

4.4 Control Building

BUILDING FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: CONTROL BUILDING Elev.: 285' through 401'

Length: 100 ft. Width: 60 ft.

Height: 116 ft.

Area (Approx.): 6,000 ft² each elevation

Drawings: 1-FHA-34, 35, 36, 37 and 38

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: ___ hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete

South - Reinforced Concrete

East - Reinforced Concrete

West - Reinforced Concrete

Roof:

Reinforced Concrete-non fire Rated

Floor:

Reinforced Concrete-non fire rated (basement)

Doors:

Entrance to the Control Building is through Class A rated doors with the exception of B labeled doors at the 322'-0" and 338'-6" elevations. Entrances from the Fuel Handling Building to the stair tower on the north wall of the Control Tower are provided with a Class A rated door on elevation 322'-0" and Class B rated doors on elevations 338'-6', 355'-0" and 380'-0".

The Control Building houses the Control Room, Relay Room, electrical equipment, offices, repair shops, and laboratories. The safe shutdown equipment is shown on drawings 1-FHA-034, 035, 036, 037 and 038.

The building has five levels connected by a 3 hour fire resistance rated stair tower. This stair tower serves common elevations of the fuel handling building, Control Building and Turbine Building.

4.4.1 Fire Area CB-FA-1

4.4.1.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 306'

Fire Area Name: CONTROL BUILDING HEALTH PHYSICS AND LAB AREA

Length: 100 ft. Width: 60 ft.

Height: 15 ft.

Area: 6,000 ft²

Drawing: 1-FHA-034

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete-non fire Rated *

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the north and west walls through Class A doors.

* No adjacent fire area or zone

Penetrations:

All penetrations through walls, and the ceiling and floor of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls and ceiling are provided with three hour rated fire dampers.

Barriers Within Area:

Rated fire barriers are provided for circuits ranging from a rating of 39 minutes (minimum required) to one hour. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.1.2 Analysis

The combustibles in the area consist of stored and transient materials and cable insulation. The fire loading is low. Fire protection for this area consists of an automatic wet pipe sprinkler system and a portable fire extinguisher is located outside this fire area in fire zone FH-FZ-2 all as shown on drawing 1-FHA-034. An additional portable fire extinguisher is located within this fire area in the primary chemistry lab. The wet pipe sprinkler system is located below the false ceiling in the area and does not protect cable tray and conduit above the false ceiling. There is no false ceiling in the northeast corner of the area. Sprinkler protection also extends into the stair tower adjacent to the northwest wall of this fire area. Ionization detection exists above the false ceiling, which will actuate alarms in the Control Room. A combustible gas detection system with local alarms monitors an acetylene line above the false ceiling and an analyzer in the primary water chemistry laboratory for acetylene leakage. The alarm setpoint for the acetylene detection system is set for 10% of the LEL for acetylene.

Exemptions:

Manual operation in lieu of cable protection; no automatic suppression above suspended ceiling and no fire detection below suspended ceiling; manual operation of valves in lieu of protection of instrument air supply. A minimum 39 minute fire barrier rating for cable raceway fire barriers in lieu of a one hour rating has been approved. See Section 3.14 for details.

4.4.1.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.2 Fire Area CB-FA-2a

4.4.2.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING 1P SWITCHGEAR ROOM

Length: 49 ft. Width: 18 ft.

Height: 15 ft.

Area: 882 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Metal Panel - Rated (excluding 480V bus duct)

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the south and west walls through Class A doors. The door in the west wall is oversized, therefore no labeled.

Penetrations:

All penetrations through walls, floors and ceilings of this fire area are sealed with three hour rated fire seals. All ventilation duct penetrations through these walls, floors and ceilings are provided with three hour rated fire dampers. The passively ventilated bus ducts are sealed around the outside periphery to a 3 hour rating. The bus duct internals are sealed with a non-fire rated smoke stop, adequate to prevent passage of smoke and hot gases.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.2.2 Analysis

The combustibles in the area consists of cable insulation, transients and the electrical equipment. The fire loading is low. Fire protection for this area consists of HVAC duct smoke detectors, which actuates alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition portable fire extinguishers are provided in zone FH-FZ-5 and portable Fire extinguishers are located in the stair tower as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection. See Section 3.14 for details.

4.4.2.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.3 Fire Area CB-FA-2b

4.4.3.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING 1S SWITCHGEAR ROOM

Length: 49 ft. Width: 19 ft.

Height: 15 ft.

Area: 931 ft²

Drawings: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Metal Panel - Rated (excluding 480v bus duct)

West - Metal Panel - Rated

Ceiling: Reinforced Concrete - Rated

Floor: Reinforced Concrete - Rated

Columns: Exposed Structural Steel-fireproofed

Beams: Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the east and west walls through Class A doors.

Penetrations:

All penetrations through walls, floors and ceilings of this fire area are sealed with three hour rated fire seals. All ventilation duct penetrations through these walls, floors and ceilings are provided with three hour rated fire dampers. The passively ventilated bus duct is sealed around the outside periphery to a 3 hour rating. The bus duct internal is sealed with a non-fire rated smoke stop, adequate to prevent passage of smoke and hot gases. Stainless steel tubes, which penetrate the west wall of this fire area, are sealed around the periphery to a three hour rating. The tubes are an integral part of the incipient fire detection system. The tubing is not sealed internally. This condition

has been evaluated as acceptable in this configuration (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.3.2 Analysis

The combustibles in this area consist of cable insulation, transient materials, and the electrical equipment. The fire loading is low. Fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition portable fire extinguishers are provided in zone FH-FZ-5 and portable fire extinguishers are located in the stair tower as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection and automatic suppression. See Section 3.14 for details.

4.4.3.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.4 Fire Area CB-FA-2c

4.4.4.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING REMOTE SHUTDOWN AREA

Length: 49 ft. Width: 22 ft.

Height: 15 ft.

Area: 1,078 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Metal Panel - Rated

West - Reinforced Concrete - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area through the south, east, and west is through Class A rated doors. Entrance to the north wall via the stair tower is through a Class B rated door.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. Stainless steel tubes, which penetrate the south, east and west walls of this fire area, are sealed around the periphery to a three hour fire rating. The tubes are an integral part of the incipient fire detection system. They are not sealed internally even though they transition to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003)

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.4.2 Analysis

Combustibles in this area consist of cable insulation, transient and stored materials. The fire loading is low. The fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition portable fire extinguishers are provided in zone FH-FZ-5 and portable fire extinguishers are provided in the stair tower as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection and automatic suppression. See Section 3.14 for details.

4.4.4.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.5 Fire Area CB-FA-2d

4.4.5.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING EAST BATTERY CHARGER AREA

Length: 24 ft. Width: 30 ft.

Height: 15 ft.

Area: 720 ft²

Drawings: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Metal Panel - Rated

East - Reinforced Concrete - Rated

West - Metal Panel - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the north, south and west walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. Stainless steel tubes, which penetrate the south and west walls of this fire area, are sealed around the periphery to a three hour fire rating. The tubes are an integral part of the incipient fire detection system. They are not sealed internally even though they transition to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.5.2 Analysis

The combustibles in this area consist of cable insulation, transient materials and the electrical equipment. The fire loading is low. Fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition a portable fire extinguisher is located inside this fire area and in adjacent areas as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection; manual operation of valves in lieu of protection of instrument air supply and automatic suppression. See Section 3.14 for details.

4.4.5.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.6 Fire Area CB-FA-2e

4.4.6.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING WEST BATTERY CHARGER AREA

Length: 24 ft. Width: 30 ft.

Height: 15 ft.

Area: 720 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Metal Panels - Rated

East - Metal Panels - Rated

West - Reinforced Concrete - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the north, south and east walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. Stainless steel tubes, which penetrate the north, south and east walls of this fire area, are sealed around the periphery to a three hour fire rating. The tubes are an integral part of the incipient fire detection system. They are not sealed internally even though they transition to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.6.2 Analysis

The combustibles in this area consist of cable insulation, electrical equipment and transient materials. The fire loading is low. Fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition a fire extinguisher is located inside this fire area and portable fire extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection and automatic suppression. See Section 3.14 for details.

4.4.6.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.7 Fire Area CB-FA-2f

4.4.7.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING EAST BATTERY AREA

Length: 24 ft. Width: 30 ft.

Height: 15 ft.

Area (Approx.): 720 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

- North - Metal Panel - Rated
- South - Reinforced Concrete - Rated
- East - Reinforced Concrete - Rated
- West - Metal Panel - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the north and west walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. A stainless steel tube, which penetrates the north wall of this fire area, is sealed around the periphery to a three hour fire rating.

The tube is an integral part of the incipient fire detection system. It is not sealed internally even though it transitions to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.7.2 Analysis

Combustibles in this area consist of cable insulation, transient materials and battery cases. The fire loading is low. Fire protection for this area consists of HVAC duct ionization smoke detection and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition portable extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

The ventilation system is equipped with a loss of flow switch, which provides an alarm in the Control Room. The alarm response outlines actions to prevent any hydrogen accumulation in the battery room.

Exemptions:

Manual operation in lieu of cable protection; manual operation of valves in lieu of protection of instrument air supply and automatic suppression. See Section 3.14 for details.

4.4.7.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.8 Fire Area CB-FA-2g

4.4.8.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 322'

Fire Area Name: CONTROL BUILDING WEST BATTERY AREA

Length: 24 ft. Width: 30 ft.

Height: 15 ft.

Area: 720 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Metal Panel - Rated
South - Reinforced Concrete - Rated
East - Metal Panel - Rated
West - Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area is on the north, west and east walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. A stainless steel tube, which penetrates the north wall of this fire area, is sealed around the periphery to a three hour fire rating. The tube is an integral part of the incipient fire detection system. It is not sealed internally even though it transitions to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.8.2 Analysis

Combustibles in this area consist of cable insulation, transient materials and battery cases. The fire loading is low. Fire protection for this area consists of HVAC duct ionization smoke detection and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition, portable extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

The ventilation system is equipped with a loss of flow switch, which provides an alarm in the Control Room. The alarm response outlines actions to prevent hydrogen accumulation in the battery room.

Exemptions:

Manual operation in lieu of cable protection and automatic suppression. See Section 3.14 for details.

4.4.8.3 Conclusion

The results of the analysis indicate that boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.9 Fire Area CB-FA-3a

4.4.9.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 338'-6"

Fire Area Name: CONTROL BUILDING 4160V SWITCHGEAR 1D AREA

Length: 49 ft. Width: 18 ft.

Height: 16 ft.

Area: 882 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

- North - Reinforced Concrete - Rated
- South - Reinforced Concrete - Rated
- East - Reinforced Concrete - Rated (excluding 4160v bus duct)
- West - Metal Panel - Rated (excluding 4160v bus duct)

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Beams & Columns:

Exposed Structural Steel-fireproofed

A vertical duct chase (approximately 10' X 10') located in the northeast corner of this fire area (CB-FA-3A) extends upward to the Control Building North H&V Equipment Area located on the 380' Elevation (CB-FZ-5a). The entire length of this duct chase is considered part of CB-FA-3A, and consists of 3 hour rated sheetrock construction.

