ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Thursday, October 22, 2009 3:48 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. 290, FSARCh. 11
Attachments: RAI 290 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 290 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the 5 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 290 Questions 11.05-17 and 11.05-18.

The following table indicates the respective page in the response document, "RAI 290 Response US EPR DC.pdf," that contains AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 290 — 11.05-15	2	2
RAI 290 — 11.05-16	3	3
RAI 290 — 11.05-17	4	4
RAI 290 — 11.05-18	5	5
RAI 290 — 11.05-19	6	6

A complete answer is not provided for 3 of the 5 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 290 — 11.05-15	November 6, 2009
RAI 290 — 11.05-16	November 6, 2009
RAI 290 — 11.05-19	November 6, 2009

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, September 22, 2009 10:17 AM
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. 290 (3637), FSARCh. 11

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on September 10, 2009, and on September 22, 2009, 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: 906

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Response to

Request for Additional Information No. 290 (3637), Revision 1

9/22/2009

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, 11.2, 9.3.3, 10.4.5

QUESTIONS for Health Physics Branch (CHPB)

Question 11.05-15:

FSAR Sections 11.5.3.2, 11.2.2.1.6, 11.2.2.3.3, and 10.4.5 and FSAR Figure 11.5-1 present information on the process and release paths that will be used to discharge liquid effluents from the plant during operation. A review of this information indicates that it is incomplete. Specifically, the following items were noted, given the FSAR's endorsement of Regulatory Guides 1.143 and 1.206:

a. FSAR Sections 11.2.3 and 10.4.5 do not define or describe the complete process path of LWMS discharges after the isolation valves shown in Figure 11.2-1 to the discharge canal. The information does not describe the connection from the LWMS discharge line to the Circulating Water System (CWS) and discharge canal as the ultimate point of release into the environment. A review of the information presented in FSAR Section 10.4.5 and Figure 10.4.5-1 reveals there is no input stream shown for the LWMS into the CWS, and no information describing the type of blowdown system and blowdown rates of the process stream receiving discharges from the LWMS before going into the CWS. Accordingly, the applicant is requested to provide the missing information defining the boundary of the LWMS beginning at the interface starting with plant systems provided for the collection of radioactive liquid wastes to the point of discharge into the environment in complying with the requirements of Part 20, Appendix B, and Part 50, Appendix I.

b. The applicant is requested to describe or reconcile the bases of the dilution flow rate of 100 ft^3/s presented in FSAR Section 11.2.3.3 against a discharge flow rate of 39.3 ft^3/s listed in FSAR Table 11.2-9, both used in characterizing radioactive effluent discharges into the environment. Update the corresponding sections of the FSAR with the revised discharge and/or dilution flow rates and supporting discussions for their use in assessing offsite doses to members of the public.

c. A review of FSAR Section 11.5.3.2 indicates that there are no descriptions of equipment and types of potential releases occurring from the "Turbine Building Plant Drainage" (TBPD). FSAR Table 11.5-1 and Figure 11.5-1 identify a radiation monitor on the line leading to a "water source" before being released into the environment. The information does not describe the connection from the TBPD discharge line to the Circulating Water System (CWS) and discharge canal as the ultimate point of release into the environment. A review of the information presented in FSAR Sections 9.3.3 and 10.4.5, Figure 10.4.5-1, and Table 1.1-1 (U.S. EPR FSAR Acronyms) reveals the TBPD is not listed as a plant acronym, there is no input stream shown for the TBPD into the CWS, and no information describing the type of blowdown system and blowdown rates of the process stream receiving discharges from the TBPD before going to the CWS. Accordingly, the applicant is requested to provide the missing information defining the boundary of the TBPD beginning at the interface of turbine building systems provided for the collection of process streams and radioactive liquid wastes to the point of discharge into the environment in complying with the requirements of Part 20, Appendix B, and Part 50, Appendix I.

Response to Question 11.05-15:

A response to this question will be provided by November 6, 2009.

Question 11.05-16:

FSAR Sections 11.5.2 to 11.5.4 present the descriptions of PERMSS subsystems and Table 11.5-1 lists radiation monitoring instrumentation used to monitor process and effluent streams. However, a review of subsystems listed in Table 11.5-1 and Figure 11.5-1 indicates that the descriptions are inconsistent and incomplete. For example:

a. FSAR Table 11.5-1 does not indicate any automatic control features (ACF) for the Component Cooling Water System (CCWS), but FSAR Sections 9.2.2.3.1 and 11.5.4.4 state that upon detection of elevated radioactivity levels, the affected CCWS train is isolated from the associated CCWS cooler for the CVCS. FSAR Section 9.2.2.6 provides information on instrumentation requirements for the CCWS. In addition, Section 9.2.2.6 does not refer to FSAR Section 11.5 and Table 11.5-1 for specific details on the associated radiation monitoring equipment for the CCWS. Accordingly, the applicant is requested to revise Table 11.5-1 to include the isolation feature for that system's description and revise Section 9.2.2.6 in referring to Section 11.5.4.4 for specific operating features of the radiation monitoring system.

