ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Friday, November 06, 2009 8:32 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC); SLIVA Dana (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 276, FSARCh. 11, Supplement 1
Attachments: RAI 276 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 276 on October 14, 2009. The attached file, "RAI 276 Supplement 1 Response US EPR DC.pdf," provides a technically correct and complete response to 1 of the 2 questions, as committed.

Appended to this file is one of the affected pages of the U.S. EPR Final Safety Analysis Report (FSAR) in redline-strikeout format which support the response to RAI 276 Question 11.05 -14c.

A complete FSAR markup is not provided for Question 11.05 -14. As agreed by NRC staff during an FSAR Chapter 11 audit on October 7, 2009, FSAR markups may be submitted after Phase 2 completion to support Staff review to close confirmatory items. Therefore, a complete FSAR markup for this portion of the question will be provided as indicated in the following table:

Question #	Supplement Date (providing FSAR Markup)
RAI 276 — 11.05-14	March 31, 2010

The following table indicates the respective page(s) in the response document, "RAI 276 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 276 — 11.05-14	2	4

A complete answer is not provided for 1 question. The schedule for a technically correct and complete response to the remaining question has been revised as provided below.

Question #	Response Date
RAI 276 — 11.05-13	November 25, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
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An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
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From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, October 14, 2009 5:47 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); WILLIFORD Dennis C (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 276, FSARCh. 11

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 276 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the 2 questions is not provided.

The following table indicates the respective page(s) in the response document, "RAI 276 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 276 — 11.05-13	2	2
RAI 276 — 11.05-14	3	4

A complete answer is not provided for the 2 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 276 — 11.05-13	November 6, 2009
RAI 276 — 11.05-14	November 6, 2009

Sincerely,

Ronda Pederson
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, September 14, 2009 3:18 PM
To: ZZ-DL-A-USEPR-DL
Cc: Dehmel, Jean-Claude; Frye, Timothy; Jennings, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 276 (3496), FSARCh. 11

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 17, 2009, and discussed with your staff on August 25, 2009. No changes were made to the draft RAI questions 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: 946

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Subject: Response to U.S. EPR Design Certification Application RAI No. 276, FSARCh. 11, Supplement 1
Sent Date: 11/6/2009 8:31:59 PM
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From: Pederson Ronda M (AREVA NP INC)

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RAI 276 Supplement 1 Response US EPR DC.pdf	101548	

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

Response to

Request for Additional Information No. 276, Supplement 1

9/14/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 11.05 - Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems
Application Section: 11.5 and 5.2.5

QUESTIONS for Health Physics Branch (CHPB)

Question 11.05-14:

FSAR Sections 11.5.2 to 11.5.4 present the descriptions of PERMSS subsystems and Table 11.5-1 lists radiation monitoring methods used to monitor radioactive process and effluent streams for normal operations, anticipated operational occurrences, and accident conditions. Subsystem descriptions presented in Section 11.5 are supported by information presented in Sections 1.9, 7.1.2, 7.5.1, and 9.3.2. A review of these sections indicates that the design bases and system descriptions are not presented consistently. In particular, the staff noted that:

a) FSAR Section 1.9, Table 1.9-3 commits to the requirements of Part 50.34(f)(2)(viii), but this commitment is not addressed in FSAR Section 9.3.2 as it relates to the capability of prompting collecting samples from reactor coolant and containment. Section 11.5 refers to Section 9.3.2 for details and itself does not state how the requirements of Part 50.34(f)(2)(viii) are met.

b) FSAR Section 1.9, Table 1.9-3 commits to the requirements of Part 50.34(f)(2)(xvii), but this commitment is not addressed in FSAR Section 9.3.2 as it relates to design provisions for continuous sampling of radioiodines and particulates from all potential accident release points. Section 11.5 refers to Section 9.3.2 for details and Sections 11.5.3 and 11.5.4 do not state how the requirements of Part 50.34(f)(2)(xvii) are met.

