REVISED RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: **45-7883**

SRP Section: **07.09 - Data Communication Systems**

Application Section:

Date of RAI Issue: **06/23/2015**

Question No. 07.09-7

Clarify what is meant by "any errors", and describe potential data communication faults and mitigating measures.

10 CFR 50.55a(h) requires compliance to IEEE Std 603-1991. IEEE Std 603-1991, Clause 5.6.1, states, in part, “Redundant portions of a safety system provided for a safety function shall be independent of and physically separated from each other to the degree necessary to retain the capability to accomplish the safety function during and following any design basis event requiring that safety function,” and Clause 5.6.3, states, in part, “The safety system design shall be such that credible failures in and consequential actions by other systems, as documented in 4.8 of the design basis, shall not prevent the safety systems from meeting the requirements of this standard.” RG 1.75 provides guidance on the physical separation requirements of IEEE Std. 603-1991, Clause 5.6. BTP 7-11 provides guidance on application and qualification of isolation devices to meet the electrical isolation requirements of IEEE Std. 603-1991 Clause 5.6. DI&C-ISG-04 provides guidance for meeting the communications independence requirements of IEEE Std. 603-1991, Clause 5.6.

DI&C ISG-04, Section 1, Position 12, states, in part, "Communication faults should not adversely affect the performance of required safety functions in any way...", and lists examples of credible communication faults. APR1400 FSAR, Tier 2, Section 7.1, Page 7.1-3, states, in part, “Data communications within or between I&C systems are designed to provide reasonable assurance that any error in data communication will not cause inadvertent actuations or prevent the safety functions from being performed.” Clarify whether the applicant really meant "any" errors as this goal is typically difficult to achieve except on simple communication schemes. Also, per DI&C ISG-04, Section 1, Position 12, describe the potential data communication faults between IFPD and ESCM and the mitigating measures for each fault.

Response – (Rev.2)

The use of “any error” in APR1400 DCD, Tier 2, Section 7.1 means the malfunctions that lead to detectable and undetectable failures of data communications. APR1400 FSAR, Tier 2, Section 7.1, Page 7.1-3, sub-part, “Data Communication” was updated in the APR1400 FSAR, Tier 2, Chapter 7, Rev. 1 as follows: “Data communications within or between I&C systems is provided with the communication independence to ensure that there will be no adverse impact on the safety systems. Data communication systems are composed of a qualified PLC data communication network, a non-qualified DCS data communication network, a qualified serial data link, and Ethernet network. Communication independence is provided among safety divisions and between safety and non-safety data communication systems. The safety and non-safety data communication systems are diverse.”

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The above design information will be included into technical report APR1400-Z-J-NR-14001-P, Rev. 0, “Safety I&C System,” Subsection C.5.1.5.

Impact on DCD

There is no impact on the DCD.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

Technical Report APR1400-Z-J-NR-14001-P, Rev. 0, “Safety I&C System,” Subsection C.5.1.5 will be revised as indicated in the Attachment.

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Figure C.5-1 ESCM Interface Diagram

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