

## **KHNPDCDRAIsPEm Resource**

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**Sent:** Thursday, August 20, 2015 10:23 AM  
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**Cc:** Foli, Adakou; Wunder, George; Lee, Samuel  
**Subject:** APR1400 Design Certification Application RAI 165-8192 (08.04 - Station Blackout)  
**Attachments:** APR1400 DC RAI 165 EEB 8192.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 this RAI. 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 165-8192

Issue Date: 08/20/2015  
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

### 08.04-6

10 CFR 50.63 requires that each nuclear power plant be capable of 1) coping with a station blackout (SBO) for a specified duration and 2) maintaining adequate core cooling and appropriate containment integrity for the SBO duration. RG 1.155, Positions C.3.2 and C.3.3 provide guidance for complying with these requirements of 10 CFR 50.63. In Section 8.4.2.2 of the DCD Tier 2, the applicant states: “[A]dditional coping analysis for the APR1400 is performed for the SBO and extended SBO. Conformance with NRC RG 1.155 position C.3.2 and C.3.3 is described in Subsections 8.4.1 and 19.2.” Conformance to RG 1.155, Position C.3.2.5 regarding the availability of the AAC power source within 10 minutes of the onset of the SBO and Position C.3.3.5 is provided in Section 8.4.1 of the DCD.

- a- Please provide a summary of the above coping analysis performed for the SBO.
- b- Please discuss how the APR1400 design conforms to: (1) all the considerations, except C.3.2.5, recommended in RG 1.155, Positions C.3.2, and (2) RG 1.155, Position C.3.3 regarding the modifications, except C.3.3.5, to cope with the SBO.

### 08.04-7

10 CFR 50.63 requires that an alternating AC (AAC) power source meets certain criteria to be considered an acceptable SBO coping capability. NUREG-0800, Section 8.4.III.3, “AAC power sources,” provides guidance for complying with these criteria. Section 8.4.1 of the DCD Tier 2 states: “The electrical connections between the offsite power and onsite power systems are described in Section 8.2.” Sections 8.2 and 8.4 of the DCD Tier 2 do not provide sufficient information to enable the NRC staff to make the determination that the requirements of 10 CFR 50.63 regarding the APR1400 AAC GTG source are satisfied. Thus, the NRC staff has the following questions:

- a- Please provide the description of the electrical connections between the AAC power source and the offsite and onsite Class 1E power sources, and discuss how the APR1400 design conforms to the provisions in NUREG-0800, Section 8.4.III.3 Criterion B.i and B.iv in regards to the independence of the AAC power source. Also, please confirm that provisions for the AAC power source and failures of the AAC power components will not adversely affect the functioning of offsite and/or Class 1E onsite power systems.
- b- Please discuss how the APR1400 design conforms to NUREG-0800, Section 8.4 III.3, Criteria D – G, I, and K – M.

### 08.04-8

Section 8.4.1 of the DCD Tier 2 stated that the AAC source the AAC GTG has sufficient capacity, to operate the system necessary for coping with the SBO for the time required to bring and maintain the plant in a safe shutdown condition. In Section 8.3 of the DCD Tier 2, Table 8.3.1-6 and Table 8.3.1-4 identifies the rating of the AAC GTG and the capacity of the SBO loads, respectively. The AAC GTG has an output rating of 9,700 kilo watts (kW) and the capacity of the SBO loads is 8,688.8 kW.

Please provide the power factor and kilo Volts Amperes (kVA) values for both the AAC GTG output rating and the total SBO loads, to ensure that the AAC power has sufficient capacity with margin to supply the reactive power dissipated by the SBO loads with motors in addition to the real power (kW).

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08.04-9

10 CFR 50.65(a)(4) relates to the assessment and management of the increase in risk that result before performing the SBO maintenance activities. In Section 8.4.2.1 of the DCD Tier 2, the applicant stated that the AAC GTG performance monitoring is included in the reliability assurance program and the maintenance rule program described in Section 17.4 and 17.6 of the DCD.

Please confirm that all systems, including the AAC GTG support systems, provided to mitigate the SBO conform to 10 CFR 50.65(a)(4).



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