTF conveyor car.

- Tilting of the fuel container."

The interlock related to automatic movement of the FTTF conveyor car will be deleted from the U.S. EPR FSAR because it is included with the interlocks related to "horizontal movement of the FTTF conveyor car."

The interlocks related to the "horizontal movement of the FTTF conveyor car" refer to the interlock restricting the travel of the FTTF conveyor car when the fuel transfer tube isolation valve is closed, and to the interlock providing the FTTF conveyor car End-Travel (hard stop) listed in Table 1 of ANS 57.1. It also refers to the provision for limiting the horizontal drive force.

The interlocks related to the "tilting of the fuel container" refer to the interlocks for upenders - Up-Position, Down-Position, Over-Load, End-Travel (hard stop), and Slack Cable in Table 1 of ANS 57.1. The interlocks related to the "tilting of the fuel container" also include the interlocks which prevent interference of the FTTF with the RM and its load in the Reactor Building (RB) and with the SFM and its load in the Fuel Building (FB).

The interlocks for upenders - Overload and Slack Cable in Table 1 of ANS 57.1 are described in the existing text for the FTTF in U.S. EPR FSAR Tier 2, Section 9.1.4.3.1:

> "A load cell is also provided, which prevents operation in the event of overloading or in case of a slack cable".

Spent Fuel Machine

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 states:

> "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 Spent Fuel Cask Transfer Facility."

The interlocks related to "traveling or traversing" refer to the interlocks for Bridge Travel, Trolley Travel, End-Travel (hard stop), Non-simultaneous Motion, and Translation Inhibit in Table 1 of ANS 57.1.

The interlocks related to "lowering or lifting" refer to the interlocks for Up-Position, Down-Position, Up-Limit, Slow Zone, Overload, Underload, Slack Cable, and Non-simultaneous Motion in Table 1 of ANS 57.1.

The interlocks related to "engaging or disengaging of the latches" refer to the interlocks for Grapple Release in Table 1 of ANS 57.1.

The interlocks related to "functioning of the FTTF….." refer to the interlocks provided for preventing interference between the SFM, its load, and the FTTF. The interlocks related to "functioning of the . . . Auxiliary Crane" refer to the interlocks provided for preventing interference between the SFM and Auxiliary Crane.

The interlocks for the "Bridge Travel and Trolley Travel, and Overload" listed in Table 1 of ANS 57.1 are described in the existing text for the SFM in U.S. EPR FSAR Tier 2, Section 9.1.4.3.1:

> Bridge Travel and Trolley Travel - "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."
>
> Overload - "A load cell prevents hoisting operation in the event of overload."

The SFM interlock related to functioning of the Spent Fuel Cask Transfer Facility will be deleted from U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 because cask loading operations are not within the scope of the Design Certification, as described in the Response to Question 09.01.04-5. An SFM interlock related to "access to the fuel pool transfer pit" will be added to U.S. EPR FSAR, Tier 2 Section 9.1.4.3.1. The SFM is interlocked with the fuel pool transfer pit gates to avoid a hitting risk between the SFM and the gates.

The interlock related to "Slow Zone" for the RM and SFM listed in Table 1 of ANS 57.1 is described in the existing text in U.S. EPR FSAR Tier 2, Section 9.1.4.3:

> "Movement of fuel assemblies that could result in assembly grid contact or contact with other fuel assemblies takes place at low speed."

New Fuel Elevator

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 states:

> "The NFE is provided with interlocks related to:
>
> - Lowering or lifting.
> - Functioning of the SFM."

The interlocks related to "lowering or lifting" refer to the interlocks for Up-Position, Down-Position, Up-Limit, Overload, and Slack Cable in Table 1 of ANS 57.1.

The interlocks related to "functioning of the SFM" refer to the interlocks provided for preventing interference between the SFM, its load, and the NFE.

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 09.01.04-5:

Guidelines specified in SRP Section 9.1.4, "Light Load Handling System Related to Refueling," Revision 3, state that the objective of the review is to confirm that the LLHS design precludes system malfunctions or failures that could cause criticality accidents, a release of radioactivity, or excessive personnel radiation exposures.

