

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Thursday, November 17, 2011 12:11 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); LENTZ Tony (EXTERNAL AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 506 (5456), FSAR Ch. 14, Supplement 2
Attachments: RAI 506 Supplement 2 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 18 questions in RAI No. 506 on September 28, 2011. Supplement 1 response to RAI 506 was submitted on November 8, 2011 to provide technically correct and complete responses to 12 of the 18 questions.

The attached file, "RAI 506 Supplement 2 Response US EPR DC.pdf" provides a technically correct and complete revised final response to Question 14.03.05-29. The response has not changed from that provided in Supplement 1, however two additional affected pages from the U.S. EPR Final Safety Analysis Report were omitted from the earlier transmittal.

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 Question 14.03.05-29.

The following table indicates the respective pages in the response document, "RAI 506 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's revised response to the subject question.

Question #	Start Page	End Page
RAI 506 — 14.03.05-29	2	2

The schedule for a technically correct and complete response to the remaining 6 questions is unchanged as provided below.

Question #	Response Date
RAI 506 — 14.03.05-27	December 9, 2011
RAI 506 — 14.03.05-28	December 9, 2011
RAI 506 — 14.03.05-30	January 19, 2012
RAI 506 — 14.03.05-35	December 9, 2011
RAI 506 — 14.03.05-39	January 19, 2012
RAI 506 — 14.03.05-41	January 19, 2012

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, November 08, 2011 4:24 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 506 (5456), FSAR Ch. 14, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 18 questions in RAI No. 506 on September 28, 2011.

The attached file, "RAI 506 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete final response to 12 of the 18 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 Questions 14.03.05-25, 14.03.05-26, 14.03.05-29, 14.03.05-31, 14.03.05-32, 14.03.05-33, 14.03.05-34, 14.03.05-36, 14.03.05-37, 14.03.05-38, 14.03.05-40 and 14.03.05-42.

The following table indicates the respective pages in the response document, "RAI 506 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 506 — 14.03.05-25	2	2
RAI 506 — 14.03.05-26	3	3
RAI 506 — 14.03.05-29	4	4
RAI 506 — 14.03.05-31	5	5
RAI 506 — 14.03.05-32	6	6
RAI 506 — 14.03.05-33	7	7
RAI 506 — 14.03.05-34	8	8
RAI 506 — 14.03.05-36	9	9
RAI 506 — 14.03.05-37	10	10
RAI 506 — 14.03.05-38	11	11
RAI 506 — 14.03.05-40	12	12
RAI 506 — 14.03.05-42	13	13

The schedule for a technically correct and complete response to the remaining 6 questions has been revised as provided below.

Question #	Response Date
RAI 506 — 14.03.05-27	December 9, 2011
RAI 506 — 14.03.05-28	December 9, 2011

RAI 506 — 14.03.05-30	January 19, 2012
RAI 506 — 14.03.05-35	December 9, 2011
RAI 506 — 14.03.05-39	January 19, 2012
RAI 506 — 14.03.05-41	January 19, 2012

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
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From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, September 28, 2011 5:19 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 506 (5456), FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 506 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the 18 questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 506 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 506 — 14.03.05-25	2	2
RAI 506 — 14.03.05-26	3	3
RAI 506 — 14.03.05-27	4	4
RAI 506 — 14.03.05-28	5	5
RAI 506 — 14.03.05-29	6	6
RAI 506 — 14.03.05-30	7	7
RAI 506 — 14.03.05-31	8	8
RAI 506 — 14.03.05-32	9	9
RAI 506 — 14.03.05-33	10	10
RAI 506 — 14.03.05-34	11	11
RAI 506 — 14.03.05-35	12	12
RAI 506 — 14.03.05-36	13	13
RAI 506 — 14.03.05-37	14	14
RAI 506 — 14.03.05-38	15	15
RAI 506 — 14.03.05-39	16	16

RAI 506 — 14.03.05-40	17	17
RAI 506 — 14.03.05-41	18	18
RAI 506 — 14.03.05-42	19	19

A complete answer is not provided for the 18 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 506 — 14.03.05-25	November 8, 2011
RAI 506 — 14.03.05-26	November 8, 2011
RAI 506 — 14.03.05-27	November 8, 2011
RAI 506 — 14.03.05-28	November 8, 2011
RAI 506 — 14.03.05-29	November 8, 2011
RAI 506 — 14.03.05-30	November 8, 2011
RAI 506 — 14.03.05-31	November 8, 2011
RAI 506 — 14.03.05-32	November 8, 2011
RAI 506 — 14.03.05-33	November 8, 2011
RAI 506 — 14.03.05-34	November 8, 2011
RAI 506 — 14.03.05-35	November 8, 2011
RAI 506 — 14.03.05-36	November 8, 2011
RAI 506 — 14.03.05-37	November 8, 2011
RAI 506 — 14.03.05-38	November 8, 2011
RAI 506 — 14.03.05-39	November 8, 2011
RAI 506 — 14.03.05-40	November 8, 2011
RAI 506 — 14.03.05-41	November 8, 2011
RAI 506 — 14.03.05-42	November 8, 2011

