ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Wednesday, October 13, 2010 1:45 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); NOXON David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 5
Attachments: RAI 387 Supplement 5 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a complete response to 1 of the 3 questions and a partial response to one of the other questions of RAI No. 387 on May 12, 2010. AREVA NP submitted Supplement 1 to the response on June 8, 2010, providing a revised schedule for the remaining questions. Supplement 2 response to RAI No. 387 was transmitted to the NRC on July 8, 2010 to provide a revised schedule. AREVA NP submitted Supplement 3 to the response on July 28, 2010, providing a complete response to one of the remaining 2 questions. AREVA NP submitted Supplement 4 to the response on August 17, 2010, providing a revised schedule for the remaining question. The attached file, "RAI 387 Supplement 5 Response US EPR DC.pdf," provides a complete response to the one remaining question.

Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 387 Question 11.02-21.

The following table indicates the respective pages in the response document, "RAI 387 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 387 — 11.02-21	2	3

This concludes the formal AREVA NP response to RAI 387, and there are no questions from this RAI for which AREVA NP has not provided responses.

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: Tuesday, August 17, 2010 11:14 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WILLIFORD Dennis (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a complete response to 1 of the 3 questions and a partial response to one of the other questions of RAI No. 387 on May 12, 2010. AREVA NP submitted Supplement 1 to the response on June 8, 2010, providing a revised schedule for the remaining questions. Supplement 2 response to RAI No. 387 was transmitted to the NRC on July 8, 2010 to provide a revised schedule. AREVA NP submitted Supplement 3 to the response on July 28, 2010, providing a complete response to one of the remaining 2 questions.

Additional time is required to complete a response to the remaining question and to interact with the NRC staff.

The schedule for providing a complete response to the remaining question has been revised as indicated below.

Question #	Response Date
RAI 387 — 11.02-21	October 14, 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 28, 2010 5:22 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a complete response to 1 of the 3 questions and a partial response to one of the other questions of RAI No. 387 on May 12, 2010. AREVA NP submitted Supplement 1 to the response on June 8, 2010, providing a revised schedule for the remaining questions. A draft response to RAI 387 Question 11.02-20(b) was submitted to the NRC on June 8, 2010. Since additional time was required to resolve NRC staff comments on RAI 301 Question 11.02-17 which is referenced in the RAI 387 response, a revised scheduled was provided via Supplement 2 on July 8, 2010. The attached file, “RAI 387 Supplement 3 Response US EPR DC.pdf” provides a technically correct and complete response to 1 of the remaining 2 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 387 Question 11.02-20(b).

The following table indicates the respective pages in the response document, “RAI 387 Supplement 3 Response US EPR DC.pdf” that contain AREVA NP’s response to the subject question.

Question #	Start Page	End Page
RAI 387 — 11.02-20(b)	2	3

The schedule for providing a complete response to the remaining question is unchanged and is provided below.

Question #	Response Date
RAI 387 — 11.02-21	August 20, 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: Thursday, July 08, 2010 3:32 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a complete response to 1 of the 3 questions and a partial response to one of the other questions of RAI No. 387 on May 12, 2010. AREVA NP submitted Supplement 1 to the response on June 8, 2010, providing a revised schedule for the remaining questions. Additional time is required to interact with the NRC staff on the response.

The schedule for providing complete responses to the remaining 2 questions has been changed and is provided below.

Question #	Response Date
RAI 387 — 11.02-20 (b)	July 28, 2010
RAI 387 — 11.02-21	August 20, 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: Tuesday, June 08, 2010 3:53 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a complete response to 1 of the 3 questions and a partial response to one of the other questions of RAI No. 387 on May 12, 2010. Additional time is required to interact with the NRC staff on the response to the remainder of Question 11.02-20 (Part b) prior to formal transmittal.

The schedule for providing complete responses to the remaining 2 questions has been changed and is provided below.

Question #	Response Date
RAI 387 — 11.02-20 (b)	July 8, 2010
RAI 387 — 11.02-21	July 29, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
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Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Wednesday, May 12, 2010 2:48 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 387 (4591), FSAR Ch. 11 PHASE 4 RAI

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 387 Response US EPR DC.pdf" provides technically correct and complete responses to one of the 3 questions. A partial response is provided for one of the other 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 387 Questions 11.02-19, and 11.02-20.

