
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.: 212-8246

SRP Section: 09.05.01 - Fire Protection Program

Application Section:

Date of RAI Issue: 09/14/2015

Question No. 09.05.01-39

10 CFR 52.47(a)(18) requires a DC application to contain a description and analysis of the fire protection design features for the standard plant necessary to comply with 10 CFR 50.48 and GDC 3 in 10 CFR part 50, Appendix A.

In DCD Tier 2, Section 9.5.1, "Fire Protection Program," the applicant states:

"In addition, in the final fire hazard analysis (FHA) and fire safe shutdown analysis (FSSA), a detailed post-fire safe shutdown circuit analysis is included, using a methodology that is similar to NEI 00-01."

The staff reviewed NEI 00-01, "Guidance for Post Fire Safe Shutdown Circuit Analysis," Revision 2, and finds that this document does not consider the effects of heat and smoke on digital equipment or digital I&C cabinets.

During the February 5, 2015 meeting of the Advisory Committee on Reactor Safeguards (ACRS), (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15049A189), the issue of the possible effects of heat and smoke on digital equipment and digital I&C cabinets was discussed.

In the ACRS's letter to the Commission concerning the February 5, 2015, meeting (ADAMS Accession Number ML15039A006) the ACRS stated:

"Fire hazard analyses have not thoroughly evaluated the possibility of fire-induced spurious actuations that may result from heat or fire damage to digital instrumentation and control signal cabinets, when external connections to those cabinets are made via fiber optic cables. Staff consideration of this as a generic issue would be prudent."

The applicant is requested to state whether the final fire hazards analyses will evaluate/consider the effects from spurious actuations that may be caused by heat from a fire inside or nearby

cabinets that contain digital signal processing circuitry, if the external connections to those cabinets are made via fiber optic cables. If applicable, the applicant is requested to provide justification for not evaluating these effects.

Response

The final FHA and FSSA is to be performed considering the effects of fire-induced spurious actuations that may result from heat or fire damage to digital I&C cabinets, if the external connections to those cabinets are made via fiber optic cables.

The DCD Tier 2, subsection 9.5.1.3.2 will be revised to include above.

Impact on DCD

DCD Tier 2, Subsection 9.5.1.3.2 will be revised as indicated in 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 Report.

APR1400 DCD TIER 2

- c. Provide reasonable assurance that reactor coolant makeup is available to maintain reactor coolant level within the level indication of the pressurizer
- d. Maintain RCS decay heat removal function
- e. Provide direct reading of process variables necessary to perform and control reactivity, reactor coolant pressurizer level, and decay heat removal
- f. Maintain support functions (process cooling, lubrication) for equipment required for safe shutdown

The FSSA demonstrates that one success path of two safety SSCs that is used to bring the reactor to safe shutdown conditions remains free of fire damage. As required by NRC RG 1.189, fire barriers, physical separation with no intervening combustibles, and/or automatic detection and suppression provide this protection. The FSSA is included in Appendix 9.5A.

For an MCR fire, the RSR is used as alternative shutdown capability. A fire in the MCR is the only fire scenario that requires the RSR to be used. Shutdown from the MCR is accomplished for fires originating in all other fire areas. For the MCR fire, both shutdown paths (i.e., Division I and Division II) are available to safely shut down and maintain cold shutdown from the RSR. Subsection 7.4.1 contains a discussion of the transfer of control from the MCR to the RSR. Each of these systems includes adequate controls and instrumentation in the MCR and at the RSR to provide reasonable assurance that safe shutdown can be achieved. Subsection 7.4.1 describes the instrumentation and controls in the RSR that are required to bring the plant to safe shutdown conditions.

The COL applicant is to provide a milestone for completing a final FHA and FSSA on the basis of the final plant cable routing, fire barrier ratings, fire loading, ignition sources, and equipment arrangement. The initial FHA and FSSA for design certification state the assumptions and requirements. The final FHA and FSSA include evaluation results of them based on final design data. In addition, in the final FHA and FSSA, a detailed post-fire safe shutdown circuit analysis is included, ^{using} a methodology that is similar to NEI 00-01, Rev. 3 (Reference 19). The final FHA and FSSA are carried out and documented as part of the update for the COL application and maintained in the licensing basis for the site (COL 9.5(4)).

The final FHA and FSSA is to be performed considering the effects of fire-induced spurious actuations that may result from heat or fire damage to digital I&C cabinets, if the external connections to those cabinets are made via fiber optic cables.