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

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From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]

Sent: Tuesday, August 30, 2011 1:31 PM

To: ZZ-DL-A-USEPR-DL

Cc: Mills, Daniel; Zhang, Deanna; Morton, Wendell; Spaulding, Deirdre; Mott, Kenneth; Truong, Tung; Zhao, Jack; Jackson, Terry; Jaffe, David; Canova, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource

Subject: U.S. EPR Design Certification Application RAI No. 506 (5456), FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 12, 2011, and discussed with your staff on August 25 and 29, 2011. Draft RAI Question 14.03.05-38 has been modified as a result of those discussions. 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: 3555

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D49B572F)

Subject: Response to U.S. EPR Design Certification Application RAI No. 506 (5456),
FSAR Ch. 14, Supplement 2
Sent Date: 11/17/2011 12:10:56 PM
Received Date: 11/17/2011 12:11:15 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

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MESSAGE	8307	11/17/2011 12:11:15 PM
RAI 506 Supplement 2 Response US EPR DC.pdf		128724

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
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Response to

Request for Additional Information No. 506(5456), Revision 0, Supplement 2

8/30/2011

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

**SRP Section: 14.03.05 - Instrumentation and Controls - Inspections, Tests,
Analyses, and Acceptance Criteria**

Application Section: 2.4

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

Question 14.03.05-29:

Provide editorial corrections to Tier 1, Tables 2.4.17-1, 2.4.19-1, and 2.4.26-3.

10 CFR 52.47(b)(1) requires inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations. Should the headings of Tier 1, Table 2.4.17-1, Column 4, and Tier 1, Table 2.4.19-1, Column 4, "seismic class" be changed to "seismic category" to be consistent with other Tier 1 descriptions? Also, should Tier 1, Table 2.4.26-3, Item 1, read "temperature compensated RCCA positions" to maintain consistency within Tier 1?

Response to Question 14.03.05-29:

"Seismic class" will be changed to "Seismic Category" in U.S. EPR FSAR Tier 1, Tables 2.4.17-1 and 2.4.19-1 for to be consistent with other descriptions in U.S. EPR FSAR Tier 1.

U.S. EPR FSAR Tier 1, Tables 2.4.1-2 and 2.4.26-3, Item 1 will be revised to read "temperature compensated RCCA positions" to be consistent with other Tier 1 descriptions.

FSAR Impact:

U.S. EPR FSAR Tier 1, Tables 2.4.1-2, 2.4.17-1, 2.4.19-1 and 2.4.26-3 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 2.4.1-2—Protection System Automatic Reactor Trip Signals and Input Variables (2 Sheets)

Reactor Trip Signal	Input Variable
High Linear Power Density (HLPD)	Neutron Flux - Self Powered Neutron Detectors
Low Departure from Nucleate Boiling Ratio (DNBR)	Neutron Flux - Self Powered Neutron Detectors
	Cold Leg Temperature (NR)
	Reactor Coolant Pump (RCP) Speed
	RCS Loop Flow
	14.03.05-29 → Temperature Compensated Rod Cluster Control Assembly Analog Position
	Pressurizer Pressure (NR)
High Neutron Flux Rate of Change	Neutron Flux - Power Range Detectors
High Core Power Level	Cold Leg Temperature (WR)
	Hot Leg Pressure (WR)
	Hot Leg Temperature (NR)
	RCS Loop Flow
Low RCP Speed	RCP Speed
Low RCS Flow Rate in Two Loops	RCS Loop Flow
Low-Low RCS Flow Rate in One Loop	RCS Loop Flow
Low Doubling Time	Neutron Flux - Intermediate Range Detectors
High Neutron Flux	Neutron Flux - Intermediate Range Detectors
Low Pressurizer Pressure	Pressurizer Pressure (NR)
High Pressurizer Pressure	Pressurizer Pressure (NR)
High Pressurizer Level	Pressurizer Level (NR)
Low Hot Leg Pressure	Hot Leg Pressure (WR)
Steam Generator (SG) Pressure Drop	SG Pressure
Low Steam Generator Pressure	SG Pressure
High Steam Generator Pressure	SG Pressure
Low Steam Generator Level	SG Level (NR)
High Steam Generator Level	SG Level (NR)
High Containment Pressure	Containment Equipment Compartment Pressure
	Containment Service Compartment Pressure (NR)
Low Saturation Margin	Cold Leg Temperature (WR)
	Hot Leg Pressure (WR)
	Hot Leg Temperature (NR)
	RCS Loop Flow