The applicant stated that the spent fuel cask transfer facility has safety related components and safety related functions and that single failure criterion are applied to the components of the facility performing safety functions. The applicant did not specify and describe safety related components and functions of the spent fuel cask transfer facility, thus the staff can not evaluate the spent fuel cask transfer facility.

In order to complete our review the staff requires the following information:

a. Identify the safety related components and the non safety related components of the spent fuel cask transfer facility,

b. Describe the safety function of each safety related component,

c. Explain the compliance to the single failure criterion,

d. Describe the emergency cooling and the need for emergency cooling of the spent fuel casks,

e. Explain the function of the internal and external interlocks and including the prevention of unsafe operation by the interlocks.

This information should be in the FSAR.

Response to Question 09.01.04-5:

a. Cask handling operations will be covered under a 10 CFR Part 72 license application once a cask design is selected. Within the scope of design certification, the cask loading pit penetration assembly (part of the spent fuel cask transfer facility), including the penetration cover, is a safety-related component. The U.S. EPR FSAR will be revised accordingly, including deletion of Tier 2, Figure 9.1.4-7 that showed a simplified sketch of the spent fuel cask transfer facility .

b. The loading pit penetration assembly maintains leak-tightness during fuel loading into the cask, thereby maintaining fuel integrity. The penetration cover maintains the water inventory in the loading pit when the cover is closed.

c. The penetration cover is held in position and is maintained closed under administrative control. The penetration cover is designed to maintain leak-tightness in the event of a single failure. Cask handling operations requiring the opening of the penetration cover will be addressed under a 10 CFR Part 72 license application.

d. Refer to Part a.

e. Refer to Part a.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.2.8 and Table 2.2.8-1, and Tier 2, Section 9.1.4, Section 14.2.12.3.16, and Figure 9.1.4-7 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-6:

In FSAR Tier 2, Section 9.1.4.1, “Design Basis,” the applicant states that the spent fuel cask transfer facility is Seismic Category I and safety related. However, FSAR Tier 2 Table 3.2.2-1 “Classification Summary,” lists neither the spent fuel cask transfer facility nor its components. Table 3.2.2-1 needs to be revised to include these components.

Response to Question 09.01.04-6:

The spent fuel cask transfer facility penetration and cover are safety-related, Seismic Category I components and will be added to U.S. EPR FSAR Tier 2, Table 3.2.2-1. Refer to the Response to Question 09.01.04-5.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 3.2.2-1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-11:

10 CFR 52.47(b) (1), which requires that a design certification (DC) application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC regulations.

Safety related functions should be described in the FSAR Tier 1, Section 2.2.8,"Fuel Handling System" and Table 2.2.8-2, " FHS Inspections, Test, and Analysis and Acceptance Criteria." (ITAAC).

Justify the exclusion of ITAAC for the safety related systems, structures, and components and safety related functions, that include the fuel tube transfer facility (FTTF) and the spent fuel transfer facility.

Response to Question 09.01.04-11:

The safety-related functions of the fuel handling system are listed in U.S. EPR FSAR Tier 1, Section 2.2.8. The fuel transfer tube provides a containment isolation function, as listed in U.S. EPR FSAR Tier 1, Section 2.2.8. The spent fuel cask transfer facility penetration and cover maintain water inventory to facilitate cooling of irradiated fuel assemblies, which is also listed in U.S. EPR FSAR Tier 1, Section 2.2.8.

The fuel transfer tube (equipment tag number FCJ05) is included in U.S. EPR FSAR Tier 1, Table 2.2.8-1 and is subject to ITAAC that reference this table. U.S. EPR FSAR Tier 1, Table 2.2.8-1 will be revised to add the spent fuel cask transfer facility penetration and cover. In addition, reference to the ASME Code Subsection will be removed from Table 2.2.8-1 for the fuel transfer tube to maintain consistency with other U.S. EPR FSAR Tier 1 sections.

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 09.01.04-13:

The applicant stated in FSAR Tier 2 Section 9.1.4.2.2 that one of the main components of the Spent Fuel Cask Transfer Facility is fluid circuits. The staff does not know the meaning of the term “fluid circuits” in this application. Explain the meaning of the term “fluid circuits” in the FSAR. Furthermore, the applicable components of the Spent Fuel Cask Transfer Facility referred to as "fluid circuits" should be listed in FSAR Tier 2, Table 3.2.2-1.

