
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. 09.05.01-35

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.

Response

DCD Tier 2, Appendix 9.5A will be revised to include a fire hazard analysis for the AAC gas turbine generator building and the ESW/CCW HX buildings.

Impact on DCD

DCD Tier 2, Appendix 9.5A will be revised as indicated 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 no impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 2

The radioactive laundry system treats all liquid wastes within the refueling water area that have the potential for radioactive contamination (e.g., personnel decontamination, contaminated laundry waste). The treatment process is conducted in steel containers and monitored. Therefore, in case a fire accident occurs in the CPB, no significant release is expected; any release is below the 10 CFR Part 100 limits.

Burning of filters could result in releases of radioactive products, but this is within the radiological design basis since all filters are in closed metal tanks or containers and all air leaving this area passes through charcoal filters that are monitored by radiation detectors. Charcoal filters are also protected by deluge systems.

← Insert A in next page

9.5A.4 References

1. Regulatory Guide 1.189, “Fire Protection for Nuclear Power Plants,” Rev. 2, U.S. Nuclear Regulatory Commission, October 2009.
2. ASTM E 119, “Standard Test Methods for Fire Tests of Building Construction and Materials,” American Society for Testing and Materials, 2012.
3. NFPA 72, “National Fire Alarm Code,” National Fire Protection Association, 2010.
4. ANSI/IEEE Std. 383, “American National Standard IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations,” Institute of Electrical and Electronics Engineers.
5. NEI 00-01, “Guidance for Post Fire Safe Shutdown Circuit Analysis,” Rev. 3, National Energy Institute, October 2011.
6. NFPA 14, “Standard for the Installation of Standpipe and Hose Systems,” National Fire Protection Association, 2010.
7. NFPA 10, “Standard for Portable Fire Extinguishers,” National Fire Protection Association, 2010.

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9.5A.3.7 ESW/CCW Hx. Building

9.5A.3.7.1 F000-WPPA: ESW Pump Room - Div.I

Figures 9.5A-25 through 9.5A-26 show the location of fire area F000-WPPA, which comprises the following zones:

Z081-W01A Pump Room – El. 81 ft

Z100-W07A Pump Room – El. 100 ft

Fire Protection Adequacy Evaluation

The fire area is enclosed with 3-hour-rated concrete walls. Penetrations and openings are sealed for fire confinement.

The combustible materials in this area are listed in Table 9.5A-2. The fire loading of fire area F000-WPPA is 1.04×10^5 kJ/m² (9.14×10^3 Btu/ft²), and the expected duration of fire is 7 minutes. Three-hour fire-rated barriers provide adequate separation from adjacent fire areas, and a fire would be contained within the fire area.

A fire in this area is detected by a smoke detector and is extinguished manually using a water hose or portable extinguisher in accordance with NFPA 72, 14, and 10. Based on the expected fire hazards in this fire area, the 3-hour-rated boundaries of this area provide sufficient containment of any unsuppressed fire that could occur. On this basis, the fire protection that is provided for this fire area is adequate.

Fire Protection System Integrity

Because no automatic suppression systems are installed in this area, an evaluation of the inadvertent actuation effect of an automatic suppression system is not applicable.

Safe Shutdown Analysis

The design basis fire would occur if all the combustibles in this area burned. This fire area is completely separated from the adjacent area with 3-hr rated fire barriers. Equipment in this area

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are all Div.I related. Complete loss of Div.I equipment is acceptable since redundant division of equipment located in a separate fire area is available for safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.7.2 F000-WPPB: ESW Pump Room - Div.II

Figures 9.5A-27 through 9.5A-28 show the location of fire area F000-WPPB, which comprises the following zones:

Z081-W01B Pump Room – El. 81 ft

Z100-W07B Pump Room – El. 100 ft

Fire Protection Adequacy Evaluation

The fire area is enclosed with 3-hour-rated concrete walls. Penetrations and openings are sealed for fire confinement.