Doors:

Entrance to this fire area is through the south and west walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All ventilation duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. The passively ventilated bus ducts are sealed around the outside periphery to a 3 hour rating. The bus duct internals are sealed with a non-fire rated smoke stop, adequate to prevent the passage of smoke and hot gases. The bus ducts were found acceptable in NRC SER dated 12/30/1986 (5211-86-3333), Section 10.0, page 20, item f., paragraph 4 of 5. Stainless steel tubes, which penetrate the west wall of this fire area, are sealed around the periphery to a three-hour fire rating. The tubes are an integral part of the incipient fire detection system. It is not sealed internally even though it transitions to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.9.2 Analysis

The combustibles in this area consist of cable insulation, and the electrical equipment. The fire loading is low. The fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition, portable extinguishers are located in

Exemptions:

Manual operation in lieu of cable protection and automatic suppression. See Section 3.14 for details.

4.4.9.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.10 Fire Area CB-FA-3b

4.4.10.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 338' ft.

Fire Area Name: CONTROL BUILDING 4160V SWITCHGEAR 1E AREA

Length: 49 ft. Width: 18 ft.

Height: 16 ft.

Area: 882 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated
South - Reinforced Concrete - Rated
East - Metal Panel - Rated (excluding 4160v bus duct)
West - Metal Panel - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this area is through the east and west walls through Class A rated doors. The southwest Class A door is permanently locked shut and therefore provides no means of egress.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All ventilation duct penetrations through the walls, ceilings and floors are provided with three hour rated fire dampers. The passively ventilated bus ducts are sealed around the outside periphery to a 3 hour rating. The bus duct internals are sealed with a non-fire rated smoke stop, adequate to prevent the passage of smoke and hot gases. The bus ducts were found acceptable in NRC SER dated 12/30/1986 (5211-86-3333), Section 10.0, page 20, item f., paragraph 4 of 5. Stainless steel tubes, which penetrate the east and west walls of this fire area, are sealed around the periphery to a three hour fire rating. The tubes are an integral part of the incipient fire detection system. They are not sealed internally even though they transition to nylon tubing inside the room. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003).

Barriers Within Area:

1 hour rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.10.2 Analysis

The combustibles in this area consist of cable insulation, the electrical equipment and transient materials. The fire loading is low. The fire protection for this area consists of HVAC duct smoke detectors and an area wide incipient fire detection system, which actuate alarms in the Control Room. Hose protection is provided outside this area in zone FH-FZ-5. In addition, portable extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

Exemptions:

Manual operation in lieu of cable protection. Manual action to establish portable ventilation in Intake Screen and Pump House in lieu of protection and automatic suppression. See Section 3.14 for details.

4.4.10.3 Conclusion

The results of the analysis indicate the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.11 Fire Area CB-FA-3c

4.4.11.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 338' ft.

Fire Area Name: CONTROL BUILDING ESAS AREA

Length: 49 ft. Width: 24 ft.

Height: 16 ft.

Area: 1,176 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated
South - Reinforced Concrete - Rated
East - Metal Panel - Rated
West - Reinforced Concrete - Rated

Ceiling:

Reinforced Concrete - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel-fireproofed

Beams:

Exposed Structural Steel-fireproofed

Doors:

Entrance to this fire area through the south, east and west walls is through Class A rated doors. Entrance to the north wall via the stair tower is through a Class B rated door. The southeast Class A door is permanently locked shut and therefore provides no means of egress.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through the walls, ceiling and floor are provided with three hour rated fire dampers.

Barriers Within Area:

In lieu of protection, the alternate shutdown system is used for a fire in this area.

Safe Shutdown Components:

For safe shutdown components in the area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

Contrary to NFPA 13, the single pendant (e.g. non-upright) sprinkler head installed in CB-FA-3C is not listed for use on a dry-pipe system. It appears the pendant head is installed to direct water away from potential obstructions, thus enhancing the system performance. Therefore, based on fire protection engineering judgment, this deviation is insignificant and the installed manual suppression system in Fire Zone CB-FA-3C will adequately control and/or extinguish a fire associated with the hazards.

4.4.11.2 Analysis

The combustibles in this area consist of cable insulation and electrical equipment. The fire loading is low. Fire protection for this area consists of HVAC duct smoke detectors and area ionization smoke detection, which actuate alarms in the Control Room. A manually actuated normally dry sprinkler system equipped with fusible head nozzles protects the entire fire area. Hose protection is provided outside the area in zone FH-FZ-5. Portable extinguishers are located in adjacent areas as shown on drawing 1-FHA-035.

Exemptions:

Manual action to establish portable ventilation in Intake Screen and Pump House in lieu of protection. See Section 3.14 for details.

4.4.11.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

4.4.12 Fire Area CB-FA-3d

4.4.12.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 338' ft.

Fire Area Name: CONTROL BUILDING RELAY ROOM

Length: 48 ft. Width: 60 ft.

Height: 16 ft.

Area: 2,880 ft²

Drawing: 1-FHA-035

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <3 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete - Rated (excluding 6 bus ducts for CRDM's)

Ceiling:

Reinforced Concrete on fireproofed steel - Rated

Floor:

Reinforced Concrete - Rated

Columns:

Exposed Structural Steel - fireproofed

Beams:

Exposed Structural Steel - fireproofed

Doors:

Entrance to this area is through the north and west walls through Class A rated doors.

The door in the west wall is oversized, therefore not labeled.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals with exception of CRDM bus ducts. The six small passively ventilated bus ducts (6 inch x 8-1/2 inch) are sealed around the outside periphery to a 3 hour rating. The bus ducts were found acceptable in NRC SER dated 12/30/1986 (5211-86-3333), Section 10.0, page 20, item f., paragraph 4 of 5. These small openings in the rated barrier, supported by the detection and automatic suppression in the area do not invalidate the ability of the west wall to confine a fire. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers.

Barriers Within Area:

In lieu of protection, the alternate shutdown system is used for a fire in this area.

Safe Shutdown Components:

For safe shutdown components in the area see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.12.2 Analysis

Combustibles in this area consist of cable insulation, electrical equipment and transient materials including a work area for Instrument and Control personnel. The fire loading is high. Heat shields are provided between mutually redundant cable trays to help prevent the spread of electrically initiated fires in accordance with Reg Guide 1.75. Fire protection for this area consists of a low pressure total flooding carbon dioxide system actuated by heat detectors which alarm in the Control Room. HVAC duct smoke detectors and area ionization smoke detection actuates alarms in the Control Room. Portable fire extinguishers are provided in this area. Hose protection is provided outside the area in zone FH-FZ-5. In addition, portable fire extinguishers are located in zone FH-FZ-5 and fire extinguishers are located in the stair tower.

Exemptions:

Manual action to establish portable ventilation in Intake Screen and Pump House in lieu of protection. See Section 3.14 for details.

Deviations:

The spacing of the four Heat Activated Detectors (HADs) that perform the automatic actuation of the Relay Room Carbon Dioxide suppression system were not installed in accordance with NFPA 72E-1974 with regard to spacing and elevation. There are two additional detection systems, which also monitor the Relay Room for fire. First, the fire program defense in depth concept for the Relay Room also provides a duct mounted ionization fire detector that monitors the air in the exhaust duct from this room for smoke particles. Second there is a six-detector ionization system near the Relay Room ceiling that independently monitors the room for smoke particles. Both ionization detector systems send independent fire alarms to the Control Room upon identification of smoke particles. See CR 112699-13.

4.4.12.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection is considered adequate.

4.4.13 Fire Area CB-FA-4a

4.4.13.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 355'

Fire Area Name: CONTROL BUILDING ADMINISTRATIVE AREA

Length: 61 ft. Width: 49 ft.

Height: 24 ft.

Area: 2,906 ft²

Drawing: 1-FHA-036

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <2 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete - Rated

Ceiling: Reinforced Concrete - Rated

Floor: Reinforced Concrete - Rated

Beams & Columns: protected steel-fireproofed

Note, the northeast corner duct chase is part of fire area CB-FA-3a. The barrier consists of 3 hour rated sheetrock construction.

Doors:

Entrance to this fire area is through the north and south walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. The window in the Shift Manager's office on the south wall of this area is provided with a sliding three hour rated fire door which is equipped with a fusible link for actuation to shut.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown components in this area see, Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.13.2 Analysis

Combustibles in this area consist of stored and transient materials and cables insulation above ceiling. The fire loading is medium. HVAC duct smoke detectors actuate alarms in the Control Room. Portable fire extinguishers are located inside the area. Hose protection is provided outside the area in zone FH-FZ-5.

Portable fire extinguishers are located in zone FH-FZ-5 and additional fire extinguishers are located in fire area CB-FA-4b as shown on drawing 1-FHA-036.

Exemptions:

None

4.4.13.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for the area is considered adequate.

4.4.14 Fire Area CB-FA-4b

4.4.14.1 Fire Area Boundary Construction Features

Building: CONTROL BUILDING Elev.: 355'

Fire Area Name: CONTROL BUILDING CONTROL ROOM AREA

Length: 61 ft. Width: 49 ft.

Height: 24 ft.

Area: 2,989 ft²

Drawing: 1-FHA-036

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete - Rated

Ceiling: Reinforced Concrete - Rated

Floor: Reinforced Concrete - Rated

Beams & Columns: Structural steel fireproofed

Doors:

Entrance to this fire area is through the north and west walls through Class A rated doors.

Penetrations:

All penetrations through walls, ceilings and floors of this fire area are sealed with three hour rated fire seals. All duct penetrations through these walls, ceilings and floors are provided with three hour rated fire dampers. The window in the Shift Manager's office on the north wall of this area is provided with a sliding three hour rated fire door which is equipped with a fusible link for actuation to shut.

Barriers Within Area:

In lieu of protection, the alternate shutdown system is used for a fire in this area.

Safe Shutdown Components:

For safe shutdown components in this area, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.4.14.2 Analysis

Combustibles in this area consist of cable insulation and transient materials. The fire loading is low. Fire protection for this area consists of a fire damper in the barrier wall between fire areas CB-FA-4a and 4b, which is shut at all times. Ionization smoke detection is provided inside safety related control consoles and panels and above the NI cabinets, which alarms on the Control Room fire alarm panel. Portable fire extinguishers are located inside the area. Hose protection is provided outside the area in zone FH-FZ-5. Additional portable fire extinguishers are provided in zone FH-FZ-5 and portable fire extinguishers are provided in fire area CB-FA-4a as shown on drawing 1-FHA-036.

Exemptions:

No area-wide detection and fixed suppression system; manual action to establish portable ventilation for intake screen and pump house; emergency lighting not using 8 hour battery units. See Section 3.14 for details.

4.4.14.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for the area is considered adequate.

4.4.15 Fire Zone CB-FZ-5a

4.4.15.1 Fire Zone Boundary Construction Features

Building: CONTROL BUILDING Elev.: 380'

Fire Zone Name: CONTROL BUILDING NORTH H&V EQUIPMENT AREA

Length: 61 ft. Width: 49 ft.

Height: 20 ft.

Area: 2,989 ft²

Drawing: 1-FHA-036

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north and east boundaries as well as the floor are three-hour rated fire barriers. The ceiling is not adjacent to any other plant area. The west boundary is adjacent to fire zone

FH-FZ-5; the south boundary is adjacent to fire zone CB-FZ-5b; these boundaries are not relied on to separate redundant trains of safe shutdown equipment.

Combustible loadings on either side of the non-fire rated zone boundary are identified in the analysis for each of the following fire zones:

CB-FZ-5a, CB-FZ-5b and FH-FZ-5

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated	B2	Rated	B2	Rated	A1

Doors:

The entrance to this zone is from FH-FZ-5 through non-rated doors.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown components in this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.15.2 Analysis

Combustibles in this zone consist of cable insulation, transients and charcoal protected by deluge water spray system. The fire loading is low. The charcoal contained with the emergency air filter cabinet is provided with thermal fire detectors, which actuate alarms in the Control Room. A deluge water spray system for fire protection of the charcoal is provided, which can be manually initiated locally or from the Control Room. Hose protection is provided outside the zone in zone FH-FZ-5. In addition, fire extinguishers are provided in the stair tower, which is adjacent to the northwest boundary of this area. There is no direct access to the stair tower from this area, however, the travel distance from the stair tower through zone FH-FZ-5 to this fire zone is short as shown on 1-FHA-036.

