INTERIM COMPENSATORY MEASURES

REVISION 1
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INTERIM COMPENSATORY MEASURES

I. INTRODUCTION

The schedular requirements for Appendix R modifications are outlined in 10 CFR 50.48. The NRC has requested that nuclear stations petitioning for relief from the schedular requirements of 10 CFR 50.48 show, through interim measures, that safe shutdown can be achieved. These interim measures should be implemented until the modifications, which do not meet the requirements of 10 CFR 50.48, are completed. In the B. Rybak letter to H. R. Denton dated May 18, 1983, Quad Cities Station petitioned for relief from the schedular requirements of 10 CFR 50.48 for the modifications in the 1982 Quad Cities Units 1&2 Associated Circuits Analysis. This schedular exemption was updated in a B. Rybak letter to H. R. Denton dated March 30, 1984.

Table 1 references interim measures or justification for continued operation for each modification which will not be completed within the 10 CFR 50.48 schedule. The interim measures will ensure that safe shutdown can be achieved for both units in the event of a fire. The proposed interim measures will only be implemented until the corresponding modifications are completed. In addition, Quad Cities Station has a safe shutdown procedure to ensure the ability to safely shut down both units in the event of a fire in the control room, auxiliary electric equipment room, or cable spreading room. This procedure is currently being updated.

The F-Drawings for Quad Cities Units 1&2 have been included with this submittal. These are general arrangement drawings which show safe shutdown equipment and power and control cables, fire zone boundaries, and existing detection and suppression systems.

The interim measures or justifications for continued operation outlined in Table 1 are based, for the most part, on the following:

- All electrical equipment and cabling required for safe shutdown were reviewed for impact of fire involving either fixed or transient combustibles.
- The interim measures reflect steps taken to ensure one safe shutdown path remains free from fire damage and/or the potential for the fire has been significantly reduced.

- The majority of fire zones containing safe shutdown equipment have relatively low fire loadings and the combustibles are uniformly distributed.

- Major combustible concentrations and fire hazards are protected with automatic suppression systems.

- Electrical penetrations are sealed with material having a 3-hour rating at the barriers separating fire zones.

- Fire stops are provided between electrical divisions to impede the spread of a fire within fire zones.

- Local fire detection is provided over major electrical equipment (i.e., 4-kV switchgear and 480-V MCC's).

As noted in Enclosure I of the Quad Cities 1&2 exemption request transmittal, an emergency lighting and communication evaluation is underway at Quad Cities Station. This evaluation will identify additional emergency lighting and any upgrading to the communication system necessary to perform safe shutdown functions. In the interim, until completion of this evaluation, flashlights and hand-held radios will be available to the control room operators.

The interim measures or justifications for continued operation described herein will ensure that Quad Cities Station can be safely shut down in the event of a fire in any fire area.

II. SAFE SHUTDOWN METHODS

The only areas of the plant requiring an interim safe shutdown method are as follows:

a. Turbine Building 4-kV bus 24-1 and 480-V bus 29 plant area,

b. Turbine Building 480-V bus 28 plant area, and

c. Central turbine building area on the ground and mezzanine floor elevations.

These interim safe shutdown methods are only required to shut down Unit 2. All Unit 1 safe shutdown equipment modifications have been installed. All other areas in both Unit 1 and Unit 2 will be shut down using final safe shutdown methods. Interim measures, for these areas, will consist of roving fire watches until the fire detection and suppression system modifications are completed.

RCIC and RHR Division I Shutdown Method

- RCIC Pump and Turbine (Manual Operation Required)
- RCIC Auxiliaries
- Inboard Valve
- Outboard Valves (Manual Operation)
- RHR Pump Division I
- RHR Room Cooler Division I
- RHRSW Pump Division I
- RHRSW Pump Cooler Division I
- RHR and RHRSW Valves (Manual Operation)
- Diesel Generator 1/2
- Diesel Generator Auxiliaries (Trans. Pump, CWP, Vent Fan)
- 4-kV SWGR 23-1
- 480-V SWGR 28

- 125-Vdc (Division I)
- 250-Vdc (Division II)

Safe Shutdown Makeup Pump and RHR Division I and II Method

- Safe Shutdown Makeup Pump (SSMP)
- SSMP Valves
- SSMP Room Cooler
- RHR Pump Division I or II
- RHR Room Cooler Division I or II
- RHRSW Pump Division I or II
- RHR and RHRSW Valves Division I or II
- Diesel Generator 1 and Diesel Generator 1/2 or Diesel Generator 2
- Diesel Generator Auxiliaries (Trans Pump, CWP, Vent Fan)
- 4-kV SWGR 14-1 and 23-1 or SWGR 24-1
- 480-V SWGR 19 and 28 or SWGR 29
- 125-Vdc (Divisions I and/or II)

III. REACTOR BUILDING INTERIM COMPENSATORY MEASURES EVALUATION

The reactor building is typical of configurations found in BWR's. In general, the reactor building is one large fire area. It is made up of six major floor elevations.

The turbine building is adjacent to the reactor building west wall and above the HPCI room which is adjacent to the reactor building west wall at Elevation 554 feet 0 inches. In addition, the diesel generator 1/2 room is adjacent to the reactor building east wall at the 595-foot 0-inch elevation.

A. Elevation 554 feet 0 inches - Unit 1 Reactor Building Torus

1. Safe Shutdown Equipment

The south side of the Unit 1 reactor building contains equipment and/or cables associated with RHR Division II. The north side of the Unit 1 reactor building area contains equipment and cables associated with RCIC, RCIC auxiliaries, and RHR Division I.

a. RCIC

The RCIC equipment is located in the northwest corner room and is separated from the torus area by a concrete wall with unsealed penetrations and a submarine type door. The RCIC power feeds are routed in the same cable tray in the RCIC room and torus. These cables exit the torus area via the same riser to the 595-foot elevation.

b. RHR

The RHR Division I equipment and cables are contained in the northeast corner room. These cables are routed directly from this room to the reactor building 595-foot elevation. This room is separated from the torus area by concrete walls with unsealed penetrations and a submarine type door. The RHR pump Division II cabling has been rerouted and now exits the southeast corner room into the torus. This power cable is routed along the south wall to the Unit 1 cable tunnel. The Division II RHR room cooler feed is unchanged and still passes directly from the Division II RHR room to the reactor building 595-foot elevation. However, an alternate feed from Unit 2 480-V motor control center 29-1 has been installed. The alternate feed does not pass through the north end of the torus area or any of the other floors of the reactor building. The Division II RHR room is separated from the torus area by concrete walls and unsealed penetrations and a submarine type door.

c. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located on elevation 554 feet, 0 inches.

2. Fire Protection Systems

The 554-foot, 0-inch elevation is equipped with manual hose stations and portable extinguishers (see Drawings F-2-1 and F-9-1 for locations). In addition, the HPCI room is protected by a local automatic water spray over the HPCI pump which is actuated by thermal detectors.

3. Fire Hazards Analysis

The torus area is a limited access area. The only combustibles are cables which amount to an average combustible loading of less than 8,000 btu/ft^2. The RHR pump rooms contain the RHR pumps, auxiliaries and associated cables which account for an average combustible loading of less than 25,000 Btu/ft^2 for the southeast pump room and less than 20,000 Btu/ft^2 for the northeast pump room. The RCIC room contains the RCIC pump, turbine, auxiliaries and associated cabling and the core spray pump and associated cabling which account for an average combustible loading of less than 10,000 Btu/ft^2.

Finally, the HPCI room, which contains the HPCI pump, turbine, auxiliaries and associated cabling, has an average combustible loading of less than 120,000 Btu/ft^2.

