

Draft

Request for Additional Information No. 68 (987, 1008), Revision 0

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U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants

Application Section: 14.2

CQVB Branch

QUESTIONS

14.02-19

In RAI 14.02-3, the staff requested that AREVA describe the administrative controls with respect to the transition from initial criticality to low power physics testing in FSAR Section 14.2.1.1. AREVA's response to RAI 14.02-03 stated that the transition from initial criticality to low power physics testing is completed after verifying that the technical specification SR 3.1.2.1 requirement of 1000 pcm is met; however, this statement is not specifically repeated in the FSAR as being the transition from initial criticality to low power physics testing. The NRC staff requests that AREVA add a statement to clarify that verification of technical specification SR 3.1.2.1 is the transition point from initial criticality to low power physics testing.

Also, in its recent revision to Section 14.2.1.1.4 of the U.S. EPR FSAR, AREVA cites that the initial criticality and low power physics testing follow the guidelines described in ANSI 19.6.1. The staff notes that the NRC staff has not endorsed the use of ANSI 19.6.1 for initial test programs. Also, the scope of the ANSI standard is limited and does not cover all of the needed areas for the administrative controls of the initial criticality and low power physics testing. Therefore, the NRC staff requests that AREVA remove the reference to ANSI 19.6.1 in Section 14.2.1.1.4 of the U.S. EPR FSAR or provide justification for its inclusion in a manner consistent with RG 1.68.

14.02-20

In RAI 14.02-04, the staff requested that AREVA revise Section 14.2.1.1.1, "Construction Activities," of the FSAR to include initial instrument calibration and functional test of components as recommended by Appendix A.1 of RG 1.68. The AREVA response to RAI 14.02-04 revised Section 14.2.1.1.2, "Phase I - Preoperational Testing," to include instrument calibrations and functional tests as objectives of preoperational testing. The revision of the FSAR is inconsistent with RG 1.68 guidance that preoperational tests should not proceed until the designated construction tests and inspections, which consist of initial instrument calibration and functional test of components, have been satisfactorily completed. The NRC staff requests that AREVA confirm that initial instrument calibration and functional test of components are completed in construction activities and revise Section 14.2.1.1.1 of the AREVA U.S. EPR FSAR accordingly.

14.02-21

In RAI 14.02-07, the NRC staff requested that AREVA provide additional information addressing the objectives of initial criticality and low-power physics testing in accordance with the guidance of Appendix A.3 and Appendix A.4 of RG 1.68. The AREVA response revised the U.S. EPR FSAR Section 14.2.1.1.4, "Phase III - Initial Criticality and Low Power Physics Testing," to provide the objectives stated in Appendix A.3 of RG 1.68, however, the objectives in Appendix A.4 were not included. Specifically, the objective A.4(a), "confirm the design and, to the extent practical, validate the analytical models and verify the correctness or conservatism of assumptions used in the safety analyses for the facility," and (b) "confirm the operability of plant systems and design features that could not be completely tested during the preoperational test phase because of the lack of an adequate heat source for the reactor coolant and main steam systems," are not discussed in the objectives of 14.2.1.1.4 of the U.S. EPR. The NRC staff requests that AREVA revise section 14.2.1.1.4 to include the objectives listed in Appendix A.4 of the RG.

14.02-22

In RAI 14.02-08, the NRC staff requested that AREVA provide additional information addressing the objectives of power ascension testing in accordance with Appendix A.5 of RG 1.68. AREVA's response revised Section 14.2.1.1.5, "Phase IV - Power Ascension Testing," to include objectives as stated in Appendix A.5 of RG 1.68, however, the revision does not include all of the objectives. Specifically, Section 14.2.1.1.5 does not address the following objectives: (1) tests and acceptance criteria should be prescribed to demonstrate the ability of major or principal plant control systems to automatically control process variables within design limits. Such tests are expected to provide assurance that the facility's integrated dynamic response is in accordance with design for plant events such as reactor scram, turbine trip, reactor coolant pump trip, and loss of feedwater heaters or pumps; (2) testing should be sufficiently comprehensive to establish that the facility can operate in all operating modes for which it has been designed; however, tests should not be conducted, or operating modes or plant configurations established, if they have not been analyzed or if they fall outside the range of assumptions used in analyzing postulated accidents in the facility's FSAR; and, (3) appropriate consideration should be given to testing at the extremes of possible operating modes for facility systems. Testing under simulated conditions of maximum and minimum equipment availability within systems should be accomplished if the facility is intended to be operated in these modes.

The NRC staff requests that AREVA revise Section 14.2.1.1.5 to address the objectives of power ascension testing in accordance with Appendix A.5 of RG 1.68.

14.02-23

In RAI 14.02-14, the NRC staff requested that AREVA include additional information in Section 14.2.10.2, "Initial Criticality," of the U.S. EPR FSAR with respect to the initial criticality criteria in Appendix C.3 of RG 1.68. AREVA's response provided information on the conditions for the safe controlled approach to initial criticality, including: a

minimum count rate of two counts per second is met, and a statistical reliability test on each operable source range instrument is performed. RG 1.68 Appendix C.3 states that a neutron count rate of at least 1/2 count per second should be used. The NRC staff requests additional information to justify the use of two counts per second versus the 1/2 counts per second recommended by the regulatory guide. In addition, the NRC staff requests clarification on the process used to perform a statistical reliability test on each operable source range instrument.