Exemptions:

None

4.4.15.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection for this zone is considered adequate.

4.4.16 Fire Zone CB-FZ-5b

4.4.16.1 Fire Zone Boundary Construction Features

Building: CONTROL BUILDING Elev.: 380'

Fire Zone Name: CONTROL BUILDING SOUTH H&V EQUIPMENT AREA

Length: 61 ft. Width: 49 ft.

Height: 20 ft.

Area: 2,989 ft²

Drawing: 1-FHA-036

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The east boundary as well as the floor are three-hour fire barriers. The south boundary and ceiling are not adjacent to any other plant area. The west boundary is adjacent to fire zone FH-FZ-5; the north boundary is adjacent to fire zone CB-FZ-5a; these boundaries are not relied on to separate redundant trains of safe shutdown equipment. Combustible loadings on either side of the non-fire rated zone boundary are identified in the analysis for each of the following fire zones:

CB-FZ-5b, CB-FZ-5a and FH-FZ-5

The above discussion provides the basis for establishing the boundary classifications in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
B2	A1	Rated	B2	Rated	A1

Doors:

The entrance to this zone is from FH-FZ-5 through non-rated doors.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown components in this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.4.16.2 Analysis

Combustibles in this zone consist of cable insulation, transients and charcoal. The fire loading is low. The charcoal contained within the emergency air filter cabinet is provided with thermal fire detectors, which alarm in the Control Room. A deluge water spray system for fire protection of the charcoal is provided which can be actuated locally or from the Control Room. Hose protection is provided outside the zone in zone FH-FZ-5. In addition, portable fire extinguishers are provided in the stair tower, which is on the north wall of the Control Building. There is no direct access to the stair tower from this zone, however, the travel distance from the stair tower through zone FH-FZ-5 to this fire zone is short as shown on 1-FHA-036.

Exemptions:

None

4.4.16.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection for this zone is considered adequate.

Diesel Generator Building**BUILDING FIRE AREA BOUNDARY CONSTRUCTION FEATURES**

Building: DIESEL GENERATOR BUILDING Elev.: 305'

Length: 85 ft. Width: 105 ft.

Height: 27 ft.

Area (Approx.): 8,925 ft²

Drawing: 1-FHA-044 and 045

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: ____ hours

Design Rating: 3 hours

The Building Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete-non-fire rated in DG-FA-1 rated in DG-FA-2

South - Reinforced Concrete

East - Reinforced Concrete

West - Reinforced Concrete-non-fire rated

Ceiling:

Reinforced Concrete-non-fire rated

Floor:

Reinforced Concrete-non-fire rated

Doors:

Entry to this building is through a class A rated door on the east side of the building. Unlabeled doors are provided on the north wall (one) and two unlabeled doors on the west wall.

The diesel generator building houses two independent diesel generator units, as well as related auxiliaries. The diesel generators are Class 1E and are required for safe shutdown of TMI-1. The safe shutdown equipment and auxiliaries are shown on drawings 1-FHA-044, 045.

4.5.1 Fire Area DG-FA-1

4.5.1.1 Fire Area Boundary Construction Features

Building: DIESEL GENERATOR BUILDING Elev.: 305'

Fire Area Name: DIESEL GENERATOR A BUILDING AREA

Length: 85 ft. Width: 48 ft.

Height: 27 ft.

Area: 4,080 ft²

Drawings: 1-FHA-044 and 045

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete-non-fire Rated*

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete-non-fire Rated*

Ceiling:

Reinforced Concrete-non-fire Rated*

Floor:

Reinforced Concrete - non-fire Rated*

* No adjacent fire area or zone. Openings are protected by automatic fire suppression systems and considered as fire rated for insurance purposes and protection of post-fire safe shutdown capability when temporary fire hazards are present in the yard area.

Doors:

Entry to this fire area is through a Class A door on the south wall and an unlabeled door on the north wall.

Penetrations:

All penetrations through the rated barriers of this fire area are sealed with three hour rated fire seals. All duct penetrations through the rated barriers are provided with 3 hour rated dampers. The 6" under-floor drain pipe between the "A" and "B" D/G rooms is plugged with an expandable plug to preclude fluid (e.g. oil) transfer.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown components contained within this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.5.1.2

Analysis

The combustibles in this area consist of lube and fuel oil in the engine, fuel oil in the day tank and transient material. The fire loading is low. Electrical equipment in this area is enclosed and therefore adds no additional fire loading. The fire protection for this area consists of automatic wet pipe sprinkler, deluge water spray systems and portable fire extinguishers. Hose station protection is provided in the Service Building, which is adjacent to this building via the door on the east wall of Fire Area DG-FA-2. Three hydrants in the YARD are available for additional hose protection to this building.

Thermal fire detectors are located as shown on drawing 1-FHA-044 for actuating the deluge water spray systems, which protect the diesel air intakes for the area. Rupture alarms in the Control Room are provided for the diesel fuel day tank.

Exemptions:

None

4.5.1.3

Conclusion

The results of the analysis indicate that, the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for the area is considered adequate.

4.5.2 Fire Area DG-FA-2

4.5.2.1 Fire Area Boundary Construction Features

Building: DIESEL GENERATOR BUILDING Elev.: 305'

Fire Area Name: DIESEL GENERATOR B BUILDING AREA

Length: 85 ft. Width: 48 ft.

Height: 27 ft.

Area: 4,080 ft²

Drawings: 1-FHA-044 and 045

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete - Rated

South - Reinforced Concrete - Rated

East - Reinforced Concrete - Rated

West - Reinforced Concrete-non-fire Rated*

Ceiling:

Reinforced Concrete non-fire - Rated*

Floor:

Reinforced Concrete non-fire - Rated*

* No adjacent fire area or zone. Openings are protected by automatic fire suppression systems and considered as fire rated for insurance purposes and protection of post-fire safe shutdown capability when temporary fire hazards are present in the yard area.

Doors:

Entries to this fire area is through a Class A door on the east wall. A Class A door to fire area DG-FA-1 is provided on the north wall.

Penetrations:

All penetrations through the rated barriers of this fire area are sealed with three hour rated fire seals. All duct penetrations through the rated barriers are provided with 3 hour rated dampers.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown components contained within this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.5.2.2 Analysis

The combustibles in this area consist of lube and fuel oil in the engine, fuel oil in the day tank and transient material. The fire loading is low. Electrical equipment in this area is enclosed and therefore adds no additional fire loading. The fire protection for this area consists of automatic wet pipe sprinkler, deluge water spray systems and portable fire extinguishers. Hose station protection is provided in the Service Building, which is adjacent to this building via the door on the area's east wall. Three hydrants in the YARD are available for additional hose protection to this building. Thermal fire detectors are provided as shown on drawing 1-FHA-044 for actuating the deluge water spray systems, which protect the diesel air intakes and HVAC intakes for the area. Rupture alarms are provided in the Control Room for the diesel fuel day tank.

Exemptions:

Manual operation of valves in other areas in lieu of protection of back-up instrument air supply or instrument air supply. See Section 3.14 for details.

4.5.2.3 Conclusion

The results of the analysis indicate that the boundaries of this fire area are adequate to contain a postulated fire. Due to the features described, existing fire protection for this area is considered adequate.

Intake Screen and PumphouseFire Area Boundary Construction Features

Building: Elev.: 308'

Intake Screen and Pumphouse

Length: 124 ft.

Width: 86 ft.

Height: 26 ft.

Area (Approx.): 10,700 ft.²

Drawings: 1-FHA-046

Fire Area Boundaries

Fire Area Boundary Barrier Ratings:

Fire Loading: ____ hours

Design Rating: ____ - ____ hours

The Fire Area Boundary Components Are As Follows:

Walls:*

- North - Non-fire Rated except where next to fire pumphouse and wall between switchgear rooms
- South - Reinforced Concrete, non-fire Rated
- East - Reinforced Concrete, non-fire Rated
- West - Reinforced Concrete, non-fire Rated

* Exterior walls are substantial concrete construction in fire zones ISPH-FZ-1, 2 and 3. Based on this construction and the automatic fire suppression, the unprotected openings in the south wall of ISPH-FZ-1 and 3 are treated as fire rated for insurance purposes and during periods of exposure hazards in the yard area. This exposure does not affect the ability to achieve, maintain or monitor safe shutdown in the event of a fire.

Ceiling:

Reinforced Concrete, non-fire Rated

Floor:

Reinforced Concrete, non-fire Rated

Doors:

Access to this building is described under the construction features for each fire area and fire zone.

The intake screen and pumphouse contains equipment for TMI-1 water supply. This equipment includes safe shutdown and fire protection components as shown on drawing 1-FHA-046.

4.6.1 Fire Zone ISPH-FZ-1

4.6.1.1 Fire Zone Boundary Construction Features

Building: Elev.: 308'-0"
Intake Screen and Pump House
Fire Zone Name: IR Switchgear Area
Length: 48 ft. Width: 42 ft.
Height: 21 ft.
Area: 2,016 ft²

Drawing: 1-FHA-046

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north boundary is a three-hour rated fire barrier with the exception of ventilated (passive) bus duct internals penetrating the barrier. All other penetrations in this wall are controlled and maintained with three hour rated fire seals. Since automatic suppression is provided on both sides of the barrier, the bus ducts do not adversely affect the barrier rating. The roll up door in this barrier is maintained closed. The east and south boundaries and the ceiling are not adjacent to any other plant areas. The floor is adjacent to the intake pit. The intake pit is not considered a fire zone or area; however, this boundary is considered adequate because a full automatic wet pipe suppression system is present on ISPH-FZ-1. The west boundary is adjacent to fire zone ISPH-FZ-3. Doorways are provided with "A" labeled doors, however these doors are not maintained as fire rated. The automatic wet pipe suppression system on both sides of the west boundary is sufficient to preclude conflagration through the zone boundary. The boundary penetrations are not required to be sealed. Combustible loadings on either side of the west boundary of this zone are identified in the analysis for each of the following fire zones:

ISPH-FZ-1 and ISPH-FZ-3

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>			<u>Floor</u>	<u>Ceiling</u>	
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated	A1	A1	A3	A2	A1

Doors:

Entrance to this fire zone is through a Class A door on the south wall and through a Class A roll-up* and personnel door* on the west wall and a normally closed Class A door in the north wall.

*Not maintained.

Barriers Within Zone:

Rated fire barriers are provided for circuits ranging from a rating of 39 minutes (minimum required) to one hour. Rockbestos Fire Zone R cable is installed. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown components located in this fire zone, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.6.1.2

Analysis

The combustibles in this area consist of lube oil, cable insulation and transient materials. The fire loading is low. Fire protection for this zone consists of an automatic wet pipe sprinkler system and portable fire extinguishers. In addition a portable fire extinguisher is located in zone ISPH-FZ-3 as shown on drawing 1-FHA-046. Hose protection is available from a yard hydrant located outside the building. An ionization smoke detection system will actuate alarms in the Control Room.

Exemptions:

Rockbestos Fire Zone R cable in lieu of one hour rated barriers; minimum 39 minute fire barrier rating for cable raceway fire barriers in lieu of a one hour rating; no fire barriers on tray supports; manual operation to establish portable ventilation; manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.6.1.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection is considered adequate.