b. FSAR Section 10.4.8.3.2 and Table 11.5-1 identify an automatic control feature (ACF) for the Steam Generator Blowdown System (SGBS), but FSAR 11.5.4.3 states that "This system does not initiate automatic actions." Upon detection of elevated radioactivity levels, the affected SG is isolated and the blowdown is diverted to the LWMS. In addition, a review of FSAR Section 10.4.8 and Figures 10.4.8-1 and 10.4.8-2 indicates that the SGBS radiation monitor is not shown on the SGBS P&ID, but it is represented schematically in Figure 11.5-1. Accordingly, the applicant is requested to revise Section 11.5.4.3 in providing a consistent description of the isolation feature of that system and revise Figures 10.4.8-1 and 10.4.8-2 to include the location of the radiation monitor in the SGBS drawing.

Response to Question 11.05-16:

A response to this question will be provided by November 6, 2009.

Question 11.05-17:

FSAR Section 10.4.6.3 describes the operation of the Condensate Polishing System (CPS) and states that in the event that spent resins become contaminated with radioactive materials, shielding will be provided. While correct as an interim measure in reducing radiation exposures to plant workers, the main focus of the discussion is on spent resin disposal and not about the radiation protection program described in FSAR Section 12.3. Accordingly, the applicant is requested to revise the discussion by pointing out that the disposal of spent resin contaminated with radioactive materials, following the rupture of SG tubes, will be managed using a plant-specific process control program as described in FSAR Section 11.4.

Response to Question 11.05-17:

U.S. EPR FSAR Tier 2, Section 10.4.6.3 will be revised to indicate that the spent resins are shipped offsite in accordance with the Process Control Program (PCP), which is discussed in U.S. EPR FSAR Tier 2, Section 11.4.3.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 10.4.6.3 will be revised as described in the response and indicated on the enclosed markup.

Question 11.05-18:

FSAR Sections 11.5.4.3 and 10.3.5 describe operational and radiological aspects in the event of SG tube ruptures. In addressing the radiological consequences on the secondary side water chemistry, Section 10.3.5.5 focuses on the presence of radioiodines. While the presence of radioiodines would be expected, the discussion should also note that in such an event, the assessment and compliance with dose limits for members of the public (Part 20) and release criteria (Part 50, Appendix I) would consider the presence of other equally predominant radionuclides. The sampling of the secondary side and types of analyses, in part, will be dictated by the requirements identified in FSAR Sections 9.3.2 and 11.5 and a plant-specific offsite dose calculation manual (ODCM) in addition to plant technical specifications. Accordingly, the applicant is requested to revise the discussion by describing that the radiological implications of detecting radioactivity in the secondary side will be addressed by the requirements identified in Section 11.5 and a site-specific ODCM developed by COL applicants.

Response to Question 11.05-18:

The consequences of primary to secondary leakage on the secondary side water chemistry program will be clarified in U.S. EPR FSAR Tier 2, Section 10.3.5.5 by adding the following:

> "In addition, in case of such an event, the 10 CFR Part 20 dose limits to members of the public and the 10 CFR Part 50, Appendix I release criteria would consider the presence of other equally predominant nuclides. The radiological implications of detecting radioactivity in the secondary side are addressed by the requirements identified in Section 11.5 and a site-specific ODCM developed by COL applicants."

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 10.3.5.5 will be revised as described in the response and indicated on the enclosed markup.

Question 11.05-19:

FSAR Sections 11.5.3 and 11.5.4 describe effluent and process monitoring and sampling. The descriptions are supplemented with information presented in FSAR Table 11.5-1, which identifies process and effluent sampling provisions for the sampling activity monitoring system and the nuclear sampling and severe accident sampling system. A review of the information presented in these subsections of Section 11.5, indicate that it is incomplete and the interface with complementary provisions of FSAR Section 9.3.2 (Tables 9.3.2-1 and 9.3.2-2) is not described and not consistent with SRP Sections 11.5 and 9.3.2 and Regulatory Guide 1.206. Specifically:

a. The sampling activity monitoring system and the nuclear sampling and severe accident sampling system are described as "systems" in Section 11.5.4. However, there are no subsections in Section 11.5 that describe either system. It is not clear if the information presented for the various subsystems consists, in the aggregate, the description of each system. The applicant is requested to organize the information for the sampling activity monitoring system and the nuclear sampling and severe accident sampling system in their respective subsections to ensure that all relevant information and criteria are clearly identifiable for the staff to assess compliance against the requirements of Part 20, Appendix B; Appendix I to Part 50; and TMI-related requirements of Part 50.34(f)(2).

b. Many of the entries in Table 11.5-1 for the sampling activity monitoring system and the nuclear sampling and severe accident sampling system are populated with "---" under the process and effluent table headers. As a result, it is impossible to confirm how these two systems will be used in complying with the requirements of Part 20, Appendix B; Appendix I to Part 50; and TMI-related requirements of Part 50.34(f)(2). The applicant is requested to review all associated Table 11.5-1 entries and populate each one with criteria demonstrating compliance with NRC regulatory guidance and requirements, or insert footnotes providing supporting details or pointing out to other sections of the FSAR where the requirements are addressed.