c) FSAR Section 1.9, Table 1.9-3 commits to the requirements of Part 50.34(f)(2)(xvii), but this commitment is not addressed in FSAR Section 7.5.2 as it relates to design provisions for continuous sampling of radioiodines and particulates from all potential accident release points. For Part 50.34(f)(2)(xvii), Section 7.5.2 refers only to the monitoring of noble gases and does not refer to Section 9.3.2 for supporting details on design features. Also, Section 7.1.2 and Table 7.1-2 do not present specific information on how these requirements of Part 50.34(f)(2)(xvii) are being met.

d) FSAR Section 1.9, Table 1.9-3 commits to the requirements of Part 50.34(f)(2), but these commitments are not consistently referenced in the column identifying where in the FSAR such commitments are described. For example, FSAR Section 9.3.2 should be added to the commitment on Part 50.34(f)(2)(xvii) and (f)(2)(xxvi). Similarly, FSAR Section 11.5 should be added to the commitment on Part 50.34(f)(2)(xxvii).

e) FSAR Section 1.9, Table 1.9-2 commits to the guidance of Regulatory Guide (RG) 1.21 without any exclusion. FSAR Section 9.3.2 refers to RG 1.21 (regulatory position C.2) as it relates to the placement of radiation monitoring equipment on all potential effluent release points, but it does not address other equally important considerations. Such considerations are ensuring that sample collection is representative of effluent streams being monitored (regulatory position C.6 and ANSI/HPS 13.1-1999), and whether composite sampling will be used to assess releases for specific process and effluent streams (regulatory position C.7).

f) FSAR Section 9.3.2, Tables 9.3.2-1 and 9.3.2-2 refer to “activity” as a one of several process measurements that will be evaluated from primary and secondary sampling points. In sampling for noble gases, radioiodines, and particulates, the descriptions and tables do not identify significant or surrogate radionuclides that will be monitored as indicators of plant conditions; what type of analytical methods will be used for liquid, particulate, and gaseous samples, such as gross beta and alpha counting, gamma and alpha spectroscopy, and liquid scintillation counting; and types of samples that would require radionuclide chemical extraction before conducing radiological analyses.

Accordingly, FSAR Sections 1.9, 7.1.2, 7.5.1, 9.3.2, and 11.5 should be reviewed and revised to correct these inconsistencies and ensure the consistent presentation of all design bases, system descriptions, and design features of radiation instrumentation and sampling systems used in monitoring and controlling airborne radioactivity releases under normal operations, anticipated operational occurrences, and accident conditions in meeting the requirements of Part 50.34(f)(2).

Response to Question 11.05.14:

a) The U.S. EPR has the capability of promptly collecting samples from the reactor coolant and the containment. The reactor coolant is sampled through the nuclear sampling system. The IRWST and containment gases are monitored via the severe accident sampling system.

   U.S. EPR FSAR, Tier 2, Section 9.3.2 will be revised to include the related requirements of Part 50.34(f)(2)(viii).

b) The U.S. EPR has the capability to continuously sample radioactive iodines and particulates in gaseous effluents from all potential accidental release points, and provides for onsite capability to analyze and measure these samples. The monitoring of inplant radiation and airborne radioactivity is provided for a broad range of routine and accident conditions.

   U.S. EPR FSAR, Tier 2, Section 9.3.2 will be revised to include the related requirements of Part 50.34(f)(2)(xvii).

c) U.S. EPR FSAR, Tier 2, Table 7.1-2 is not meant to contain specific information on how the system meets the requirements of 10 CFR 50.34(f)(2)(xvii). U.S. EPR FSAR, Tier 2, Table 1.9-3 provides FSAR sections where relevant areas of 10 CFR 50.34(f)(2)(xvii) are addressed.

   U.S. EPR FSAR, Tier 2, Section 7.5.2.1.1 will be revised to add the following:

   "Continuous sampling of radioiodines and particulates from potential accident release points will be provided by the process sampling system as described in Section 11.5. Additional details on the process sampling system are described in Section 9.3.2."

d) U.S. EPR FSAR Tier 2, Table 1.9-3 will be reviewed and revised to identify locations in the FSAR where commitments are described.

e) The U.S. EPR will use continuous radiation monitoring systems combined with grab sample analyses to more fully characterize and quantify a discharge. Grab samples are collected at scheduled frequencies to quantify specific radionuclide concentrations and release rates.