4.6.2 Fire Zone ISPH-FZ-2

4.6.2.1 Fire Zone Boundary Construction Features

Building: Elev.: 308"-0"

Intake Screen and Pump House

Fire Zone Name: IT Switchgear Area

Length: 48 ft.

Width: 42 ft.

Height: 21 ft.

Area: 2,016 ft.²

Drawing: 1-FHA-046

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north boundary is a three-hour fire rated barrier where adjacent to ISPH-FA-2; the remainder is not adjacent to any other plant area. The south boundary is a three-hour rated fire barrier with the exception of the ventilated (passive) bus duct internals penetrating the barrier. All other penetrations in this wall are controlled and maintained with three-hour fire rated seals. Since automatic suppression is provided on both sides of the barrier, the bus duct does not adversely affect the barrier integrity. The roll up door in this barrier is maintained closed. The east boundary and the ceiling are not adjacent to any other plant areas. The floor is adjacent to the intake pit. The intake pit is not considered a fire zone or area; however, this boundary is considered adequate because a full zone automatic wet pipe suppression system is present in ISPH-FZ-2. The west boundary is adjacent to fire zone ISPH-FZ-3 with two open passageways. The automatic wet pipe suppression system on both sides of the west boundary is sufficient to preclude conflagration through the zone boundary. The boundary penetrations are not required to be sealed.

Combustible loadings on either side of the west boundary are identified in the analysis for each of the following fire zones:

ISPH-FZ-2 and ISPH-FZ-3

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>					
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>	<u>Floor</u>	<u>Ceiling</u>
Rated/A1	Rated	A1	A3	A2	A1

Doors:

Entrance to this fire zone is through two door openings on the west wall and a normally closed Class A door in the south wall.

Barriers Within Zone:

Rated fire barriers are provided for circuits ranging from a rating of 39 minutes (minimum required) to one hour. Rockbestos Fire Zone R cable is installed. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown components located in this fire zone, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.6.2.2

Analysis

The combustibles in this area consist of lube oil, cable insulation and transient materials. The fire loading is low. Fire protection for this zone consists of an automatic wet pipe sprinkler system and a portable fire extinguisher. In addition, a portable fire extinguisher is located in zone ISPH-FZ-3 and fire extinguishers are located in zone ISPH-FZ-1 as shown on drawing 1-FHA-046. Hose protection is available from a yard hydrant located outside the building. Area ionization smoke detection is installed which actuates alarms in the Control Room.

Exemptions:

Rockbestos Fire zone R cable in lieu of one hour rated barriers; minimum 39 minute fire barrier rating for cable raceway fire barriers in lieu of a one hour rating; no fire barriers on tray supports; manual operation to establish portable ventilation; manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.6.2.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection is considered adequate.

4.6.3 Fire Zone ISPH-FZ-3

4.6.3.1 Fire Zone Boundary Construction Features

Building: Elev.: 308'-0"

Intake Screen and Pump House

Fire Zone Name: Trash Rake and Screen Area

Length: 73 ft.

Width: 84 ft.

Height: 21 ft.

Area: 6,132 ft.²

Drawings: 1-FHA-046

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north boundary is a three-hour rated fire barrier where adjacent to ISPH-FA-2; the remainder is not adjacent to any other plant area. The south and west boundaries and the ceiling are not adjacent to any other plant area. The floor is adjacent to the intake pit. The intake pit is not considered a fire zone or area; however, this boundary is considered adequate because a full automatic wet pipe suppression system is present in ISPH-FZ-3. The east boundary is adjacent to fire zones ISPH-FZ-1 and ISPH-FZ-2 with "A" labeled, though not maintained, doors provided where adjacent to fire zone ISPH-FZ-1. The automatic wet pipe suppression system provided on both sides of the east boundary is sufficient to preclude conflagration through the zone boundary. The boundary penetrations are not required to be sealed. Combustible loadings on either side of the non-rated east boundary are identified in the analysis for each of the following fire zones:

ISPH-FZ-3, ISPH-FZ-1 and ISPH-FZ-2

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated/A1	A1	A3	A1	A2	A1

Doors:

Entrance to this fire zone is through a Class A roll-up door* on the south wall. Two door openings are provided for access for fire zone ISPH-FZ-2 and two Class A doors* (one personnel and one roll-up) are provided for access to fire zone ISPH-FZ-1.

*Not Maintained.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown equipment is located in this fire zone See Attachment 3-6.

Safe Shutdown Repairs:

None

4.6.3.2 Analysis

The combustibles in this area consist of minor amount of cable insulation, lube oil and transient materials. The fire loading is low. Fire protection for this area consists of an automatic wet pipe sprinkler system and portable fire extinguishers. In addition, portable fire extinguishers are available in adjacent fire zones. Hose protection is available from yard a hydrant located outside the building. Thermal detectors are located in the exhaust ductwork of each screen house air handling unit as shown on drawing 1-FHA-046. The zone is further subdivided by reinforced concrete walls provided with Class A roll-up* and personnel doors*.

*Not Maintained.

Exemptions:

Manual operation to establish portable ventilation; manual operation of valve in lieu of protection of instrument air supply. See Section 3.14 for details.

4.6.3.3 Conclusion

Due to the limited amount of combustible material in this fire zone, and the features described, existing fire protection for this zone is considered adequate.

4.6.4 Fire Area ISPH-FA-2

4.6.4.1 Fire Area Boundary Construction Features

Building: El.: 308'

Intake Screen and Pump House

Fire Area Name: Diesel Fire Pump Room

Length: 27.5ft.

Width: 15 ft.

Height: Area (approx): 412 ft²

Drawing: 1-FHA-46

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: <2 hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete, non-fire Rated*

South - Reinforced Concrete - Rated

East - Reinforced Concrete, non-fire Rated*

West - Reinforced Concrete, non-fire Rated*

Ceiling:

Reinforced Concrete, non-fire Rated*

Floor:

Reinforced Concrete, non-fire Rated, intake pit located below floor.

* No adjacent fire area or zone

Doors:

Entrance to this fire area is through an unrated door on the east wall.

Penetrations:

Penetrations through the south wall of this fire area are sealed with three hour fire seals. No other penetrations through walls, the floor or ceiling are fire sealed.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown components located within this fire area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.6.4.2 Analysis

The combustibles in this zone consist primarily of diesel fuel oil, lube oil and transients. The fire loading is medium. The fire barrier on the south wall of this fire area is adequate to contain a postulated fire in this area and prevent the spread of fire to adjacent fire zones ISPH-FZ-1 and 2. Fire protection for this area consist of an automatic wet pipe sprinkler system and a portable fire extinguisher. In addition, hose protection is available from yard a hydrant located outside the building.

4.6.4.3 Conclusion

The fire loading in this zone is medium, however, based on the features described, existing fire protection for this area is considered adequate.

Fuel Handling Building

Building: FUEL HANDLING BUILDING

Elev.: 281' through 400'

Length: 70 ft.

Width: 168 ft.

Height: 119 ft.

Area: (See Each Zone)

Drawings: 1-FHA-026, 027, 028, 029, 030, 031, 033, 034, 035, 036, 037 and 038.

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: ____ hours

Design Rating: 3 hours

The Fire Area Boundary Components Are As Follows:

Walls:

North - Reinforced Concrete

South - Reinforced Concrete

East - Reinforced Concrete

West - Reinforced Concrete

Ceiling:

Reinforced Concrete

Floor:

Reinforced Concrete

Doors:

Access to this building is described under the construction features for each fire area and zone.

The fuel handling building is used for receiving, storing, preparation, handling and transfer of fuel. Elevation 281 is used as the principle circuit routing to and from containment.

4.7.1 Fire Zone FH-FZ-1

4.7.1.1 Building: FUEL HANDLING BUILDING Elev.: 281'

Fire Zone Name: Fuel Handling Building Basement

Length: 54 ft.

Width: 144 ft.

Height: 23 ft.

Area: 6,805 ft²

Drawings: 1-FHA-026

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. Most of the east boundary is not adjacent to any other plant area except for a three-hour rated fire barrier where adjacent to zone IB-FZ-8, which contains a non-rated steel door, and a non-fire rated boundary where adjacent to FH-FZ-6. A raceway, which runs through the east wall to fire area CB-FA-1 in the east boundary of zone FH-FZ-1, is sealed to a three-hour fire rating. The north boundary is adjacent to the Reactor Building, which is a three-hour fire rated barrier. Containment penetrations do not have a specific fire rating due to overriding nuclear considerations, however their construction is adequate to prevent the spread of fire to the Reactor Building. The south and west boundary is adjacent to fire zones AIT-FZ-1, AIT-FZ-1a, AB-FZ-3, AB-FZ-4 and AB-FZ-5. An open passage exists between this zone and zone AB-FZ-5 and the boundary between this zone and zone AB-FZ-4 does not consist of wall construction; the boundaries adjacent to AB-FZ-3 and AIT-FZ-1 also contain unprotected openings, however, this zone (FH-FZ-1) is equipped with an automatic wet pipe sprinkler system, therefore the boundaries are each classified as an A2 boundary. The north and south boundary of the ventilating duct chase, which extends vertically, is penetrated where adjacent to FH-FZ-2 on elevation 305' - 2". The south boundary of the ventilating duct chase is penetrated where adjacent to FH-FZ-3 on elevation 329'-0". The boundaries of this ventilation duct where they interface with FH-FZ-2 and FH-FZ-3 are classified as B3 walls. The elevator shaft at the south end is also classified as B3. No additional modifications are required because the required train B cables in FH-FZ-2 are located more than 50 feet from this wall; and MU-V-20 located in FH-FZ-2 is not utilized for shutdown during a fire in FH-FZ-1, while the cables for the redundant equipment in FH-FZ-1, although less than 50 feet away from this wall, are routed through areas equipped with a sprinkler system. Zone FH-FZ-3 contains circuits for IC-P-1B; while zone FH-FZ-1 contains circuits for IC-P-1A. No additional modification is required because the circuits for IC-P-1B are located more than 50 feet from this wall; while cables for IC-P-1A in zone FH-FZ-1 are routed through areas equipped with an automatic sprinkler system.

The west wall of this ventilation duct adjacent to AB-FZ-6 need not be sealed since FH-FZ-1 has an automatic suppression system and there is no continuity of combustibles from FH-FZ-1 to AB-FZ-6. The floor of this zone is not adjacent to any other plant area. The ceiling of this zone is adjacent to zone FH-FZ-2 and FH-FZ-4. Note that FH-FZ-4 is the fuel pool. Its boundary is not fire rated, but due to the nature of this zone, combustible loadings (combustible loading is on the operating floor between FH-FZ-2 and FH-FZ-4) are not compared to each other. Combustible loadings on either side of each zone boundary are identified in the analysis for each of the following fire zones:

FH-FZ-1, AB-FZ-3, AB-FZ-4, AB-FZ-5, FH-FZ-2 and AB-FZ-6

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated	*B3/A2	A1/A2/Rated	A2	A1	A2

*B3 classified where duct chase and elevator shaft is adjacent to FH-FZ-2 and FH-FZ-3.

Doors:

Entrance to this fire zone is through an open stairwell in the southwest corner of this zone, which provides access from zone FH-FZ-2. The west boundary is open to zones AB-FZ-4 and AB-FZ-5. The wall common to fire zone IB-FZ-8 contains a non-rated steel door.

