

ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Wednesday, February 16, 2011 3:51 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); HUDSON Greg (AREVA); GARDNER Darrell (AREVA); Canova, Michael; WILLIFORD Dennis (AREVA); BUDZIK Dennis (AREVA)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 413, FSAR Ch. 7 Questions 7.8-10, 7.8-11, 7.8-12, 7.8-14, 7.8-16, and 7.8-17
Attachments: RAI 413 Response US EPR DC - DRAFT.pdf

Getachew,

To support the final response date of March 15, 2011, attached is a draft response for RAI 413 questions 7.8-10, 7.8-11, 7.8-12, 7.8-14, 7.8-16, and 7.8-17. Please let me know if the staff has questions or 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: Tuesday, February 01, 2011 6:06 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. 413, FSAR Ch. 7, Supplement 4

Getachew,

AREVA NP provided a schedule for technically complete and correct responses to the questions in RAI 413 on September 08, 2010. Supplement 1 response to RAI No. 413 was sent on November 19, 2010, to provide a revised schedule. Supplement 2 response to RAI No. 413 was sent on December 13, 2010, to provide a revised schedule. Supplement 3 response to RAI No. 413 was sent on January 28, 2011, to provide technically correct and complete responses to seven questions. Based on discussions with NRC, the attached file, "RAI 413 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to seven of the remaining 26 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 413 Question 07.08-20.

The following table indicates the respective pages in the response document, "RAI 413 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 413 07.08-15	2	2
RAI 413 07.08-18	3	4

RAI 413 07.08-20	5	6
RAI 413 07.08-23	7	11
RAI 413 07.08-25	12	14
RAI 413 07.08-33	15	19
RAI 413 07.08-34	20	33

The schedule for technically correct and complete responses to the remaining 19 questions is unchanged and provided below:

Question #	Response Date
RAI 413 07.08-10	March 15, 2011
RAI 413 07.08-11	March 15, 2011
RAI 413 07.08-12	March 15, 2011
RAI 413 07.08-13	March 15, 2011
RAI 413 07.08-14	March 15, 2011
RAI 413 07.08-16	March 15, 2011
RAI 413 07.08-17	March 15, 2011
RAI 413 07.08-19	March 31, 2011
RAI 413 07.08-21	March 2, 2011
RAI 413 07.08-22	March 2, 2011
RAI 413 07.08-26	March 31, 2011
RAI 413 07.08-27	March 2, 2011
RAI 413 07.08-28	March 2, 2011
RAI 413 07.08-29	March 31, 2011
RAI 413 07.08-32	March 31, 2011
RAI 413 07.08-35	March 2, 2011
RAI 413 07.08-38	March 2, 2011
RAI 413 07.08-39	March 2, 2011
RAI 413 07.08-42	March 15, 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: Friday, January 28, 2011 5:41 PM
To: 'Tefaye, 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. 413, FSAR Ch. 7, Supplement 3

Getachew,

The proprietary and non-proprietary responses for RAI 413 Supplement 3 are submitted via AREVA NP Inc. letter, "Response to U.S. EPR Design Certification Application RAI No. 413, Supplement 3, Questions 07.08-24, 07.08-30, 07.08-31, 07.08-36, 07.08-37, 07.08-40, and 07.08-41" NRC 11:010, dated January 28, 2011. An affidavit to support withholding of information from public disclosure, per 10CFR2.390(b), is provided as an enclosure to that letter.

AREVA NP provided a schedule for technically complete and correct responses to the questions in RAI 413 on September 08, 2010. Supplement 1 response to RAI No. 413 was sent on November 19, 2010, to provide a revised schedule. Supplement 2 response to RAI No. 413 was sent on December 13, 2010, to provide a revised schedule.

