ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Monday, August 09, 2010 11:45 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); WILLIFORD Dennis (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 391, FSAR Ch. 11, PHASE 4 RAI, Supplement 3
Attachments: RAI 391 Supplement 3 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the 3 questions in RAI No. 391 on May 28, 2010. AREVA NP provided responses to 2 of the 3 remaining questions via Supplement 1 on June 22, 2010. To allow time for interaction with NRC staff, the schedule for the remaining question was revised via Supplement 2 on July 29, 2010.

The attached file, "RAI 391 Supplement 3 Response US EPR DC" provides a technically correct and complete response to the remaining question, 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 391 Question 11.03-16.

The following table indicates the respective pages in the response document, "RAI 391 Supplement 3 Response US EPR DC," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 391 — 11.03-16	2	5

This concludes the formal AREVA NP response to RAI 391, 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 (EXT)
Sent: Thursday, July 29, 2010 11:26 AM
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. 391, FSAR Ch. 11, PHASE 4 RAI, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to the 3 questions in RAI No. 391 on May 28, 2010. AREVA NP provided responses to 2 of the 3 remaining questions via Supplement 1 on June 22, 2010.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete response to the remaining question has been revised and is provided below.

Question #	Response Date
RAI 391 — 11.03-16	August 30, 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 22, 2010 2:57 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. 391, FSAR Ch. 11, PHASE 4 RAI, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 391 on May 28, 2010. The attached file, "RAI 391 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete response to 2 of the remaining 3 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 391 Questions 11.03-17 and 11.04-16.

The following table indicates the respective pages in the response document, "RAI 391 Supplement 1 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 391 — 11.03-17	2	4
RAI 391 — 11.04-16	5	7

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

Question #	Response Date
RAI 391 — 11.03-16	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: BRYAN Martin (EXT)
Sent: Friday, May 28, 2010 10:52 AM
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. 391, 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 391 Response U.S. EPR DC.pdf" provides a schedule since a technically correct and complete response to the 3 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 391 Response U.S. EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 391 — 11.03-16	2	3
RAI 391 — 11.03-17	4	4
RAI 391 — 11.04-16	5	6

A complete answer is not provided for the 3 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 391 — 11.03-16	July 29, 2010
RAI 391 — 11.03-17	June 29, 2010
RAI 391 — 11.04-16	June 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: Wednesday, April 28, 2010 7:08 AM
To: ZZ-DL-A-USEPR-DL

Cc: Dehmel, Jean-Claude; McCann, Edward; Roach, Edward; Jennings, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 391(4595,4643,4598), 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 20, 2010, and discussed with your staff on April 22, 2010. No changes were made to the draft RAI 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: 1806

Mail Envelope Properties (BC417D9255991046A37DD56CF597DB710725FCE4)

Subject: Response to U.S. EPR Design Certification Application RAI No. 391, FSAR Ch. 11, PHASE 4 RAI, Supplement 3
Sent Date: 8/9/2010 11:44:54 AM
Received Date: 8/9/2010 11:45:07 AM
From: BRYAN Martin (EXTERNAL AREVA)

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Tracking Status: None
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Tracking Status: None

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MESSAGE	6747	8/9/2010 11:45:07 AM
RAI 391 Supplement 3 Response US EPR DC.pdf	65013	

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

Response to

Request for Additional Information No. 391(4595, 4643, 4598), Supplement 3

4/28/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 11.03 - Gaseous Waste Management System
SRP Section: 11.04 - Solid Waste Management System
Application Section: FSAR Ch 11

QUESTIONS for Health Physics Branch (CHPB)

Question 11.03-16:

Phase 4 RAI

Follow-up to Open Item RAI 299, Question 11.3-14 (d)

