

## **KHNPDCDRAIsPEm Resource**

---

**From:** Ciocco, Jeff  
**Sent:** Wednesday, April 13, 2016 1:08 PM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Jung-ho Kim (jhokim082@gmail.com); Andy Jiyong Oh; Christopher Tyree  
**Cc:** Hernandez, Raul; Dias, Antonio; Wunder, George; Umana, Jessica; Williams, Donna  
**Subject:** APR1400 Design Certification Application RAI 458-8569 (09.01.02 - New and Spent Fuel Storage)  
**Attachments:** APR1400 DC RAI 458 SPSB 8569.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,

Jeff Ciocco  
New Nuclear Reactor Licensing  
301.415.6391  
[jeff.ciocco@nrc.gov](mailto:jeff.ciocco@nrc.gov)



**Hearing Identifier:** KHNP\_APR1400\_DCD\_RAI\_Public  
**Email Number:** 510

**Mail Envelope Properties** (228ae2fbdbc54877a1a9f69ad3f8c869)

**Subject:** APR1400 Design Certification Application RAI 458-8569 (09.01.02 - New and Spent Fuel Storage)  
**Sent Date:** 4/13/2016 1:08:07 PM  
**Received Date:** 4/13/2016 1:08:08 PM  
**From:** Ciocco, Jeff  
**Created By:** Jeff.Ciocco@nrc.gov

**Recipients:**

"Hernandez, Raul" <Raul.Hernandez@nrc.gov>  
Tracking Status: None  
"Dias, Antonio" <Antonio.Dias@nrc.gov>  
Tracking Status: None  
"Wunder, George" <George.Wunder@nrc.gov>  
Tracking Status: None  
"Umana, Jessica" <Jessica.Umana@nrc.gov>  
Tracking Status: None  
"Williams, Donna" <Donna.Williams@nrc.gov>  
Tracking Status: None  
"apr1400rai@khnp.co.kr" <apr1400rai@khnp.co.kr>  
Tracking Status: None  
"KHNPDCDRAIsPEM Resource" <KHNPDCDRAIsPEM.Resource@nrc.gov>  
Tracking Status: None  
"JungHo Kim (jhokim082@gmail.com)" <jhokim082@gmail.com>  
Tracking Status: None  
"Andy Jiyong Oh" <jiyong.oh5@gmail.com>  
Tracking Status: None  
"Christopher Tyree" <Christopher.tyree@aecom.com>  
Tracking Status: None

**Post Office:** HQPWMSMRS07.nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	493	4/13/2016 1:08:08 PM
APR1400 DC RAI 458 SPSB 8569.pdf		90819
image001.jpg	5040	

**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## REQUEST FOR ADDITIONAL INFORMATION 458-8569

Issue Date: 04/13/2016  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 09.01.02 - New and Spent Fuel Storage  
Application Section: Tier 2 Section 9.1.2

### QUESTIONS

09.01.02-51

RAI 9.1.2-9

In RAI 79-7990, Question 9.1.2-3, the staff requested the applicant to include in the DCD the design description that demonstrates that the new fuel storage pit (NFSP) drain system is capable of handling the maximum flow from the rupture of the largest water pipe in the area; therefore preventing conditions that may lead to an unintentional criticality event.

The applicant stated that there is no piping in the upper area of the NFSP and that the top of the NFSP is provided with a curb, with a height of approximately 4 inches, which would deny water from going into the pit.

The staff evaluated the applicant's response and determined that additional information is needed since the response did not provided the sizing criteria (drain size and maximum design flow) for the drainage system as requested in the original RAI. The applicant response states that there are no pipes located in the NFSP, but it does not address pipes located nearby whose failure could still spill water into the pit (such as fire protection piping).

The applicant is requested to:

- a. provide the sizing criteria (drain size and maximum design flow) for the drainage of the NFSP. Even if there are no pipes in the NFSP vicinity this information must be provided.
- b. consider any pipes nearby the NFSP (such as fire protection piping) that could fail and spill water that could reach the NFSP, and how the NFSP drainage system together with the curb design would work to prevent fluid in the pit from reaching the bottom of the fuel assemblies.

