ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Wednesday, January 14, 2009 2:03 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. 61, Supplement 1
Attachments: RAI 61 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 9 of the 17 questions of RAI No. 61 on October 13, 2008. The attached file, "RAI 61 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 2 of the remaining 8 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 61 Question 07-04-5.

The following table indicates the respective pages in the response document, "RAI 61 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 61 — 07.04-5	2	3
RAI 61 — 07.05-1	4	5

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

Question #	Response Date
RAI 61 — 07.04-1	March 3, 2009
RAI 61 — 07.04-9	March 3, 2009
RAI 61 — 07.05-3	March 31, 2009
RAI 61 — 07.05-4	March 31, 2009
RAI 61 — 07.05-5	March 31, 2009
RAI 61 — 07.05-6	March 3, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, November 26, 2008 3:54 PM
To: 'Getachew Tesfaye'
Cc: PANNELL George L (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. 61, FSAR Ch 7, Revised Schedule

Getachew,

On October 13, 2008, AREVA NP provided technically correct and complete responses to 9 of the 17 questions and a schedule for responding to the remaining 8 questions of RAI No. 61. 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 8 questions or RAI No. 61 is provided below.

Question #	Response Date
RAI 61 — 07.04-1	March 3, 2009
RAI 61 — 07.04-5	January 15, 2009
RAI 61 — 07.04-9	March 3, 2009
RAI 61 — 07.05-1	January 15, 2009
RAI 61 — 07.05-3	March 31, 2009
RAI 61 — 07.05-4	March 31, 2009
RAI 61 — 07.05-5	March 31, 2009
RAI 61 — 07.05-6	March 3, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR(TM) Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: WELLS Russell D (AREVA NP INC)
Sent: Monday, October 13, 2008 6:22 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. 61, FSAR Ch 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 61 Response US EPR DC.pdf" provides technically correct and complete responses to 9 of the 17 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 61 Questions 07.04-3, and 07.04-7.

The following table indicates the respective pages in the response document, "RAI 61 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 61 — 07.04-1	2	2
RAI 61 — 07.04-2	3	3
RAI 61 — 07.04-3	4	4
RAI 61 — 07.04-4	5	5
RAI 61 — 07.04-5	6	6
RAI 61 — 07.04-6	7	7
RAI 61 — 07.04-7	8	9
RAI 61 — 07.04-8	10	10
RAI 61 — 07.04-9	11	11
RAI 61 — 07.05-1	12	12
RAI 61 — 07.05-2	13	13
RAI 61 — 07.05-3	14	14
RAI 61 — 07.05-4	15	15
RAI 61 — 07.05-5	16	16
RAI 61 — 07.05-6	17	17
RAI 61 — 07.05-7	18	18
RAI 61 — 07.05-8	19	19

A complete answer is not provided for 8 of the 17 questions. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 61 — 07.04-1	December 4, 2008
RAI 61 — 07.04-5	December 4, 2008
RAI 61 — 07.04-9	December 4, 2008
RAI 61 — 07.05-1	December 4, 2008
RAI 61 — 07.05-3	December 4, 2008
RAI 61 — 07.05-4	December 4, 2008
RAI 61 — 07.05-5	December 4, 2008
RAI 61 — 07.05-6	December 4, 2008

Sincerely,

(Russ Wells on behalf of)
Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
New Plants Deployment
AREVA NP, Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, September 12, 2008 6:05 PM

To: ZZ-DL-A-USEPR-DL
Cc: Denise McGovern; Terry Jackson; Michael Canova; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 61 (970,977),FSAR Ch 7

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: 119

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D3197A97C)

Subject: Response to U.S. EPR Design Certification Application RAI No. 61, Supplement 1
Sent Date: 1/14/2009 2:03:04 PM
Received Date: 1/14/2009 2:03:28 PM
From: Pederson Ronda M (AREVA NP INC)

Created By: Ronda.Pederson@areva.com

Recipients:
"PANNELL George L (AREVA NP INC)" <George.Pannell@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
"Getachew Tesfaye" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

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MESSAGE	6478	1/14/2009 2:03:28 PM
RAI 61 Supplement 1 Response US EPR DC.pdf	93284	

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

Response to

Request for Additional Information No. 61 Supplement 1 (970,977), Revision 0

9/12/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.04 - Safe Shutdown Systems
SRP Section: 07.05 - Information Systems Important to Safety
Application Section: FSAR Ch 7
ICE1 Branch

Question 07.04-5:

DC FSAR, Section 7.4 states the definition of safe shutdown (is) different depending on the scenario. Define safe shutdown for each of the given three scenarios provided in Section 7.4 in accordance with GDC 19. Also, identify the equipment and process of achieving safe shutdown for the three scenarios.

