

## **KHNPDCDRAIsPEm Resource**

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**From:** Ward, William  
**Sent:** Monday, November 02, 2015 11:30 AM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; Mannon, Steven (steven.mannon@aecom.com)  
**Cc:** Lee, Samuel; Ciocco, Jeff; Wunder, George; Ray, Sheila; Zimmerman, Jacob  
**Subject:** APR1400 Design Certification Application RAI 282-8238 (14.2 - Initial Plant Test Program)  
**Attachments:** APR1400 DC RAI 282 EEB 8238.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.

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

Thank you,

**William R. Ward, P.E.**  
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**Subject:** APR1400 Design Certification Application RAI 282-8238 (14.2 - Initial Plant Test Program)  
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**Received Date:** 11/2/2015 11:30:14 AM  
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## REQUEST FOR ADDITIONAL INFORMATION 282-8238

Issue Date: 11/02/2015

Application Title: APR1400 Design Certification Review – 52-046

Operating Company: Korea Hydro & Nuclear Power Co. Ltd.

Docket No. 52-046

Review Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants

Application Section:

### QUESTIONS

#### 14.02-55

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 Section 14.2.12.1.114 discusses the non-Class 1E DC Power Systems Test. Parts 3.1, 3.2 and 3.3 state test methods for the batteries and battery chargers of the 125Vdc, 250Vdc, and AAC 125Vdc power systems, respectively. Each states that the discharge and charging tests will be performed, which the staff understands is for the batteries. Please discuss the tests for the battery chargers to verify that the battery charger dc output meets design criteria.

#### 14.02-56

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 Section 14.2.12.1.115 discusses the Class 1E DC Power Systems Test and the objective is stated as “To demonstrate that the Class 1E dc power system is capable of supplying power as designed in the different operating modes.” Please clarify whether this test demonstrates the Class 1E is capable to perform as designed in the required operating modes.

Part 3.1, states test methods for the batteries and battery chargers and that the discharge and charging tests will be performed, which the staff understands is for the batteries. Please discuss the tests for the battery chargers to verify that the battery charger dc output meets design criteria.

Please discuss how the electrical independence and redundancy of power supplies for safety-related functions are checked for the Class 1E DC power system.

Please discuss how this test determines the voltage which would be available at the Class 1E inverters exceeds the design minimum if the batteries were discharged to the minimum voltage limit.

## **REQUEST FOR ADDITIONAL INFORMATION 282-8238**

### **14.02-57**

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 Section 14.2.1.12.1.110 discusses the Unit Main Power System Test. Part 3.6 states, "verify the operation of interlocks, alarms, and protective relays." Please discuss how this test verifies that the backup relay protection scheme works for simulated single failures by verifying operation of the primary and backup relay systems.

### **14.02-58**

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 Section 14.2.1.12.1.111 discusses the 13,800 V normal auxiliary power system test. Please discuss how this test verifies the alignment of the 13.8kV buses to the alternate offsite supply, upon a loss of normal offsite power supply.

### **14.02-59**

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 Section 14.2.1.12.1.108 discusses the 4.16kV Class 1E Auxiliary Power System Test. Part 3.5 states, verify the 4,160V and 480V safety-related systems load shed as designed on undervoltage." Please discuss whether this includes degraded voltage conditions and loss-of voltage conditions.

### **14.02-60**

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 Section 14.2.1.12.1.116 discusses the offsite power system test. Please confirm that this test includes demonstrating the operation of protective relaying, alarms, and control devices of the main, unit auxiliary and standby auxiliary transformers.

### **14.02-61**

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 Section 14.2.12.4.8 discusses the Loss of Offsite Power Test. Please discuss how this test demonstrates that upon a loss of offsite power, there is an automatic transfer from offsite power to the onsite emergency diesel generators.