(a) In the response dated Nov. 5, 2009, the applicant provides information addressing the basis of the adjustment factor applied in estimating releases characterized by maximum fuel defects. A review of the method described in the response, proposed revisions to the FSAR, and a comparison with stated reactor coolant and effluent concentrations given in FSAR Tables 11.1-2, 11.1-7, 11.2-7, and 11.3-6, and RAI 299, Question 11.3-14 (d) response Table 11.03-14(a)-1 indicates that the application of the scaling factor is not clearly explained. For example, a review of the results for Sr-89 indicates that its RCS effluent concentration (1% failed fuel) is 2.5E-03 uCi/ml in FSAR Table 11.1-2, as 8.9E-05 uCi/ml in FSAR Table 11.1-7 as the RCS realistic source term, and 1.4E-04 uCi/ml as primary coolant activity derived by the GALE code. The method described in the response states that when reported GALE concentrations are 1.0E-05 uCi/ml, a conservative factor of 1000 is applied in deriving releases characterized by maximum fuel defects. Using Sr-89 as example, the GALE-derived RCS concentration is 1.4E-04 uCi/ml, which is greater than 1.0E-05 uCi/ml. Given that result, the factor of one 1000 would not apply and its specific ratio would be used instead. However, a review of proposed Table 11.03-14(a)-1 indicates that the Sr-89 ratio between maximum fuel defect and normal operation is 1000 (2.54E-14/2.54E-17), and the corresponding Sr-89 ratio is 40 (1.4E-10/3.5E-12) in FSAR Table 11.2-7. Using the Sr-89 RCS effluent concentration of 2.5E-03 uCi/ml (FSAR Table 11.1-2, 1% failed fuel) and the GALE code primary coolant activity of 1.4E-04 uCi/ml, yields a ratio of 18 (2.5E-03/1.4E-04) and not 40. Accordingly, the applicant is requested to revise its response to this RAI and propose revisions to FSAR Sections 11.2.3.5 and 11.3.3.5, where this approach is described, and present a clear description of the methodology used in deriving radionuclide-specific adjustment factors and their applications in estimating liquid and gaseous effluent radionuclide concentrations characterizing conditions with maximum fuel defects. [Note: In addressing effluent releases, the resolution of this open item also applies to the applicant's response to RAI 299, Question 11.02-16(l). Accordingly, the applicant is requested to address the resolution of this open item in a consistent manner between RAI 299, Question 11.3-14 (d) and RAI 299, Question 11.02-16(l).]

(b) A review of FSAR Sections 1.8.1 and 11.3 indicates that the listing of COL information items is incomplete. Regulatory Guide 1.206 (Section C.III.4) addresses COL information that a COL applicant is required to address because of plant and site-specific conditions that cannot be described at the design certification stage. In this context, the staff has determined that the following COL information items should be added to the FSAR. The COL information items are:

1. The COL applicant is responsible for ensuring that offsite gaseous effluent discharges and associated doses to members of the public (using plant and site-specific parameters) due to radioactive gaseous effluents comply with effluent concentration limits of 10 CFR Part 20, Appendix B (Table 2, Col. 1); dose limits of 10 CFR 20.1301, 20.1302, and 20.1301(e) in unrestricted areas; and design objectives of Sections II.B, II.C, and II.D of Appendix I to 10 CFR Part 50.

2. The COL applicant will include plant and site-specific information describing how design features and implementation of operating procedures for the GWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.3, Regulatory

Guides 4.21 and 1.143, IE Bulletin 80-10, and NEI 08-08 when the GWMS and building radioactive exhaust ventilation systems are augmented with the installation and operation of ski-mounted treatment systems connected to permanently installed process waste gas waste treatment equipment and building radioactive exhaust ventilation systems.

Response to Question 11.03-16(a):

For gaseous effluents, the method of applying a scaling factor that is equivalent to the ratio of the primary coolant concentrations (maximum expected fuel failure to expected activity as generated by the GALE code) is only performed for noble gases and iodines. For H-3, the scaling factor represents the ratio of design basis primary coolant concentration (from U.S. EPR FSAR Tier 2, Table 11.1-2) to realistic primary coolant concentration (from U.S. EPR FSAR Tier 2, Table 11.1-7). Scaling for the other isotopes (including Sr-89) is performed using a conservative factor of 1000. An example is shown in Table 11.03-16-1 for the following nuclides: Kr-85m, I-131, H-3 and Sr-89.

Response to Question 11.03-16(b):

See the Response to RAI 301, Supplement 5, Question 11.03-15 and its associated U.S. EPR FSAR markups for the COL information items that address COL item 1 listed in Part b of this question. New COL items 11.3-3 and 11.3-4 were added in U.S. EPR FSAR Tier 2, Table 1.8-2 in response to RAI 301, Question 11.02-17.

The following COL item will be added to U.S. EPR FSAR Tier 2, Table 1.8-2 and Section 11.3.1 to address COL item 2 listed in RAI 391, Question 11.03-16(b) for plant and site-specific conditions that cannot be addressed as a part of design certification:

- A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed GWMS processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the GWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.3, RG 4.21, RG 1.143, IE Bulletin 80-10, and NEI 08-08.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 11.3.1 and Table 1.8-2 will be revised as described in the response and indicated on the enclosed markup.