Response to Question 07.04-5:

Three safe shutdown scenarios are listed in U.S. EPR FSAR Tier 2, Section 7.4. The first safe shutdown scenario assumes that only safety-related equipment is available to shut down the plant.

The U.S. EPR is designed so that the reactor can be taken from normal operating conditions to cold shutdown with only offsite or onsite power available, in accordance with BTP 5-4. The cold shutdown condition refers to a subcritical reactor and reactor coolant temperature no greater than 200ºF. Safe shutdown is defined as hot shutdown for this scenario, with the capability to proceed to cold shutdown. The protection system (PS), safety automation system (SAS), priority and actuator control system (PACS), and the safety information and control system (SICS) can control and monitor the safety-related plant systems described in U.S. EPR FSAR Tier 2, Section 7.4.1.2 to reach safe shutdown.

The second scenario is the post-fire safe shutdown in accordance with RG 1.189. In this scenario, safe shutdown is defined as cold shutdown and safety-related or non-safety-related equipment can be utilized. The U.S. EPR may be shutdown outside the main control room at the remote shutdown station (RSS). The process information and control system (PICS) and the process automation system (PAS) can control and monitor the post-fire safe shutdown systems that are described in Section 7.4.1.3 to reach cold shutdown. The PACS is also necessary to control any safety-related equipment. Safety-related equipment can be controlled by the PAS through the operational part of the PACS module.

The third scenario is the safe shutdown required during and following a station blackout (SBO) in accordance with 10 CFR 50.63 and RG 1.155. Safe shutdown for SBO (non-design basis accident) means bringing the plant to those shutdown conditions specified in plant technical specifications as hot standby or hot shutdown, as appropriate (plants have the option of maintaining the RCS at normal operating temperatures or at reduced temperatures), and as defined in 10 CFR 50.2. The PICS and the PAS can control and monitor the equipment and systems necessary to achieve safe shutdown in this scenario. The PACS is also necessary to control any safety-related equipment. U.S. EPR FSAR Tier 2, Section 8.4 provides a description of other systems and processes necessary for achieving post-SBO safe shutdown.

GDC 19 requires that equipment at appropriate locations outside the control room shall be provided with the design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and with a potential capability for subsequent cold shutdown of the reactor through use of suitable procedures. The U.S. EPR design can achieve hot shutdown with the capability for subsequent cold shutdown from outside the control room with the use of PICS and SICS in the RSS. U.S EPR FSAR Tier 2, Section 7.1.1.3.1 describes the functions that SICS can perform and U.S EPR FSAR Tier 2, Section 7.1.1.3.2 describes the functions that PICS can perform.

The PACS will be added to the I&C systems associated with safe shutdown by adding the following paragraph to U.S. EPR FSAR Tier 2, Section 7.4.1.1.

“The priority and actuator control system (PACS) module is assigned to safety-related components associated with safe shutdown. The functions performed by PACS modules are described in Section 7.1.1.4.3.”

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 7.4.1.1 will be revised as described in the response and indicated on the enclosed markup.

Question 07.05-1:

Provide information to demonstrate how the design addresses 10 CFR 50.55a(h) in accordance with the acceptance criteria of Section 7.5 of NUREG-0800. For accident monitoring instrumentation isolated from the protection system, the applicable requirements of 10 CFR 50.55a (h) for IEEE Std. 603-1991 are Clause 5.6.3, "Independence between Safety Systems and Other Systems," and Clause 6.3, "Interaction between the Sense and Command Features and Other Systems."

DC-FSAR Sections 7.1 and 7.5.1.2, specify the use of the non-safety-related process information and control system (PICS) as the primary component of the accident monitoring system. DC-FSAR Table 7.1-2 identifies that 10 CFR 50.55a (h) is not applicable to PICS because it is non-safety-related.