A fire in the torus area could potentially affect both divisions of RHR. Due to the extensive barriers separating the various rooms in the torus, the light combustible loading in most areas, the suppression and detection in the HPCI room and the 1-hour fire barriers around the Division I and II cable trays in the torus area where they approach within 20 feet of one another, fire damage will be limited to the northern or southern areas only. The following interim measure has been provided to ensure that a fire in the torus will not affect both RHR divisions (i.e., will not spread from the north end of the torus area to the south end and vice versa).

a. A roving fire watch.

With this interim measure in place, the following shutdown methods will be utilized for fires at the 554 foot, 0-inch elevation:

Fire in Area	Shutdown Method
RCIC Room	SSMP/RHR Division II
RHR Division I Room	SSMP/RHR Division II
RHR Division II Room	SSMP/RHR Division I
Torus NRB Area	SSMP/RHR Divisic.. II
Torus SRB Area	SSMP/RHR Division I
HPCI Room	SSMP/RHR Division II

B. Elevation 595 feet 0 inches - Unit 1 Reactor Building Ground Floor

1. Safe Shutdown Equipment

The ground floor of the Unit 1 reactor building contains equipment and/or cables associated with the RCIC system, Division I and II of the RHR system, diesel generator 1, and diesel generator 1/2.

a. RCIC

The RCIC cables located in the ground floor area are for RCIC room cooler fan control, RCIC inboard valve power and 250-Vdc power to the condensate pump and vacuum pump.

b. Diesel Generator 1 and Diesel Generator 1/2

Cables associated with diesel generator 1 fuel oil transfer pump and vent fan power and control and diesel generator 1/2 excitation, 4-kV feeds to SWGR 13-1 and 23-1, fuel oil transfer pump and vent fan power and control and the vent fan CO_2 interlock are routed through the ground floor. To ensure a power supply to the diesel generator 1 fuel oil transfer pump and vent fan, alternate feeds from MCC 29-2 have been installed.

c. RHR

The RHR cables located on this floor are for Division I and II RHR room cooler power and control and for Division I RHR pump power and control. The power cable for the Division II RHR pump has been rerouted away from the ground floor and an alternate feed for the Division II RHR room cooler from MCC 29-1 has been installed.

d. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located in the ground floor area.

2. Fire Protection Systems

The 595-foot 0-inch elevation is equipped with manual hose stations and portable extinguishers. In addition, local fire detection is located over the 480-V MCC's and the major penetration areas between the reactor building and turbine building (i.e., northwest and southwest corners). Furthermore, a local preaction sprinkler system is located over the air compressors. See Drawing F-3-1 for system locations.

3. Fire Hazards Analysis

The combustible loading for the ground floor is light (less than 25,000 Btu/ft^2). In order to ensure that a fire will be detected promptly to prevent spread to other areas the following interim measure will be implemented:

a. Roving fire watch.

With this interim measure in place, the SSMP/RHR Division II shutdown method will be available for fires at the 595-foot 0-inch elevation.

C. Elevation 623 feet 0 inches - Unit 1 Reactor Building Mezzanine

1. Safe Shutdown Equipment

The mezzanine floor of the Unit 1 reactor building contains cable and/or equipment associated with the RCIC system, Divisions I and II of the RHR and RHRSW systems, diesel generator 1, diesel generator 1/2 and the electrical distribution system.

a. RCIC

The RCIC cables located on this floor are those associated with RCIC auxiliaries and inboard valve power and control.

b. Diesel Generator 1 and Diesel Generator 1/2

Cables associated with diesel generator 1 fuel oil transfer pump, vent fan and cooling water pump power and control and diesel generator 1/2 excitation, 4-kV feed to SWGR 13-1 and 23-1, and fuel oil transfer pump, vent fan and cooling water pump power and control are routed through the mezzanine floor. To ensure a power supply to the diesel generator 1 auxiliaries,

alternate feeds from MCC 29-2 to the fuel oil transfer pump and vent fan and from SWGR 29 to the cooling water pump have been installed.

c. RHR and RHRSW

The RHR and RHRSW cables located on this floor are associated with the Division I and II RHR room cooler power and control and RHRSW pump cubicle cooler power and Division I RHR pump power and control. In the event of failure of the RHRSW pump cubicle coolers, cooling water can still be provided to the Division II RHR heat exchanger by the Unit 2 RHR service water pump via the Division II crosstie pipe. To assure RHR room cooler operation, alternate power feeds from MCC 29-1 have been installed.

d. Electrical Distribution

Division I and II 480-V MCC's, Division I 125-Vdc panels and 250-Vdc MCC's 1A and 1B and their respective power feeds are located on the mezzanine floor.

e. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located on elevation 623 feet, 0 inches.

2. Fire Protection Systems

The 623-foot 0-inch elevation is equipped with manual hose stations and portable fire extinguishers. In addition, local fire detection is located over the MCC's and over the major penetration areas between the reactor and turbine buildings (northwest and southwest corners). See Drawing F-4-1 for systems locations.

3. Fire Hazards Analysis

The combustible loading for the mezzanine floor is light (less than 15,000 Btu/ft^2). In order to ensure that a fire will be detected promptly to prevent spread to other areas the following interim measure will be implemented:

a. Roving fire watch.

With these interim measures in place, the SSMP/RHR Division II shutdown method will be utilized for fires at the 623-foot 0-inch elevation.

D. Elevations 647 feet 6 inches, 666 feet 6 inches, and 690 feet 6 inches - Unit 1 and Unit 2 Reactor Building

These elevations do not contain any safe shutdown equipment. All electrical penetrations are sealed to lower elevations. Hose stations and portable CO_2 extinguishers are available for manual fire fighting. Consequently, a fire in any of these areas would not affect the safe shutdown equipment located on the floors below. No interim measures are required.

E. Elevation 595 feet 0 inches - Swing Diesel Generator Room Detection and Suppression

This area contains the swing diesel generator and auxiliaries and is separated from the reactor building by 3-hour rated fire walls. The SSMP/RHR Division II shutdown method would be available in the event of a fire. The room is provided with an automatic CO_2 suppression system actuated by a thermal detection system throughout. No interim measures are required.

F. Elevation 554 feet 0 inches - Reactor Building Torus Unit 2

1. Safe Shutdown Equipment

The south side of the Unit 2 reactor building contains equipment and/or cables associated with RCIC auxiliaries, and RHR Division II power and control. The north side of the Unit 2 reactor building contains equipment and cables associated with RHR Division I.

a. RCIC

The RCIC equipment is located in the southwest corner room and is separated from the torus area by a concrete wall with unsealed penetrations and a submarine type door. The RCIC auxiliary power feeds are routed in the same cable tray in the RCIC room and torus. These cables exit the torus area via the same riser to the 595-foot elevation.

b. RHR

The RHR Division I and Division II equipment and cables are contained in the northeast and southeast corner rooms, respectively. The Division I RHR pump and Division I and II RHR cooler feeds are currently routed from these rooms to the 595-foot 0 inch elevation directly. These rooms are separated from the torus area by concrete walls with unsealed penetrations and submarine type doors. In addition, the rooms are separated by 60 feet.

The RHR Division II pump feeds have been rerouted out of the ground floor area. The new routing is through the torus area along the south wall into the Unit 2 cable tunnel. An alternate feed from Unit 1 480-V motor control center 19-1 has been installed for the RHR room cooler. The alternate feed does not pass through the north end of the torus area or any of the other floors of the reactor building.

c. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located on elevation 554 feet 0 inches.

2. Fire Protection Systems

The 554-foot 0-inch elevation is equipped with manual hose stations and portable extinguishers. In addition, the HPCI room is protected by local automatic water spray actuated by thermal detectors. See Drawings F-2-1 and F-9-1 for system locations.

