

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Wednesday, January 25, 2012 4:06 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); KOWALSKI David (AREVA); Miernicki, Michael; Hearn, Peter
Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9
Attachments: RAI 525 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 525 Response US EPR DC.pdf," provides a preliminary schedule since a technically correct and complete response to these eighteen questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 525 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

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A preliminary schedule for technically correct and complete responses to these questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by February 21, 2012.

Question #	Response Date
RAI 525 — 09.01.04-21	February 21, 2012
RAI 525 — 09.01.04-22	February 21, 2012

RAI 525 — 09.01.04-23	February 21, 2012
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RAI 525 — 09.01.04-35	February 21, 2012
RAI 525 — 09.01.04-36	February 21, 2012
RAI 525 — 09.01.04-37	February 21, 2012
RAI 525 — 09.01.04-38	February 21, 2012

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

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From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]

Sent: Monday, December 19, 2011 4:19 PM

To: ZZ-DL-A-USEPR-DL

Cc: Curran, Gordon; McKenna, Eileen; Xu, Jim; Thomas, Brian; Hearn, Peter; Segala, John; ArevaEPRDCPEm Resource

Subject: U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on November 11, 2011, and discussed with your staff on December 2, 2011. Draft RAI Questions 09.01.04-24, 09.01.04-31, and 09.01.04-33 were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs, excluding the time period of **December 24, 2011 thru January 2, 2012, to account for the holiday season** as discussed with AREVA NP Inc. For any RAIs that cannot be answered **within 40 days**, it is expected that a date for receipt of this information will be provided to the staff within the 40-day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 3719

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D4AA0303)

Subject: Response to U.S. EPR Design Certification Application RAI No. 525 (6194, 6154), FSAR Ch. 9
Sent Date: 1/25/2012 4:06:22 PM
Received Date: 1/25/2012 4:06:28 PM
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Files	Size	Date & Time
MESSAGE	3857	1/25/2012 4:06:28 PM
RAI 525 Response US EPR DC.pdf		86337

Options

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

Response to

Request for Additional Information No. 525(6194, 6154), Revision 0

12/19/2011

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 09.01.04 - Light Load Handling System (Related to Refueling)

Application Section: 09.01.04

QUESTIONS for Balance of Plant Branch 1 (SBPA)

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

Question 09.01.04-21:

OPEN ITEM

While it is clear that the biological lid handling station is designed in accordance with NOG-1, it was not clear to the staff whether the hoists of the SFCTF are single failure proof and designed with redundant components. The applicant should define which SFCTF components are designed to NOG-1 as a single failure proof hoist. In addition, the applicant indicates that the anti-seismic devices are engaged at every station, prior to any cask handling operations. However, it is not clear to the staff whether the SFCTM brakes are also applied at every station or whether the SFCTM is held in place with just the anti-seismic device. The staff requests the applicant to clearly define which components are designed to NOG-1 as a single failure proof hoist.

Response to Question 09.01.04-21:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-22:**OPEN ITEM**

The staff asked the applicant in RAI 385, Question 9.1.4-15 to provide a description of interlock protection used with the SFCTF. In the response to RAI 9.1.4-15, the applicant provided Table 09.01.04-15-6 which contains an extensive list of operation and required conditions to satisfy prior to performing various operations. Although these are presented in the RAI response as interlocks, it is not clear to the staff how these features will be provided and initiated to prevent damage to fuel units or control components and provide for personnel safety. To minimize the potential for operator error, the staff requests the applicant to describe any mechanical stops or electric interlocks included with the equipment to prevent movement in an unsafe manner in the FSAR. In addition, the applicant is requested to describe how Table 09.01.04-15-6 items will be monitored and controlled (i.e. physical limitations, procedurally, etc...) and justify not including this table in the FSAR.

Response to Question 09.01.04-22:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-23:

OPEN ITEM

The under-pool loading configuration precludes contamination of the exterior surface of the cask, which minimizes occupational dose during cask loading operations. As indicated by the applicant, the loading hall is provided with a separate supply and exhaust duct. The FB ventilation system has isolation provisions that can isolate the SFP room and loading hall from the rest of the building when needed. Response to RAI 9.1.4-15 indicates that occupational doses are minimized if an operator is required to enter the loading hall for abnormal conditions.

However, the staff is unclear regarding why an operator would be required to enter the SFCTF during cask loading. Therefore, the staff requests the applicant to identify what abnormal conditions would require an operator to enter the cask loading hall during cask loading operation.

Response to Question 09.01.04-23:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-24:

OPEN ITEM

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

Response to Question 09.01.04-24:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-25:**OPEN ITEM**

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

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

Response to Question 09.01.04-25:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-26:

OPEN ITEM

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

Response to Question 09.01.04-26:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-27:

OPEN ITEM

The objective of the FHS preoperational test program was found to be appropriate since it is to demonstrate the capability of the FHS to perform. The results of the FHS test program are considered to be acceptable if the FHS perform as described in Tier 2, FSAR Section 9.1.4.

While the pre-operational tests are appropriate to address the objective of the test, the staff has a concern about when this testing will be performed. For safe operation, the staff finds that the capability of the SFCTF should be performed prior to operation of the SFCTF. Since the SFCTF is not planned for use until some duration after plant operation, the applicant is requested to clearly state what testing will be performed prior to use of the SFCTF.

Response to Question 09.01.04-27:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-28:

OPEN ITEM

The applicant's proposed COL item requests that the cask design requirements be addressed prior to initial cask loading operations. Initial cask loading operations may occur many years after plant startup. The staff needs assurance that the facility has the capability to remove spent fuel once fuel is loaded. Therefore, the staff requests the applicant to revise the COL item and interface requirements. The COL item should instruct the COL applicant to identify an NRC approved cask and demonstrate that the cask can be safely connected to the certified EPR SFCTF and remove spent fuel from the SFP prior to initial fuel load and plant startup.

