

ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, November 02, 2010 7:32 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); SLAY Lysa (AREVA); HALLINGER Pat (EXTERNAL AREVA); NOXON David (AREVA); PATTON Jeff (AREVA)
Subject: Draft Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 4
Attachments: RAI 355 Supplement 5 Response US EPR DC- DRAFT.pdf

Getachew,

Attached is a draft response for RAI 355. Let me know if the staff has questions of if the response can be sent as a final response.

Thanks,

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: Friday, October 08, 2010 5:39 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 355 on February 17, 2010. Supplements 1, 2 and 3 to RAI 355 provided revised schedules.

Additional time is required to complete a response to the one question and to interact with the NRC staff.

The schedule for a technically correct and complete response to this question has been changed and is provided below.

Question #	Response Date
RAI 355 — 17.04-23	November 23, 2010

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 (EXT)
Sent: Friday, July 30, 2010 3:02 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 355 on February 17, 2010. Supplement 1 on March 25, 2010 and Supplement 2 on May 27, 2010 provided revised schedules. To allow more time to resolve issues associated with Draft ISG-18, the schedule for a response to this RAI is being revised.

The schedule for a technically correct and complete response to this question has been changed and is provided below.

Question #	Response Date
RAI 355 — 17.04-23	October 18, 2010

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 (EXT)
Sent: Thursday, May 27, 2010 3:54 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 355 on February 17, 2010. Supplement 1 to RAI 355 provided a revised schedule. To allow more time to resolve issues associated with Draft ISG-18, the schedule for a response to this RAI is being revised.

The schedule for a technically correct and complete response to this question has been changed and is provided below.

Question #	Response Date
RAI 355 — 17.04-23	July 30, 2010

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 (EXT)
Sent: Thursday, March 25, 2010 4:16 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete answer to RAI 355 Question 17.04-23 on February 17, 2010. As discussed in the Thursday March 18, 2010 phone call between AREVA NP and the NRC, the response for this question will be delayed until after the March 25, 2010 Design Center Working Group meeting when the new ITAAC wording associated with Draft ISG-18 will be presented.

The schedule for a technically correct and complete response to this question has been changed and is provided below.

Question #	Response Date
RAI 355 — 17.04-23	May 28, 2010

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Wednesday, February 17, 2010 3:45 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC); ROMINE Judy (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 355 Response US EPR DC.pdf," provides the schedule for a technically correct and complete response to this question.

The following table indicates the respective pages in the response document, "RAI 355 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
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RAI 355 — 17.04-23	2	2
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The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 355 — 17.04-23	March 25, 2010

Sincerely,

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

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, January 11, 2010 2:10 PM
To: ZZ-DL-A-USEPR-DL
Cc: Phan, Hanh; Mrowca, Lynn; Roy, Tarun; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 355 (4263), FSARCh. 17 OPEN ITEM

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 9, 2010, and on January 11, 2010, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The question in this RAI is an OPEN ITEM in the safety evaluation report for Chapter 17 for Phases 2 and 3 reviews. As such, the schedule we have established for your application assumes technically correct and complete responses prior to the start of Phase 4 review. For any RAI that cannot be answered prior to the start of Phase 4 review, it is expected that a date for receipt of this information will be provided 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: 2225

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7108226E12)

Subject: Draft Response to U.S. EPR Design Certification Application RAI No. 355, FSARCh. 17 OPEN ITEM, Supplement 4
Sent Date: 11/2/2010 7:31:51 PM
Received Date: 11/2/2010 7:34:46 PM
From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

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Files	Size	Date & Time
MESSAGE	7303	11/2/2010 7:34:46 PM
RAI 355 Supplement 5 Response US EPR DC- DRAFT.pdf		479196

Options

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

Response to

Request for Additional Information No. 355, Supplement 5

1/11/2010

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 17.04 - Reliability Assurance Program (RAP)

Application Section: 17.04

**QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1
(AP1000/EPR Projects) (SPLA)**

DRAFT

Question 17.04-23:

OPEN ITEM

Follow-up to Question 17.04-17 (RAI 226) and AREVA response: Based on NRC legal staff guidance, use of the words "reasonable assurance" and "report" in the RAP ITAAC have specific legal meaning and may result in ITAAC closure issues. NRC staff plans to issue interim staff guidance for the RAP ITAAC in DC/COL-ISG-018, as follows:

Commitment: The RAP ensures that the plant is designed and will be constructed in a manner that is consistent with the key assumptions and risk insights for the risk-significant SSCs

Acceptance Criteria: Documentation exists for the following:

- a. for the risk-significant SSCs, identification and description of the reliability assurance activities that are accomplished prior to initial fuel load
- b. confirmation that these activities ensure that the plant is designed and will be constructed consistent with the key assumptions (including reliability and availability assumptions in the PRA, when applicable) and risk insights for the risk-significant SSCs

As an alternative to the current RAP ITAAC wording in the referenced AREVA response, the staff requests that the applicant reconsider its wording to be incorporated in the U.S. EPR FSAR Tier 1, Section 3.2, Item 2.1 and Table 3.2-1, taking into consideration the comments provided herein.