Table 11.03-16-1—Sample Calculations for Maximum Fuel Defect Gaseous Release Concentrations

Nuclide	Normal Effluent Release Rate (Ci/yr)[1]	Normal Effluent Release Rate (Ci/sec)	Normal Effluent Release Concentration (µCi/ml)[2]	Design Basis primary coolant concentration corresponding to 1% FF (µCi/g)[3]	Expected primary coolant concentration (uCi/g) as predicted by GALE[4]	Scaling Factor[5]	Maximum Fuel Defect Release Concentration (µCi/ml)[6] (Column D* Column G)
Kr-85m	1.60E+02	5.07E-06	2.54E-11	5.7E-01	2.02E-01	2.82	7.15E-11
I-131	8.80E-03	2.79E-10	1.40E-15	7.4E-01	2.07E-02	35.75	4.99E-14
H-3	1.80E+02	5.71E-06	2.85E-11	4.0E+00	1.0	4.0	1.14E-10
Sr-89	1.60E-04	5.07E-12	2.54E-17	N/A		1000	2.54E-14

Notes:

1. Values from Table 11.3-3 of U.S. EPR FSAR.
2. Normal Effluent Release Concentration (µCi/ml) = Normal Effluent Release Rate (Ci/sec) X 5.0E-06 sec/m3
3. Values from Table 11.1-2 of U.S. EPR FSAR.
4. Values appear in GALE output and are not reported in the FSAR. See Table 11.03-16-2 for the applicable GALE output.
5. Scaling Factor = (Design Basis primary coolant concentration / Expected primary coolant concentration (uCi/g) as predicted by GALE or ANSI/ANS 18.1-1999 for H-3) or 1000 for isotopes other than noble gases, iodines and H-3.
6. Maximum Fuel Defect Release Concentration (µCi/ml) = Normal Effluent Release Concentration (µCi/ml) x Scaling Factor

