

## ArevaEPRDCPEm Resource

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**From:** WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]  
**Sent:** Friday, June 12, 2009 5:11 PM  
**To:** Tesfaye, Getachew  
**Cc:** Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, FSAR Ch 7, Supplement 4  
**Attachments:** RAI 59 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 4 of the 11 questions of RAI No. 59 on October 13, 2008. AREVA NP submitted Supplement 1 to the response on January 14, 2009 to address 1 of the remaining 7 questions. AREVA NP submitted Supplement 2 to the response on March 3, 2009 to address 2 of the remaining 6 questions. AREVA NP submitted Supplement 3 to the response on March 31, 2009 to address 1 of the remaining 4 questions. The attached file, "RAI 59 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining 3 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 59 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 59 — 07.01-1	2	2
RAI 59 — 07.01-8	3	3
RAI 59 — 07.01-9	4	6

This concludes the formal AREVA NP response to RAI 59, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

(Russ Wells on behalf of)

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

**AREVA NP, Inc.**

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**From:** WELLS Russell D (AREVA NP INC)  
**Sent:** Tuesday, March 31, 2009 1:45 PM  
**To:** 'Getachew Tesfaye'  
**Cc:** Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, FSAR Ch 7, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 4 of the 11 questions of RAI No. 59 on October 13, 2008. AREVA NP submitted Supplement 1 to the response on January 14, 2009 to address 1 of the remaining 7 questions. AREVA NP submitted Supplement 2 to the response on March 3, 2009 to address 2 of the remaining 6 questions. The attached file, "RAI 59 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 4 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 59 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to question 07.01-11.

Question #	Start Page	End Page
RAI 59 — 07.01-11	2	2

Based upon feedback from the NRC staff, AREVA NP is modifying the I&C architecture. Therefore, AREVA NP is unable to provide technically correct and complete responses to the questions that were scheduled to be completed by March 31, 2009. The revised schedule for technically correct and complete responses to the remaining 3 questions is provided below:

Question #	Response Date
RAI 59 — 07.01-1	June 12, 2009
RAI 59 — 07.01-8	June 12, 2009
RAI 59 — 07.01-9	June 12, 2009

Sincerely,

(Russ Wells on behalf of)

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

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**From:** Pederson Ronda M (AREVA NP INC)

**Sent:** Tuesday, March 03, 2009 3:44 PM

**To:** Getachew Tesfaye

**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 4 of the 11 questions of RAI No. 59 on October 13, 2008. AREVA NP submitted Supplement 1 to the response on January 14, 2009 to address 1 of the remaining 7 questions. The attached file, "RAI 59 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the remaining 6 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 59 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
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RAI 59 — 07.01-7	2	3
RAI 59 — 07.01-10	4	5

The schedule for technically correct and complete responses to the remaining 4 questions is unchanged and provided below:

Question #	Response Date
RAI 59 — 07.01-1	March 31, 2009
RAI 59 — 07.01-8	March 31, 2009
RAI 59 — 07.01-9	March 31, 2009
RAI 59 — 07.01-11	March 31, 2009

Sincerely,

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

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**From:** Pederson Ronda M (AREVA NP INC)

**Sent:** Wednesday, January 14, 2009 1:50 PM

**To:** 'Getachew Tesfaye'

**Cc:** DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); PANNELL George L (AREVA NP INC)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 4 of the 11 questions of RAI No. 59 on October 13, 2008. The attached file, "RAI 57 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 1 of the remaining 7 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 57 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 59 — 07.01-6	2	3

The schedule for technically correct and complete responses to the remaining 6 questions is unchanged and provided below:

Question #	Response Date
RAI 59 — 07.01-1	March 3, 2009
RAI 59 — 07.01-7	March 3, 2009
RAI 59 — 07.01-8	March 31, 2009

RAI 59 — 07.01-9	March 31, 2009
RAI 59 — 07.01-10	March 3, 2009
RAI 59 — 07.01-11	March 31, 2009