Barriers Within Zone:

Rated fire barriers are provided for circuits ranging from a rating of 39 minutes (minimum required) to one hour. Rockbestos Fire Zone R cable is installed. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located in this zone, see Attachment 3-6

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.7.1.2 Analysis

The combustibles in this zone consist of pump lube oil, transient materials, and cable insulation. The fire loading is low. Fire protection for this zone consists of an automatic wet pipe sprinkler system which protects the entire floor and cable trays on elevation 281'-0", a fire hose station, ionization smoke detection which actuates alarms in the Control Room. Portable fire extinguishers and additional hose protection is provided in zones AB-FZ-1 and 5 as shown on drawing 1-FHA-026.

Exemptions:

Manual operation in lieu of cable protection; Rockbestos Fire zone R cable in lieu of one hour fire barriers; minimum 39 minute fire barrier rating for cable raceway fire barriers in lieu of a one hour rating; tray and conduit supports not fire proofed; unrated steel door in rated fire barrier; manual operation of valves in lieu of protection of instrument air supply; 20 ft. separation with intervening combustibles. See Section 3.14 for details.

4.7.1.3 Conclusion

Due to the low fire loading in this zone and the features described, existing fire protection for this zone is considered adequate.

4.7.2 Fire Zone FH-FZ-2

4.7.2.1 Building: FUEL HANDLING BUILDING Elev.: 305' and 306'

Fire Zone Name: Fuel Handling Building at Elevation 305'

Length: 150 ft.

Width: 50 ft.

Height: 21 ft.

Area: 6,631 ft²

Drawings: 1-FHA-027

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of concrete walls, floor and ceiling. The south boundary of this zone is three-hour fire rated except on the operating floor (348' elevation), which is common between TMI-1 and TMI-2. The rated portion of this boundary includes a class A fire door on elevation 305'. There is no redundant safe shutdown equipment separation provided by this door. The west boundary is

adjacent to fire zone AB-FZ-6, with two open passages between the zones. The boundaries between FH-FZ-2 and FH-FZ-4 (fuel pool) are reinforced concrete (no penetrations) except on the operating floor where no boundaries exist. The boundaries between FH-FZ-2 and FH-FZ-3 are reinforced concrete. These boundaries are not relied upon to separate redundant trains of equipment being relied on for safe shutdown. The east boundary of FH-FZ-2 in the Control Building patio is a three-hour fire rated barrier except where adjacent to zone FH-FZ-4 (concrete wall with no penetrations). The north boundary for the Reactor and Turbine Buildings is a three-hour rated fire barrier. Containment penetrations do not have a specific fire rating due to overriding nuclear considerations, however their construction is adequate to prevent the spread of fire to the Reactor Building. The north boundary adjacent to the duct chase (FH-FZ-1) is classified as B3. No additional modifications are required because the train B cables in FH-FZ-2 are located more than 50 feet from this wall; while the cables for the redundant equipment in FH-FZ-1, although less than 50 feet away from this wall, are routed through areas equipped with a sprinkler system.

The floor of this zone is adjacent to zone FH-FZ-1 (protected by an automatic wet pipe sprinkler system) and FH-FZ-2 is sprinklered above FH-FZ-6 and the Air Intake Tunnel. The remainder is not adjacent to any other plant area. The ceiling of this zone is adjacent to zones FH-FZ-3 (which does not contain redundant safe shutdown equipment) and FH-FZ-5. Note that the Control Building patio portion of FH-FZ-2 is provided with an automatic wet pipe sprinkler system where adjacent to FH-FZ-4, FH-FZ-5 and FH-FZ-6. The remainder of the ceiling is not adjacent to any other plant area. Combustible loadings on either side of each non-fire rated zone boundary are identified in the analysis for each of the following fire zones:

FH-FZ-2, AB-FZ-6, FH-FZ-4, FH-FZ-3, FH-FZ-5, FH-FZ-1 and FH-FZ-6

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
B3**/Rated	Rated	Rated	A1/B2	A1/A2	A1/A2*/B2
B2*	B2***				

*above 348'-0"

**B3 classified where adjacent to FH-FZ-1.

***where adjacent to FH-FZ-4

Doors:

Entrance to this fire zone is through a class A rated rollup fire door with a passage or egress door in it on the north wall of this zone which is adjacent to the Turbine Building. Class A rated fire doors are provided on the east wall of this zone, which is adjacent to the Control Tower. A Class A door on the south wall at elevation at 305'-1" of this zone (not maintained) is provided to separate this zone from the Unit 2 Fuel Handling Building. An opening is provided on the west wall of this fire zone, which is adjacent to zone AB-FZ-6 and a rolling concrete missile door on the west wall of this zone is provided at the railroad entrance. An open stairwell in the floor of this zone provides access to zone FH-FZ-1. Above elevation 348'-0" this zone is open to the Unit 2 Fuel Handling Building and to zone FH-FZ-4. Access to the air intake tunnel through a steel hatch is provided in the south end of this fire zone.

Barriers Within Zone:

One hour fire rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment located within this zone, see Attachment 3-6.

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.7.2.2 Analysis

Combustibles in this zone consist of cable insulation and transient materials. The fire loading is low. Fire protection in this zone consists of an automatic wet pipe sprinkler system on elev. 306 ft. of this zone adjacent to the Control Tower, and fire extinguishers. Hose protection for the 306 ft. elevation area of this fire zone is available in the Turbine Building outside the north wall of the zone. Additional hose protection is available near the open stairwell in zones FH-FZ-1 (elev. 281'-0") and zone FH-FZ-3 (elev. 329'-0"). Also portable fire extinguishers are available in zone AB-FZ-6 and area CB-FA-1 as shown on drawings 1-FHA-027, 1-FHA-026, 1-FHA-028 and 1-FHA-034.

Exemptions:

Detection and suppression does not cover entire fire zone; manual operation in lieu of cable protection; manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.7.2.3 Conclusion

Due to the limited amounts of combustible material in this zone and the features described, existing fire protection for this zone is considered adequate.

4.7.3 Fire Zone FH-FZ-3

4.7.3.1 Building: FUEL HANDLING BUILDING Elev.: 329'

Fire Zone Name: Fuel Handling Building at Elevations 329' and 331'

Length: 18 ft.

Width: 80 ft.

Height: 19 ft.

Area: 1,221 ft²

Drawings: 1-FHA-028

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls and a combination of grating and reinforced concrete for floors and ceilings. The west boundary consists of a three-hour rated fire barrier adjacent to AB-FZ-10. The north boundary is adjacent to a ventilating duct chase (FH-FZ-1) and as such, combustible loadings between FH-FZ-3 and FH-FZ-1 will not be compared to each other. This boundary is classified as a B3 wall. Zone FH-FZ-3 contains circuits for IC-P-1B; while zone FH-FZ-1 contains circuits for IC-P-1A. No modification is required because the circuits for IC-P-1B are located more than 50 feet from this wall; while cables for IC-P-1A in zone FH-FZ-1 are routed through areas equipped with an automatic sprinkler system. The east boundary is adjacent to the fuel pool (FH-FZ-4). A portion of the south boundary is adjacent to zone FH-FZ-2; the remainder being adjacent to an elevator shaft which is part of zone FH-FZ-1 (B3). The floor is adjacent to zone FH-FZ-2 and the ceiling is adjacent to zone FH-FZ-4. These boundaries are not relied upon to separate redundant trains of safe shutdown equipment on either side of the boundary.

Combustible loadings on either side of the non-fire rated zone boundaries are identified in the analysis for each of the following fire zones:

FH-FZ-3, FH-FZ-2, FH-FZ-1 and FH-FZ-4

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>		<u>Floor</u>		<u>Ceiling</u>	
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
B3	B2/B3	B2	Rated	B2	B2

Doors:

Entrance to this fire zone is through a class A rated door on the west wall and through an unrated door on the south wall.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown equipment contained within this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.7.3.2 Analysis

Combustibles in this zone consist of cable insulation. The fire loading is low. Fire protection for this zone consists of a fire hose station as shown on drawing 1-FHA-028. Additional hose protection as well as portable fire extinguishers are available in AB-FZ-10 as shown on drawing 1-FHA-028.

Exemptions:

Manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.7.3.3 Conclusion

Due to the limited amount of combustible material in this zone and the features described, existing fire protection for this zone is considered adequate.

4.7.4 Fire Zone FH-FZ-4

4.7.4.1 Building: FUEL HANDLING BUILDING Elev.: 305' and 348'
Fire Zone Name: Fuel Handling Building at Elevations 329', 331' and 348'
Length: 24 ft. Width: 104 ft.
Height: 95 ft.
Area: 4,855 ft²

Drawings: 1-FHA-028 and 029

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls and ceiling except on the operating floor where no physical construction exists on the south boundary between this zone and zone FH-FZ-2; however, combustibles in FH-FZ-2 are concentrated on elevation 305, not on the operating floor, and this boundary is not relied upon to separate redundant trains of safe shutdown equipment from each other. Boundary construction and combustible loading is only discussed on the operating floor as the area below the operating floor for this zone is the fuel pool. A portion of the floor over zone FH-FZ-3 consists of reinforced concrete and grating. This boundary is not relied upon to separate redundant trains of safe shutdown equipment from each other. A portion of the south boundary is adjacent to an elevator shaft (FH-FZ-1) and as such, combustible loading comparison between FH-FZ-4 and FH-FZ-1 will not be made. Most of the south boundary on the operating floor is a large high bay area open to the TMI-2 fuel handling building elevation 348'. The east boundary of this zone is adjacent to zone FH-FZ-5 and is a B2 category wall.

The west boundary of this zone is a three hour rated fire barrier. The ceiling and the north boundary are not adjacent to any other plant area. Two ventilation duct penetrations in the north wall at elevation 376' and 380' are provided with 3-hour fire rated fire dampers. Combustible loadings on either side of the non-fire rated zone boundaries are identified in the analysis for each of the following fire zones:

FH-FZ-4, FH-FZ-3, FH-FZ-5, FH-FZ-2 and TMI-2 operating floor.

The principal combustible in this zone is lube oil in negligible quantities. The lack of a fire damper in the east boundary of this zone (B2 Classification) is not considered critical even though the loading in adjacent zone FH-FZ-5 is greater than 40,000 BTU/Ft² as combustibles in FH-FZ-5 are concentrated approximately 30 feet below the duct penetration.

The above discussion provides the basis for establishing the boundary

classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
A1	B2	B2	Rated	**B2/B1	A1

**Fuel pool where not adjacent to FH-FZ-3.

Doors:

Entrance to this fire zone is via the open stairwell on the south boundary to the zone or via the elevator.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown equipment is contained within this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.7.4.2 Analysis

The combustibles in this zone consist of transient materials, and lube oil. The fire loading is low. Fire protection in this zone consists of portable fire extinguishers and a fire hose station as shown on drawings 1-FHA-029.

Exemptions:

Manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.7.4.3 Conclusion

Due to the limited amount of combustible material in this zone, and the features described, existing fire protection for this zone is considered adequate.

4.7.5 Fire Zone FH-FZ-5

4.7.5.1 Building: FUEL HANDLING BUILDING Elev.: 322' and 380'

Fire Zone Name: Control Bldg. Patio Area

Length: 121 ft.

Width: 20.4 ft.

Height: 80 ft.

Area: 2,468 ft²

Drawings: 1-FHA-034, 035, and 036

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <2 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Note: This fire zone covers four elevations, 322'-0", 338'-6", 355'-0" and 380'-0". Each elevation floor except elevation 322'0" consists of steel grating.