## REQUEST FOR ADDITIONAL INFORMATION 458-8569

09.01.02-52

RAI 9.1.2-10

In RAI 79-7990, Question 9.1.2-4, the staff requested the applicant to modify DCD Tier 1 Section 2.7.4.1, "New Fuel Storage (NFS)," in order to add detailed information to the system description section and to create new specific ITAAC. Question 9.1.2-7, requested similar actions to be taken for Section 2.7.4.2, "Spent Fuel Storage (SFS)."

The applicant responded to the RAI by adding clarifications to the system description section and proposing to use a single functional arrangement ITAAC to address all of the staff's concerns.

The staff evaluated the applicant's responses and determined that the proposed ITAAC is unacceptable. The applicant is using generic terms such as "sufficient" or "approximately" which are not conducive to the successful application of the ITAAC process.

This issue is not pertinent to KHNP only. In fact, the staff observed other ITAAC submittals with similar problems, which led the staff to issue two regulatory issue summaries (RIS). In RIS 2008-05, "Lessons Learned to Improve Inspections, Tests, Analyses, and Acceptance Criteria Submittal," dated February 27, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073190162), the staff discussed 4 areas in which ITAACs could be improved. The staff later issued Revision 1 to RIS 2008-05 (Accession No. ML102500244) by identifying even more issues with proposed ITAAC.

Examples of issues identified in RIS-2008-05 and its Revision 1 are:

- applicants should avoid the integration of several different engineering or construction areas into a single ITAAC;
- applicants should avoid applying a single ITAAC to a large area of construction or to activities that are likely to be widely separated in time;
- applicants should consider the timing and sequence of construction activities in the development of related ITAAC
- applicants should avoid expanding the ITAAC for functional arrangement of a system beyond the definition of functional arrangement as a physical arrangement of SSCs (it does not include testing, qualification, and analytical attributes
- applicants should avoid subjective terms, such as "inclined sufficiently," "acceptable level," and "adequate thickness."

Therefore the staff requests the applicant to:

- a. update Tier 1 Section to include a description of the anti-flooding features credited to prevent flooding of the NFSP (pit drainage back-flow protection) and create an ITAAC to confirm the proper construction and installation of these features;
- b. update Tier 1 Section to include a description of the anti-tipping feature of the NFS racks (bolted to the floor) and an ITAAC to confirm that the racks are adequately installed (and bolted);
- c. create a new ITAAC that verifies that no non-Seismic Category I component is located in an area where its failure could impact NFSP racks or stored fuel (see proposed Standard ITAAC S02 as an example);
- d. create a new ITAAC that verifies that no non-Seismic Category I component is located in an area where its failure could impact a SFP safety-related SSC, the racks, or stored fuel (see proposed Standard ITAAC S02 as an example).

## REQUEST FOR ADDITIONAL INFORMATION 458-8569

09.01.02-53

### RAI 9.1.2-11

As discussed in RAI 9.1.2-10, the staff finds that the proposed NFS, and SFP ITAACs are inadequate.

Therefore the staff requests the applicant to:

- a. update Tier 1 Section to include a detailed description (or a figure) that identifies the elevations of all pipes, gates, drains, openings, and anti-siphon devices in the SFP, and create an ITAAC to verify that the components has been installed as described (at correct location and elevation);
- b. update Tier 1 Section to include a detailed description (or a figure) that identifies the pool dimensions and create an ITAAC to verify the as-built pool has been built as designed.

09.01.02-54

### RAI 9.1.2-12

In RAI 98-8051, Question 9.1.2-8, the staff requested the applicant to discuss in the DCD the volume (sizing) of the adjacent fuel handling areas, such that the leakage into these areas, while drained, would not reduce the coolant inventory to less than 3 meters (10 feet) above the top of the fuel assemblies.

The applicant's response provides a summary of the volume calculation that demonstrates that, after a gate failure, the SFP water level still remains more than 3 meters (10 feet) above the top of the fuel assemblies.

The staff evaluated the applicant's response and determined that additional information is needed. The staff does not find clear indication that the applicant has taken into consideration the added volume available due to the cask decontamination pit.

Therefore the staff requests the applicant to:

- a. clarify if the cask decontamination pit volume was taken into consideration in the pool draindown calculation;
- b. reevaluate the pool draindown calculation, if necessary.



**U.S.NRC**

United States Nuclear Regulatory Commission

*Protecting People and the Environment*