**Table 2.4.17-1—Excore Instrumentation System Equipment
(2 Sheets)**

14.03.05-29

Description	Tag Number ⁽¹⁾	Location	Seismic Category Class	IEEE Class 1E ⁽²⁾	Harsh Environment
Source Range Detector, Division 1	30JKT01CX851	Reactor Building	I	1 ^N 2 ^A	<u>Harsh</u> Yes
Source Range Detector, Division 2	30JKT01CX852	Reactor Building	I	2 ^N 1 ^A	<u>Harsh</u> Yes
Source Range Detector, Division 3	30JKT01CX853	Reactor Building	I	3 ^N 4 ^A	<u>Harsh</u> Yes
Intermediate Range Detector, Division 1	30JKT02CX851	Reactor Building	I	1 ^N 2 ^A	<u>Harsh</u> Yes
Intermediate Range Detector, Division 2	30JKT02CX852	Reactor Building	I	2 ^N 1 ^A	<u>Harsh</u> Yes
Intermediate Range Detector, Division 3	30JKT02CX853	Reactor Building	I	3 ^N 4 ^A	<u>Harsh</u> Yes
Intermediate Range Detector, Division 4	30JKT02CX854	Reactor Building	I	4 ^N 3 ^A	<u>Harsh</u> Yes
Upper Core Half Power Range Detector, Division 1	30JKT03CX851	Reactor Building	I	1 ^N 2 ^A	<u>Harsh</u> Yes
Lower Core Half Power Range Detector, Division 1	30JKT03CX855	Reactor Building	I	1 ^N 2 ^A	<u>Harsh</u> Yes
Upper Core Half Power Range Detector, Division 2	30JKT03CX852	Reactor Building	I	2 ^N 1 ^A	<u>Harsh</u> Yes
Lower Core Half Power Range Detector, Division 2	30JKT03CX856	Reactor Building	I	2 ^N 1 ^A	<u>Harsh</u> Yes
Upper Core Half Power Range Detector, Division 3	30JKT03CX853	Reactor Building	I	3 ^N 4 ^A	<u>Harsh</u> Yes
Lower Core Half Power Range Detector, Division 3	30JKT03CX857	Reactor Building	I	3 ^N 4 ^A	<u>Harsh</u> Yes
Upper Core Half Power Range Detector, Division 4	30JKT03CX854	Reactor Building	I	4 ^N 3 ^A	<u>Harsh</u> Yes

**Table 2.4.17-1—Excore Instrumentation System Equipment
(2 Sheets)**

14.03.05-29

Description	Tag Number ⁽¹⁾	Location	Seismic Category Class	IEEE Class 1E ⁽²⁾	Harsh Environment
Lower Core Half Power Range Detector, Division 4	30JKT03CX858	Reactor Building	I	4 ^N 3 ^A	Harsh Yes
Excore Instrumentation Conditioning Cabinets – Division 1	30CLE13	Safeguard Building 1	I	1 ^N 2 ^A	Mild No
Excore Instrumentation Conditioning Cabinets – Division 2	30CLF13	Safeguard Building 2	I	2 ^N 1 ^A	Mild No
Excore Instrumentation Conditioning Cabinets – Division 3	30CLG13	Safeguard Building 3	I	3 ^N 4 ^A	Mild No
Excore Instrumentation Conditioning Cabinets – Division 4	30CLH13	Safeguard Building 4	I	4 ^N 3 ^A	Mild No

- 1) Equipment tag numbers are provided for information and are not part of the design certification.
- 2) ^N denotes the division the component is normally powered from. ^A denotes the division the component is powered from when alternate feed is implemented.

**Table 2.4.19-1—Incore Instrumentation Equipment
(4 Sheets)**

Description	Tag Number ⁽¹⁾	14.03.05-29		IEEE Class 1E	Harsh Environment
		Location	Seismic Class Category		
SPND Division 1	30JKS41CX811	Reactor Building	I	Yes	<u>Harsh</u> Yes
	30JKS41CX812				
	30JKS41CX813				
	30JKS41CX814				
	30JKS41CX815				
	30JKS41CX816				
	30JKS16CX811				
	30JKS16CX812				
	30JKS16CX813				
	30JKS16CX814				
	30JKS16CX815				
	30JKS16CX816				
	30JKS21CX811				
	30JKS21CX812				
	30JKS21CX813				
	30JKS21CX814				
	30JKS21CX815				
30JKS21CX816					
SPND Division 2	30JKS11CX821	Reactor Building	I	Yes	<u>Harsh</u> Yes
	30JKS11CX822				
	30JKS11CX823				
	30JKS11CX824				
	30JKS11CX825				
	30JKS11CX826				
	30JKS13CX821				
	30JKS13CX822				
	30JKS13CX823				
	30JKS13CX824				
	30JKS13CX825				
	30JKS13CX826				
	30JKS15CX821				
	30JKS15CX822				
	30JKS15CX823				
	30JKS15CX824				
	30JKS15CX825				
30JKS15CX826					