3. Fire Hazards Analysis

The torus area is a limited access area. The only combustibles are cables which amount to an average combustible loading of less than 5,000 Btu/ft^2. The average combustible loading in the RCIC room is less than 30,000 Btu/ft^2. The northeast and southeast RHR pump rooms have average combustible loadings of less than 20,000 Btu/ft^2 and the core spray room has a loading of less than 5000 Btu/ft^2. Finally, the HPCI room has an average combustible loading of less than 120,000 Btu/ft^2.

A fire in the torus area could potentially affect both divisions of RHR. Due to the extensive barriers separating the various rooms in the torus, the light combustible loading in most areas, the suppression and detection in the HPCI room and the 1-hour fire barriers around the Division I and II cable trays in the torus area where they approach within 20 feet of one another, fire damage will be limited to the northern or southern areas only. The following interim measure has been provided to ensure that a fire in the torus will not affect both RHR divisions (ie, will not spread from the north end of the torus area to the south end and vice-versa).

a. A roving fire watch.

With this interim measure in place, the following shutdown methods will be available for a fire at the 554-foot 0-inch elevation.

Fire in Area	Shutdown Method
RCIC Room	SSMP/RHR Division I
RHR Division I Room	SSMP/RHR Division II
Torus NRB Area	SSMP/RHR Division II
RHR Division II Room	SSMP/RHR Division I
Torus SRB Area	SSMP/RHR Division I
HPCI Room	SSMP/RHR Division I

G. Elevation 595 feet 0 inches - Reactor Building Ground Floor Unit 2

1. Safe Shutdown Equipment

The ground floor of the Unit 2 reactor building contains equipment and/or cables associated with the RCIC system, Divisions I and II of the RHR system, diesel generator 2, diesel generator 1/2 and the electrical distribution system.

a. RCIC

The RCIC cables located on this floor are the RCIC inboard valve power feed and the RCIC auxiliaries power feeds from 250-Vdc MCC 2B.

b. Diesel Generator 2 and Diesel Generator 1/2

Cables providing power and/or control of the diesel generator 2 fuel oil transfer pump and vent fan and the diesel generator 1/2 excitation, fuel oil transfer pump and vent fan are routed through the ground floor area. To ensure a power supply to the diesel generator 2 fuel oil transfer pump and vent fan, alternate feeds from MCC 19-2 have been installed.

c. RHR

The RHR cables located on this floor are for Division I and II RHR room cooler power and control and for Division I RHR pump power and control. The power cable for the Division II RHR pump has been rerouted away from the ground floor area and an alternate feed for the Division II RHR room cooler from MCC 19-1 has been installed.

d. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located on elevation 595 feet 0 inches.

e. Electrical Distribution

The 480-V feeds to MCC's 28-1, 29-1 and 29-2 are routed through the ground floor area.

2. Fire Protection Systems

The 595-foot 0-inch elevation is equipped with manual hose station and portable extinguishers. In addition, local fire detection is located over MCC's and penetration areas (northwest and southwest corners). Furthermore, a local preaction sprinkler system is located over the air compressors. See Drawing F-3-1 for system locations.

3. Fire Hazards Analysis

The combustible loading for the ground floor is light (less than 20,000 Btu/ft^2). In order to ensure that a fire will be detected promptly to prevent spread to other areas the following interim measure will be implemented:

a. Roving fire watch.

With this interim measure in place, the SSMP/RHR Division II shutdown method will be available for fires at the 595-foot 0-inch elevation.

H. Elevation 623 feet 0 inches - Unit 2 Reactor Building Mezzanine

1. Safe Shutdown Equipment

The mezzanine floor of the Unit 2 reactor building contains cable and/or equipment associated with the RCIC system, Division I and II RHR and RHRSW systems, diesel generator 2, diesel generator 1/2 and the electrical distribution system.

a. RCIC

The RCIC cables located on this floor are for RCIC auxiliaries and the RCIC inboard valve power and control.

b. Diesel Generator 2 and Diesel Generator 1/2

Cables providing power and/or control of the diesel generator 2 fuel oil transfer pump, vent fan and cooling water pump and the diesel generator 1/2 excitation, fuel oil transfer pump, vent fan and cooling water pump are routed through the mezzanine floor area.

c. RHR and RHRSW

The RHR and RHRSW cables located on this floor are for Division I and II RHR room cooler power and control and RHRSW pump cubicle cooler power and Division I RHR pump power. In the event of failure of the RHRSW pump cubicle coolers, cooling water can still be provided to the Division II RHR heat exchanger by the Unit 1 RHR service water pumps via the Division II crosstie pipe. To assure Division II RHR room cooler operation, an alternate power feed from MCC 19-1 has been installed.

d. Electrical Distribution

Division I and II 480-V MCC's and 250-Vdc MCC's and their respective power feeds are located in the mezzanine floor area. Also in this area are the 4-kV feed from diesel generator 1/2 to SWGR 23-1 and the feed from the SWGR 23-1 to 480-V SWGR 28.

e. SSMP

No equipment or cables associated with the safe shutdown makeup pump system are located in the mezzanine floor area.

2. Fire Protection Systems

The 623-foot 0-inch elevation is equipped with manual hose stations and portable fire extinguishers. In addition, local fire detection is located over the MCC's and over the penetration areas (northwest and southwest corners). See Drawing F-4-1 for system locations.

3. Fire Hazards Analysis

The combustible loading for the mezzanine floor is light (less than 15,000 Btu/ft^2). In order to ensure that a fire will be detected promptly to prevent spread to other areas the following interim measure will be implemented:

a. Roving fire watch.

With this interim measure in place, the SSMP/RHR Division II shutdown method will be utilized for fires at the 623-foot 0-inch elevation.

IV. TURBINE BUILDING AND SERVICE BUILDING AREA DESCRIPTIONS

The turbine building is typical of configurations found in all BWR's. The building is subdivided by extensive reinforced concrete shield walls but formal fire walls are limited to very few building sections. In general, the turbine building is one large fire area. It is made up of three major floor elevations and two basement elevations. Figures F-9-1 through F-18-1 show the fire protection systems. Rooms within the turbine building which are constructed as fire areas include the diesel generator rooms (Fire Areas 9.1 and 9.2), turbine oil storage room (Fire Area 8.1), auxiliary electric equipment room (Fire Area 6.3), control room (Fire Area 2.0), cable spread room (Fire Area 3.0), and computer room (Fire Area 4.0).

The remainder of the turbine building, with the exception of the operating floor, has been divided into three zone groups: The Northern Zone Group, the Central Zone Group, and the Southern Zone Group.

The operating floor is open between units. The major equipment located on the floor includes the turbine generators, MG sets, and both divisions of 4-kV and 480-V switchgear for each unit. The switchgear is the only safe shutdown equipment. Fixed water suppression and foam water systems are provided over the MG sets.

The divisions of 4-kV switchgear for each unit are separated by a full height fire barrier. These fire barriers set the boundaries for the zones on the operating floor (8.2.8.A, 8.2.8.B, 8.2.8.C, and 8.2.8.D).

The turbine building operating floor has a floor constructed of concrete. The floor has numerous penetrations for stairwells, equipment removal hatches, and pipe and electrical penetrations. The electrical penetrations are sealed with noncombustible materials. Penetrations into the bottom of the switchgear have 3-hour rated seals. Given the existing low fire loading, the special separation and floor barrier provide an adequate impediment to the spread of fire so that a fire on the operating floor in the area of the 4-kV and 480-V SWGR will not have an adverse effect on equipment or combustibles in adjacent fire zones or vice versa.