The following table indicates the respective pages in the response document, "RAI 413 Supplement 3 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 413 07.08-24	2	11
RAI 413 07.08-30	12	12
RAI 413 07.08-31	13	22
RAI 413 07.08-36	23	24
RAI 413 07.08-37	25	26
RAI 413 07.08-40	27	38
RAI 413 07.08-41	39	43

To provide additional time to interact with the NRC a revised schedule is provided below (bolded dates have changed).

Question #	Response Date
RAI 413 07.08-10	March 15, 2011
RAI 413 07.08-11	March 15, 2011
RAI 413 07.08-12	March 15, 2011
RAI 413 07.08-13	March 15, 2011
RAI 413 07.08-14	March 15, 2011
RAI 413 07.08-15	March 2, 2011
RAI 413 07.08-16	March 15, 2011
RAI 413 07.08-17	March 15, 2011
RAI 413 07.08-18	March 2, 2011
RAI 413 07.08-19	March 31, 2011
RAI 413 07.08-20	March 2, 2011
RAI 413 07.08-21	March 2, 2011
RAI 413 07.08-22	March 2, 2011
RAI 413 07.08-23	March 2, 2011
RAI 413 07.08-25	March 2, 2011
RAI 413 07.08-26	March 31, 2011
RAI 413 07.08-27	March 2, 2011
RAI 413 07.08-28	March 2, 2011
RAI 413 07.08-29	March 31, 2011

RAI 413 07.08-32	March 31, 2011
RAI 413 07.08-33	March 2, 2011
RAI 413 07.08-34	March 2, 2011
RAI 413 07.08-35	March 2, 2011
RAI 413 07.08-38	March 2, 2011
RAI 413 07.08-39	March 2, 2011
RAI 413 07.08-42	March 15, 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, December 13, 2010 8:40 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); RYAN Tom (RS/NB); PANNELL George (CORP/QP)
Subject: Response to U.S. EPR Design Certification Application RAI No. 413, FSAR Ch. 7, Supplement 2

Getachew,

AREVA NP provided a schedule for technically complete and correct responses to the questions in RAI 413 on September 08, 2010. Supplement 1 response to RAI No. 413 was sent on November 19, 2010, to provide a revised schedule.

To provide additional time to interact with the NRC a revised schedule is provided below (bolded dates have changed).

Question #	Response Date
RAI 413 07.08-10	March 15, 2011
RAI 413 07.08-11	March 15, 2011
RAI 413 07.08-12	March 15, 2011
RAI 413 07.08-13	March 15, 2011
RAI 413 07.08-14	March 15, 2011
RAI 413 07.08-15	January 28, 2011
RAI 413 07.08-16	March 15, 2011
RAI 413 07.08-17	March 15, 2011
RAI 413 07.08-18	January 28, 2011
RAI 413 07.08-19	February 22, 2011
RAI 413 07.08-20	January 28, 2011
RAI 413 07.08-21	January 28, 2011
RAI 413 07.08-22	January 28, 2011
RAI 413 07.08-23	January 28, 2011
RAI 413 07.08-24	January 28, 2011

RAI 413 07.08-25	January 28, 2011
RAI 413 07.08-26	February 22, 2011
RAI 413 07.08-27	January 28, 2011
RAI 413 07.08-28	January 28, 2011
RAI 413 07.08-29	February 22, 2011
RAI 413 07.08-30	January 28, 2011
RAI 413 07.08-31	January 28, 2011
RAI 413 07.08-32	February 22, 2011
RAI 413 07.08-33	January 28, 2011
RAI 413 07.08-34	January 28, 2011
RAI 413 07.08-35	January 28, 2011
RAI 413 07.08-36	January 28, 2011
RAI 413 07.08-37	January 28, 2011
RAI 413 07.08-38	January 28, 2011
RAI 413 07.08-39	January 28, 2011
RAI 413 07.08-40	January 28, 2011
RAI 413 07.08-41	January 28, 2011
RAI 413 07.08-42	March 15, 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: Friday, November 19, 2010 4:51 PM
To: 'Tefsaye, 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. 413, FSAR Ch. 7

Getachew,

AREVA NP provided a schedule for technically complete and correct responses to the questions in RAI 413 on September 08, 2010. To provide additional time to interact with the NRC a revised schedule is provided below for questions 07.08-36, 07.08-39, and 07.08-41.

