ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Monday, November 29, 2010 6:01 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); WELLS Russell (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 435, FSAR Ch. 3, OPEN ITEM, Supplement 1
Attachments: RAI 435 Supplement 1 Response US EPR DC.pdf

Getachew,

On October 18, 2010, AREVA NP Inc. (AREVA NP) submitted a schedule for a technically correct and complete response to the 4 questions in RAI 435. As committed, the attached file, "RAI 435 Supplement 1 Response US EPR DC.pdf," provides a technically correct and complete response to the 3 of the 4 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 435 Question 03.04.01-14.

The following table indicates the respective pages in the response document, "RAI 435 Response Supplement 1 US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 435 — 03.02.02-12	2	2
RAI 435 — 03.04.01-14	3	4
RAI 435 — 03.11-38	5	6

A complete answer is not provided for 1 of the 4 questions. In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response to this question has been revised and is provided below.

Question #	Response Date
RAI 435 — 03.11-37	January 24, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, October 18, 2010 3:49 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 435, FSAR Ch. 3, OPEN ITEM

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 435 Response US EPR DC.pdf," provides a schedule for a technically correct and complete response to the 4 questions.

The following table indicates the respective pages in the response document, "RAI 435 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 435 — 03.02.02-12	2	2
RAI 435 — 03.04.01-14	3	3
RAI 435 — 03.11-37	4	4
RAI 435 — 03.11-38	5	5

A complete answer is not provided for 4 of the 4 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 435 — 03.02.02-12	November 30, 2010
RAI 435 — 03.04.01-14	November 30, 2010
RAI 435 — 03.11-37	November 30, 2010
RAI 435 — 03.11-38	November 30, 2010

Sincerely,

Martin (Marty) C. Bryan
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Saturday, September 18, 2010 11:54 AM
To: ZZ-DL-A-USEPR-DL
Cc: McNally, Richard; Dixon-Herrity, Jennifer; Li, Chang; Lee, Samuel; Strnisha, James; Terao, David; Miernicki, Michael; Patel, Jay; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 435(4831,4981,4925), FSAR Ch. 3, OPEN ITEM

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 10, 2010, and discussed with your staff on September 15, 2010. No changes were made to the draft RAI 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. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 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: 2323

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB71085848A7)

Subject: Response to U.S. EPR Design Certification Application RAI No. 435, FSAR Ch. 3, OPEN ITEM, Supplement 1
Sent Date: 11/29/2010 6:00:54 PM
Received Date: 11/29/2010 6:01:15 PM
From: BRYAN Martin (EXTERNAL AREVA)

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Files	**Size**	**Date & Time**
MESSAGE	4158	11/29/2010 6:01:15 PM
RAI 435 Supplement 1 Response US EPR DC.pdf	109142	

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

Response to

Request for Additional Information No. 435(4831, 4981, 4925), Revision 1, Supplement 1

9/17/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.02.02 - System Quality Group Classification
SRP Section: 03.04.01 - Internal Flood Protection for Onsite Equipment Failures
SRP Section: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

Application Section: 3.2.2

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)
QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB)
QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

Question 03.02.02-12:

POTENTIAL OPEN ITEM

Follow-up to RAI 72, Question 03.02.02-1

General Design Criterion 1 identifies, in part, that structures systems and components important to safety shall be designed, fabricated, erected and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. FSAR Subsection 3.2, in combination with Subsection 3.1.1.1.1, identify that safety-related SSCs are designed to quality standards commensurate with their safety-functions, or to fail in a safe condition. GDC 1 actually applies to all important to safety SSCs and not only SSCs that are considered safety-related. As defined in 10 CFR 50 Appendix A, important to safety SSCs are those that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. In addition to the guidance provided in SRP 3.2 for classification, applicants complete a Probabilistic Risk Analysis (PRA) which identifies risk significant SSCs. In RAI 03.02.02-1, the applicant was requested to clarify in FSAR Subsections 3.2 and 3.1.1.1.1 how GDC 1 is satisfied relative to SSCs that are not identified as safety-related, but are considered important to safety or risk significant by the PRA such that augmented quality requirements (e.g.; NS-AQ), such as the non-safety -related fire protection system or any SSC that is classified as Seismic Category II, should be considered. Our intent is to understand that, based on a comprehensive classification methodology, that a process is in place to satisfy GDC 1.

The RAI response stated that the FSAR will not be changed and referenced the response to RAI 03.02.01-1 concerning GDC 2 and seismic classification of important to safety SSCs that are not considered safety-related. The response to RAI 03.02.01-1 goes into great detail on the definition of words in the regulations and why the applicant does not have to address the staff concern. However, in this case, the intent of the request for additional information is to understand the methodology used to determine that all SSCs are appropriately classified for safety and quality group, and to ensure that methodology is documented in the FSAR. The response does not adequately address the request in regard to compliance with GDC 1 for non-safety-related SSCs that are important to safety. Specifically, there should be a process in place to assure that those risk-significant non-safety-related SSCs have appropriate special treatment, such as a QA program and appropriate design considerations, to ensure reliability consistent with their safety function, the D-RAP and reliability assumed in the PRA. For example, the process to apply the NS-AQ supplemented safety classification to certain SSCs should be explained so that GDC 1 is satisfied for all important to safety SSCs and not just those specifically designated as safety-related. Explain in the FSAR how this consideration is accomplished and/or provide a pointer in the FSAR to the sections where this methodology is considered if the process is already described.