Response to Question 09.01.04-13:

Refer to the Response to Question 09.01.04-5. The fluid circuits of the spent fuel cask transfer facility are outside the scope of the design certification and will be removed from the U.S. EPR FSAR.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

2.2.8 Fuel Handling System

1.0 Description

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The fuel handling system (FHS) provides for handling of fuel assemblies from the time new fuel assemblies are received at the plant site until the spent fuel assemblies are ~~removed from~~stored in the spent fuel pool. The FHS handles and transfers fuel assemblies across the containment. The system provides a means of receiving, inspecting, and storing new fuel assemblies. The spent fuel assemblies are stored in the underwater storage racks in the spent fuel pool. ~~The spent fuel assemblies are removed from the fuel storage pool through the use of the spent fuel cask transfer facility.~~ The main pieces of equipment used for fuel handling operations are the refueling machine, fuel transfer tube facility, new fuel elevator, spent fuel machine, auxiliary crane, and fuel storage racks.

The FHS provides the following safety related functions:

- Maintains fuel assemblies in a subcritical array.
- Facilitates cooling of the irradiated fuel assemblies to avoid overheating.
- Provides for safe handling of heavy loads (i.e., loads weighing more than one fuel assembly and its handling device) to prevent a load drop in a critical area.
- Maintains its portion of the containment isolation.

2.0 Arrangement

2.1 The location of the FHS equipment and components is as listed in Table 2.2.8-1—FHS Equipment Mechanical Design.

3.0 Mechanical Design Features

3.1 Equipment listed in Table 2.2.8-1 as ASME Code Section III is designed, welded, and hydrostatically tested in accordance with ASME Code Section III.

3.2 Equipment identified as Seismic Category I in Table 2.2.8-1 can withstand seismic design basis loads without loss of safety function as listed in Table 2.2.8-1.

3.3 Deleted.

4.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.2.8-2 lists the FHS ITAAC.

Table 2.2.8-1—FHS Equipment Mechanical Design

Equipment Description	Equipment Tag Number(1)	Equipment Location	ASME Code Section III	Seismic Category
New Fuel Elevator	FCD10	Fuel Building (UFA)	N/A	N/A
Spent Fuel Machine	FCD01	Fuel Building (UFA)	N/A	N/A
Transfer Tube (Fuel Transfer Tube Facility)	FCJ05	Fuel Building (UFA) and Reactor Building (UJA)	~~yes [Division 1, Subsection NC]~~Yes	I
Mechanism (Fuel Transfer Tube Facility)	FCJ01	Fuel Building (UFA) and Reactor Building (UJA)	N/A	N/A
Refueling Machine	FCB01	Reactor Building (UJA)	N/A	N/A
Spent Fuel Cask Transfer Facility penetration including loading pit bottom cover.	FCJ12	Fuel Building (UFA)	Yes	I

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

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Table 3.2.2-1—Classification Summary
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KKS System or Component Code	SSC Description	Safety Classification (Note 15)	Quality Group Classification	Seismic Category (Note 16)	10 CFR 50 Appendix B Program (Note 5)	Location (Note 17)	Comments/ Commercial Code
FCJ07	Up-Ender and Track (Reactor Building)	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCJ03	Up-Ender Hoist (Fuel Building)	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCJ02	Up-Ender Hoist (Reactor Building)	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCJ12	Spend Fuel Cask Transfer Facility Penetration including Loading Pit Bottom Cover	S	C	I	Yes	UFA	ASME Class 3(3)
KBB	**Coolant Supply & Storage System**						
30KBB11/12/13/14/ 15/16 BB001	Storage Tanks	NS	D	NSC	No	UKA	ASME VIII[8]
KBB	All KBB System Piping	NS	D	NSC	No	UKA	ANSI/ASME B31.1[6]

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9.1.4 Fuel Handling System

The fuel handling system (FHS) provides a safe means for handling and performance monitoring of fuel assemblies and control components from the time of receipt of new fuel assemblies to the ~~shipment~~storage of spent fuel. This includes installing and removing fuel assemblies in the reactor vessel, transferring irradiated fuel assemblies from the reactor vessel to the spent fuel pool (SFP), and storage of irradiated fuel assemblies. The system also provides a means of safely receiving, inspecting, storing, and handling new fuel.