The following table indicates the respective pages in the response document, "RAI 387 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 387 — 11.02-19	2	3
RAI 387 — 11.02-20	4	5
RAI 387 — 11.02-21	6	6

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

Question #	Response Date
RAI 387 — 11.02-20 (b)	June 8, 2010
RAI 387 — 11.02-21	July 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: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, April 12, 2010 3:53 PM
To: ZZ-DL-A-USEPR-DL
Cc: Dehmel, Jean-Claude; Roach, Edward; Jennings, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 387 (4591), FSAR Ch. 11 PHASE 4 RAI

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 6, 2010, and on April 12, 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 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: 2125

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB7107E64CE7)

Subject: Response to U.S. EPR Design Certification Application RAI No. 387, FSAR Ch. 11 PHASE 4 RAI, Supplement 5
Sent Date: 10/13/2010 1:44:38 PM
Received Date: 10/13/2010 1:45:04 PM
From: BRYAN Martin (EXTERNAL AREVA)

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

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"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
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MESSAGE	10350	10/13/2010 1:45:04 PM
RAI 387 Supplement 5 Response US EPR DC.pdf	104938	

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

Response to

Request for Additional Information No. 387(4591), Supplement 5

4/12/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 11.02 - Liquid Waste Management System
Application Section: 11.2

QUESTIONS for Health Physics Branch (CHPB)

Question 11.02-21:

Phase 4 RAI

Follow-up to Open Item 299, Question 11.2-16, items a, c, d, f, g, h, and k

In the response dated Nov. 5, 2009, the applicant provides information addressing the staff's concerns about the inconsistent application of parameters used in assumptions and calculations of radioactive source terms and doses. A review of the response indicates that the discussions do not commit to adding supporting explanations in the corresponding descriptions of FSAR Section 11.2. As addressed by the response, the FSAR still presents the use of parameters in Section 11.2 that are not supported in FSAR Sections 11.1 and 11.2. For example, steam flow rates were increased by a factor of 1.05 in bounding potential increases in process flows, but neither text nor tabulations provide any explanation for the change. Similarly, the use of an 80% capacity factor in deriving the liquid effluent source term is not explained when the U.S. EPR is expected to operate at 92%. The proposed explanatory footnote to FSAR Table 11.2-3 is incomplete as it refers instead to improved fuel performance and not the impact on the source term with the expected higher capacity factor. The applicant is requested to insert in FSAR descriptions and tables the basis for the modified plant parameters identified in RAI 299, Question 11.2-16 (items c, d, f, g, h, and k) that cannot be directly traced to another FSAR description or table. Also, the applicant should revise the proposed footnote addressing the difference between the 80% vs 92% capacity factors. For part of item (a) in RAI 299, Question 11.2-16 that addresses circulating water blowdown and dilution for liquid effluent releases, the applicant is requested to review the applicability of that part of the response to the associated topic and make it consistent with the disposition of related issues identified in RAI 290, Supplement 2, Question 11.05-15, and RAI 301, 11.02-17(2) in describing the liquid effluent flow path from the boundary of the Radwaste Processing Building to the point of environmental discharge given current and future revisions to FSAR Figure 11.5-1, which would show the full discharge path and which process streams contribute to dilution.

Response to Question 11.02-21:

U.S. EPR FSAR Tier 2, Table 11.2-3 explanatory footnotes have been expanded to provide the basis for the modified plant parameters identified in RAI 299, Question 11.2-16 (items c, d, f, g, h, and k) that cannot be directly traced to another U.S. EPR FSAR description or table.

The footnote addressing the difference between the 80 percent vs. 92 percent capacity factors will be revised to replace the information on dilution with information on germane issues of capacity factors.

The following are updated and new footnotes to U.S. EPR FSAR Tier 2, Table 11.2-3:

1. Dirty waste decontamination factor (DF) has no impact on results because dirty waste input is 0 gpd.
2. The GALE code built-in capacity factor of 80 percent is used in the calculation along with operating plant primary coolant concentration data that are over 30 years old when fuel failures were routinely experienced. The minimum capacity factor for the U.S. EPR is assumed to be 92 percent consistent with current U.S. capacity factors indicative of significant reduction in the severity of fuel defects, resulting in lower fission product

concentrations in the primary coolant. The GALE calculation scales the power level and further scaling the capacity factor results in artificially high release estimates.