Table 11.03-16-2—Portion of GALE output File for Normal Effluent Gaseous Release Rate

```
1
              U.S. EPR
0                                                                GASEOUS RELEASE RATE - CURIES PER YEAR
0          PRIMARY    SECONDARY                          BUILDING VENTILATION
           COOLANT     COOLANT                 ---------------------------------------------      BLOWDOWN   AIR EJECTOR   TOTAL
         (MICROCI/GM) (MICROCI/GM)              FUEL HANDLG   REACTOR    AUXILIARY   TURBINE   VENT OFFGAS   EXHAUST
0-----------------------------------------------------------------------------------------------------------------------------------
0  I-131     2.070E-02   2.510E-07                 2.7E-04     1.9E-03     6.6E-03      .0E+00      .0E+00      .0E+00     8.8E-03
0  I-133     7.917E-02   8.930E-07                 1.0E-03     5.9E-03     2.5E-02      .0E+00      .0E+00      .0E+00     3.2E-02
0-----------------------------------------------------------------------------------------------------------------------------------
0                             TOTAL H-3 RELEASED VIA GASEOUS PATHWAY =  180 CI/YR

                              C-14 RELEASED VIA GASEOUS PATHWAY = 7.3 CI/YR

                              AR-41 RELEASED VIA CONTAINMENT VENT =  34 CI/YR
1
              U.S. EPR
0                                                                GASEOUS RELEASE RATE - CURIES PER YEAR
0          PRIMARY    SECONDARY       GAS STRIPPING          BUILDING VENTILATION
           COOLANT     COOLANT     ---------------------    ------------------------------     BLOWDOWN   AIR EJECTOR   TOTAL
         (MICROCI/GM) (MICROCI/GM) SHUTDOWN   CONTINUOUS    REACTOR    AUXILIARY   TURBINE   VENT OFFGAS   EXHAUST
0-----------------------------------------------------------------------------------------------------------------------------------
0  KR-85M    2.021E-01   2.968E-08     .0E+00      .0E+00     1.5E+02     4.0E+00      .0E+00      .0E+00     2.0E+00     1.6E+02
0  KR-85     6.836E+00   9.777E-07    3.7E+03     1.4E+04     1.6E+04     1.4E+02      .0E+00      .0E+00     6.8E+01     3.4E+04
0  KR-87     1.888E-01   2.609E-08     .0E+00      .0E+00     5.0E+01     4.0E+00      .0E+00      .0E+00     2.0E+00     5.6E+01
0  KR-88     3.530E-01   5.140E-08     .0E+00      .0E+00     1.8E+02     7.0E+00      .0E+00      .0E+00     4.0E+00     1.9E+02
0  XE-131M   1.222E+00   1.735E-07    1.3E+02     4.9E+02     2.8E+03     2.6E+01      .0E+00      .0E+00     1.2E+01     3.5E+03
0  XE-133M   9.368E-02   1.387E-08     .0E+00      .0E+00     1.9E+02     2.0E+00      .0E+00      .0E+00      .0E+00     1.9E+02
0  XE-133    3.760E+00   5.396E-07    5.3E+01     2.0E+02     8.2E+03     8.0E+01      .0E+00      .0E+00     3.7E+01     8.6E+03
0  XE-135M   1.634E-01   2.345E-08     .0E+00      .0E+00     1.0E+01     3.0E+00      .0E+00      .0E+00     2.0E+00     1.5E+01
0  XE-135    1.080E+00   1.580E-07     .0E+00      .0E+00     1.2E+03     2.3E+01      .0E+00      .0E+00     1.1E+01     1.2E+03
0  XE-137    4.273E-02   6.165E-09     .0E+00      .0E+00      .0E+00      .0E+00      .0E+00      .0E+00      .0E+00      .0E+00
0  XE-138    1.508E-01   2.171E-08     .0E+00      .0E+00     8.0E+00     3.0E+00      .0E+00      .0E+00     1.0E+00     1.2E+01
0  TOTAL NOBLE GASES                                                                                                        4.8E+04
0-----------------------------------------------------------------------------------------------------------------------------------
00.0 APPEARING IN THE TABLE INDICATES RELEASE IS LESS THAN 1.0 CI/YR FOR NOBLE GAS, 0.0001 CI/YR FOR I
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U.S. EPR Final Safety Analysis Report Markups

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 41 of 55

Item No.	Description	Section	~~Action Required by COL Applicant~~	~~Action Required by COL Holder~~
11.3-5	A COL applicant that references the U.S. EPR design certification will confirm that the site-specific accident atmospheric dispersion data is bounded by the values provided in Table 2.1-1. For site-specific accident atmospheric dispersion data that exceed the values provided in Table 2.1-1, a COL applicant that references the U.S. EPR design certification will provide a site-specific analysis demonstrating that the resulting dose at the exclusion area boundary associated with a radioactive release due to gaseous waste system leak or failure does not exceed 0.1 rem in accordance with SRP Section 11.3, BTP 11-5.	11.3.3.6		
11.3-6	A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed GWMS processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the GWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.3, RG 4.21, RG, 1.143, IE Bulletin 80-10, and NEI 08-08.	11.3.1.2.4		

11.03-16

to withstand seismic loading equivalent to one-half the amplitude of the safe shutdown earthquake (SSE).

11.3.1.2.3 Controlled Release of Radioactivity

Expected Releases

The U.S. EPR is designed to meet ALARA design objectives for gaseous releases due to plant operation. Section 11.3.3 describes the calculated releases from the gaseous waste processing system and from the Containment Building, Safeguard Building controlled area, Nuclear Auxiliary Building, Radioactive Waste Processing Building, and fuel building ventilation systems. Section 11.3.3 also contains a demonstration that the doses to individuals at or beyond the site boundary arising from the combined expected releases from the gaseous waste management systems meet ALARA design objectives.

Release Monitoring

Releases from the gaseous waste processing system are continuously monitored by radiation sensors in the delay system discharge line. The system also provides for grab sample collection for analysis from several different points on the process stream, and from each of the delay beds along the discharge line. Gaseous waste processing system releases are routed through the filtration system of the nuclear auxiliary building ventilation system.

Building ventilation exhausts are processed in the filtration system of the nuclear auxiliary building ventilation system or in the "low flow purge" in the containment purge subsystem of the containment ventilation system. These exhausts are routed through the nuclear auxiliary building ventilation stack for release to the environment. Radiation detectors in the stack continuously monitor the exhaust gases released from the nuclear auxiliary building ventilation system.

Operator Error or Equipment Malfunction

The radiation sensors in the gaseous waste processing discharge line generate alarms in the main control room. Few operator actions are required during gaseous waste system operation because the system is mostly automated.

11.03-16

11.3.1.2.4 Mobile Systems

A COL applicant that references the U.S. EPR design certification and that chooses to install and operate mobile skid-mounted processing systems connected to permanently installed GWMS processing equipment will include plant and site-specific information describing how design features and implementation of operating procedures for the GWMS will address the requirements of 10 CFR Part 20.1406(b) and guidance of SRP Section 11.3, RG 4.21, RG, 1.143, IE Bulletin 80-10, and NEI 08-08.