ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
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
Attachments: RAI 131 Supplement 3 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. 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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Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
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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,
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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: 367

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D31CA05A1)

Subject: Response to U.S. EPR Design Certification Application RAI No. 131, Supplement 3
Sent Date: 3/31/2009 8:07:06 PM
Received Date: 3/31/2009 8:07:08 PM
From: Pederson Ronda M (AREVA NP INC)

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Files	**Size**	**Date & Time**
MESSAGE	10562	3/31/2009 8:07:08 PM
RAI 131 Supplement 3 Response US EPR DC.pdf	147058	

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

Response to

Request for Additional Information No. 131, Supplement 3

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 09.01.04-1:

Regulatory Position C2 of Regulatory Guide 1.29, “Seismic Design Classification” describes the guidance for Seismic Category II systems, structure and components (SSC). This guidance states, in part, that Seismic Category II SSC are designed to preclude structural failure during a safe shutdown earthquake to preclude interaction with safety related SSC.

a. Some fuel handling system equipment (e.g. control rod drive shaft and instrumentation tooling and video mapping equipment) shown in FSAR Tier 2, Table 3.2.2-1 “Classification Summary,” are classified as non-safety related and non-seismic (NSC). The applicant is requested to explain the NSC classification of these components and whether these components have been evaluated for their impact on safety-related SSCs following a safe shutdown earthquake (SSE).

b. The cranes and hoists listed in FSAR Tier 2, Table 3.2.2-1 are classified as Seismic Category II. In addition to not failing structurally, such that safety related equipment would not be degraded, the applicant is requested to verify that these components will continue to hold their maximum load (not drop the load) during an SSE. The applicant needs to revise the FSAR to clarify the ability of this equipment to hold its maximum load during an (SSE).

c. Component FCD30 and FCB30 in FSAR Tier 2, Table 3.2.2-1 use the acronym CCU. The staff could not find the meaning of this acronym. Provide the meaning of this acronym.

Response to Question 09.01.04-1:

a. The control rod drive shaft handling tool, control rod drive shaft unlatching/latching tool, defective FAIs storage adaptor, instrumentation guide funnel tool, instrumentation lance handling tool, lance finger cutting tool, and video core mapping equipment will be removed from U.S. EPR FSAR Tier 2, Table 3.2.2-1. According to RG 1.206 Section C.I.9.1.4.2, the FSAR should include "design data, seismic category, and quality class for all principal components." The tools identified in this question are not principal components of the fuel handling system. The tools are designed so that they will not reduce the functioning of any safety-related or Seismic Category I SSC to an unacceptable level of safety during an SSE in accordance with the guidance of RG 1.29.

b. The refueling machine, spent fuel machine, new fuel elevator, and fuel transfer tube facility are designed to hold their maximum load during an SSE. The U.S. EPR FSAR Tier 2, Section 9.1.4.3 will be revised for clarification. In the Response to RAI 173, Question 09.01.05-3, AREVA clarified that the auxiliary crane is designed to hold its maximum critical load during an SSE and provided corresponding FSAR markups.

c. CCU is an abbreviation for Centralized Control Unit. The abbreviation will be replaced with the component name in U.S. EPR FSAR Tier 2, Table 3.2.2-1.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.3 and Table 3.2.2-1 will be revised as described in the response and indicated on the enclosed markup.

Question 09.01.04-4:

GDC 62 requires criticality in the fuel storage and handling system be prevented by physical systems or processes, preferably by use of geometrically safe configuration. The applicant has stated in FSAR Tier 2, Section 9.1.4.2.2, "Component Description," that the new fuel elevator (NFE) is used to lower new fuel assemblies to the bottom of the spent fuel pool for handling by the spent fuel machine. The applicant is requested to explain the design and operation of the NFE such that, in accordance with GDC 62, inadvertent critically is prevented when handling new fuel assemblies. The explanation needs to include the maximum number of fuel assemblies that can be placed in the NFE at any one time.

Response to Question 09.01.04-4:

As stated in the component description of the NFE in U.S. EPR FSAR Tier 2, Section 9.1.4.2.2, "The primary purpose of the new fuel elevator (NFE) is to lower new fuel assemblies to the bottom of the spent fuel storage pool for transfer via the spent fuel machine (SFM). The NFE supports and rotates the fuel assemblies, protects them from shock, and provides a means to inspect fuel assemblies underwater." The NFE has an auxiliary function of raising a load from the spent fuel storage pool; this requires activation of a key-locked bypass.

The main components of the NFE are shown in U.S. EPR FSAR Tier 2, Figure 9.1.4-5—New Fuel Elevator. The normal operation to transfer a new fuel assembly into the spent fuel storage pool is as follows:

- A new fuel assembly is inserted into the empty fuel basket (which is in the upper position) by the auxiliary crane using the new fuel handling tool.
- The NFE fuel basket is lowered to the floor of the spent fuel storage pool.
- The fuel assembly is withdrawn from the NFE fuel basket by the SFM.

