

September 10, 1986

Docket No. 50-348

Mr. R. P. McDonald
Senior Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

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Dear Mr. McDonald:

SUBJECT: TECHNICAL EXEMPTIONS FROM THE REQUIREMENTS OF 10 CFR 50
APPENDIX R FOR THE JOSEPH M. FARLEY NUCLEAR PLANT UNIT NO. 1

By letter dated May 31, 1985, you advised that you conducted a second review of the fire areas in Unit No. 1. The review was made in light of IE Notice 84-09 and Generic Letter 83-33. As a result you requested certain technical and scheduler exemptions pursuant to 10 CFR 50.12(a). The exemption requests are included in a document entitled "J. M. Farley Nuclear Plant Unit 1, 10 CFR 50 Appendix R Fire Hazards Analysis Reevaluation: May 1985."

We have completed our review of your exemption requests. Our letter dated August 28, 1985 discussed action on your scheduler requests. By letters dated October 18, 1985, and July 16, 1986, you provided additional justifications and special circumstances. These justifications and special circumstances have been evaluated. Therefore, we grant the twenty-seven technical exemptions as specifically identified in the enclosed safety evaluation. These specifically identified exemptions which we grant, in conjunction with your proposed modifications, will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R to 10 CFR 50 in the specific fire areas identified.

A copy of the notice of exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

Thomas M. Novak, Acting Director
Division of PWR Licensing-A

Enclosures:

- 1. Notice of Exemption
- 2. Safety Evaluation

cc w/enclosures:
See next page

*SEE PREVIOUS CONCURRENCE

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UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter

Docket No. 50-348

ALABAMA POWER COMPANY

(Joseph M. Farley Nuclear Plant
Units No. 1)EXEMPTION

I.

The Alabama Power Company (the licensee) is the holder of Facility Operating License No. NPF-2 which authorized operation of the Joseph M. Farley Nuclear Power Plant Unit No. 1. This license provides, among other things, that the licensee is subject to all rules, regulations and Orders of the Commission now or hereafter in effect.

The facility comprises two pressurized water reactors at the licensee's site located near the City of Dothan, Alabama.

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 the fire protection features of nuclear power plants (48 FR 76602). The revised Section 50.48 and Appendix R became effective on February 17, 1981. Section 50.48(c) established the schedules for satisfying the provisions of Appendix R. 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. Only one of the fifteen subsections, III.G, is the subject of this exemption request.

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:

- (1) 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;
- (2) 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
- (3) 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 an alternative shutdown capability independent of the fire area of concern. It also requires a fixed fire 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.

III.

By letter dated May 31, 1985, the licensee submitted the results of their Appendix R fire hazards analysis reevaluation for Unit No. 1, dated May 1985 for review. The licensee contends that the reevaluation was prompted by the interpretations to Appendix R promulgated in IE Notice 84-09 and Generic Letter 83-33. Therefore, based on the results of this reevaluation the licensee requested twenty-seven additional exemptions from the specific provisions of Section III.G of Appendix R for certain fire areas in Unit No. 1. Prior to the fire hazards analysis reevaluation, the Commission had granted only one exemption on December 30, 1983, for certain system cables or components located within the containment buildings of Unit No. 1. The Commission also granted an exemption on November 19, 1985, for certain shared fire areas of Unit No. 1 with fire areas for Unit No. 2 after the fire hazards analysis reevaluation.

The licensee identified twenty-seven specific fire areas which would require exemptions based on their reevaluation of Unit No. 1 fire areas. Based on our review of the licensee's submittal as well as site visits by the Region II assigned fire protection engineer and the assigned NRR Project Manager, we issued a safety evaluation finding that the licensee's alternate fire protection configuration in twenty-two of the twenty-seven fire areas where exemptions or modifications were requested represents an equivalent level of safety to that achieved by compliance with Section III.G of Appendix R, 10 CFR 50. The remaining five exemptions required further review of the additional justifications provided by the licensee by letter dated October 18, 1985. An attachment to this safety evaluation discusses

the remaining five fire areas. The alternate fire protection configurations in these areas also represent an equivalent level of safety to that achieved by compliance with Section III.G of Appendix R, 10 CFR 50.

By letter dated July 16, 1986, the licensee provided information relevant to the "special circumstances" finding required by revised 10 CFR 50.12(a) (see 50 FR 50764). The licensee stated that the existing and proposed fire protection features at Farley, Unit 1 accomplish the underlying purpose of the rule. Implementing additional modifications to provide additional suppression systems, detection systems and fire barriers to comply with Appendix R for all areas of the plant would require the expenditure of engineering and construction resources as well as the associated capital costs which would represent an unwarranted burden on the licensee's resources. Costs that would be incurred are as follows:

- Engineering, procurement and installation of additional piping, sprinkler heads, and supporting structures.
- Engineering, procurement and installation of additional fire barriers, supports, support protection and ongoing maintenance.
- Significant rerouting of power cabling and associated conduits, ducts and supports.
- Increased surveillance on new or extended fire suppression and fire detection systems.
- Increased congestion in numerous plant locations complicating future plant modifications/operations.

The licensee stated that these costs are significantly in excess of those required to meet the underlying purpose of the rule. The staff concludes

that "special circumstances" exist for the licensee's requested exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of Appendix R to 10 CFR Part 50. (see 10 CFR 50.12(a)(2)(11)).

IV.

Accordingly, the Commission has determined pursuant to 10 CFR Part 50.12(a), that these twenty-seven technical exemptions discussed in Section III are authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest. The Commission hereby approves the twenty-seven requested exemptions from Appendix R of 10 CFR 50 Section III.G as specifically identified in the Safety Evaluation dated September 10, 1986, which is available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, DC, and at the Local Public Document Room, located at the George S. Houston Memorial Library, 212 W. Burdeshaw Street, Dothan, Alabama.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the Exemption will have no significant impact on the environment (51 FR 32151, dated September 9, 1986).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Thomas M. Novak, Acting Director
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 10th day of September, 1986

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

ALABAMA POWER COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-348

1.0 INTRODUCTION

By letter dated May 31, 1985, supplemented by letter dated October 18, 1985, the licensee submitted the results of their Appendix R fire hazards analysis re-evaluation, dated May 1985 for review. The licensee contends that the re-evaluation was prompted by the interpretations to Appendix R promulgated in IE Notice 84-09 and Generic Letter 83-33. Therefore, based on the results of this re-evaluation the licensee requested twenty-seven additional exemptions from the specific provisions of Section III.G of Appendix R for fire areas in Unit 1. The Commission previously granted an exemption on December 30, 1983, for certain system cables or components located within the containment buildings of Units 1 and 2. The Commission also granted an exemption on November 19, 1985, for certain shared fire areas of Unit No. 1 with fire areas of Unit No. 2. This evaluation treats exemptions as requested by the licensee for fire areas affecting Unit 1 only.

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 three-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.
- c. Enclosure of cables and equipment and associated non-safety circuits of one redundant train in a fire barrier having a one-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

In summary, Section III.G is related to fire protection features for ensuring the 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 hazard analysis.

If these conditions are not met, Section III.G.3 requires an alternative shutdown capability independent of the fire area of concern. It also requires that a fixed suppression system 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.

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 requires to meet Section III.G would be detrimental to overall facility safety.

As a result of a site visit during the week of August 19, 1985, we determined that for five of the twenty-seven exemptions request additional technical information was required and some additional plant fire protection modifications (i.e., additional sprinkler protection and raceway fire barriers were necessary in order to assure that the licensee's alternative fire protection configurations would represent an equivalent level of safety to that achieved by full compliance with Section III.G of Appendix R. Thus, the licensee committed to provide the necessary fire protection modifications and the additional technical information to support the five outstanding exemption requests. Therefore, we deferred our review and evaluation of exemption requests 1-17, 1-26, 1-31, 1-36 and 1-38 pending receipt of additional licensee information. The attachment to this evaluation completes our action based on information provided by the license by letter dated October 18, 1985.

Our evaluations of the licensee's alternate fire protection configurations and their justifications regarding the plant's alternative ability for specific redundant shutdown functions to achieve and maintain safe shutdown conditions for fire conditions which affect those fire areas documented by twenty-two of the twenty-five exemption requests are as follows:

2.0 UNIT 1 AUXILIARY BUILDING CABLE CHASE TRAIN A - FIRE AREA 1-008 (EXEMPTION REQUEST 1-14)

UNIT 1 AUXILIARY BUILDING TO DIESEL BUILDING CABLE TUNNEL TRAIN A - FIRE AREA 1-075 (EXEMPTION REQUEST 1-18)

UNIT 1 AUXILIARY BUILDING TRAIN A BATTERY ROOM - FIRE AREA 1-017 (EXEMPTION REQUEST 1-20)

UNIT 1 TRAIN A DC SWITCHGEAR ROOM AUXILIARY BUILDING EL. 121 ft. - 0 IN. - FIRE AREA 1-018 (EXEMPTION REQUEST 1-21)

UNIT 1 AUXILIARY BUILDING EL. 139 ft. - 0 IN. - FIRE AREA 1-041 (EXEMPTION REQUEST 1-23)

UNIT 2 AUXILIARY BUILDING EL 139 ft. - 0 IN. - FIRE AREA 2-041 (EXEMPTION REQUEST 1-24)

UNIT 1 AUXILIARY BUILDING EL 139 ft. - 0 IN. - FIRE AREA 1-042 (EXEMPTION REQUEST 1-25)

UNIT 1 AUXILIARY BUILDING CABLE CHASE TRAIN A - FIRE AREA 1-031 (EXEMPTION REQUEST 1-33)

2.1 EXEMPTIONS REQUESTED

The licensee, in their exemption requests 1-14, 1-24, and 1-33 associated with the fire areas identified in Section 2.0 above, requested an exemption from the technical requirements of 10 CFR 50 Appendix R Section III.G.2 to the extent that one train of redundant safe shutdown cables be enclosed by a fire barrier having a one-hour fire rating.