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The FHS design maintains occupational radiation exposures as low as is reasonably achievable (ALARA) during transportation and handling.

9.1.4.1 Design Bases

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

- New and spent fuel storage racks.
- Transfer tube and containment isolation valves and expansion joints.
- Spent Fuel Cask Transfer Facility ~~components~~loading pit penetration and cover.

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The design basis requirements and design criteria are as follows:

The FHS components are located inside the Reactor Building (RB) and Fuel Building (FB) structures, which are designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods and external missiles (GDC 2).

The seismic design of the system components meets the guidance of RG 1.29 (Position C1 for safety-related portions and Position C2 for non-safety-related portions).

The FHS components are not shared among nuclear power units (GDC 5).

The design of the FHS includes the safe handling and storage of fuel under both normal and accident conditions (GDC 61).

The design of the FHS prevents inadvertent criticality (GDC 62). The fuel racks (FR) are designed to store fuel assemblies in an appropriate manner during normal operation and the safe shutdown earthquake (SSE) so that criticality accidents are avoided, and the fuel racks are not damaged by overloading or overheating.

The FHS is designed and arranged so that dropped loads do not result in fuel damage that would release radioactivity in excess of 10 CFR 100 guidelines or impair the safe shutdown of the plant.

The fuel transfer tube facility (FTTF) provides containment isolation so that offsite dose limits are not exceeded during a design basis accident (DBA).

9.1.4.2 System Description

FHS equipment is needed to perform the following functions:

- New fuel handling and storage.
- Refueling.
- Spent fuel storage and activities during plant normal operation.
- ~~Spent fuel transfer from SFP.~~

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This equipment consists of fuel assembly handling devices such as the refueling machine, FTTF, new fuel elevator, spent fuel machine, auxiliary crane, Spent Fuel Cask Transfer Facility, and fuel racks. The areas associated with the fuel handling equipment are the refueling cavity consisting of the reactor cavity, the core internal storage area and the reactor building transfer compartment, and the fuel pool consisting of the transfer pit, the loading pit and the spent fuel storage pool, and the new fuel storage area. Figures showing the overall system arrangement in the Reactor Building and Fuel Building are provided in Section 3.8.

9.1.4.2.1 General Description

The fuel handling equipment can handle a fuel assembly under water from the time a new fuel assembly is lowered into the underwater fuel storage area until the irradiated fuel assembly is placed in a spent fuel cask for shipment from the site. Underwater transfer of spent fuel assemblies provides radiation shielding and cooling for removal of decay heat. The boric acid concentration in the water is sufficient to preclude criticality.

The reactor cavity, the core internal storage compartment, and the Reactor Building Pool Transfer Compartment are flooded only for refueling during plant shutdowns. The SFP remains full of water and is always accessible to operating personnel.

New Fuel Handling and Storage

New fuel containers are received in the FB loading bay. Typically, each container carries two fuel assemblies. The new fuel assemblies are moved from the loading bay to the new fuel assembly examination facility. After examination, the accepted new fuel assemblies are placed either in the new fuel dry storage area or lowered into the spent fuel storage pool for underwater storage via the new fuel elevator. The new fuel assemblies placed in the new fuel dry storage will be moved to underwater storage

during the plant normal operation. The calibration of instruments and circuits, and the testing of electrically operated equipment and components, including the checking for proper operation of interlocks, are accomplished.

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~~**Spent Fuel Transfer From the SFP**~~

~~Spent fuel assemblies may be removed from the underwater fuel storage racks after a sufficient decay period. The removal of spent fuel assemblies from the SFP is performed through the use of the spent fuel cask transfer facility in conjunction with the spent fuel machine. The spent fuel cask transfer facility and its operation are described in the subsequent section. The spent fuel cask transfer machine transports the cask to the loading hall of the FB from outside the FB and connects the cask to the cask loading pit for the loading process. All transfer cask loading and handling operations are performed per approved procedures ensuring fuel and personnel safety.~~

~~The operations for loading the spent fuel transfer cask are listed as follows:~~

