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:	**Section 7.9**
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Question No. 07.09-5

Clarify what is meant by "the Qualified Indication and Alarm System - non-safety (QIAS-N) network is implemented by the Safety System Data Network (SDN)."

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.

APR1400 FSAR, Tier 2, Section 7.9.1.4, "Data Communication from Safety System to Non-Safety System" states, in part, "The QIAS-N network is implemented by the SDN." It is not clear what is meant by "is implemented by the SDN." Is the applicant trying to say QIAS-N network will be implemented using AF100 network communication system, which is discussed in the Common Q topical report? The staff requests applicant to clarify and update the FSAR accordingly.

Response

The qualified indication and alarm system-non-safety (QIAS-N) is the backup system for the information processing system (IPS) which is the primary indication and alarm system for operation. The QIAS-N is implemented with the common PLC platform, even though it is a non-safety system, because it displays the important plant parameters and maintains diversity from the IPS.

Figure 7.9-5-1 is a part of APR1400 DCD, Tier 2, Figure 7.9-1 and shows the data communication block diagram between the QIAS-N and safety systems.

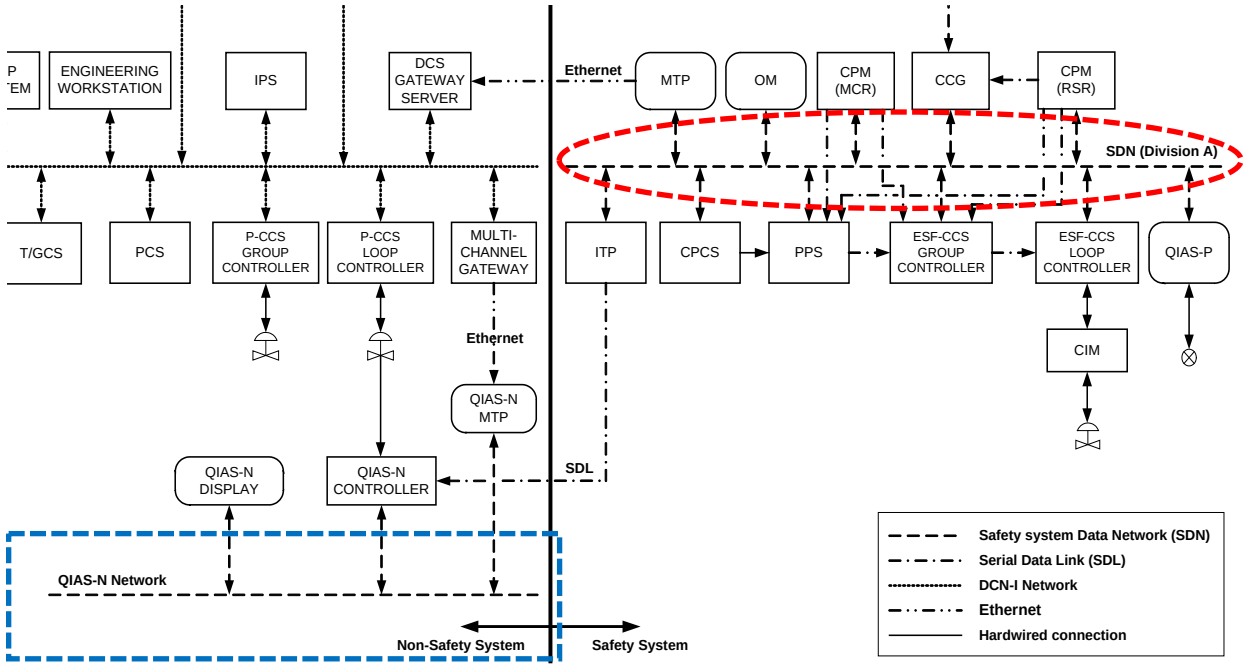

Figure 7.9-5-1 Data Communication Block Diagram

The network marked with a red ellipse in the above figure is a dedicated network for the divisionalized safety systems such as plant protection system (PPS), core protection calculator system (CPCS), and engineered safety features-component control system (ESF-CCS). The network marked with a blue square is a dedicated network for the QIAS-N.

The two networks marked with a red ellipse and a blue square are different and designed in such a way that safety systems do not receive any signals from non-safety systems. These networks are also physically separated and electrically isolated. However, these networks are implemented with the SDN. The SDN means the AF100 communication network discussed in the Common Q topical report.

Therefore, “The QIAS-N network is implemented by the SDN.” means that the QIAS-N network is implemented with the AF100 communication network.

APR1400 DCD Tier 2, Subsection 7.9.1.4 will be revised to reflect the above clarification.

Impact on DCD

DCD Tier2, Subsection 7.9.1.4 will be revised as indicated on the attached markup.

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

There is no impact on any Technical, Topical, or Environmental Reports.

The ITP sends the status and alarm information to the QIAS-N through the SDL unidirectionally. Therefore the failure of the QIAS-N does not prevent the ITP from performing the intended functions.

c. DCS gateway server

The DCS gateway server receives data from safety systems with fiber-optic isolation.

Data Communication from Non-Safety System to Safety System

Ethernet communication is used to communicate from the IFPD to the ESCM. The connection does not transfer any safety or control information to perform any safety or control functions. The signal from the IFPD provides component identification information to the ESCM. This signal is used for bringing up the control template on the ESCM display and is not used for performing any control functions. Therefore, the ESF-CCS division does not rely on information from the IFPD to accomplish its function.

Compliance with DI&C-ISG-04 regarding communication from the IFPD to the ESCM is described in Appendix C of the Safety I&C System Technical Report (Reference 3).

Data Communication between the QIAS-N and Other Systems

~~The QIAS-N network is implemented by the SDN.~~

a. QIAS-N network

The QIAS-N network is use

1) QIAS-N processor

2) QIAS-N display

3) QIAS-N MTP

~~The QIAS-N network and the DCN-I network are independent of each other. The QIAS-N network uses different data communication hardware and protocols from the DCN-I network.~~

The QIAS-N network is a dedicated network implemented with the SDN. The intra-division network for the safety systems such as PPS, ESF-CCS, and CPCS is also implemented with the SDN. However, these networks are different and designed in such a way that safety systems do not receive any signals from non-safety systems.These networks are also physically separated and electrically isolated.

The QIAS-N network uses different data communication hardware and protocols from the DCN-I network. The QIAS-N network is physically separated and electrically isolated from the DCN-I network