In addition, the licensee's exemption requests 1-20, 1-21, and 1-23 associated with the fire areas identified in Section 2.0 above requested an exemption from 10 CFR 50 Appendix R, Section III.G.2 to the extent that it requires one train of redundant safe shutdown cables be enclosed by a fire barrier having a one-hour fire rating and that automatic fire suppression be installed in the area.

The licensee in their exemption request 1-18 requested an exemption from 10 CFR 50 Appendix R, Section III.G.2 to the extent that it requires one train of redundant safe shutdown cables be enclosed by a fire barrier having a one-hour fire rating and the installation of an automatic fire detection system installed in the subject fire area.

Also, the licensee in their exemption request 1-25 requested an exemption from 10 CFR 50 Appendix R, Sections III.G.2.a. and III.G.2.c to the extent that it requires that one train of cabling, equipment and non-safety associated circuits of redundant trains be separated by a three-hour fire barrier or enclosed by a fire barrier having a one-hour fire rating.

2.2 DISCUSSION

Fire Area 1-008 consists of only room 116 and is bounded by three-hour fire-rated floor, ceiling, and walls. Area boundary doors are UL Class A fire rated.

Fire Area 1-075 consists of a cable tunnel running from the Unit 1 auxiliary building to the diesel generator building. The fire area boundary floor, ceiling, and walls are three-hour fire rated. An UL Class A fire-rated door exists between the tunnel and the diesel building. A non-fire-rated watertight door and bulkhead exist between the tunnel and auxiliary building

room 251 (area 1-031). The non-rated door has a fire-resistant coating applied on the fire area 1-075 side.

Fire Area 1-017 consists of only room 214 and is bounded by three-hour fire-rated floor, ceiling, and walls. Area boundary door is UL Class A fire rated.

Fire Area 1-018 consists of only room 224 and is bounded by three-hour fire rated floor, ceiling, and walls. The door between fire area 1-018 and room 225 is UL Class A fire rated.

Fire Area 1-041 consists of rooms 335, 343, and 346. All fire area boundary walls, floors, and ceilings have a three-hour fire rating, with all electrical and piping penetrations sealed for a three-hour fire rating. All ventilation ducting penetrating the fire area boundary have three-hour fire rated dampers installed. All doors located in the fire area boundary are UL listed Class A doors except for the door between rooms 345 and 346.

Fire Area 2-041 consists of rooms 2335, 2343, and 2346. All fire area boundary walls, floors, and ceilings have a three-hour fire rating, with all electrical and piping penetrations sealed for a three-hour fire rating. All ventilation ducting area boundaries have three-hour fire rated dampers installed. All doors located in the fire area boundary are UL listed Class A doors except for the door between rooms 2345 and 2346.

Fire Area 1-042 consists of rooms 319, 339, and 345. All fire area boundary walls are three-hour fire rated with the exception of the wall adjacent to elevator No. 1 and stairwell No. 1 which are two-hour fire rated. All electrical and piping penetrations are sealed and are three-hour rated. All ventilation ducting had three-hour fire rated dampers installed. All doors located in the boundary walls are Class A rated with the exception of a Class B rated door leading from room 345 into stairwell No. 1 (area 1-S01) and the door between rooms 345 and 346. The floors and ceilings of Fire Area 1-042 are of reinforced concrete and are three-hour fire rated with the exception of two hatchways with steel plate covers located in room 345. The two hatches are located directly above one another in the floor and ceiling of room 345 and communicate with Fire Areas 1-020 and 1-004.

Fire Area 1-031 consists of rooms 250 (el 121 ft. - 0 in. and 139 ft. - 0 in.) and 251 (el 127 ft. - 0 in.). All area boundary walls, floors, and ceilings are three-hour fire rated except for a non-rated bulkhead between this fire area and the cable tunnel (area 1-075). A non-fire rated watertight door and bulkhead exist between room 251 and cable tunnel (area 1-075), and an UL Class A fire rated door exists between rooms 250 and 235 (area 1-023). The non-rated door has a fire resistant coating applied on the fire area 1-075 side.

The licensee's re-evaluation has indicated that a fire in either fire areas 1-008, 1-018, 1-041, and 1-042 could damage control and power cabling associated with the Train A electrical distribution system. An analysis of the potential effects of a fire in any of these fire areas demonstrates that

the plant could experience a fire induced failure of the total Train A electrical distribution system. This could result in a loss of all reactor coolant system (RCS) hot leg temperature indication and neutron flux monitoring capabilities.

A fire in either fire areas 1-075, 2-041, or 1-031 could potentially result in fire damage to the electrical circuitry of both Units 1 and 2 Train A diesel generators. This condition along with an assumed loss of offsite power for Unit 1 could result in total loss of the electrical Train A distribution system. This could result in the loss of the following instrumentation:

<u>Instrumentation</u>	<u>Function</u>
N1B21TE413 (Loop-1)	RCS Hot Leg Temperature, Indication
N1B21TE423 (Loop-2)	RCS Hot Leg Temperature, Indication
N1B21TE433 (Loop-3)	RCS Hot Leg Temperature, Indication
Q1C55NE0048A-A	Post-Accident Neutron Flux Monitor
N1C55NE0031-P1	Source Range Neutron Flux Monitor
N1C55NE0032-P2	Source Range Neutron Flux Monitor
Q1N11PV3371A-A	Main Steam Atmospheric Relief Valve (S.G. - 1A)
Q1N11PV3371B-A	Main Steam Atmospheric Relief Valve (S.G. - 1B)
Q1N11PV3371C-A	Main Steam Atmospheric Relief Valve (S.G. - 1C)

Note: Fire Area 1-008 also contains cables required for post-fire operation of the main steam atmospheric relief valves.

In addition, a total loss of the electrical Train-A distribution system, as a result of a fire in either Fire Areas 1-008, 1-075, 1-017, 1-018, 2-041, 1-042, or 1-031 could also render main steam atmospheric relief valves electrically inoperable in the closed position.

Fire Area 1-017 contains electrical Train-A 125 V-dc plant batteries and related 125 V-dc Train-A power cabling. An evaluation of the potential effects of a fire in this area shows that the plant could experience a total loss of the 125 V-dc train-A distribution system. This condition along with an assumed loss of offsite power (LOSP) for Unit 1 will cause total loss of the electrical Train-A distribution system. A total loss of the electrical Train-A distribution system could cause loss of RCS hot leg temperature indication and neutron flux monitoring instrumentation.

The combustible materials associated with the subject fire areas consists of cable insulation and/or plastic panel parts. The following summarizes the fire loading associated with the subject fire areas:

<u>Fire Area</u>	<u>Fire Load BTU/FT</u>
1-008	1,250,296
1-075	59,600
1-017	1,391
1-018	29,191
1-041	105,934
2-041	105,934
1-042	32,445
1-031	794,491

Fire Area 1-008 is protected by a smoke detection and an automatic sprinkler system. In addition, 1 inch water type hose stations are located in rooms 185 (fire area 1-006) and 319 (fire area 1-042) and are available for manual fire brigade firefighting operations in Fire Area 1-008.

Fire Area 1-075 is protected by an automatic water suppression system.

In Fire Area 1-017 an area type smoke detection system is provided. This system alarms locally and is annunciated in the main control room. A CO₂ hose reel and a 1 water type hose station is located in room 210 (fire area 1-020) and are available for fire brigade use in Fire Area 1-017.

An ionization smoke detector is located in Fire Area 1-018. In addition, a 1 inch water type hose station and a CO hose reel are located in room 210 (Fire Area 1-020) and are available for fire brigade use in Fire Area 1-018.

Fire Area 1-041 is protected by an area smoke detection system. In addition, heat detectors are located in the cabinets of the 600-V load center 11, 4160-V switchgear 1A and 1F, 5-kV disconnect switch 1G, 600-V load center 1D and 1A, and 4160-V switchgear 1B and 1C. Heat detectors will actuate a total-flooding CO system in the load centers and switchgears. A CO hose reel located in room 339 (area 1-42), a water hose station in room 345 (area 1-42), and two water hose cabinets in room 319 (area 1-42), are available for use in this area.

