
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.: 548-8822

SRP Section: 09.05.02 – Communication Systems

Application Section:

Date of RAI Issue: 05/22/2017

Question No. 09.05.02-6

10 CFR Part 50, Appendix A, GDC 2, states, in part, “Structures, systems and components important to safety are designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.” GDC 3, states, “Structures, systems and components important to safety to be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room.” GDC 4, states, “Structures, systems and components important to safety to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of coolant accidents.”

When the staff reviewed the applicant’s human reliability analysis, the staff identified risk important human actions that must be performed by an operator outside of the control room. This assumes the availability of communication systems. In RAI 491-8613, Question 09.05.02-04, the staff asked the applicant to justify why none of the communication system SSCs are classified as a risk-significant. The applicant’s response (ML16222A952) stated that the risk significance of the communication systems would be reviewed at the next Reliability Assurance Program (RAP) expert panel meeting. The applicant’s response also stated that the communication system will be added in DCD Tier 2, Table 17.1-1 (Risk-significant Within-Scope RAP SSCs) if it is identified as a risk-significant SSC. In a subsequent phone call with the applicant, staff was informed that the RAP panel would be conducted in April 2017. RAI 491-8613, Question 09.05.02-04, has been closed as unresolved.

Clarify whether the Reliability Assurance Program (RAP) expert panel meeting has been conducted. Based on the panel, have the communication systems been identified as risk significant SSCs. If yes, then the communication systems need to comply with the requirements of 10 CFR Part 50, Appendix A, GDC1, GDC 2, GDC 3, and GDC 4 and the applicant needs to

describe how the communication systems comply with the requirements of 10 CFR Part 50, Appendix A, GDC 2, GDC 3, and GDC 4. Update the FSAR documents accordingly.

Response

The communication systems, as described in DCD Tier 2, Subsection 9.5.2 are designed to provide reliable and effective interplant communications and plant-to-offsite communications during normal plant operations, transient, fire, accident conditions, including loss of offsite power and security-related events. The various communication systems provide independent and alternate paths to provide reasonable assurance of the capability to communicate with plant and offsite personnel and organizations during all operating or emergency conditions.

These communication systems are classified as non-Class 1E system; serve no safety-related functions, and are not required to function for hot or cold shutdown of the reactor.

Given the variety of independent and redundant communication systems available:

- a. Plant communication systems
 - 1) Paging phone system
 - 2) Evacuation alarm address system
 - 3) Public address system
 - 4) Sound powered telephone system
 - 5) Telephone system
 - 6) Plant time synchronizing system
 - 7) LAN and VPN systems
 - 8) Wireless communication system
- b. Offsite communication systems
 - 1) Commercial telephone
 - 2) Local law enforcement communications
 - 3) Emergency telephone system
 - 4) Satellite telephone system
- c. Security communication systems
 - 1) Security telephone system

2) Security wireless communication system

Also as described in the response to RAI 548-8822, Question 09.05.02-7 (2), the normal power supply for all communication subsystems has access to a non-Class 1E onsite standby power from AAC source in the event of LOOP, with independent UPS for the communication systems with 1 hour capacity in normal operation. Particularly, telephone system has independent battery chargers and 16-hour batteries for each PABX node. Wireless communication system is supplied from the dedicated emergency UPS with 16-hour batteries.

To provide reliable and effective communications during normal and abnormal plant operations, the communication systems of the APR1400 are designed to meet GDC 1, 2, 3 and GDC 4 as shown in the attachment. DCD Tier 2, Subsection 9.5.2.3 will be revised to incorporate the attachment.

Impact on DCD

DCD Tier 2, Subsection 9.5.2.3 will be revised as shown in the attachment.

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 on impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 2**9.5.2.2.2.4 Satellite Telephone System**

A satellite telephone system is connected to the plant telephone system to fulfill the needs after a beyond design basis external event. This system is tied directly into the plant telephone exchange (PBX) as an alternate source of outside telephone lines for the plant.

This system provides an automatic alternate communication path for outside connections to the public switched telephone network. The satellite telephone equipment includes a roof mounted antenna and transceiver.