c. Given that Table 11.5-1 lists the nuclear sampling and severe accident sampling system, it is presumed that such an entry would complement supporting information presented in FSAR Section 9.3.2 (Tables 9.3.2-1 and 9.3.2-2). A review of the information indicates that the interface between FSAR Sections 11.5 and 9.3.2 is not established. FSAR Section 11.5 references FSAR Section 9.3.2, but does not provide further details. Similarly, FSAR Section 9.3.2 does not reference FSAR Section 11.5 even though Table 11.5-1 includes an entry for the nuclear sampling and severe accident sampling system, which should be linked to Section 9.3.2. The applicant is requested to review and revise FSAR Sections 11.5 and 9.3.2 and integrate the information to show the complementary provisions and interface work in demonstrating compliance with the requirements of Part 20, Appendix B and TMI-related requirements of Part 50.34(f)(2).

Response to Question 11.05-19:

A response to this question will be provided by November 6, 2009.

U.S. EPR Final Safety Analysis Report Markups

The remaining sources of contaminants, described below, are detected by continuous monitoring or sample analysis, and appropriate action is taken following detection to locate and to correct the problem.

- Contaminants that enter the system through condenser tube leaks are detected by continuous process monitoring of the condensate pump discharge, condenser hotwells, feedwater pump discharge, reheater drains and steam generator blowdown.
- The condensate polisher discharge is continuously monitored for cation conductivity, dissolved oxygen and sodium when in use.
- Demineralized water is continuously monitored as it is being produced and the demineralized water storage is routinely sampled to verify makeup water quality.
- Air inleakage is detected by monitoring the condensate pump discharge for excessive dissolved oxygen and by monitoring the condenser air removal rate.

10.3.5.4 Condensate Polishing

Condensate polishers are used in the recirculation cleanup system during plant startup and shutdown to remove both dissolved and particulate contaminants prior to admitting feedwater to the steam generators. This practice achieves the required water purity in a shorter time and prevents these contaminants from entering the steam generators.

Condensate polishers are used during power operation in the event of an upset in chemistry conditions, for example, during periods of condenser cooling water leakage or when inadequate performance of the makeup water system would introduce impurities to the steam generators. Additional information on the condensate polishing system may be found in Section 10.4.6.

10.3.5.5 Primary to Secondary Leakage

Leakage of primary water into the steam generator via through-wall tube defects provides a source of radioactive iodine to the secondary system. The volatility of radioactive iodine is increased by acidic and oxidizing solutions. As described in Section 10.3.5.2, the U.S. EPR secondary side AVT chemistry is both basic and reducing. These conditions suppress the volatility of radioactive iodine species and any release via the air ejector will be minimized. In addition, in case of such an event, the 10 CFR Part 20 dose limits to members of the public and the 10 CFR Part 50, Appendix I release criteria would consider the presence of other equally predominant nuclides. The radiological implications of detecting radioactivity in the secondary side are addressed by the requirements identified in Section 11.5 and a site-specific ODCM developed by COL applicants.

11.05-18

Condensate Polisher

The condensate polisher consists of at least four trains of deep mixed bed demineralizers with downstream resin traps. Spent polisher resin is replaced or regenerated offsite. The number and size of the ion exchangers allow functional requirements to be met while permitting replacement of resin in one ion exchanger at a time.

Resin Trap

Resin traps are installed downstream of each ion exchanger to remove resin fines.

Spent Resin Tank

The spent resin tank is used for storage of exhausted or spent resin prior to shipping offsite for regeneration or disposal.

Resin Addition Equipment

Equipment is provided to replace the ion exchange resin.

10.4.6.3 System Operation

The CPS cleans up the condensate during startup to meet condensate and feedwater system water chemistry specifications as described in Section 10.3.5. The condensate is recirculated to the hotwell during startup until the desired water quality is attained. Condensate and feedwater system operation is described in Section 10.4.7.

During power operation, the condensate polishers are used only when abnormal secondary cycle conditions exist. This allows continuous operation of the plant with condenser tube leakage until repairs can be made. Flow through the condensate polisher is controlled by the condensate polisher bypass valve.

Exhausted or spent resin is removed from the polisher vessel and replaced with new or regenerated resin. Resin replacement requires the polisher vessel to be out of service. The standby vessel is placed in service when another vessel needs to be removed from service. Spent resin may be transferred directly to a truck or the spent resin storage tank until it can be removed offsite. Spent resin will normally be nonradioactive and not require any special packaging prior to disposal. In the event the resin becomes contaminated with radioactive material, shielding is provided, if required. Spent resins are shipped offsite per the Process Control Program (PCP). Information about the PCP can be found in Section 11.4.3. Radiation monitors associated with the steam generator blowdown system, main steam system and condenser evacuation system vent are used to detect secondary side radioactive contamination (refer to Section 11.5).

11.05-17