

DCR 016

Dockets Nos. 50-321
and 50-366

April 18, 1984

Distribution

Docket File

NRC PDR ACRS 10 ✓

L PDR OPA CMiles ✓

ORB#4 Reading SECY

DEisenhut ✓ RDiggs ✓

ORAB ✓

RIngram ✓

GRivenbark

OELD ✓

EJordan ✓

JGrace ✓

TBarnhart 8 ✓

Mr. J. T. Beckham, Jr.
Vice President - Nuclear Generation
Georgia Power Company
P. O. Box 4545
Atlanta, Georgia 30302

Dear Mr. Beckham:

By letter dated July 1, 1982, you requested 12 exemptions from the requirements of Appendix R to 10 CFR 50. In subsequent letters dated April 28, May 27, November 16 and 30 and December 20, 1983 you provided additional information revising some of the previous information and requests, adding additional requests for exemptions and requesting approval for deviations from provisions of several National Fire Protection Association (NFPA) Codes.

We have completed our evaluation and have granted exemptions for all 26 of the areas requested as specified in the enclosed Exemption (Enclosure 1). We have also granted the requested deviations from the provisions of the NFPA Code requirements as discussed in the enclosed Safety Evaluation (Enclosure 2).

Sincerely,

*Original signed by
Darrell G. Eisenhut*

Darrell G. Eisenhut, Director
Division of Licensing

Enclosures:
As stated

cc w/enclosures:
See next page

ORB#4:DL
RIngram
04/3/84

TW
ORB#5
TWambach
04/17/84
ORB#4:DL
GRivenbark;ef
04/3/84

ORB#4:DL
JStolz
04/12/84
4

AD-OR:DL
GLairas
04/17/84

adm
OELD
U. Strickels
04/13/84
4
D:DL
DEisenhut
04/18/84

8405140452 840418
PDR ADDCK 05000321
F PDR



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 18, 1984

Dockets Nos. 50-321
and 50-366

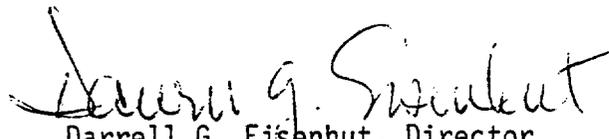
Mr. J. T. Beckham, Jr.
Vice President - Nuclear Generation
Georgia Power Company
P. O. Box 4545
Atlanta, Georgia 30302

Dear Mr. Beckham:

By letter dated July 1, 1982, you requested 12 exemptions from the requirements of Appendix R to 10 CFR 50. In subsequent letters dated April 28, May 27, November 16 and 30 and December 20, 1983 you provided additional information revising some of the previous information and requests, adding additional requests for exemptions and requesting approval for deviations from provisions of several National Fire Protection Association (NFPA) Codes.

We have completed our evaluation and have granted exemptions for all 26 of the areas requested as specified in the enclosed Exemption (Enclosure 1). We have also granted the requested deviations from the provisions of the NFPA Code requirements as discussed in the enclosed Safety Evaluation (Enclosure 2).

Sincerely,


Darrell G. Eisenhut, Director
Division of Licensing

Enclosures:
As stated

cc w/enclosures:
See next page

Hatch 1/2
Georgia Power Company

50-321/366

cc w/enclosure(s):

G. F. Trowbridge, Esq.
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Ruble A. Thomas
Vice President
P. O. Box 2625
Southern Company Services, Inc.
Birmingham, Alabama 35202

Ozen Batum
Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202

Chairman
Appling County Commissioners
County Courthouse
Baxley, Georgia 31513

Mr. L. T. Gucwa
Georgia Power Company
Engineering Department
P. O. Box 4545
Atlanta, Georgia 30302

Mr. H. C. Nix, Jr. General Manager
Edwin I. Hatch Nuclear Plant
Georgia Power Company
P. O. Box 442
Baxley, Georgia 31513

Regional Radiation Representative
EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Resident Inspector
U. S. Nuclear Regulatory Commission
Route 1, P. O. Box 279
Baxley, Georgia 31513

Mr. James P. O'Reilly, Regional
Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Charles H. Badger
Office of Planning and Budget
Room 610
270 Washington Street, S.W.
Atlanta, Georgia 30334

J. Leonard Ledbetter, Commissioner
Department of Natural Resources
270 Washington Street, N.W.
Atlanta, Georgia 30334

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of

GEORGIA POWER COMPANY, ET AL

(Edwin I. Hatch Nuclear Plant,
Units Nos. 1 and 2)

)
)
)
)
)

Dockets Nos. 50-321
and 50-366

EXEMPTION

I.

The Georgia Power Company (GPC or the licensee) and three other co-owners are the holders of Facility Operating Licenses Nos. DPR-57 and NPF-5 which authorize operation of the Edwin I. Hatch Nuclear Plant, Units 1 and 2 (Hatch or the facilities) at steady state reactor power levels not in excess of 2436 megawatts thermal for each unit. The facilities are boiling water reactors located at the licensee's site in Appling County, Georgia. The licenses are subject to all rules and regulations of the Nuclear Regulatory Commission (the Commission).

II.

On November 19, 1980, the Commission published a revised Section 10 CFR 50.48 and a new Appendix R to 10 CFR 50 regarding fire protection features of nuclear power plants (45 FR 76602). The revised Section 50.48 and Appendix R became effective on February 17, 1981. Section III of Appendix R contains fifteen subsections, lettered A through O, each of which specifies requirements for a particular aspect of the fire protection features at a nuclear power plant. One of these fifteen subsections, III.G, is the subject of this Exemption. Specifically, Subsection III.G.2 requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

8405140459 840418
PDR ADOCK 05000321
F PDR

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- b. Separation of cables and equipment and associated non-safety circuits or redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

III.

By letters dated July 1, 1982, as supplemented by letters dated April 28, May 27, November 16 and 30 and December 20, 1983, the licensee requested an exemption from the requirements of Subsection III.G.2 of Appendix R in 26 areas of the Hatch Nuclear Plant, Units 1 and 2. The acceptability of the exemption request for each of these 26 areas is addressed below. More details are contained in the Commission's related Safety Evaluation dated April 18, 1984.

IV.

AREAS: 4160V Transformer Room - Unit 1
West 600V Switchgear Room - Unit 1

The licensee requested exemptions from Section III.G.2 in these two areas to the extent that it requires the installation of automatic fire suppression systems and requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

Both rooms are bounded by walls, floor and ceiling of reinforced concrete and masonry block. The walls have a minimum fire resistance rating of 2 hours. All openings in the walls are protected by 3-hour fire rated doors, dampers or penetration seals. Combustible materials located in the 4160V Transformer Room include cable insulation in conduit and fire retardant-type transformer oil, which represent a negligible fire load. Combustible material located in the West 600V Switchgear Room includes cable insulation, which represents a fire load of 25,000 BTU/sq. ft., and if totally consumed, would equal a fire severity of approximately 20 minutes on the ASTM E-119 time-temperature curve. Existing fire protection in both rooms consists of smoke detection systems, portable fire extinguishers and manual hose stations. The licensee has committed to completely protect the redundant shutdown division in each room by a 1 hour fire rated barrier.

The smoke detection systems provide reasonable assurance of early fire awareness and response by operating personnel and the plant fire brigade. The combustible material in these rooms is limited and widely dispersed. Consequently, we do not expect a fire to propagate rapidly and with a high heat release rate. The 2-hour rated perimeter walls and reinforced concrete ceiling will confine the fire to the room of origin until the arrival of the fire brigade. The fire brigade has sufficient manual fire fighting equipment available to extinguish the fire. Therefore, an automatic fire suppression system is not necessary to limit damage. The 1-hour fire barrier will protect one shutdown related pathway within these rooms until the fire brigade arrives.

Based on our evaluation, we conclude that the existing protection, with the modifications the licensee has committed to make, will provide a level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for these two areas is granted.

- AREAS: Control Building Working Floor, El. 112 Feet - Unit 1
West DC Switchgear Room - Unit 1
East DC Switchgear Room - Unit 1
East 600V Switchgear Room - Unit 1
4160V Transformer Room - Unit 2
West DC Switchgear Room - Unit 2
East DC Switchgear Room - Unit 2
West 600V Switchgear Room - Unit 2
East 600V Switchgear Room - Unit 2

The licensee requested exemptions from Section III.G.2 in these nine areas to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

These rooms are all bounded by walls, floors and ceilings of reinforced concrete and masonry block. Some of the walls are not 3-hour fire rated; however, all walls have a minimum fire resistance rating of 2 hours. Openings in the walls are protected by 3-hour rated doors, dampers or penetration seals.

Cables and components of only one safe shutdown pathway are vulnerable to fire damage in these rooms. Systems associated with the other required pathway are either located outside the room, in a separate fire area, or will be completely protected in a 3-hour fire rated enclosure (Control Building Working Floor - E1. 112 feet). The fire loads in these areas range from 21,000 to 48,000 BTU/sq. ft. Existing fire protection in each of these rooms consists of fire detection systems, portable fire extinguishers and manual hose stations. The Control Building Working Floor area also has partial coverage by an automatic fire suppression system.

The fire loading in these locations is low. Combustible materials are generally dispersed throughout the area. Therefore, a fire, if one should occur, will not be of significant magnitude or duration. Because each room is equipped with fire detectors, we expect the fire to be discovered in its initial stages before serious damage occurs. The fire brigade will then be summoned and will extinguish the fire with portable fire fighting equipment. Because the minimum fire rating of the perimeter walls and floor/ceiling is at least 2 hours, we have reasonable assurance that the damaging effects of a fire will be confined within the room of origin until suppression is achieved. The systems associated with the required redundant shutdown pathway are located outside the fire area and will not be affected by the fire.

Based on our evaluation, we conclude that the existing protection will provide a level of fire protection equivalent to that provided by Section III.G.2, and therefore, the licensee's request for exemption for these areas is granted.

AREAS:

Reactor Building North of Column Line R7 - Unit 1

Reactor Building South of Column Line R7 - Unit 1

Reactor Building North of Column Line R19 - Unit 2

Reactor Building South of Column Line R19 - Unit 2

The licensee requested exemption~~s~~ from Section III.G.2 in these areas to the extent that redundant shutdown systems are required to be protected by either 1) a 3-hour fire rated barrier, or 2) a 1-hour fire rated barrier and area-wide automatic fire detection and suppression systems.

