

## KHNPDCRAIsPEm Resource

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**Sent:** Monday, September 14, 2015 7:26 AM  
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**Cc:** Vettori, Robert; Dias, Antonio; Wunder, George; Lee, Samuel  
**Subject:** APR1400 Design Certification Application RAI 212-8246 (09.05.01 - Fire Protection Program )  
**Attachments:** APR1400 DC RAI 212 SPSB 8246.pdf; image001.jpg

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, 120 days, 45 days, 30 days, 45 days, and 30 days, respectively, to respond to these RAI questions. We may adjust the schedule accordingly.

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

Thank you,

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## REQUEST FOR ADDITIONAL INFORMATION 212-8246

Issue Date: 09/14/2015  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 09.05.01 - Fire Protection Program  
Application Section:

### QUESTIONS

#### 09.05.01-35

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, Chapter 1, Section 1.8, "Interfaces with Standard Designs," the applicant states:

"A standard site plot of the APR1400 is provided in Figure 1.2-1. The plot shows the scope of the design certification application."

In DCD Tier 2, Section 9.5.1, page 9.5-11, the applicant states:

"The diesel fuel oil storage tanks for each EDG and AAC gas turbine generator (GTG) are separated from the adjacent fire areas by 3-hour rated fire barrier."

The staff reviewed Figure 1.2-1 and finds that the alternate alternating current (AAC) gas turbine generator building and the two essential service water and component cooling water heat exchanger (ESW/CCW HX) buildings are within the scope for the design certification. However, while reviewing Appendix 9.5A, "Fire Hazard Analysis," the staff finds that these buildings were not included in the fire hazard analysis even though the AAC gas turbine generator building is discussed in Section 9.5.1 as noted above.

The applicant is requested to include a fire hazard analysis for the AAC gas turbine generator building and the ESW/CCW HX buildings. If applicable, the applicant is requested to provide justification for not providing a fire hazard analysis on these buildings.

#### 09.05.01-36

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.

The staff reviewed DCD Tier 2, Appendix 9.5A, "Fire Hazard Analysis," and noted that on Figure 9.5A-1, "Fire Barrier DBD – RCB/AB EI.55'-0," the applicant states in note 5:

"F000-ACV is a general fire area encompassing all rooms in the chemical and volume control system (CVCS) area except those designated as separate fire area."

And in note 6:

"F000-AFH is a general fire area encompassing all rooms in the fuel handling area except those designated as separate fire area."

The staff reviewed Tier 2, Appendix 9.5A, "Fire Hazard Analysis," and was unable to find any information regarding these two fire areas (F000-ACV and F000-AFH) in Section 9.5A.3, "Fire Hazard Analysis Result."

The applicant is requested to provide a fire hazard analysis for the above noted fire areas. If applicable, the applicant is requested to provide justification for not providing a fire hazard analysis on these fire areas.

## REQUEST FOR ADDITIONAL INFORMATION 212-8246

09.05.01-37

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.

Reg Guide 1.189, Section 6.1.7, "Station Battery Rooms," states in part:

"Automatic fire detection should alarm and annunciate in the control room and alarm locally."

In DCD Tier 2, Section 8.3.2.2.2, "Conformance with NRC Regulatory Guides," the applicant states:

"An automatic fire detection system is installed in each battery room with provision for local alarm and annunciation in the MCR."

The staff reviewed DCD Tier 2, Appendix 9.5A, "Fire Hazard Analysis," and found that the battery room located in the Auxiliary Building, Division II, Fire Area F120-A35B, does not have automatic fire detection.

The applicant is requested to reconcile the above noted discrepancy. If applicable, the applicant is requested to provide justification for not having an automatic fire detection system installed in the battery room identified above.

09.05.01-38

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.

Reg Guide 1.189, Section 6.1.7, "Station Battery Rooms," states in part:

"Battery rooms should be separated from each other and from other areas of the plant by barriers having a minimum fire rating of 3 hours inclusive of all penetrations and openings. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Battery room ventilation systems should be capable of maintaining the hydrogen concentration well below 2 percent. Loss of ventilation should be alarmed in the control room."

In DCD Tier 2, Section 8.3.2.2.2, "Conformance with NRC Regulatory Guides," the applicant states:

"An automatic fire detection system is installed in each battery room with provision for local alarm and annunciation in the MCR."

The staff reviewed DCD Tier 2, Appendix 9.5A, "Fire Hazard Analysis," and noted that on Figure 9.5A-22, "Fire Barrier DBD – CPB El. 120' - 0", Room 120-R10 is designated as a battery room. The staff also noted that Figure 9.5A-22 shows the fire rating of three walls and the floor slab to be 2-hours instead of 3-hours. The staff is unable to determine the fire rating of the ceiling from this drawing. The staff was also unable to determine if this battery room has an automatic fire detection system that alarms and annunciates in the control room and alarms locally; and a ventilation system capable of maintaining the hydrogen concentration well below 2% and that loss of ventilation will be alarmed in the control room.

The applicant is requested:

1. To reconcile the above noted discrepancy regarding automatic fire detection in this battery room. If applicable, the applicant is requested to provide justification for not having an automatic fire detection system installed in this battery room.
2. To reconcile the above noted discrepancy regarding the fire rating of barriers in battery room 120-R10. If applicable, the applicant is requested to provide justification for not having 3 hour barriers for all walls, floor, and ceiling for this battery room.
3. To provide information stating that the ventilation system for this battery room will be capable of maintaining the hydrogen concentration well below 2% and that loss of ventilation will be alarmed in the control room. If applicable, the applicant is requested to provide justification for not having a ventilation system for this battery room that conforms to Reg Guide 1.189, Section 6.1.7.

## REQUEST FOR ADDITIONAL INFORMATION 212-8246

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.