The SFM is interlocked with the NFE to avoid a hitting risk between the SFM, its load and the NFE. U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised to add this additional interlock of the SFM with the NFE.

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will also be revised to add the following safety provisions and interlocks for the NFE:

"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 limit.

The NFE is provided with interlocks related to:

- Lowering or lifting.

- Functioning of the SFM."

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 09.01.04-8:

The spent fuel machine (SFM) transports spent fuel assemblies over and above the spent fuel racks. If the raised fuel assembly was too close to the surface of the spent fuel pool (SFP), excessive radiation levels on the fuel handling floor might occur. GDC 61 requires the avoidance of excessive personnel radiation exposure. Therefore, the applicant should explain the operating interlocks for the SFM, which ensures a spent fuel assembly is not raised above a specified level in the SFP, such that radiation levels in the fuel building are as low as reasonably achievable (ALARA).

The information should be in the FSAR.

Response to Question 09.01.04-8:

The SFM is restricted from raising a fuel assembly to a height which could result in excessive personnel radiation exposure. The limit switch prevents lifting of a fuel assembly beyond the level such that personnel exposure from an irradiated fuel assembly will not be >2.5 mrem/hour. In addition, the SFM is provided with a dose rate measurement device and the fuel assembly lifting is stopped in case of exceeding the allowable dose rate limit. U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised to include this information.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.1.4.3.1 will be revised as described in the response.

U.S. EPR Final Safety Analysis Report Markups

Table 3.2.2-1—Classification Summary
Sheet 60 of 180

KKS System or Component Code	~~System or Component~~ SSC Description	Safety Classification (Note 15)	Quality Group Classification	Seismic Category (Note 16)	10 CFR 50 Appendix B Program	Location (Note 17)	Comments/ Commercial Code
FCD30	~~CCU~~Centralized Control Unit (Fuel Building)	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Must maintain structural integrity during earthquake
FCB30 09.01.04-1c	~~CCU~~ Centralized Control Unit (Reactor Building)	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Must maintain structural integrity during earthquake
~~FCB63~~	~~Control Rod Drive Shaft Handling Tool~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	~~ANS 57.1-1992~~
~~FCB62~~	~~Control Rod Drive Shaft Unlatching/ Latching Tool~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	
FCJ04	Conveyor Car and Drive	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment
~~FCD40~~	~~Defective FAIs Storage Adaptor~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UFA~~	~~ANS 57.1-1992~~
FCJ06 09.01.04-1a	Emergency Manual Drive System for Conveyor Car	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment

Table 3.2.2-1—Classification Summary
Sheet 61 of 180

KKS System or Component Code	~~System or Component~~ SSC Description	Safety Classification (Note 15)	Quality Group Classification	Seismic Category (Note 16)	10 CFR 50 Appendix B Program	Location (Note 17)	Comments/ Commercial Code
FCD07	FAs Guide System	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCJ01	Fuel Transfer Tube Facility (Except FCJ05)	NS-AQ	D	II	Yes	UJA, UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment and must maintain structural integrity
~~FCB61~~	~~Instrumentation Guide Funnel Tool~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	
~~FCB60~~	~~Instrumentation Lance Handling Tool~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	
~~FCB64~~	~~Lance Finger Cutting Tool~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	
FAA01	New Fuel Storage Racks	S	C	I	Yes	UFA	ANS 57.3-1983
FCD10	NFE (Entire Assembly)	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment

09.01.04-1a

Table 3.2.2-1—Classification Summary
Sheet 63 of 180

KKS System or Component Code	~~System or Component~~ SSC Description	Safety Classification (Note 15)	Quality Group Classification	Seismic Category (Note 16)	10 CFR 50 Appendix B Program	Location (Note 17)	Comments/ Commercial Code
FCB07	RM Mast & Gripper (FAIs)	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCB06	RM Mast & Gripper (FAs)	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCB03	RM Trolley	NS-AQ	D	II	Yes	UJA	ANS 57.1-1992; Located in close proximity to safety-related equipment
~~FCB10~~	~~RM Video Core Mapping~~	~~NS~~	~~E~~	~~NSC~~	~~No~~	~~UJA~~	
FCD01	SFM (Entire Assembly)	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment
FCD02	SFM Bridge	NS-AQ	D	II	Yes	UFA	ANS 57.1-1992; Located in close proximity to safety-related equipment

09.01.04-1a

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

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 Facility.

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. 09.01.04-1b 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 15.7~~Section 15.0.3.10.

- 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

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.

09.01.04-8

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

09.01.04-4

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.

09.01.04-4

- 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.

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