Request for Additional Information No. 70 (675, 676, 961), Revision 0

10/3/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 08.03.01 - AC Power Systems (Onsite)
SRP Section: 08.04 - Station Blackout
Application Section: SRP Section 8.3.1
EEB Branch

QUESTIONS

08.03.01-17

C.I.8.3.1.3 and C.I.8.3.2.3 of RG 1.206 identify a list of electrical system calculations (or studies) necessary for the onsite ac and dc distribution systems. The staff has requested a summary of the calculations and assumptions for Items 1-4 (i.e., load flow, short circuit, equipment sizing, and coordination studies) in previous RAIs. Provide a similar summary of calculations (or studies) and assumptions used to demonstrate its adequacy for surge and lightning protection (Item 5) on insulation coordination and power quality limits (harmonic distortion-Item 6) as cited in the above RG 1.206. Also, indicate whether the above calculations should be performed and provided by COL applicants, as the calculations may require site-specific grid (interface) information.

08.03.01-18

Provide the latest electrical FSAR drawings (8.3-1 through 8.3-7) if it has been updated since the original submittal.

08.04-5

FSAR Page 8.4-9 (8.4.2.6.1) states that “the U.S. EPR (US-EPR) design requires one emergency power source for decay heat removal; four are provided. From RG 1.155 Table 3— Emergency AC Power Configuration Group A is selected.” In determining the required SBO coping duration, one factor is the redundancy of the onsite Class 1E emergency power supply system. The staff’s review of the US-EPR section 8.3 (Onsite Power System) indicates that one divisional pair (i.e., two divisions-1 and 2 or 3 and 4) is required for a minimum safety-related function. Thus, the selection of Emergency AC Power Configuration Group should be corrected from “A” to “B” in the above FSAR. In addition, the SBO rule (10 CFR 50.63) requires each COL applicant to demonstrate the capability to withstand and recover from an SBO condition for a specified duration. Since the above SBO coping duration evaluation requires site-specific information, the duration should be included in FSAR Table 1.8-2 as a COL applicant (COLA) item.

08.04-6

On FSAR Page 8.4-12, Item 7 of SBO timeline states that “thirty minutes into the event, two EFW pumps are started and begin feeding four SGs.” Since the US-EPR design

provides two station blackout diesel generators (SBODGs) and each SBODG powers one EFW pump, US-EPR is designed to use two SBODGs for a postulated SBO event. However, page 8.4-6 (8.4.2.1) states that “Each SBODG has sufficient capacity to bring and maintain the plant in a safe shutdown condition, to continue core cooling, and to maintain containment integrity during an SBO.” With one SBODG, how long it will take to bring the plant in a safe shutdown condition (i.e., cold shutdown)? How long it will take with two SBODGs? SBO Tables 8.4-1 and 2 do not show any makeup water and residual heat removal equipment. Comment whether US-EPR can cope with an SBO without these equipment.

08.04-7

SBO timeline (10 minutes into an SBO event-No. 4) indicates that “operator actions are begun to limit reactor coolant inventory losses through letdown, sampling and pressurizer degasification connections.” Is the operator action alone adequate to maintain coolant inventory without makeup water system for an SBO event? The timeline also indicates that “the HVAC equipment in divisions 1 and 4 can be restored. Some Safeguards Building areas may briefly exceed 122°F before HVAC is restored.” Comment whether the temperature exceedance of the Safeguard building areas would damage any equipment.

08.04-8

AREVA's response to Question 08.04-1 (RAI 11) regarding to the sizing of alternate ac (AAC) power source for meeting 10 CFR 50.63 conflicts with the staff’s understanding of the applicability of SECY-94-084. The staff disagrees with your statement that the required end state of operating mode has not been identified. You referenced: (1) the staff recommendation of SECY-90-016, “Evolutionary Light Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements,” January 12, 1990, which it states, “The staff believes that the preferred method of demonstrating compliance with 10 CFR 50.63 is through the installation of a spare (full capacity) alternate ac power source of diverse design that is consistent with the guidance in Regulatory Guide 1.155, and is capable of powering at least one complete set of normal safe shutdown loads” and (2) the Commission’s approval of the staff’s recommendations of SECY-90-16, by the letter dated June 26,1990. Based on the above "safe shutdown," you interpret the operating mode as “hot standby” and sized the alternate ac (AAC) power source accordingly.

The Commission approval is based on: (1) installing a spare (full capacity) AAC power source of diverse design, and (2) it be capable of powering at least one complete set of normal safe shutdown loads. At the time the Commission approved the staff position as documented above, they recognized that this requirement meant to be more restrictive than meeting 10 CFR 50.63, in that an AAC should be fully capable of powering at least one complete set of equipment necessary to achieve and maintain safe shutdown without requiring complicated operator actions for load management. The staff interprets that “normal safe shutdown loads” means to bring the plant to “cold shutdown.”

Further clarification to cold shutdown has been documented in the Draft Safety Evaluation Report (DSER) on Chapter 11 of the Advanced Light Water Reactor (ALWR), “Requirements Document for Evolutionary Plant Designs,” dated March 1991, where it states, “For station blackout purposes, however, the combustion turbine generator

should be the primary means of coping with station blackout and bringing the plant to a cold-shutdown condition in an evolutionary ALWR plant. Therefore, the staff concludes that, as a minimum, the combustion turbine generator should be capable of powering one safety division and one division of permanent non-safety loads during the worst-case shutdown (to cold shutdown) and that it should have the capability to power these loads with some margin for load growth when operating within its continuous rating."

In SECY 94-084, it also includes staff's clear understanding of the required end state of operating mode, where it states that the preferred method of demonstrating compliance with 10 CFR 50.63 for evolutionary design to be a spare full-capacity AAC power source of a diverse design and that the AAC power source powers a larger complement of shutdown equipment to bring the plant to cold shutdown.

The acceptance criteria for sizing AAC power sources (Item No.3) for meeting 10 CFR 50.63 in the Standard Review Plan (SRP) requires that "the Commission has established a policy (SECY-90-016) that such plants should have an AAC power source of diverse design and capable of powering at least one complete set of normal shutdown loads."

Based on the above documents, the size of AAC power source provided in the current EPR plant design for 10 CFR 50.63 requirements does not fully meet the staff position documented in the above SECYs (90-016 and 94-084), SRP acceptance criteria, and DSER for the ALWR plant designs. Please explain how EPR Plant design intends to satisfy the above staff position.