Area smoke detection system is provided throughout Fire Area 2-041. In addition, heat detectors are located in the cabinets of the 600-V load center 21, 4160-V switchgear 2A and 2F, 5-kV disconnect switch 2G, 600-V load center 2D and 2A, and 4160-V switchgear 2B and 2C. Heat detectors will actuate a total-flooding CO₂ system in the load centers and switchgears. A CO₂ hose reel located in room 2339 (area 2-42), a water hose station in room 2345 (area 2-42), and 2 water hose cabinets in room 2319 (area 2-42) are available for use in this area.

In Fire Area 1-042 ionization smoke detection is provided throughout the area. Two 1 inch water hose stations are located in room 319. A CO₂ hose

reel is located in room 319 and a water hose in room 345. Automatic water suppression systems are installed in the area to protect electrical cable from an exposure fire and to provide coverage in the area of the steel hatches. Appropriate barriers are provided for electrical cable.

The door between rooms 2346 (Fire Area 2-041) and 2345 (Fire Area 2-042) and between rooms 346 (Fire Area 1-041) and 345 (Fire Area 1-042) are provided with a removable transoms and cannot be labeled as UL Class A.

Two hatchways located in room 345 directly above one another have non-rated sheet plate covers, and communicate with Fire Areas 1-020 and 1-004.

Fire Area 1-031 is protected by an automatic ionization smoke detection system. In addition, automatic sprinkler protection is provided throughout the fire area. An 1 inch water type hose station is located in room 234 (Fire Area 1-020) and is available for use by the fire brigade for manual firefighting in this area.

The licensee justifies the acceptability of the exemptions requested in Section 2.1 on the basis of the existing fire protection, their alternative shutdown actions and the proposed plant modifications associated with the subject fire areas identified in Section 2.0.

2.3 EVALUATION

One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator can establish manual control of the atmospheric relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in any of the subject fire areas identified in Section 2.0 above. The capability to control steam generator pressure and reactor coolant system temperature with the use of the manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, fire in these fire areas would not prevent the operation of at least one redundant atmospheric relief valve.

Each RCS Loop hot leg temperature instrumentation loop is powered from channelized inverter-1A. Inverter-1A is powered from 600 V-ac MCC 1A or 125 V-dc bus 1A. A fire in area 2-041 along with an assumed LOSP could result in loss of the 600 V-ac power supply to inverter 1A; however, inverter 1A will continue to operate from 125 V-dc bus 1A and will supply power to the instrument loops for a minimum of two hours. If after two hours power is lost, RCS hot leg temperature indication is available from the core exit thermocouples. A fire in either 1-008, 1-075, 1-017, 1-018, 1-041, 2-041, 1-042 or 1-031 will not affect core exit temperature indication.

In addition to the alternate dc power supply, and core exit temperature availability; a design change to be installed as a result of Regulatory Guide (RG) 1.97 will provide a redundant signal processing and indication between RCS hot leg temperature loops N1B21TE413, N1B21TE423, and N1B21TE433.

Based upon RG 1.97 commitment schedule, implementation of the modification is currently planned for the seventh refueling outage presently scheduled to commence during the fourth quarter of 1986. After implementation of this modification a fire in any of the fire areas identified in Section 2.0 above will not affect the ability to monitor one loop of RCS hot leg temperature.

Source range neutron flux monitors N1C55NE0031-P1 and N1C55NE0032-P2 are powered from channelized inverters 1A and 1B. The post-accident neutron flux monitor Q1C55NE0048A-A is powered from inverter-1F. Inverters 1A, 1B, and 1F are all powered from 600 V-ac MCC 1A or 125 V-dc bus-1A. Therefore, neutron-flux monitoring following potential fire damage in area 1-042 and the resultant loss of 600 V-ac MCC 1A will be available for a minimum of two hours. An RCS sample can be obtained after initiation of the RHR system by using portions of the RCS sampling system and RHR Hx Nos. 1 and 2 sample valves Q1P15HV3105-B and Q1P15HV3106-B for determination of the boron concentration and shutdown margin following a fire in any of the fire areas identified in Section 2.0.

The licensee, by letter May 31, 1985, committed to develop detailed procedures specifically for the subject fire areas covered by this evaluation. These procedures will identify the manual operator actions required to regain control of one main steam atmospheric relief valve and to monitor boron concentration and shutdown margin. These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage.

The door/transcom assemblies separating Unit 1 rooms 346 (Fire Area 1-041) and 345 (Fire Area 1-042) and Unit 2 rooms 2346 (Fire Area 2-041) and 2345 (Fire Area 2-042) are provided with a removable transom in order to facilitate the movement of large electrical equipment. The door and frame assemblies associated with these doors meet the UL fire test criteria and they bear a Class A UL labels. However, since the transom is removable, the subject door/transcom assemblies cannot be listed as Class A by UL. The respective transoms have been certified by the manufacturer as being constructed of materials and in a manner similar to that of a Class A fire door. Therefore, based on the construction, the installation of these doors and the configuration of the in-situ combustibles in these fire areas, we have reasonable assurance that a fire involving the in-situ combustibles in any of the subject fire areas, would not propagate through the transom opening and spread into the adjacent fire areas.

The watertight door and the bulkhead between auxiliary building (Area 1-031) and cable tunnel (Area 1-075) do not comply with three-hour fire rated boundary requirements. However, a fire in Area 1-075 propagating into Area 1-031 will not have any additional impact on Unit 1 safe shutdown because

the same redundant safe shutdown function cables are contained in both areas.

It appears, that the sprinkler system existing in room 345 will serve the purpose of a water curtain to prevent the passage of fire from Area 1-042 to the adjacent fire areas via the non-rated steel hatches. Therefore, the sprinkler systems existing in the hatch area of the adjacent fire areas above and below room 345 should prevent the spread of a fire into Area 1-042.

All other shutdown systems associated with the fire areas identified in Section 2.0 have redundant counterparts in other fire areas or are located in plant areas which meet the requirement of 10 CFR 50 Appendix R Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the subject fire areas, safe shutdown could be achieved and maintained.

2.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration and their proposed modifications will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for the fire areas identified in Section 2.0 above should be granted.

3.0 UNIT 1 AUXILIARY BUILDING SWITCHGEAR ROOM TRAIN B - FIRE AREA 1-021 (EXEMPTION REQUEST 1-15)

UNIT 1 AUXILIARY BUILDING CONTROL ROD DRIVE SWITCHGEAR ROOM TRAIN B - FIRE AREA 1-023 (EXEMPTION REQUEST 1-19)

UNIT 1 AUXILIARY BUILDING TRAIN B DC SWITCHGEAR ROOM - FIRE AREA 1-019 (EXEMPTION REQUEST 1-27)

3.1 EXEMPTIONS REQUEST

The licensee in their exemption request 1-19 requested exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2.C to the extent that it requires one train of redundant safe shutdown cables be enclosed by a fire barrier having a one hour fire rating.

In addition, the licensee in their exemption requests 1-15 and 1-27 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2.C to the extent that it requires one train of redundant safe shutdown cables to be enclosed by a fire barrier having a one-hour fire rating and the installation of an automatic fire suppression system.

3.2 DISCUSSION

Fire Area 1-021 consists of rooms 229 and 233 on auxiliary elevation building 121 ft - 0 in. All fire area boundary floors, ceilings, and walls are three-hour rated. Fire area boundary doors are UL Class A fire rated, except for the door separating this fire area from Fire Area 1-020.

Fire Area 1-023 consists only of room 235 and is bounded by three hour fire-rated walls, floor, and ceiling. Area boundary doors are UL Class A fire rated, except for the door separating this fire area from Fire Area 1-020.

Fire Area 1-019 consists of room 226, the Train B DC switchgear room on auxiliary building elevation 121 ft - 0 in and is bounded by three hour fire rated walls, floor, and ceiling. Fire area boundary doors are UL Class A fire rated.

Fire Areas 1-021, 1-023, and 1-019 contain either electrical Train B equipment and/or electrical Train B power and control cabling associated with the Train B electrical distribution system. The analysis of the potential effects of a fire in any of these areas upon the equipment and cabling shows that the plant could lose the entire electrical Train B system. Due to the loss of the electrical Train B system caused by a fire in either fire area 1-021; 1-023; or 1-019, the following safe shutdown equipment could become inoperable in the closed position.

<u>Equipment</u>	<u>Function</u>
N1P19HV3885-B	Instrument Air to Penetration Room
Q1B13HV2228-B	Backup Air/N Supply to Pressurizer PORVs
Q1B31PCV0445A-A,	Pressurizer PORV, Train A
Q1B31PCV0444B-B	Pressurizer PORV, Train B
Q1E2HV8145-N	Pressurizer Auxiliary Spray

The combustible materials associated with the subject fire areas consists of cable insulation and plastic panel parts the following summarizes the fire loading associated with these fire areas:

<u>Fire Area</u>	<u>Fire Load BTU/FT</u>
1-021	109,062
1-023	68,002
1-019	34,375

In Fire Area 1-021, an area smoke detection system is installed. Heat detectors are provided in the 4.16-kV switchgear, the 5-kV disconnect switch, and the four 600-V load centers. These heat detectors activate the alarm horn located in the area and total-flooding CO systems in each piece of equipment. A water hose is installed in room 234 (area 1-20) outside of room 235 (area 1-23) and would be available for manual fire brigade

firefighting operations. A CO hose reel located in room 210 (area 1-20) is also available for use by the fire brigade.