All floors of the Northern Zone Group (Fire Zones 6.2.A, 6.2.B, 7.2, 8.2.1.B, 8.2.1.D, 8.2.2.A, 8.2.2.B, 8.2.5, 8.2.6.D, 8.2.6.E, 8.2.7.D, 8.2.7.E, 9.2, 11.1.2.A, 11.1.2.B, 11.1.2.C, and 14.1.2) contain Unit 2 cabling and equipment. If a fire were to occur in this zone group, only Unit 2 would be affected.

The Central Zone Group (Fire Zones 5.0, 8.1, 8.2.6.C and 8.2.7.C) on the ground and mezzanine floor levels of the turbine building contains some cabling related to both Units 1 and 2. However, necessary cabling and equipment related to RCIC/RHR Division II shutdown for Unit 1 and RCIC/RHR Division I shutdown for Unit 2 are unaffected by a fire in this zone group. The Unit 1 diesel generator supplies power to the equipment required to shut down Unit 1 and the swing diesel generator powers the equipment required to shut down Unit 2.

All floors of the Southern Zone Group (Fire Zones 6.1.A, 6.1.B, 7.1, 8.2.1.A, 8.2.1.C, 8.2.3.A, 8.2.3.B, 8.2.4, 8.2.6.A, 8.2.6.B, 8.2.7.A, 8.2.7.B, 9.1, 11.1.1.A, 11.1.1.C, and 14.1.1) contain Unit 1 cabling and equipment. If a fire were to occur in this portion of the station, only Unit 1 would be affected.

Fire Area 2.0 (control room), 3.0 (cable spread room), 4.0 (computer room), and 6.3 (auxiliary electric equipment room) are located in the service building and separated from the Southern Zone Group by complete 3-hour rated fire barriers. These areas contain cables associated with control of safe shutdown equipment.

Fire zones 8.2.6.C and 8.2.7.C are separated from the northern and southern zone groups by complete shield walls on the ground and mezzanine floors with the exception of two corridors that penetrate these barriers on the ground level (595-foot 0-inch elevation) at column/rows 11 and 14/G. The shield walls are not specifically fire rated but are substantial, reinforced concrete construction with cable penetrations sealed with noncombustible material. Personnel access between zone groups is through substantial, locked, unlabeled metal doors. The corridors (which extend from column/row G/9 to 12 and G/14 to 17) contain no equipment or cabling associated with adjacent zone group shutdown paths. The presence of the fire detection, general sprinklers, and water spray for major hazards and separation of alternate shutdown functions ensure that a fire in the Central Zone Group could not spread to affect cabling or equipment in the adjacent zone groups or vice versa.

The Unit 1 and Unit 2 cable tunnels run below the Southern Zone Group. The Unit 1 cable tunnel has an access point in the auxiliary electric equipment room. A second access point is located at column/row G/17.5 and is covered with a heavy metal checker plate. The Unit 2 cable tunnel passes from the auxiliary electric equipment room below all three zone groups with an access point into each (F/17, F/12, and F/9). Each point is covered with heavy metal checker plate. Each tunnel is constructed of reinforced concrete with all electrical penetrations sealed with

materials having a 3-hour fire rating. The tunnels are also protected by complete fire detection throughout and water suppression in the cable trays.

A. Turbine Building Main Operating Floor

The portion TB main operating floor where the 4-kV and 480-V switchgear are located has been divided into the following areas.

1. North of column line 11 (8.2.8.D)

2. Central between column line 11 and 15 (8.2.8.B and 8.2.8.C)

3. South column line 15 (8.2.8.A)

These three areas are separated by partial 3-hour fire rated barriers.

1. North of Column Line 11 (8.2.8.D)

a. Safe Shutdown Equipment

The only safe shutdown equipment located in this area is 4-kV switchgear 23-1.

b. Fire Protection Systems

The TB main operating floor is equipped with manual hose stations and portable extinguishers (see Drawing F-17-1 for locations). In addition, the turbine lift pump and reactor recirculation MG set is protected by wet-pipe sprinkler systems. The MG set is also protected by a foam-water suppression system. The turbine bearings 1 through 9 are protected by an automatic water spray system. The MG set and 4-kV switchgear 23-1 are protected by a detection system.

c. Fire Hazards Analysis

Fire detection is located above the 4-kV SWGR 23-1. The MG set adjacent to 23-1 is curbed, drained and provided with an automatic foam-water deluge system and wet pipe sprinkler system at the ceiling. A full height concrete block wall with 3-hour sealed penetrations separates this portion from the adjacent 4-kV and 480-V SWGR. This wall extends from column line H to G (the outer edge of the MG set). A fire in this area would not affect the SSMP/RHR Division II shutdown method.

2. Central Between Column Line 11 and 15 (8.2.8.B and 8.2.8.C)

a Safe Shutdown Equipment

A fire in this area could potentially affect 4-kV switchgear 24-1, 480-V switchgear 28 and 29, 4-kV switchgear 13-1, and 480-V switchgear 18 and 19.

b. Fire Protection Systems

The TB main operating floor is equipped with manual hose stations and portable extinguishers (see Drawings F-17-1 and F-18-1 for locations). In addition, the reactor recirculation MG sets are protected by a wet-pipe sprinkler system and a foam-water suppression system. The MG sets are curbed and have drains. The 4-kV SWGR for each unit are separated by 40 feet and a fire wall is present at column line 13 east of G separating the two units' between each unit's 480-V SWGR. Protection for the MG sets, 4-kV switchgears 13-1 and 24-1, and 480-V switchgears 18, 19, 28, and 29 is provided by a detection system.

c. Fire Hazards Analysis

A fire cannot be allowed to spread between 4-kV SWGR 24-1 and 480-V SWGR 28. In addition, a fire cannot be allowed to spread between the 480-V SWGR for either unit. The 4-kV SWGR 13-1 and 24-1 are at elevation 639 feet-0 inches separated by a minimum of 40 feet with no intervening combustibles and the 480-V SWGR 28 and 29 are at elevation 647 feet-6 inches separated by a minimum of 10 feet with no intervening combustibles. The 4-kV SWGR 24-1 is separated from 480-V SWGR 28 and 29 by a minimum of 7 feet with no intervening combustibles. See Drawings F-5, F-17, and F-18.

The only combustibles in this area are the metal enclosed switchgear and some cables routed into the top of the switchgear. The penetrations from below are sealed with material having a 3-hour fire rating. Specifically the 4-kV switchgear each contain approximately 263 pounds of cable insulation and the 480-V switchgear each contain approximately 316 pounds of cable insulation.

The following interim measure will be implemented to ensure that a fire is not initiated at this elevation:

1. The floor of this entire area will be painted red in conjunction with a procedure to eliminate transient combustibles.

2. Roving fire watch.

With this interim measure in place, the follow shutdown methods will be utilized:

Fire Involving	Shutdown Method
SWGR 13-1, 18, or 19	SSMP/RHR Division II
SWGR 24-1 or 29	SSMP/RHR Division I
SWGR 28	SSMP/RHR Division II

3. South of Column Line 15 (8.2.8.A)

a. Safe Shutdown Equipment

The only safe shutdown equipment located in this area is 4-kV switchgear 14-1.

b. Fire Protection Systems

The TB main operating floor is equipped with manual hose stations and portable extinguishers (see Drawing F-18-1 for locations). In addition, the turbine lift pump and reactor recirculating MG set is protected by wet-pipe sprinkler systems. The MG set is also protected by a foam-water suppression system. The turbine bearings 1 through 9 are protected by an automatic water spray system. The MG set and 4-kV switchgear 14-1 are protected by a detection system.

c. Fire Hazards Analysis

Fire detection is located over the 4-kV SWGR 14-1. The MG set adjacent to the 4-kV SWGR 14-1 is curbed, drained and protected by an automatic foam-water deluge system and a wet pipe sprinkler system at the ceiling. A full height concrete block wall with 3-hour sealed penetrations currently separates this SWGR from the adjacent SWGR. A fire in this area would not affect the SSMP/RHR Division I shutdown method.

