KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, February 22, 2016 8:24 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Andy Jiyong Oh; Steven Mannon
Cc: Foli, Adakou; Zimmerman, Jacob; Wunder, George; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 412-8525 (08.04 - Station Blackout)
Attachments: APR1400 DC RAI 412 EEB 8525.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, the following RAI question response times. We may adjust the schedule accordingly.

08.04-12: 30 days
08.04-13: 45 days
08.04-14: 45 days
08.04-15: 45 days
08.04-16: 30 days
08.04-17: 45 days

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

Thank you,

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United States Nuclear Regulatory Commission
Protecting People and the Environment

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REQUEST FOR ADDITIONAL INFORMATION 412-8525

Issue Date: 02/22/2016
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 08.04 - Station Blackout
Application Section:

QUESTIONS

08.04-12

In response to RAI 7928, Question 08.04-3, the applicant states: "[t]he AAC [gas turbine generator] GTG is capable of supplying power for the shutdown loads required to bring the plant to the hot shutdown condition during an [station blackout] SBO." This information is not provided in the DCD.

Please revise Section 8.4 of the DCD Tier 2 to incorporate the above information.

08.04-13

In response to RAI 8192, Question 08.04-6.b, the applicant provided conformance of the APR1400 design to RG 1.155, Position C.3.3 (except 3.3.5). The applicant did not discuss conformance with Position C.3.3, other than C.3.3.5, in the DCD.

a- Please revise Section 8.4 of the DCD Tier 2 to include a discussion of how the APR1400 design conforms to RG 1.155, Position C.3.3.

b- For conformance with Position C.3.3.4, the applicant states: "The [main control room] MCR contains all of the control and/or monitoring provision for the operator to manually actuate the components of the systems necessary to cope with an SBO condition." Please discuss whether the systems necessary to cope with a station blackout event can also be actuated and controlled from the remote shutdown room (RSR).

c- Regarding conformance with RG 1.155, Position C.3.2, the applicant stated that NUREG-0800, Section 8.4.III.2 (SBO Capability) recommends that the design be conformed to Position C.3.2.5 only. Position C.3.2 provides guidance for determining a plant's capability to cope with an SBO. Since a coping analysis is not required for the APR1400, please confirm that the APR1400 design has the capability to maintain adequate core cooling and appropriate containment integrity for the SBO coping duration.

08.04-14

In response to RAI 8192, Question 08.04-7.a, the applicant provided information regarding electrical connections and independence of the AAC power source from the preferred offsite power supply (PPS) and the Class 1E onsite power sources. However, the information provided is not sufficient for the staff to determine that provisions of the AAC power source will not adversely affect the functioning of the PPS and/or Class 1E onsite power systems. Thus, the staff has the following questions:

a- Please provide a description of how the AAC power source is connected to the PPS.

b- The applicant states: "The connections between the non-Class 1E AAC [switchgear] SWGR 3N and each Class 1E SWGR 1A and 1B are separated from the cables connecting the Class 1E SWGR 1A and 1B to the PPS as practicable such that impact on the connections of the AAC power source is minimized for events that affect the PPS." Please provide the safety classification of cables connecting the AAC SWGR 3N to the Class 1E SWGR 1A and 1B, the Class 1E SWGR 1A and 1B to the PPS, and the Class 1E emergency diesel generators (EDGs) to the Class 1E SWGR 1A and 1B. Also, please discuss how the APR1400 design conforms to NRC RG 1.75 in regards to the separation of the cables.

c- Please revise Section 8.4 of the DCD Tier 2 to include a description of the electrical connections and independence (information not already provided in the DCD) of the AAC power source.

08.04-15

In response to RAI 8192, Question 08.04-7.b, the applicant discussed conformance to NUREG-0800, Section 8.3.III.3 Criteria D – G, I, and K – M.

a- The applicant did not discuss conformance with NUREG-0800, Section 8.3.III.3 in the DCD. Please revise Section 8.4 of the DCD Tier 2 to include conformance of the APR1400 design with NUREG-0800, Section 8.3.III.3, Criteria D – I, K – M.

b- Regarding conformance with Criterion D, the applicant stated that voltage, current, frequency, volt-ampere reactive, watts, watt-hour, power factor, and circuit breaker position of the AAC power source are monitored from the control room. Please specify which control room is being referred to in this statement, and confirm that the performance monitoring of the AAC power source is available in both the main control room and the remote control room. If either the MCR and RSR does not have the above monitoring capabilities, please discuss how performance of the AAC GTG will be monitored in the specific control room during an SBO event.

c- Criterion F recommends that the non-safety related AAC power source(s) and associated dedicated direct current (dc) system(s) meet the quality assurance (QA) guidance in Position 3.5, Appendix A, and Appendix B of RG 1.155. In the RAI response, the applicant discussed the QA program for the AAC GTG only. The applicant also provided the specifications of the AAC power source in accordance with RG 1.155, Appendix B.

i. Please clarify whether the support systems are included in the QA program for the AAC GTG. Also, please revise Section 8.4 of the DCD Tier 2 to include conformance of the AAC GTG with RG 1.155, Appendix B.

ii. Appendix A provides QA guidance for non-safety systems and equipment. Appendix B discusses specifications of system and station equipment such as water source, instrument air, and water delivery system. Please state how the APR1400 design conforms to RG 1.155, Position 3.5, Appendix A, Appendix B in regards to non-safety related systems. Also, please revise Section 8.4 of the DCD Tier 2 to include conformance of the non-safety related systems with RG 1.155, Position 3.5, Appendix A, and Appendix B.

08.04-16

In response to RAI 8192, Question 08.04-8, the applicant provided the kilo Volts Amperes (kVA) and the power factor (pf) of the AAC GTG and the total SBO loads. This information is not provided in the DCD.

Please revise Section 8.4 of the DCD Tier 2 to include the kVA and pf of the AAC GTG and the SBO loads.

08.04-17

In response to RAI 8216, Question 08.04-10, the applicant confirmed that the AAC GTG will be connected to the Class 1E 4.16 kV switchgear (1A or 1B) within 10 minutes of the onset of the station blackout (SBO). In addition, the licensee stated that after the AAC GTG reaches rated speed and voltage, operators will connect the AAC GTG to the selected Class 1E 4.16 kV (1A or 1B) bus by closing three circuit breakers in accordance with the emergency operating procedures from the control room. In Section 8.4.1.4 of the DCD Tier 2, the applicant provided information for aligning the AAC GTG to the dedicated train of the onsite Class 1E switchgear buses (train A or train B).

a- Please confirm that the transfer of the AAC GTG power supply from the PNS buses to the dedicated Class 1E bus will not affect the required 10-minute timing for connecting to the Class 1E bus during an SBO event.

b- The applicant provided an ITAAC in DCD Tier 1, Table 2.6.6-1, Item 4 to verify that the as-built AAC source is started and connected manually to the as-built class 1E train bus within 10 minutes of the onset of a simulated SBO event. Please clarify whether the tests will include verification of the AAC GTG power transfer from the PNS buses to the dedicated Class 1E bus within 10 minutes of the onset of the SBO. If not, please provide an ITAAC for this verification.