Both the Unit 1 and Unit 2 reactor buildings are divided into two fire areas. The dividing line for Unit 1 is approximately along column line R7 and for Unit 2 is approximately along column line R19. The two areas for each Unit are separated from each other by a combination of existing concrete walls, the drywell and an automatic sprinkler system and draft curtain which the licensee has committed to install along the common boundary between these two areas where no physical barrier exists.

Combustible material within both areas of each unit consists of cable insulation, lube oil, health physics supplies and charcoal filters. Existing fire protection in both areas of each unit includes: an automatic sprinkler system and fire detectors for the Heating, Ventilation and Air Conditioning (HVAC) room on elevation 164 feet, a smoke detection system at the ceiling of working floor elevation 130 feet, portable fire extinguishers and manual hose stations. For Unit 1 only, it also includes a sprinkler system below 130 feet elevation in the High Pressure Coolant Injection (HPCI) room for the north half and in the southwest corner room for the south half. For Unit 2 only, it also includes automatic sprinkler systems located in the northwest corner room below elevation 130 feet for the north half and a sprinkler system in the HPCI room below elevation 130 feet for the south half.

The north half of the Unit 1 reactor building primarily contains components and cables for safe shutdown pathway 2, and the south half primarily contains components and cables for safe shutdown pathway 1. The licensee has committed that those pathway 1 systems that are located in the north half and those pathway 2 systems that are located in the south half of the reactor building will be protected by a 1-hour fire rated barrier or will be relocated outside these respective fire areas.

The north half of the Unit 2 reactor building primarily contains components and cables of safe shutdown pathway 1, and the south half primarily contains components and cables for safe shutdown of pathway 2. The licensee has committed that those pathway 2 systems that are located in the north half and those pathway 1 systems that are located in the south half of the reactor building will either be protected by a complete 1-hour fire rated barrier or will be relocated outside these respective fire areas.

These 1-hour fire rated barriers will extend throughout the respective area and extend to a point 20 feet inside the opposite half of the reactor building. Those required pathway 1 circuits that are not protected by a fire barrier will be relocated outside of this fire area. Also, within the area that will be protected by the automatic sprinkler system, all required safe shutdown related circuits will be enclosed in a 1-hour barrier.

For both Unit 1 and Unit 2, the area that will be covered by the automatic sprinkler system will extend from the east-west centerline of the reactor building into each fire area to a distance of 20 feet beyond the last redundant opposite train component. Where only one train of equipment exists, the area of sprinkler coverage will be 20 feet wide. On elevation 185 feet, the area south of columns R7 on Unit 1 and R19 on Unit 2 will be sprinklered except for the decontamination room. Draft curtains at the ceiling at R7 on Unit 1 and R19 on Unit 2 will be installed to facilitate sprinkler operation and restrict smoke spread from one area to another.

The licensee has also committed to install a fire detection system in the sprinklered areas on elevation 158 feet and in the torus rooms of both Hatch Units 1 and Unit 2. Additional modifications committed to by the licensee for Hatch Unit 2 only include installation of an automatic halon fire suppression system above remote shutdown panels 2C82 - P001B and 1A, upgrade and extension of the existing missile shield around and behind these panels, and installation of a noncombustible partition between these panels from the back of the panel to the missile shield. The licensee also committed to install a fire detection system at these shutdown panels.

The existing fire detection systems and the committed additional fire detectors provide reasonable assurance that a fire will be detected in its initial stages before significant damage occurs. The fire will then be suppressed manually by the plant fire brigade before it represents a serious threat to shutdown systems. The fire suppression systems, fire barriers, the large open areas of the reactor building, and the existing spatial separation between redundant divisions provide assurance that one division will remain free of fire damage until the fire brigade arrives.

Based on our evaluation, we conclude that the existing fire protection, with the proposed modifications, will achieve a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the reactor building (Units 1 and 2) is granted.

AREA: Control Building Health Physics Area - Unit 2

The licensee requested an exemption from Section III.G.2 in this area to the extent that it requires a complete area-wide automatic fire suppression system.

The area is bounded by walls, floor and ceiling of reinforced concrete and masonry construction. All penetrations of these fire barriers are protected by 3-hour fire rated doors, dampers or penetration seals. Redundant systems are separated by approximately 40 feet in this area. The fire load consists of 5160 BTU/sq. ft. which corresponds to an ASTM E-119 fire severity of less than 5 minutes. Existing fire protection includes a smoke detection system, which provides area-wide coverage, manual hose stations and carbon dioxide hose reels.

The licensee has committed to provide automatic sprinkler protection over the shutdown related systems in the area.

Because the fire load is small, any postulated fire will tend to cause damage over a limited area. Because redundant shutdown divisions are separated by about 40 feet, we expect that damage will be sustained by only one pathway. The area is equipped with a complete smoke detection system. Therefore, a fire will be discovered early and would be put out by the fire brigade before serious damage resulted. If a fire should propagate rapidly and produce elevated temperatures, which would represent a threat to shutdown related systems in the area, the sprinkler system will activate to protect the vulnerable systems until the arrival of the fire brigade.

Based on our evaluation, we conclude that the existing protection with the proposed modification will provide a level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Health Physics Area - Unit 2 is granted.

AREA: Control Building Switchgear Hallway - Unit 2

The licensee requested an exemption from Section III.G.2 in this area to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour rated fire barriers.

The area is bounded by walls, floor and ceiling of reinforced concrete and masonry block. With the exception of an opening into the control building south corridor, all penetrations of the fire area boundaries are protected against the propagation of fire.

Combustible material located in this area consists principally of cable insulation in four cable trays, which represent a fire load of approximately 45,000 BTU/sq. ft. This corresponds to an ASTM E-119 fire severity of approximately 1/2 hour. Existing fire protection includes an area-wide smoke detection system, manual hose stations and carbon dioxide hose reels.

Both the control building switchgear hallway and the control building south corridor are equipped with smoke detectors. We, therefore, expect that a fire would be discovered in its initial stages before significant heat build-up occurred. The existing spatial separation between shutdown systems provides assurance that only one shutdown pathway would be damaged before the fire brigade responds and suppresses the fire. If the fire were to propagate through the unprotected perimeter wall opening before the arrival of the fire brigade, the automatic sprinkler system in the south corridor will activate and discharge water in a pattern which would limit the propagation of hot gases. Therefore, the absence of a complete fire barrier will not prevent the achievement and maintenance of safe shutdown conditions.

Based on our evaluation, we conclude that the existing protection, with the committed modifications, provides a level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Switchgear Hallway-Unit 2 is granted.

AREA: Control Building Station Battery Rooms - Units 1 & 2

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

Each battery room is enclosed by walls, floor and ceiling of reinforced concrete or masonry block construction having a fire resistance rating of 3 hours. HVAC duct penetrations of the walls are protected by fire dampers. Access to these rooms is via a single watertight door that is not fire rated. Safe shutdown equipment located in each room consists of one safety division of station batteries and redundant circuits for the drywell air system. The licensee has committed to reroute these circuits as needed to conform to the separation criteria of Section III.G. The licensee states that replacing this door with one that is fire rated will degrade plant safety because the station batteries must be protected from a circulatory water flood, and a non-watertight fire rated door would not provide sufficient protection.

Combustible material located in these rooms include cable insulation, battery casing and hydrogen gas which represent a fire load of approximately 30,000 BTU/sq. ft. Existing fire protection consists of a smoke detection system, manual hose stations and portable fire extinguishers.

The fuel load in these areas is low. If totally consumed, the combustibles would produce a fire which corresponds to a fire severity on the ASTM E-119 time-temperature curve of less than 25 minutes. It is our judgment that a fire in these areas, if one should occur, would not be of significant magnitude or duration. It would be discovered early by the smoke detection system and extinguished by the fire brigade using manual fire fighting equipment. Because the door is watertight, it would prevent smoke from passing through it. Since it is constructed of 5/8-inch thick steel, the door would act as an effective radiant heat shield. The door in conjunction with the ventilation system would prevent convective heat from

increasing to a significant level so as to damage safety systems. Therefore, a 3-hour fire rated door is not necessary to provide reasonable assurance that one safety division would remain free of fire damage.

Based on our evaluation, we conclude that the existing fire protection will provide a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Control Building Station Battery Rooms - Units 1 & 2 is granted.

AREA: Turbine Building Condenser Bay - Unit 2

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

The area is bounded by walls, floor and ceiling constructed of reinforced concrete. However, unsealed electrical penetrations in the west perimeter wall and unsealed mechanical penetrations in the ceiling communicate with adjoining plant locations, which the licensee has designated as separate fire areas. There are no pathway 2 systems located within this fire area. The combustible material in this location consists of turbine lube oil and cable insulation which represent a fire load of about 360,000 BTU/sq. ft. or a fire severity of approximately 6 hours on the ASTM E-119 time-temperature curve. Existing fire protection includes an automatic sprinkler system which protects the drain cooler area, a fire detection system, manual hose stations and portable fire extinguishers.

The principal fire hazard in the condenser bay, which is associated with a turbine oil spill, is mitigated by the presence of the automatic fire suppression system. If a turbine oil or other fire should occur within this area, we expect the existing fire detection system to activate and summon the fire brigade. During the time delay until the arrival

of the fire brigade, the reinforced concrete perimeter walls and ceiling would, to a significant extent, confine the damaging effects of a fire to this area. A small quantity of smoke and hot gases would be expected to propagate beyond the perimeter of these fire areas because of the unprotected penetrations. However, these penetrations are located away from the redundant shutdown systems. Therefore, hot gases passing through the penetrations would not affect components or cabling of the redundant division. The remaining products of combustion would be so diluted by ambient air conditions and the temperature of the air mass would be so diminished that they would not present a threat to the redundant division. Consequently, we have reasonable assurance that if a fire were to occur within this area, safe shutdown conditions could be achieved and maintained.

Based on our evaluation, we conclude that the existing fire protection will achieve a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Unit 2 Turbine Building Condenser Bay is granted.