B. Turbine Building Central Zone Group Unit 1

1. Safe Shutdown Equipment Unit 1

The central zone group contains equipment associated with the Unit 1 RCIC and RHR Division I systems and the SSMP system. As discussed below, the Unit 1 RCIC/RHR Division II shutdown method will be utilized.

2. Fire Protection Systems in the Central Zone Group

a. Fire Zone 5.0

This zone is equipped with portable extinguishers. Hose reels are available in adjacent Fire Zone 8.2.6.C.

b. Fire Zone 8.1

This zone is protected throughout by an automatic wet pipe sprinkler system.

c. Fire Zone 8.2.6.C

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-12-1 for locations). In addition, the EHC fluid reservoir area is protected with a preaction system and a detection system. A detection system protects the area bounded by column rows 13, 14, G.5, and H.

d. Fire Zone 8.2.7.C

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-14-1 for locations). In addition, the zone, except for the area west of column row D, is protected by a wet pipe sprinkler system. The turbine oil tank is also protected by an automatic deluge system and a detection system. The area bounded by column rows 13, 14, G, and H is protected with a detection system also.

3. Fire Hazards Analysis Unit 1

RCIC

The 4-kV power feed to Division I 4-kV SWGR 13-1 is located in this area. Consequently, all 4-kV power to Unit 1 will be provided by 4-kV SWGR 14-1, which powers 480-V SWGR 19. Power to the RCIC room cooler will be provided via SWGR 19 through the crosstie with SWGR 18.

The control cables for valve MO1-1301-16 and associated with the RCIC vacuum and condensate pumps pass through this area. To ensure the availability of this equipment, local control and isolation switches have been installed in the RCIC room and local isolation and control for valve MO1-1301-16 has been installed in MCC 18-1A-1.

RHR Division II

Power to Division II RHR pumps and the 480-V SWGR 19 will be

provided by 4-kV SWGR 14-1. These feeds are routed inside the HPHB which is independent of the Central Zone Group.

RHRSWP Division II (Unit 1)

RHRSWP power and auxiliary cables are routed independently of the Central Zone Group and powered by 4-kV SWGR 14 in the Southern Zone Group.

125-Vdc for Control of 4-kV SWGR

125-Vdc is available for 4-kV SWGR 14-1 and SWGR 14 from Unit 1 125-Vdc batteries by closing a breaker between Panel 1A and 1B if the normal feed to Panel 1B from Unit 2 (through the Central Zone Group) is destroyed by fire.

The normal feeds from panel 1B to both SWGR 14-1 and 14 are routed in the HPHB and Southern Zone Group, respectively. The necessary 125-Vdc cables are independent of the Central Zone Group.

250-Vdc

The normal feed to 250-Vdc MCC 1A is independent of the Central Zone Group. Consequently, RCIC auxiliaries are available.

DG 1

DG 1 4-kV bus duct to 14-1 and feed from 14-1 to SWGR 14 is only routed in the Southern Zone Group and Unit 1 cable tunnel. These are independent of the Central Zone Group. DG 1 auxiliaries are routed independently of the Central Zone Group, except for the vent fan CO_2 interlock and control cable for the fuel transfer pump. To ensure the availability of this equipment local control and isolation switches have been installed. Also routed through the zone group are cables associated with startup and control of the diesel generator. Diesel generator availability has been assured by installation of local control and isolation.

C. Turbine Building Central Zone Group Unit 2

1. Safe Shutdown Equipment Unit 2

The Central Zone Group contains equipment associated with the Unit 2 RCIC and RHR Division II systems and the SSMP system. As discussed below, the Unit 2 RCIC/RHR Division I shutdown method can be utilized to shut down Unit 2.

2. Fire Protection Systems Unit 2

a. Fire Zone 8.2.6.C

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-13-1 for locations). In addition, the EHC fluid reservoir area is protected with a preaction system and a detection system. A detection system protects the area bounded by column rows 12, 13, G.5 and H. An automatic deluge system protects the area bounded by column rows D, E, 12.5, and 13.

b. Fire Zone 8.2.7.C

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-15-1 for locations). In addition, the zone, except for the area west of column row D, is protected by a wet pipe sprinkler system. The turbine oil tank is also protected by an automatic deluge system and a detection system. The area bounded by column rows 12, 13, G and H is protected with a detection system also.

3. Fire Hazards Analysis Unit 2

RCIC

Control cables for the RCIC inboard valve (M02-1301-16), the RCIC condensate and vacuum pumps and the RCIC emergency room coolers are routed through this area. The power cable for the condensate pump is also routed through this area.

Local control and isolation have been installed for the RCIC vacuum and condensate pumps in the RCIC room to ensure pump operation. The following interim measures have been implemented to ensure RCIC condensate pump operation and RCIC room cooling.

a. RCIC room cooling procedure in conjunction with the condensate pump alternate feed.

b. A procedure for local reopening of the RCIC inboard valve at MCC 28-1A-1.

RHR Division I

The RHR Division I pump power feeds from 4-kV SWGR 23-1 are independent of the Central Zone Group.

RHRSWP Unit 2 Division I

RHRSWP power and auxiliary cables are routed independently of the Central Zone Group. Power is provided from 4-kV SWGR 23-1 to 4-kV SWGR 23 in the Northern Zone Group.

125-Vdc

125-Vdc is available for SWGR 23-1 and SWGR 23 from the Unit 2 125-Vdc batteries through the normal feed from Panel 2A to reactor building panel 2. These cables are routed in the Northern Zone Group on the mezzanine level through the HPHB independent of the Central Zone Group. The HPHB is separated from the Central Zone Group by shield walls.

250-Vdc

The normal and alternate feeds to 250-Vdc MCC 2A and 2B could be effected by a fire in the Central Zone Group. This would disable RCIC auxiliaries. However, the interim measures established for the Central Zone Group will ensure the RCIC system can be operated.

DG 1/2

The 4-kV bus duct from DG 1/2 to the 4-kV SWGR 23-1 is routed from the reactor building into the Unit 2 HPHB in the Northern Zone Group and is independent of the Central Zone Group.

DG 1/2 Auxiliaries

Control cables for the DG 1/2 CWP and power cables for the DG 1/2 CWP room cooler are routed in the Central Zone Group.

There are redundant feeds to the DG 1/2 CWP from 480-V SWGR 18 and 28. The feed from SWGR 18 is routed from the switchgear through the Central Zone Group at the mezzanine level into the Unit 1 HPHB through the Southern Zone Group down to the DG CWP in the basement. This cable is routed under suppression while passing through the Central Zone Group.

The redundant feed from SWGR 28 is routed from the switchgear into the Unit 2 HPHB at the mezzanine level. The cable is then routed into the Unit 2 cable tunnel and up into the Central Zone Group on the ground floor at column/row 12/F. The alternate feed is routed west on the ground floor to just past row D, then south to column 12, down to the TB basement, and into the CWP room. Suppression protects this cable on the ground floor of the Central Zone Group from rows D to E. The Central Zone Group west of E contains no

other SSD equipment. Therefore, if a fire effected the DG 1/2 CWP alternate feed in this area, the RCIC/RHR Division I shutdown method would be available.