The combustible materials in this area are listed in Table 9.5A-2. The fire loading of fire area F000-WPPB is 4.33×10^4 kJ/m² (3.81×10^3 Btu/ft²), and the expected duration of fire is 7 minutes. Three-hour fire-rated barriers provide adequate separation from adjacent fire areas, and a fire would be contained within the fire area.

A fire in this area is detected by a smoke detector and is extinguished manually using a water hose or portable extinguisher in accordance with NFPA 72, 14, and 10. Based on the expected fire hazards in this fire area, the 3-hour-rated boundaries of this area provide sufficient containment of any unsuppressed fire that could occur. On this basis, the fire protection that is provided for this fire area is adequate.

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Fire Protection System Integrity

Because no automatic suppression systems are installed in this area, an evaluation of the inadvertent actuation effect of an automatic suppression system is not applicable.

Safe Shutdown Analysis

The design basis fire would occur if all the combustibles in this area burned. This fire area is completely separated from the adjacent area with 3-hr rated fire barriers. Equipment in this area are all Div.II related. Complete loss of Div.II equipment is acceptable since redundant division of equipment located in a separate fire area is available for safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.7.3 F000-WECA: ESW/CCW HX. building - Div.I

Figures 9.5A-25 through 9.5A-26 show the location of fire area F000-WECA, which comprises the following zones:

Z000-WCTA	Cooling Tower Basin – El. 49 ft, El. 100 ft
Z100-W08A	CCW Hx. Room

Fire Protection Adequacy Evaluation

The fire area is enclosed with non-rated concrete walls except the north and south wall to ESW pump room and has 3-hour-rated fire doors. Most of walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

The combustible materials in this area are listed in Table 9.5A-2. The fire loading of fire area F000-WECA is 2.15×10^3 kJ/m² (1.90×10^2 Btu/ft²), and the expected duration of fire is negligible.

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A fire in this area is detected by a smoke detector and is extinguished manually using a water hose or portable extinguisher in accordance with NFPA 72, 14, and 10. Based on the expected fire hazards in this fire area, the 3-hour-rated boundaries to ESW pump provide sufficient separation for any unsuppressed fire of this area that could occur. On this basis, the fire protection that is provided for this fire area is adequate.

Fire Protection System Integrity

Because no automatic suppression systems are installed in this area, an evaluation of the inadvertent actuation effect of an automatic suppression system is not applicable.

Safe Shutdown Analysis

The design basis fire would occur if all the combustibles in this area burned. This fire area is completely separated from the adjacent area with 3-hr rated fire barriers. Equipment in this area are all Div.I related. Complete loss of Div.I equipment is acceptable since redundant division of equipment located in a separate fire area is available for safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.7.4 F000-WECB: ESW/CCW HX. building - Div.II

Figures 9.5A-27 through 9.5A-28 show the location of fire area F000-WECA, which comprises the following zones:

Z000-WCTB Cooling Tower Basin – El. 49 ft, El. 100 ft

Z100-W08B CCW Hx. Room

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Fire Protection Adequacy Evaluation

The fire area is enclosed with non-rated concrete walls except the north and south wall to ESW pump room and has 3-hour-rated fire doors. Most of walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

The combustible materials in this area are listed in Table 9.5A-2. The fire loading of fire area F000-WECB is 1.13×10^3 kJ/m² (9.92×10^1 Btu/ft²), and the expected duration of fire is negligible.

A fire in this area is detected by a smoke detector and is extinguished manually using a water hose or portable extinguisher in accordance with NFPA 72, 14, and 10. Based on the expected fire hazards in this fire area, the 3-hour-rated boundaries to ESW pump provide sufficient separation for any unsuppressed fire of this area that could occur. On this basis, the fire protection that is provided for this fire area is adequate.

Fire Protection System Integrity

Because no automatic suppression systems are installed in this area, an evaluation of the inadvertent actuation effect of an automatic suppression system is not applicable.