Sincerely,

*Ronda Pederson*

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**From:** Pederson Ronda M (AREVA NP INC)

**Sent:** Wednesday, November 26, 2008 3:47 PM

**To:** 'Getachew Tesfaye'

**Cc:** PANNELL George L (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. 59, FSAR Ch 7, Revised Schedule

Getachew,

On October 13, 2008, AREVA NP provided technically correct and complete responses to 4 of the 11 questions and a schedule for responding to the remaining 7 questions of RAI No. 59. On October 22, 2008, a public meeting was held between AREVA NP Inc. and the NRC to discuss the U.S. EPR FSAR Chapter 7 and RAI No.'s 56 through 61.

A revised schedule for a technically correct and complete response to each of the remaining 7 questions of RAI No. 59 is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 59 — 07.01-1	March 3, 2009
RAI 59 — 07.01-6	January 15, 2009
RAI 59 — 07.01-7	March 3, 2009
RAI 59 — 07.01-8	March 31, 2009
RAI 59 — 07.01-9	March 31, 2009
RAI 59 — 07.01-10	March 3, 2009
RAI 59 — 07.01-11	March 31, 2009

Sincerely,

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

Licensing Manager, U.S. EPR(TM) Design Certification

**AREVA NP Inc.**

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**From:** WELLS Russell D (AREVA NP INC)  
**Sent:** Monday, October 13, 2008 6:02 PM  
**To:** 'Getachew Tesfaye'  
**Cc:** 'John Rycyna'; Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, FSAR Ch 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 59 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the 11 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 59 Questions 07.01-2, and 07.01-4.

The following table indicates the respective pages in the response document, "RAI 59 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

<b>Question #</b>	<b>Start Page</b>	<b>End Page</b>
RAI 59 — 07.01-1	2	2
RAI 59 — 07.01-2	3	3
RAI 59 — 07.01-3	4	4
RAI 59 — 07.01-4	5	5
RAI 59 — 07.01-5	6	6
RAI 59 — 07.01-6	7	7
RAI 59 — 07.01-7	8	8
RAI 59 — 07.01-8	9	9
RAI 59 — 07.01-9	10	10
RAI 59 — 07.01-10	11	11
RAI 59 — 07.01-11	12	12

A complete answer is not provided for 7 of the 11 questions. The schedule for a technically correct and complete response to this question is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 59 — 07.01-1	December 4, 2008
RAI 59 — 07.01-6	December 4, 2008
RAI 59 — 07.01-7	December 4, 2008
RAI 59 — 07.01-8	December 4, 2008
RAI 59 — 07.01-9	December 4, 2008
RAI 59 — 07.01-10	December 4 2008
RAI 59 — 07.01-11	December 4, 2008

Sincerely,

(Russ Wells on behalf of)

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

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**From:** Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]

**Sent:** Friday, September 12, 2008 5:58 PM

**To:** ZZ-DL-A-USEPR-DL

**Cc:** Mario Gareri; Terry Jackson; Michael Canova; Joseph Colaccino; John Rycyna

**Subject:** U.S. EPR Design Certification Application RAI No. 59 (955), FSAR Ch7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 26, 2008, and on September 5, 2008, 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 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:** 571

**Mail Envelope Properties** (1F1CC1BBDC66B842A46CAC03D6B1CD4101953065)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 59, FSAR Ch 7,  
Supplement 4  
**Sent Date:** 6/12/2009 5:10:33 PM  
**Received Date:** 6/12/2009 5:10:36 PM  
**From:** WELLS Russell D (AREVA NP INC)

**Created By:** Russell.Wells@areva.com

**Recipients:**

"Pederson Ronda M (AREVA NP INC)" <Ronda.Pederson@areva.com>

Tracking Status: None

"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>

Tracking Status: None

"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>

Tracking Status: None

"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>

Tracking Status: None

**Post Office:** AUSLYNCMX02.adom.ad.corp

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	11437	6/12/2009 5:10:36 PM
RAI 59 Supplement 4 Response US EPR DC.pdf		67233

**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

**Response to**

**Request for Additional Information No. 59, Supplement 4**

**9/12/2008**

**U. S. EPR Standard Design Certification**

**AREVA NP Inc.**

**Docket No. 52-020**

**SRP Section: 07.01 - Instrumentation and Controls - Introduction**

**Application Section: 7.1.2.2.12**

**ICE1 Branch**



**Question 07.01-1:**

Provide the entire failure modes and effects analysis (FMEA) for the U.S. EPR Instrumentation and Control (I&C) System.

