ArevaEPRDCPEm Resource

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Sent: Wednesday, October 20, 2010 4:14 PM
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Subject: U.S. EPR Design Certification Application RAI No. 450 (5095), FSAR Ch. 14
Attachments: RAI_450_CHPB_5095.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 8, 2010, and on October 19, 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,
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Request for Additional Information No. 450(5095), Revision 1

10/20/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: 14.3

QUESTIONS for Health Physics Branch (CHPB)

14.03.07-37

Follow-up to RAI 292, Question 14.03.07-33

Under RAI 292, Question 14.3.7-33, the staff noted that ITAACs were inconsistent with respect to FSAR Tier 2 design features as they do not address the automatic isolation or termination control features of the PERMSS, as described in FSAR Tier 2, Section 11.5. For example, FSAR Tier 2, Section 11.5.1 states that PERMSS subsystems are design to process liquid and gaseous effluents in accordance with 10 CFR Part 20, and the control of effluent releases depends on the automatic termination features of the radiation monitor located on the discharge line. However, the liquid effluent radiation monitor and the associated isolation valve on the LWMS discharge line are not included in FSAR Tier 1, Section 2.9. Also, the ITAAC were found to be incomplete with respect to FSAR Tier 2 design features as they do not address the initial introduction of absorbent and filtration media in systems to successfully process and treat liquid and gaseous wastes before being discharged to the environment. As a result, such effluent releases could exceed the concentration limits of 10 CFR Part 20, Appendix B, Table 2. The applicant was requested to address these aspects in the respective subsections of the FSAR, Tier 1 material and the applicant submitted a response on January 18, 2010.

Based on a review of the January 18, 2010 response, CHPB, SBPB, and CTSB staff has identified the following items for the applicant to address and resolve in FSAR Tier 1:

a. In the response to Item 8).e, p.9 of 10, 4th para., the response states that the listed ITAAC can be performed without a functional arrangement drawing shown in FSAR Tier 1, Section 2.4.22 and no functional arrangement drawing is included in the proposed revision of FSAR Tier 1, Section 2.4.22. The staff disagrees with this response because for some radiation monitoring systems, the placement and functional relationship of radiation detectors on piping or ductwork and valves and dampers that are actuated by such radiation monitors are important design considerations in controlling effluent releases. If these functional arrangements are not shown in drawings, it is questionable that the associated inspection and test can be satisfactorily completed in demonstrating compliance with the acceptance criteria assigned to that portion of the system. Accordingly, the applicant is requested to include functional arrangement drawings for all systems equipped with valves, dampers, and flow sensors that are actuated or used by radiation monitors in terminating liquid effluent releases

and diverting gaseous process streams to particulate and radioiodine filtration systems before being discharged to the environment.

b. In the proposed revision to FSAR Tier 1, Section 2.8.7, Item 4.4, the applicant identifies that the SGBS is isolated upon receipt of a high radioactivity signal from the main steam lines or SG blowdown radiation monitors, both coinciding with partial cooldown signals. While conceptually acceptable, it is not clear as to how the associated ITAAC commitments, listed in FSAR Tier 1, Table 2.8.7-3, Item 4.4, will be met given that FSAR Tier 1, Table 2.8.7-2 does not identified the associated radiation monitoring systems for the SGBS or main steam lines. A review of FSAR Tier 1, Table 2.8.7-3, Item 4.4 and FSAR Tier 1, Section 2.8.2, Item 4.0 and Table 2.8.2-2 indicates that the required radiation monitors are not included consistently and their functional arrangements are not identified in completing the tests. For example, if the ITAAC for the SGBS invokes a test for radiation monitors associated with main steam lines, FSAR Tier 1, Table 2.8.7-3, Item 4.4, does not state how this is going to be achieved and does not point to any ITAAC for details, e.g., Tier 1, Table 2.8.7-2. As noted above, FSAR Tier 1, Section 2.8.2, Item 4.0 and Tier 1, Table 2.8.2-3 do not identify how these interdependent functional arrangements will be confirmed through the appropriate ITAACs in Tier 1, FSAR Section 2.8.7 with an interface described in FSAR Tier 1, Section 2.8.2. The applicant is requested to revise the ITAAC commitments and describe the logic interface for the isolation functions of the SGBS in light of the interdependent operational arrangements of radiation monitoring equipment and simultaneous receipts of high radioactivity signals from main steam line or SG blowdown radiation monitors coinciding with partial cooldown signals.