Response to Question 09.01.04-28:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-29:

OPEN ITEM

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

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

Response to Question 09.01.04-29:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-30:

OPEN ITEM

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

- a. Description of how specific provisions of ASME NOG-1-2004 are applied to the structural design of the SFCTM.
- b. Description of how the seismic Category I requirements for the SFCTM would be met through the Code provisions.

Response to Question 09.01.04-30:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-31:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that the penetration assembly is designed in accordance with ANSI/ANS-57.2-1983. No specifics are provided in the FSAR with respect to how the provisions of the standard are used in the design of the penetration assembly, given the standard often refers to other Codes and Standards for detailed technical requirements. The applicant is requested to provide the following:

- a. Description of how specific provisions of ANSI/ANS-57.2-1983 are applied to the design of the penetration assembly; if other codes and standards are referenced for technical requirements, provide a description of the extent to which other codes and standards are applied to the structural design/analysis of the penetration assembly.
- b. Description of how the seismic Category I requirements for the penetration assembly to maintain the leak-tight fluid boundary during and following an SSE would be met through the provisions ANSI/ANS-57.2-1983.
- c. Description of how the standard is used to design the various seals to ensure the leaktight fluid boundary of the penetration assembly during and following an SSE, as well as an accident drop of fuel assembly.

Response to Question 09.01.04-31:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-32:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that the SFCTM operation take place in the loading hall. However, no detailed structural description of the loading hall is provided, nor is the design category for the loading hall presented. The applicant is requested to provide the following:

- a. Description of whether the loading hall and the cask loading pit are designed as seismic Category I structures.
- b. Description of the relevant codes and standards used for the design of these structures.

Response to Question 09.01.04-32:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-33:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that both SFCTM and the penetration assembly are designed as seismic Category I but provided insufficient details with respect to the loads and load combinations considered for the design/analysis of these equipment. The applicant is requested to provide the following:

- a. Description of various loads applied to the SFCTM, the penetration assembly, the loading hall structure, and the cask loading pit, including dead, live, fluid, seismic, accidental drop of fuel assembly, etc.
- b. Description of specific load combinations used for their designs and associated technical bases.

Response to Question 09.01.04-33:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-34:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) described that the SFCTM and the penetration assembly are designed as seismic Category I equipment. The SFCTM is designed in accordance with the applicable portions of ASME NOG-1-2004 while the design for the penetration assembly follows the ANSI/ANS-57.2-1983. However, no description of the analysis methods and associated analysis results is provided in the FSAR section to support the designs of the SFCTM and the penetration assembly. Therefore, the applicant is requested to provide the following:

- a. Description of the design/analysis procedures and results used for the SFCTM and penetration assembly.
- b. Description of the computer models used to establish that the design of the SFCTM and the penetration assembly meet the seismic Category I requirements.
- c. Description of how various connections are modeled such as the lateral supports to the SFCTM with concrete walls through the anti-seismic locking devices and the vertical support at the base, as well as the interfaces between the SFCTM and the penetration assembly to ensure the leaktightness during an SSE event.
- d. Description of the design/analysis procedures and results used for the loading hall and cast loading pit structures.

Response to Question 09.01.04-34:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-35:

OPEN ITEM

The SFCTM is moved in the loading hall on rails which are anchored to the base slab. However, the FSAR does not describe how the anchors are designed and analyzed to ensure adequate structural support for the safe movement of the SFCTM trolley. Therefore, the applicant is requested to provide the description of the analysis/design procedures used for the design of the anchors to ensure adequate structural support for the SFCTM when subject to the SSE loads.

Response to Question 09.01.04-35:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-36:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) does not provide description of any acceptance limits for the SFCTF equipment and associated structures. Therefore, the applicant is requested to provide the description of applicable acceptance limits in terms of allowable stresses, strains, deformation and other design criteria for the SFCTM, penetration assembly components, seals, and loading hall and cask loading pit structures.

Response to Question 09.01.04-36:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-37:

OPEN ITEM

Section 9.1.4.2 of US EPR FSAR Revision 4 Interim (August 31, 2011, Response to RAI 385) does not provide description of materials for the SFCTF equipment and the quality control procedures to ensure adequate designs. Therefore, the applicant is requested to provide the following:

- a. Description of materials used for the SFCTM, penetration assembly components, seals, and loading hall and cask loading pit structures.
- b. Description of quality control procedures in place to ensure adequate designs.
- c. Description of special construction techniques if used.

Response to Question 09.01.04-37:

A response to this question will be provided by February 21, 2012.

Question 09.01.04-38:

OPEN ITEM

The operation for transferring spent fuels to the cask underneath the spent fuel pool is unique in the U.S. nuclear power plants. Although the penetration assembly and SFCTM are classified as seismic Category I, the safety operation of the SFCTF to transfer the spent fuels rely on a number of safety devices such as safety interlocks, and seals to maintain the leaktight boundary for the penetration assembly. To demonstrate these safety devices and seals will perform their intended functions during the normal operation and under the SSE loads (no drain-down events), the applicant is requested to provide the following:

- a. Whether these safety devices and seals are seismically qualified, and to what codes and standards these will be qualified against.
- b. Whether any tests will be performed to demonstrate the safety performance of the SFCTF during the normal operation and under the SSE loads.

Response to Question 09.01.04-38:

A response to this question will be provided by February 21, 2012.