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## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

### APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 536-8725

SRP Section: 09.01.01 – Criticality Safety of Fresh and Spent Fuel Storage and handling

Application Section: 09.01.01

Date of RAI Issue: 02/01/2017

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### **Question No. 09.01.01-43**

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix A, General Design Criteria 62 requires preventing criticality in the fuel storage and handling system through the use of physical systems or processes.

In response to RAI 8421, Question 28814 (09.01.01-30) and RAI 8578 Question 09.01.01-39 the applicant provided a justification for the use of as-manufactured neutron absorber coupons even though the Metamic material is exposed to elevated temperatures during fuel rack fabrication. The staff has determined that the applicant's justification is inadequate.

The coupon monitoring program is intended to use material that is in the as-fabricated condition. The Metamic material is expected to experience elevated temperatures during fabrication due to the close proximity of welding. As such, the as-fabricated condition may not be the same as the as-supplied condition of the material.

Modify the proposed neutron absorber monitoring program to include neutron absorber coupons that are heat treated to the same conditions as the qualification test described in RAI 8578 Question 09.01.01-38 or provide justification regarding how the as-fabricated (heated) material experiences aging with the same effects and at the same rate as the as-supplied material.

### **Response**

DCD 9.1.2.4 will be revised to include the description that the coupon used in the coupon monitoring program will be the same as in the as-fabricated condition.

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**Impact on DCD**

DCD 9.1.2.4 will be revised as indicated on the attachment.

**Impact on PRA**

There is no impact on the PRA.

**Impact on Technical Specifications**

There is no impact on the Technical Specifications.

**Impact on Technical/Topical/Environmental Reports**

There is no impact on any Technical, Topical, or Environment Report.

**APR1400 DCD TIER 2**

- b. Maintain the stored fuel in a subcritical configuration
- c. Maintain the capability to remove and insert fuel assemblies
- d. Maintain the stored fuel in a coolable geometry

The spent fuel storage racks and storage facility are designed to maintain the minimum allowable fuel spacing during the fuel storage. The structural material of the spent fuel storage rack is designed to withstand corrosion from contact with the cooling water.

#### 9.1.2.3.3 Fuel Assembly Drop Analysis

New and spent fuel storage racks are evaluated for withstanding a postulated drop of a fuel assembly and its associated handling tool to maintain a subcritical array assuming the maximum weight handled on each rack and the maximum drop height, as described in Table 9.1.2-1.

#### 9.1.2.4 Inspection and Testing Requirements

Refer to Subsection 14.2.12.1.33 for the initial plant startup test program related to the proper operation of the fuel handling equipment, including the spent fuel storage rack positions.

A coupon surveillance program monitors the neutron absorbing material (METAMIC™) over the lifetime of the racks to verify their integrity. The coupons are taken from the same production lot as used for fabrication of the rack and characterized for comparison with subsequent measurements. At least one archive specimen is retained for later comparison with the irradiated coupons.

The coupons are also heat treated to the same conditions as the neutron absorbing material used for fabrication of the rack.

A minimum of 14 coupons are immersed into the storage racks in the SFP. Additional coupons may be used to address potential license extensions and post-shutdown fuel storage. Each coupon is large enough to obtain a tensile test specimen (approximately 10.16 × 20.32 cm [4 × 8 in]). The coupons are adjacent to freshly discharged irradiated fuel in an empty fuel compartment in regions I and II.