AREAS: Turbine Building East Cableway - Unit 2
East Cableway - Common
Turbine Building West Cableway, El. 112 feet

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

The East Cableway - Unit 2 area is bounded on two sides by 3-hour rated fire walls. The other two sides are open to an adjoining plant location. The floors and ceiling are of reinforced concrete construction. The licensee has committed to protect the required pathway 1 systems that are located within this cableway by a 1-hour fire rated barrier. Combustible material within this area consists primarily of cable insulation and oil, which represent a fuel load of approximately 340,000 BTU/sq. ft. or a fire severity of about 4-1/2 hours. Existing fire protection includes an area-wide automatic sprinkler system, an open-head deluge-type fire suppression system for the oil conditioner unit, an area-wide smoke detection system, portable fire extinguishers and manual hose stations.

The East Cableway - Common area is bounded on three sides by reinforced concrete and masonry block walls having a 3-hour fire rating. The fourth side is open to an adjoining plant location. The floor and ceiling are of reinforced concrete construction. The licensee has committed to protect the required systems associated with the redundant pathway with a 1-hour fire barrier. In lieu of protecting the cables for the compressed nitrogen system valve (2T48-F026), the licensee has committed to lock the valve open to assure proper alignment for safe shutdown. Combustible material within this area consists primarily of cable insulation which represents a fire load of approximately 220,000 BTU/sq. ft. or a fire severity of about 3 hours based on the ASTM E-119 time-temperature curve. Existing fire protection includes an automatic sprinkler system located throughout the area, an area-wide smoke

detection system, a noncombustible radiant energy shield between redundant shutdown divisions, manual hose stations and portable fire extinguishers.

The West Cableway, El. 112 ft. area is bounded by walls, floor and ceiling of reinforced concrete construction. There are no systems from the redundant shutdown capability located within the west cableway or adjoining areas. Combustible material located in this area consists primarily of cable insulation. Existing fire protection includes an area-wide automatic sprinkler system and heat detection system, manual hose stations and portable fire extinguishers.

If a fire were to occur within any of the above three areas, the existing fire detection system would activate during the early stages of a fire and summon the fire brigade. If the room temperature rose significantly, the automatic sprinkler system would activate and suppress the fire while protecting the exposed shutdown systems. Until the fire burned itself out, or was extinguished manually by the fire brigade or automatically by the fire suppression system, the committed 1-hour fire barriers would provide reasonable assurance that one shutdown division would remain free of damage. A small quantity of smoke and hot gases would be expected to propagate beyond the perimeter of these fire areas because of the unprotected penetrations. However, these penetrations are located away from the redundant shutdown systems. Therefore, hot gases passing through the penetrations would not affect components or cabling of the redundant division. The remaining products of combustion would be so diluted by ambient air conditions and the temperature of the air mass would be so diminished that they would not present a threat to the redundant division.

If a fire were to occur outside of these areas, smoke and heat which would result from a fire would be dissipated throughout the area of fire origin. The existing smoke and heat detection systems would activate or plant operators would discover the fire and summon the plant fire brigade. The fire brigade would then extinguish the fire before shutdown systems within the areas became vulnerable. If a sufficient temperature rise were to occur within these areas, the automatic sprinkler system would activate to protect the exposed systems. Therefore, complete 3-hour fire rated walls around the cableways would not significantly enhance the level of fire protection. We, therefore, have reasonable assurance that safe shutdown conditions could be achieved and maintained.

Based on our evaluation, we conclude that the existing fire protection, with the proposed modifications, will achieve a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for these three areas is granted.

AREA: Diesel Building Switchgear Room 2G - Unit 2

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of an area-wide automatic fire suppression system.

The room is enclosed by walls, floor and ceiling of reinforced concrete. Combustible material located in this room includes cable insulation which represents a fire load of 53,460 BTU/sq. ft. or a fire severity of approximately 45 minutes. Existing fire protection consists of heat and smoke detection systems, portable fire extinguishers, a carbon dioxide hose reel and hose lines from outside hydrants. The licensee has committed to protect the required pathway 1 system in a 1-hour fire rated barrier.

Active protection in this area consists of the heat and smoke detection systems. We expect that they would activate in the early stages of a fire and summon the plant fire brigade which would extinguish the fire before serious damage occurs. Passive protection is achieved by the 1-hour fire rated barrier for the shutdown pathway 1 systems and the fire rated perimeter construction.

The combustible material in this room is limited and widely dispersed. Consequently, we do not expect a fire would propagate widely or with a high heat release rate. The reinforced concrete walls, floor and ceiling will confine the fire to this room until the arrival of the fire brigade. The brigade has sufficient manual fire fighting equipment available to extinguish the fire. Therefore, an automatic fire suppression system is not necessary to limit damage. The 1-hour fire barrier, which completely protects the systems for one shutdown pathway until the fire brigade arrives, will provide reasonable assurance that safe shutdown can be achieved and maintained.

Based on our evaluation, we conclude that the existing fire protection, with the committed modifications, will provide a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Diesel Building Switchgear Room 2G - Unit 2 is granted.

AREA: Control Building Corridor - Common

The licensee requested exemptions from Section III.G.2 in this area to the extent that it requires: 1) a complete 3-hour fire rated barrier between redundant shutdown divisions; or 2) a 1-hour barrier between redundant divisions and area-wide automatic fire suppression and detection systems.

The area is bounded by 2- and 3-hour fire rated walls with openings protected by fire doors, fire dampers and penetration seals. However, the east portion of the south wall is open to the switchgear hallway, and the west wall is open to the fan room in the service building. The floor and ceiling are of reinforced concrete construction.

It was assumed that all systems for safe shutdown pathway 1 were lost in a fire in this area. The licensee has committed that those required pathway 2 systems that cannot be repaired within 72 hours, as stipulated in Section III.G.1, will be completely protected by a 1-hour fire rated barrier. The barrier for essential panel (R 25-S002) will extend from the floor to the top of the panel. The barrier will be open at the top to allow adequate ventilation of the panel.

The combustible material in this area consists primarily of cable insulation which represents a fuel load of approximately 334,000 BTU/sq. ft. In addition, a 1-inch hydrogen gas line which has a 2-inch protective pipe casing, passes along the west wall of the corridor. A compressed gas cylinder containing a mixture of 10% methane and 90% argon is located in the area within a concrete block enclosure. Existing fire protection includes an automatic sprinkler system installed at the level of the ceiling. Additional sprinklers are installed beneath the lowest cable trays in the north corridor to protect against exposure fires. The sprinkler system does not extend to the rest rooms, the decontamination rooms in the health physics area and the HVAC room, all of which are part of the same fire area, but contain no safe shutdown equipment. Additional protection includes a complete area-wide smoke detection system, portable fire extinguishers and manual hose stations.

If a fire were to occur within the corridor, the existing smoke detection system would activate during the early stages of a fire and summon the fire brigade. If room temperatures rose significantly, the sprinkler system would activate and suppress the fire while protecting the exposed shutdown systems and limiting further fire spread. Until the fire was completely extinguished, adequate passive protection is available to ensure that one shutdown pathway will be free of fire damage. This passive protection includes varying degrees of spatial separation between redundant divisions and 1-hour fire rated barriers. Although the barrier at panel R25-S002 does not extend from floor to ceiling, it is high enough to protect the panel from radiant heat and direct flame impingement; coupled with the existence of the automatic sprinkler system, the barrier provides reasonable assurance that the panel will remain free of damage.

If a fire were to occur outside of the control building corridor, the 2- and 3-hour fire rated walls and reinforced concrete floors and ceiling would tend to limit fire propagation into this area. Because of the unprotected openings, a quantity of smoke and heat is expected to enter this fire area. However, the sprinkler system and 1-hour fire barriers are expected to limit damage to the systems associated with shutdown pathway 1. The redundant pathway would then be available to achieve and maintain safe shutdown conditions.

With regard to the unsprinklered rooms within this area, no shutdown related systems are located within them. Consequently, localized fire damage would not affect safe shutdown. The sprinkler system in the corridor and the fire brigades provide reasonable assurance that if the fire were to spread beyond these rooms, one shutdown division would remain free of damage.

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration, with committed modifications, will provide a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Corridor - Common is granted.

AREA: River Intake Structure

The licensee requested an exemption from the requirements of Section III.G.2 to the extent that it requires the installation of a complete, area-wide automatic fire suppression system.

The building is enclosed within walls, floor and ceiling of reinforced concrete. Safe shutdown equipment located within this fire area includes both safety divisions of Residual Heat Removal (RHR) service water pumps and associated cabling and motor control centers (MCC) for both units. In addition, this area contains both safety divisions of plant service water pumps and associated cabling and MCCs for both units. Redundant safety circuits are located in conduit and cable trays and are either separated by more than 20 feet without intervening combustibles, or one train will be protected by a 1-hour fire rated barrier as described in the May 27, 1983, revision to the licensee's Appendix R report. One-half inch steel plate barriers have been installed to separate RHR service water pumps and MCCs for each unit, and to separate the service water pumps from the remainder of the equipment in the building.

Combustible materials located in the area include cable insulation and lube oil representing a fire load of 55,000 BTU/sq. ft. Existing fire protection consists of a smoke detection system, a wet-pipe automatic sprinkler system protecting the RHR and plant service water pump motors, manual hose stations and portable fire extinguishers.

The technical requirements of Section III.G.2 are not met in this area because of the absence of an area-wide automatic fire suppression system. In addition, the fire barriers between the pumps and MCCs are not 1-hour fire rated. In this area the smoke detection system will provide reasonable assurance of early fire awareness and response by operating personnel and the plant fire brigade. The fire loading in this location, which includes anticipated transient combustibles, is low. If the combustibles were totally consumed, they would produce a fire which corresponds to a fire severity on the ASTM time-temperature curve of less than 50 minutes; but this fire would be unlikely to occur because of the existing level of fire protection. It is our judgment that a fire in this area would not be significant and would not breach the protection provided by physical fire barriers until the fire self-extinguished or was suppressed by the plant fire brigade. We, therefore, have reasonable assurance that one safe shutdown pathway will be free of fire damage.

Based on our evaluation, we conclude that the existing fire protection, with the committed modification, will provide a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the River Intake Structure is granted.

AREA: East Corridor, Control and Turbine Building and Condensate Pump Area, E1.

