

## KHNPDCDRAIsPEm Resource

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**From:** Ciocco, Jeff  
**Sent:** Thursday, August 13, 2015 10:44 AM  
**To:** KHNPDCDRAIsPEm Resource  
**Subject:** FW: APR1400 Design Certification Application RAI 119-7976 (16 - Technical Specifications)  
**Attachments:** image001.jpg; APR1400 DC RAI 119 SPSB 7976.pdf

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**From:** Ciocco, Jeff  
**Sent:** Monday, July 27, 2015 10:23 AM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource <KHNPDCDRAIsPEm.Resource@nrc.gov>; Harry (Hyun Seung) Chang <hyunseung.chang@gmail.com>; Yunho Kim <yshh8226@gmail.com>; Steven Mannon <steven.mannon@aecom.com>  
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**Subject:** APR1400 Design Certification Application RAI 119-7976 (16 - Technical Specifications)

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, 60 days to respond to this RAI. We may adjust the schedule accordingly.

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

Thank you,

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**Hearing Identifier:** KHNP\_APR1400\_DCD\_RAI\_Public  
**Email Number:** 172

**Mail Envelope Properties** (c968bee162a04f679a8617b752b07b47)

**Subject:** FW: APR1400 Design Certification Application RAI 119-7976 (16 - Technical Specifications)  
**Sent Date:** 8/13/2015 10:43:38 AM  
**Received Date:** 8/13/2015 10:43:39 AM  
**From:** Ciocco, Jeff

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**Recipients:**  
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Tracking Status: None

**Post Office:** HQPWMSMRS08.nrc.gov

Files	Size	Date & Time
MESSAGE	1158	8/13/2015 10:43:39 AM
image001.jpg	5040	
APR1400 DC RAI 119 SPSB 7976.pdf		103021

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



## REQUEST FOR ADDITIONAL INFORMATION 119-7976

Issue Date: 07/27/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 16 - Technical Specifications

Application Section: TS Section 3.4 and Bases

### QUESTIONS

16-23

10 CFR 50.36, "Technical Specifications" and 10 CFR 52.47(a)(11) provides the regulatory basis for the following questions. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility. Subsection 52.47(a)(11) requires that technical specifications be provided in the application for a design certification.

NUREG-1432, "Standard Technical Specifications-Combustion Engineering Plants," provides NRC guidance on format and content of technical specifications as one acceptable means to meet 10 CFR 50.36 requirements.

SPR 16, Part III.2.A states, in part, "when reviewing a difference between the proposed TS provision and the reference TS provision, verify that the applicant's written technical or administrative reasoning in support of the difference is logical, complete, and clearly written."

1. The TS 3.4.1 Applicability, and hence the construction of Required Actions, are different from those in NUREG-1432. The applicant is requested to provide the reason for these differences.
2. SR 3.4.1.4 specifies both minimum and maximum values for the acceptable flow rate. However only the minimum value is included in the LCO statement. The applicant is requested to address this inconsistency.
3. The frequency of SR 3.4.1.4 for a precision calorimetric heat balance is "31 days" instead of "18 months" in NUREG-1432. The discussion in the base is different from the one in NUREG-1432. The applicant is requested to clarify the scope of the precision calorimetric heat balance.
4. On Page B 3.4.1-1, use the full text on the first occurrence of the acronym "DNB."
5. In the LCO section of the bases, discussion of instrumentation error is limited to the collected total flow rate only. The applicant is requested to explain why other DNB parameters (RCS pressure and cold leg temperature) were not addressed.
6. The discussions in the bases for SRs 3.4.1.1, 3.4.1.2, and 3.4.1.3 are different from those in NUREG-1432. The applicant is requested to address the omission of basis information presented in NUREG-1432.
7. The TS 3.4.2 Applicability and SR 3.4.2.1 requirements are specified differently than those in NUREG-1432. The applicant is requested to provide the reason for these differences. Also, as written, the LCO 3.4.2 statement appears to conflict with the LCO 3.4.1 statement. The applicant is requested to resolve this conflict.
8. The LCO 3.4.5 Note and hence Required Action C.1, are stated differently from those presented in NUREG-1432. As a result, the discussion of these items in the bases are not consistent with the stated requirements. The applicant is requested to provide the basis for the difference and to address the inconsistency between the TS and the associated bases.
9. On Pages 3.4.5-1 and 3.4.5-3, correct format errors in the LCO Note; add a line space after the first paragraph, and in SR 3.4.5.3; maintain horizontal alignment for the Frequency entry and the SR description text, respectively.