Question #	Response Date
RAI 413 07.08-10	March 15, 2011
RAI 413 07.08-11	March 15, 2011
RAI 413 07.08-12	March 15, 2011
RAI 413 07.08-13	March 15, 2011
RAI 413 07.08-14	March 15, 2011

RAI 413 07.08-15	December 17, 2010
RAI 413 07.08-16	March 15, 2011
RAI 413 07.08-17	March 15, 2011
RAI 413 07.08-18	December 17, 2010
RAI 413 07.08-19	January 28, 2011
RAI 413 07.08-20	December 17, 2010
RAI 413 07.08-21	January 28, 2011
RAI 413 07.08-22	December 17, 2010
RAI 413 07.08-23	December 17, 2010
RAI 413 07.08-24	January 28, 2011
RAI 413 07.08-25	December 17, 2010
RAI 413 07.08-26	December 17, 2010
RAI 413 07.08-27	December 17, 2010
RAI 413 07.08-28	December 17, 2010
RAI 413 07.08-29	January 28, 2011
RAI 413 07.08-30	January 28, 2011
RAI 413 07.08-31	January 28, 2011
RAI 413 07.08-32	January 28, 2011
RAI 413 07.08-33	December 17, 2010
RAI 413 07.08-34	December 17, 2010
RAI 413 07.08-35	January 28, 2011
RAI 413 07.08-36	December 15, 2010
RAI 413 07.08-37	January 28, 2011
RAI 413 07.08-38	December 17, 2010
RAI 413 07.08-39	December 15, 2010
RAI 413 07.08-40	January 28, 2011
RAI 413 07.08-41	December 15, 2010
RAI 413 07.08-42	March 15, 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: Wednesday, September 08, 2010 4:33 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. 413, FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information RAI 413.

The following table indicates the respective pages in the response document, "RAI 413 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 413 07.08-10	2	2
RAI 413 07.08-11	3	3
RAI 413 07.08-12	4	4
RAI 413 07.08-13	5	5
RAI 413 07.08-14	6	6
RAI 413 07.08-15	7	7
RAI 413 07.08-16	8	8
RAI 413 07.08-17	9	9
RAI 413 07.08-18	10	10
RAI 413 07.08-19	11	11
RAI 413 07.08-20	12	12
RAI 413 07.08-21	13	13
RAI 413 07.08-22	14	14
RAI 413 07.08-23	15	15
RAI 413 07.08-24	16	16
RAI 413 07.08-25	17	18
RAI 413 07.08-26	19	19
RAI 413 07.08-27	20	20
RAI 413 07.08-28	21	21
RAI 413 07.08-29	22	22
RAI 413 07.08-30	23	23
RAI 413 07.08-31	24	24
RAI 413 07.08-32	25	25
RAI 413 07.08-33	26	26
RAI 413 07.08-34	27	27
RAI 413 07.08-35	28	28
RAI 413 07.08-36	29	29
RAI 413 07.08-37	30	30
RAI 413 07.08-38	31	31
RAI 413 07.08-39	32	32
RAI 413 07.08-40	33	33
RAI 413 07.08-41	34	34
RAI 413 07.08-42	35	35

A complete answer is not provided for 33 of the 33 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 413 07.08-10	March 15, 2011
RAI 413 07.08-11	March 15, 2011
RAI 413 07.08-12	March 15, 2011
RAI 413 07.08-13	March 15, 2011
RAI 413 07.08-14	March 15, 2011
RAI 413 07.08-15	December 17, 2010
RAI 413 07.08-16	March 15, 2011
RAI 413 07.08-17	March 15, 2011
RAI 413 07.08-18	December 17, 2010
RAI 413 07.08-19	January 28, 2011
RAI 413 07.08-20	December 17, 2010
RAI 413 07.08-21	January 28, 2011