   For batch release, grab sample measurements will be performed to identify principal radionuclides before a release. Representative samples will be collected for the purpose of subsequent composite analysis.

   U.S. EPR FSAR, Tier 2 Section 9.3.2 will be revised to include the related requirements of positions C1.6 and C1.7 of RG 1.21.

f) With respect to U.S. EPR FSAR Tier 2, Table 9.2.3-1, the chemical volume and control system , reactor coolant system, and pressurizer samples can all be analyzed for β-radiation by aligning them to the online activity monitor.

The primary side sampling online activity measurement point is used for fast detection of fuel element damages. It is able to detect β-radiation of noble gases using a flow through ionization chamber. The samples are part of the nuclear sampling system.

In the event of an accident, grab samples from the in-containment refueling water storage tank (IRWST) and containment atmosphere are possible. These samples are part of the severe accident sampling system.

With respect to U.S. EPR FSAR Tier 2, Table 9.3.2-2, the steam generator blowdown is continuously sampled for gamma radiation. This sample is part of the secondary sampling system.

As described in U.S. EPR FSAR Tier 2, Section 11.5.4.1, radioactivity in the main steam system is monitored over a wide power range. At low power levels, gamma radiation is detected in the main steam due to the presence of noble gas. At high power levels, radiation is detected from the strong gamma from nitrogen-16.

U.S. EPR FSAR Tier 2, Section 9.3.2.2.1.2 will be revised to refer to Section 11.5.4.1 for a discussion of the main steam radiation monitoring system. U.S. EPR FSAR Tier 2, Table 9.3.2-1 and 9.3.2-2 will be revised to indicate the type of activity measurement. Additionally the activity measurements associated with main steam will be added to U.S. EPR FSAR Tier 2, Table 9.3.2-2.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Section 7.5.2.1.1 will be revised as indicated in the response and shown on the attached markup.

U.S. EPR FSAR, Tier 2, Section 9.3.2, Table 1.9-3, Table 9.3.2-1, and Table 9.3.2-2 will be revised as indicated in the response and the FSAR markups provided by March 31, 2010.

U.S. EPR Final Safety Analysis Report Markups

10 CFR 50.34(f)(2)(xvii) Accident Monitoring Instrumentation

The following instrumentation is available for readout in the MCR:

- Containment pressure sensors are provided by the containment ventilation system described in Section 9.4.7.
- Level sensors for the in-containment refueling water storage tank (IRWST) are provided by the safety injection system described in Section 6.3.
- Containment hydrogen sensors are provided by the hydrogen monitoring system described in Section 6.2.5.
- Containment radiation intensity (high level) monitors are provided by the radiation monitoring system (RMS) described in Section 11.5.

Q 11.05-14c

- Noble gas effluent monitoring at all potential accident release points are provided by the RMS described in Section 11.5.
- Continuous sampling of radioiodines and particulates from all potential accident release points will be provided by the process sampling system as described in Section 11.5. Additional details on the process sampling system are described in Section 9.3.2.

10 CFR 50.34(f)(2)(xviii) Inadequate Core Cooling Instrumentation

The following instrumentation provides an indication in the MCR of inadequate core cooling:

- The reactor vessel water level indication is provided by the reactor pressure vessel water level measurement system described in Section 7.1.
- A combination of RCS hot leg wide range (WR) pressure and the core outlet thermocouples (COT) described in Section 7.1 is used to determine inadequate core cooling.

10 CFR 50.34(f)(2)(xix) Instruments for Monitoring Plant Conditions Following Core Damage

The post-accident monitoring variables discussed in Section 7.5.2.2.1 and the severe accident monitoring variables discussed in Section 7.5.2.2.3 provide for monitoring plant conditions following core damage.

10 CFR 50.34(f)(2)(xx) Power for Pressurizer Level Indication

Each of the four PZR level sensors generates a signal that is received in one of the four divisions of the PS. The PZR level sensors are powered from the Class 1E bus of the PS division in which the sensor signal is received. PZR level indication is provided by PICS and is backed by the safety-related SICS.