Draft

Request for Additional Information No. 96 (991, 1025, 1209,), Revision 0

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U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

Application Section: FSAR Ch. 3

QUESTIONS for EEB, CHPB, and CIB1 Branches

03.11-1

RAI-SRP 3.11-EEB-01

In FSAR Tier 2, Revision 0, Section 3.11.2.1 it is stated that electrical equipment identified to be in a harsh location, as described in Section 3.11.1.1, will be environmentally qualified by type testing or type testing and analysis using the guidance of IEEE Std 323-2003 and related standards in Table 3.11-4. However, NRC has not endorsed the 2003 version of IEEE Std 323 for environmental qualification of electrical equipment in the harsh environment with the exception of safety-related computer-based I&C systems located in a mild environment as addressed in Regulatory Guide 1.209, March 2007. Since IEEE Std 323-1974 remains the current standard of record and is endorsed by Regulatory Guide 1.89 for environmental qualification, Section 3.11 of the FSAR Tier 2, Revision 0 needs to be modified to reflect the change from IEEE Std 323-2003 to IEEE Std 323-1974.

03.11-2

i) FSAR Tier 2, Rev 0, Section 3.11.1.2, Definition of Environmental Conditions, defines a radiation harsh environment as a location inside or outside containment where the radiation levels are ≥ FSAR rads for mechanical equipment and ≥ 1.0E3 rads gamma for electrical or digital equipment. The section goes on to say that “a mild location is essentially an area…whose radiation levels are less than or equal to the thresholds discussed above for mechanical and electrical equipment”. This means that areas with radiation levels of FSAR (1.0E3 rads for electrical) would be considered both a harsh and mild environment for the purposes of equipment qualification. Provide justification or correct this statement.

ii) In FSAR Tier 2, Rev 0, Table 3D-8, Bounding Normal EQ Radiation Dose, the Dose Rates to air listed for the annulus and containment buildings are integrated over a 55 year period (when calculated by dividing the Cumulative Dose values listed in the table by the corresponding Dose Rates listed). However, Section 3D.5.1.1, Normal Radiation Dose, states that the cumulative dose values in Table 3D-8 were calculated based on 60 years of continuous operation and steady-state operating conditions. Provide a reason for the difference in integration times.

iii) In FSAR Tier 2, Rev 0, Table 3D-4, Normal Operating Environments, under the heading of “Nuclear Auxiliary Building, All other rooms (except laboratory rooms)”:

a. Please insert a closed parenthesis at the end of the phrase “All other rooms (except Laboratory rooms.”
b. Provide justification as to why Table 3D-4 refers the reader to Table 3D-7, Abnormal Room Conditions, to describe the radiation normal operating environment. Otherwise, if this reference is incorrect, modify Table 3D-4 accordingly.

IV) In FSAR Tier 2, Rev 0, Section 3.11.1.2, Definition of Environmental Conditions, radiation levels of 1E 4 rad (1E 3 rad for electrical) are used to define a harsh radiation environment.Provide clarification as to what dose rates integrated over what time period were compared to these thresholds to make the determination of a harsh or mild radiation environment for the various pieces of equipment.

03.11-3

i) FSAR Tier 2, Rev 0, Appendix 3D, Attachment E, Seismic Qualification Techniques, states that Table 3.10-1, List of Seismically and Dynamically Qualified Mechanical and Electrical Equipment, has a listing of electrical and I&C equipment not located in a harsh environment that will be seismically qualified in accordance with IEEE Std 344. However, in Table 3.10-1, under the heading of Sampling Activity Monitoring System, a statement is made that “As a Result of the EQ Program Screening No Components in This System were Identified for Seismic Qualification”. This contradicts Table 3.11-1, which lists six radiation monitors under the heading of Sampling Activity Monitoring Systems, and designates all of them as located in a mild EQ environment, with an EQ Program Designation of “EQ Seismic.” In addition, the “EQ program Designations” for both the Sampling Activity Monitoring System and the Radiation Monitoring System are not consistent between Table 3.11-1 and Table 3.10-1. Provide justification for these differences, or correct the Tables 3.10-1 and 3.11-1 so that they are consistent.

ii) The EPR FSAR, Tier 2, Appendix 3D, Attachment C, Effects of Gamma Radiation Doses Below 10^4 Rads on the Mechanical Properties of Materials, does not clearly address the following:

a. Will the equipment addressed by this attachment contain devices that have been selected for performance through the total integrated dose expected in service?
b. What is the applicable failure mode addressed in this attachment?
c. When discussing performance degradation is the applicant referring to electrical properties or mechanical strength and flexibility of the components?

03.11-4

In Tier 2, Section 3.11.2.2 of the U.S. EPR FSAR titled, “Environmental Qualification of Mechanical Equipment,” the applicant states that the U.S. EPR’s approach to environmental qualification (EQ) of mechanical equipment is based on methods developed and accepted for the South Texas Project 1 and 2 (STP) in References 24, 25, 26, and 27 of the EPR Tier 2 FSAR Section 3.11. The program the applicant is proposing for EPR might not be appropriate for use as an initial mechanical EQ program under a design certification. The STP approach was

based on a 50.59 evaluation ensuring that existing mechanical EQ methods were maintained using operational programs such as maintenance, surveillance, and procurement programs that were redundant with the mechanical EQ program. Provide an explanation of how it can be determined at this time that the maintenance, surveillance, and procurement programs for future plants referencing the EPR standard design provide an equivalency to a mechanical EQ program when those operational programs are outside the scope of design certification and are not yet developed.