

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Thursday, November 05, 2015 7:04 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; Erin Wisler
Cc: Ashcraft, Joseph; Jackson, Terry; Ward, William; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 294-8302 (07.05 - Information Systems Important to Safety)
Attachments: APR1400 DC RAI 294 ICE 8302.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 response time for the RAI questions. We may adjust the schedule accordingly.

07.05-4: 30 days
07.05-5: 30 days
07.05-6: 90 days
07.05-7: 45 days

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

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Subject: APR1400 Design Certification Application RAI 294-8302 (07.05 - Information Systems Important to Safety)
Sent Date: 11/5/2015 7:04:01 AM
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Options

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REQUEST FOR ADDITIONAL INFORMATION 294-8302

Issue Date: 11/05/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 07.05 - Information Systems Important to Safety
Application Section:

QUESTIONS

07.05-4

Provide the assessment documentation and the demonstration of allowances for uncertainties consistent with the APR1400 methodology that conforms to Regulatory Guide (RG) 1.105, Revision 3, including environmental and/or seismic conditions.

10 CFR Part 50, Appendix A, General Design Criteria 13, requires, in part, instrumentation to be provided to monitor variables and systems over their anticipated ranges for normal operation, anticipated operational occurrences, and accident conditions. RG 1.97, Rev. 4, "Criteria For Accident Monitoring Instrumentation for Nuclear Power Plants," endorses IEEE Std 497-2002, "IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations." IEEE Std 497-2002, Section 5.6, states:

An assessment for each of the performance criteria shall be conducted. This assessment shall be done to assure the as-designed performance meets or exceeds the performance criteria. The results of this assessment shall be documented and shall consider:

- a) Allowances for calibration uncertainties, loop errors, and drift consistent with the methodology given in ANSI/ISA Std 67.04.01.
- b) The magnitude and direction of errors imposed on the accident monitoring instrumentation by environmental and/or seismic conditions during and after the postulated event.

The staff was not able to locate the assessment pertaining to the guidance in RG 1.97, Rev. 4, although the APR1400 design certification application states conformance to the guidance. Provide the assessment documentation and the demonstration of allowances for uncertainties consistent with the APR1400 methodology that conforms to Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," including environmental and/or seismic conditions.

07.05-5

Provide basis for APR1400 emergency operating procedure (EOP) actions points.

10 CFR Part 50, Appendix A, General Design Criteria 13, requires, in part, instrumentation to be provided to monitor variables and systems over their anticipated ranges for normal operation, anticipated operational occurrences, and accident conditions. The SRP (NUREG-0800), Section 7.5, "Information Systems Important To Safety," Review Procedures Item 1.C, states "A basis should be provided for EOP action points that accounts for measurement uncertainties. Regulatory Guide 1.105, "Setpoints for Safety-Related Instrumentation," provides acceptable guidance for establishing these uncertainties." The staff was not able to locate the basis for the APR1400 EOP action points, although the APR1400 design certification application states conformance to the guidance. Provide the basis for the APR1400 EOP action points, or direct the staff to the location in the application where the basis resides.

REQUEST FOR ADDITIONAL INFORMATION 294-8302

07.05-6

Clarify why the APR1400 has no Type A variables when there are manual actions described in FSAR Tier 2, Chapter 15, Section 15.0.0.6.

10 CFR Part 50, Appendix A, General Design Criteria 13, "Instrumentation and Controls," requires, in part, instrumentation to be provided to monitor variables and systems over their anticipated ranges for normal operation, anticipated operational occurrences, and accident conditions. RG 1.97, Rev. 4 endorses IEEE Std 497-2002. IEEE Std 497-2002, Section 4.1, states "Type A variables are those variables that provide the primary information required to permit the control room operating staff to:

a) Take specific planned manually-controlled actions for which no automatic control is provided and that are required for safety systems to perform their safety-related functions as assumed in the plant Accident Analysis Licensing Basis.

b) Take specific planned manually-controlled actions for which no automatic control is provided and that are required to mitigate the consequences of an AOO.

Type A variables provide information essential for the direct accomplishment of specific safety-related functions that require manual action. These variables are a subset of those necessary to implement the plant specific emergency procedure guidelines (EPGs) or the plant specific emergency operating procedures (EOPs) or the plant abnormal operating procedures (AOPs)."

In RAI 38-7878, Question 07.05-2, the applicant indicated there were no Type A variables. However, in Chapter 15 of the APR1400 FSAR Tier 2, the staff finds manual actions are credited for certain safety functions, such as those to address a steam generator tube rupture. Using the methodology above as stated in IEEE Std 497-202, provide a table of all operator actions required by Chapter 15; listing all indications that the operator would rely on, the location and qualification for each indication that is needed by the operator. Provide the basis for why there are no Type A variables when it appears in FSAR Tier 2, Chapter 15, that manual operator actions are credited to address design basis events.

07.05-7

Clarify in the APR1400 FSAR, the instrumentation provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as required by GDC 13.

10 CFR Part 50, Appendix A, General Design Criteria 13, "Instrumentation and Controls," requires, in part, instrumentation to be provided to monitor variables and systems over their anticipated ranges for normal operation, anticipated operational occurrences, and accident conditions. Is the Information Flat Panel Display (IFPD) in combination with the ESF-CCS Soft Control Module (ESCM) used as the primary controls for safety-related equipment during normal, abnormal, and accident conditions? If so, revise the APR1400 FSAR and associated technical reports to show the IFPD/ESCM are the primary controls for safety-related equipment during normal, abnormal, and accident conditions, or point to the locations in the FSAR indicating they are the primary controls. If IFPD/ESCM are not the primary controls for safety-related equipment, identify the display and control systems that would be the primary controls.



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