1. ~~Bring the spent fuel cask to the site outside the FB.~~
2. ~~Place the cask in the vertical position on the spent fuel cask transfer machine.~~
3. ~~Transfer the spent fuel cask transfer machine, with cask, into the loading hall of the FB.~~
4. ~~Move the spent fuel cask transfer machine under the biological lid handling station and remove the lid.~~
5. ~~Position the spent fuel cask transfer machine under the penetration at the bottom of the loading pit and connect the penetration to the cask mating surface by means of a leak-tight device.~~
6. ~~Flood the cask loading pit and the cask and open the loading pit bottom cover, and check for leakage.~~
7. ~~Open the gate between the SFP and the cask loading pit and move a spent fuel assembly under water into the cask using the spent fuel machine. Repeat this sequence until the cask is filled.~~
8. ~~Close the cask loading pit bottom cover and the gate between the SFP and the cask loading pit.~~
9. ~~Disconnect the leak tight flange from the cask mating surface, and place the biological lid on the cask at the cask biological lid handling station. Position the spent fuel cask transfer machine under the handling opening, where the final cask conditioning operations are carried out.~~
10. ~~The spent fuel cask transfer machine is moved outside the FB and the cask is placed on the trailer in a horizontal position for transfer.~~

Fuel Handling Administrative Controls and Programs

The fuel handling operations are performed per approved plant procedures, which cover administrative, operating, emergency, testing and maintenance aspects.

The administrative control procedure and checklists are developed from a review of fuel handing related safety analysis and the fuel handling operations. The checklists assist in providing assurance that fuel handing safety analysis assumptions and initial conditions are not violated during the refueling and other fuel handling operations.

Administrative controls for fuel handling operations include the following:

1. Movement of the fuel assemblies from the core shall be started only after allowing for sufficient decay after the reactor shutdown.

2. The spent fuel cask loading pit gate shall be retained closed during refueling operations.

3. Manual control of the handling equipment, such as, Refueling Machine, Spent Fuel Machine, New Fuel Elevator, and Auxiliary Crane shall be put under administrative control.

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4. The spent fuel cask loading pit penetration cover shall be kept closed.

9.1.4.2.2 Component Description

The major components of the FHS are described in the following paragraphs. Refer to Section 3.2 for the seismic and system quality group classification of these components. The FHS is designed in accordance with ANS 57.1 (Reference 1), ANS 57.2 (Reference 2), and ANS 57.3 (Reference 3). The transfer tube components are designed per ASME Boiler and Pressure Vessel Code, III (Reference 4).

Refueling Machine

The refueling machine (RM) moves fuel assemblies both within the reactor vessel and between the reactor vessel and the fuel transfer tube facility during outages. The RM is primarily designed for the underwater handling of fuel assemblies between the FTTF and the core during outages. The RM also provides access to fuel assemblies for detecting fuel cladding ruptures, visual core mapping, an operational platform for handling control rod drive shafts and instrumentation, and access to the upper internals of the reactor vessel.

The main components of the RM are shown in Figure 9.1.4-1—Refueling Machine.

A conceptual drawing of the fuel assembly hoisting mechanism is shown in Figure 9.1.4-2—Fuel Assemblies Hoisting Mechanism.

Section 9.1.2, the design of the new and spent fuel storage racks is the responsibility of the COL applicant.

Spent Fuel Cask Transfer Facility

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A penetration is located in the bottom of the cask loading pit to enable loading of spent fuel assemblies into a spent fuel cask after a sufficient decay period in the spent fuel pool. The penetration assembly maintains leak-tightness during fuel loading into the cask to maintain fuel integrity. A Seismic Category I penetration cover with double seals in the bottom of the loading pit seals the penetration to maintain the water inventory in the loading pit when the cover is closed. The cover is maintained closed. ~~The Spent Fuel Cask Transfer Facility is located below the cask loading pit in the loading hall of the FB and provides for loading of spent fuel assemblies into the cask. The main components of the Spent Fuel Cask Transfer Facility are the spent fuel cask transfer machine, the penetration station equipment, biological lid handling station and fluid circuits.~~

~~A simplified drawing of the spent fuel cask transfer facility is shown in Figure 9.1.4-7—Spent Fuel Cask Transfer FacilityDeleted.~~

9.1.4.3 Safety Evaluation

- The safety-related portions of the FHS are located in the RB and FB. These buildings are designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other similar natural phenomena. Section 3.3, Section 3.4, Section 3.5, Section 3.7, and Section 3.8 provide the bases for the adequacy of the structural design of these buildings.