Safe Shutdown Analysis

The design basis fire would occur if all the combustibles in this area burned. This fire area is completely separated from the adjacent area with 3-hr rated fire barriers. Equipment in this area are all Div.I related. Complete loss of Div.I equipment is acceptable since redundant division of equipment located in a separate fire area is available for safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

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9.5A.3.8 AAC Gas Turbine Generator Building

9.5A.3.8.1 F079-NFS: AAC Gas Turbine Generator Fuel Oil Storage Tank Room

Figure 9.5A-29 shows the location of fire area F079-NFS.

Fire Protection Adequacy Evaluation

This fire area, AAC gas turbine generator (GTG) fuel oil storage room, is enclosed with 3-hour-rated concrete walls except the exterior wall to below grade. Penetrations and openings are sealed for fire confinement. HVAC ductwork that passes through barriers is equipped with a rated fire damper. The walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

A fire in this area is detected by smoke, temperature, and flame detectors in accordance with NFPA 30. The fire area has an automatic preaction sprinkler system in accordance with NFPA 13 and regulatory guidance. The fire area has substantial concrete walls that are designed to seismic Category I criteria. The walls may provide more than 3-hour fire resistance. Additional fire suppression capability is provided by portable extinguishers in accordance with NFPA 10. The combination of structural confinement with fire-rated barriers, an automatic fire suppression system, manual extinguishers, and an automatic fire detection system provides a defense-in-depth approach to providing reasonable assurance that the fire protection in this area is adequate and would prevent the spread of a fire outside this fire area.

This fire area is served by the AAC GTG area HVAC system. Any HVAC ductwork that passes into the area is provided with automatically closing fire dampers at the fire area boundaries. Smoke migration into the area is mitigated by sealed penetrations and openings in the fire area boundaries. After the fire, smoke is removed from the fire area by flexible ducting and portable fans.

Fire Protection System Integrity

A fire in this area is detected by smoke, heat and flame detectors in accordance with NFPA 72. The fire area has automatic wet pipe sprinkler system in accordance with NFPA 13 and regulatory guidance. Additional fire suppression capability is provided by a water hose or portable extinguishers in accordance with NFPA 14 and 10. Based on the expected fire hazards

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in this area, the 3-hour-rated boundaries of this area provide sufficient containment of any un-suppressed fire that can be expected to occur. On this basis, the fire protection that is provided for this fire area is adequate.

Safe Shutdown Analysis

The design basis fire would occur if all of the combustibles in this area burned. This fire area is separated from the adjacent fire areas with 3-hour-rated fire barriers, and equipment in this area is not needed for safe shutdown. Therefore, a complete loss of equipment in the event of a fire in this area would not affect the plant safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.8.2 F100-NGTG: AAC Gas Turbine Generator Area

Figures 9.5A-29 show the location of fire area F100-NGTG.

Fire Protection Adequacy Evaluation

The fire area is enclosed with the exterior wall below grade. The walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

A fire in this area is detected by smoke, heat and flame detectors in accordance with NFPA 72. The fire area has automatic wet pipe sprinkler system in accordance with NFPA 13 and regulatory guidance. Additional fire suppression capability is provided by a water hose or portable extinguishers in accordance with NFPA 14 and 10. Based on the expected fire hazards in this area, the 3-hour-rated boundaries of this area provide sufficient containment of any un-suppressed fire that can be expected to occur. On this basis, the fire protection that is provided for this fire area is adequate.

This fire area is served by the AAC GTG area HVAC system. Smoke migration into the area is mitigated by sealed penetrations and openings in the fire area boundaries. After the fire, smoke is removed from the fire area by flexible ducting and portable fans.

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Fire Protection System Integrity

Inadvertent actuation of the automatic wet pipe sprinklers installed in this area would not affect the capability to safely shut down the plant because there is no safety-related equipment in this area.

Safe Shutdown Analysis

The design basis fire would occur if all of the combustibles in this area burned. This fire area is separated from the adjacent fire areas with 3-hour-rated fire barriers, and equipment in this area is not needed for safe shutdown. Therefore, a complete loss of equipment in the event of a fire in this area would not affect the plant safe shutdown.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.8.3 F120-N01: AAC GTG Fuel Oil Day Tank Room

Figure 9.5A-29 shows the location of fire area F120-N01.