3. Nominal value of steam flow was increased by 5 percent to bound potential increases in process flow.
4. Nominal value of steam generator blow-down flow was increased by 5 percent to bound potential increase in steam flow rate.
5. Shim bleed nominal flow is first increased by 5 percent for bounding a higher power level. The amount of treated primary coolant discharged as liquid waste is conservatively assumed to be 5 percent to account for recycling the effluent from the boron treatment system.
6. Equipment drain is based on the maximum technical specification leakage rate from the primary system of 1 gpm with 20 percent conservatism added.
7. Clean waste is based on maximum Group II waste water expected, only three or four times per year, which is 66,000 gallons per week.
8. DF values for Cs/Rb and for other nuclides are based on vendor data and represent the evaporator (DF = 1.0E+04) and demineralizer (DF = 1.0E+03) in series.
9. Containment internal clean-up nominal flow rate of 4120 cfm was decreased to 4100 cfm for conservatism.

The Response to RAI 299, Question 11.2-16 (a) addresses GALE default and U.S. EPR plant capacity factors. The information regarding circulating water blowdown and dilution for liquid effluent releases is not applicable to the capacity factor discussion. As previously explained, the footnote to U.S. EPR FSAR Tier 2, Table 11.2-3 is updated to remove the unrelated material.

Responses to RAI 301, Question 11.02-17(2) provide liquid effluent flow paths and dilution flows for the different analyses performed in U.S. EPR FSAR Tier 2, Section 11.2.

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 11.2-3 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 11.2-3—Liquid and Gaseous Effluent Input Parameters for the GALE Computer Code
Sheet 1 of 3

GALE Input Parameter	Value
Thermal power level[2]	4612 MW_t
Mass of coolant in primary system (excluding the pressurizer)	5.937E+05 lb_m
Primary system letdown rate	226.7 gpm
Letdown cation demineralizer flow rate	0 gpm
Number of steam generators	4
Total steam flow[3]	2.171E+07 lb_m/hr
Mass of liquid in each steam generator	1.6977E+05 lb_m
SG blowdown rate[4]	2.184E+05 lb_m/hr
Blowdown treatment method (Full blowdown flow processed by blowdown system and recycled to condensate system.)	0
Condensate demineralizer regeneration time (regeneration not used)	0 days
Condensate demineralizer flow fraction	0.33
Shim bleed flow rate[5]	110 gpd
Shim bleed DF for iodine (Evaporator and demineralizer in series)	1.0E+04
Shim bleed DF for cesium and rubidium[8] (Evaporator and demineralizer in series)	1.0E+07
Shim bleed DF for other nuclides[8] (Evaporator and demineralizer in series)	1.0E+07
Shim bleed collection time	8.1 days
Shim bleed processing and discharge times	0.589 days
Shim bleed average fraction of waste to be discharged	1.0
Equipment drains input[6]	1728 gpd
Equipment drains PCA	1.0
Equipment drains DF for iodine (Evaporator and demineralizer in series)	1.0E+04
Equipment drains DF for cesium and rubidium (Evaporator and demineralizer in series)	1.0E+07
Equipment drains DF for other nuclides (Evaporator and demineralizer in series)	1.0E+07
Equipment drains collection time	8.1 days
Equipment drains processing and discharge times	0.589 days

11.02-21

11.02-21

Table 11.2-3—Liquid and Gaseous Effluent Input Parameters for the GALE Computer Code
Sheet 2 of 3