- The safety-related portions of the FHS are designed to remain intact after an SSE. Section 3.7 provides the design loading conditions that were considered. Section 3.5, Section 3.6, and Appendix 9A provide the required hazards analysis. The refueling machine, fuel transfer tube facility, NFE, and SFM are designed to hold their maximum load during an SSE. See Section 9.1.5.2.3 for auxiliary crane design requirements.

- The portions of the FHS that provide containment boundary and containment isolation functions are safety related. The FHS lines penetrating containment are provided with manually operated containment isolation valves, which are normally closed when refueling is not in progress. During refueling, when they are open, they can be closed manually when containment isolation is needed (refer to Section 6.2.4). The function and performance of containment isolation valves are tested in accordance with Technical Specifications (refer to Section 16.3.6.3) and 10 CFR 50, Appendix J, programmatic requirements (refer to Section 6.2.6).

- The spent fuel assemblies and their inserts are handled with sufficient water cover to provide adequate shielding. Movement of fuel assemblies that could result in assembly grid contact or contact with other fuel assemblies takes place at low

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

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

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

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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.

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The RM is provided with a dose rate measurement device, and lifting is stopped in case of exceeding the allowable dose rate limit.

The RM is provided with interlocks related to:

- Traveling or traversing.
- Lowering or lifting.
- Engaging or disengaging of the latches.
- ~~Simultaneous horizontal movement.~~
- Travel from one compartment of the pool to another.
- Preventing interference with the FTTF.

Fuel Transfer Tube Facility

The transfer tube is attached to the RB internal containment wall by means of a rigid and leak tight connection so as not to affect containment integrity. A metal expansion bellows welded to the transfer tube and to the frames of the building structure is provided at each end of the transfer tube. The bellows form close concentric volumes, which are equipped with a sensor for detecting leaks from the expansion joints. The sensors provide an alarm in the main control room.

The fuel transfer tube facility hoisting mechanism is equipped with an operational brake and a safety brake, which acts on the drum in case of overspeed, chain failure or reverse rotation. The winch is equipped with redundant cables that preclude the falling of a lifting frame to its horizontal position in the event of a cable failure. The brakes are designed to engage when de-energized. They engage in case of malfunction of the loop drive train configuration.

In case of an abnormal situation during fuel assembly transfer, the fuel assembly can be placed in a safe position. The fuel assembly can be moved by using either manual devices (hand wheels at the drives) or via the backup horizontal movement system of the conveyor car in case of an electrical or mechanical failure to place it in a safe state. The backup horizontal movement system can be used to return the conveyor car to the FB from any position in its normal travel in the event of control system malfunction. After returning the conveyor car, the gate valve can be closed manually to restore the integrity of the containment.

A load cell is also provided, which prevents operation in the event of overloading or in case of a slack cable.

Each control desk is equipped with a manual switch which trips the main circuit breakers should the operator note a malfunction.

In addition to limit switches, the fuel transfer tube facility is provided with the following interlocks related to:

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- ~~Automatic movement of the FTTF conveyor car.~~
- Horizontal movement of the FTTF conveyor car.
- Tilting of the fuel container.

Spent Fuel Machine

The SFM hoisting mechanism is equipped with an operational brake, an auxiliary brake, and a safety brake, which acts on the drum in case of overspeed, chain failure or reverse rotation. The brakes are designed to be engaged when de-energized. They engage in case of 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 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 provided with a dose rate measurement device and the lifting is stopped in case of exceeding the allowable dose rate limit.

The SFM is provided with interlocks related to:

- Traveling or traversing.
- Lowering or lifting.
- Engaging or disengaging of the latches.

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- Functioning of the FTTF, auxiliary crane, and NFE~~, and Spent Fuel Cask Transfer Facility.~~
- 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.

Auxiliary Crane

Refer to Section 9.1.5 for safety provisions incorporated in the auxiliary crane.