c. A comparison of the proposed revision to FSAR Tier 1, Section 2.8.7, Item 4.4; FSAR Tier 1, Section 2.8.8; and FSAR Tier 2, Section 10.4.8.3.2 indicates that there are no ITAAC commitments to include tests confirming the isolation of SGBS valves protecting SG blowdown demineralizer resins if the temperature of the blowdown exceeds 131 degree F. It should be noted that if the SG blowdown demineralizer resins were damaged (i.e., melted by high temperatures), any radioactivity accumulated in resins at that time would be readily dispersed in the secondary side and result in the radioactive contamination of the secondary system. The resulting contamination of the secondary side would be contrary to the requirements of Part 20.1406(b) and possibly result in uncontrolled and unmonitored releases of radioactivity in the environment above effluent concentration limits of Table 2 in Appendix B to Part 20. Accordingly, the applicant is requested to add an ITAAC in Tier 1, FSAR Section 2.8.7 or 2.8.8 that confirms the full isolation or bypassing of the blowdown to the SG blowdown demineralizer resin beds upon detecting SG blowdown temperatures exceeding 131 degree F.

d. In the proposed revision to FSAR Tier 1, Section 2.9.1, Item 4.1, the applicant is requested to consider a revision that would read: “The LWMS processing equipment contains <u>the proper types and amounts of</u> filter media or treatment media.” Without this distinction, there is no assurance that the LWMS would meet the design performance characteristics described in FSAR Tier 2, Rev. 1, Section 11.2, Table 11.2-3, expressed as decontamination factors. These design performance characteristics form the basis in demonstrating compliance with

Part 20, Appendix B, liquid effluent concentration limits and offsite doses to members of the public, as shown in FSAR Tier 2, Tables 11.2-7 and 11.2-6. Note that a parallel revision is required in all commitments stated in FSAR Tier 1, Table 2.9.1-3, Item 4.1.

e. In the proposed revision to FSAR Tier 1, Section 2.9.1, Item 2.0, the applicant has not included a figure describing the functional arrangement and locations of LWMS components subject to ITAAC commitments, as listed in FSAR Tier 1, Table 2.9.1-3. Note that such a figure was provided for the GWMS (FSAR Tier 1, Figure 2.9.3-1) and it is not clear as to why the LWMS should be treated differently for similar types of ITAAC. Accordingly, the applicant is requested to add a figure describing the functional arrangement and locations of LWMS components subjected to the stated ITAAC commitments.

f. In the proposed revision to FSAR Tier 1, Table 2.9.1-3, Item 4.2, the applicant is requested to revise the description of inspections, tests and analyses for the LWMS. The description incorrectly refers "… to downstream of the delay beds," when in fact it should be downstream of the demineralizer beds. The "delay beds" are part of the GWMS and not part of the LWMS.