Response to Question 03.02.02-12:

This response will be answered in the Response to RAI 420, Question 03.02.01-12.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 03.04.01-14:

OPEN ITEM

Follow-up to Open Item RAI 377, Question 03.04.01-13

In the response to the Open Item RAI 377 Question 03.04.01-13, the applicant established a COL information item to address the maintenance program of watertight doors as described below:

"A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building watertight door above elevation +0 feet remains capable of performing its intended function."

The applicant was requested in a teleconference of July 21, 2010 to justify the maintenance program for watertight doors being limited to the "Safeguards Building" only, rather than all the buildings that contain safety-related SSCs. The applicant indicated in the call that divisional building design can be used to justify such that watertight doors are not relied upon for the flood protection with the exception of safeguards building and fuel building.

The staff notes the following inconsistencies and concerns:

- The fuel building is not included in the COL item.
- The reactor building and containment, and annulus building do not have divisional building design.
- The water from external flooding common water source could enter into the watertight doors of multiple divisions even with the divisional building design. The divisional building design might not be an adequate justification for limiting the maintenance program to the safeguards building and fuel building.

The applicant is requested to revise or justify the COL item described above, addressing these inconsistencies and concerns.

Response to Question 03.04.01-14:

U.S. EPR FSAR Tier 2, Table 1.8-2 and Section 3.4.1, COL information item 3.4-6 will be revised to include the watertight doors in the Fuel Building. Watertight doors do not exist in the other Seismic Category I buildings with divisional separation, including the Essential Service Water Pump Buildings and Emergency Power Generating Buildings. Water from external flood sources is prevented from entering Seismic Category I buildings through doors by the flood protection measures as described in U.S. EPR FSAR Tier 2, Section 3.4.2, which includes the location of the probable maximum flood (PMF) one foot below finished yard grade, finished yard grade slopes away from Seismic Category I structures, and no access openings penetrate exterior walls of Seismic Category I structures below grade. Watertight doors are not relied upon for internal flood protection of safety-related structures, systems, and components (SSC) required for safe shutdown within Seismic Category I buildings without divisional separation, which include the Reactor Building and Reactor Building Annulus.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 1.8-2 and Section 3.4.1 will be revised as described in the response and indicated on the enclosed markup.

Question 03.11-38

Potential OPEN ITEM

Tier 2, Section 3.11 of U.S. EPR FSAR describes the environmental qualification (EQ) of electrical and mechanical equipment for the U.S. EPR reactor design. The EQ program consists of two phases: initial equipment qualification and maintaining equipment qualification during the operational life of the plant. The U.S. EPR FSAR does not clearly describe these two phases of the operational EQ program. As discussed in Regulatory Guide 1.206 and Commission Paper SECY-05-0197, COL applicants must fully describe their operational programs to avoid the need for ITAAC regarding those programs.

Therefore, the NRC staff requests that AREVA address the operational aspects of the EQ program in Tier 2, Section 3.11.2.2.6, "Maintaining Mechanical Equipment Qualification," of the U.S. EPR FSAR. For example, the U.S. EPR FSAR should indicate that the EQ operational programs for maintaining equipment qualification during the operational life of the plant will include the following aspects: (1) evaluation of EQ results for design life to establish activities to support continued EQ; (2) determination of surveillance and preventive maintenance activities based on EQ results; (3) consideration of EQ maintenance recommendations from equipment vendors; (4) evaluation of operating experience in developing surveillance and preventive maintenance activities for specific equipment; (5) development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications; (6) development of plant procedures for reviewing equipment performance and EQ operational activities, and for trending the results to incorporate lessons learned through appropriate modifications to the EQ operational program; and (7) development of plant procedures for the control and maintenance of EQ records.

The EQ operational program should also discuss development of EQ Master Equipment List (EQMEL). The EQMEL identifies the electrical and mechanical equipment or components that must be environmentally qualified for use in a harsh environment. The EQMEL should include the length of time for which the function of each mechanical component is required since this information was not identified in the FSAR. The EQMEL should be developed from the equipment list provided in FSAR Tables 3.10-1 and 3.11-1. The EQMEL and a summary of equipment qualification results are maintained as part of the equipment qualification file as auditable records for the operational life of the plant.

Response to Question 03.11-38:

Development of procedures and maintenance activities related to the environmental qualification (EQ) operational program is the responsibility of the COL applicant as described in U.S. EPR FSAR Tier 2, Sections 13.5.2 and 17.6. U.S. EPR FSAR Tier 2, Section 3.11.2.2 states: "As noted in Section 17.6, a COL applicant that references the U.S. EPR design certification is responsible for implementing the Maintenance Rule program."

U.S. EPR FSAR Tier 2, Section 3.11.3 states that if the EQ testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.

