ArevaEPRDCPEm Resource

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Sent: Friday, September 11, 2009 8:48 AM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 292 (3724, 3718), FSAR Ch. 14
Attachments: Draft RAI_292_SPCV_3724_CHPB_3718.doc

Attached please find draft RAI No. 292 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Request for Additional Information No. 292 (3724, 3718), Revision 1

9/11/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.03 - Inspections, Tests, Analyses, and Acceptance Criteria
SRP Section: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: 2.1.1, Table 2.1.1-8; 2.2.2, Table 2.2.2-3

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)
QUESTIONS for Health Physics Branch (CHPB)

14.03-12

Follow-up to Question 14.03-5

RAI Question 14.03-7 notes that the debris source term is a key design feature and identifies that there is no ITAAC to inspect containment materials to ensure as-built is consistent with as analyzed/tested. In response, AREVA made the following change to ITAAC for the reactor building (See Table 2.1.1-8 Rev 1):

> "The reactor pressure vessel, reactor coolant pumps, pressurizer, steam generators, and interconnecting
> RCS piping are insulated with reflective metallic insulation."

US EPR is not an all RMI plant and there are other insulating materials that will make up the debris source term, and are more likely to result in consequential head loss, namely particulate and fibrous insulation. Please explain why all source term materials such as fiber and particulate insulation, as well as coatings, are not included in the proposed ITAAC?

14.03-13

Follow-up to Question 14.03-8

RAI Question 14.03-8 notes that retaining baskets did not have ITAAC. In response, AREVA made the following change to the ITAAC for the IRWST (See Table 2.2.2-3 Rev 1):

> "A retaining basket exists in the IRWST directly below each heavy floor opening.
>
> The retaining basket has a minimum surface area of 721 ft2 and a maximum grid opening of 0.08 x 0.08 inches."

Given that a retaining basket is open at the top and designed to receive, collect and retain debris internally, it appears that volume (holding capacity) is an important design

feature, in addition to area and filtering hole size. Please explain why volume (holding capacity) was not included in ITAAC?

14.03.07-33

A review of FSAR Tier 2, Rev. 1, Section 14.3.2; FSAR Section 11.5; and FSAR Tier 1, Rev. 1, Section 2.0, indicates that the treatment of ITAACs has been divided in two groups, certified design material (CDM), and Inspection, Test, Analysis, and Acceptance Criteria (ITAAC). CDM binds the design commitment of structure, system, and components for the lifetime of the facility; and ITAACs are used to verify the as-built features of the plant. FSAR Tier I, Rev. 1, Section 14.3.2 assigns ITAACs based on (a) the classification of systems and equipments, and (b) on systems identified during key safety and integrated plant safety analyses for the purpose of preserving specific design features in the as-built facility. Systems described in FSAR, Tier 2 sections that have no safety significant features or that were not identified as part of the "key safety and integrated plant safety analyses" process are listed in Tier 1 as "No entry for this system." Although the selection process identifies pertinent NRC regulations for safety related design features, FSAR Tier 1, Section 2.9 does not identify ITAACs associated with plant systems and components used to monitor and/or control radioactivity releases in the environment in demonstrating compliance with 10 CFR Part 20, Appendix B, Table 2 liquid and gaseous effluent concentration limits; and doses to members of the public under 10 CFR Parts 20.1301 and 20.1302, as well as avoiding unmonitored and uncontrolled radioactive releases to the environment in response to Part 20.1406(b).

Plant systems described in FSAR Tier 2, that are used to demonstrate compliance with Part 20 requirements, include the liquid waste management system (LWMS, Section 11.2), the gaseous waste management system (GWMS, Section 11.3), and the process and effluent radiological monitoring and sampling systems (PERMSS, Section 11.5). FSAR Tier 1, Section 2.9 places the LWMS and GWMS in the "No entry for this system" category, and the PERMSS is not identified in FSAR Tier 1, Section 2.9. The ITAACs assigned to the radiation monitoring systems, FSAR Tier 1, Rev. 1, Section 2.4.22, are for safety-related functions in protecting control room personnel, and for isolating the containment on a receipt of signals from the containment high range radiation monitor. The ITAACs assigned to the steam generator blowdown system (SGBS), FSAR Tier 1, Rev. 1, Section 2.8.7, do not identify the isolation features of the system in the event that elevated radiation levels are detected in the SG blowdown. The ITAACs assigned to the sampling activity monitoring systems, FSAR Tier 1, Rev. 1, Section 2.9.4, are safety-related functions for the protection of personnel in the control room and its isolation upon receipt of high radiation signals by the control room air intake radiation monitor. This ITAAC is also used to confirm the alarm functions of the plant stack radiation monitor in the control room upon receipt of high radiation signals.

A review indicates that ITAACs are inconsistent with respect to 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. 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. For example, compliance with Part 20 requirements for LWMS effluent releases depends on the automatic termination control features of a radiation monitor located on its 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.