Fire Protection Adequacy Evaluation

The fire area is enclosed with 3-hour-rated concrete walls except the exterior wall below grade. Penetrations and openings are sealed for fire confinement. HVAC ductwork that passes through barriers is equipped with a fire damper. The walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

A fire in this area is detected by temperature detectors in accordance with NFPA 30. The fire area has automatic wet pipe sprinkler system in accordance with NFPA 13 and regulatory guidance. The fire area has substantial concrete walls. The walls may provide more than 3-hour fire resistance. Additional fire suppression capability is provided by a fire hose and portable extinguishers in accordance with NFPA 14 and 10. The combination of structural confinement with fire-rated barriers, an automatic fire suppression system, a manual water hose, portable

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extinguishers, and an automatic fire detection system provides a defense-in-depth approach to providing reasonable assurance that the fire protection in this area is adequate and would prevent the spread of a fire outside this fire area.

This fire area is served by the AAC GTG area HVAC system. Any HVAC ductwork that passes into the area is provided with automatically closing fire dampers at the fire area boundaries. Smoke migration into the area is mitigated by sealed penetrations and openings in the fire area boundaries. After the fire, smoke is removed from the fire area by flexible ducting and portable fans.

Fire Protection System Integrity

Inadvertent actuation of the automatic wet pipe sprinklers installed in this area would not affect the capability to safely shut down the plant because there is no safety-related equipment in this area.

Safe Shutdown Analysis

The design basis fire would occur if all of the fuel oil spilled and ignited. This fire area is separated from the adjacent areas with 3-hour-rated barriers. A complete loss in this area will not affect the capability of the plant safe shutdown because there is no safety-related equipment in this area.

Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

9.5A.3.8.4 F000-NG: AAC Gas Turbine Generator Building – General

Figure 9.5A-29 through 9.5A-30 shows the location of fire area F000-NG.

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Fire Protection Adequacy Evaluation

The fire area is enclosed with non-rated concrete walls and has 3-hour-rated fire doors. HVAC ductwork that passes through barriers is equipped with a fire damper. Most of walls of this area are exterior walls that are not required to be rated, according to NRC RG 1.189.

Combustible materials in this area are listed in Table 9.5A-2. Fire load and the duration of fire are expected to be negligible. Three-hour-rated fire barriers provide adequate separation from adjacent fire areas, and the fire is contained within the fire area.

This fire area is served by the AAC GTG area HVAC system. Any HVAC ductwork that passes into the area is provided with automatically closing fire dampers at the fire area boundaries. Smoke migration into the area is mitigated by sealed penetrations and openings in the fire area boundaries. After the fire, smoke is removed from the fire area by flexible ducting and portable fans.

Fire Protection System Integrity

The AAC GTG cable spreading room, the room number 085-N01, is provided with the fire suppression system of an automatic preaction sprinkler system. The preaction sprinkler system is not vulnerable to inadvertent actuation because it consists of a normally closed preaction valve, which automatically opens upon a fire detection signal, and closed type sprinkler heads. Even when the preaction valve is opened by a spurious fire detection signal, the water is retained in the piping if there is no actual occurrence of fire that could melt the fusible sprinkler heads.

The AAC GTG switchgear room, room the number 100-N01, is provided with an automatically actuated clean agent suppression system. The clean agent suppression system does not have a harm effect on the equipments. Therefore, the damage to equipment in this area in the event of inadvertent actuation of the clean agent suppression system would not affect the capability of the equipments.

Safe Shutdown Analysis

A fire in this area would not affect safe shutdown of the plant because there are no safety-related structures or equipment that would be affected by the fire.

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Radioactive Release Analysis

This fire area is not a radiological area. The piping systems in the fire area do not contain fluids with radiological content. Therefore, a radioactive release due to a fire in this area is not expected.

