Request for Additional Information No. 116 (1122, 680), Revision 0

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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: 14.03.06 - Electrical Systems - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: FSAR Ch. 14

QUESTIONS for Health Physics Branch (CHPB)
QUESTIONS for Electrical Engineering Branch (EEB)

14.03-3

The U.S. EPR FSAR Tier 1, Section 2.9.4, “Sampling Activity Monitoring System,” contains one ITAAC item, a safety-related function to provide a radioactivity indication that initiates isolation of the main control room (MCR) ventilation intake. The description indicates three functions to be evaluated under ITAAC, namely, mechanical/seismic qualification, electrical power separation, and physical arrangement.

The U.S. EPR FSAR Tier 1, Section 2.6.1 “Main Control Room Air Conditioning System,” states that the system maintains habitability of the CRE areas in case of radioactive or toxic gas contamination of the environment. This function is necessary under 10 CFR 50, Appendix A, General Design Criteria 19 and 60. The criteria for determining acceptance are stated as mechanical/seismic qualification, electrical power separation, and physical arrangement.

Not included in either section’s ITAAC was the actual safety function, either with respect to whether or how the system responds to radiation in order to provide a radioactivity indication, nor with respect to output to the related system (presumably the Main Control Room Air Conditioning System (CRACS) for the stated isolation signal.

Please provide information with respect to how the ITAAC for the interface between these two Tier 1 safety-related systems will be addressed.

14.03.06-1

In FSAR Section 2.5.1 (Class 1E Emergency Power Supply System), Table 2.5.1-1, “Class 1E Emergency Power Supply Electrical Equipment Location” lists electrical equipment descriptions, tag numbers, and locations. The above equipment is important to ensure safety system redundancy (assuming a single failure) for the normal and alternate feed electrical lineups. Identify actual equipment and their location on EPSS buses.

14.03.06-2

The list of electrical ITAACs (2.5.1 through 2.5.11) provided in Section 2.5 (Electrical Power) of FSAR Chapter 2, “System Based Design Descriptions and ITAAC Table of Contents,”does not include containment electrical penetrations,

rather they are addressed in Section 3.5 of FSAR Chapter 3 as a part of "Containment Isolation ITAAC." The Section 3.5 containment penetration discussion addresses separations, and protections (primary and secondary) and protections against postulated currents greater than their continuous current rating. Appendix C (Electrical systems review checklist) of SRP 14.3.6 includes the containment penetrations in the above ITAAC. Include the containment penetrations in the ITAAC list, and comment on whether they will be tested periodically, and where the testing records will be kept. Correct "their current rating" to "their continuous current rating" in 5.5 of the commitment wording column. Justify why the ITAAC relies on testing and inspection, instead of analysis. Comment whether the penetrations will be tested periodically, and included in FSAR Table 1.8-2 under "COL Information Item" under action required by either COL applicant or holder.

14.03.06-3

Electrical ITAAC Tables associated with Chapter 2.5 of FSAR rely mostly on inspection and test, but little or no analyses (e.g., Table 2.5.1.3 on pages 2.5-13 through 16). The purpose of ITAAC is to verify that an "as built" facility conforms to the approved plant design and applicable NRC regulations (e.g., GDC-17, 10 CFR 52.47(b)(1), 52.80(a), 50.49, and 50.63). Thus, analyses (i.e., calculations) must be included as a part of ITAAC commitment to demonstrate that electrical equipment has adequate load carrying capacity, and adequate voltage to support safety functions, as well as demonstrating protection. In fact, pages 14-50 through 58 of Table 1-2 of Technical Report, "US-EPR Conformance with Standard Review Plan (NUREG-0800)," state "ITAAC should include analyses…" for the capacity and capability (14.3.6-SAC-1E-03) and electrical protection features (14.3.6-SAC-1E-04). Include all necessary analyses for electrical ITAAC Tables mentioned Chapter 2.5, where applicable. In addition, explain why 14.3.6-SAC-1E-03 (capacity and capability) contains separate rows for a single issue. FSAR Chapter 3 for equipment qualification (i.e., 3.10 and 3.11) should be for 14.3.6-SAC-1E-01, not 14.3.6-SAC-1E-03.

