

## KHNPDCRAIsPEm Resource

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**From:** Ciocco, Jeff  
**Sent:** Tuesday, March 08, 2016 10:42 AM  
**To:** apr1400rai@khnp.co.kr; KHNPDCRAIsPEm Resource; Andy Jiyong Oh; Erin Wisler  
**Cc:** Gilmer, James; Karas, Rebecca; Vera, John; Lee, Samuel  
**Subject:** APR1400 Design Certification Application RAI 435-8541 (07.02 - Reactor Trip System)  
**Attachments:** APR1400 DC RAI 435 SRSB 8541.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.

07.02-15: 30 days  
07.02-16: 45 days

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

Thank you,

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**Received Date:** 3/8/2016 10:42:01 AM  
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**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
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# REQUEST FOR ADDITIONAL INFORMATION 435-8541

Issue Date: 03/08/2016  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 07.02 - Reactor Trip System  
Application Section: 4.3, 4.4, and 7.2

## QUESTIONS

07.02-15

### Regulatory Bases:

10 CFR 50.55a(h)(3) states that applications filed on or after May 13, 1999, for design certifications under 10 CFR Part 52 must meet the requirements for safety systems in IEEE Std. 603–1991 and the correction sheet dated January 30, 1995.

IEEE Std. 603–1991 establishes functional and design requirements for power, instrumentation, and control portions of safety systems. According to this standard, “The design basis shall be consistent with the requirements of ANSI/ANS 51.1-1983 or ANSI/ANS 52.1-1983 and shall document as a minimum: [Criterion 4.9] “The methods to be used to determine that the reliability of the safety system design is appropriate for each safety system design and any qualitative or quantitative reliability goals that may be imposed on the system design.”

In addition, 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” requires that “measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.”

### Requests:

To determine whether the core protection calculator (CPC) functions as designed and with acceptable reliability, in accordance with 10 CFR 50.55a(h)(3) and 10 CFR Part 50, Appendix B, the staff needs to ascertain that the computer codes and data used by the CPC are acceptable for application to APR1400. Specifically, the staff is unable to find program description and validation documentation related to the CPCSIM and CEFAST codes, as well as modifications made to the CETOP code to incorporate the KCE-1 critical heat flux correlation associated with the PLUS7 fuel. Additionally, no direct evidence of staff review or approval has been located for the CPCSIM and CEFAST codes. Therefore, please provide documentation supporting the applicability and acceptability of these codes for the APR1400 design. The staff considers this information to be essential design information, and therefore should be incorporated by reference in the DCD.

## REQUEST FOR ADDITIONAL INFORMATION 435-8541

07.02-16

### Regulatory Basis:

10 CFR 52.47, "Contents of applications; technical information" states: "The application must contain a level of design information sufficient to enable the Commission to judge the applicant's proposed means of assuring that construction conforms to the design and to reach a final conclusion on all safety questions associated with the design before the certification is granted. The information submitted for a design certification must include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC, and procurement specifications and construction and installation specifications by an applicant."

The NRC staff makes its safety finding based on information provided in the DCD and any documents incorporated by reference into the DCD. It is necessary for all documents containing essential design information that is not contained in the DCD to be docketed and clearly referenced in the DCD wherever needed to support or supplement the Tier 2 design and analysis information.

### Requests:

1. The applicant stated during the audit held on January 20 and 21, 2016, that the functional design of the CPCS is based on those described in topical report CEN-310-P-A, "CPC and Methodology Changes for the CPC Improvement Program." In addition, the applicant stated that topical report CEN-312, "Overview Description of the Core Operating Limit Supervisory System (COLSS)," describes the design basis for the core operating limits supervisory system (COLSS). Since these documents contain design information the staff deems necessary to make its safety finding, please either (1) include these design details in the appropriate section in the DCD or (2) incorporate the above topical reports by reference. If the reports are to be incorporated by reference, then Tier 2, Table 1.6-2 should be updated accordingly.
2. A CPCS flow diagram was presented during the audit on January 20, 2016 (page 16 of the first presentation) which the staff believes is basic design information. Please incorporate this diagram in the DCD or in the referenced technical report.
3. The staff requests clarification on procedures to be used for making changes to the core protection calculator or core operating limits supervisory system software and to various program constants, both those adjusted once per cycle, such as Reload Data Block constants, and those addressable constants which can be changed during power operation. Specifically, are procedures used by operating C-E System 80 plants, such as CEN-39(A)-P, "CPC Protection Algorithm Software Change Procedure" and CEN-323-P-A, "Reload Data Block Constant Installation Guidelines," considered APR1400 licensing bases? If so, please incorporate these reports by reference in the DCD, as well as the procedure for determination of addressable constants. If alternate procedures are to be used for APR1400, please provide a description and reference to the documentation. If these procedures will not be finalized until the COL Holder selects the fuel to be loaded, a COL Holder Item should be added to the DCD to ensure that the procedures are developed at least 12 months prior to fuel loading.



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