112 Feet

The licensee requested an exemption from the technical requirements of Section III.G.2 to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

The area is bounded by 3-hour fire rated walls, floor and ceiling. However, the common walls between this location and the condenser and west cableway areas are of non-fire rated reinforced concrete. In addition, an open stairway connects this area with the east cableway. There are no pathway 2 systems within this area. The fire load has been estimated to be approximately 34,000 BTU/sq. ft. or a fire severity of about 25 minutes. Existing fire protection includes an area-wide fire detection system, manual hose stations and portable fire extinguishers.

Combustible materials within this area are limited. We, therefore, do not expect a fire to propagate rapidly or produce significantly elevated temperatures. Because of the fire detection system, we expect a fire to be detected early and suppressed by the plant fire brigade before significant damage resulted. Because of the open stairway into the east cableway, smoke and heat from a fire is expected to propagate into this area; but, if this occurs, the automatic sprinkler system in the east cableway will activate to protect exposed shutdown related cables and limit further fire spread. Systems from only one shutdown pathway are located within the area, and a redundant shutdown capability is outside of this location. It is therefore our judgment that, because of the masonry and reinforced concrete perimeter construction, coupled with the sprinkler system in the east cableway, fire damage would be limited and systems from just one shutdown pathway would be lost. The redundant pathway would remain free of damage so as to achieve and maintain safe shutdown conditions.

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration will provide a level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the East Corridor, Control and Turbine Building and Condensate Pump Area, El. 112 feet is granted.

V.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemptions requested by the licensee's letters as referenced and discussed in III. and IV. above are authorized by law, will not endanger life or property or the common defense and security, are otherwise in the public interest, and are hereby granted.

The Commission has determined that the granting of these Exemptions will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with this action.

A copy of the Safety Evaluation dated April 18, 1984 related to this action is available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555 and at the Appling County Public Library, 301 City Hall Drive, Baxley, Georgia.

This Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 18th day of April, 1984.



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO EXEMPTION FROM 10 CFR 50, APPENDIX R
GEORGIA POWER COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 & 2

DOCKETS NOS. 50-321 AND 50-366

1.0 Introduction

By letter dated July 1, 1982, Georgia Power Company (the licensee) submitted an Appendix R evaluation. Twelve exemptions to the technical requirements of Section III.G were requested. We evaluated this information, concluded that in five areas of the plant the level of fire safety was equivalent to that achieved by compliance with the technical requirements of Section III.G of Appendix R and concluded that the exemptions should be granted. We concluded that the fire protection in the remaining seven areas did not provide an equivalent level of safety to that of Section III.G of Appendix R and the exemption requests should be denied.

In a meeting with the licensee on March 30, 1983, and in subsequent letters dated April 28, May 27, November 16, 30 and December 20, 1983, we received additional information. This included:

- ° Commitments to provide additional fire protection in those areas where we had previously concluded that exemptions should be denied;
- ° Revisions to the descriptions of the areas where we had concluded that exemptions should be granted;
- ° Requests for exemptions from Section III.G of Appendix R in 21 additional plant areas, which superseded the seven exemptions which we had previously concluded should be denied;
- ° A request for approval for deviations from the provisions of several National Fire Protection Association (NFPA) Codes pertaining to the installation and maintenance of fire protection systems.

This Safety Evaluation covers the exemptions for all 26 areas as well as the NFPA Code deviations.

Our requirements for the fire protection for safe shutdown are as follows:

Section III.G.2 of Appendix R requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

If these conditions are not met, Section III.G.3 requires alternative shutdown capability independent of the fire area of concern. It also requires a fixed suppression system to be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are accepted.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified in the rule rather than the design basis fire. Plant specific features may require protection different than the measures specified in Section III.G. In such a case, the licensee must demonstrate, by means of a detailed fire hazards analysis, that existing protection or existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Fire protection configurations must either meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazards analysis.

~*~

Our general criteria for accepting an alternative fire protection configuration are the following:

- ° The alternative assures that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control stations is free of fire damage.
- ° The alternative assures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited such that it can be repaired within a reasonable time (minor repairs with components stored on-site).
- ° Modifications required to meet Section III.G would not enhance fire protection safety above that provided by either existing or proposed alternatives.

- Modifications required to meet Section III.G would be detrimental to overall facility safety.

2.0.1 4160V Transformer Room - Unit 1

2.0.2 West 600V Switchgear Room - Unit 1

2.1 Exemptions Requested

The licensee requested exemptions from Section III.G.2 in these areas to the extent that it requires the installation of automatic fire suppression systems and requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

2.2.1 Discussion (4160V Transformer Room)

The room is bounded by walls, floor and ceiling of reinforced concrete and masonry block. The walls have a minimum fire resistance rating of 2 hours. All openings in the walls are protected by 3-hour fire rated doors, dampers or penetration seals. All components associated with safe shutdown pathway 1 were assumed lost in a fire in the room. Pathway 2 systems which require protection to assure their availability during a fire are those associated with residual heat removal (RHR) and the reactor recirculation system. Combustible materials located in the room include cable insulation in conduit and fire retardant-type transformer oil, which represent a negligible fire load.

Existing fire protection consists of a smoke detection system, portable fire extinguishers and manual hose stations.

By letter dated July 1, 1982, the licensee proposed to completely protect the required pathway 2 systems in the room by a 1-hour fire rated barrier.

2.2.2 Discussion (West 600V Switchgear Room)

The room is enclosed by walls, floor and ceiling of reinforced concrete and masonry block. The walls have a minimum fire resistance rating of 2 hours. All openings in the walls are protected by 3-hour fire rated doors, dampers or penetration seals.

All components of safe shutdown pathway 1 were assumed lost in a fire in this room. Pathway 2 systems which require protection to assure their availability during a fire are those associated with:

1. Suppression chamber temperature elements,
2. Reactor pressure vessel level indication,
3. Suppression chamber level indication;
4. Plant service water, and
5. Automatic depressurization system.

Combustible materials located in the room include cable insulation, which represents a fire load of 25,000 BTU/sq. ft. This material, if totally consumed, would equal a fire severity of approximately 20 minutes on the ASTM E-119 time-temperature curve.

Existing fire protection includes a smoke detection system, portable fire extinguishers and manual hose stations.

By letter dated July 1, 1982, the licensee proposed to completely protect the required pathway 2 systems in the room by a 1-hour fire rated barrier.

The licensee justified the exemptions in these two areas on the basis of the low fire load, the existing fire protection, and the ability of the perimeter construction and proposed pathway 2 fire barrier to limit damage until the arrival of the fire brigade.

2.3 Evaluation

The technical requirements of Section III.G are not met in these rooms because of the lack of an area-wide automatic fire suppression system. In addition, the perimeter walls, which separate redundant shutdown divisions, are not 3-hour fire rated.

The fire protection requirements of Section III.G of Appendix R represent an aggregate, comprised of active and passive components. They act synergistically to achieve an acceptable level of fire safety. In the subject areas, the licensee has provided active protection in the form of complete smoke detection systems. These systems provide reasonable assurance of early fire awareness and response by operating personnel and the plant fire brigade.

Passive protection is achieved in these areas by the 1-hour fire rated barrier for the required shutdown pathway 2 systems and the fire rated perimeter construction.

The combustible material in these rooms is limited and widely dispersed. Consequently, we do not expect a fire to propagate rapidly and with a high heat release rate. The 2-hour rated perimeter walls and reinforced concrete ceiling will confine the fire to the room of origin until the arrival of the fire brigade. The fire brigade has sufficient manual fire fighting equipment available to extinguish the fire. Therefore, an automatic fire suppression system is not necessary to limit damage.

Until the fire brigade arrives, the 1-hour fire barrier will protect one shutdown related pathway within these rooms.

2.4 Conclusion

Based on our evaluation, we conclude that the existing protection, with the proposed modifications, will provide reasonable assurance that one safe shutdown division will be free of fire damage and will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the following rooms should be granted:

1. 4160V Transformer Room - Unit 1,
 2. West 600V Switchgear Room - Unit 1.
-
- 3.0.1 Control Building Working Floor, El. 112 Feet - Unit 1
 - 3.0.2 West DC Switchgear Room - Unit 1
 - 3.0.3 East DC Switchgear Room - Unit 1
 - 3.0.4 East 600V Switchgear Room - Unit 1
 - 3.0.5 4160V Transformer Room - Unit 2
 - 3.0.6 West DC Switchgear Room - Unit 2
 - 3.0.7 East DC Switchgear Room - Unit 2
 - 3.0.8 West 600V Switchgear Room - Unit 2
 - 3.0.9 East 600V Switchgear Room - Unit 2

3.1 Exemptions Requested

The licensee requested exemptions from Section III.G.2 in these areas to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

3.2 Discussion

These rooms are all bounded by walls, floors and ceilings of reinforced concrete and masonry block. Some of the walls are not 3-hour fire rated; however, all walls have a minimum fire resistance rating of 2 hours. Openings in the walls are protected by 3-hour rated doors, dampers or penetration seals.

Cables and components of only one safe shutdown pathway are vulnerable to fire damage in these rooms. Systems associated with the other required pathway are either located outside the room, in a separate fire area, or will be completely protected in a 3-hour fire rated enclosure (Control Building Working Floor - El. 112 feet).

The fire load and fire protection for these areas are tabulated below:

<u>ROOM</u>	<u>FIRE LOAD</u> <u>(BTU/SQ. FT.)</u>	<u>PORT.</u> <u>EXT.</u>	<u>HOSE</u> <u>STATION</u>	<u>FIRE</u> <u>DETECTION</u>	<u>AUTO. FIRE</u> <u>SUPPRESSION</u>
CB, WF-1	36,000	Yes	Yes	Yes	Partial
W, DC SG-1	47,000	Yes	Yes	Yes	No
E, DC SG-1	42,000	Yes	Yes	Yes	No
E, 600V SG-1	21,000	Yes	Yes	Yes	No
4160V Trans.-2	48,000	Yes	Yes	Yes	No
W, DC SG-2	48,000	Yes	Yes	Yes	No
E, DC SG-2	42,000	Yes	Yes	Yes	No
W, 600V SG-2	26,000	Yes	Yes	Yes	No
E, 600V SG-2	21,000	Yes	Yes	Yes	No

The licensee justified the exemptions in these areas on the basis of the low fire load, existing fire protection and the availability of an unaffected shutdown capability which is outside of the fire area.