**Table 2.4.19-1—Incore Instrumentation Equipment
(4 Sheets)**

Description	Tag Number ⁽¹⁾	Location	Seismic Class Category	IEEE Class 1E	Harsh Environment
SPND Division 3	30JKS42CX831	Reactor Building	I	Yes	<u>Harsh</u> Yes
	30JKS42CX832				
	30JKS42CX833				
	30JKS42CX834				
	30JKS42CX835				
	30JKS42CX836				
	30JKS31CX831				
	30JKS31CX832				
	30JKS31CX833				
	30JKS31CX834				
	30JKS31CX835				
	30JKS31CX836				
	30JKS22CX831				
	30JKS22CX832				
	30JKS22CX833				
	30JKS22CX834				
30JKS22CX835					
30JKS22CX836					
SPND Division 4	30JKS14CX841	Reactor Building	I	Yes	<u>Harsh</u> Yes
	30JKS14CX842				
	30JKS14CX843				
	30JKS14CX844				
	30JKS14CX845				
	30JKS14CX846				
	30JKS32CX841				
	30JKS32CX842				
	30JKS32CX843				
	30JKS32CX844				
	30JKS32CX845				
	30JKS32CX846				
	30JKS12CX841				
	30JKS12CX842				
	30JKS12CX843				
	30JKS12CX844				
30JKS12CX845					
30JKS12CX846					

**Table 2.4.19-1—Incore Instrumentation Equipment
(4 Sheets)**

Description	14.03.05-29		Seismic Class Category	IEEE Class 1E	Harsh Environment
	Tag Number ⁽¹⁾	Location			
Core Outlet Thermocouples (NR) Division 1	30JKS16CT812 30JKS21CT812 30JKS41CT812 30JKS16CT813 30JKS21CT813 30JKS41CT813	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (NR) Division 2	30JKS11CT822 30JKS13CT822 30JKS15CT822 30JKS11CT823 30JKS13CT823 30JKS15CT823	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (NR) Division 3	30JKS22CT832 30JKS31CT832 30JKS42CT832 30JKS22CT833 30JKS31CT833 30JKS42CT833	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (NR) Division 4	30JKS12CT842 30JKS14CT842 30JKS32CT842 30JKS12CT843 30JKS14CT843 30JKS32CT843	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (WR) Division 1	30JKS16CT811 30JKS21CT811 30JKS41CT811	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (WR) Division 2	30JKS11CT821 30JKS13CT821 30JKS15CT821	Reactor Building	I	Yes	<u>Harsh</u> Yes
Core Outlet Thermocouples (WR) Division 3	30JKS22CT831 30JKS31CT831 30JKS42CT831	Reactor Building	I	Yes	<u>Harsh</u> Yes

**Table 2.4.19-1—Incore Instrumentation Equipment
(4 Sheets)**

Description	Tag Number ⁽¹⁾	Location	Seismic Class Category	IEEE Class 1E	Harsh Environment
Core Outlet Thermocouples (WR) Division 4	30JKS12CT841 30JKS14CT841 30JKS32CT841	Reactor Building	I	Yes	Harsh Yes
Incore Instrumentation Cabinets – Division 1	30CLE12GH001 30CLE15GH	Safeguard Building 1	I	1 ^N 2 ^A	Mild No
Incore Instrumentation Cabinets – Division 2	30CLF12GH002 30CLF15GH	Safeguard Building 2	I	2 ^N 1 ^A	Mild No
Incore Instrumentation Cabinets – Division 3	30CLG12GH003 30CLG15GH	Safeguard Building 3	I	3 ^N 4 ^A	Mild No
Incore Instrumentation Cabinets – Division 4	30CLH12GH004 30CLH15GH	Safeguard Building 4	I	4 ^N 3 ^A	Mild No

- 1) Equipment tag numbers are provided for information and are not part of the design certification.
- 2) ^N denotes the division the component is normally powered from. ^A denotes the division the component is powered from when alternate feed is implemented.

Table 2.4.26-3—Rod Position Measurement System Output Signals

14.03.05-29

Item #	Signal	RecipientDestination	# Divisions
1	<p><u>Temperature Compensated</u> RCCA positions</p> <p>Division 1 (22 RCCA positions)</p> <p>Division 2 (22 RCCA positions)</p> <p>Division 3 (22 RCCA positions)</p> <p>Division 4 (23 RCCA positions)</p>	SCDS	4