KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Wednesday, July 22, 2015 2:32 PM
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Cc: Som, Swagata; Steven Mannon; Wunder, George; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 102-8017 (08.03.01 - AC Power Systems (Onsite))
Attachments: APR1400 DC RAI 102 EEB 8017.pdf; image001.jpg

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, KHNP requests, and we grant, 45 days to respond to the RAI question. We may adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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Options
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REQUEST FOR ADDITIONAL INFORMATION 102-8017

Issue Date: 07/22/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 08.03.01 - AC Power Systems (Onsite)
Application Section: 8.3.1

QUESTIONS

08.03.01-9
Containment Electrical Penetration:

DCD Tier 2, Section 8.3.1.1.9, Containment Electrical Penetrations (EPA), provides information on EPA. Information is needed for staff to determine that the EPA meets all requirements to satisfy GDC 50. GDC 50 requires, in part, that the design of containment penetrations, including electrical penetrations containing circuits of the ac power system in containment structures, must withstand a LOCA without loss of mechanical integrity. In order to satisfy this requirement, the penetration assemblies in containment structures must be capable to withstand all ranges of overload and short circuit currents up to the maximum fault current vs. time conditions that could occur given single random failures of circuit protective devices:

1. The aforementioned section states that Class 1E containment EPAs are physically separated and electrically isolated to maintain the independence of Class 1E circuits and equipment. Please confirm that containment electrical penetration assemblies contain only Class 1E protection devices for Class 1E circuits, as recommended in the guidance of IEEE Std. 384.

2. Confirm that protection devices are capable of being tested, calibrated, and inspected. Discuss the periodic inspection and testing program for containment penetration protective devices, including the circuit breakers used as containment penetration conductor overcurrent protection devices, as mentioned in Section 8.3.1.1.9. Discuss the periodic testing methods that will be performed to ensure functionality.

3. Confirm that the panels in which the protective devices are located are independent so that the failure of one device would not adversely affect the other.

4. Confirm that electrical penetrations would withstand the full range of fault current (minimum to maximum) available at the penetration.

5. Confirm that medium voltage cables are routed through penetration assemblies separate from low voltage power and low voltage control/instrumentation cables.

6. Discuss the design of physical separation of Class 1E cables and non-safety cables routed in the EPA so that faults in non-safety cables do not impact the Class 1E circuits.

08.03.01-10
Cables and Raceways:

DCD Tier 2, Section 8.3.1.1.10 provides Cable and Raceway Design Criteria. The staff has the following questions to evaluate that the design meets the GDC 17, since GDC 17 relates to the safety related onsite power system's capacity and capability:

1. DCD Tier 2, Section 8.3.1.1.4, Electrical Equipment Layout states that all 4 emergency diesel generators (EDGs) are located in one building in separate rooms as shown in layout Figure 8.2-1. Discuss the cabling and raceways to be designed to provide physical separation and independence, for all 4 trains of cables/raceways originating from the Class 1E switchgear building and ending at the EDG building.
2. COL Item, 8.3 (3) states that the COL applicant is to provide testing, inspection, and monitoring programs for detecting insulation degradation of underground and inaccessible power cables within the scope of 10 CFR 50.65.
    - Describe inspection, testing and monitoring programs to detect the degradation of inaccessible or underground power cables that support EDGs, offsite power, essential service water, component cooling water and other systems that are within the scope of 10 CFR 50.65.
    - Provide a description of the condition monitoring methods that would be used to detect cable insulation degradation.
3. Operating experience, as documented in NRC Generic Letter (GL) 2007-01, has shown that undetected degradation of electric cables could result in multiple equipment failures. Please discuss how the APR1400 design addressed the concerns detailed in NRC GL 2007-01, and also, why this GL is not included in DCD Tier 2.

08.03.01-11
Cathodic Protection:

One of the miscellaneous electrical systems is cathodic protection (CP) for plant underground directly buried steel piping, aboveground storage tanks, buried carbon steel/metallic structures etc that would be impaired by corrosion. Cathodic protection design is plant unique and is tailored to the site conditions. Please provide a description and applications of CP systems if it is applicable for APR 1400 design. If it is applicable for APR1400 design to prevent structures from corrosion, a COL item for CP will be required for the design of the Class 1E buried piping/ other structures.


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