3.3 Evaluation

The technical requirements of Section III.G are not met in these areas because redundant shutdown divisions are not separated by complete 3-hour rated fire barriers.

The fire loading in these locations is low. Combustible materials are generally dispersed throughout the area. Therefore, a fire, if one should occur, would not be of significant magnitude or duration. Because each room is equipped with fire detectors, we expect the fire to be discovered in its initial stages before serious damage occurred. The fire brigade would then be summoned and would extinguish the fire with portable fire fighting equipment.

There is an inherent time delay between the advent of fire and the arrival of the plant fire brigade. It has been our experience that this delay can be up to half an hour. Because the minimum fire rating of the perimeter walls and floor/ceilings is at least 2 hours, we have reasonable assurance that the damaging effects of a fire will be confined within the room of origin until suppression is achieved.

Since the systems associated with the required redundant shutdown pathway are located outside the fire area, the capability to achieve and maintain safe shutdown conditions will not be affected by the fire.

3.4 Conclusion

Based on our evaluation, we conclude that the existing protection will provide reasonable assurance that one required safe shutdown division will be free of fire damage and will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the following rooms should be granted:

1. Control Building Working Floor El. 112 Feet - Unit 1
2. West DC Switchgear Room - Unit 1
3. East DC Switchgear Room - Unit 1
4. East 600V Switchgear Room - Unit 1
5. 4160V Transformer Room - Unit 2
6. West DC Switchgear Room - Unit 2
7. East DC Switchgear Room - Unit 2
8. West 600V Switchgear Room - Unit 2
9. East 600V Switchgear Room - Unit 2

- 4.0.1 Reactor Building North of Column Line R7 - Unit 1
- 4.0.2 Reactor Building South of Column Line R7 - Unit 1
- 4.0.3 Reactor Building North of Column Line R19 - Unit 2
- 4.0.4 Reactor Building South of Column Line R19 - Unit 2

4.1 Exemptions Requested

The licensee requested exemptions from Section III.G.2 in these areas to the extent that redundant shutdown systems are required to be protected by either:

- 1) a 3-hour fire rated barrier; or
- 2) a 1-hour fire rated barrier and area-wide automatic fire detection and suppression systems.

4.2.1 Discussion (RB North of Column Line R7 - Unit 1)

The Unit 1 reactor building consists of two fire areas. The dividing line is approximately along column line R7. The two areas are separated from each other by a combination of existing concrete walls, the drywell and a proposed automatic sprinkler system which will be installed along the common boundary between these two areas where no physical barrier exists. The reactor building on the north side consists of seven distinct zones, one for each level of the building, the two diagonal rooms and the High Pressure Coolant Injection (HPCI) room on the lower level, and the upper levels above elevation 185 feet. However, because of open stairways, unprotected wall openings and other non-fire-rated features in the perimeter construction, these zones are considered together as a single fire area.

The north half of the reactor building primarily contains components and cables for safe shutdown pathway 2. All pathway 2 systems are assumed lost in a fire and pathway 1 systems will be relied upon to achieve and maintain safe shutdown conditions. Those pathway 1 systems that are located in the north half of the reactor building will be protected by a 1-hour fire rated barrier or will be relocated as described in the licensee's May 27, 1983, revision to its Appendix R report.

Combustible material within this area consists of cable insulation, lube oil, health physics supplies and charcoal filters.

Existing fire protection includes a preaction sprinkler system and fire detectors for the Heating, Ventilation and Air Conditioning (HVAC) room on elevation 164 feet, a sprinkler system in the HPCI room below elevation 130 feet, a smoke detection system at the ceiling of Working Floor elevation 130 feet, portable fire extinguishers and manual hose stations.

By letter dated May 27, 1983, the licensee proposed to install an automatic sprinkler system to protect against the spread of fire from one half of the reactor building to the other. The area covered by the system will extend from the east-west centerline of the reactor building into each fire area to a distance of 20 feet beyond the last redundant opposite train component. Where only one train of equipment exists, the area of sprinkler coverage will be 20 feet wide. On elevation 185 feet, the area south of column R7 will be sprinklered except for the decontamination room. Draft curtains at the ceiling at R7 will be installed to facilitate sprinkler operation and restrict smoke spread from one area to another. The licensee also committed to install a fire detection system in the sprinklered areas on elevation 158 feet and the torus room.

All required pathway 1 circuits located north of column line R7 will be enclosed in a 1-hour fire rated barrier. The barrier will extend throughout this fire area and extend to a point 20 feet south of the area boundary at R7. Those required pathway 1 circuits that are not protected by a fire barrier will be relocated outside of this fire area. Also, within the area protected by the proposed sprinkler system, all required safe shutdown related circuits will be enclosed in a 1-hour barrier.

4.2.2 Discussion (RB South of Column Line R7 - Unit 1)

The reactor building south of R7 consists of five distinct zones, one for each level of the building and two diagonal rooms on the lower level. As described above, open stairways, unprotected wall penetrations and other non-fire-rated features in the perimeter construction necessitate that these zones be considered together as a single fire area.

The south half of the reactor building primarily contains components and cables for safe shutdown pathway 1. All pathway 1 systems are assumed lost in a fire and pathway 2 systems will be relied upon to achieve and maintain safe shutdown conditions. The required pathway 2 systems that are located south of column R7 will be protected by a 1-hour fire rated barrier or will be relocated into another fire area.

Combustible materials in this area consist of cable insulation, lube oil, health physics supplies and charcoal filters.

Existing fire protection includes a sprinkler system and fire detection system for the HVAC room on elevation 164 feet, a sprinkler system in the southwest corner room below elevation 130 feet, a smoke detection system at the ceiling of Working Floor elevation 130 feet, portable fire extinguishers and manual hose stations.

In the May 27, 1983, revision to the Appendix R report, the licensee proposed to install an automatic sprinkler system to protect against the spread of fire from one half of the reactor building to the other. This system is described in Section 4.2.1.

All required pathway 2 circuits located south of column R7 will be enclosed in a 1-hour fire rated barrier. The barrier will extend throughout this fire area and extend to a point 20 feet north of the area boundary. Those required pathway 2 circuits that are not protected by a fire barrier will be relocated outside of this fire area. Also, within the area protected by the proposed sprinkler system, all required safe shutdown related circuits will be enclosed in a 1-hour barrier.

4.2.3 Discussion (RB North of Column Line R19 - Unit 2)

The Unit 2 reactor building consists of two fire areas. The dividing line is approximately along column line R19. The two areas are separated from each other by a combination of existing concrete walls, the drywell and a proposed automatic sprinkler system which will be installed along the common boundary between these two areas where no physical barrier exists. The reactor building north of column line R19 consists of five distinct zones,

one for each level of the building and the two diagonal rooms on the lower level. However, open stairways, unprotected wall openings and other non-fire-rated features in the perimeter construction necessitate that these zones be considered together as a single fire area.

The north half of the reactor building primarily contains components and cables of safe shutdown pathway 1. All pathway 1 systems are assumed lost in a fire and required pathway 2 systems will be relied upon to achieve and maintain safe shutdown conditions. Those pathway 2 systems that are located north of column line R19 will either be protected by a complete 1-hour fire rated barrier or will be relocated.

Combustible materials within this area consist of cable insulation, lube oil, health physics supplies and charcoal filters.

Existing fire protection includes automatic sprinkler systems located in the northwest corner room below elevation 130 feet and in the HVAC room on elevation 164 feet, ceiling mounted smoke detectors at Working Floor elevation 130 feet, portable fire extinguishers and manual hose stations.

In the May 27, 1983, revision to the Appendix R report, the licensee proposed to install an automatic sprinkler system and draft curtains to protect against the spread of fire from one half of the reactor building to the other. The design concept for this system is described in Section 4.2.1. On elevation 185 feet the area south of column line R19 will be sprinklered except for the decontamination room.

Additional modifications include the installation of an automatic halon fire suppression system above remote shutdown panels 2C82 - P001B and 1A; upgrade and extension of the existing missile shield around and behind these panels; and installation of a noncombustible partition between these panels from the back of the panel to the missile shield. Also, the licensee committed to install fire detection systems in the sprinklered areas on elevation 158 feet, for the two sprinklered areas of the torus room, and at the above referenced panels.

All required pathway 2 circuits located north of column line R19 will be enclosed in a 1-hour fire barrier. The barrier will extend throughout this fire area and extend to a point 20 feet south of the area boundary at R19. Those pathway 2 circuits that are not protected by a fire barrier will be relocated outside of the fire area.

The licensee also committed to separate circuits for two of the safety relief valves of the ADS system to achieve compliance with Appendix R.

4.2.4 Discussion (RB South of Column Line R19 - Unit 2)

The reactor building south of R19 consists of eight distinct zones, one for each level of the building, the HVAC room on elevation 164 feet, two corner rooms and the HPCI room below elevation 130 feet, and the upper elevations. As described above, unprotected stairways and wall penetrations necessitate that these zones be considered together as a single fire area.

The south half of the reactor building primarily contains components and cables of safe shutdown pathway 2. Pathway 1 systems will be relied upon if a fire should occur in this area. The required pathway 1 systems that are located south of R19 will either be protected by a 1-hour fire barrier or located outside of the area.

Combustible materials in the area consist of cable insulation, lube oil, health physics supplies and charcoal filters.

Existing fire protection includes a sprinkler system in the HVAC room at elevation 164 feet and the HPCI room below elevation 130 feet, ceiling mounted smoke detectors at Working Floor elevation 130 feet, portable fire extinguishers and manual hose stations.

The proposed fire protection modifications include the installation of an automatic sprinkler system, the installation of fire barriers and the rerouting of circuits as described in Section 4.2.3.

Justification

The licensee justifies the exemptions in these four areas on the basis of the adequacy of the existing fire protection, the proposed modifications, and the availability of a undamaged redundant shutdown capability which is independent of the fire area.

4.3 Evaluation

The technical requirements of Section III.G.2 are not met in these areas because: 1) redundant shutdown divisions in either half of the reactor building are not separated from each other by continuous 3-hour fire rated barriers; and 2) redundant divisions are not separated by continuous 1-hour fire barriers and protected by area-wide automatic fire suppression and detection systems.

We had two principal concerns with the level of fire protection in these areas. The first was that because each half of the reactor building was open to the other, a fire occurring on one side could spread to the other and damage systems associated with the redundant shutdown division.