Response to Question 17.04-23:

As presented by the NRC at the June 25, 2010 public meeting where the Design Reliability Assurance Program (DRAP) Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) and Interim Staff Guidance-18 (ISG-018) were discussed, "wording in the model is only one acceptable example." Further, "applicants are not expected to copy the language, but are free to amend if they chose." To that end, AREVA NP proposes the following changes to the DRAP ITAAC.

U.S. EPR FSAR Tier 1, Section 3.2, Item 2.1 and Table 3.2-1 will be changed to remove the term "reasonable assurance" and replace the word "report" with "documentation."

The NRC staff provided additional guidance in the draft ISG-018 to assist with Reliability Assurance Program (RAP) ITAAC closure by ensuring that the RAP Structures, Systems and Components (SSC) are adequately designed and controlled during the design stage. The quality controls of a full 10 CFR 50 Appendix B quality assurance (QA) program apply to all safety-related SSC that were also determined to be risk-significant by the RAP. Non-safety-related SSC that are determined to be risk-significant by the RAP are subject to the quality controls stated in NUREG 0800 Section 17.5 part V. The AREVA NP QAP Topical Report (ANP-10266A) Addendum A implements the guidance for the design of all non-safety-related RAP SSC during design certification. Later stages of plant development such as procurement, fabrication, construction, and initial testing activities will be conducted by the COL applicant by applying these program controls. The RAI 420 Response to Question 3.2.1-12 revises U.S.EPR FSAR Tier 2, Section 17.4.2 to clarify the quality requirements to be applied to all RAP SSC.

RAP SSC are specified at a system and structure level in U.S. EPR FSAR Tier 2, Table 17.4-2. While performing detailed design, the COL applicant may further refine the list to identify in Table 17.4-2 risk-significant SSC at a component level and screen out the non-risk-significant components. Development of specifications for RAP components as well as procurement, fabrication, shipping, and storage phases will be controlled by the COL applicant's RAP program as specified by the U.S. EPR FSAR Tier 2, Section 17.4.4 COL item.

For the design certification, ITAAC will be revised to confirm that as the SSC design progresses into design specification development, the procurement information for risk-significant SSC is consistent with the RAP-related key assumptions and insights. This confirmation occurs by verifying that appropriate quality requirements are detailed in the design specifications for the procurement of RAP SSC.

Consistency with RAP-related key assumptions and insights during the construction and initial testing phases is verified by confirming that the systems are as-built in accordance with the system-level ITAAC identified in U.S. EPR FSAR Tier 1, Chapter 2. At a plant level, RAP SSC-related safety-significant features are based on probabilistic risk assessment (PRA) insights and severe accident analyses, which are identified in U.S. EPR FSAR Tier 2, Table 14.3-6 and verified by corresponding system-related ITAAC. Since the construction and initial testing phases are covered by existing system-level ITAAC, the phrase "will be constructed" will be removed from U.S. EPR FSAR Tier 1, Section 3.2, Item 2.1 and Table 3.2-1.

U.S. EPR FSAR Tier 2 Section 17.4.2 will be revised to describe the process for confirming the application of appropriate quality controls to the design and procurement of RAP SSC.

FSAR Impact:

U.S. EPR FSAR, Tier 1, Section 3.2 and Tier 2, Section 17.4.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

DRAFT

3.2 Reliability Assurance Program

1.0 Description

The Reliability Assurance Program (RAP) is implemented as an integral part of the design process and is implemented during the detailed design phase prior to initial fuel load. The RAP evaluates and sets priorities for the structures, systems and components (SSC) in the design, based on their degree of risk significance.

The objective of the RAP is to provide reasonable assurance that risk-significant SSC are designed such that: (1) assumptions from the risk analysis are maintained, (2) SSC when challenged, function in accordance with the assumed reliability, (3) SSC whose failure could result in a reactor trip, function in accordance with the assumed reliability, and (4) maintenance actions to achieve the assumed reliability are identified.

2.0 Design Features

2.1

~~The RAP provides reasonable assurance that~~ The plant is designed ~~and will be constructed~~ in a manner that is consistent with the key assumptions and risk insights for risk-significant SSC within the scope of the RAP.

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17.04-23

3.0 Inspections, Tests, Analyses, and Acceptance Criteria

Table 3.2-1 lists the RAP ITAAC.

