ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, February 08, 2011 9:46 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); RYAN Tom (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 5
Attachments: RAI 414 Supplement 5 Response US EPR DC.pdf

Getachew,

AREVA NP provided a schedule on July 14, 2010 for a technically correct and complete response to RAI 414. Supplement 1 response was sent on October 28, 2010 to provide a revised schedule for all questions. Supplement 2 was sent on November 29, 2010 to provide a revised schedule for 6 of the remaining 7 questions. Supplement 3 was sent on January 13, 2011 to provide a revised schedule for 6 of the remaining 7 questions. Supplement 4 was sent on February 3, 2011 to provide technically correct and complete responses to two questions. Based on discussions with NRC, the attached file, "RAI 414 Supplement 5 Response US EPR DC.pdf" provides technically correct and complete responses to two of the remaining 5 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 these two questions.

The following table indicates the respective pages in the response document, "RAI 414 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 414 07.07-20	2	3
RAI 414 07.07-22	4	5

The schedule for a technically correct and complete response to the three remaining questions is unchanged and is provided below.

Question #	Response Date
RAI 414 — 07.02-32	March 22, 2011
RAI 414 — 07.03-30	March 10, 2011
RAI 414 — 07.03-31	March 10, 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: Thursday, February 03, 2011 2:44 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 4

Getachew,

AREVA NP provided a schedule on July 14, 2010 for a technically correct and complete response to RAI 414. Supplement 1 response was sent on October 28, 2010 to provide a revised schedule for all questions. Supplement 2 was sent on November 29, 2010 to provide a revised schedule for 6 of the remaining 7 questions. Supplement 3 was sent on January 13, 2011 to provide a revised schedule for 6 of the remaining 7 questions. Based on discussions with NRC, the attached file, "RAI 414 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to two of the remaining 7 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 these two questions.

The following table indicates the respective pages in the response document, "RAI 414 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 414 07.02-33	2	3
RAI 414 07.04-14	4	5

To allow additional time to interact with the NRC staff, a revised schedule for the remaining questions is provided.

Question #	Response Date
RAI 414 — 07.02-32	March 22, 2011
RAI 414 — 07.03-30	March 10, 2011
RAI 414 — 07.03-31	March 10, 2011
RAI 414 — 07.07-20	March 10, 2011
RAI 414 — 07.07-22	March 10, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
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From: BRYAN Martin (External RS/NB)
Sent: Thursday, January 13, 2011 4:35 PM
To: 'Tesfaye, Getachew'

Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); PANNELL George (CORP/QP)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 3

Getachew,

AREVA NP provided a schedule on July 14, 2010 for a technically correct and complete response to RAI 414. Supplement 1 response was sent on October 28, 2010 to provide a revised schedule for all questions. Supplement 2 was sent on November 29, 2010 to provide a revised schedule for 6 of the remaining 7 questions. To allow additional time to interact with the NRC staff, a revised schedule for these six questions is provided. The schedule for Question 07.02-32 remains the same.

A complete answer is not provided for the 7 questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 414 — 07.02-32	March 01, 2011
RAI 414 — 07.03-33	February 11, 2011
RAI 414 — 07.02-30	February 11, 2011
RAI 414 — 07.03-31	February 11, 2011
RAI 414 — 07.04-14	February 11, 2011
RAI 414 — 07.07-20	February 11, 2011
RAI 414 — 07.07-22	February 11, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
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Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, November 29, 2010 2:35 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); PANNELL George (CORP/QP)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 2

Getachew,

AREVA NP provided a schedule on July 14, 2010 for a technically correct and complete response to RAI 414. Supplement 1 response was sent on October 28, 2010 to provide a revised schedule for all questions. To allow additional time to interact with the NRC staff, a revised schedule for six of the seven questions is provided. The schedule for Question 07.02-32 remains the same.