RAI 413 07.08-22	December 17, 2010
RAI 413 07.08-23	December 17, 2010
RAI 413 07.08-24	January 28, 2011
RAI 413 07.08-25	December 17, 2010
RAI 413 07.08-26	December 17, 2010
RAI 413 07.08-27	December 17, 2010
RAI 413 07.08-28	December 17, 2010
RAI 413 07.08-29	January 28, 2011
RAI 413 07.08-30	January 28, 2011
RAI 413 07.08-31	January 28, 2011
RAI 413 07.08-32	January 28, 2011
RAI 413 07.08-33	December 17, 2010
RAI 413 07.08-34	December 17, 2010
RAI 413 07.08-35	January 28, 2011
RAI 413 07.08-36	November 19, 2010
RAI 413 07.08-37	January 28, 2011
RAI 413 07.08-38	December 17, 2010
RAI 413 07.08-39	November 19, 2010
RAI 413 07.08-40	January 28, 2011
RAI 413 07.08-41	November 19, 2010
RAI 413 07.08-42	March 15, 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: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, August 09, 2010 3:46 PM
To: ZZ-DL-A-USEPR-DL
Cc: Mott, Kenneth; Spaulding, Deirdre; Jackson, Terry; Canova, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 413(4772), FSAR Ch. 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on June 4, 2010, and discussed with your staff on July 22, 2010. Draft RAI Questions 07.08-19, 07.08-21, 07.08-23, and 07.08-41, were modified 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: 2562

Mail Envelope Properties (199EBB4D1CD9644D9472AA84D5D8EFA71C9971)

Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 413, FSAR Ch. 7 Questions 7.8-10, 7.8-11, 7.8-12, 7.8-14, 7.8-16, and 7.8-17
Sent Date: 2/16/2011 3:51:05 PM
Received Date: 2/16/2011 3:53:00 PM
From: BRYAN Martin (EXTERNAL AREVA)

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

Recipients:

"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"HUDSON Greg (AREVA)" <Greg.Hudson@areva.com>
Tracking Status: None
"GARDNER Darrell (AREVA)" <Darrell.Gardner@areva.com>
Tracking Status: None
"Canova, Michael" <Michael.Canova@nrc.gov>
Tracking Status: None
"WILLIFORD Dennis (AREVA)" <Dennis.Williford@areva.com>
Tracking Status: None
"BUDZIK Dennis (AREVA)" <Dennis.Budzik@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	Size	Date & Time
MESSAGE	15657	2/16/2011 3:53:00 PM
RAI 413 Response US EPR DC - DRAFT.pdf		453018

Options

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

Request for Additional Information No. 413(4772), Revision 1

8/9/2010

U.S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 07.08 - Diverse Instrumentation and Control Systems

Application Section: ANP-10304

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

DRAFT

Question 07.08-10:

Provide correct and unambiguous design descriptions for the PAS.

10CFR52.47(a)(2) states that an application must contain a “description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. ... The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations....”

Section 2.4.9, item 3.2, of the U.S. EPR FSAR, Tier 1 design descriptions, state that the PAS system hardware and system software are diverse from the PS and SAS system hardware and software. However, Section 7.1.1.4.6 of the U.S. EPR Tier 2, FSAR, Revision 2-markups, removed the diversity commitment from the PAS system. The design description now states that there “are no diversity requirements for the PAS.” The design information provided for the design basis items, taken alone and in combination, should have one and only one interpretation. Therefore, the staff requests the applicant to provide correct and unambiguous design descriptions for the PAS in order to complete its safety evaluation. The staff expects this RAI response to be included within the FSAR design descriptions.