The ITAACs were also found to be incomplete with respect to Tier 2 design features as they do not address the initial introduction of absorbent and filtration media in systems that rely on such media to successfully process and treat liquid and gaseous wastes before being discharged into the environment. For example, if the LWMS were properly built with all mechanical components in place, but without confirming the initial introduction of the proper types and amounts of filtration and adsorbent media, the LWMS would be totally ineffective and would fail to meet the performance parameters stated in FSAR, Tier 1, Rev. 1, Section 11.2.1 and decontamination factors listed in Table 11.2-3. As a result, such liquid effluent releases could exceed the concentration limits of 10 CFR Part 20, Appendix B, Table 2.

Accordingly, the applicant is requested to:

a. review PERMSS subsystems described in FSAR Sections 11.5.3 and 11.5.4 and Table 11.5-1 and assign ITAACs to systems that used to demonstrate compliance with 10 CFR Part 20, Appendix B, Table 2 liquid and gaseous effluent concentration limits and doses to members of the public under 10 CFR Parts 20.1301 and 20.1302.

b. review the design features of the LWMS, GWMS, and SGBS and assign ITAACs to confirm the proper operations of all automatic control features used to divert process streams and terminate effluent releases in meeting design descriptions and parameters given in FSAR Tier 2, Rev. 1, Sections 11.2 (LWMS), 11.3 (GWMS), and 10.4.8 (SGBS).

c. review the design features of the LWMS and SGBS and assign ITAACs to confirm the initial loading of the proper types and amounts of ion-exchange resins and filtration or absorption media in vessels and tanks in meeting design descriptions and parameters given in FSAR Tier 2, Rev. 1. For the LWMS and SGBS, the design performance parameters are expressed as decontamination factors in FSAR Table 11.2-3, which are used to demonstrate 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 11.2-6, 11.2-7, and 11.2-8.

d. review the design features of the GWMS and assign ITAACs in confirming the initial loading of the proper types and amounts of charcoal media and dessicant for the GWMS in meeting the design descriptions and parameters described in FSAR Tier 2, Rev. 1, Section 11.3. For the GWMS, the design commitments are expressed as retention times for noble gases in FSAR Tier 2, Rev. 1, Table 11.3-1, which are used to demonstrate 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.

e. review system design descriptions and address internal inconsistencies in the presentation of information presented under the headings of “I&C Design Features, Displays and Controls,” and “Equipment and System Performance,” and ITAAC tabulations. For example, such inconsistencies include listing radiation monitors in equipment description tabulations but not including the operational functions of radiation monitors in subsections on “I&C Design Features, Displays and Controls,” and “Equipment and System Performance.” Another type of inconsistencies includes differences in the functional arrangements of systems presented between Tier 1 and Tier 2 figures. For example, FSAR Tier 1, Figure 2.6.4-1 does not show the radiation monitor as compared to FSAR Tier 2, Figure 9.4.2-1, even though the radiation monitor has been assigned ITAACs in FSAR Tier 1, Table 2.6.4-3. The systems for which such inconsistencies were noted include the component cooling water system (CCWS), fuel building ventilation system (FBVS), safeguard building controlled-area ventilation

system, containment building ventilation system, steam generator blowdown system, and the sampling activity monitoring system.

Without such clarifications and corrections, the staff cannot complete its evaluation and conclude, with reasonable assurance, that if the tests and inspections were performed and acceptance criteria were met, that all design commitments will be fulfilled and that the plant will be built and operated in accordance with the design certification and comply with applicable NRC regulations.

14.03.07-34

A review of FSAR Tier 1, Rev. 1, Section 5.0 (Site Parameters for the U.S. EPR Design) indicates that the inventory of radioactive materials presented in Table 5.0-1 (third sheet) is not supported with information contained in FSAR Tier 2 sections. This portion of Table 5.0-1 lists radionuclides that could potentially migrate into ground or surface waters in the event of a tank failure and provides concentrations for the listed radionuclides. As such, Table 5.0-1 presents an inventory of radionuclides and their corresponding concentrations (uCi/g) and not an inventory of total radioactivity summed over all radionuclides (uCi) for a given tank volume assumed to have failed. A review of FSAR Tier 2, Sections 2.4.12 (Groundwater), 2.4.13 (Pathways of liquid effluents in ground and surface waters), 11.2.3.7 (Postulated radioactive releases due to liquid-containing tank failures), and 12.2.1 (Contained sources) indicates that there is no basis and technical information supporting the listing of radionuclides and concentrations shown in FSAR Tier 1, Table 5.0-1.

Accordingly, the applicant is requested to provide the basis and technical information supporting the listing of radionuclides and concentrations shown in FSAR Tier 1, Table 5.0-1, and confirm whether the information presented in Table 5.0-1 needs to be expanded by including the total inventory of radioactivity for each radionuclide (uCi) in addition to concentrations (uCi/g). Also, the applicant is requested include descriptions of the methodology, assumptions, and parametric values used in the calculations and their bases, and references to enable the staff to conduct an independent evaluation of the radioactive inventory and radiological impacts of such releases on and use of ground or surface waters, given Part 20, Appendix B effluent concentration limits.