An instrument shop is located on the south side of elevation 355'-0" of this fire zone. Two means of egress are provided consisting of a stair tower and intercommunicating stairway. The north stair tower is a one hour rated enclosure, but is separated from the new facility by full height walls. The construction is non-combustible (structural steel, metal studded walls and partitions with gypsum wall board. Except for the fire rated stairwell, structural steel is not required to be fireproofed as the walls and floors of the facility are not fire barriers.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north and south boundaries are three-hour fire rated barriers. The west boundary is adjacent to fire zones FH-FZ-2 and FH-FZ-4 and is a B2 category where adjacent to FH-FZ-4. The east boundary is a three-hour rated fire barrier except on elevation 380' where adjacent to zones CB-FZ-5a and CB-FZ-5b. A major portion of the east boundary where adjacent to CB-FZ-5a and 5b consists of reinforced concrete. The wall of CB-FZ-5a and CB-FZ-5b does not separate redundant safe shutdown equipment and is considered a B2 category. This zone boundary analysis is considered valid even though the combustible loading in FH-FZ-5 exceeds 40,000 BTU/sq.ft. because the concentrations of class A combustibles are situated on elevation 355'-0"; combustibles in cable tray are situated primarily at elevation 350' and the remainder of combustibles are located below El. 350' (Instrument Shop & Repair Facilities). In addition, the east boundary where adjacent to fire area CB-FA-3d has six ventilated (passive) bus ducts (each 6"x8 1/2") which are externally sealed at the barrier to a three hour rating and are controlled as such. These small openings in the rated barrier supported by the detection and suppression systems in CB-FA-3d, do not degrade the ability of the barrier to confine a fire. The bus ducts were found acceptable in NRC SER dated

12/30/1986 (5211-86-3333), Section 10.0, page 20, item f., paragraph 4 of 5. Stainless steel tubes which penetrate the east wall of this fire zone (where adjacent to CB-FA-2C & CB-FA-3C) are sealed around the periphery to a three hour fire rating. The tubes are an integral part of the incipient fire detection system for Control Building fire areas CB-FA-2B, CB-FA-2C, CB-FA-2D, CB-FA-2E, CB-FA-2F, CB-FA-2G, CB-FA-3A, CB-FA-3B). They are not sealed internally even though they transition to nylon tubing inside this fire zone. Tubing has been evaluated as acceptable in this configuration. (Ref. FPE-T1-417109-003). The floor is adjacent to zone FH-FZ-2, however, FH-FZ-2 is provided with an automatic wet pipe sprinkler system where adjacent to FH-FZ-5. The ceiling is not adjacent to any other plant areas. Combustible loadings on either side of non-fire rated zone boundaries are identified in the analysis for each of the following fire zones:

FH-FZ-5, FH-FZ-2, FH-FZ-4, CB-FZ-5a, and CB-FZ-5b

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated	Rated	Rated/B2**	B1/B2	A2	A1

**B2 at FH-FZ-4, CB-FZ-5a, CB-FZ-5b

Doors:

Entrance to this fire zone is as follows:

Elevation 322'-0"	- Three class A rated doors on the east wall
Elevation 338'-6"	- Two class A rated doors and one class B rated door on the east wall
Elevation 355'-0"	- One class A rated door and one class B rated door on the east wall
Elevation 380'-0"	- One class B rated door and two open wall sections in the east wall

Barriers Within Zone:

3 hour fire rated barriers are provided for circuits. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown components located in this zone See Attachment 3-6

Safe Shutdown Repairs:

For safe shutdown repairs, see Attachment 3-7C.

4.7.5.2 Analysis

The combustibles in this zone consist of cable insulation, transient and stored materials. The fire loading is medium due to the office facility.

Fire protection for this zone consists of two fire hose stations on each elevation except elevation 380'-0" which is provided with one fire hose station. Portable fire extinguishers are located on elevations 322'-0", 338'-6, and on elevation 355'-0". Additional portable fire extinguishers are provided inside the stairwell on elevation 380'-0" as shown on drawings 1-FHA-035 and 1-FHA-036. The Instrument Shop and office facilities are provided with a combination of area and HVAC duct smoke detectors.

Exemptions:

Manual operation in lieu of cable protection. See Section 3.14 for details.

4.7.5.3 Conclusion

Based on the medium combustible loading in this zone, and the features described, existing fire protection for this zone is considered adequate.

4.7.6 Fire Zone FH-FZ-6

4.7.6.1 Fire Zone Boundary Construction Features

Building: FUEL HANDLING BUILDING

Elev.: 285'

Fire Zone Name: Chiller Room

Length: 44.8 ft.

Width: 20.4 ft.

Height: 20 ft.

Area: 914 ft²

Drawing: 1-FHA-034

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading: <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The east boundary is a three-hour rated fire barrier. The north and south boundaries are not adjacent to any other plant areas. The west boundary is adjacent to fire zone FH-FZ-1 which is provided with an automatic wet pipe sprinkler system. The floor is not adjacent to any other plant areas. The ceiling is adjacent to zone FH-FZ-2 which is provided with an automatic wet pipe sprinkler system. Combustible loadings on either side of each non-fire rated zone boundary are identified in the analysis for each of the following fire zones:

FH-FZ-6, FH-FZ-2 and FH-FZ-1

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
A1	A1	Rated	A2	A1	A2

Doors:

Entrance to this fire zone is through a class A rated door located on the east wall of this zone via the stairwell.

Barriers Within Zone:

Rated fire barriers are provided for circuits ranging from a rating of 39 minutes (minimum required) to one hour. See Attachment 3-1 for details.

Safe Shutdown Components:

For safe shutdown equipment is located in this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.7.6.2 Analysis

The only combustible in this zone is lube oil and cable insulation and thermolag. The fire loading is low. Fire protection for this zone consists of ionization smoke detection throughout with alarms to the Control Room, an automatic wetpipe sprinkler system which protects the entire zone and alarms in the Control Room, a portable fire extinguisher located in the stairwell as shown on drawing 1-FHA-034

- South - Reinforced Concrete and metal siding, all of which is non-fire rated - elevation 322' - enclosure of switchgear two hour rated (not maintained). Adjacent Turbine Building Addition TB-FA-2, Operations Office Building, North wall is 3 hour rated.
- East - Reinforced Concrete and metal siding, all of which is non-fire rated. A portion of the wall adjacent to the auxiliary and main transformers is considered as fire rated for insurance purposes.
- West - Three hour rated barriers consist of: Reinforced Concrete adjacent to Intermediate Building
Reinforced Concrete adjacent to Reactor Building
Reinforced Concrete adjacent to Fuel Handling Building
Reinforced Concrete adjacent to Control Building

Roof:

Built-up roofing – non-fire rated

Floor:

Reinforced concrete and steel grating – non-fire rated - except over IB-FZ-8

Columns:

Exposed Structural Steel

Beams:

Exposed Structural Steel

Doors:

Entrance to the Turbine from the Service, Control, Fuel Handling and Intermediate Buildings is through three hour rated walls with Class A rated doors except for the personnel access hatch to the Reactor Building. Due to overriding nuclear considerations, this door is not labeled, however its construction is adequate to prevent the spread of fire to the Reactor Building. All other entrances (grade level) through non-fire rated walls in the Turbine Building are unlabeled.

Penetrations:

All penetrations through three hour rated walls and floors are sealed with three hour fire seals. Containment penetrations do not have specific fire ratings due to overriding nuclear considerations, however, their construction is adequate to prevent the spread of fire to the Reactor Building. There are several passively ventilated bus ducts, which penetrate the west wall (3 hour rated). These bus ducts are sealed around the outside periphery to a 3 hour rating. The internals are sealed to prevent the passage of smoke and hot gases. These penetrations are

described in the fire hazards analysis for fire areas CB-FA-2a and 3a. No other penetrations through remaining walls, the floors or the roof of the Turbine Building are fire sealed except for the floor slab over the alligator pit (IB-FZ-8). Some penetrations are sealed (for insurance purposes) in the east wall adjacent to the main and auxiliary transformers.

The Turbine Building houses the turbine generator and its auxiliaries as shown on the following drawings 1-FHA-002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015, 016, 040, 042, and 043.

For the purposes of analysis, the building is considered to be one fire area.

Barriers Within Area:

None

Safe Shutdown Components:

For safe shutdown components in this area, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.8.2

Analysis

The walls separating the Turbine Building from adjacent buildings have a 3 hour fire barrier rating, with the exception of unlabeled doors, passively ventilated bus ducts and penetrations to the Reactor Building which are of sufficient construction to prevent the spread of fire.

The combustibles in the Turbine Building consist of cable insulation, lube oil, and transient materials. The total combustible inventory is to be determined, and is assumed as high for the purposes of conservative analysis. The following fire protection features are provided: Ref. drawings 1-FHA-002, 003, 004, 005, 006, 007, 040, 041, and 042.

A. Fire Suppression Systems

1. Automatic Wet Pipe Sprinklers

- a. Elevation 305'-0" - entire elevation except the area between columns 6-8b and G-H₃
- b. Elevation 322'-0" - entire elevation except the Switchgear Room, which has ionization detection.

- c. Elevation 355'-0" - extension of el. 322'-0" system to turbine walkway platform enclosure (valves closed, system normally dry, manual actuation by opening valves).
- 2. Automatic Deluge Water Spray - actuated by a thermal detection system (specific hazard protection within the sprinklered areas)
 - a. Elevation 305'-0" - Main turbine oil reservoir and oil conditioner located at the north end of the turbine pedestal.
 - b. Elevation 305'-0" - Feedwater pump turbine oil reservoir on west side of the turbine pedestal including the feedwater pump turbines at elevation 322'-0".
 - c. Elevation 305'-0" - Generator Hydrogen Seal Oil unit under the east side of the turbine pedestal.
- 3. Manually Actuated Preaction Systems - Thermal detectors indicate fires.
 - a. Elevation 322'-0" - Turbine feedwater pump bearings
 - b. Elevation 355'-0" - Main turbine bearings
- 4. Curtain wall and transformer deluge system.

B. Hose Stations

Fixed hose stations are provided on all elevations of the Turbine Building.

C. Portable Fire Extinguishers

Portable fire extinguishers are provided on all elevations of the Turbine Building.

D. Ventilation

880,000 cfm is available for smoke removal capability (unprotected).

Exemptions:

Manual operation in lieu of protection for cables, valves and main feedwater pumps; fire detection and suppression does not cover entire fire area; manual operation of valves in lieu of protection of instrument air supply. See Section 3.14 for details.

4.8.3 Conclusion

The results of the analysis indicate that sufficient barrier protection is provided to prevent fires in the turbine building from spreading to adjacent buildings. Although containment penetrations and passively ventilated bus ducts are not specifically fire rated, and the personnel access hatch to the Reactor Building is unlabeled, their construction is adequate. Due to the fixed fire suppression systems, which protect and mitigate the hazards considered to contribute to the assumed high combustible loading, and the features described, existing fire protection for the area is considered adequate.

4.9 **Air Intake Tunnel**

An air intake tunnel is provided to admit outside air to TMI-1 and is shown on drawings 1-FHA-025,026,032 and 033. The tunnel is designed to provide adequate separation between TMI-1 and the outside air intake in the event of a hypothetical aircraft incident as described in the FSAR.

The air intake tunnel is constructed of reinforced concrete. It is located southwest of TMI-1 and connects to the auxiliary building and fuel handling building. Except for the intake structure, the tunnel is located underground.

For purposes of analysis, the air intake tunnel was considered as two fire zones, AIT-FZ-1 and AIT FZ-1a.