9.5.2.2.3 Security Communication System**9.5.2.2.3.1 Security Telephone System**

The security telephone system provides conventional telephone service between central alarm station and secondary alarm station and also has continuous telephone service with the main control room and local law enforcement authorities to provide assurance of effective command and control during both normal and emergency situations.

9.5.2.2.3.2 Security Wireless Communication System

The security wireless communication system consists of a base unit, mobile units, and portable units. This system is provided to enable continuous communication among all on-duty security force personnel and individuals in each alarm stations. The security wireless communication system is used as the primary source of communications for security force personnel.

The COL applicant is to provide the security radio system which consists of a base unit, mobile units, and portable units (COL 9.5(10)).

9.5.2.2.3.3 Power Supply

Security communication devices in the central and secondary alarm stations are powered from independent power source in the event of loss of normal power.

9.5.2.3 Safety Evaluation

~~The communication systems are not required for the safe shutdown or for mitigating a design basis accident. The systems have no safety-related function, but they have to~~

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~~support effective operations as well as coordinate on-site and off-site responses during abnormal or emergency events. Various communication systems are used to minimize the complete loss of on-site and off-site communications.~~

9.5.2.4 Inspection and Testing Requirements

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The communication systems are inspected and tested prior to initial startup. Preoperational testing is described in Section 14.2. To verify the functionality of the systems by standby power and battery sources, the loss of ac power tests are performed. It will test communications among MCR, TSC, principal stats and emergency operation center, and radiological field assessment in conformance requirement of 10 CFR 50.47 (b)(6) (Reference 58).

9.5.2.5 Instrumentation Requirements

No special instrumentation is required for the communication systems.

9.5.3 Lighting Systems

The lighting systems provide for adequate lighting during normal, transients, fires, accidents, and the loss of all ac power. The lighting systems are composed of normal, emergency, and security lighting systems. These lighting systems maintain adequate illumination levels during normal and off-normal conditions.

9.5.3.1 Design Bases

The lighting systems are designed not to be completely lost in normal and off-normal conditions including electrical equipment faults, LOOP, and SBO. The lighting systems are not required to mitigate the consequences of a DBE. Therefore, the lighting systems are non-Class 1E systems.

- a. Normal lighting power is supplied from non-safety-related auxiliary power buses. Normal lighting is provided in the entire plant during normal plant operation.
- b. Emergency lighting is provided in areas required for safe shutdown of the plant, restoring the plant to normal operation, firefighting, and safe movement of people to the access and egress routes during plant off-normal condition and loss of normal power supply.

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The communication systems are non-safety-related. Also the communication systems are not required for the safe shutdown or for mitigating a design basis accident.

For GDC 1 and 10 CFR 50.55a, structures, systems, and components of the communication systems are designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Recognized codes and standards are identified and evaluated to determine their applicability, adequacy, and sufficiency and supplemented or modified as necessary to assure a quality product in keeping with the required safety function. The communication system is classified as a non-Class 1E system which serves no safety-related function

For GDC 2, portions of the communication systems whose structural failure could reduce the functioning of seismic Category I SSCs to an unacceptable safety level or could result in incapacitating injury to occupants of the control room are designed to meet seismic Category II requirements in accordance with Subsection 3.2.1.

For GDC 3, the communication systems are designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. The communication systems support safe shutdown and emergency response as well as coordinate on-site and off-site response in the event of fire. The wireless communication system is in accordance with RG 1.189, Regulatory Position 4.1.7 to provide plant-wide communication between designated personnel during fire conditions.

For GDC 4, the communication systems are not required to be protected against dynamic effects, including the effects of missile, pipe whipping, and discharging fluids. The communication systems are non-safety-related and does not interface with any safety-related or risk-significant SSC.

The four communication subsystems (evacuation alarm address system, paging phone system, telephone system, and wireless communication system) are independent. These systems serve as a backup to one another in case of system failure due to environmental or dynamic effects and fires. The four communication subsystems are designed to assure that any single event does not result in a complete loss of plant communication.