Response to

Request for Additional Information No. 19 Supplement 1, Revision 0

7/09/2008

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.05.03 – Lighting Systems
Application Section: 9.5.3
EE Branch

Question 09.05.03-4:

FSAR, Rev. 0, Section 9.5.3.2.2 states that the emergency lighting system provides lighting in plant areas primarily containing safety-related equipment. Identify the areas besides MCR and RSS where the emergency lighting will be utilized.

Response to Question 09.05.03-4:

The emergency lighting system is a normally energized lighting system in conjunction with the normal lighting system that provides the normal illumination to support operation and maintenance activities in the plant. The difference between the emergency lighting system and the normal lighting is that the emergency lighting provides plant lighting supplied from a diesel backed power source. The emergency lighting system supplements escape route lighting during loss of power conditions by providing diesel generator backed lighting in areas with safety-related equipment. The emergency lighting system is not credited for post-fire safe shutdown activities. The special emergency lighting and eight-hour battery packs are credited for post-fire safe shutdown activities.

The amount of emergency lighting powered from the emergency power supply system (EPSS) in areas other than the main control room and remote shutdown station is based on the amount of safety-related equipment in the room. Rooms containing safety-related equipment that routine access is expected for normal operations, surveillances and maintenance activities (e.g., emergency core cooling systems pump rooms, switchgear rooms, I&C rooms and emergency power generating buildings) will have approximately one-third of the area lighting supplied by the emergency lighting system. The balance of the lighting is provided by the normal lighting system. The lighting supplied by the emergency lighting system provides adequate illumination for access to the Safeguard Buildings, Reactor Building, Fuel Building, and Emergency Power Generating Buildings during a loss of offsite power (LOOP).

Emergency lighting system fixtures powered by the EPSS are also provided in other areas of the Nuclear Island that have limited or no safety-related equipment. The emergency lighting fixtures in these areas are provided on a smaller ratio (approximately one-tenth of the area lighting) than areas with safety-related equipment. These lighting fixtures supplement escape route lighting and provide lighting for personnel movement in the Nuclear Island (e.g., stairways and passageways). The balance of lighting in these areas is provided by the normal lighting system. The emphasis on the percentage of emergency lighting provided in any particular area is based on providing access to safety-related equipment.

Emergency lighting fixtures powered by the normal power supply system (NPSS) provide a long term lighting supply during a LOOP in select areas outside the Nuclear Island such as the Switchgear Building. These specific lighting fixtures are station blackout diesel generator (SBODG) backed to provide lighting in areas where operator actions may be expected during a LOOP event (e.g., monitoring of SBODG operation).

FSAR impact

The U.S. EPR FSAR will not be changed as a result of this question.

Question 09.05.03-10:

FSAR, Tier 2, Section 9.5.3.1 states that isolation is provided for lighting systems powered from Class 1E sources by a Class 1E isolation device located at the MCC feed to the distribution panel. It is not clear to the staff whether a series of circuit breakers/fuses or single circuit breaker/fuse will be used. Provide clarification. Address how the requirements of RG 1.75 will be met. Revise Tier 1, Section 2.5.9 to include ITAAC reference for this item.

Response to Question 09.05.03-10:

Lighting systems powered from Class 1E sources are isolated by a single Class 1E circuit breaker or fuse located at the motor control center (MCC) feed to the distribution panel. The circuit breaker or fuse used for this isolation is applied so that the maximum credible voltage or current transient applied to the non-Class 1E side of the circuit breaker or fuse does not degrade, below an acceptable level, the operation of the circuit on the other side of that circuit breaker or fuse in accordance with IEEE Std 384-1992[1]. Following the isolation device, the circuit is treated as "associated" and routed with the division from which it originated (e.g., special emergency lighting), or it remains separated from Class 1E circuits.

The guidance provided in RG 1.75 is met by proper coordination of the lighting isolation circuit breaker or fuse so that: (a) the fault current under bolted and arcing fault conditions (assuming multiple faults of all non-safety-related loads and load current of all safety-related circuits) will cause the nearest circuit breaker or fuse to interrupt the fault current prior to initiation of a trip of any upstream protection devices, and (b) periodic testing of the circuit breakers (visual inspection of fuses and fuse holders) during every refueling demonstrates that the overall coordination scheme under multiple faults of non-safety-related loads remains within the limits specified in the design criteria.

The isolation of the lighting system non-Class 1E circuits from the Class 1E systems is verified with ITAAC in U.S. EPR FSAR Tier 1, Sections 2.5.1.5.2 and 2.5.2.5.2. The electrical isolation of the non-Class 1E circuits from the Class 1E systems is verified in the section associated with the Class 1E system. The commitments in these sections identify the emergency lighting and special emergency lighting systems specifically. Since the Class 1E systems which contain an electrical isolation device are verified, it is unnecessary to provide a reference to those sections in U.S. EPR FSAR Tier 1, Section 2.5.9.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

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[1] IEEE Std 384-1992, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits, "Institute of Electrical and Electronics Engineers, 1992.