4.9.1 Fire Zone AIT-FZ-1

4.9.1.1 FIRE ZONE BOUNDARY CONSTRUCTION FEATURES

Building: AIR INTAKE TUNNEL Floor Elev.: 305' and below

Fire Zone Name: AIR INTAKE TUNNEL (NORTH SIDE)

Area: 4,877 ft²

Length: 91'

Width: Variable

Height: Variable

Drawing: 1-FHA-026

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor, and ceiling. The north boundary is adjacent to AB-FZ-5. The east boundary is adjacent to FH-FZ-1. The south boundary is adjacent to AIT-FZ-1a. A portion of the ceiling is adjacent to fire zone FH-FZ-2. Fire zone AIT-FZ-1 is equipped with automatic halon explosion suppression systems actuated by ultraviolet or pressure detectors, and automatic deluge water systems activated by thermal detectors or by actuation of the halon suppression systems. The west boundary and the floor are not adjacent to any other plant area. Combustible loadings on either side of each zone boundary are identified in the analysis for each of the following fire zones:

AIT-FZ-1, AIT-FZ-1a, AB-FZ-5 and FH-FZ-1

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below.

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
Rated*	A3	A2	A1	A1	A2

Doors:

Access to the above ground entrance of this zone is not fire rated. Entrance through the steel plate floor of fire zone FH-FZ-2 is unrated.

*No fire damper in duct through wall common to AB-FZ-5.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown components located in this zone, see Attachment 3.6.

Safe Shutdown Repairs:

None

4.9.1.2 Analysis

The fire loading is low. Although no appreciable amount of combustible material is present in the zone, fire protection is provided to prevent the spread of fire along the air intake tunnel in the event of the hypothetical aircraft incident. This fire protection consists of four automatic Halon explosion suppression systems actuated by ultraviolet or pressure detectors, and three automatic deluge water system activated by thermal detectors or by actuation of the halon suppression systems.

Exemptions:

None

4.9.1.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection for this zone is considered adequate.

4.9.2 Fire Zone AIT-FZ-1a

4.9.2.1 FIRE ZONE BOUNDARY CONSTRUCTION FEATURES

Building: AIR INTAKE TUNNEL

Floor Elev.: 305' and below

Fire Zone Name: AIR INTAKE TUNNEL (SOUTH SIDE)

Area: 3,272 ft²

Length: 148'

Width: 17'

Height: 20'

Drawing: 1-FHA-026

Fire Zone Boundaries:

Fire Zone Boundary Barrier Ratings:

Fire Loading <1 hours

Design Rating: - hours

The Fire Zone Boundary Components Are Evaluated As Follows:

Zone boundaries consist of reinforced concrete walls, floor, and ceiling. The north boundary is adjacent to AIT-FZ-1 and FH-FZ-1. The east boundary is adjacent to FH-FZ-2. A portion of the ceiling is adjacent to FH-FZ-2. Fire zone AIT-FZ-1a is equipped with automatic halon suppression systems activated by ultraviolet or pressure detectors, and automatic deluge water systems activated by thermal detectors or by actuation of the halon suppression systems. The south and west boundaries as well as the floor and the remainder of the ceiling are not adjacent to any other plant area. Combustible loadings on either side of each zone boundary

are identified in the analysis for each of the following fire zones:

AIT-FZ-1a, AIT-FZ-1, FH-FZ-2 and FH-FZ-1

The above discussion provides the basis for establishing the boundary classification in accordance with the zone boundary analysis criteria. The classification of each boundary in this zone is presented below:

<u>Walls</u>				<u>Floor</u>	<u>Ceiling</u>
<u>North</u>	<u>South</u>	<u>East</u>	<u>West</u>		
A3/A2	A1	A2	A1	A1	*A2/A1

*Where adjacent to FH-FZ-2.

Doors:

Access to the above ground entrance of this zone is not fire rated. Entrance through the steel plate floor of fire zone FH-FZ-2 is unrated.

Barriers Within Zone:

None

Safe Shutdown Components:

For safe shutdown components located in this zone, see Attachment 3-6.

Safe Shutdown Repairs:

None

4.9.2.2 Analysis

The fire loading is low. Although no appreciable amount of combustible material is present in the area, fire protection is provided to prevent the spread of fire along the air intake tunnel in the event of the hypothetical aircraft incident. This fire protection consists of multiple automatic Halon explosion suppression systems actuated by ultraviolet or pressure detectors, and multiple automatic deluge water systems activated by thermal detectors, or by actuation of the Halon suppression systems.

Exemptions:

None

4.9.2.3 Conclusion

Due to the low fire loading in this zone, and the features described, existing fire protection for this zone is considered adequate.

4.10 **Radwaste Storage Facility**

A Radwaste Storage Facility is used for staging (storage) of low level solid or solidified radioactive waste packages from TMI. The building is a pre-engineered metal building on a concrete floor slab with shielding partitions of grout-filled and/or solid block concrete masonry units used to satisfy dose rate criteria.

The facility is located southeast of TMI-1 or directly east of TMI-2 cooling tower No. 2. It is not located within 50 feet of any safety related structure.

4.10.1 Fire Area RWSF-FA-1

FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: Radwaste Storage Facility Elev: 302'-0"

Fire Area Name: Radwaste Storage Facility

Length: 143 ft. Width: 62 ft.

Height: Approx. 30 ft.

Area: Approx. 8900 ft.²

Drawing: No Fire Area Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: Not tracked

Design Rating: None

The Fire Area Boundary Components Are as Follows:

Walls:

North - Steel Frame Metal Panel Const/Solid Black - non fire rated.

South - Steel Frame Metal Panel Const/Solid Block - non fire rated.

East - Solid Block/Open - non fire rated.

West - Steel Frame Metal Panel Const/Solid Block - non fire rated.

Ceiling:

Steel Frame Metal Deck

Floor:

Concrete Slab

Doors:

Non-rated

Penetrations:

N/A

Barriers Within Area:

None

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.10.2 Analysis

This facility stages/stores low level radwaste for shipment. No forced ventilation is provided as the building is unheated and open to the outside. There are no fire detection/suppression systems within the facility. Hydrants located south and west of the facility are available for fire fighting.

No open combustible storage and no combustible containers are permitted in the facility. Any combustible material is stored in metal containers; therefore there is no effective fire load.

4.10.3 Conclusion

Due to the restrictions on combustible storage, automatic detection and suppression in the facility is not required. Manual fire fighting capability is available from nearby hydrants in the remote event of a fire. This is considered adequate fire protection for the facility.

4.11 **Waste Handling and Packaging Facility**

A Waste Handling and Packaging Facility is used for preparation of low level radwaste for eventual shipment offsite. The building is a combination solid concrete block/poured concrete structure with a steel frame metal panel roof.

The facility is located south of TMI-1 or directly south of TMI-2 cooling tower No. 2. It is not located within 50 feet of any safety related structure.

4.11.1 Fire Area WHPF-FA-1

4.11.1.1 FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: Waste Handling Packaging Facility Elev.: 302'0"

Fire Area Name: Office & Equipment Area

Length: 56 ft.

Width: 18 ft.

Height: Approx. 15 ft.

Area: 1000 ft.²

Drawing: No Fire Area Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Area Boundaries

Fire Area Boundary Barrier Ratings:

Fire Loading: Not Tracked. Load consists of Class A combustibles (furniture & office supplies), and flammable liquids, and electrical equipment.

Design Rating: 3 Hours (west wall)

The Fire Area Boundary Components are as Follows:

Walls:

North - Solid block - non-fire rated

South - Solid block - non-fire rated

East - Concrete - 3 hr. rated

West - Solid block - non-fire rated

Ceiling:

False ceiling, negligible combustibles above false ceiling. Roof is steel frame metal construction (FM Class 1).

Floor:

Concrete slab.

Doors:

None rated except for Class B labeled door in east wall to WHPH-FA-2

Penetrations:

All penetrations through the east wall of this fire area are sealed with three hour rated seals. Ventilation duct penetrations through this wall are provided with 3 hour rated fire dampers. Remaining boundaries are not maintained as rated boundaries.

Barriers Within Area:

Area is compartmentalized but no interior walls are rated.

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.11.1.2 Analysis:

The combustibles in the area consist primarily of Class A combustibles with minor amounts of flammable liquids. The fire loading is low. Fire protection for this area consists of an area wide automatic pre-action system actuated by an automatic detection system, which alarms locally and in the TMI-1 control room. Detection consists of heat and smoke detectors. Hose protection is provided outside this area from nearby yard hydrants. Portable fire extinguishers are provided in this area as well as adjacent area WHPF-FA-2.

4.11.1.3 Conclusion:

The results of the analysis indicate that the boundaries of this fire are adequate to contain a potential fire. The fire protection features for this area are considered adequate.

4.11.2 Fire Area WHPF-FA-2

4.11.2.1 FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: Waste Handling Packaging Facility Elev.: 302'-0"

Fire Area Name: Waste Handling Area
Length: 56 ft. Width: 40 ft.
Height: Approx. 15 ft.
Area: 2240 ft²

Drawing: No Fire Are Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Area Boundaries

Fire Area Boundary Barrier Ratings

Fire Loading: Not tracked. Load consists of Class A combustibles and compressed gas cylinders electrical equipment.

Design Rating: 3 Hours (west wall).

The Fire Area Boundary Components are as follows:

Walls:

North - Solid block – non-fire rated
South - Solid block – non-fire rated
East - Solid block - non-fire rated
West - Concrete - 3 hr. rated

Ceiling:

Steel frame metal construction (FM Class 1)

Floor:

Concrete Slab

Doors:

Non rated except for Class B labeled door in west wall to WSPH-FA-1.

Penetrations:

All penetrations through the west wall of this fire area are sealed with three hour rated seals. Ventilation duct penetrations through this wall are provided with 3 hour rated fire dampers. Remaining boundaries are not maintained as rated boundaries.

Barriers Within Area:

Area is compartmentalized but no interior walls are rated.

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.11.2.2 Analysis:

The combustibles in the area consist of primarily of Class A combustibles, compressed gas (oxygen & acetylene) cylinders, and minor amounts of flammable and combustible liquids. The fire loading is low. Fire protection for this area consists of an area wide automatic preaction system actuated by an automatic detection system which alarms locally and in the TMI-1 Security Processing Center. Detection consists of heat and smoke detectors. Hose protection is provided outside this area from nearby yard hydrants. Portable fire extinguishers are provided in this area as well as adjacent area WHPF-FA-1.

4.11.2.3 Conclusion:

The results of this analysis indicate that the boundaries of this fire area are adequate to contain a potential fire. The fire protection features for this area are considered adequate.

4.12 Chemical Cleaning Building

A Chemical Cleaning Building for periodic processing of liquid low level radwaste is located to the east of the TMI-1 fuel handling building. It is not located within 50 feet of any safety related structure.

4.12.1 Fire Zone CCB-FZ-1

4.12.1.1 FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: Chemical Cleaning Building Elev.: 304'-0"
Fire Zone Name: Chemical Cleaning Building
Length: 52 ft. Width: 57 ft.
Height: 52 ft.
Area: 2913 ft²

Drawing: No Fire Area Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Zone Boundaries

Fire Zone Boundary Barrier Ratings

Fire Loading: <1 hour

Design Rating: None

The Fire Zone Boundary Components Are as Follows:

Walls:

North - Concrete/steel frame; metal panel - non-fire rated
South - Concrete/steel frame; metal panel - non-fire rated
East - Concrete - non-fire rated
West - Concrete/steel frame; metal panel - non-fire rated

Ceiling:

Steel Frame Metal Deck

Floor:

Concrete Slab

Doors:

Not rated

Penetrations:

N/A

Barriers Within Area:

Zone is compartmentalized but no walls are rated.

