

## ArevaEPRDCPEm Resource

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**From:** Tesfaye, Getachew  
**Sent:** Monday, September 14, 2009 3:18 PM  
**To:** 'usepr@areva.com'  
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ArevaEPRDCPEm Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 276 (3496), FSAR Ch. 11  
**Attachments:** RAI\_276\_CHPB\_3496.doc

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,  
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**Hearing Identifier:** AREVA\_EPR\_DC\_RAIs  
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Request for Additional Information No. 276 (3496), Revision 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)

11.05-13

FSAR Sections 11.5.1.2 and 5.2.5.1.2 address instrumentation and methods used to quantify reactor coolant system leakage and leakage rates, as required by EPR Technical Specifications (TS) 16.3.4.12 and TS B16.3.4.12. The technical basis for RCS leakage detection instrumentation [see (TS) 16.3.4.14 and TS B16.3.4.14, RG 1.45 (Rev. 1), and RIS 2009-02 (Rev. 1)] establish radiation monitor sensitivity requirements for a leakage detection increase of 1 gpm within 1 hour, using a realistic primary coolant concentration. A review of Sections 11.5.1.2 and 5.2.5.1.2 indicates that although Section 5.2.5.1.2 refers to Section 11.5 for information on the associated radiation monitoring instrumentation, Section 11.5.4 and Table 11.5-1 do not identify instrumentation and do not describe the methodology that would be used by COL applicants to monitor containment atmosphere for the presence of radioactive particulates capable of satisfying the requirements of EPR TS 16.3.4.12 on RCS leakage rates. Accordingly, the applicant is requested to review and revise Section 5.2.5 and 11.5 and address the following in the FSAR:

- a. Revise Table 11.5-1 to include the appropriate numbers of particulate radiation monitors used to satisfy (TS) 16.3.4.14 and TS B16.3.4.14, and specify the minimum required radiation monitor sensitivities for the containment particulate radiation monitors necessary to satisfy the required RCS leakage rate technical basis. Indicate whether noble gas radiation monitors will be used to supplement the particulate radiation monitor, given RG 1.45 regulatory position C.2.3, and, if so, provide similar supporting information for that type of monitoring method.
- b. In Section 11.5.2, provide the methodology to demonstrate that particulate radiation monitors will be capable of satisfying the technical basis for RCS leakage detection instrumentation using a realistic radioactive concentration in the RCS. Include descriptions of the model, methodology, assumptions, and parametric values used in the calculations and their basis, and references to enable the staff to conduct an independent evaluation.
- c. In Sections 5.2.5.1.2 and 5.2.5.5, revise the descriptions and discussions on which type of radiation monitor instrumentation will be used to comply with EPR TS 16.3.4.14, and update all internal citations in referencing Section 11.5 for specific details on the associated radiation instrumentation.

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 conducting 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).