Table 3.2-1—Reliability Assurance Program ITAAC

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	<p>The RAP provides reasonable assurance that The plant is designed and will be constructed in a manner that is consistent with the key assumptions and risk insights for risk-significant SSC <u>within the scope of the RAP.</u></p>	<p>An analysis will confirm the adequacy of the RAP. <u>An analysis will be performed of the implementation of the RAP to confirm that reliability assurance activities for the design stage have been applied to the design of all within-scope SSC.</u></p>	<p>A report exists and concludes that the RAP includes the following three (3) major elements:</p> <ul style="list-style-type: none"> • Identification of all SSC in the scope of the plant-specific RAP. • Description of the methodology used to identify the SSC in scope of the plant-specific RAP. <ul style="list-style-type: none"> • For the SSC in scope of RAP, identify and describe the reliability assurance activities that are accomplished prior to the initial fuel load, which provide reasonable assurance that the plant is designed and constructed in a manner that is consistent with the key assumptions (including reliability and availability assumptions in probabilistic risk assessment when applicable) and risk insights for the risk-significant SSC. <p><u>Documentation exists that:</u></p> <ul style="list-style-type: none"> • <u>Identifies the SSC within the scope of the RAO.</u> • <u>Shows within-scope SSC that are classified as safety-related will be designed in accordance with a 10 CFR 50 Appendix B quality assurance program.</u> • <u>Shows within-scope SSC that are classified as non-safety-related will be designed consistent with PRA assumptions.</u>

DRAFT

17.4.2 Reliability Assurance Program Implementation

The RAP for the design stage is implemented in several phases. The first phase is the design certification phase, which defines the overall structure of the RAP, including guidance for procedures and other activities which will be implemented in future phases. A design-specific PRA model is used to develop a list of SSC and insights. The risk-significant SSC are identified in this phase for inclusion in the program using the probabilistic, deterministic, or other methods previously indicated.

The second phase is the site-specific phase, which introduces the plant site-specific design information to the RAP process. A COL applicant that references the U.S. EPR design certification will identify the site-specific SSC within the scope of the RAP. Also in this phase, the RAP is modified or appended based on consideration specific to the site.

Risk-significant SSC are subject to the appropriate quality requirements through the implementation of the RAP. Safety-related SSC that are also determined to be risk significant in the RAP have a full 10 CFR 50 Appendix B quality assurance program applied along with the applicable GDC.

For non-safety-related SSC that have been determined to be “risk-significant” under the RAP in Section 17.4, the U.S. EPR design applies additional quality assurance measures and design requirements consistent with the guidance in SRP 17.5, Part V, “Non-Safety Related SSC Quality Controls.” These additional quality assurance measures are described in the approved topical report ANP-10266A, Revision 1, “AREVA NP Inc. Quality Assurance

Plan (QAP) for Design Certification of the U.S. EPR Topical Report,” Addendum A, and are applied to all risk-significant SSC during the design certification phase.

All risk-significant SSC will be included in the scope of the COL applicant’s Maintenance Rule program in accordance with 10 CFR 50.65(b) in the high safety significance category. This is done so that the risk-significant SSC are subject to performance monitoring criteria which are established consistent with the reliability and availability assumptions used in the PRA.

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Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) provide confirmation that as the SSC design progresses into developing design specifications, the procurement information for risk significant SSC is consistent with the RAP related key assumptions and insights. This confirmation occurs by verifying that appropriate quality requirements are specified in the design specifications for the procurement of risk significant SSC.

Beyond the writing of design specifications, consistency with RAP related key assumptions and insights during the construction and initial testing phases are verified

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by confirming that the systems are as built in accordance with the system level ITAAC identified in Tier 1 Chapter 2. Related to the RAP SSC, at a plant level, safety-significant features based on PRA insights and severe accident analyses are identified in Table 14.3-6, which are verified by corresponding system related ITAAC.

Also in this phase, the RAP is modified or appended based on consideration of conditions specific to the site.

17.4.2.1 Design Consideration

The RAP is established to provide sufficient documentation during the design and operation of the U.S. EPR. As part of the design process, SSC are evaluated to determine their dominant failure modes and the associated effects. Most components have an industry operating history available that defines the significant failure modes and their likely causes.

Strategies for failure prevention or mitigation are developed through the identification and prioritization of the various possible failure modes for each component. This information is provided as input for the operational program phase.

During the design phase, appropriate design reviews and reliability assessments evaluate the reliability of risk-significant SSC that are identified by the PRA and other sources. As part of the design reliability process, design engineers provide quality and reliability to the development of the SSC while verifying that the PRA properly models the basis for the design of SSC. PRA model development during the design phase mostly relies on generic information, bounding assumptions, or design requirements as a basis for model development. An assessment of the model can be performed when changes occur during the plant design phase, as well as during normal plant operations. The assessment considers reliability concepts, such as human reliability, redundancy, diversity, and external events to improve the system design. A further evaluation of design options is pursued if the results of the assessment reveal that the proposed design change could conflict with the results and insights derived from the PRA, or could cause significant unavailability of a safety function.

The design changes that affect the PRA model are reviewed and appropriate revisions are prepared in accordance with the PRA update process.

17.4.2.2 SSC Identification and Prioritization

The first task of the RAP is to identify the risk-significant SSC that are to be included in the scope of the program. A table that includes a list of design-specific SSC is included in the RAP. This preliminary list is prepared and controlled under the RAP program. This list is updated when the plant-specific PRA is developed. The selection of risk-significant SSC uses a combination of probabilistic and deterministic insights