The DG 1/2 CWP room cooler is currently powered only from the 480-V MCC 18-2 located on the Unit 1 mezzanine floor in the Southern Zone Group. This MCC is powered from the 480-V SWGR 18 which is fed from 4-kV SWGR 13-1. The cable routing from the DG 1/2 to 13-1, SWGR 13-1 to SWGR 18 and SWGR 18 to MCC 18-2 are all routed in the Central Zone on the mezzanine level. A calculation has been performed to show that the DG 1/2 CWP can operate for a minimum of 72 hours without the room cooler.

In addition, the DG 1/2 vent fan CO_2 interlock is routed through this area. Local isolation for the interlock has been provided in the DG 1/2 room.

For a fire in the Central Zone Group the Unit 1 RCIC/RHR Division II shutdown method will be utilized to shutdown Unit 1 and the Unit 2 RCIC/RHR Division I shutdown method will be utilized to shutdown Unit 2.

D. Separation Between Central Zone Group and Adjacent Northern and Southern Turbine Building Zone Groups

At the mezzanine level, the zone groups are separated by substantial reinforced concrete shield walls with noncombustible penetration seals and heavy metal unlabeled doors. Automatic water suppression is provided throughout most of these zone groups (see Drawings F-14-1 and F-15-1). Local detection is located above the major penetration area from the turbine building to the reactor building and above the turbine oil reservoirs.

At the ground level, a 75-foot corridor passes between these two zone groups. A fire in the Central Zone Group would have to propagate more than 45 feet down Unit 1 corridor and up through a concrete floor or 150 feet down the corridor before there would be any exposure to cables associated with the necessary shutdown path in Unit 1. Furthermore, a fire in the Unit 2 side would have to propagate more than 150 feet down the Unit 2 corridor before there would be any exposure to cables associated with the necessary shutdown path.

This corridor is the main thoroughfare through the TB and is traveled frequently by station personnel and security personnel. In addition, the detection in the Central Zone Group will ensure that a fire involving cabling will be identified quickly.

The following interim measure has been implemented:

a. The floors of these corridors have been painted red in conjunction with a procedure to eliminate transient combustibles.

b. A roving fire watch.

E. Turbine Building Southern Zone Groups

1. Safe Shutdown Equipment

The Southern Zone Group contains cables associated with the RCIC and RHR Division II systems. Therefore, the SSMP/RHR Division I shutdown method will be utilized.

2. Fire Protection Systems

a. Fire Zone 6.1.A

This zone is protected by a detection system.

b. Fire Zone 6.1.B

This zone is protected by a detection system.

c. Fire Zone 7.1

This zone is protected by a detection system and a portable extinguisher (see Drawing F-14-1 for location).

d. Fire Zone 8.2.1.A

This zone is equipped with a manual hose station and portable extinguishers (see Drawing F-9-1 for locations). In addition, this zone is protected by an automatic wet pipe suppression system.

e. Fire Zone 8.2.1.C

This zone is equipped with a manual hose station (see Drawing F-9-1 for location). In addition, this zone is protected by an automatic wet pipe suppression system.

f. Fire Zone 8.2.3.A

This zone is protected throughout by fire detection and automatic suppression systems. A manual hose station and portable extinguisher are also present in the zone.

g. Fire Zone 8.2.3.B

This zone is equipped with a manual hose station.

h. Fire Zone 8.2.4

This zone is protected by an automatic wet pipe suppression system and a detection system.

i. Fire Zone 8.2.6.A

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-12-1 for locations). In addition, an automatic wet pipe suppression system protects the feedwater pumps and speed increasers (column/row 19-22/G-H) and the high pressure heater bay. A preaction suppression system and a detection system protect the area bounded by column/row 24-25/D-H. A detection system protects the 4-kV switchgear area and the southeast corner of the high pressure heater bay.

j. Fire Zone 8.2.6.B

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-12-1 for locations). In addition, an automatic wet pipe suppression system protects this zone throughout, except for the turbine foundation and the heater pull space. This pull space is protected with a deluge suppression system and a detection system.

k. Fire Zone 8.2.7.A

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-14-1 for locations). In addition, the hydrogen seal oil unit and the hydrogen and stator cooling cabinet area are protected by an automatic wet pipe suppression system. The hydrogen seal oil unit is also protected by an open head water spray suppression system and a detection system. The 4-kV switchgear area is protected by a detection system.

l. Fire Zone 8.2.7.B

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-14-1 for locations). In addition, the entire zone, except for the turbine foundation and the heater pull space, is protected by an automatic wet pipe suppression system. The southeast corner of the high pressure heater is also protected by a detection system.

m. Fire Zone 9.1

This zone is protected by an automatic CO_2 system that is

actuated by thermal detectors. A wet pipe sprinkler system is also provided in the day tank room.

n. Fire Zone 11.1.1.A

This zone is protected by an automatic wet pipe suppression system.

o. Fire Zone 11.1.1.C

This zone is protected by an automatic wet pipe suppression system.

p. Fire Zone 14.1.1

This zone is equipped with manual hose stations and a portable extinguisher.

3. Fire Hazards Analysis

RCIC

RCIC control cables are routed the through Southern Zone Group. Since the SSMP system is used for reactor water makeup, safe shutdown can be achieved and maintained.

RHR Division I

RHR Division I pumps for Unit 1 will be powered from 4-kV SWGR 13-1. Cables routed from 13-1 to the RHR pumps and the 4-kV bus duct from DG 1/2 to 13-1 are routed independently of the Southern Zone Group and are in the Central Zone Group on the mezzanine level.

RHRSWP Division I (from Unit 2)

The Unit 1 power and control cables to the Unit 1 RHRSWP are routed in this zone group and may be damaged by a fire here. In this case, the Unit 2 RHRSWP Division I will be used through the mechanical crosstie to supply SW to the Unit 1 RHR Hx. The Unit 2 Division I RHRSW pumps will be powered by DG 1/2 through 4-kV SWGR 23. A modification has been made to allow the simultaneous energizing of SWGR 23-1 and 13-1 from DG 1/2.

SSMP

Control cables for the pump and valves are routed in the Southern Zone Group. Local control and isolation switches have been installed to allow control of the pump and valves from the SSMP room.

125-Vdc

Both normal and reserve 125-Vdc feeds to 4-kV SWGR 13-1 and 480-V SWGR 18 could be affected by a fire in this area. In addition, one fire could affect all Unit 1 125-Vdc. The 125-Vdc power for control of 4-kV switchgear 13-1 can be provided through a normally open electrical crosstie to 4-kV switchgear 23-1. A loss of 125-Vdc to 480-V switchgear 18 will cause all breakers to remain in their pre-existing positions. Feeds to the vast majority of motor control centers have full manual operability.

250-Vdc

The power feed to 250-Vdc MCC 1A, 1B and 2B are routed through this area. 250-Vdc power is not required by the SSMP/RHR Division I shutdown method.

DG 1/2

Diesel Generator 1/2 4-kV power feeds to SWGR 13-1 and 23-1 are independent of this area. DG 1/2 is needed to operate the RHR system which must be initiated within 3 1/2 hours of beginning of the event.

DG 1/2 Auxiliaries

The DG 1/2 auxiliaries are independent of this area except for the DG 1/2 CWP feed. The DG 1/2 CWP is located in an enclosed reinforced concrete cubicle with a submarine hatch. The concrete walls are 3-hour fire rated, however, the hatch is not rated. The DG 1/2 CWP alternate power feed from Unit 2 is routed through areas which are completely covered by suppression in this zone group and the power feed is protected by a 1-hour rated cable wrap.

F. Turbine Building Northern Zone Group

1. Safe Shutdown Equipment and Fire Hazards Analysis

The Northern Zone Group contains cables associated with RCIC and RHR Divisions I and II systems.

