

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.: 469-8578
SRP Section: 09.01.01 – Criticality Safety of Fresh and Spent Fuel Storage and handling
Application Section: 09.01.01
Date of RAI Issue: 04/22/2016

Question No. 09.01.01-40

In response to RAI 8421, Question 28827 (09.01.01-33) the applicant provided the staff details on the acceptance criteria for the neutron absorber coupon monitoring program.

The staff found the response technically acceptable, however one additional statement needs to be added to the FSAR (FSAR text is in blue, additional text is in red):

“Of the measurements to be performed on the neutron absorbing material surveillance coupons, the most important are (1) the neutron attenuation measurements (to verify the continued presence of the boron) and (2) the thickness measurement (as a monitor of potential swelling). Surveillance measurements shall be compared to each coupon’s pre-immersion baseline measurements. Acceptance criteria for these measurements are as follows:”

Response

FSAR 9.1.2.4 will be revised as recommended by the NRC.

Impact on DCD

FSAR 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

Coupons that are not destroyed may be returned to the pool for continued use in the surveillance program.

The poison surveillance program is intended to monitor changes in physical and chemical properties of neutron absorbing material by performing the following measurements on a pre-planned schedule:

- a. Visual observation and photography
- b. Neutron attenuation
- c. Dimensional measurements (length, width, and thickness)
- d. Weight and specific gravity

Of the measurements to be performed on the neutron absorbing material surveillance coupons, the most important are (1) the neutron attenuation measurements (to verify the continued presence of the boron) and (2) the thickness measurement (as a monitor of potential swelling). Acceptance criteria for these measurements are as follows:

Surveillance measurements shall be compared to each coupon's pre-immersion baseline measurements.

- A decrease of no more than 5% in Boron-10 content, as determined by neutron attenuation, is acceptable. This is tantamount to a requirement for no loss in boron within the accuracy of the measurement.
- An increase in thickness at any point should not exceed 25% of the initial thickness at that point.

Changes in excess of either of these two criteria requires investigation and engineering evaluation which may include early retrieval and measurement of one or more of the remaining coupons to provide corroborative evidence that the indicated change(s) is real. If the deviation is determined to be real, an evaluation shall be performed to determine if the spent fuel system complies with the licensing basis.

The remaining measurement parameters serve a supporting role and should be examined for early indications of the potential onset of neutron absorbing material degradation. These include: (1) visual or photographic evidence of unusual surface pitting, corrosion, or edge deterioration; or (2) unaccountable weight loss in excess of the measurement accuracy. If indications of material degradation are found (other than normally expected oxidation), then the degradation shall be evaluated, causes shall be identified, and corrective actions, as necessary, shall be implemented.