Response to Question 07.05-1:

U.S. EPR FSAR Tier 2, Section 7.4.2.2 addresses conformance of the safety-related I&C systems used for shutdown in accordance with 10 CFR 50.55a (h) and IEEE 603. IEEE Std 603-1991, Clause 5.6.3.1 (1) states "Equipment that is used for both safety and non-safety functions shall be classified as part of the safety systems. Isolation devices used to affect a safety system boundary shall be classified as part of the safety system". The PICS does not perform any safety-related functions. Additionally, as described in the Digital Protection System Topical Report (ANP-10281), the protection system (PS) provides the physical and electrical independence as well as the electrical isolation devices for connections between the PS and non-safety-related systems. In accordance with IEEE Std 603-1991, Clause 5.6.3.1 (1), the methods and equipment to provide isolation from the PS is classified as part of the PS, and not the PICS. Therefore, IEEE Std 603-1991, Clause 5.6.3, "Independence between Safety Systems and Other Systems," does not apply to the PICS.

IEEE Std 603-1991, Clause 6.3, "Interaction between the Sense and Command Features and Other Systems," provides guidance to prevent a single credible event that could result in a non-safety-related system action causing a condition requiring protective action while concurrently preventing the protective action in those channels designated to protect during the condition. As described in the Digital Protection System Topical Report (ANP-10281), design features of the U.S. EPR I&C systems along with the redundancy designed into the PS allow the PS to conform to the guidance of IEEE Std 603-1991, Clause 6.3. U.S. EPR FSAR Tier 2, Section 7.4.2.2.1 addresses how the safety-related I&C systems comply with IEEE Std 603-1991, Clause 6.3. Because the safety-related I&C systems (which includes the PS) comply with IEEE Std 603-1991, Clause 6.3, AREVA NP does not apply IEEE Std 603-1991, Clause 6.3 to the PICS.

The PICS is the primary component of the accident monitoring system, meaning that the operators will normally use the PICS for the operator interface. If the PICS is not available, the safety information and control system (SICS) is used. As shown in U.S. EPR FSAR Tier 2, Table 7.1-2, the SICS is credited for complying with 10 CFR 50.55a (h). Because the PICS is classified as non-safety related, it is not credited for complying with 10 CFR 50.55a(h), or the applicable requirements of 10 CFR 50.55a (h) for IEEE Std 603-1991, Clause 5.6.3, "Independence between Safety Systems and Other Systems," and Clause 6.3, "Interaction between the Sense and Command Features and Other Systems."

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

07.04-3, 07.04-5, 07.04-7

In certain scenarios, non-safety-related systems perform shutdown functions. These functions are initiated in the process automation system (PAS). The priority and actuator control system (PACS) module is assigned to safety-related components associated with safe shutdown. The functions performed by PACS modules are described in Section 7.1.1.4.3.

The human machine interface (HMI) is the PICS. In case of unavailability of the PICS, functions needed to achieve and maintain a safe shutdown condition can be controlled through the SICS. Monitoring and control of the safety-related systems are both available in the main control room (MCR) and the remote shutdown station (RSS).

7.4.1.2 Safe Shutdown Using Safety-Related Systems and Equipment

The plant is designed so that it can be taken from normal operating conditions to cold shutdown using only safety-related systems. The safety-related systems and equipment, that with proper alignment are capable of achieving a safe shutdown of the plant, are described in Section 7.4.1.2.1 through Section 7.4.1.2.13. These systems satisfy GDC 1, GDC 2, GDC 3, and GDC 4.

The systems and equipment described in Section 7.4.1.2.1 through Section 7.4.1.2.13 are capable of bringing the plant to a cold shutdown condition, with only offsite or onsite power available along with the most limiting single failure. The entire shutdown procedure is completed from the MCR.

7.4.1.2.1 Emergency Feedwater System

The emergency feedwater system (EFWS) provides a safety-related means of supplying feedwater to the steam generators (SG) for decay heat removal. This system is capable of maintaining hot standby and facilitating a plant cooldown. The I&C associated with the EFWS, are described in Section 10.4.9.

7.4.1.2.2 Main Steam Supply System

The main steam supply system (MSSS) contains the main steam relief train (MSRT). The MSRT provides secondary side pressure control capability. The MSRT valves are located outside of containment upstream of the main steam isolation valves (MSIV). These valves are used to remove decay heat via the SGs in the event the condenser is unavailable (including loss of power), and to dissipate the heat to atmosphere. The MSRT may be used to cool and depressurize the reactor coolant system (RCS) to conditions necessary to initiate residual heat removal. The MSSS contains the MSIVs and associated bypass valves that are necessary to isolate the secondary plant and to allow decay heat removal by the MSRT. The I&C associated with the MSSS are described in Section 10.3.