Four ionization smoke detectors are provided in Fire Area 1-023 which activate an alarm bell in room 234 (area 1-20) and annunciate in the control room. A total-flooding Halon system is provided which is activated by the detectors. A water hose installed in room 234 (area 1-20) outside of room 235 is available for use by the fire brigade as a backup.

An ionization smoke detector is located in Fire Area 1-019. A portable extinguisher is available in rooms 211 and 225 (area 1-20). In addition, a CO hose reel located in room 210 (area 1-20) is available for use by the fire brigade for firefighting operations in this area.

The doors separating room 233 (fire area 1-021) from 228 (Fire area 1-020) and room 235 (fire area 1-023) from 234 (fire area 1-020) are provided with removable transoms and cannot be labeled as UL Class A.

The licensee justifies the acceptability of exemptions requested in Section 3.1 on the basis of the existing fire protection and their alternative shutdown actions associated with the subject fire areas identified in Section 3.0.

3.3 EVALUATION

A fire in either Fire Areas 1-021, 1-023 or 1-019 will cause failure of valve Q1E21HV8145-N in the closed position. This will disable the pressurizer auxiliary spray system which provides one method to achieve depressurization of the RCS.

In addition, the same fire in either of the subject fire areas, will affect pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV044B-B which provides the other means of achieving RCS depressurization. Valves N1P19HV3885-B and Q1B13HV2228-B will fail in the closed position on loss of Train B DC power. This will isolate the instrument air supply to the pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV0444B-B. PORV Q1B31PCV044B-B will also be inoperable due to loss of the Train B DC power supply. However, the Train A DC supply to PORV Q1B31PCV0444A-A is not affected due to a fire in this area. Since only one of the PORVs is required for RCS depressurization, and RCS depressurization is a long term requirement, the operator has adequate time to take manual action to restore the instrument air by handwheel operation of valve N1P19HV3885-B located in room 189 (Fire Area 1-006).

Once air is restored, PORV Q1B31PCV0445A-A will be operable to achieve RCS depressurization.

The licensee, by letter dated May 31, 1985, committed to develop detailed procedures specifically for the subject fire areas covered by this evaluation. These procedures will identify the manual operator actions required to regain control of the pressurizer power operated relief valves

(PORVs). These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

The door/transom assemblies, separating rooms 223 (fire area 1-021) and 228 (Fire Area 1-020) rooms 235 (fire area 1-023) and 234 (fire area 1-020) are provided with a removable transom in order to facilitate the movement of large electrical equipment.

The door and frame assemblies associated with these doors meet the UL fire test criteria and they bear a Class A UL label. However, since the transom is removable, the subject door/transom assemblies cannot be listed as Class A by UL. The respective transoms have been certified by the manufacturer as being constructed of materials and in a manner similar to that of a Class A fire door. Therefore, based on the construction, the installation of these doors, and the configuration of the in-situ combustibles in these fire areas, we have reasonable assurance that a fire involving the in-situ combustibles in any of the subject fire areas would not propagate through the transom opening and spread into the adjacent fire area.

All other shutdown systems associated with the fire areas identified in Section 3.0 have redundant counteracts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the subject fire areas, safe shutdown could be achieved and maintained.

3.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configurations will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for the fire areas identified in Section 3.0 above should be granted.

4.0 UNIT 1 AUXILIARY BUILDING LOCAL HOT SHUTDOWN PANEL ROOM - FIRE AREA 1-012 (EXEMPTION REQUEST 1-32)

UNIT 1 AUXILIARY BUILDING VERTICAL CABLE CHASE - FIRE AREA 1-013 (EXEMPTION REQUEST 1-16)

4.1 EXEMPTION REQUESTED

The licensee, in their exemption request 1-32, requested exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2.c to the extent that it requires one train of redundant safe shutdown cables be enclosed by a fire barrier having a one-hour fire rating and that automatic fire suppression be installed in the area.

In addition, the licensee's exemption request 1-013 requested an exemption from 10 CFR 50, Appendix R, Section III.G.2.c to the extent that it requires one train of redundant safe shutdown cabling to be enclosed by a fire barrier having a one-hour fire rating.

4.2 DISCUSSION

Fire Area 1-013 consists of rooms 227 (el 128 ft - 0 in.), 300 (el 141 ft - 0 in.) - 465 and 466 (el 155 ft - 0 in.), and 500 (el 168 ft - 6 in.). All fire area boundary walls, floor, and ceiling are three-hour fire rated and fire area boundary doors are UL Class A fire rated.

Fire Area 1-012 consists of only room number 254 and is bounded by three-hour fire rated floor, ceiling, walls, and UL Class A fire rated doors.

Fire Areas 1-012 and 1-013 contain hot shutdown panel control cables for the following safe shutdown equipment:

<u>Equipment</u>	<u>Function</u>
Q1B31PCV0445A-A	Pressurizer Power Operated Relief Valve
Q1B13MOV800A-A	Pressurizer PORV Block Valve
Q1B13SV2213A-A	Reactor Head Vent Valve
Q1B13SV2214A-A	Reactor Head Vent Valve

The subject control cables are associated with control functions from the hot shutdown panel Q1H21NBAFP2605G-A. In addition, control cables which shift control from the main control room to the hot shutdown panel via the transfer relay cabinet Q1H22L002-A are located in these fire areas. The analysis of the potential effects of a fire, in either of these fire areas, upon the cabling shows that a fire induced failure causing multiple hot shorts could cause the reactor inventory to letdown via the PORV or the reactor head vent path.

Fire Area 1-012 contains electrical train A control cables associated with the following main steam atmospheric relief valves.

<u>Equipment</u>	<u>Function</u>
Q1N11PV3371A-A	Main Steam Atmospheric Relief Valve (SG-1A)
Q1N11PV3371B-A	Main Steam Atmospheric Relief Valve (SG-1B)
Q1N11PV3371C-A	Main Steam Atmospheric Relief Valve (SG-1C)

The analysis of the potential effects of a fire upon these cables shows that the main steam atmospheric relief valves could become inoperable in the closed position.

Fire area 1-013 contains hot shutdown panel control cables for the following safe shutdown components.

EquipmentFunction

Q1H11SV3369AC-A	Main Steam Isolation (SG-1A)
Q1H11SV3369BC-A	Main Steam Isolation (SG-1B)
Q1H11SV3369CC-A	Main Steam Isolation (SG-1C)

The subject cables are associated with control function from the hot shutdown panel Q1H21NBAFP2605G-A. In addition, control cables which shift control from the main control board to the hot shutdown panel via transfer relay cabinet Q1H22L003-A are in this fire area. A fire induced failure causing multiple hot shorts could cause these components to become inoperable in the open position.

In addition, electrical Train B main steam isolation valves could become inoperable in the open position due to loss of electrical Train B distribution system.

Fire Area 1-013 contains control and power cables for the Train B electrical distribution system. An analysis of the potential effects of fire induced failures of these cables demonstrates that the plant could experience a total loss of the electrical Train B distribution system. This could result in the following safe shutdown equipment becoming inoperable in the closed position.

EquipmentFunction

N1P19HV3885-B	Instrument Air to Penetration Room
Q1B13HV2228-B	Backup Air/N Supply to Pressurizer PORVs

In addition, Fire Area 1-013 contains control cables associated with valve Q1B13HV2228-B and the following Unit 1 service air compressors.

EquipmentFunction

N1P19M001A-N	Service Air Compressor - 1A
N1P19M001B-N	Service Air Compressor - 1B
N1P19M001C-N	Service Air Compressor - 1C
N1P19M001D-N	Service Air Compressor -- 1D

The licensee's analysis of the potential effects of fire induced failures on these cables demonstrates that valve Q1B13HV2228-B could become inoperable in the closed position and all service air compressors could be disabled.

The combustible loading associated with these fire areas consists primarily of cable insulation and plastic panel parts. The fire loading associated with Fire Areas 1-012 and 1-013 is 63,382 and 256,281 BTU/ft, respectively.

In Fire Area 1-012 a smoke detection system is provided. In addition, a CO2 hose reel is located in room 210 (fire area 1-020) and is available for fire brigade firefighting operation in this area.

Ionization smoke detectors are located throughout Fire Area 1-013. An automatic water suppression system is provided for this area. Two portable fire extinguishers, and two water hose stations located outside room 300 (e) 139 ft. - 0 in.) in area 1-042 are available to the fire brigade as backup.

The licensee justifies the acceptability of the exemptions requested in Section 4.1 on the basis of the existing fire protection and their alternative shutdown actions associated with the subject fire areas identified in Section 4.0.