This question also states that "The EQMEL should include the length of time for which the function of each mechanical component is required since this information was not identified in the FSAR." The response to RAI 326, Supplement 2, Question 03.11-33 addressed this concern by stating:

> "The operability times for electrical and mechanical equipment listed in U.S. EPR FSAR Tier 2, Table 3.10-1 and 3.11-1 are documented in the Equipment Qualification Data Packages (EQDPs) (U.S. EPR FSAR Tier 2, Appendix 3D, Attachment A) and the Seismic Qualification Data Packages (SQDPs) (U.S. EPR FSAR Tier 2, Appendix 3D, Attachment F) as applicable for electromechanical assemblies (e.g., valve and actuators, pumps, and motors). U.S. EPR FSAR Tier 2, Section 3.11.1.3 will be revised to indicate that the function times are documented as described above."

As noted in the Response to RAI 326, Supplement 2, Question 03.11-33 and RAI 393, Question 03.11-34, AREVA NP has established ITAAC related to the SQDPs and EQDPs. U.S EPR FSAR Tier 2 Section 3.11 notes that, "A COL applicant that references the U.S. EPR design certification will maintain the equipment qualification test results and qualification status file during the equipment selection, procurement phase and throughout the installed life in the plant."

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

U.S. EPR Final Safety Analysis Report Markups

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 9 of 37

Item No.	Description	Section
3.4-6	A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building and Fuel Building watertight door above elevation +0 feet remains capable of performing its intended function.	3.4.1 03.04.01-14
3.4-7	A COL applicant that references the U.S. EPR design certification will design the watertight seal between the Access Building and the adjacent Category I access path to the Reactor Building Tendon Gallery. Watertight seal design will account for hydrostatic loads, lateral earth pressure loads, and other applicable loads.	3.4.2
3.5-1	A COL applicant that references the U.S. EPR design certification will describe controls to confirm that unsecured maintenance equipment, including that required for maintenance and that are undergoing maintenance, will be removed from containment prior to operation, moved to a location where it is not a potential hazard to SSC important to safety, or seismically restrained to prevent it from becoming a missile.	3.5.1.2.3
3.5-2	A COL applicant that references the U.S. EPR design certification will confirm the evaluation of the probability of turbine missile generation for the selected turbine generator, P1, is less than 1 x 10^{-4} for turbine-generators favorably oriented with respect to containment.	3.5.1.3
3.5-3	A COL applicant that references the U.S. EPR design certification will assess the effect of potential turbine missiles from turbine generators within other nearby or co-located facilities.	3.5.1.3
3.5-4	A COL applicant that references the U.S. EPR design certification will evaluate the potential for other missiles generated by natural phenomena, such as hurricanes and extreme winds, and their potential impact on the missile protection design features of the U.S. EPR.	3.5.1.4
3.5-5	A COL applicant that references the U.S. EPR design certification will evaluate the potential for site proximity explosions and missiles generated by these explosions for their potential impact on missile protection design features.	3.5.1.5
3.5-6	A COL applicant that references the U.S. EPR design certification will evaluate site-specific aircraft hazards and their potential impact on plant SSC.	3.5.1.6

contained within the division of hazard origin and are not allowed to propagate to other divisions. Consequently, in a large internal flooding event in buildings with divisional separation safety-related SSC within the affected division are assumed to be flooded. The plant arrangement provides divisional separation walls to physically separate the redundant trains of safe shutdown systems and components. A combination of fluid diversion flow paths and passive features contain the water within the affected division.

Division walls below elevation +0 feet, 0 inches (hereinafter +0 feet) provide separation and serve as flood barriers to prevent flood waters spreading to adjacent divisions. These division walls are watertight, have no doors, and a minimal number of penetrations all of which are watertight up to elevation +0 feet. Water is directed within one division to the building elevations below +0 feet, where it is stored. Above elevation +0 feet, a combination of watertight doors and openings for water flow to the lower building levels prevent water ingress into adjacent divisions. Watertight doors have position indicators for control of the closed position and are periodically inspected and maintained so that they remain capable of performing their intended function. Existing openings (e.g., stair cases, elevator shafts, and equipment openings) are credited as water flow paths. Watertight doors are designed to functional requirements such as leak-rate limits, door-closure indication, door-seal aging-degradation characteristics, and maintainability. Maintenance requirements are based on manufacturer recommendations and maintenance procedures are written by COL applicants in accordance with their respective regulatory approved maintenance programs.

03.04.01-14

A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building and Fuel Building watertight door above elevation +0 feet remains capable of performing its intended function.

Flooding pits with burst openings collect and direct water flow to lower building levels. Rooms within divisions have interconnections so that the maximum released water volume can be distributed and stored in the lower building levels of the affected division. Interconnections include doors with flaps, wall openings, and other wall penetrations that are not required to be sealed. Elevated thresholds, curbs, and pedestals are provided as necessary.

In Seismic Category I buildings that are not designed with divisional separation, e.g., the Reactor Building (RB), the layout allows water released inside the building to flow to the lower level of the building. In containment, water flows down to the in-containment refueling water storage tank (IRWST). In the annulus, water flows to the bottom level where it is stored. Safety-related SSC in these buildings, required to