Table 9.5A-2 (320 of 331)

F000-WPPA: ESW Pump Room - Div.I			
Fire Area or Fire Zone Description		Protective Measures	
Z081-W01A: Pump Room – El. 81'		Detection	• Analog-type photoelectric smoke detector
Wall	• Z100-W08A • Z049-W01A • Z100-W04A • Z100-W03A	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Z100-W07A	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• ESW Pumps ^S		Major Combustible (kJ (Btu))	• Transient combustible 4.22×10^5 (4.00×10^5)
		Floor Area (m ² (ft ²))	372 (4,000)
		Fire Load (kJ/m ² (Btu/ft ²))	1.14×10^3 (1.00×10^2)
		Fire Severity (min)	Less than 1 min
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. I. Div. II equipment remains free from the damage.	

Table 9.5A-2 (321 of 331)

F000-WPPA: ESW Pump Room - Div.I			
Fire Area or Fire Zone Description		Protective Measures	
Z100-W07A: Pump Room – El. 100'		Detection	• Analog-type photoelectric smoke detector
Wall	• Z100-W08A • Z100-W04A • Z100-W03A	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• Class 1E 480V MCCs ^S		Major Combustible (kJ (Btu))	• Cable insulation 3.51×10^7 (3.32×10^7)
		Floor Area (m ² (ft ²))	372 (4,000)
		Fire Load (kJ/m ² (Btu/ft ²))	1.04×10^5 (9.14×10^5)
		Fire Severity (min)	7
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. I. Div. II equipment remains free from the damage.	

Table 9.5A-2 (322 of 331)

F000-WPPB: ESW Pump Room - Div.II			
Fire Area or Fire Zone Description		Protective Measures	
Z081-W01B: Pump Room – El. 81'		Detection	• Analog-type photoelectric smoke detector
Wall	• Z100-W08B • Z049-W01B • Z100-W04B • Z100-W03B	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Z100-W07B	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• ESW Pumps ^S		Major Combustible (kJ (Btu))	• Transient combustible 4.22×10^5 (4.00×10^5)
		Floor Area (m ² (ft ²))	372 (4,000)
		Fire Load (kJ/m ² (Btu/ft ²))	1.14×10^3 (1.00×10^2)
		Fire Severity (min)	Less than 1 min
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. II. Div. I equipment remains free from the damage.	

Table 9.5A-2 (323 of 331)

F000-WPPB: ESW Pump Room - Div.II			
Fire Area or Fire Zone Description		Protective Measures	
Z100-W07B: Pump Room – El. 100'		Detection	• Analog-type photoelectric smoke detector
Wall	• Z100-W08B • Z100-W04B • Z100-W03B	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• Class 1E 480V MCCs ^S		Major Combustible (kJ (Btu))	• Cable insulation 1.46×10^7 (1.39×10^7)
		Floor Area (m ² (ft ²))	372 (4,000)
		Fire Load (kJ/m ² (Btu/ft ²))	4.33×10^4 (3.81×10^3)
		Fire Severity (min)	3
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. II. Div. I equipment remains free from the damage.	

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F000-WECA: ESW/CCW HX. building - Div.I			
Fire Area or Fire Zone Description		Protective Measures	
Z000-WCTA: Cooling Tower Basin – El. 49 ft, El. 100 ft		Detection	• None
Wall	• F000-WPPA • Exterior wall	Fire Extinguisher	• None
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• None		Major Combustible (kJ (Btu))	• Transient combustible 4.22×10^5 (4.00×10^5)
		Floor Area (m ² (ft ²))	9,112 (98,080)
		Fire Load (kJ/m ² (Btu/ft ²))	4.63×10^1 (4.08)
		Fire Severity (min)	Less than 1 min
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
No detection and suppression system.		No safe shutdown equipment in this zone to be damaged.	

Table 9.5A-2 (325 of 331)

F000-WECA: ESW/CCW HX. building - Div.I			
Fire Area or Fire Zone Description		Protective Measures	
Z100-W08A: CCW Hx. Room		Detection	• Analog-type photoelectric smoke detector
Wall	• F000-WPPA • Exterior wall	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• CCW Hx.s ^S		Major Combustible (kJ (Btu))	• Cable insulation 1.78×10^7 (1.69×10^7)
		Floor Area (m ² (ft ²))	367 (3,952)
		Fire Load (kJ/m ² (Btu/ft ²))	5.34×10^4 (4.70×10^3)
		Fire Severity (min)	4
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. I. Div. II equipment remains free from the damage.	