However, the licensee has proposed to install automatic sprinkler systems and draft curtains at the common boundary between the two fire areas in the reactor building where no physical barrier exists. The draft curtains, located at the ceiling, will retard smoke spread from one area to another and will also bank heat so as to facilitate sprinkler operation. The sprinkler system, consisting of close-spaced, thermally activated sprinkler heads, is expected to discharge water in a "curtain" fashion to prevent significant

horizontal fire propagation. Such systems have been used successfully to protect conveyor openings in fire walls and escalator openings in buildings. Because this is a water barrier rather than a continuous masonry wall, we expect a small quantity of smoke and heat to pass through the water curtain. However, the smoke and hot gases would be so cooled and dispersed throughout the large open areas of the reactor building so as to pose no credible threat to the redundant shutdown division.

Our second concern was that in those locations where components for redundant shutdown pathways were either not separated by the water curtain or were located in close proximity to each other on either side of the curtain, a fire could cause damage to both. An example would be panels 2C82-P001A and 18. However, the licensee has committed to enclose vulnerable shutdown related cable in a fire rated barrier. In addition, the proposed sprinkler system will cover an area with a minimum width of 20 feet extending in some areas to 20 feet beyond locations where redundant systems are located in close proximity to one another. The panels identified above will be protected by non-combustible barriers, an automatic halon fire suppression system and fire detectors.

The existing fire detection systems and the proposed additional fire detectors will provide reasonable assurance that a fire will be detected in its initial stages before significant damage occurred. The fire would then be suppressed manually by the plant fire brigade before it represented a serious threat to shutdown systems. Until the fire brigade arrives, the fire suppression systems, fire barriers, the large open areas of the reactor building, and the existing spatial separation between redundant divisions will provide reasonable assurance that one division will remain free of fire damage to achieve and maintain safe shutdown conditions.

4.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, with the proposed modifications, will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the reactor building (Units 1 & 2) should be granted.

5.0 Control Building Health Physics Area - Unit 2

5.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 in this area to the extent that it requires a complete area-wide automatic fire suppression system.

5.2 Discussion

The area is bounded by walls, floor and ceiling of reinforced concrete and masonry construction. All penetrations of these fire barriers are protected by 3-hour fire rated doors, dampers or penetration seals.

All components of safe shutdown pathway 1 were assumed lost in a fire in this location. Pathway 2 systems which require protection to assure their availability during a fire are those associated with:

1. Diesel generator 2C and power distribution
2. Residual heat removal
3. High pressure coolant injection
4. Plant service water

Redundant systems are separated by approximately 40 feet in this area.

The fire load consists of 5160 BTU/sq. ft. which corresponds to an ASTM E-119 fire severity of less than 5 minutes.

Existing fire protection includes a smoke detection system, which provides area-wide coverage, manual hose stations and carbon dioxide hose reels.

In the May 27, 1983, revision to the Appendix R report, the licensee proposed to provide automatic sprinkler protection over the shutdown related systems in the area.

The licensee justifies the exemption on the basis of the low fire load, the existing protection and the proposed modification.

5.3 Evaluation

The technical requirements of Section III.G are not met because the sprinkler system does not provide complete protection for the entire area.

We were concerned that if a fire occurred in a portion of the area not protected by the sprinkler system, redundant shutdown systems would be damaged.

However, because the fire load is small, any postulated fire would tend to cause damage over a limited area. Because redundant shutdown divisions are separated by about 40 feet, we expect that damage would be sustained by only one pathway.

The area is equipped with a complete smoke detection system. Therefore, a fire would be discovered early and would be put out by the fire brigade before serious damage resulted. If a fire should propagate rapidly and produce elevated temperatures, which would represent a threat to shutdown related systems in the area, the sprinkler system would activate to protect the vulnerable systems until the arrival of the fire brigade.

5.4 Conclusion

Based on our evaluation, we conclude that the existing protection with the proposed modification will provide reasonable assurance that one safe shutdown division will be free of fire damage and will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Health Physics Area - Unit 2 should be granted.

6.0 Control Building Switchgear Hallway - Unit 2

6.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 in this area to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour rated fire barriers.

6.2 Discussion

The area is bounded by walls, floor and ceiling of reinforced concrete and masonry block. With the exception of an opening into the control building south corridor, all penetrations of the fire area boundaries are protected against the propagation of fire.

All components of safe shutdown pathway 2 were assumed lost in a fire in this location. All pathway 1 systems will be relocated outside of the fire area. However, because of the opening in the perimeter wall, shutdown systems in the fire area will be separated from their redundant counterparts in the control building common corridor by the south corridor. The south corridor is 25 feet long and is equipped with smoke detectors and a sprinkler system.

Combustible material located in this area consists principally of cable insulation in four cable trays, which represents a fire load of approximately 45,000 BTU/sq. ft. This corresponds to an ASTM E-119 fire severity of approximately 1/2 hour.

Existing fire protection includes an area-wide smoke detection system, manual hose stations and carbon dioxide hose reels.

The licensee justifies the exemption on the basis of the separation between redundant shutdown systems and the fire protection for the intervening space.

6.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because redundant shutdown divisions are not completely separated by a 3-hour fire rated barrier.

We were concerned that because of the opening in the common wall between the subject fire area and the control building south corridor, a fire could spread to both areas and damage systems from both shutdown divisions.

However, both areas are equipped with smoke detectors. We, therefore, expect that a fire would be discovered in its initial stages before significant heat build-up occurred. While the fire brigade was responding to the emergency, the existing spatial separation between shutdown systems would provide us with reasonable assurance that only one shutdown pathway would be damaged.

If the fire were to propagate through the unprotected perimeter wall opening before the arrival of the fire brigade, the automatic sprinkler system in the south corridor would activate and discharge water in a pattern which would limit the propagation of hot gases. Therefore, the absence of a complete fire barrier would not prevent the achievement and maintenance of safe shutdown conditions.

6.4 Conclusion

Based on our evaluation, we conclude that the existing protection, with the proposed modifications, will provide reasonable assurance that one shutdown division will be free of fire damage and will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Switchgear Hallway should be granted.

7.0 Control Building Station Battery Rooms - Units 1 & 2

7.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

7.2 Discussion

Each battery room is enclosed by walls, floor and ceiling of reinforced concrete or masonry block construction having a fire resistance rating of 3 hours. HVAC duct penetrations of the walls are protected by fire dampers. Access to these rooms is via a single watertight door that is not fire rated. Safe shutdown equipment located in the rooms consists of one safety division of station batteries and redundant circuits for the drywell air system. The licensee proposes to reroute these circuits as needed to conform to the separation criteria of Section III.G.

Combustible material located in these rooms includes cable insulation, battery casing and hydrogen gas which represent a fire load of approximately 30,000 BTU/sq. ft.

Existing fire protection consists of a smoke detection system, manual hose stations and portable fire extinguishers.

The licensee justifies the exemption on the basis that the watertight door is substantially constructed and will provide adequate protection from fire, in consideration of the existing fire loading and plant safeguards. Also, replacing this door with one that is fire rated will degrade plant safety because the station batteries must be protected from a circulatory water flood. A non-watertight fire rated door would not provide sufficient protection.

7.3 Evaluation

The technical requirements of Section III.G are not met because a complete 3-hour fire rated barrier does not exist to separate the redundant station battery rooms.

We were concerned whether the steel, submarine-type, watertight doors will protect the battery room contents from direct flame impingement, heat, and smoke until the fire self-extinguishes or is suppressed by the plant fire brigade. The fuel load in this area of the plant is low. If totally consumed, the combustibles would produce a fire which corresponds to a fire severity on the ASTM E-119 time-temperature curve of less than 25 minutes. It is our judgment that a fire in this area, if one should occur, would not be of significant magnitude or duration. It would be discovered early by the smoke detection system and extinguished by the fire brigade using manual fire fighting equipment.

Because the door is watertight, it would prevent smoke from passing through it. Since it is constructed of 5/8-inch thick steel, the door would act as an effective radiant heat shield. The door in conjunction with the ventilation system would prevent convective heat from increasing to a significant level so as to damage safety systems. Therefore, a 3-hour fire rated door is not necessary to provide reasonable assurance that one safety division would remain free of fire damage.

7.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Control Building Station Battery Rooms-Units 1 and 2 should be granted.

8.0 Turbine Building Condenser Bay - Unit 2

8.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

8.2 Discussion

The area is bounded by walls, floor and ceiling constructed of reinforced concrete. However, unsealed electrical penetrations in the west perimeter wall and unsealed mechanical penetrations in the ceiling communicate with adjoining plant locations, which the licensee has designated as separate fire areas.

All components of safe shutdown pathway 1 were assumed lost in a fire in the condenser bay.

There are no pathway 2 systems located within this fire area.

The combustible material in this location consists of turbine lube oil and cable insulation which represent a fire load of about 360,000 BTU/sq. ft. or a fire severity of approximately 6 hours on the ASTM E-119 time-temperature curve.

Existing fire protection includes a preaction-type sprinkler system which protects the drain cooler area, a fire detection system, manual hose stations and portable fire extinguishers.

The licensee justifies the exemption on the basis of the existing fire protection, the ability of the reinforced concrete construction to limit fire spread, and the presence of a redundant shutdown capability located in a separate fire area.

8.4 Evaluation

The technical requirements of Section III.G.2 are not met in this area because the perimeter construction is not 3-hour fire rated.

We were concerned that a fire might originate within this area and propagate to adjoining plant locations. However, the principal fire hazard in the condenser bay, which is associated with a turbine oil spill, is mitigated by the presence of the automatic fire suppression system.

If a turbine oil or other fire should occur within this area, we expect the existing fire detection system to activate and summon the fire brigade.

During the time delay until the arrival of the fire brigade, the reinforced concrete perimeter walls and ceiling would, to a significant extent, confine the damaging effects of a fire to this area. A small quantity of smoke and hot gases would be expected to propagate beyond the perimeter of these fire areas because of the unprotected penetrations. However, these penetrations are located away from the redundant shutdown systems. Therefore, hot gases passing through the penetrations would not affect components or cabling of the redundant division. The remaining products of combustion would be so diluted by ambient air conditions and the temperature of the air mass would be so diminished that they would not present a threat to the redundant division. Consequently, we have reasonable assurance that if a fire were to occur within this area, safe shutdown conditions could be achieved and maintained.