2. Fire Protection Systems

a. Fire Zone 6.2.A

This zone is protected by a detection system.

b. Fire Zone 6.2.B

This zone is protected by a detection system.

c. Fire Zone 7.2

This zone is protected by a detection system and a portable extinguisher (see Drawing F-15-1 for location).

d. Fire Zone 8.2.1.B

This zone is equipped with portable extinguishers (see Drawing F-9-1 for locations). In addition, this zone is protected by an automatic wet pipe suppression system.

e. Fire Zone 8.2.1.D

This zone is equipped with a manual hose station (see Drawing F-9-1 for location). In addition, this zone is protected by an automatic wet pipe suppression system.

f. Fire Zone 8.2.2.A

This zone is protected throughout by fire detection and automatic suppression systems. A manual hose station and portable extinguisher are also present in the zone.

g. Fire Zone 8.2.2.B

This zone is equipped with a manual hose station.

h. Fire Zone 8.2.5

This zone is protected by an automatic wet pipe suppression system and a detection system.

i. Fire Zone 8.2.6.D

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-13-1 for locations). In addition, an automatic wet pipe suppression system protects this zone throughout, except for the turbine foundation and the heater pull space. This pull space is protected with a deluge suppression system and a detection system.

j. Fire Zone 8.2.6.E

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-13-1 for locations). In addition, an automatic wet pipe suppression system protects the feedwater

pumps and speed increasers (column/row 4-7/G-H) and the high pressure heater bay. A preaction suppression system and a detection system protects the area bounded by column/row 1-2/D-H. A detection system protects the 4-kV switchgear area and the northeast corner of the high pressure heater bay.

k. Fire Zone 8.2.7.D

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-15-1 for locations). In addition, the entire zone, except for the turbine foundation and the heater pull space, is protected by an automatic wet pipe suppression system. The northeast corner of the high pressure heater bay is also protected by a detection system.

l. Fire Zone 8.2.7.E

This zone is equipped with manual hose stations and portable extinguishers (see Drawing F-14-1 for locations). In addition, the hydrogen seal oil unit and the hydrogen and stator cooling cabinet area is protected by an automatic wet pipe suppression system. The hydrogen seal oil unit is also protected by an open head water spray suppression system and a detection system. The 4-kV switchgear area is protected by a detection system.

m. Fire Zone 9.2

This zone is protected by an automatic CO_2 system that is actuated by thermal detectors. A wet pipe sprinkler is also provided in the day tank.

n. Fire Zone 11.1.2.A

This zone is protected by an automatic wet pipe suppression system.

o. Fire Zone 11.1.2.B

This zone is protected by an automatic wet pipe suppression system.

p. Fire Zone 11.1.2.C

This zone is protected by an automatic wet pipe suppression system.

q. Fire Zone 14.1.2

This zone is equipped with manual hose stations and a portable extinguisher.

3. Fire Hazards Analysis

RCIC

RCIC cables are routed through the Northern Zone Group. Since the SSMP system is used for reactor water makeup, in the event of a fire in this zone group, safe shutdown can be achieved and maintained.

RHR Division I Unit 2

RHR Division I pumps for Unit 2 will be powered by 4-kV SWGR 23-1. Cables to SWGR 23-1 from DG 1/2 are routed through the reactor building into the Unit 2 HPHB at the mezzanine level in this zone group. In addition, the cable from 23-1 to the Division I RHR pumps are routed in the same area. Automatic water suppression is provided through the Unit 2 HPHB and local fire detection is located above the penetration area between column line 7-8/H. The 4-kV bus duct is protected by a 1-hour rated cable wrap in the HPHB. The HPHB is separated from the remaining zone groups by substantial full-height shield walls.

RHRSWP Division I Unit 1

The Unit 2 power and control cables to the Unit 2 RHRSWP are routed in this zone group and may be damaged by a fire. In this case, the Unit 1 RHRSWP Division I will be used through the mechanical crosstie to supply service water to the Unit 2 RHR heat exchanger. These Unit 1 Division I RHRSWP will be powered by DG 1/2 through SWGR 13. A modification has been made to allow the simultaneous energizing of SWGR 23-1 and 13-1 from DG 1/2.

SSMP

Control cables for valves in this system are routed through this zone group. Local control and isolation switches have been installed to allow valve control from the SSMP room.

125-Vdc

Both normal and reserve 125-Vdc feeds to 4-kV SWGR 23-1 and 480-V SWGR 28 could be affected by a fire in this area. In addition, one fire could affect all 125-Vdc. The 125-Vdc power for control of 4-kV switchgear 23-1 can be provided through a normally open electrical crosstie to 4-kV switchgear 13-1. A loss of 125-Vdc to

480-V switchgear 28 will cause all breakers to remain in their preexisting positions. Feeds to the vast majority motor control centers have full manual operability.

250-Vdc

The normal 250-Vdc MCC 2B feed is independent of the Northern Zone Group while the normal 250-Vdc MCC 2A feed is routed through this zone group. However, 250-Vdc power is not required by the SSMP/RHR Division I shutdown method.

DG 1/2

Diesel generator 1/2 4-kV power feed to SWGR 13-1 is independent of the Northern Zone Group. The 4-kV power feed to SWGR 23-1 is routed through the HPHB area which has automatic water suppression throughout and the 4-kV bus duct is protected by a 1-hour rated wrap where it passes through this area.

DG 1/2 Auxiliaries

The DG 1/2 auxiliaries alternate feeds are independent of this area.

G. Turbine Building Unit 1 Basement (Diesel Generator 1/2 CWP Cubicle) Fire Zone 11.1.1.B

1. SSD Equipment

This area contains the DG 1/2 cooling water pump and room cooler. In addition, a Division I and II RHRSWP are located in this area.

2. Fire Protection Systems

Complete automatic suppression is provided throughout the cubicle. The cubicle is constructed of 3-hour rated reinforced concrete walls and thick metal submarine hatch to prevent a fire in the room from spreading outside the room. No interim measure is required.

3. Fire Hazards Analysis

The dedicated diesel generator cooling water pump is available independent of this area. In addition, a Division II RHRSW pump is available independent of this area.

H. Cable Tunnels

The Unit 1 and 2 cable tunnels have complete detection and automatic water suppression is provided over open cable trays. By

locally operating safe shutdown equipment the SSMP/RHR Division I shutdown method can be utilized for a fire anywhere in either cable tunnel (if the fire is in the Unit 2 cable tunnel, the Unit 2 RHR Division I system will be used, and if it is in the Unit 1 cable tunnel, the Unit 1 RHR Division I system will be used). No interim measure is required.

I. Service Building (Control Room, AEER, and Cable Spreading Room)

1. Safe Shutdown Equipment

The control room contains control circuits for various safe shutdown equipment.

2. Fire Protection Systems

Control Room - Fire detection is provided throughout the room and a constant fire watch is maintained by the operators on duty. Portable extinguishers and hose stations are available.

Cable Spread Room - Fire detection is provided throughout the room and sprinklers are provided at ceiling level and in trays.

AEER - Fire detection is provided throughout this fire area. Portable extinguishers and hose stations are available.

3. Fire Hazards Analysis

A procedure exists for shutdown independent of the control room. This procedure is currently being updated.