4.3 EVALUATION

A fire in either fire area 1-012 or 1-013 could cause fire induced failures (hot shorts) to the control cables for the transfer relay cabinet Q1H22L002-A could cause control for the pressurizer power operated relief and blocking valves and the reactor head vent valves, to shift from their normal main control board alignment to the remote hot shutdown panel. Subsequent fire induced failures (hot shorts from adjacent control cables in the shared raceway) of the control cables for Q1B31PCV0445A-A, pressurizer power operated valve relief valve, and Q1B35V2213A-A and Q1B135V2214A-a, reactor head vent valves, could result in the valves being energized to open. The power relief blocking valve (MOV) could become electrically inoperative in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manual operation (handle) of the affected relays thereby shifting control to the main control board. To remove power from the transfer relay, open breaker 17 on dc distribution panel 1B Q1R4L001B-A) in fire area 1-043 room 0343 go to transfer relay cabinet TRC-1 in Fire Area 1-035 room 0347 and manually shift transfer relays TR1 (Q1B135V2213A-A), TR2 (Q1B135V2214A-A), TR3 (Q1B31PCV0445A-A), and TR5 (Q1B13MOV8000A-A). This will place control back into the control room and allow the operator to mitigate the letdown. In addition, the plant's ability to provide RCS makeup utilizing the Train A chemical volume control system (CVCS) is not affected by a fire in either Fire Area 1-012 or 1-013.

One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator would establish manual control of the atmospheric relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in area 1-012. The capability to control steam generator pressure and reactor coolant system temperature with the use of the manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, a fire in area 1-012 would not prevent the operation of at least one redundant atmospheric relief valve.

The only safe shutdown components which require instrument air are the pressurizer PORVs which are required to be operable for RCS depressurization. RCS depressurization is a long-term action required to initiate RHR. This allows adequate time for manual action to be performed to restore instrument air/backup II, to the pressurizer PORVs. The plant has existing procedures to restore the instrument air on loss of the service air compressors. Once air is restored, valve N1P19HV3885-B can be manually operated to restore air to the pressurizer PORVs.

Fire induced failures (hot shorts) in fire area 1-013 to control cables for the transfer relay cabinet Q1H22L03-A could cause control for the main steam isolation valve Q1N11SV3368AC-A, Q1N11SV3369BC-A, and Q1N11SV3369CC-A to shift from normal main control board alignment to the remote hot shutdown panel. Subsequent fire induced failures of the cables for the main steam isolation valves listed above, could result in the valves becoming inoperable in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manual operation (handle) of the effected relay, thereby shifting control to the main control board. This will enable the plant to maintain main steam isolation using the Train A isolation valves.

The licensee, by letter dated May 31, 1985, committed to develop detailed procedures specifically for the subject fire areas covered by this evaluation. These procedures will identify the manual operator actions required to regain control of the transfer relays for the PORVs, reactor head vent valves and the main steam isolation valves, control of instrument and control of a main steam atmospheric relief valve. These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

All other shutdown systems associated with the fire areas identified in Section 2.0 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the subject fire areas, safe shutdown could be achieved and maintained.

4.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configurations will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for the fire areas identified in Section 4.0 above should be granted.

5.0 UNIT 1 AUXILIARY BUILDING TO DIESEL BUILDING CABLE TUNNEL TRAIN B - FIRE AREA 1-076 (EXEMPTION REQUEST 1-30)

UNIT 1 AUXILIARY BUILDING CABLE CHASE TRAIN B - FIRE AREA 1-030 (EXEMPTION REQUEST 1-29)

UNIT 1 AUXILIARY BUILDING BATTERY ROOM TRAIN B - FIRE AREA 1-016 (EXEMPTION REQUEST 1-28)

5.1 EXEMPTION REQUESTED

The licensee, in their exemption request 1-30, requested an exemption from Section III.G.2.c to the extent that it requires one train of redundant safe shutdown cables to be enclosed by a barrier having a one-hour fire rating and the installation of an automatic fire detection system.

In addition, the licensee in their exemption request 1-29 requested exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, to the extent that it requires one train of redundant safe shutdown cables to be enclosed by a barrier having a one-hour fire rating.

The licensee, in their exemption request 1-28, requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, to the extent that it requires one train of redundant safe shutdown cables and equipment to be enclosed by a barrier having a one-hour fire rating and the installation of an automatic fire-suppression system.

5.2 DISCUSSION

Fire Area 1-076 consists of a cable tunnel running from the Unit 1 auxiliary building to the diesel building. The fire area boundary walls, floor, and ceiling are three-hour fire rated except for a non-fire rated watertight door and bulkhead which exist between the cable tunnel and the auxiliary building (area 1-030). The non-rated door has a fire-resistant coating applied. An UL Class A fire rated door exists between the cable tunnel and the diesel building.

Fire Area 1-030 consists of rooms 249 (el 121 ft. - 0 in. and 139 ft. - 0 in.) and 252 (el 127 ft. - 0 in.). All fire area boundary walls, floors, and ceilings are three-hour fire rated, except for the door and bulkhead between room 252 and cable tunnel (area 1-076) which are non-fire rated and watertight. The non-rated door has a fire resistant coating applied on the Fire Area 1-076 side. UL Class A fire rated door exists between rooms 249 and 235 (area 1-023).

Fire Area 1-016 consists only of room 212 at el 121 ft - 0 in. and is bounded by three-hour fire rated floor, ceiling, and walls. The area boundary door is UL Class A fire rated.

Fire Areas 1-076, 1-030 and 1-016 contain electrical power and control cables for the electrical Train B distribution system.

The licensee's analysis of the potential effects of a fire in either Fire Areas 1-076, 1-030, or 1-016 shows that the plant could lose Train-B emergency diesel backup power. In the event of a postulated loss of offsite power (LOSP) for Unit 1 along with a fire in any of these areas, the plant could experience a total loss electrical Train-B distribution system inoperable in the closed position.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
N1P19HV3885-B	Instrument Air to Penetration Room
Q1B13HV2228-B	Backup Air/N/Supply to Pressurizer PORVs
Q1B31PCV0445A-A	Pressurizer PORV, Train A
Q1B31PCV0444B-B	Pressurizer PORV, Train B
Q1E21HVB145-N	Pressurizer Auxiliary Spray

The combustible materials associated with the subject fire areas consists of cable insulation and plastic panel parts. The following summarizes the fire loading associated with the subject fire areas:

<u>FIRE AREA</u>	<u>FIRE LOAD BTU/FT</u>
1-076	39,000
1-030	423,898
1-016	1,567

Fire Protection Features provided for Fire Area 1-076 consists of an automatic water suppression system.

In Fire Area 1-030, a smoke detection system and automatic water suppression system are installed in this area. The manual hose station located in room 234 (area 1-020), is available for use by the fire brigade in this area.

A smoke detection system is installed in Fire Area 1-016. In addition, a CO2 hose reel located in room 210 (area 1-020) is available for use. Portable extinguishers are available in adjacent rooms 210, 211, and 225.

The licensee justifies the acceptability of the exemptions requested in Section 5.1 on the basis of the existing fire protection, and their alternative shutdown actions associated with the subject fire areas identified in Section 6.0.

5.3 EVALUATION

Failure of valve Q1E21HVB145-N in the closed position will disable the pressurizer auxiliary spray system which provides one method to achieve depressurization of the RCS.

Pressurizer PORVs Q1B31PCV0445A-A and Q1B31PV0444B-B provide another means of achieving RCS depressurization. Valves N1P19HV3885-B and Q1B13HV2228-B will fail in the closed position on loss of Train-B dc power. This will isolate the instrument air supply to the pressurizer PORVs, Q1B31PCV0445A-A

and Q1B31PCV0444B-B. PORV Q1B31PCV0444B-B will also be inoperable due to loss of the train-B dc power supply. However, the Train-A dc supply to PORV Q1B31PCV0445A-A is not affected due to a fire in this area. Since only one of the PORVs is required for RCS depressurization and RCS depressurization is a long term requirement, the operator has adequate time to take manual action to restore the instrument air by handwheel operation of valve N1P19HV3885-B.

Once air is restored, PORV Q1B31PCV0445A-A will be operable to achieve RCS depressurization.

The licensee, by letter dated May 31, 1985, committed to develop detailed procedures specifically for the subject fire areas covered by this evaluation. These procedures will identify the manual operator actions required to regain control of the pressurizer PORVs and the transfer relays for the PORVs and the head vent valves. These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage presently scheduled for the fourth quarter of 1986.

The watertight doors between Fire Areas 1-030 and 1-076 do not comply with the three-hour fire-rated fire area boundary requirements. However, a fire in either Fire Area 1-030 propagating into fire area 1-076 will not have any additional impact on Unit 1 safe shutdown capability because the same redundant safe shutdown function cables are contained in Unit 1 fire area.

5.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configurations will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee request for the fire areas identified in Section 5.0 above should be granted.