14.02-24

In RAI 14.02-12, the NRC staff requested that AREVA revise Section 14.2.10.1, "Initial Fuel Loading," of the FSAR to include the prerequisites for fuel loading from RG 1.68, Appendix C.2.a. AREVA's response revised the Section 14.2.10.1 to include the prerequisites listed in the RAI; however, there are additional prerequisites listed in the RG in Appendix A.2 that are not included in the FSAR revision. Specifically, the objectives are: (1) establish requirements for periodic data-taking; (2) predictions of core reactivity should be prepared in advance to aid in evaluating the measured responses to specified loading increments; (3) establish requirements for the operability of plant systems and components, including reactivity control systems and other systems and components necessary to ensure the safety of plant personnel and the public in the event of errors or malfunctions; and, (4) scram time tests should be sufficient to provide reasonable assurance that the control rods will scram within the required time under plant conditions that bound those under which the control rods might be required to function to achieve plant shutdown (testing should demonstrate control rod scram times at both hot zero power and cold temperature conditions, and with flow and no-flow conditions). The NRC requests that AREVA include all of the prerequisites listed in RG 1.68 in Section 14.2.10.1 of the U.S. EPR FSAR, or justify their exclusion.

In addition, AREVA removed the statement that all ITAAC have been closed from the minimum initial conditions for core load in Section 14.2.10.1. This statement was consistent with the guidance in SRP 1.4.II.4.A.i. The NRC staff requests that AREVA reinstate this statement in Section 14.2.10.1 of the EPR FSAR, or justify its removal.

14.02-25

Regulatory Guide 1.68, Appendix A.3, "Initial Criticality," states that "Licensees should conduct the initial approach to criticality in a deliberate and orderly manner using the same rod withdrawal sequences and patterns that will be used during subsequent startups." Section 14.2.10.2, "Initial Criticality," of the U.S. EPR FSAR does not discuss the use of the same rod withdrawal sequences and patterns in subsequent plant startups. Please revise the U.S. EPR FSAR, Section 14.2.10.2 to address the use of the same rod withdrawal sequences and patterns in subsequent plant startups.

14.02-26

Regulatory Guide, 1.68.3, "Preoperational Testing of Instrument and Control Air Systems," provides guidance for preoperational testing of I&C air systems. The RG states that as part of the initial preoperational testing program the system and loads should be tested as described in

the RG to verify that all components function properly at normal pressures and following possible pressure increases and that the systems respond as designed to a loss-of-pressure event. Test abstract 178, "Pre-Core Loss of Instrument Air," does not provide for the testing of all of the aspects of the guidance given in the RG. One example is that the test does not include testing of compressors, aftercoolers, oil separator units, air receivers, and pressure-reducing stations to verify proper operation according to system design. The NRC staff requests that AREVA revise test abstract 178 to ensure that all pertinent aspects of RG 1.68.3 are addressed in the test.

14.02-27

Regulatory Guide 1.68, Regulatory Position C.4 and Appendix C, Item 1.f, "Acceptance Criteria," note that the test acceptance criteria should account for measurement errors and uncertainties used in the transient and accident analyses. The U.S. EPR FSAR, Section 14.2.3 does not specifically address this provision. The NRC staff requests that AREVA revise Section 14.2.3 to clarify how test acceptance criteria will account for measurement errors and uncertainties used in the transient and accident analyses.

14.02-28

SRP 14.2.II.5 states that 10 CFR 52.47(b)(1) referring to ITAAC is applicable to design certifications. FSAR Section 14.1, "Specific Information to be addressed for the Initial Plant Test Program," states the regulations that the Initial Test Program addresses; however, the section does not include 10 CFR 52.47(b)(1). The NRC staff requests that AREVA add 10 CFR 52.47(b)(1) to the U.S. EPR FSAR, Section 14.1 since it is applicable to design certification applications.

14.02-29

Regulatory Guide 1.68, Section C.3, Scope, Conditions, and Length of Testing, states, "The testing of SSCs should include, to the extent practical, simulation of the effects of control system and equipment failures or malfunctions that could reasonably be expected to occur during the plant's lifetime." The U.S. EPR FSAR, Section 14.2.1.1, "Summary of the Startup Test Program," states that the test program will demonstrate that SSC operate and comply with design requirements, however, it does not include the statement that simulation of the effects of control system and equipment failures or malfunctions that could reasonably be expected to occur during the plant's lifetime will be part of the testing.

The NRC staff requests that AREVA expand the scope of Section 14.2.1.1 of the U.S. EPR FSAR to include a statement to the effect that testing of SSCs will include, to the extent practical, simulation of the effects of control system and equipment failures or malfunctions that could reasonably be expected to occur during the plant's lifetime.

14.02-30

The title of Regulatory Guide 1.9, Revision 4, listed in Section 14.2.7 of the U.S. EPR FSAR is stated as, "Selection, Design, and Qualification of Diesel-Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," however, the correct title is "Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants." Therefore, the NRC staff requests that AREVA revise Section 14.2.7 accordingly.