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.12.1.2 Analysis:

The combustibles in this zone consist of cable insulation, electrical equipment and minor amounts of Class A combustibles. The fire loading is low. Fire protection for this zone consists of an area detection system, which alarms locally and with TMI-1 security. A hose station is provided on the platform at elevation 317'-6". Additional hose protection is available from a nearby yard hydrant. Portable fire extinguishers are provided in this zone as well as adjacent fire zone CCB-FZ-2.

4.12.1.3 Conclusion:

The boundaries of this fire zone are adequate to contain a postulated fire. Any liquid released due to a fire would be contained within the building. The existing features of construction and fire protection/detection features are considered adequate.

4.12.2. Fire Zone CCB-FZ-2

4.12.2.1. FIRE AREA BOUNDARY CONSTRUCTION FEATURES

<u>Building:</u> Chemical Cleaning Building	<u>Elev.:</u> 305'-0"
<u>Fire Zone Name:</u> Air Filtration Room	
<u>Length:</u> 57 ft.	<u>Width:</u> 22'
<u>Height:</u> 13 ft.	
<u>Area:</u> 1193 ft ²	

Drawing: No fire area layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Zone Boundaries

Fire Zone Boundary Barrier Ratings

Fire Loading: <1 hour

Design Rating: None

The Fire Zone Boundary Components are as follows:

Walls:

North - Concrete - non-fire rated

South - Concrete - non-fire rated

East - Concrete - non-fire rated

West - Concrete - non-fire rated

Ceiling:

Steel Frame Metal Deck

Floor:

Concrete Slab

Doors:

Not rated

Penetrations:

N/A

Barriers With Area:

None

Safe Shutdown Components:

None

Safe Shutdown Components:

None

4.12.2.2 Analysis:

The combustibles in this zone consist primarily of cable insulation, a hydrogen peroxide liquid bin (about 300 gallons) and charcoal in the filtration unit. The fire loading is low. Fire Protection for this zone consists of an area detection system which alarms locally and with TMI-1 Security. Thermal detection and a manually actuated deluge system is provided for the charcoal filter. Portable fire extinguishers are provided at the entrances to this room. Adjacent fire zone CCB-FZ-1 is provided with a hose reel and portable extinguishers. Additional hose protection is available from a nearby yard hydrant.

4.12.2.3 Conclusion:

The boundaries of this zone are adequate to contain a postulated fire. The existing features of construction and fire protection/detection features are considered adequate.

4.13 **Station Blackout (SBO) Diesel Generator Bldg.**

A station blackout diesel generator is located in the former TMI-2 Diesel Generator Building. The primary purpose is to insure that electrical power is available to TMI-1 in the event of a Station Blackout. Note that the fire area for the SBO Diesel Generator encompasses both the SBO Diesel Generator and the unused Diesel Generator.

4.13.1 Fire Area SBO-FA-1

4.13.1.1. FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: SBO Diesel Generator Bldg.

Fire Area Name: SBO Diesel Generator

Length: 103 ft

Width: 70 ft.

Height: 50 ft.

Area: 7200 ft²

Drawing: No Fire Area Layout is maintained for this fire area. Fire pre-plan drawings are considered adequate.

Fire Area Boundaries

Fire Area Boundary Barrier Ratings:

Fire Loading: <1 hour

Design Rating: 3 hours

The Fire Area Boundary Components Are as Follows:

Walls: *

North - Reinforced Concrete, non-fire rated*

South - Reinforced Concrete, 3 hour rated

East - Reinforced Concrete, 3 hour rated

West - Reinforced Concrete, non-fire rated*

* Exterior walls are of substantial construction with some openings. Based on the construction and automatic fire suppression systems, these barriers are treated as fire rated for insurance purposes and provide adequate protection during periods when temporary fire exposures may be present in the yard.

Ceiling:

Reinforced Concrete, non-fire rated*

Floor:

Reinforced Concrete, non-fire rated*

* No adjacent fire area or zone.

Doors:

"A" labeled door at entrance in east wall at 305'. "A" labeled door on south wall.

Penetrations:

Penetrations through the east and south walls of this fire area are sealed with three hour fire seals with exception of unsealed openings provided for valve reach rods. Penetrations through the ceiling on elevation 280' where adjacent to the SBO Diesel Fuel Oil Tank Room (SBO-FA-2) are sealed with three hour fire seals. No other penetrations through walls, the floor or ceiling are fire sealed.

Barriers Within Area:

Area is compartmentalized to separate electrical equipment and battery rooms but none of these walls is rated or maintained as such.

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.13.1.2 Analysis

The combustibles in the area consist of cable insulation, electrical equipment and fuel oil. The fire loading is low. The fire barriers adjacent to the TMI-2 Fuel Handling Area and the diesel generator fuel oil tank room (only one tank filled), are adequate to contain a postulated fire in this area. Fire Protection for this area consists of an automatic wet pipe sprinkler system for the diesel generator area on elevation 305 ft, as well as an automatic fire detection system. The air intake is protected by an automatic deluge water system actuated by thermal detectors. Fire detection and system actuation alarms are alarmed locally and in the TMI-1 control room. Portable, fire extinguishers are provided in the area. In addition, protection is provided by a hydrant in the YARD located west of the building.

4.13.1.3 Conclusion

The fire loading in this area is low. Based upon the fire protection features described, existing fire protection for this area is considered adequate.

4.13.2 Fire Area SBO-FA-2

4.13.2.1 FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: SBO Diesel Generator Bldg.

Fire Area Name: SBO Diesel Fuel Oil Tank Room

Length: 70 ft.

Width: 21 ft.

Height: 23 ft.

Area: 1470 ft²

Drawing: No fire Are Layout is maintained for this fire area. Fire Pre-Plan drawings are considered adequate.

Fire Area Boundaries

Fire Area Boundary Barrier Ratings

Fire Loading: >3 hours

Design Rating: 3 hours

The Fire Area Components are as follows:

Walls: *

North - Reinforced Concrete, 3 hour rated

South - Reinforced Concrete, non-fire rated*

East - Reinforced Concrete, 3 hour rated

West - Reinforced Concrete, non-fire rated*

* Exterior walls are of substantial construction with some openings. Based on the construction and automatic fire suppression systems, these barriers are treated as fire rated for insurance purposes and provide adequate protection during periods when temporary fire exposures may be present in the yard.

Ceiling:

Reinforced Concrete, non-fire rated*

Floor:

Reinforced Concrete, 3 hour rated

* No adjacent fire area or zone.

Doors:

Only access is through an unrated exterior wall.

Penetrations:

Penetrations through the north and east walls and the floor are sealed with three hour fire seals. No other penetrations through walls or ceiling are fire sealed.

Barriers Within Area:

None

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.13.2.2 Analysis

The combustible in this area consists of fuel oil. Note that only one of the tanks is filled with 25,000 gal of oil. The fire loading is high. However, the fire loading is based upon burning all the oil in the area simultaneously without considering that the oil is in a tank or that an automatic deluge system is available in the area. The automatic deluge system is actuated by thermal detectors, which alarm locally and in the TMI-1 control room. Portable fire extinguishers are provided in the area. In addition, hose protection is provided by a hydrant in the YARD located west of the building.

4.13.2.3 Conclusion

While the fire loading in this area is high, the presence of an automatic deluge system is sufficient to justify a fire barrier rating of 3 hours. Existing fire protection features as described above are considered adequate.

Original Steam Generator Storage Facility (OSGSF)

OSGSF is a permanent facility to store the Original Steam Generators and the RCS Hot leg elbows (candy canes) after their removal in fall of 2009. This building is a low level radiological area with outside background radiation of 2.5 mrm. The building is a cast in place reinforced concrete structure with two-foot thick walls and roof and three-foot floor slab.

This facility, TMI-BLG-132 is located at the SE corner of the intersection of Independence Road and Constitution Drive, East of the South Administration Building. This building is not located within 50 feet of any safety related structure.

4.14.1 Fire Area OSGSF-FA-14.14.1.1. FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: Original Steam Generator Storage Facility (TMI-BLG-132)

Elev: 303'-9"

Fire Area name: Original Steam Generator Storage Facility

Length: 90 feet, Width: 80 feet

Height: Approx. 30 feet.

Area: Approx 5,400 ft²

Drawing: No Fire Area Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Area Boundaries:

Fire Area Boundary Ratings:

Fire Loading: Not tracked

Design Rating: 3 Hours

The Fire Area Boundary Components are as follows:

Walls:

North- 24" reinforced concrete-3 hour rated

South- 24" reinforced concrete-3 hour rated

East- 24" reinforced concrete-3 hour rated

West- 24" reinforced concrete-3 hour rated

Ceiling: 24" reinforced concrete-3 hour rated

Door:

Metal —3 hour rated Class A Labeled

Penetrations:

A 4-inch diameter stainless steel pipe with a 150 # stainless steel flange for Radiation Protection sampling of the OSGSF sump.

Barriers Within Area:

None

4.14.2

Analysis

This facility stores low activity original steam generators and hot leg RCS piping elbows. No forced ventilation is provided as the building is unheated and closed to the outside. There are no fire detection/suppression systems within the facility. Hydrants located north and west of the facility are available for fire fighting.

No open combustible storage and no combustible containers are permitted in the facility; therefore there is no effective fire load.

4.14.3

Conclusion

Due to the restriction on combustible storage, automatic detection and suppression in the facility is not required. Manual fire fighting capability is available from nearby hydrants in the remote event of a fire. This is considered adequate fire protection for the facility.

4.15

Outage Equipment Storage Building (OESB)

The OESB is used for storage of equipment used routinely for outage support. The building is a pre-engineered metal building on a concrete floor slab (top of the Heat Exchanger Vault). The facility is located west of the Auxiliary Building on top of the Heat Exchanger Vault and south of the Borated Water Storage Tank.

The OESB is located within 50 feet of a safety related structure.

4.15.1

Fire Area OESB-FA-1

FIRE AREA BOUNDARY CONSTRUCTION FEATURES

Building: OESB Elev: 305'-0"

Fire Area Name: OESB

Length: 100 ft. Width: 30 ft.

Height: Approx. 20 ft.

Area: Approx. 3000 ft²

Drawing: No Fire Area Layout is maintained for this facility. Fire Pre-Plan Drawings are considered adequate.

Fire Area Boundaries:

Fire Area Boundary Barrier Ratings:

Fire Loading: Not tracked

Design Rating: None

The Fire Area Boundary Components Are as Follows:

Walls:

North – Steel Frame Metal Panel Construction – non-fire rated.

South – Steel Frame Metal Panel Construction – non-fire rated

East – Exterior of Existing Auxiliary Building

West – Steel Frame Metal Panel Construction – non-fire rated

Ceiling:

Steel Frame Metal Deck

Floor:

Concrete Slab (Heat Exchanger Vault Roof)

Doors:

2 Personnel Doors (1 North Wall, 1 South Wall)
2 Roll-up Doors (1 North Wall, 1 South Wall)
Non-rated

Penetrations:

N/A

Barriers Within Area:

None

Safe Shutdown Components:

None

Safe Shutdown Repairs:

None

4.15.2

Analysis

This facility stages/stores low level radioactive equipment for use during routine refueling outages. A ventilation fan is provided and the building is heated. A fire detection / suppression system is provided. Hydrants located North and South of the facility are available for fire fighting. No open combustible storage and no combustible containers are permitted in the facility. Any combustible material is stored in metal containers; therefore there is no effective fire load.

4.15.3

Conclusion

Due to the restrictions on combustible storage, the availability of a fire detection and suppression system in the OESB and the availability of manual fire fighting equipment, this is considered adequate fire protection for the facility.