A complete answer is not provided for the 7 questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 414 — 07.02-32	March 01, 2011
RAI 414 — 07.03-33	January 13, 2011
RAI 414 — 07.02-30	January 13, 2011
RAI 414 — 07.03-31	January 13, 2011

RAI 414 — 07.04-14	January 13, 2011
RAI 414 — 07.07-20	January 13, 2011
RAI 414 — 07.07-22	January 13, 2011

Sincerely,

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

From: BRYAN Martin (External RS/NB)
Sent: Thursday, October 28, 2010 4:53 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); PANNELL George (CORP/QP)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 1

Getachew,

AREVA NP provided a schedule on July 14, 2010 for a technically correct and complete response to RAI 414. To allow additional time to interact with the NRC staff, a revised schedule is provided.

A complete answer is not provided for the 7 questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 414 — 07.02-32	March 01, 2011
RAI 414 — 07.03-33	November 29, 2010
RAI 414 — 07.02-30	November 29, 2010
RAI 414 — 07.03-31	November 29, 2010
RAI 414 — 07.04-14	November 29, 2010
RAI 414 — 07.07-20	November 29, 2010
RAI 414 — 07.07-22	November 29, 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: Wednesday, July 14, 2010 6:32 PM
To: 'Tesfaye, Getachew'

Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); RYAN Tom (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 414 Response US EPR DC.pdf" provides a schedule since technically correct and complete responses to the 7 questions are not provided.

The following table indicates the respective pages in the response document, "RAI 414 Response US EPR DC.pdf" that contain AREVA NP's responses to the subject questions.

Question #	Start Page	End Page
RAI 414 — 07.02-32	2	2
RAI 414 — 07.03-33	3	3
RAI 414 — 07.02-30	4	6
RAI 414 — 07.03-31	7	8
RAI 414 — 07.04-14	9	9
RAI 414 — 07.07-20	10	10
RAI 414 — 07.07-22	11	11

A complete answer is not provided for the 6 questions. The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 414 — 07.02-32	October 28, 2010
RAI 414 — 07.03-33	October 28, 2010
RAI 414 — 07.02-30	October 28, 2010
RAI 414 — 07.03-31	October 28, 2010
RAI 414 — 07.04-14	October 28, 2010
RAI 414 — 07.07-20	October 28, 2010
RAI 414 — 07.07-22	October 28, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, June 15, 2010 4:58 PM
To: ZZ-DL-A-USEPR-DL
Cc: Truong, Tung; Morton, Wendell; Spaulding, Deirdre; Mott, Kenneth; Jackson, Terry; Canova, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 414(4394,4398,4752,4548), FSAR Ch. 7 OPEN ITEM

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on June 8, 2010, and on June 15, 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 7 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: 2516

Mail Envelope Properties (199EBB4D1CD9644D9472AA84D5D8EFA7193B99)

Subject: Response to U.S. EPR Design Certification Application RAI No. 414, FSAR Ch. 7 OPEN ITEM, Supplement 5
Sent Date: 2/8/2011 9:45:52 AM
Received Date: 2/8/2011 9:45:56 AM
From: BRYAN Martin (EXTERNAL AREVA)

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

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Tracking Status: None
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Tracking Status: None

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MESSAGE	11293	2/8/2011 9:45:56 AM
RAI 414 Supplement 5 Response US EPR DC.pdf	57634	

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

Response to

Request for Additional Information No. 414(4394, 4398, 4752, 4548), Revision 1, Supplement 5

6/15/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.02 - Reactor Trip System
SRP Section: 07.03 - Engineered Safety Features Systems
SRP Section: 07.04 - Safe Shutdown Systems
SRP Section: 07.07 - Control Systems

Application Section: FSAR Chapter 7

QUESTIONS for Instrumentation, Controls and Electrical Engineering 1 (AP1000/EPR Projects) (ICE1)

Question 07.07-20:

OPEN ITEM

Provide the design descriptions and design commitments for the RCSL software development process.