Response to Question 07.08-10:

The process automation system (PAS) design description diversity was deleted in U.S. EPR FSAR Tier 1, Section 2.4.9, Revision 2. Design descriptions for the PAS in U.S. EPR FSAR Tier 1 and U.S. EPR FSAR Tier 2 are consistent. Additional information is provided in the Response to RAI 413, Question 07.08-11, including details of diversity information that will be included in U.S. EPR FSAR Tier 2, Section 7.1 revision.

FSAR Impact:

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

Question 07.08-11:

Provide the design descriptions and design commitments for the credited PAS equipment diversity.

10CFR52.47(a)(2) states that an application must contain a “description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. ... The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations....” 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 22 requires, in part, that design techniques, such as functional diversity or diversity in component design and principles of operation, shall be used to the extent practical to prevent loss of the protection function.”

The applicant describes PAS equipment diversity attributes within Technical Report ANP-10304, “U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report,” Revision 1, as a way to show sufficient mitigation for a postulated PS software common-cause-failure (SWCCF) and to justify that adequate diversity has been provided in the design. However, Section 7.1.1.4.6 of the U.S. EPR FSAR, Tier 2, Revision 2 Interim markups, removed the diversity commitment from the PAS system. The design description now states that there “are no diversity requirements for the PAS.” The information provided for the design basis items, taken alone and in combination, should have one and only one interpretation. It should be possible to trace the information in each design basis item to the safety analyses, plant system design documents, regulatory requirements, applicant commitments, or other plant documents. Therefore, if the applicant’s FSAR PAS design does not commit to diverse PAS equipment, then the applicant is not able to take credit for PAS diversity in order to demonstrate that adequate and sufficient PAS diversity exist within their design.

Response to Question 07.08-11:

This response clarifies the role of the process automation system (PAS) regarding the U.S. EPR D3 analysis.

In the U.S. EPR D3 analysis, the PAS is not intended to mitigate any design basis event concurrent with a protection system (PS) software common-cause failure (CCF). The PAS does not process any of the manual system level controls of critical safety-related functions to satisfy BTP 7-19, Point 4.

Under best-estimate assumptions in the U.S. EPR D3 analysis, the normally operating control functions in the PAS (e.g., pressurizer level control, pressurizer pressure control) continue to operate following a PS software CCF. This assumption allows the event progression to be accurately modeled, considering the effects on plant systems caused by the normally operating PAS control functions.

To support the best-estimate PAS control functions assumption, Technical Report ANP-10304, Section 4.2 states that “The PAS equipment is specified to be an industrial control platform other than TXS.” Inherent diversity attributes result from this equipment specification and the nature of the functions performed by the PAS (i.e., closed loop control as opposed to actuation

based on voting). Technical Report ANP-10304, Section 4.2 discusses these inherent diversity attributes to support the validity of the best-estimate assumption.

U.S. EPR FSAR Tier 2, Section 7.1 will be revised to specify that PAS equipment is an industrial control platform other than Teleperm XS (TXS). U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 will be revised to clarify the role of the PAS in the U.S. EPR D3 analysis as described in this response.

To support submittal of complete and consistent information, and considering multiple RAI responses and design changes communicated to the NRC staff, the U.S. EPR FSAR Tier 2, Section 7.1 revisions described in this response will be submitted with the Response to RAI 442, Question 07.01-26. The U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 revisions described in this response will be submitted with the Response to RAI 413, Question 07.08-13.

FSAR Impact:

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

DRAFT

Question 07.08-12:

Provide the PAS design descriptions that would demonstrate that the non-safety-related PAS meets the applicable regulatory requirements for manual operation of the safety-related main steam relief trains (MSRT) during a postulated software common-cause-failure (SWCCF) of the PS.

IEEE-603-1998, Clause 5.6, requires in part, independence between safety systems and other systems. 10CFR 50.62 requires, in part, that ATWS equipment must be designed to perform its function in a reliable manner. 10CFR52.47(a)(2) states that an application must contain a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. GDC 24, states, in part, that interconnection of the protection and control systems shall be limited to assure that safety is not significantly impaired.