11.02-21

GALE Input Parameter	Value
Equipment drains average fraction of waste to be discharged	1.0
Clean waste input[7] (Clean waste input are included as Group II)	9428 gpd
Clean waste PCA	0.001
Clean waste DF for iodine	1.0E+02
Clean waste DF for cesium and rubidium	1.0E+02
Clean waste DF for other nuclides	1.0E+02
Clean waste collection time	1.6 days
Clean waste processing and discharge times	0.463 days
Clean waste average fraction of waste to be discharged	1.0
Dirty waste input	0 gpd
Dirty waste PCA	0.1
Dirty waste DF for iodine[1]	1.0E+02
Dirty waste DF for cesium and rubidium[1]	1.0E+03
Dirty waste DF for other nuclides[1]	1.0E+03
Dirty waste collection time	0 days
Dirty waste processing and discharge times	0 days
Dirty waste average fraction of waste to be discharged	1.0
Blowdown fraction processed	1.0
Blowdown DF for iodine	1.0E+02
Blowdown DF for cesium and rubidium	1.0E+02
Blowdown DF for other nuclides	1.0E+03
Blowdown collection time	0 days
Blowdown processing and discharge times	0 days
Blowdown average fraction of waste to be discharged	0.0
Regenerant flow rate	0.0 gpd
Regenerant DF for iodine	1.0
Regenerant DF for cesium and rubidium	1.0
Regenerant DF for other nuclides	1.0
Regenerant collection time	0.0 days
Regenerant processing and discharge times	0.0 days
Regenerant average fraction of waste to be discharged	0.0

Table 11.2-3—Liquid and Gaseous Effluent Input Parameters for the GALE Computer Code
Sheet 3 of 3

GALE Input Parameter	Value
Is there continuous stripping of full letdown flow?	No
Holdup time for xenon	27.7 days
Holdup time for krypton	1.67 days
Fill time of decay tanks for the gas stripper	0 days
Waste gas system particulate releases HEPA efficiency	99 %
Fuel Handling Building releases: charcoal efficiency	90 %
Fuel Handling Building releases: HEPA efficiency	99 %
Auxiliary Building releases: charcoal efficiency	90 %
Auxiliary Building releases: HEPA efficiency	99 %
Containment free volume	2.8E+06 ft^3
Containment internal cleanup system: charcoal efficiency	90 %
Containment internal cleanup system: HEPA efficiency	99 %
Containment internal cleanup system: flow rate[9] 11.02-21	4.1E+03 cfm
Containment high volume purge: charcoal efficiency	90 %
Containment high volume purge: HEPA efficiency	99 %
Containment high volume purges at operation: purges per year (GALE code accounts for 2 purges at cold shutdown)	0
Containment low volume purge: charcoal efficiency	90 %
Containment low volume purge: HEPA efficiency	99 %
Containment low volume purge: Flow rate	3210 cfm
Percent of iodine released from blowdown tank vent	0.0 %
Percent of iodine removed from air ejector release	0.0 %
Detergent waste PF	0.0
SG blowdown flash tank gases vented via main condenser air ejector?	No
Condenser air ejector offgas released without treatment?	Yes
Condenser air ejector offgas processed via charcoal adsorbers prior to release?	No

Note:

~~1. Dirty waste decontamination factor (DF) has no impact on results since dirty waste input is 0 gpd.~~

~~2. Basis of source term assumes an 80 percent capacity factor, the default value in the GALE code. Significant improvements have been made in fuel~~

~~performance, resulting in lower fission product concentrations in the primary coolant~~

11.02-21

1. Dirty waste decontamination factor (DF) has no impact on results because dirty waste input is 0 gpd.

2. The GALE code built-in capacity factor of 80 percent is used in the calculation along with operating plant primary coolant concentration data that are over 30 years old when fuel failures were routinely experienced. The minimum capacity factor for the U.S. EPR is assumed to be 92 percent consistent with current U.S. capacity factors indicative of significant reduction in the severity of fuel defects, resulting in lower fission product concentrations in the primary coolant. The GALE calculation scales the power level and further scaling the capacity factor results in artificially high release estimates.

3. Nominal value of steam flow was increased by 5 percent to bound potential increases in process flow.

4. Nominal value of steam generator blowdown flow was increased by 5 percent to bound potential increase in steam flow rate.

5. Shim bleed nominal flow is first increased by 5 percent for bounding a higher power level. The amount of treated primary coolant discharged as liquid waste is conservatively assumed to be 5 percent to account for recycling the effluent from the boron treatment system.

6. Equipment drain is based on the maximum technical specification leakage rate from the primary system of 1 gpm with 20 percent conservatism added.

7. Clean waste is based on maximum Group II waste water expected, only three or four times per year, which is 66,000 gallons per week.

8. DF values for Cs/Rb and for other nuclides are based on vendor data and represent the evaporator (DF = 1.0E+04) and demineralizer (DF = 1.0E+03) in series.

9. Containment internal clean-up nominal flow rate of 4120 cfm was decreased to 4100 cfm for conservatism.