TABLE 1

INTERIM MEASURES

	MODIFICATION	STATUS	INTERIM MEASURES
A.	PREVIOUSLY IDENTIFIED MODIFICATIONS		
1.	Install water curtain between units on main operating floor.	Fall 1986	A roving fire watch has been established.
B.	NEW MODIFICATIONS	Unit 1 Fall 1986	A roving fire watch has been established.
1.	Install linear heat detectors in corner rooms.	Unit 2 Fall 1986	
2.	Install automatic sprinklers in Division II RHR pump rooms.	Unit 1 Fall 1986	A roving fire watch has been established.
		Unit 2 Fall 1986	
3.	Install automatic sprinkler near cable tray at south wall of Units 1&2.	Unit 1 Fall 1986	A roving fire watch has been established.
		Unit 2 Fall 1986	
4.	Install linear heat detectors in each torus area tray and below bottom tray.	Unit 1 Fall 1986	A roving fire watch has been established.
		Unit 2 Fall 1986	

TABLE 1 (Cont'd)

	MODIFICATION	STATUS	INTERIM MEASURES
5.	Install complete smoke detection on the ground and mezzanine floors in the reactor buildings.	Unit 1 Fall 1986 Unit 2 Fall 1986	A roving fire watch has been established.
6.	Install complete detection on the ground floor of the turbine building from column 17 to 9 in the eastern corridor and in the safe shutdown pump room.	Eastern Corridors and SSMP room Fall 1986	A roving fire watch has been established for the eastern corridors and SSMP room.
7.	Install automatic sprinkler on the ground floor of the turbine building from column 17 to 9 in the eastern corridor.	Eastern Corridors Fall 1986	A roving fire watch has been established for the eastern corridors.
8.	Install detection in far north and south portions of the turbine building corridor and in central portion of 8.2.6.C column/row 12-14/C-F.	Fall 1986	A roving fire watch has been established.
9.	Install detection to areas beneath switchgears 24-1 and 13-1, and northern portion of Zone 8.2.7.A.	Fall 1986	A roving fire watch has been established.
10.	Install detection in the area column/row 12-14/C-D of the mezzanine floor of the turbine building.	Fall 1986	A roving fire watch has been established.
11.	Install 3-hour seals at the bottom of switchgears 13-1, 14-1, 23-1, and 24-1.	Fall 1986	A roving fire watch has been established.
12.	Provide an alternate feed to Unit 2 Division I RHR Room Cooler from MCC 18-1A.	Fall 1986	A roving fire watch has been established.

TABLE 1 (Cont'd)

	MODIFICATION	STATUS	INTERIM MEASURES
13.	Emergency lighting.	12-31-86	Flashlights are provided in the control room for the NSO's and the SCRE.
14.	Reroute 250-Vdc MCC 2A power feeds.	Fall 1986	Alternate feeds for the RCIC vacuum and condensate pumps have been installed.
15.	Upgrade mechanical penetrations in Appendix R barriers.	Fall 1986	Roving fire watch will be established as appropriate.

ENCLOSURE 2

UPDATED APPENDIX R MODIFICATION SCHEDULES

FOR

QUAD CITIES UNITS 1 AND 2

Revision
7-10-86

ATTACHMENT A

Appendix R Fire Protection Modifications

Quad Cities Station Unit 1

New Modifications

Modification	Completion Date	Remarks
RCIC Vacuum Pump & Condensate Pump Isolation	1-1-86	Complete
Fire Wrap DG 1/2 Cooling Pump Feed	8-1-85	Complete.
Installation of fire dampers in HVAC ducts penetrating fire barriers.	Fall '87 Outage	Involves access to high radiation areas.

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ATTACHMENT A

Appendix R Fire Protection Modifications

Quad Cities Station Unit 2

New Modifications

Modification	Completion Date	Remarks
Alternate feed from MCC 19-1 to RHR Room Cooler 2-5746A	Fall,'86 Outage	Outage related; involves safety related equipment procurement.
Local control of Unit 2 RCIC Steam Supply Valve	Fall '86 Outage	Outage related; involves safety-related equipment procurement.
Reroute of 250 VDC cable to MCC 2A.	Fall '86 Outage	Outage related.
Installation of fire dampers in HVAC ducts penetrating fire barriers.	Fall '86 Outage	Involves access to high radiation areas.

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ATTACHMENT A

Appendix R Fire Protection Modifications

Quad Cities Station Units 1/2

New Modifications

Modification	Completion Date	Remarks
New 125 V DC Cross tie Between Swgr. 13-1 and 23-1.	9-1-85	Complete
Fire Suppression & Detection	3-31-87	Installation has started.
Remove Check Valve in DG1 and DG 1/2 Cooling Pump Crosstie Line.	Spring, '86 Outage	Complete
Addition of fire doors between Unit 1 & Unit 2 RCIC and RHR Corner Rooms.	12-1-85	Complete.
Capability to deenergize RCIC Turbine Governor Flow Control.	9-1-85	Complete.
Isolation of DG 1/2 Breaker Interlock Logic	Fall '86 Outage	Complete.
Installation of additional Emergency Lighting.	7-1-86	Complete except for the final walkdown under blackout conditions. This May result in a need for additional lights. In that case those lights will be installed by the end of 1986.
Fire Barrier Penetration Seals	Fall '86 Outage	Involves access to high rad areas. Unit 1 outage related work will be completed during the Spring '86 Outage.

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7-10-86

ATTACHMENT B

Appendix R Fire Protection Modifications

Quad Cities Station Unit 1

Original Modifications

Modification	NRC Commitment	Remarks
Alternate Feeds to DG 1, 2 Auxiliaries.	Unit 1, Spring '86 Outage	Complete
Separation of 4 kV Switchgear	Unit 1, Spring '84 Outage.	Complete
Fire Protection of 125 VDC Control Power and 4 kV bus duct.	Unit 1, Fall '85 Outage	The reverification Analysis has shown that only the protection of the 4 kV bus duct is required. This work is complete.
Unit 1 RCIC Steam Supply Valve Local Control Capability	Spring '84 Outage	Complete
RHR Pump Cable Rerouting	Unit 1, Spring '84 Outage	Complete
Alternate feed to RHR Room Coolers	Unit 1, Spring '86 Outage	Complete
RHR Fire Protection	Spring '84 Outage	Complete
Safe Shutdown Makeup Pump System	Unit 1, Spring '86 Outage	Complete

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7-10-86

ATTACHMENT B

Appendix R Fire Protection Modifications

Quad Cities Station Unit 2

Original Modifications

Modification	NRC Commitment	Remarks
Alternate Feeds to DG 1, 2 Auxiliaries.	Unit 2, Spring '85 Outage.	Complete
DG 1/2 Vent Fan Isolation	Fall '83 Outage	Complete
Separation of 4 kV Switchgear	Unit 2, Spring '85 Outage.	Complete
Fire Protection of 125 VDC Control Power and 4 kV bus duct.	Unit 2, Spring '85 Outage.	The reverification Analysis has shown that only the protection of the 4 kV bus duct is required. This work is complete.
RHR Pump Cable Rerouting	Unit 2, Spring '85 Outage	Complete
Alternate feed to RHR Room Coolers	Unit 2, Spring '85 Outage	Complete
RHR Fire Protection	Spring '85 Outage	Complete
Safe Shutdown Makeup Pump System	Unit 2, Spring 85' Outage	Complete

Revision
7-10-86

ATTACHMENT B

Appendix R Fire Protection Modifications

Quad Cities Station Unit 1/2

Original Modifications

Modification	NRC Commitment	Remarks
Installation of Fire Doors	2-1-84	Complete
Alternate Feeds to DG 1/2 Cooling Water Pump Cubicle Coolers.	Spring '85 Outage	A reverification analysis calculation has shown that this modification is not needed. Therefore, this modification is cancelled.
Suppression & Detection	2-1-85	Complete
DG 1/2 Cooling Water Pump Isolation Capability	Spring '85 Outage	Complete

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