6.0 UNIT 1 AUXILIARY BUILDING, ELEVATION 100 FT. - 0 IN. CHARGING PUMP ROOMS AND STORAGE AREAS - FIRE AREA 1-005 (EXEMPTION REQUEST 1-34).

6.1 EXEMPTION REQUESTED

The licensee, in their exemption request 1-34, requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2.a to the extent it requires a three-hour fire barrier between redundant safe shutdown cabling and equipment.

In addition, the licensee requested an exemption for rooms 172 and 181 within Fire Area 1-005 from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2.c to the extent that it requires one train of redundant safe shutdown cable to be enclosed by a fire barrier having a one-hour fire rating and an automatic suppression system.

6.2 DISCUSSION

Fire Area 1-005 consists of the three charging pump rooms (173, 174, and 181), a hallway (172), a general storage area (171), and a contaminated storage area (182). The fire area boundary walls, floors, and ceilings are three-hour fire rated except for the containment wall. The fire area boundary door is fire rated. Self expanding cork is installed between the fire area boundary walls and the containment.

Fire Area 1-005 contains the three redundant charging pumps, related valves, and air handling units. Fire Area 1-005 was subdivided into the four zones identified below to perform the fire hazards analysis.

- Zone 1: Room 181 - Train A Charging Pump Room
- Zone 2: Room 174 - Swing Charging Pump Room
- Zone 3: Room 173 - Train B Charging Pump Room
- Zone 4: Rooms 171, 172, and 183 - Storage Rooms and Hallway

The licensee's reevaluation is based on the premise that a fire would be contained in one of the four zones listed above.

Room 172 in Fire Area 1-005 contains the redundant RWST isolation valves (LCV115B and LCV115D) and CVCS makeup valves (FCV114A-2 and FCV113B-A). The CVCS makeup valves control the flow of boric acid from the boric acid transfer pumps and control the flow of primary water from the primary water makeup pump. Fire barriers are not provided for the valves or cables. The analysis of the effects of a fire in the area shows that the RWST isolation valves could become electrically inoperable in the closed position and makeup to either the VCT or charging pump suction header could be isolated.

Control cables of the Train A pressurizer power operated relief and blocking valves Q1B31PCV0445A-A and Q1B13MOV8000A-A and the reactor head vent valves Q1B13SV2213A-A and Q1B13SV2214A-A are located in Fire Area 1-005. The subject cables are associated with the control function from the hot shutdown panel Q1H21NBAFP2605G-A. In addition, control cables which shift control from the main control board to the hot shutdown panel via the transfer relay cabinet Q1H22L002-A are in this area. A fire induced failure having multiple hot shorts could cause the reactor inventory to letdown via the PORV and reactor head vent paths.

Combustible materials in Fire Area 1-005 primarily consists of cable insulation and lube oil. The following fire loading is associated with the rooms bounded by Fire Area 1-005:

<u>ROOM NUMBER</u>	<u>FIRE LOAD BTU/FT</u>
173 Charging/Safety Injection Pump Room	27,563

174 Charging/Safety Injection Pump Room	28,508
181 Charging/Safety Injection Pump Room	47,414
171, 172 and 182 Hallway/Storage Areas	31,820

Smoke detection systems are installed throughout Fire Area 1-005. A manual hose station, CO2 hose reel, portable extinguishers, and portable smoke removal equipment located in the corridor just outside the fire area are available for use in Fire Area 1-005. An automatic sprinkler system is installed in rooms 171 and 172.

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection, their proposed modifications and their alternative shutdown actions associated with the charging pump rooms and storage areas (Fire Area 1-005).

6.3 EVALUATION

The charging pump rooms (173, 174, and 181) are watertight with 2-ft.-thick reinforced concrete walls. Penetrations in the pump room walls internal to Fire Area 1-005 are sealed to provide a watertight boundary. The seals utilized to provide the watertight boundary are of the type (foam, welded plate, or grout) to provide an adequate barrier to inhibit the spread of fire, smoke, or gas. The doors are watertight and are normally maintained closed. Lubricating oil and cable insulation are the only combustibles present in the pump rooms. Lubricating oil would be contained within the individual rooms or would drain into the sump servicing the room. In addition, there is a fixed suppression system installed in rooms 172 (hallway) and 171 which provide additional protection in the area of the pump room doors that communicate with this hallway. Room 171 is a designated combustible material storage area with three-hour fire rated boundaries and door. Smoke detection systems are installed throughout the area including the three charging pump rooms. The maximum combustible in-situ loading in any room of this fire area is estimated to be less than 48,000 Btu/ft with a maximum fire severity of less than one hour. Based upon the evaluation of the protection provided, a credible fire would be contained within the zone of its initiation.

A one-hour barrier enclosure will be installed on portions of raceway sections AHFA15, AHF031, AFD-30, AEF028 that carry cables for RWST isolation valve LCV115B-A in room 172. Given a fire in room 172, this modification will ensure that all cables required for the operation of the redundant RWST isolation valves (LCV115B and LCV115D) are protected by a fire barrier.

Although the redundant RWSI isolation valve operators are in room 172, they are separated by a distance of 18 feet. The duration and severity of a fire in room 172 would be limited due to low quantities of combustibles and partial automatic fire suppression system coverage. The combustible loading in room 172 consists of cable insulation and is of such quantity that the maximum expected fire severity is less than 30 minutes.

Raceway Section AHDB12 will be protected by a one-hour fire barrier enclosure over its entire route within Fire Area 1-005. This modification will protect cables for the subject valves in all portions of Fire Area 1-005 with the exception of room 181. The modification will ensure that a single fire can not impact the RWSI isolation valve operators and cause a loss of boration capability.

Fire induced failures (hot shorts) within the control cables for the transfer relay cabinet Q1H22L002-A resulting from a fire in room 181 could cause control for the pressurizer power operated relief and blocking valves and the reactor head vent valves to shift from their normal main control board alignment to the remote hot shutdown panel. Subsequent fire induced failures (hot shorts from adjacent control cables in the shared raceway) of the control cables for Q1B31PCV0445A-A, pressurizer power operated relief valve, and Q1B13SV2213A-A and Q1B13SV2214A-A, reactor head vent valves, could result in the valves being energized to open. The MOV could become electrically inoperable in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 1B (Q1R41L001BV-A) in Fire Area 1-043 room 0343 then go to transfer relay cabinet TRC-1 in Fire Area 1-035 room 347 and manually shift transfer relays TR1 (Q1B13SV2213A-A), TR2 (Q1B13SV2214A-A), TR3 (Q1B13PCV0445A-A), and TR5 (Q1B13SV2214A-A). This will restore control to the main control board and allow the operator to mitigate the letdown.

By letter dated May 31, 1985, the licensee committed to develop a detailed procedure specifically for this fire area covering the manual operator actions required to regain control of the transfer relays associated with the PORVs and the reactor head vent valves. This procedure will be fully implemented by the end of the Unit 1 seventh refueling outage. In addition, the licensee has also committed to install the proposed raceway fire barrier enclosures by the end of this refueling outage, which is currently scheduled for the fourth quarter of 1986.

All other shutdown systems associated with Fire Area 1-005 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in either rooms 173, 174, 171, 172, 181, or 182 (Fire Area 1-005), safe shutdown could be achieved and maintained.

6.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration, will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for Unit 1 auxiliary building elevation 100 ft. - 0 in. Charging Pump Rooms and Storage Areas (Fire Area 1-005) should be granted.

7.0 UNIT 1 AUXILIARY BUILDING, ELECTRICAL PENETRATION ROOM TRAIN A - FIRE AREA 1-035 (EXEMPTION REQUEST 1-37)

7.1 EXEMPTION REQUESTED

The licensee, in their exemption request 1-37, requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2, to the extent that it requires one train of redundant safe shutdown cable and equipment to be enclosed by a one-hour fire-rated barrier and the installation of an automatic fire suppression system.

7.2 DISCUSSION

Fire area 1-035 consists of rooms 333 and 347 at el 139 ft - 0 in. All fire area boundary walls, ceilings, and floors are three-hour fire rated and area boundary doors are UL Class A fire rated. Self-expanding cork is installed for the portions of the area boundary along the containment wall.

Fire Area 1-035 contains instrumentation cables associated with the following RCS hot leg temperature indication:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
N1B21TE413-P1	RCS Loop-1 Hot Leg Temperature Indication
N1B21TE423-P1	RCS Loop-2 Hot Leg Temperature Indication
N1B21TE433-P1	RCS Loop-3 Hot Leg Temperature Indication

The licensee's analysis of the potential effects of a fire upon these cables shows that the plant could lose hot leg temperature indication for all three RCS loops.

In addition, Fire Area 1-035 contains power and control cables and equipment (MCC-IU) associated with the following valve.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1E21MOV8106-A	Charging Pump Miniflow Isolation Valve

The licensee's analysis of the potential effects of a fire upon the equipment and these cables shows that the subject valve could become inoperable in the closed position, isolating charging pump miniflow.