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10. The LCO 3.4.6 Note 1 and hence Required Action C.1, are stated differently from those presented in NUREG-1432. As a result, the discussion of these items in the bases are not consistent with the stated requirements. The applicant is requested to provide the basis for the difference and to address the inconsistency between the TS and the associated bases.
11. The LCO 3.4.6 Note 2 is stated differently from the one presented in NUREG-1432. The applicant is requested to provide the basis for the difference.
12. On Page 3.4.6-3, to correct format error in SR 3.4.6.3; maintain horizontal alignment for the Frequency entry and the SR description text.
13. The LCO 3.4.7 Note 1 and hence Required Action C.1, are stated differently from those presented in NUREG-1432. As a result, the discussion of these items in the bases are not consistent with the stated requirements. The applicant is requested to provide the basis for the difference and to address the inconsistency between the TS and the associated bases.
14. The LCO 3.4.7 Note 3 is stated differently from the one presented in NUREG-1432. In Technical Report APR1400-K-O-NR-14001-NP, the applicant states "APR1400 POSRV is qualified for water relief" as basis for the difference. This basis is not relevant to LCO 3.4.7 which is for Mode 5 and Note 3 is related to meeting LTOP requirements. POSRVs are not used in APR1400 design for LTOP. The applicant is requested to provide a different basis for the difference.
15. On Pages 3.4.7-1 and 3.4.7-3, correct editorial/format errors in LCO Note 1; replace "LCO 3.1.1" with "LCO 3.1.2," and in SR 3.4.7.3; maintain horizontal alignment for the Frequency entry and the SR description text.
16. The LCO 3.4.8 Note 1 and hence Required Action B.1, are stated differently from those presented in NUREG-1432. As a result, the discussion of these items in the bases is not consistent with the stated requirements. The applicant is requested to provide the rationale for the differences and to address the inconsistency between the TS and the associated bases.
17. On Page 3.4.8-3, correct format error: maintain horizontal alignment for the Frequency entry and the SR description text.
18. LCO 3.4.8 Note 3 and Action B.3 are added to address safety concerns during Mid-Loop operations as identified in GL 88-17. LCO 3.4.8 Note 3 states "3. A containment spray pump can be manually realigned to meet the requirement of a SC pump," and Action B.3 states "B.3 Initiate action to raise RCS level to > EL. 38.72 m (127 ft-1/4 in) with a completion time of "Immediately.". The proposed addition to TS 3.9.5 to address these same safety concerns are more elaborate in order to implement the staff's recommendations presented in GL 88-17. The proposed additions to TS 3.9.5 include the following:
  - a) LCO 3.9.5.b which states "With REDUCED RCS INVENTORY, the containment spray pump in the same train as an operating SCS train shall be OPERABLE."
  - b) All exceptions presented in STS LCO 3.9.5 Notes regarding stopping of the SC pump in operation are removed to provide extra conservatism.
  - c) Action B.3 which states "Initiate action to raise RCS level to > EL 38.72 m (127'-1/4") when in REDUCED RCS INVENTORY." With a CT of "Immediately."
  - d) Conditions C and D to address a failure to meet the new LCO 3.9.5.b for the containment spray pump.Since "Mid-Loop operations" occur in both Modes 5 and 6, the same proposed changes should be effected in TS 3.4.8 and TS 3.9.5. The applicant is requested to revise TS 3.4.8 to reflect proposed changes to TS 3.9.5.
19. SR 3.4.10.6 states "Verify downstream manual valves of spring-loaded pilot valves are locked in open position." The staff could not identify these downstream manual valves in DCD Figure 5.4.10-1, "Pilot Operated Safety Relief Valve Schematic Diagram." The applicant is requested to provide the applicable DCD section where these valves are described.

