

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Wednesday, April 06, 2016 9:58 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Junggho Kim (jhokim082@gmail.com); Andy Jiyong Oh; Christopher Tyree
Cc: Le, Hien; Dias, Antonio; Wunder, George; Umana, Jessica; Williams, Donna
Subject: APR1400 Design Certification Application RAI 457-8558 (09.01.05 - Overhead Heavy Load Handling Systems)
Attachments: APR1400 DC RAI 457 SPSB 8558.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.

09.01.05-10: 30 days
09.01.05-11: 45 days
09.01.05-12: 45 days

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

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 457-8558

Issue Date: 04/06/2016

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 09.01.05 - Overhead Heavy Load Handling Systems

Application Section: DCD Subsection 9.1.5

QUESTIONS

09.01.05-10

Follow up to the response to RAI 124-8071, Question 09.01.05-3.

The staff considered the response incomplete for the following reason.

In the original RAI, the staff raised the following issue (with underlined text for emphasis):

“DCD Tier 2, Section 9.1.5.2.1 states “[a]ll loads that are handled over the new fuel storage racks, spent fuel storage racks, SFP, and fuel transfer system fuel carrier are limited in weight and lift height so that, if they fall, the resultant impact will not exceed the design impact energy of the fuel storage racks and SFP.

DCD Tier 2, Section 9.1.5.3 states “[t]he effects of a heavy load drop are analyzed. The results provide reasonable assurance that it does not damage stored fuel and preclude the operation of equipment required to achieve safe shutdown.

The staff finds it not clear what analyses have been performed and referred to in DCD, Tier 2 Sections 9.1.5.2.1 and 9.1.5.3. The applicant is requested to:

1. Specify what loads will be handled over the safe shutdown equipment, new fuel storage racks, spent fuel storage racks, spent fuel pool, and fuel transfer system fuel carrier by the fuel handling hoist and cask handling hoist of the non-single failure proof Fuel Building Area Overhead Crane
2. Provide description of analyses completed for heavy load handling system
3. Clarify what load drop analyses were completed and which cranes were evaluated for impact energy of postulated dropped loads and what assumptions were included”

In the response the applicant provided the following information to address Item 3 above (with underlined text for emphasis):

- “3. There is no load drop from FHA OHC that will affect the spent fuel storage racks, the spent fuel pool, or the fuel transfer system fuel carrier, except the new fuel storage racks. The FHA OHC is restricted from travelling over the new fuel storage racks by the electrical interlock when new fuel is stored in this area. The FHA OHC is excluded in the load drop analysis.

The drops of a spent fuel assembly with its handling tool and a swing gate of the spent fuel pool have been analyzed to evaluate the structural integrity of the spent fuel storage rack and the liner. Impact energies due to the drop scenarios are considered in the analyses. The integrity of spent fuel assemblies stored in the racks is assured for both drop accidents. The structural integrity of the pool is also ensured.

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The assumption included in the heavy load analysis is that the operator and the administrative controls follow the procedures based on NUREG-0612.”

The applicant is requested to identify the crane that is used to handle the spent fuel assembly with its handling tool and a swing gate as discussed in the above response, and revise DCD, Tier 2 Section 9.1.5.3, to reflect that the fuel handling area overhead crane is not “single-failure-proof.”

09.01.05-11

Follow up to the response to RAI 124-8071, Question 09.01.05-4.

The staff considered the response incomplete for the following reason.

In the original RAI, the staff raised the following issue (with underlined text for emphasis):

“DCD Tier 2, Section 9.1.5 classifies the main hoist of the Polar crane as single failure proof. The staff finds it not clear whether the polar crane auxiliary hoist is also single failure proof.

In addition, DCD Tier 2, Section 9.1.5.2.2.1 states that containment polar crane auxiliary hoist has 60-ton load block and Table 9.1.5-1 indicates capacity to be 81.6 metric tons.

The applicant is requested to provide classification of the containment polar crane auxiliary hoist, clarify its capacity, and describe features provided to control travel restrictions.”

In the response the applicant provided the following information:

“The containment polar crane will be used to handle loads including the integrated head assembly, reactor vessel internals, and other necessary equipment or components in the containment during an outage. The main hoist of the polar crane is designed with single-failure-proof features so that any credible failure of a single component will not result in the loss of capability to stop and hold the critical load. The auxiliary hoist of the polar crane, which is used for routine maintenance and for inservice inspection, is not designed as single failure proof, and its control restrictions are included in the main hoist path. The DCD will be revised to clarify that the main hoist of the polar crane is designed as a single-failure-proof crane.

The capacity of the containment polar crane main hoist is 475 tons. The capacity of the containment polar crane auxiliary hoist is 90 tons. During construction, the polar crane is equipped with a special trolley arrangement that increases the load block rated capacity to 950 tons. Therefore, the DCD will be revised to correct the capacity.”

The staff reviewed the proposed change to DCD Tier 2, Section 9.1.5.2.2.1 and Table 9.1.5, and noted that classification of the containment polar crane auxiliary hoist is not clearly identified.

The applicant is requested to revise the DCD Tier 2, section 9.1.5 to incorporate the correct classification of the containment polar crane auxiliary hoist as discussed in the response.

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09.01.05-12

Follow up to the response to RAI 124-8071, Question 09.01.05-8.

The staff found the response unacceptable for the following reason.

In the original RAI, the staff raised the following issue:

“DCD Tier 1, Section 2.7.4.5 specifies “OHLHS prevents the uncontrolled lowering of a heavy load.” Similarly, ITAAC Design Commitment for Item 5 of DCD Tier 1, Table 2.7.4.5-1 specifies OHLHS prevents the uncontrolled lowering of a heavy load.” The staff finds that the testing and acceptance criteria of the ITAAC are requesting NOG-1 load tests to verify lifting capacity.

The applicant is requested to justify how lift capacity testing is sufficient to assure uncontrolled lowering of a heavy load will not occur.”

In the response the applicant provided the following information:

“Both the containment polar crane and the fuel handling area overhead crane are designed to prevent a fuel handling equipment or fuel cask drop by providing special devices that are locked in a manner that will not allow the release of the fuel handling equipment or the fuel cask. Also, the overspeed switch is attached on the cranes to prevent uncontrolled lowering of a heavy load. NOG-1 load tests include the proper function testing of devices. However, the overspeed switch function test will be performed at the manufacturing shop, and it is impossible to test the overspeed switch function during power plant operation. Therefore, the testing and acceptance criteria of the ITAAC will be deleted.”

The staff disagreed with the applicant’s decision to delete this ITAAC because it will be performed by the vendor at the factory test shop. The applicant is requested to retain this ITACC with different test description to reflect testing of the applicable overspeed switches. In addition, the applicant is requested to add an ITAAC to test other design features to meet NOG-1 requirements (e.g., no-load, full-load and rated-load tests).



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