Power and control cables associated with the following valves are routed through Fire Area 1-035:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1E21MOV8131A-A	Charging Pump Suction Header Isolation Valve
Q1E21MOV8133A-A	Charging Pump Discharge Header Isolation Valve

The licensee's analysis of the potential effects of a fire upon the equipment and these cables shows that the subject valves could become inoperable in the closed position. This condition will result in loss of seal injection water flow when the swing charging pump 1B is operational. These valves cannot be locked open because they are needed for train separation during a LOCA event.

Also, Fire Area 1-035 contains control cables associated with the following safe shutdown equipment:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1B31PCV0445A-A	Pressurizer PORV
Q1B13MOV8000A-A	Pressurizer PORV Block Valve
Q1B13SV2213A-A	Reactor Head Vent Valve
Q1B13SV2214A-A	Reactor Head Vent Valve

The subject cables are associated with control from both the hot shutdown panel and the main control board. Fire induced failures having multiple hot shorts could cause the reactor inventory to letdown the PORV and reactor head vent paths.

Combustible materials in Fire Area 1-035 primarily consists of cable insulation and plastic panel parts. The fire loading associated with this area is approximately 83,542 BTU/FT.

An ionization smoke detection system is installed in Fire Area 1-035. A hose station is located in room 334 (Fire Area 1-004) and is accessible to this area for manual firefighting purposes.

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection, their proposed modifications, and their alternative shutdown actions associated with the Unit 1 auxiliary building electrical penetration room Train A (Fire Area 1-035).

7.3 Evaluation

Each RCS loop hot leg temperature instrumentation loop is powered from channelized inverter-1A. Inverter-1A is powered from 600 V-ac MCC 1A or 125 V-dc bus 1A. A fire in area 1-035 along with an assumed loss of offsite power (LOSP) for Unit 1 could result in loss of the 600 V-ac power supply to inverter 1A; however, inverter 1A will continue to operate from 125 V-dc bus 1A and will supply power to the instrument loops for a minimum of two hours. If after two hours power is lost, RCS hot leg temperature indication is available from the core exit thermocouples. Core exit thermocouple temperature indication will not be affected by a fire in area 1-035. In addition to the alternate dc power supply for a minimum of two hours and core exit temperature indication availability, a design change to be installed as a result of RG 1.97 will provide a redundant signal processing and indication between RCS hot leg temperature loops N1B21TE413, N1B21TE423, and N1B21TE433. Based upon the RG 1.97 commitment schedule, implementation of the modification is currently planned for the seventh refueling outage presently scheduled to commence during the fourth quarter of 1986. After implementation of this modification, a fire in Fire Area 1-035 will not affect the ability to monitor one loop of RCS hot leg temperature.

A design modification is proposed to install disconnect breakers in the power supply circuits of these valves outside the electrical penetration room during the next outage of sufficient duration subsequent to design and procurement completion. The next outage is currently scheduled to commence during the fourth quarter of 1986. In the interim, the operators will be instructed of the potential inadvertent closure of the charging pump suction and discharge valves in the event of a fire in this area.

The charging pump can be run safely with miniflow isolated and with a minimum of 24 gpm seal injection flow for a period of up to one hour. This will allow the operator time to deenergize MCC-1U and take manual action to open the valve and reestablish the miniflow.

Fire induced failure (hot short) of the individual control cables for Q1B31PCV0445A-A, power operated relief valve, and Q1B13SV2213A-A and Q1B13SV2214A-A, reactor head vent valves, could result in the valves to be energized to open. The power operated relief blocking valve could become electrically inoperable in the open position. In the unlikely event of the multiple fire induced failures (hot shorts from adjacent control cables in the shared raceway) occurring, this condition can be mitigated by removing 125 V-dc power from cables in the shared raceway. This can be accomplished by opening the breakers on the 125 V-dc switchgear bus 1A (Q1R42B001A-A) for 125 V-dc distribution panels 1A, 1B, and 1C and by opening feeder breaker numbers 4 and 16 on V-dc distribution panel 1G N1R41L001G-N.

The licensee, by letter dated May 31, 1985, committed to develop detailed procedure specifically for the subject fire areas covered by this

evaluation. This procedure will identify the manual operator actions required to regain the control of the pressurizer power operated relief valves. This procedure will be fully implemented by the end of the Unit 1 seventh refueling outage.

All other shutdown systems associated with Fire Area 1-035 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in the Unit 1 auxiliary building electrical penetration room Train A, safe shutdown could be achieved.

7.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R, Section III.G.2, and that no additional fire protection features are required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for the Unit 1 auxiliary building electrical penetration room Train A (Fire Area 1-035) should be granted.

8.0 UNIT 1 AUXILIARY BUILDING ELEVATION 100 FT. - 0 IN., 121 FT. - 0 IN., 130 FT. - 0 IN., 139 FT. - 0 IN., 155 FT. - 0 IN., 175 FT. - 0 IN., AND 184 FT. - 0 IN. - FIRE AREA 1-004 (EXEMPTION REQUEST 1-39).

8.1 Exemption Requested

The licensee, in their exemption request 1-39, requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2.c. TO the extent that it requires one train of redundant safe shutdown cables to be enclosed in a one-hour fire barrier and that automatic fixed suppression be installed throughout the fire area.

In addition, the licensee requested an exemption from Appendix R Section III.G.2.a to the extent that it requires separation of redundant cables and equipment by a fire barrier having a three-hour rating.

8.2 DISCUSSION

Fire Area 1-004 consists of the following rooms:

E1 100 Ft. - 0 In.

Room 151	Waste Gas Decay Tank Rooms
Room 152	Valve Compartment Room
Room 153	Waste Gas Compressor Room
Room 154	Waste Evaporator Steam Generator Room
Room 155	Passageway to Unit 2

Room 156	Holdup Tank Room
Room 157	Holdup Tank Room
Room 158	Holdup Tank Room
Room 159	Recycle Evaporator Feed Pump Room
Room 160	Hatch Area
Room 161	Corridor
Room 162	Hallway
Room 163	WDS Control Panel Room
Room 164	Storage Room/Laundry and Hot Shower Tank Room
Room 165	Waste Gas Decay Tank Room
Room 166	Waste Gas Decay Tank Room
Room 168	Chemical and Laundry Drain Tank Room
Room 170	Letdown Heat Exchanger Room
Room 175	Hallway
Room 176	Secondary Spent Resin Storage Tank Room
Room 177	Pump Room
Room 178	Filter Room
Room 179	Valve Room/Combustible Storage
Room 180	Recycle Evaporator Steam Generator Room
Room 186	Boric Acid Area
Room 187	Hydro Test Pump Room
Room 188	Boric Acid Tank Area

E1 121 Ft. - 0 In.

Room 203	Waste Condenser Tanks and Pump Room
Room 204	Waste Evaporator Package Room
Room 205	Passage to Unit 2
Room 206	Heat Exchanger Room
Room 207	Hatch Area
Room 208	Corridor
Room 209	Hallway
Room 215	Duct and Pipe Chase
Room 216	Valve Compartments Area
Room 217	Volume Control Tank Room
Room 218	Chiller Unit Room
Room 219	Pipe Chase
Room 220	Valve Compartment Room
Room 221	Primary Spent Resin Storage Tank Room
Room 222	Corridor
Room 230	Recycle Evaporator Package Room
Room 231	Sluice Pump Room
Room 232	Sluice Filter Room
Room 236	HVAC Duct Chase
Room 237	Corridor
Room 238	Cask Storage Area
Room 239	Transfer Canal
Room 240	Spent Fuel Pool Room
Room 253	Valve Compartment

E1 130 Ft. - 0 In.

Room 601	Drumming Area
Room 602	Passageway
Room 603	Drum Storage Area - Combustible Storage Area
Room 604	Passage
Room 605	Blowdown Pumps and Surge Tank Room
Room 606	Filter Room
Room 607	Filter Room
Room 608	Blowdown Heat Exchanger Room
Room 609	Storage Room
Room 610	Valve Compartment Room

E1 139 Ft. - 0 In.

Room 301	Seal Water Filter Room
Room 302	Recycle Evaporator Feed Filter Room
Room 303	Reactor Coolant Filter Room
Room 304	Waste Monitor Tank Filter Room
Room 305	Seal Injection Filter Room
Room 306	Recycle Evaporator Feed Demineralizer Room
Room 307	Valve Compartment Room
Room 308	Waste Condensate and Monitor Tank Demineralizer Room
Room 309	Hatch Area
Room 310	Valve Compartment Room
Room 311	Recycle Evaporator Concentrates Filter Room
Room 312	Corridor
Room 313	Floor Drain and Laundry Tank Filter Room
Room 314	Waste Evaporator Feed Filter Room
Room 315	Recycle Waste Condenser Filter Room
Room 316	Passage to Unit 2
Room 322	Hallway
Room 323	Sample Room
Room 324	High Activity Radioactive Lab
Room 325	Counting Room
Room 326	Gas Analyzer Room
Room 327	Valve Access Area
Room 328	BTR Demineralizer Room
Room 329	Pipe Tunnel
Room 330	Chiller Surge Tank Pump Room
Room 331	Valve Access Area
Room 332	MCC 1A Area
Room 340	Demineralizer Compartment
Room 341	Pipe Chase
Room 342	Spent Fuel Pool Pump Room
Room 348	Cask Wash Area

E1 155 Ft. - 0 In.