The U.S. EPR Tier 2, FSAR Section 7.8.1.2.2, and Technical Report ANP-10304, "U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report," Revision 1, Appendix A, Section A.2.2, provide one line design descriptions which state that manual MSRT is available through the PAS. Point 3 of Item II.Q. of the Commission's SRM to SECY-93-087, states, in part, that the [credited] diverse or different function may be performed by a non-safety system if the system is of sufficient quality to perform the necessary function under the associated event conditions. Point 4 of Item II.Q. of the Commission's SRM to SECY-93-087, states, in part, that a set of controls located in the main control room should be provided for manual system-level actuation of critical safety functions. The applicant states in U.S. EPR Tier 2, FSAR Section 7.1.1.4.6 of the Revision 2 Interim mark-ups that the PAS equipment has no quality requirements. Therefore, the staff is not able to determine if the PAS design consist of sufficient quality. The staff could not identify design descriptions that would demonstrate that the credited PAS diverse manual controls for the MSRT are actuated at the system level. In addition, U.S. EPR Tier 2, FSAR Section 7.1.1.4.6 Revision 2 Interim mark-ups do not provide design descriptions to describe PAS outputs to safety-related actuators. PAS System Architecture Figure 7.1-12 of Tier 2 of the U.S. EPR FSAR does not provide sufficient design details such as proper isolation between PAS and safety-related components that would permit the staff to understand the design as it relates to the safety evaluations. Therefore, the staff requests the applicant to demonstrate PAS regulatory conformance for credited PAS actions within the applicant's D3 technical report.

Response to Question 07.08-12:

The Response to Question 07.08-11 clarifies the role of the process automation system (PAS) in the U.S. EPR D3 analysis. The PAS is not intended to mitigate any design basis event concurrent with a protection system (PS) software common-cause failure (CCF). The PAS does not process any of the manual system level controls of critical safety-related functions to satisfy BTP 7-19, Point 4. The quality requirement in SECY-93-087 does not apply to the PAS.

U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 will be revised to clarify the role of the PAS in the U.S. EPR D3 analysis as described in the Response to Question

07.08-11. These revisions clarify that the manual control of the main steam relief train (MSRT) credited in the U.S. EPR D3 analysis will not be processed by the PAS.

To support submittal of complete and consistent information, and considering multiple RAI responses and design changes communicated to the NRC staff, the U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 revisions described in this response will be submitted with the Response to RAI 413, Question 07.08-13.

FSAR Impact:

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

DRAFT

Question 07.08-14:

With the exception of the methodology contained in Section 4.0 of Revision 0, provide the missing information found in Revision 0 into Revision 1, of Technical Report ANP-10304, "U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report."

10CFR52.47(a)(2) states that an application must contain a "description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations.

Response to Question 07.08-14:

The excluded information from Technical Report ANP-10304, Revision 1 identified in this question has been intentionally removed from Technical Report ANP-10304, Revision 0 because the information is no longer valid. The excluded information has been updated and incorporated in Technical Report ANP-10304, Revision 1. The description and justification of the changes made to the document are described on Technical Report ANP-10304, Revision 1, Page i as follows:

"Complete revision to incorporate I&C architectural design changes and to reflect completion of analysis rather than methodology to perform future analysis."

FSAR Impact:

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

Question 07.08-16:

Provide the detailed design descriptions that would explain all of the systems available that would allow the operator to manually control the main steam relief trains (MSRT) from the main control room (MCR). Include within the description the signal path from the operator's manual input from within the MCR to the final actuation device (MSRT).

10CFR52.47(a)(2) states that an application must contain a "description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. ... The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations...."