8.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Unit 2 Turbine Building Condenser Bay should be granted.

- 9.0.1 Turbine Building East Cableway - Unit 2
- 9.0.2 East Cableway - Common
- 9.0.3 Turbine Building West Cableway, 1.112 feet.

9.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of a 3-hour rated fire barrier between redundant trains of safe shutdown related cable and equipment.

9.2.1 Discussion (East Cableway - Unit 2)

The area is bounded on two sides by 3-hour rated fire walls. The other two sides are open to an adjoining plant location. The floor and ceiling are of reinforced concrete construction.

All safe shutdown pathway 2 systems were assumed lost in a fire in this area. The required pathway 1 systems that are located within the cableway will be protected by a 1-hour fire rated barrier.

Combustible material within this area consists primarily of cable insulation and oil, which represent a fuel load of approximately 340,000 BTU/sq. ft. or a fire severity of about 4-1/2 hours.

Existing fire protection includes an area-wide automatic sprinkler system, an open-head deluge-type fire suppression system for the oil conditioner unit, an area-wide smoke detection system, portable fire extinguishers and manual hose stations.

9.2.2 Discussion (East Cableway - Common)

The area is bounded on three sides by reinforced concrete and masonry block walls having a 3-hour fire rating. The fourth side is open to an adjoining plant location. The floor and ceiling are of reinforced concrete construction.

All systems associated with one safe shutdown pathway were assumed lost due to a fire within this area. The required systems associated with the redundant pathway will be protected by a 1-hour fire barrier. In lieu of protecting the cables for the compressed nitrogen system valve (2T48-F026), the valve will be locked open to assure proper alignment for safe shutdown.

Combustible material within this area consists primarily of cable insulation which represents a fire load of approximately 220,000 BTU/sq. ft. or a fire severity of about 3 hours based on the ASTM E-119 time-temperature curve.

Existing fire protection includes an automatic sprinkler system located throughout the area, an area-wide smoke detection system, a noncombustible radiant energy shield between redundant shutdown divisions, manual hose stations and portable fire extinguishers.

9.2.3 Discussion (West Cableway, ^{**}E1.112 ft.)

The area is bounded by walls, floor and ceiling of reinforced concrete construction.

All systems associated with safe shutdown pathway 1 were assumed lost in a fire in this area. There are no systems from the redundant shutdown capability located within the west cableway or adjoining areas.

Combustible materials located in this area consist primarily of cable insulation.

Existing fire protection includes an area-wide automatic sprinkler system and heat detection system, manual hose stations and portable fire extinguishers.

The licensee justifies the exemptions in these three areas on the basis of the existing fire protection, the proposed modifications and the availability of an undamaged redundant shutdown capability which would not be affected by a postulated fire.

9.3 Discussion

The technical requirements of Section III.G.2 are not met in these areas because the perimeter construction is not completely 3-hour fire rated.

There are two concerns with these areas. The first is that a fire within these locations may damage systems from both shutdown divisions. The second is that a fire that originates outside of these areas may spread into them and damage vulnerable shutdown systems.

If a fire were to occur within any of the three areas, the existing fire detection system would activate during the early stages of a fire and summon the fire brigade. If the room temperature rose significantly, the automatic sprinkler system would activate and suppress the fire while protecting the exposed shutdown systems. Until the fire burned itself out, or was extinguished manually by the fire brigade or automatically by the fire suppression system, the proposed 1-hour fire barriers would provide reasonable assurance that one shutdown division would remain free of damage.

A small quantity of smoke and hot gases would be expected to propagate beyond the perimeter of these fire areas because of the unprotected penetrations. However, these penetrations are located away from the redundant shutdown systems. Therefore, hot gases passing through the penetrations would not affect components or cabling of the redundant division. The remaining products of combustion would be so diluted by ambient air conditions and the temperature of the air mass would be so diminished that they would not present a threat to the redundant division.

If a fire were to occur outside of these areas, smoke and heat which would result from a fire would be dissipated throughout the area of fire origin. The existing smoke and heat detection systems would activate or plant operators would discover the fire and summon the plant fire brigade. The fire brigade would then extinguish the fire before shutdown systems within the areas became vulnerable. If a sufficient temperature rise did occur

within these areas, the automatic sprinkler system would activate to protect the exposed systems. Therefore, complete 3-hour fire rated walls around the cableways would not significantly enhance the level of fire protection. We, therefore, have reasonable assurance that safe shutdown conditions could be achieved and maintained.

9.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, with the proposed modifications, will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the following three areas should be granted:

1. Turbine Building East Cableway - Unit 2;
2. East Cableway - Common
3. Turbine Building West Cableway, El. 112 feet.

10.0 Diesel Building Switchgear Room 2G - Unit 2

10.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires the installation of an area-wide automatic fire suppression system.

10.2 Discussion

The room is enclosed by walls, floor and ceiling of reinforced concrete. All components of safe shutdown pathway 2 were assumed lost in a fire in this room. The pathway 1 system which requires protection to assure its availability during a fire is Diesel 1B.

Combustible material located in this room includes cable insulation which represents a fire load of 53,460 BTU/sq. ft. or a fire severity of approximately 45 minutes.

Existing fire protection consists of heat and smoke detection systems, portable fire extinguishers, a carbon dioxide hose reel and hose lines from outside hydrants.

The licensee proposes to protect the required pathway 1 system in a 1-hour fire rated barrier as described in the licensee's July 1, 1982, Appendix R report.

The licensee justifies the exemption on the basis of the low fire load, existing fire protection and the proposed modification.

10.3 Evaluation

The technical requirements of Section III.G are not met in this area because of the absence of an area-wide automatic fire suppression system.

The fire protection requirements of Section III.G of Appendix R represent an aggregate, comprised of active and passive components. They act synergistically to achieve an acceptable level of safety. Active protection in this area consists of the heat and smoke detection systems. We expect that they will activate in the early stages of a fire and summon the plant fire brigade which will extinguish the fire before serious damage occurs.

Passive protection is achieved by the 1-hour fire rated barrier for the shutdown pathway 1 systems and the fire rated perimeter construction.

The combustible material in this room is limited and widely dispersed. Consequently, we do not expect a fire to propagate widely or with a high heat release rate. The reinforced concrete walls, floor and ceiling will confine the fire to this room until the arrival of the fire brigade. The brigade has sufficient manual fire fighting equipment available to extinguish the fire. Therefore, an automatic fire suppression system is not necessary to limit damage.

Until the fire brigade arrives, the 1-hour fire barrier, which completely protects the systems for one shutdown pathway, will provide reasonable assurance that safe shutdown can be achieved and maintained.

10.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, with the proposed modifications, will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the Diesel Building Switchgear Room 2G - Unit 2 should be granted.

11.0 Control Building Corridor - Common

11.1 Exemption Requested

The licensee requested exemptions from Section III.G.2 in this area to the extent that it requires: 1) a complete 3-hour fire rated barrier between redundant shutdown divisions; or 2) a 1-hour barrier between redundant divisions and area-wide automatic fire suppression and detection systems.

11.2 Discussion

The area is bounded by 2- and 3-hour fire rated walls with openings protected by fire doors, fire dampers and penetration seals. However, the east portion of the south wall is open to the switchgear hallway and the west wall is open to the fan room in the service building. The floor and ceiling are of reinforced concrete construction.

It was assumed that all systems for safe shutdown pathway 1 were lost in a fire in this area. Those required pathway 2 systems that cannot be repaired within 72 hours, as stipulated in Section III.G.1, will be completely protected by a 1-hour fire rated barrier as described in the May 27, 1983, revision to the Appendix R report. However, the barrier for essential panel (R 25-S002) will be open at the top but will extend from the floor to the top of the cabinet. The opening is needed for adequate ventilation.

The combustible material in this area consists primarily of cable insulation which represents a fuel load of approximately 334,000 BTU/sq. ft. In addition, a 1-inch hydrogen gas line which has a 2-inch protective pipe casing passes along the west wall of the corridor. A compressed gas cylinder containing a mixture of 10% methane and 90% argon is located in the area within a concrete block enclosure.

Existing fire protection includes an automatic sprinkler system installed at the level of the ceiling. Additional sprinklers are installed beneath the lowest cable trays in the north corridor to protect against exposure fires. The sprinkler system does not extend to the rest rooms, the decontamination rooms in the health physics area and the HVAC room, all of which are part of the same fire area, but contain no safe shutdown equipment. Additional protection includes a complete area-wide smoke detection system, portable fire extinguishers and manual hose stations.

The licensee justified the exemptions on the basis of existing fire protection, the proposed modifications and the ability to make repairs to cold shutdown related systems within 72 hours.

11.3 Evaluation

The technical requirements of Section III.G are not met in this area because: 1) the perimeter walls are not all 3-hour fire rated; 2) the 1-hour fire rated barrier for essential panel R25-S002 is open at the top; 3) the entire fire area is not protected by an automatic fire suppression system.

We had the following concerns with the level of fire protection in this area:

1. A fire within this location may spread into adjoining fire areas;
2. A fire outside this location may propagate into the corridor and damage redundant shutdown-related systems;

3. A fire originating in the unsprinklered rooms within this area may cause damage to redundant shutdown systems; and
4. The partial height wall at panel R25-S002 might not prevent fire damage to the panel.

However, if a fire were to occur within the corridor, the existing smoke detection system would activate during the early stages of a fire and summon the fire brigade. If room temperatures rose significantly, the sprinkler system would activate and suppress the fire while protecting the exposed shutdown systems and limiting further fire spread. Until the fire was completely extinguished, adequate passive protection is available to ensure that one shutdown pathway will be free of fire damage. This passive protection includes varying degrees of spatial separation between redundant divisions and 1-hour fire rated barriers. Although the barrier at panel R25-S002 does not extend from floor to ceiling, it is high enough to protect the panel from radiant heat and direct flame impingement; coupled with the existence of the preaction sprinkler system, it will provide reasonable assurance that the panel will remain free of damage.