g. In the proposed revision to FSAR Tier 1, Table 2.9.1-3, Item 4.2, the applicant is requested to revise the description of inspections, tests and analyses for some portions of the PERMSS. The description refers to the use of simulated high radiation signals in verifying the closure of isolation valves upon detecting elevated levels of radioactivity above an established alarm set-point. A review of FSAR Tier 1, Rev. 1, Sections 1.1, 2.4, and 2.9, and FSAR Tier 2, Sections 11.5 and 14.3 indicates that the descriptions and scope of operational tests do not define "simulated high radiation signal" used in confirming the operational functions of a radiation monitoring channel. There are many ways in generating a simulated radiation signal, such as using jumper leads or using a electronic pulse or trip signal. In both instances, the simulated signal does not include a functional test of the radiation detector, which is the essential component of the radiation monitoring channel. In the context of completing the ITAAC, the commitment described in FSAR Tier 1, Section 2.9.1, Item 4.2, should use same the type of radioactive calibration sources as are called for in FASR Tier 2, Rev. 1, Section 14.2.12.11.20 (Test #144) in demonstrating the operational function of this channel. This approach would confirm that the radiation monitoring channel operates in accordance with design commitments and would terminate radioactive releases. Finally, note that credit for the ODCM in setting alarm set-points for all effluent discharge monitors (FSAR Tier 2, Section 11.5) cannot be used as a mean to avoid ITAAC (see NRC position in SECY 05-0197 and Regulatory Guide 1.206) and, consequently, the ODCM cannot be claimed as the last line of defense in protecting the public and environment. Accordingly, the applicant is requested to update the commitments described FSAR Tier 1, Section 2.9.1 and Table 2.9.1-3 to confirm the successful implementation of this ITAAC and ensure compliance with NRC requirements under Part 52.47(b)(1); Part 20, Appendix B, Table 2 effluent concentrations limits; Part 20.1301 and 20.1302 dose limits to members of the public; and limiting conditions for operation of Section IV of Appendix I to Part 50.

h. In the proposed revision to FSAR Tier 1, Table 2.9.1-3, Item 4.2, the description refers to the use of high radiation signals in verifying the closures of the isolation

valves upon detecting levels of radioactivity above an established alarm set-point. A review of FSAR Tier 2, Section 11.5.3.2 indicates that there are two radiation detectors and two isolation valves that work in tandem in isolating releases. In addition, FSAR Tier 2, Section 11.2.1.2.3 indicates that the two radiation detectors and effluent flow sensors work together and upon detecting discrepancies in radiation levels and flows, the system will terminate releases by closing a pair of isolation valves. However, the ITAAC does not describe this operational arrangement of radiation monitors and flow sensors valves and whether the tests will confirm these interdependent functions. The applicant is requested to revise the description of inspections and tests and specify how the ITAAC will confirm the functional operation and logic of the interdependent dual radiation monitors, dual isolation valves, and dual flow sensors, and modify the acceptance criteria accordingly. Finally, given the importance of the flow sensors in terminating releases, their descriptions and instrumentation tag numbers should be included as a new ITAAC commitment items in FSAR Tier 1, Table 2.9.1-3.

i. In the proposed revision to FSAR Tier 1, Section 2.9.3, Item 7.1, the applicant is requested to consider a revision that would read: "The GWPS processing equipment contains delay beds filled with the proper types and amounts of activated charcoal." Without this distinction, there is no assurance that the GWMS would meet the design descriptions and parameters described in FSAR Tier 2, Rev. 1, Section 11.3, Table 11.3-1, expressed as retention times for noble gases, in demonstrating compliance with Part 20 Appendix B, gaseous effluent concentration limits, and offsite doses to members of the public, as shown in FSAR Tier 2, Tables 11.3-5 and 11.3-6. Note that a parallel revision is required in all commitments stated in FSAR Tier 1, Table 2.9.3-3, Item 7.1.

j. In the proposed revision to FSAR Tier 1, Table 2.9.3-3, Item 7.2, the applicant is requested to revise the description of inspections, tests and analyses for the GWPS. The description refers to the use of simulated high radiation signals in verifying that closure of the isolation valves upon detecting levels of radioactivity above an established alarm set-point. See above item g. discussion and staff concerns to commitments described in FSAR Tier 1, Section 2.9.1 and Table 2.9.1-3 for the LWMS as they apply to the GWPS. Accordingly, the applicant is requested to update the commitments described FSAR Tier 1, Section 2.9.3 and Table 2.9.3-3 using a parallel approach as that applied for the LWMS.