Clause 5.1 of IEEE Std. 603-1991 requires, in part, that safety systems shall perform all safety functions required for a design basis event in the presence of: (1) any single detectable failure within the safety systems concurrent with all identifiable but non-detectable failures; (2) all failures caused by the single failure; and (3) all failures and spurious system actions that cause or are caused by the design basis event requiring the safety functions. Appendix 7.1-C of the Standard Review Plan identifies the guidance in Regulatory Guide 1.53 as acceptance criteria. The applicant provided an FMEA for the protection system as part of one of the RAI responses for the U.S. EPR Digital Protection System Topical Report. But, an FMEA was not seen for the entire U.S. EPR I&C system. In addition, the RAI response said that the results and additional details for the Protection System FMEA will be provided in Sections 7.2 and 7.3. In the DC FSAR, Section 7.1.2.2.12, the applicant stated that only applicable sections of the I&C FMEA will be included in Sections 7.2.2.2 and 7.3.2.2. This is not acceptable as the entire FMEA is needed for staff review.

**Response to Question 07.01-1:**

A complete failure modes and effects analyses for the safety-related I&C systems will be performed later in the design process. The ITAAC presented in the response to RAI Question 14.3.5-4 in RAI 78 will address Clause 5.1 of IEEE Std 603. See RAI response 14.3.5-4.

**FSAR Impact:**

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

**Question 07.01-8:**

Provide the complete design requirements and configuration of the TELEPERM XS components to implement the Protective System (PS) architecture.

While the U.S. EPR Digital PS topical report identified the TELEPERM XS components to be used in the PS, the topical report did not completely describe how the components would be configured to implement the proposed architecture.

**Response to Question 07.01-8:**

The nuclear regulatory and industrial design requirements for the TELEPERM XS (TXS) components used to implement the U.S. EPR protection system (PS) architecture are identified in U.S. EPR FSAR, Tier 2, Table 7.1. The PS functional requirements are found primarily in U.S. EPR FSAR, Tier 2, Sections 7.2, 7.3, and 7.6, and reflect the assumptions used in the plant safety analyses described in Tier 2, Chapter 15.

AREVA NP assumes that the question's reference to the "configuration" of TXS components refers to identifying specific versions of the components and their documentation, such as detailed wiring diagrams showing the components' interconnections.

Identifying the as-built configuration of the TXS components that form the U.S. EPR protection system is determined later in the design process. This design process may be performed separately for each U.S. EPR constructed, and thus the "configuration" of the protection system may differ from plant to plant as newer versions of TXS components become available. While the fundamental building blocks for the TXS are not expected to change, it is inappropriate to identify specific component configurations in the design certification application, as each plant will use the most recent technology.

As newer solid state devices are developed or other components become obsolete, the individual components may change but the functionality of the TXS modules described in the PS topical report will remain the same.

Appropriate ITAAC are provided in U.S. EPR FSAR, Tier 1 to verify that the TXS equipment selected for use in each plant satisfies the relevant system requirements.