If a fire were to occur outside of the control building corridor, the 2- and 3-hour fire rated walls and reinforced concrete floors and ceiling would tend to limit fire propagation into this area. Because of the unprotected openings, a quantity of smoke and heat is expected to enter this fire area. However, the sprinkler system and 1-hour fire barriers are expected to limit damage to the systems associated with shutdown pathway 1. The redundant pathway would then be available to achieve and maintain safe shutdown conditions.

With regard to the unsprinklered rooms within this area, no shutdown related systems are located within them. Consequently, localized fire damage would not affect safe shutdown. If the fire spread beyond these rooms, the sprinkler system in the corridor and the fire barriers would provide reasonable assurance that one shutdown division would remain free of damage.

11.4 Conclusion

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration, with proposed modifications, will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption in the Control Building Corridor - Common should be granted.

12.0 River Intake Structure

12.1 Exemption Requested

The licensee requested an exemption from the requirements of Section III.G.2 to the extent that it requires the installation of a complete, area-wide automatic fire suppression system.

12.2 Discussion

The building is enclosed with walls, floor and ceiling of reinforced concrete. Safe shutdown equipment located within this fire area includes both safety divisions of Residual Heat Removal (RHR) service water pumps and associated cabling and motor control centers (MCC) for both units. In addition, the area contains both safety divisions of plant service water pumps and associated cabling, and MCCs for both units. Redundant safety circuits are located in conduit and cable trays and are either separated by more than 20 feet without intervening combustibles, or one train will be protected by a 1-hour fire rated barrier as described in the May 27, 1983, revision to the Appendix R report. One-half inch steel plate barriers have been installed to separate RHR service water pumps and MCCs for each unit, and to separate the service water pumps from the remainder of the equipment in the building.

Combustible materials located in the area include cable insulation and lube oil representing a fire load of 55,000 BTU/sq. ft.

Existing fire protection consists of a smoke detection system, a wet-pipe automatic sprinkler system protecting the RHR and plant service water pump motors, manual hose stations and portable fire extinguishers.

The licensee justified the exemption on the basis of the low fire load, the existing protection and the proposed modifications.

12.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because of the absence of an area-wide automatic fire suppression system. In addition, the fire barriers between the pumps and MCCs are not 1-hour fire rated.

The fire protection requirements of Section III.G of Appendix R represent an aggregate, comprised of active and passive components. They act synergistically to achieve an acceptable level of fire safety. In this area, the licensee has provided active protection in the form of a complete smoke detection system. This system will provide reasonable assurance of early fire awareness and response by operating personnel and the plant fire brigade.

Additional protection is provided in the River Intake Structure by the automatic sprinkler system over the pump motors. Passive protection is achieved by physical separation of redundant divisions by open spaces without intervening combustibles, by partial height barriers to protect the safety components, or by complete 1-hour fire rated barriers.

The fire loading in this location, which includes anticipated transient combustibles, is low. If the combustibles were totally consumed, they would produce a fire which corresponds to a fire severity on the ASTM time-temperature curve of less than 50 minutes; but this fire would be unlikely to occur because of the existing level of fire protection.

It is our judgment that a fire, if one should occur, would not be significant and would not breach the protection provided by physical fire barriers until the fire self-extinguished or was suppressed by the plant fire brigade. We, therefore, have reasonable assurance that one safe shutdown pathway will be free of fire damage.

12.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection, with proposed modification, will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the River Intake Structure should be granted.

13.0 East Corridor, Control and Turbine Building and Condensate Pump Area, El. 112 feet

13.1 Exemption Requested

The licensee requested an exemption from the technical requirements of Section III.G.2 to the extent that it requires that redundant shutdown divisions be separated by complete 3-hour fire rated barriers.

13.2 Discussion

The area is bounded by 3-hour fire rated walls, floor and ceiling. However, the common walls between this location and the condenser and west cableway areas are of non-fire rated reinforced concrete. In addition, an open stairway connects this area with the east cableway.

It was assumed that all safe shutdown pathway 1 systems were lost due to a fire in this location. There are no pathway 2 systems within this area.

The fire load has been estimated to be approximately 34,000 BTU/sq. ft. or a fire severity of about 25 minutes.

Existing fire protection includes an area-wide fire detection system, manual hose stations and portable fire extinguishers.

The licensee justifies this exemption based on the low fire loading, the existing protection and the existence of a redundant shutdown capability located outside of the fire area.

13.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because the area perimeter construction is not completely 3-hour fire rated.

We were concerned that a fire would occur in this area and spread to adjoining plant locations and cause damage to components associated with redundant shutdown systems.

However, combustible materials within this area are limited. We, therefore, do not expect a fire to propagate rapidly or produce significantly elevated temperatures. Because of the fire detection system, we expect a fire to be detected early and suppressed by the plant fire brigade before significant damage resulted.

Because of the open stairway into the east cableway, smoke and heat from a fire is expected to propagate into this area; but, if this occurs, the automatic sprinkler system in the east cableway will activate to protect exposed shutdown related cables and limit further fire spread.

Systems from only one shutdown pathway are located within the area. These systems would be assumed to be lost if a fire occurred. However, a redundant shutdown capability is available which is outside of this location.

It is therefore our judgment that because of the masonry and reinforced concrete perimeter construction, coupled with the sprinkler system in the east cableway, fire damage would be limited and systems from just one shutdown pathway would be lost. The redundant shutdown pathway would remain free of damage so as to achieve and maintain safe shutdown conditions.

13.4 Conclusion

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration will achieve an acceptable level of safety equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the East Corridor, Control and Turbine Building and Condensate Pump Area, 1,112 feet should be granted.

14.0 National Fire Protection Association Code Deviations

14.1 Discussion

The proposed fire protection modifications will be installed according to NFPA Codes and Standards.

Deviations from these Codes and Standards are occasionally necessary to deal with plant unique issues. The licensee has requested approval for the following deviations from NFPA Code requirements pertaining to the design and installation of sprinkler and fire detection systems.

14.2 Deviation Requested

The licensee requested a deviation from the requirements of NFPA Standards Nos. 13, 14 and 15 governing sprinkler piping hanger design, selection and spacing criteria.

Evaluation

The above referenced Standards do not consider seismic hanger support systems.

To achieve the necessary system integrity for a Class 1 support system, the piping configuration is subjected to an analysis for hanger location. The type of hanger assemblies required to withstand the excessive loads and movement above NFPA allowance results in each hanger assembly as a unique design requirement. The resulting installation is an engineered system of greater integrity than the generalized instructions set forth by NFPA for such structures as warehouses, health care facilities, and general office structures. Therefore, we conclude that sprinkler and standpipe system hangers, which are designed to satisfy seismic design requirements, achieve a higher level of safety to those that literally conform with NFPA Code requirements and are, therefore, acceptable.

14.3 Deviation Requested

The licensee requested a deviation from the criteria of NFPA Standards Nos. 13, 14 and 15 concerning the use of closed head directional spray nozzles and multibushing-reductions.

Evaluation

Closed head directional spray nozzles in lieu of standard sprinkler heads are utilized in congested plant areas because of the ability of the nozzle to deliver better water dispersion where congestion exists. Additional considerations include the need to control random water discharge for sensitive electronic equipment and devices that might be adversely affected by water impingement.

Multibushing reductions were used in a limited number of cases in the plant because of the unavailability of ASTM A-234 forged steel reducing fittings. The licensee will verify the integrity of this arrangement via hydrostatic testing and will verify by flow tests that no significant hydraulic degradation results.

We conclude that the use of closed head directional spray nozzles and multi-bushing reductions, provided it does not result in hydraulic degradation, have no safety significance and are, therefore, acceptable.

14.4 Deviation Requested

The licensee requested deviations from the criteria of NFPA Standards Nos. 13, 15 and 72E concerning the positioning of sprinkler heads and fire detectors.

Evaluation

The standards stipulate the density and location of sprinklers and fire detectors based on ordinary hazard considerations. However, because of high floor-to-ceiling distances, obstructions below the ceiling such as cable trays and ductwork, high prevailing overflow patterns, and other similar considerations, standard spacing and positioning of sprinklers and detectors at the ceiling may not assure that these systems will properly function under actual fire conditions. The licensee has indicated that NFPA Code requirements regarding sprinkler/detector spacing are followed when compliance provides reasonable assurance of adequate system performance; but where this is not the case, an engineering analysis is conducted to determine the location of the devices. We find this acceptable.

14.5 Deviation Requested

The licensee requested deviations from the criteria of NFPA Standards Nos. 13, 14, 15 and 20 concerning the prohibition of welding of sections of sprinkler/standpipe piping.

Evaluation

The licensee states in its December 20, 1983, revision to its Appendix R report, that welding operations on sprinkler/standpipe piping will follow plant hot work procedures which conform with the requirements of other NFPA Standards, including NFPA 51B, "Standard for Fire Prevention in Use of Cutting and Welding Processes".

With this commitment, compliance with the above referenced standards will be achieved under the Exception to Paragraph 3-12.2.2 of NFPA 13. We, therefore, conclude that no deviation exists.

14.6 Conclusion

Based on our evaluation, we conclude that the licensee's request for deviations from the above NFPA Code requirements should be granted.

15.0 Summary

Based on our evaluation, we conclude that the level of fire safety in the areas listed below is equivalent to that achieved by compliance with the technical requirements of Section III.G of Appendix R and, therefore, the licensee's request for exemption in these areas should be granted.

1. 4160V Transformer Room - Unit 1
2. West 600V Switchgear Room - Unit 1
3. Control Building Working Floor, El. 112 Feet - Unit 1
4. West DC Switchgear Room - Unit 1
5. East DC Switchgear Room - Unit 1
6. East 600V Switchgear Room - Unit 1
7. 4160V Transformer Room - Unit 2
8. West DC Switchgear Room - Unit 2
9. East DC Switchgear Room - Unit 2
10. West 600V Switchgear Room - Unit 2
11. East 600V Switchgear Room - Unit 2
12. Reactor Building North of Column Line R7 - Unit 1
13. Reactor Building South of Column Line R7 - Unit 1
14. Reactor Building North of Column Line R19 - Unit 2
15. Reactor Building South of Column Line R19 - Unit 2
16. Control Building Health Physics Area - Unit 2
17. Control Building Switchgear Hallway - Unit 2
18. Control Building Station Battery Rooms - Units 1 & 2
19. Turbine Building Condenser Bay - Unit 2