Spent Fuel Cask Transfer Facility

When the Spent Fuel Cask Transfer Facility is not operated, the loading pit is isolated from the SFP by two gates. The loading pit may be empty or contain water for SFP makeup, as described in Section 9.1.3. The leak tightness of the SFP loading pit penetration is monitored and an alarm is transmitted to the main control room. ~~The facility has a provision for water level and temperature measurement of the transfer cask in case of loss of electrical power supply and for cask emergency cooling.~~

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The single failure criterion is applied to the components of the facility performing safety functions, failure of which may lead to abnormal levels of occupational radiation exposure. The safe position is assured by the mechanical components in case of electrical failure. ~~The brakes provided on the spent fuel cask transfer machine are designed to be engaged when de-energized. The spent fuel cask transfer machine can be operated manually with hand wheels in case of electrical failure. The spent fuel cask transfer machine is provided with anti-seismic locking devices to secure the machine during an earthquake.~~

~~The Spent Fuel Cask Transfer Facility is provided with internal and external interlocks related to:~~

- ~~Operation of the handling opening.~~
- ~~Operation of the cover of the loading penetration.~~
- ~~Operation of the spent fuel cask transfer machine.~~

9.1.4.4 Inspection and Testing Requirements

The safety-related components are located to permit preservice and inservice inspections. The FHS containment isolation function is testable. Refer to Section 14.2 (test abstracts #038 and #039) for initial plant testing of the FHS components. The performance and structural integrity of system components is demonstrated by continuous operation.

9.1.4.5 Instrumentation Requirements

In general, mechanical or electrical interlocks are provided, when required, to provide reasonable assurance of the proper and safe operation of the fuel handling equipment. The intent is to prevent a situation which could endanger the operator or damage the fuel assemblies and control components. The interlocks, setpoints, rules for handling fuel assemblies, and other devices that restrict undesired or uncontrolled movement are incorporated in the design. The RM, SFM and NFE are provided with an arrangement, on the respective control desk, for an emergency shutdown of movements. As a minimum, the interlocks specified in Table 1 of Reference 1 will be provided.

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~~The Spent Fuel Cask Transfer Facility is provided with an emergency stop push-button on the main control panel placed in the control room of the facility.~~

9.1.4.6 References

1. ANSI/ANS-57.1-1992; R1998; R2005 (R=Reaffirmed): "Design Requirements for Light Water Reactor Fuel Handling Systems," American National Standards Institute/American Nuclear Society, 2005.

2. ANSI/ANS-57.2-1983: "Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants," American National Standards Institute/American Nuclear Society, 1983

3. ANSI/ANS-57.3-1983: "Design Requirements for New Fuel Storage Facilities at Light Water Reactor Plants," American National Standards Institute/American Nuclear Society, 1983.

4. ASME Boiler and Pressure Vessel Code, III, "Rules for Construction of Nuclear Power Plant Components," The American Society of Mechanical Engineers, 2004.