14.03.06-4

The purpose of ITAAC is to verify that an "as built" facility conforms with the approved plant design and applicable NRC regulations such as 10 CFR 52.47(b)(1), and 10 CFR Part 50.49. FSAR section 3.11 describes methods on how to satisfy 10 CFR Part 50.49, Equipment Qualification (EQ) rule. FSAR Chapter 2.5 (Tier 1) lists all ITAAC items, but EQ is not indentified as an ITAAC item. However, SECY-05-197 allows operational programs (e.g., EQ) not to be in an ITAAC if the program and its implementation are fully described in the COL application and found to be acceptable by the NRC. Under FSAR section 13.4 (Operational Program Implementation), it states that "a COL applicant that references the U.S. EPR design certification will provide site-specific information for operational programs (i.e., EQ) and schedule for implementation." However, FSAR Table 1.8-2, "Action required by COL applicant," does not direct the COL applicant to address EQ program and its implementation. Revise the Table 1.8-2 to add FSAR 13.4 statement, or provide justifications.

14.03.06-5

Explain why FSAR Table 2.5.1-3 of ITAAC 2.5.1, “Class 1E Emergency Power Supply System,” does not have commitment entries for testing: (1) an automatic power transfer scheme between normal and alternate power source if a loss of emergency auxiliary transformer (EAT) occurs; (2) degraded and loss of voltage conditions for the Class 1E equipment; and (3) Class 1E isolation device when non-safety-related loads connected to the EPSS (5.2).

14.03.06-6

Justify why FSAR Table 2.5.2-3 of ITAAC 2.5.2, “Class 1E Uninterruptible Power Supply,” does not have a commitment entry for analyzing as-built Class 1E DC system to ensure operating voltage remains within voltage ranges at the terminals of the safety-related equipment.

14.03.06-7

Explain why FSAR Table 2.5.3-2 of ITAAC 2.5.3, “Station Blackout Alternate AC Source,” does not have commitment entries for: (1) starting SBODGs and manually aligning to their respective buses from the MCR within 10 minutes for an SBO; and (2) demonstrating fuel tank capacity and fuel transfer capability between tanks.

14.03.06-8

Explain why FSAR Table 2.5.4-3 of ITAAC 2.5.4, “Emergency Diesel Generator,” does not have commitment entries (i.e., analyses and testing) for EDG operability with LOOP, and LOOP concurrent with LOCA that demonstrate EDG capacity and capability? The staff is not certain whether commitment 5.3 of Table 2.5.4-3 includes all the above analyses and testing for various alternate feed configurations. In addition, explain why there is no commitment entires for load shedding and sequencer testing for EDG operation (to start and load) for the above EDG operating modes? Why are commitment entries for testing fuel tank capacity, fuel transfer capability, and various parameter monitoring for EDG operations not included?

14.03.06-9

FSAR page 2.5-46 of ITAAC 2.5.5 addresses “Preferred (Offsite) Power Supply System.” The staff has reviewed Item 5.0 “Interface Requirements” and compared it with Tier 1 interface requirements that need to be developed for the COL applicant in C.II.1.2.6 on RG 1.206 (page C.II.1-16) and an example provided in Table C.III.7-3 of RG 1.206 (Page C.III.10-11). The Interface Requirements of Section 2.5.5 still need to address the following additional information:

a. voltage analysis at load terminals for all modes of plant operation and accident conditions based on the worst grid voltages

b. sizing analysis of the offsite transmission circuits from the transmission network through and including the main step-up power transformers and

auxiliary transformers (ATs) during all design operating modes, of their respective Class 1E divisions and non-Class 1E load groups

c. interrupting capability analysis of the plant's circuits

d. separation and independence of power and I&C circuits

e. ability retrieve the I&C information (displays and alarms) for analysis

Identify any commitment entries from the above FSAR Section 2.5.5 that will be revised, or provide justification otherwise.

14.03.06-10

FSAR Table 2.5.6-1 (item 4.1) of ITAAC 2.5.6, "Power Transmission System," states that an inspection will be performed to verify that "MSUs are sized to support…." Justify why this is an inspection rather than an analysis.

14.03.06-11

ITAAC 2.5.10, "Normal Power Supply System," lists only four RCPs. Explain why the list does not include other major electrical equipment (e.g., emergency feedwater, RHR, and condensate pumps) that will be installed on onsite electrical distribution system to satisfy GDC (33, 34, 35, 38, 41, and 44) requirements.

14.03.06-12

Items 6-16 through 19 in FSAR Table 14.3-6, "PRA and Severe Accident Analysis," on Page 14.3-21 provide no PRA values for electrical design features in US-EPR FSAR. Explain whether those PRA values be provided later, and by whom (i.e., COL applicants or US-EPR).