10 CFR 52.47(a)(2) requires, in part, that the description and analysis of the structures, systems, and components (SSCs) of the facility, shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. 10 CFR 52.47(a)(9) states, in part, that the application must contain a final safety analysis report (FSAR) that describes the facility, presents the design bases, and must include ... an evaluation of the standard plant design against the Standard Review Plan (SRP) revision in effect 6 months before the docket date of the application. The guidance of SRP 7.7 states that control system software should be developed using a structured process similar to that applied to safety system software and that elements of the review process may be tailored to account for the lower safety significance of control system software. U.S. EPR FSAR Tier 2, Section 7.1.1.4.5 state that there are no quality requirements or qualification requirements for RCSL equipment. The staff could not identify U.S. EPR FSAR design descriptions that would address the software quality development process for the RCSL control system that would address SRP 7.7 guidance. Therefore, the staff request the applicant to address the software quality guidance of SRP 7.7 for the RCSL control system software.

Response to Question 07.07-20:

The reactor control, surveillance and limitation (RCSL) control system is not an event mitigating system from U.S. EPR FSAR Tier 2, Chapter 15. As with any non-safety system design, quality requirements providing reliable and consistent system operation will be applied during software development. Potential malfunctions of this software are bounded by U.S. EPR FSAR Tier 2, Chapter 15 accident analyses resulting in mitigation of initiating events by the safety-related protection system

The intent of the quality and qualification statement in U.S. EPR FSAR Tier 2, Section 7.1.1.4.5 is not to indicate that there is no quality and qualification requirement for the RCSL, but that the quality and qualification requirement for the RCSL is not equivalent to that of safety-related equipment.

The quality and qualification statement in U.S. EPR FSAR Tier 2, Section 7.1.1.4.5 for RCSL will be modified as follows:

<u>For qualification:</u>

The RCSL equipment is located in Safeguard Buildings that provide a mild environment during and following design basis events. Equipment selected for use in the RCSL will be rated by the manufacturer (or otherwise reasonably expected) to operate under the mild environmental conditions expected to exist at its location during the events that the equipment is expected to be used.

For quality:

For the RCSL equipment the quality requirements will be consistent with the Quality Assurance Plan for non-safety-related equipment as described in Addendum A of Topical Report ANP-10266.

FSAR Impact:

The U.S. EPR FSAR Tier 2, Section 7.1.1.4.5 will be revised as described in the response and indicated on the enclosed markup.

Question 07.07-22:

OPEN ITEM

Define and describe the design for the Process Automation System (PAS) components that are referred to as "CU" in the U.S. EPR Final Safety Evaluation Report (FSAR).

10 CFR 52.47(a)(2) requires, in part, that the description and analysis of the structures, systems, and components (SSCs) of the facility, shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. The Chapter 7 Standard Review Plan (SRP) guidance states that the information provided for the design basis items, taken alone and in combination, should have one and only one interpretation. The design bases should not contain contradictory requirements.

As an example, the reactor control, surveillance, and limitation system (RCSL) states that the CU components are called "Control Units." However, the RCSL system is a TXS-based system. The U.S. EPR FSAR Tier 1, Revision 1, Section 2.4.9, design description item 3.2, states that the PAS software and hardware are diverse from TXS based systems (i.e. Protection system and SAS). Also, the diversity, defense-in-depth technical report (D3-TR)," U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report," ANP-10304, Revision 1 [ML093420199], takes credit for the PAS system components being diverse from TXS-based system components. The D3-TR states, in part, that "The PAS equipment is specified to be an industrial control platform other than TXS" and that "This means the PAS equipment will be of fundamentally different design than the PS equipment."

Therefore, since the PAS design is credited with being diverse from TXS based components, such as the RCSL TXS based system, the staff is not able to conclude that the CU components in the PAS are the same CU components as described in the RCSL system. Further, the FSAR design descriptions do not sufficiently describe what the PAS CU components are.

Response to Question 07.07-22

"Control Unit (CU)" is a generic term used to identify functional units in various Level 1 I&C systems that perform the same generic types of functions. Any CU performs primarily open and closed loop controls on process components and interfaces with the associated Level 2 system. This term is not technology specific and was not intended to be associated with a specific platform. Each U.S. EPR FSAR Tier 2, 7.1 subsection that uses the term CU defines the individual functions of a CU that is used in that system. It is these functions that should be considered as the design basis of the I&C system in question, rather than the generic term "Control Unit".