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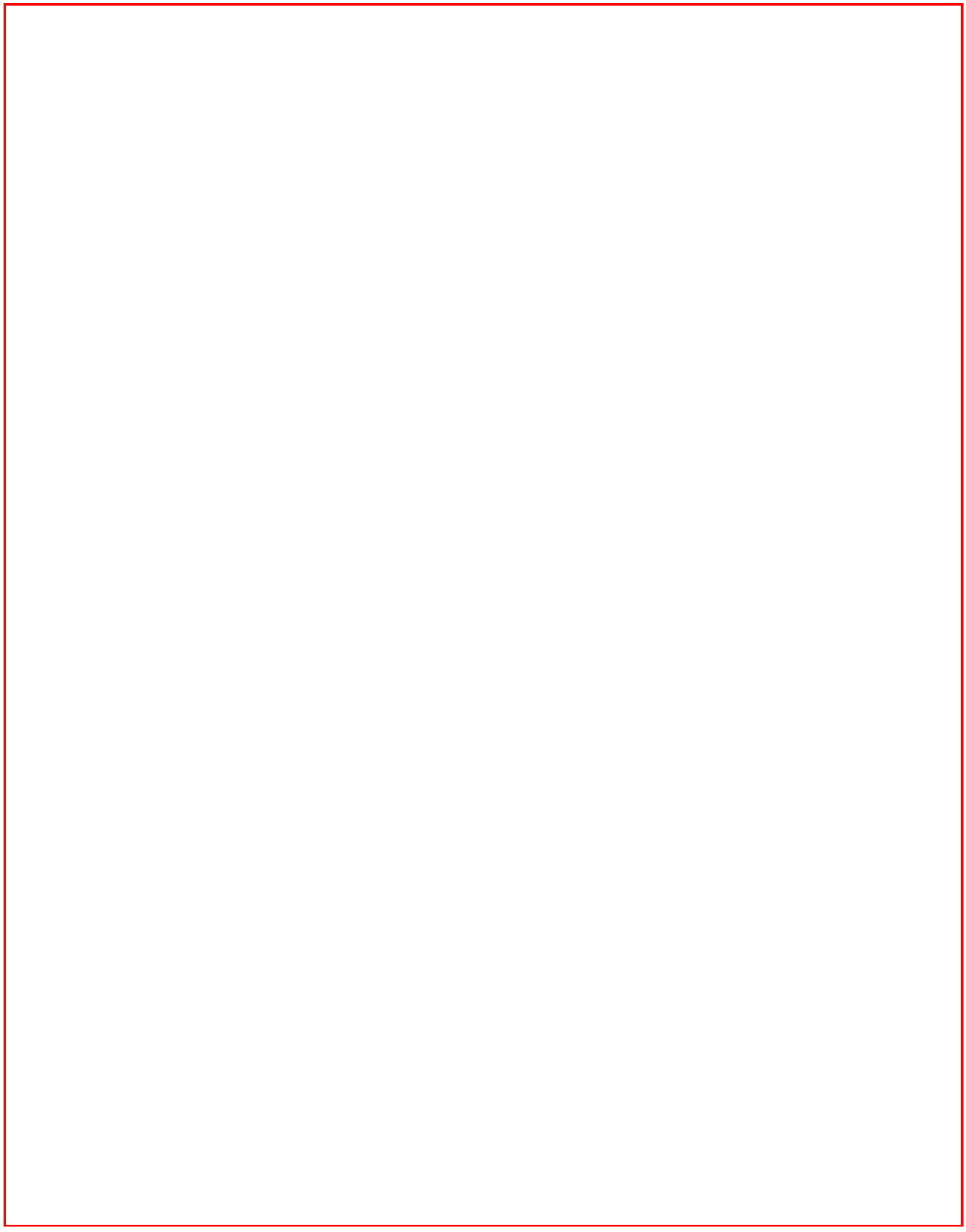
Figure 9.1.4-7—~~Spent Fuel Cask Transfer Facility~~Deleted



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5.1.5 Limit switches function as designed.

5.1.6 Spent fuel rack storage cells are accessible or controls have been implemented to prevent attempted storage of fuel assemblies in these locations.

5.1.7 New fuel rack storage cells are accessible or controls have been implemented to prevent attempted storage of fuel assemblies in these locations.

5.1.8 Fuel handling tools function as designed.

5.1.9 Fuel transfer devices function as designed.

14.2.12.3.16 Fuel Transfer System Operation and Leak Test (Test #039)

1.0 OBJECTIVE

1.1 To verify the measured leakage through the fuel transfer tube when summed with the total of other Type B and Type C LRTs is within the limits as required by the Technical Specifications and 10 CFR 50, Appendix J and meets the requirements of the SIT.

1.2 To demonstrate the operation of the fuel transfer tube closure hatch.

1.3 To verify a leak tight seal between the spent fuel transfer penetration and the cask handling area, including the ~~following~~flange into loading pit and upper cover.~~:~~

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~~1.3.1 Supporting structure.~~

~~1.3.2 Internal shell.~~

~~1.3.3 Double barrier bellows.~~

~~1.3.4 Flange into loading pit and upper cover.~~

~~1.3.5 Docking flange.~~

~~1.3.6 External shell.~~

2.0 PREREQUISITES

2.1 Construction activities on the fuel transfer tube have been completed.

2.2 Construction activities on the spent fuel transfer penetration have been completed.

2.3 Temporary pressurization equipment is installed and instrumentation calibrated.

3.0 TEST METHOD

3.1 Operate the fuel transfer tube closure hatch in accordance with manufacturer instructions.

3.2 Verify the hatch can be opened and closed within the stated amount of time.