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20. On Page B 3.4.10-2, in the second paragraph, correct editorial error as follows: "it is **in** OPERABLE status."

On Page B 3.4.10-4, in the second paragraph, improve its clarity as follows: "The LCO is not applicable in MODE 4 when all RCS cold leg temperatures are less than or equal to less than or equal to the LTOP enable temperature specified in the PTLR, **MODE 5, and MODE 6 with RV Head on**, because LTOP protection is provided in **LCO 3.4.11, "LTOP System"**. Overpressure protection is not required in MODE 6 with the reactor vessel closure head detensioned."

On Page B 3.4.10-4, remove the third paragraph regarding an LCO Note which allows the hot setting test at Mode 3. This LCO Note has been removed from the generic TS 3.4.10.

In the discussion of SR 3.4.10.2 for verification of removal of power from the valve operators, the applicant states, in part, "Verification of correct breaker alignment and power availability to the valve position indicators ensures that valves can be operated when required, and valve positions can be monitored." This sentence is not relevant to the scope of SR 3.4.10.2, and should be deleted. Further, only the upstream valve of the double motor operated pilot valves required the power disconnection, not both. The applicant is requested to revise this discussion to reflect the actual scope of SR 3.4.10.2.

21. The applicant is requested to add DCD Subsection 5.4.10 to the list of References in the TS Bases.

22. LCO 3.4.16 Applicability includes "MODES 1, 2 and 3, [and] Mode 4 with RCS pressure  $\geq$  31.6 kg/cm<sup>2</sup>A (450 psia)." TS Table 1-1 defines MODE 4 as having RCS Tcold < 350°F. For RCS Tcold = 350°F, the associated RCS pressure is 450 psia. As such there is no need to list the additional pressure requirement after the term MODE 4. As a result, Action C.2 should also be changed from "Be in MODE 4 with RCS pressure < 31.6 kg/cm<sup>2</sup>A (450 psia)" within 12 hours to "Be in MODE 5" within 36 hours."

SR 3.4.16.1 states "Cycle each RCGV valve to the fully closed and fully open position" with Frequency of 18 months. For safety-related valves, the cycling should be in accordance with the "inservice testing (IST) program."

In the "Action" section of the TS Bases, the applicant states "The ACTIONS are modified by a Note which is added to provide clarification that each RCS gas vent path of the reactor vessel closure head and the pressurizer steam space allows a separate entry into a Condition." There is no such Note posted in the specified LCO 3.4.16.

The discussion of SR 3.4.16.2 in the TS Bases states, in part, "This SR requires verification of flow through each vent path and the Surveillance test must be performed in MODE 5 or 6." The safety function of the vent path is venting non-condensable gases or steam from the RCS at operating RCS pressure and temperature. The applicant is requested to explain how testing at Mode 5 or 6 will produce an equivalent results.

23. For TS 3.4.17 and related provisions in TS 5.5.9, the applicant is request to consider adoption of TSTF-510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection," which provides improvements to the SG Tube Program which was first established under TSTF-449, Revision 4, "Steam Generator Tube Integrity."

24. In the APR1400 design, the shutdown cooling system (SCS) is completely separated from the safety injection system (SIS). In the plant transient and accident analyses as described in DCD Chapter 15, operator actions are credited to manually place the SCS in service for RCS cooling to the safe shutdown Mode 5. In NUREG-1432, the SC pump is a shared component with the low pressure safety injection (LPSI) pump, and is tested as part of STS LCO 3.5.2 during Modes 1, 2, and 3. The applicant is requested to provide an LCO for the SCS, preferably in TS Section 3.4, in accordance with Criterion 3 of 10 CFR 50.36(c)(2)(ii).