Table 9.5A-2 (326 of 331)

F000-WECB: ESW/CCW HX. building - Div.II			
Fire Area or Fire Zone Description		Protective Measures	
Z000-WCTB: Cooling Tower Basin – El. 49 ft, El. 100 ft		Detection	• None
Wall	• F000-WPPB • Exterior wall	Fire Extinguisher	• None
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• None		Major Combustible (kJ (Btu))	• Transient combustible 4.22×10^5 (4.00×10^5)
		Floor Area (m ² (ft ²))	9,112 (98,080)
		Fire Load (kJ/m ² (Btu/ft ²))	4.63×10^1 (4.08)
		Fire Severity (min)	Less than 1 min
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
No detection and suppression system.		No safe shutdown equipment in this zone to be damaged.	

Table 9.5A-2 (327 of 331)

F000-WECB: ESW/CCW HX. building - Div.II			
Fire Area or Fire Zone Description		Protective Measures	
Z100-W08B: CCW Hx. Room		Detection	• Analog-type photoelectric smoke detector
Wall	• F000-WPPB • Exterior wall	Fire Extinguisher	• Water hose • Dry chemical
Floor	• Basemat	Suppression System	• None
Ceiling	• Exterior roof	Access/Egress	• Doors
Major Equipment		Combustible & Fire Loading	
• CCW Hx.s ^S		Major Combustible (kJ (Btu))	• Cable insulation 9.33×10^6 (8.85×10^6)
		Floor Area (m ² (ft ²))	367 (3,952)
		Fire Load (kJ/m ² (Btu/ft ²))	2.80×10^4 (2.46×10^3)
		Fire Severity (min)	2
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area/zone will minimize fire damage to the safe shutdown equipment.		The potential of fire damage to safe shutdown function associated with Div. II. Div. I equipment remains free from the damage.	

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F079-NFS: AAC Gas Turbine Generator Fuel Oil Storage Tank Room			
Fire Area or Fire Zone Description		Protective Measures	
079-N01 GTG fuel oil transfer pump room 079-N02 GTG fuel oil storage tank room		Detection	<ul style="list-style-type: none"> • Explosion-proof type fixed temperature detector • Flame detector
Wall	<ul style="list-style-type: none"> • 079-N03 • 085-N01 • Exterior (underground) 	Fire Extinguisher	<ul style="list-style-type: none"> • Water hose • Dry chemical • Wheeled dry chemical
Floor	Building foundation	Suppression System	Automatic wet pipe sprinkler system
Ceiling	100-N05	Access/Egress	Doors
Major Equipment		Combustible & Fire Loading	
<ul style="list-style-type: none"> • AAC GTG Fuel Oil Storage Tank • AAC GTG Fuel Oil Transfer Pump • Exhaust Fan 		Major Combustible (kJ (Btu))	Fuel Oil 1.73E10 (1.64E10)
		Floor Area (m ² (ft ²))	169 (1,814)
		Fire Load (kJ/m ² (Btu/ft ²))	1.03×10^8 (9.03×10^6)
		Fire Severity (min)	112.9
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area will minimize fire damage to the safe shutdown equipment.		No safe shutdown equipment in this area to be damaged.	