**FSAR Impact:**

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

**Question 07.01-9:**

Describe where all of the plant-specific action items from the TELEPERM XS topical report have been addressed in the DC-FSAR. The response should have sufficient detail for staff to determine acceptability of meeting those plant-specific action items

**Response to Question 07.01-9:**

The plant-specific action items listed in the TELEPERM XS topical report safety evaluation report are addressed in the U.S. EPR FSAR as follows:

**1. Generic Qualification Bounds Plant-Specific Conditions**

The U.S. EPR FSAR addresses TXS equipment qualification for the location where it is installed. Electromagnetic and radio frequency interference are addressed in U.S. EPR FSAR, Tier 2, Section 7.1.2.4.17 and Section 3.11, which include a commitment to adhere to Regulatory Guide 1.180 (which endorses EPRI TR-102323). Environmental qualification (e.g., temperature, humidity, and seismic) of TXS equipment is addressed in U.S. EPR FSAR, Tier 2, Section 7.1.2.4.20 and Section 3.11 which include a commitment to adhere to Regulatory Guide 1.209 (which endorses EPRI TR-107330 as an acceptable method for addressing mild-environment qualification).

**2. Plant-Specific Software Development Verification and Validation (V&V) Activities and Configuration Management**

U.S. EPR FSAR, Tier 2, Section 7.1.2.5.12 addresses conformance with BTP 7-14, including software development V&V activities and configuration management.

**3. TXS Auxiliary Feedwater Control System**

U.S. EPR FSAR, Tier 2, Section 7.1.2.1.6 addresses the requirements of 10 CFR50.34(f)(2)(xii).

**4. Accident Monitoring Instrumentation**

U.S. EPR FSAR, Tier 2, Section 7.1.2.1.8 addresses the requirements of 10 CFR50.34(f)(2)(xvii).

**5. Inadequate Core Cooling**

U.S. EPR FSAR, Tier 2, Section 7.1.2.1.9 addresses the requirements of 10 CFR50.34(f)(2)(xviii).

**6. Containment Isolation**

U.S. EPR FSAR, Tier 2, Section 7.1.2.1.7 addresses the requirements of 10 CFR50.34(f)(2)(xiv).

7. Monitoring Plant Conditions Following Core Damage

U.S. EPR FSAR, Tier 2, Section 7.1.2.1.10 addresses the requirements of 10 CFR50.34(f)(2)(xix).

8. Monitoring Reactor Vessel Water Level during Post-Accident Conditions

This requirement is relevant to boiling water reactors; the U.S. EPR is a pressurized water reactor.

9. Diverse Actuation of the Reactor Trip and Engineered Safety Feature Actuation System (ESFAS)

U.S. EPR FSAR, Tier 2, Section 7.8 addresses diverse actuation of reactor trips and ESFAS, including compliance to 10 CFR 50.62 and conformance to BTP 7-19.

10. Setpoints

Setpoint analysis for the U.S. EPR has been addressed in ANP-10275PA, "U.S. EPR Instrument Setpoint Methodology Topical Report," January 2008, and ANP-10287P, "U.S. EPR Incore Trip Setpoint and Transient Methodology," November 2007.

11. Safety Analysis

U.S. EPR FSAR, Tier 2, Chapter 15 contains the generic accident analysis for the U.S. EPR.

12. Defense Against Common Mode Failures

U.S. EPR FSAR, Tier 2, Section 7.8 addresses defense against common mode failures.

13. Technical Specification

U.S. EPR FSAR, Tier 2 Chapter 16 contains the generic standard technical specifications for the U.S. EPR.

14. Compliance with EPRI TR-107330 with Reference to Power Supplies

U.S. EPR FSAR, Tier 2, Section 8.3.2 "DC Power Systems" describes how DC power is supplied to the instrumentation and control (I&C) cabinets. Therefore, this plant-specific action item is not applicable to the U.S. EPR.

15. Compliance with EPRI TR-107330 with Reference to Isolation Devices

This action item is specific to upgrades of existing analog I&C systems and is not applicable to the U.S. EPR.

16. Diversity Assessment

U.S. EPR FSAR, Tier 2, Section 7.8 addresses the I&C systems required to be diverse from the TXS systems.

## 17. Requirements Traceability Matrix

ANP-10272, "Software Program Manual for TELEPERM XS Safety Systems Topical Report," December 2006 is referenced in U.S. EPR FSAR, Tier 2, Section 7.1.1.2.2, and describes the lifecycle process for TXS software design and addresses the use of a requirements traceability matrix.

### **FSAR Impact:**

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