The staff could not identify design descriptions that would explain how the non-safety related process automation system (PAS) would initiate safety-related MSRT operation. However within the applicant's "U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report" (D3-TR), ANP-10304, Revision 1 (ML093420199), Section A.2.2 of Appendix A states that credit is taken for a manual function to control MSRT from the PICS and PAS. Therefore, the staff could not identify clear design descriptions that will permit sufficient understanding of credited manual functions for the MSRT operation.

Response to Question 07.08-16:

The Response to Question 07.08-11 clarifies the role of the process automation system (PAS) in the U.S. EPR D3 analysis. The PAS is not intended to mitigate any design basis event concurrent with a protection system (PS) software common-cause failure (CCF). The PAS does not process any of the manual system level controls of critical safety-related functions to satisfy BTP 7-19, Point 4.

U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 will be revised to clarify the role of the PAS in the U.S. EPR D3 analysis as described in the Response to Question 07.08-11. These revisions clarify the path taken through the I&C architecture for manual actions credited in the U.S. EPR D3 analysis.

To support submittal of complete and consistent information, and considering multiple RAI responses and design changes communicated to the NRC staff, the U.S. EPR FSAR Tier 2, Section 7.8 and Technical Report ANP-10304 revisions described in this response will be submitted with the Response to RAI 413, Question 07.08-13.

FSAR Impact:

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

Question 07.08-17:

Identify all RCSL and PAS actuations, for both a manual and automatic control, that rely on a PS output. For each of the conditions identified, evaluate compliance with 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 24 and its affect on the D3 analyses presented in Appendix A to ANP-10304 Rev 1.

10CFR52.47(a)(2) states that an application must contain a “description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. ... The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations....” GDC 29, “Protection Against Anticipated Operational Occurrences” requires that the protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences.

“U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report” (D3-TR), ANP-10304, Revision 1 (ML093420199), Section A.1 of Appendix A states that “... SWCCF in the PS, concurrent with an AOO or PA, does not affect I&C functions outside the PS, if those functions do not rely on a PS output” and refers to Section 4 of ANP-10304 Rev 1. Section 4.12 states that due to the diversity attributes described in Section 4.2, “... control functions in the PAS that do not rely on PS output, can be assumed to function normally following a PS SWCCF concurrent with an AOO or PA.” While Section 4.2 addresses PAS diversity attributes, it does not say whether any PAS function relies on a PS output.

Response to Question 07.08-17:

The Response to RAI 413, Supplement 2, Question 07.08-15 clarifies the role of the reactor control, surveillance and limitation (RCSL) in the U.S. EPR D3 analysis. The Response to RAI 413, Supplement 2, Question 07.08-15 and Technical Report ANP-10304, Revision 1, Section 4.1 and Section A.2.2, state that the RCSL is not credited in the U.S. EPR D3 assessment for event mitigation. The RCSL does not process any manual actions credited in the U.S. EPR D3 plant response analysis.

The process automation system (PAS) is not intended to mitigate any design basis event concurrent with a protection system (PS) software common-cause failure (CCF). The PAS does not process any of the manual system level controls of critical safety-related functions to satisfy BTP 7-19, Point 4.

Under best-estimate assumptions used in the U.S. EPR D3 analysis, the normally operating control functions in the PAS (e.g., pressurizer level control, pressurizer pressure control) continue to operate following a PS software CCF. This assumption allows the event progression to be accurately modeled, considering the effects on plant systems caused by the normally operating PAS control functions.

Instead of identifying all the PAS functions that rely on a PS output, Technical Report ANP-10304, Appendix A will be revised to confirm that each PAS control function assumed to be operating under best-estimate assumptions does not rely on a PS output. Technical Report

ANP-10304, Appendix A discusses the various PAS control functions in the evaluation of each event.

To support submittal of complete and consistent information, and considering multiple RAI responses and design changes communicated to the NRC staff, the Technical Report ANP-10304 revisions described in this response will be submitted with the Response to RAI 413, Question 07.08-13.

FSAR Impact:

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

DRAFT