Table 9.5A-2 (329 of 331)

F100-NGTG: AAC Gas Turbine Generator Area			
Fire Area or Fire Zone Description		Protective Measures	
100-N02 Control Room 100-N05 Gas turbine generator room		Detection	<ul style="list-style-type: none"> Analog-type photoelectric smoke detector Explosion-proof type fixed temperature detector Flame detector
Wall	<ul style="list-style-type: none"> 100-N01 Exterior 	Fire Extinguisher	<ul style="list-style-type: none"> Dry chemical Wheeled dry chemical Water hose
Floor	Partial F079-NFS	Suppression System	Automatic wet pipe sprinkler system
Ceiling	136-N01	Access/Egress	Doors
Major Equipment		Combustible & Fire Loading	
<ul style="list-style-type: none"> AAC GTG AAC GTG Control Room Cabinets 		Major Combustible (kJ (Btu))	Prefilter 1.01×10^5 (9.60×10^4) Cable insulation 4.85×10^7 (4.59×10^7)
		Floor Area (m ² (ft ²))	302 (3,248)
		Fire Load (kJ/m ² (Btu/ft ²))	9.89×10^5 (8.71×10^4)
		Fire Severity (min)	1.1
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area will minimize fire damage to the safe shutdown equipment.		No safe shutdown equipment in this area to be damaged.	

Table 9.5A-2 (330 of 331)

F120-N01: AAC Gas Turbine Generator Fuel Oil Day Tank Room			
Fire Area or Fire Zone Description		Protective Measures	
F120-N01 : AAC GTG oil day tank room		Detection	• Explosion-proof type fixed temperature detector
Wall	• F100-NGTG • Exterior	Fire Extinguisher	• Dry chemical • Wheeled dry chemical • Water hose
Floor	• F100-NGTG	Suppression System	Automatic wet pipe sprinkler system
Ceiling	• 136-N01	Access/Egress	Doors
Major Equipment		Combustible & Fire Loading	
• AAC GTG Fuel Oil Day Tank		Major Combustible (kJ (Btu))	Fuel oil 1.46×10^8 (1.38×10^8)
		Floor Area (m ² (ft ²))	14 (147)
		Fire Load (kJ/m ² (Btu/ft ²))	1.46×10^8 (1.38×10^8)
		Fire Severity (min)	11.8
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area will minimize fire damage to the safe shutdown equipment.		No safe shutdown equipment in this area to be damaged.	

Table 9.5A-2 (331 of 331)

F000-NG: AAC Gas Turbine Generator Building – General			
Fire Area or Fire Zone Description		Protective Measures	
F000-NG: GTG Building – General		Detection	<ul style="list-style-type: none"> Analog-type photoelectric smoke detector
Wall	<ul style="list-style-type: none"> Exterior 	Fire Extinguisher	<ul style="list-style-type: none"> Dry chemical Wheeled dry chemical Water hose
Floor	<ul style="list-style-type: none"> Building foundation 	Suppression System	<ul style="list-style-type: none"> Automatic actuated clean agent system Automatic preaction sprinkler system
Ceiling	<ul style="list-style-type: none"> Roof 	Access/Egress	Doors
Major Equipment		Combustible & Fire Loading	
<ul style="list-style-type: none"> HVAC equipments Air supply fan Clean agent storage bottles Battery Switchgears 		Major Combustible (kJ (Btu))	Cable insulation 4.98×10^7 (4.72×10^7)
		Floor Area (m ² (ft ²))	24 (254)
		Fire Load (kJ/m ² (Btu/ft ²))	2.32×10^6 (2.04×10^5)
		Fire Severity (min)	2.6
Fire Impact Analysis			
Suppression System Operates		Suppression System Operates	
A rapid detection and suppression of fire in this area will minimize fire damage to the safe shutdown equipment.		No safe shutdown equipment in this zone/area to be damaged.	

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-25 Fire Barrier DBD – ESW / CCW HX. Building El. 81'-0" - Div. I

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-26 Fire Barrier DBD – ESW / CCW HX. Building El. 100'-0" - Div. I

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-27 Fire Barrier DBD – ESW / CCW HX. Building El. 81'-0" - Div. II

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-28 Fire Barrier DBD – ESW / CCW HX. Building El. 100'-0" - Div. II

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-29 Fire Barrier DBD – AAC GTG Building El. 79'-0" ~ El. 120'-0"

APR1400 DCD TIER 2

Added

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 9.5A-30 Fire Barrier DBD – AAC GTG Building El. 136'-0" & El. 153'-0"