KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, October 05, 2015 6:48 AM
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Cc: Ray, Sheila; Olson, Bruce; Wunder, George; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 234-8284 (14.03.06 - Electrical Systems - Inspections, Tests, Analyses, and Acceptance Criteria)
Attachments: APR1400 DC RAI 234 EEB 8284.pdf

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 first RAI question, and 30 days for the remaining three RAI questions. We may adjust the schedule accordingly.

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

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 234-8284

Issue Date: 10/05/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 14.03.06 - Electrical Systems - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section:

QUESTIONS

14.03.06-1

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

DCD Tier 2, Chapter 14.3.2.6, “ITAAC for Electrical Systems” Part j discusses electrical power for non-safety plant systems. Please discuss whether or not part j includes testing of the main generator system. If not, please discuss the tests done for the main generator.

14.03.06-2

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the AC electric power distribution system, as discussed in part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.1, please discuss why in Tier 1 an ITAAC is not needed to verify that each Class 1E bus automatically connects to the EDG when both offsite power sources are not available. Otherwise, please include an ITAAC accordingly.

For the AC electric power distribution system, as discussed in part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.1, please discuss why in Tier 1 that an ITAAC is not needed for Class 1E cable sizing to consider derating due to ambient temperature and raceway loading. Otherwise, please include an ITAAC accordingly.

For the AC electric power distribution system, as discussed in part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.1, Design Commitment Item 4 in Chapter 2.6.1.1 discusses electrical equipment in the auxiliary building and EDG building with seismic Category 1 structures. Please discuss what other buildings house Class 1E equipment that are located in seismic Category 1 buildings.

Table 2.6.1-3, Design Commitment item 13 states that Class 1E electric power distribution system cables are routed in seismic Category I structures and in their respective raceway trains. Please discuss why in Column 2 (Inspection, tests and analyses) analyses of the cables is not needed to show that the seismic design basis requirements are bounded.

14.03.06-3

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the EDG System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.2, please confirm that the four Class 1E EDGs are seismic Category I and can withstand seismic design basis loads without loss of safety function and provide an associated ITAAC.

For the EDG System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.2, please discuss why an ITAAC is not necessary for confirming that the each division of the Class 1E combustion air intake and exhaust system is capable of supplying combustion air and of disposing exhaust gases. Otherwise, please provide an ITAAC.

For the EDG System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.2, Table 2.6.2-3, Design Commitment Item 9 discusses the fuel storage capacity of the EDG. Please discuss why an acceptance criteria is not needed for confirming the as-built tank capacity bounds the analyses. Otherwise, please modify the acceptance criteria.

For the EDG System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.2, Table 2.6.2-3, Design Commitment Item 10 discusses the fuel day tank capacity of the EDG. Please discuss why an acceptance criteria is not needed for confirming the as-built tank capacity bounds the analyses. Otherwise, please modify the acceptance criteria.

For the EDG System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.2, Table 2.6.2-3, Design Commitment Item 12 discusses the lube oil makeup tank capacity of the EDG. Please discuss why an acceptance criteria is not needed for confirming the as-built tank capacity bounds the analyses. Otherwise, please modify the acceptance criteria.

14.03.06-4

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the DC Power System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.3, please discuss why an ITAAC is not necessary to confirm that each redundant division of the Class 1E battery and associated charger is located in a separate room. Otherwise, please provide an ITAAC.

For the DC Power System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.3, please discuss why an ITAAC is not necessary to confirm that the Class 1E dc power cables are sized to carry the required load currents and to provide minimum design basis voltage at load terminals, considering derating due to ambient temperature and raceway loading. Otherwise, please provide an ITAAC.

For the DC Power System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.3, please discuss why an ITAAC is not needed to confirm that the Class 1E batteries have enough capacity to carry the worst case load profile assuming the chargers are unavailable. Otherwise, please provide an ITAAC.

For the DC Power System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.3, Table 2.6.3-3, Design Commitment Item 10 discusses independence between Class 1E dc system trains and between Class 1E and non-Class 1E equipment cables. Please explain how the qualification of the isolation devices between Class 1E and non-Class 1E equipment is verified and update Column 2 (Inspections, Tests, and Analyses) if needed.

For the DC Power System, as discussed part c of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.3, please discuss why an ITAAC is not needed to confirm that Class 1E protective devices (circuit breakers/fuses) in the DC power system are sized to supply their load requirements. Otherwise, please provide an ITAAC.

14.03.06-5

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the Containment Electrical Penetration Assemblies, as discussed in part g of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.5, please discuss why an ITAAC is not necessary to confirm that separate penetrations are provided for medium voltage circuits, low voltage circuits, control power circuits, and instrumentation signal circuits. Otherwise, please provide an ITAAC.

14.03.06-6

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the Alternate AC Source, as discussed in part h of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.6, please discuss why an ITAAC is not necessary to confirm that the AAC source is capable of providing power at the set voltage and frequency to the Class 1E bus after receiving a start signal. Otherwise, please provide an ITAAC.

For the Alternate AC Source, as discussed in part h of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.6, please discuss why an ITAAC is not necessary to confirm that controls exist in the MCR and RSR to start, stop, and synchronize the AAC power source. Otherwise, please provide an ITAAC.

14.03.06-7

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the Lightning Protection and Grounding System, as discussed in part f of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.7, Table 2.6.7-1, Item 4 discusses equipment grounding. Please

discuss whether this includes the ground bus of switchgear, load centers, MCCs, switchboards and revise the ITAAC and DCD Tier 1 as necessary.

14.03.06-8

Chapter 2.6, Tier 1 and Chapter 14.3.2.6, Tier 2 provide information on the ITAAC of electrical systems.

GDC 17 requires that onsite and offsite power systems provide sufficient capacity and capability and furthermore, GDC 18 requires the testing of electric power systems.

For the Lighting System, as discussed part f of DCD Tier 2 Chapter 14.2.3.6 and DCD Tier 1 Chapter 2.6.8, Table 2.6.8-1, please discuss why an ITAAC is not necessary to confirm that supports for the emergency lighting system fixtures in Class 1E equipment areas can withstand seismic design basis loads. Otherwise, please provide an ITAAC.

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