Use of the term "Control Unit" is not intended to suggest that the same technology will be used across multiple I&C systems, nor does it invalidate or contradict any diversity and defense-in-depth commitments made by AREVA NP in ANP-10304 or other sources of regulatory commitments.

The following item will be added for clarity to the definition section U.S. EPR FSAR Tier 2, Section 7.1:

> "Control Unit (CU) - a functional unit in an Instrumentation and Control system that contains a function processor. A Control Unit is a generic functional term and is neither system nor technology specific. Generally, a CU consists of microprocessors, firmware, hardware, and software necessary to implement its functions. However, specific details of each Distributed Control System design are unique to the technology chosen to implement its functions."

The diversity of the PAS from Teleperm XS (TXS) based systems will be addressed in the Response to RAI 413, Question 07.08-13.

FSAR Impact:

The U.S. EPR FSAR Tier 2, Section 7.1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

07.07-22

Communication Module – A device that is used to transmit digital information from one device to another over one or several data communication links using a predetermined protocol.

Control Unit (CU) - a functional unit in an Instrumentation and Control system that contains a function processor. A Control Unit is a generic functional term and is neither system nor technology specific. Generally, a CU consists of microprocessors, firmware, hardware, and software necessary to implement its functions. However, specific details of each Distributed Control System design are unique to the technology chosen to implement its functions.

Channel – an arrangement of components and modules as required to generate a single protective action signal when required by a generating station condition. A channel loses its identity where single protective action signals are combined.

Class 1E – the safety classification of the electrical equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or are otherwise essential in preventing significant release of radioactive material to the environment.

Component Level – actuation or control of a single actuation device (component).

Credited – designation for a system that can perform a safety function, and is qualified and relied upon to do so.

Data Communication – a method of sharing information between devices that involves a set of rules, formats, encodings, specifications, and conventions for transmitting data over a communication path, known as a protocol.

Division – the designation applied to a given system or set of components that enables the establishment and maintenance of physical, electrical, and functional independence from other redundant sets of components.

Design Basis Event (DBE) – postulated events used in the design to establish the acceptable requirements for the structures, systems, and components.

Function Processor – a device that contains hardware, system software, and application software that executes instrumentation and control functions.

Functional Unit – a set of assembled components within a system that perform specific functions to support overall system operation.

I&C Platform – a generic set of system hardware, system software, and engineering tools that can be configuration for a wide variety of instrumentation and control functions.

The MSIs provide a communication path between the RCSL and other I&C systems via the GWs for both display of information and transfer of manual commands. The MSIs also provide a path to the SU for testing and maintenance of the various functional units of the RCSL.

Redundant GWs are provided to interface to the plant data network.

The SU provides the ability to monitor, service, and test the RCSL.

Equipment

The RCSL is implemented with the TXS digital I&C platform.

The AUs, CUs, DUs and MSIs generally consist of subracks, I/O modules, function processors, and communication modules, and optical link modules. SUs and GWs are non-safety-related and consist of industrial grade computers. Fiber optic and copper cable is used for the various data and hardwired connections.

07.07-20

Qualification Requirements

The RCSL equipment is located in Safeguard Buildings that provide a mild environment during and following design basis events. Equipment selected for use in the RCSL will be rated by the manufacturer (or otherwise reasonably expected) to operate under the mild environmental conditions expected to exist at its location during the events that the equipment is expected to be used.

~~There are no qualification requirements for the RCSL equipment.~~

07.07-20

Quality Requirements

For the RCSL equipment the quality requirements will be consistent with the Quality Assurance Plan for non-safety-related equipment as described in Addendum A of Topical Report ANP-10266.

~~There are no quality requirements for the RCSL equipment.~~

Diversity Requirements

There are no diversity requirements for the RCSL equipment.

Data Communications

Data communications implemented in the RCSL are:

- AU-CU – bi-directional, point-to-point data connections implemented with the TXS Profibus protocol.