Room 402	Passway to Unit 2
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Room 403	New Resin Storage
Room 404	Filter Hatches Room/Combustible Storage
Room 405	Hatch Room
Room 406	Decon Room
Room 407	Hot Machine Shop
Room 408	Hallway
Room 409	Hallway
Room 410A	600-V Load Center (Station Service Transformer Room)
Room 410B	600-V Load Center
Room 415	Corridor
Room 417	Corridor
Room 418	Auxiliary Building and Containment Purge Vent Equipment Room
Room 419	Deminerlizer Hatch Area
Room 420	Drum Storage Room
Room 421	Drumming Station Room
Room 422	Corridor
Room 423	Valve Compartment
Room 424	Deminerlizer Compartment
Room 425	Deminerlizer Compartment
Room 426	Deminerlizer Compartment
Room 427	Deminerlizer Compartment
Room 429	Containment Purge Air Equipment Room
Room 430	Disrobe Area
Room 431	Health Physicist Room
Room 432	Corridor
Room 433	Corridor
Room 434	Passage
Room 435	Hot Shower
Room 436	Hot Toilet
Room 437	Hot Janitor
Room 438	Hot Water Heater Room
Room 439	Drying Area
Room 440	Laundry Area
Room 441	Drying Area
Room 442	First Aid Room
Room 443	Locker Room
Room 444	Clean Linen Storage
Room 445	Spent Fuel Pool Heat Exchanger Room
Room 446	Hallway
Room 447	Cask Wash Storage Room
Room 448	SFPC Pump Room
Room 449	Deminerlizer Room
Room 450	Valve Compartment
Room 451	Filter Room
Room 452	Clean Shower
Room 453	Clean Janitor Room
Room 454	Lobby
Room 455	Clean Toilet Room
Room 456	Drying Area
Room 461	Environmental Low Activity Lab

Room 462 Non-Radioactive Vent Equipment Room
 Room 463 Nitrogen Storage Room
 Room 464 Nitrogen Storage Room
 Room 467 SFP Heat Exchanger Room
 Room 478 Motor Control Center Room

E1 175 Ft. - 0 In.

Room 506 Component Cooling Surge Tank Room

E1 184 Ft. - 0 In.

Room 504 Stair No. 6
 Room 505 Spent Fuel Pool Vent Equipment Room

All of the fire area boundary walls are rated as a three-hour fire barrier with all electrical and piping penetrations sealed for a three-hour rating. All doors that are part of the fire area boundary are UL Class A doors except for Class B doors to stairwells used for access and egress and for doors in the fire area boundary leading to the outside which are not rated. The floors and ceilings of Fire Area 1-004 which bound other fire areas are rated for three-hour with the exception of two non-rated steel hatch covers. A non-rated steel hatch cover in the floor of room 163 (area 1-004) communicates with room 103 (area 1-001) and a non-rated steel hatch cover in the floor of room 454 (area 1-004) communicates with room 345 (area 1-042). All internal floors of Fire Area 1-004 are reinforced concrete, and exposed structural steel has been protected by fire proofing.

Fire Area 1-004 contains redundant safety-related MCCs, (1A) Q1R17B001A-A and (1B) Q1R17B001B-B. These motor control centers provide power for various Train-A and Train-B safe-shutdown components, respectively. Power supply cabling and subject motor control centers are not protected by fire barriers and full coverage automatic suppression is not provided.

Fire Area 1-004 also contains redundant safety-related dc distribution panels (1C) Q1R41L001C-A and (1F) Q1R41L001F-B. These 125 V-dc distribution panels provide power for various Train-A and Train-B safe-shutdown components, respectively. Power supply cabling and distribution panels are not protected by barriers.

Rooms 462 and 464 contain redundant steam generator pressure transmitters and cabling. The redundant steam generator pressure instruments provide the following signals:

<u>Equipment</u>	<u>Function</u>
Q1N11PT3371A-A	S/G-A Press, Atmospheric Relief Valve Control and Hot Shutdown Panel Pressure Indication
Q1N11PT0474-P2	S/G-A Press, Protection Signal, Indication

Q1N11PT0475-P3	S/G-A Press, Protection Signal, Indication
Q1N11PT0476-P4	S/G-A Press, Protection Signal, Indication
Q1N11PT3371B-A	S/G-B Press, Atmospheric Relief Valve Control and Hot Shutdown Panel Pressure Indication
Q1N11PT0484-P2	S/G-B Press, Protection Signal, Indication
Q1N11PT0485-P3	S/G-B Press, Protection Signal, Indication
Q1N11PT0486-P4	S/G-B Press, Protection Signal, Indication
Q1N11PT3371C-A	S/G-B Press, Atmospheric Relief Valve Control and Hot Shutdown Panel Pressure Indication
Q1N11PT0494-P2	S/G-C Press, Protection Signal, Indication
Q1N11PT0495-P3	S/G-C Press, Protection Signal, Indication
Q1N11PT0496-P4	S/G-C Press, Protection Signal, Indication

The redundant pressure transmitters and their cabling are not protected by fire barriers and full coverage automatic suppression is not provided.

In addition, Fire Area 1-004 contains redundant instrument air system dc power and control cabling which serve N1P19SV3825-A (instrument air penetration room isolation valve), Q1P19SV3611-A (instrument air containment isolation valve) Train A, and Q1B13SV2228-B (power relief valve backup air supply) Train B. The dc power and control cabling are not protected by barriers, and full automatic fixed suppression coverage is not provided.

Redundant power and control cabling of battery charging room coolers Q1E16M006A-A and Q1E16M006B-B, Trains A and B, respectively, and battery room exhaust fans and exhaust dampers, Q1V47C012A-A, Q1V47C012B-B and Q1V47MOV3644-A, Q1V47MOV3643-B, Trains A and B, respectively, are routed through Fire Area 1-004. The subject power and control cabling is not protected by barriers and full coverage automatic fixed suppression is not provided.

Flow from the charging pumps is required for reactor coolant boration and makeup, reactor coolant system depressurization, and reactor coolant pump seal integrity. The following independent conditions concern cables related to the charging pumps and charging pump room coolers:

Fire Area 1-004 contains redundant charging pump Train-A and -B power cables. One train of redundant power cables is not provided with a fire rated barrier for its entire route in the fire area,

nor is full suppression coverage provided for both redundant trains throughout their entire route in the fire area.

- Fire Area 1-004 contains redundant charging pump room cooler power and control cables. One train of redundant power and control cable is not provided with a fire rated barrier for its entire routine in the fire area, nor is full suppression coverage provided for both redundant trains throughout the entire route in the fire area.

In addition, Fire Area 1-004 contains dc distribution panel (1C) Q1R41L001C-A which supplies solenoid power for atmospheric relief valves, Q1N11PV3371A, Q1N11PV3371B, and Q1N11PV3371C. The subject panel and cables are not separated by fire barriers.

Fire area 1-004 contains power and control cables for S/G-1C steam supply to TDAFW pump valve Q1N12SV3235B-AB and TDAFW pump steam admission valve Q1N12SV3226-AB. The subject cables are not separated by fire barriers nor is full coverage automatic suppression provided.

Redundant instrumentation cabling and equipment Q1C55NM0048-A of neutron flux monitoring Q1C55NE0048A-A (post-accident neutron flux monitor) and N1C55NE0031-P1, and N1C55NE0032-P2 (source range neutron flux monitors) are located in Fire Area 1-004. The subject cabling and equipment is not separated by fire barriers and automatic fixed suppression is not provided.

Fire Area 1-004, also contains cabling for redundant RCS and pressurizer sample line boundary valves. The RCS valves are Q1P16HV3103-B, Q1P15HV3102-B, and Q1P15HV3765-A. The pressurizer valves are Q1P15HV3103-A and Q1P15HV3881-B. The subject cables are not separated by fire barriers and full coverage automatic fixed suppression is not provided.

In addition, non-fire-rated steel hatch covers are located in the floor of Rooms R 163 and 454 (Fire Area 1-004). These hatches communicate with Rooms 103A (Fire Area 1-001) and 354 (Fire Area 1-042), respectively.

Combustible materials in Fire Area 1-004 primarily consists of cable insulation, charcoal filter media, lube oil, plastic panel parts, flammable liquids and gases and various miscellaneous materials. The following fire loading is associated with the rooms bounded by Fire Area 1-004:

<u>Room Numbers/ Titles</u>	<u>Fire Load (Btu/ft²)</u>	<u>Maximum Fire Severity</u>
151 Waste Gas Decay Tank Rooms,	15,877(a)	less than 30 min(a)

152 Valve Compartment Room, 165 Gas Decay Tank Room, and 166 Waste Gas Decay Tank Room		
153 Waste Gas Compressor Room	34,733	less than 30 min
159 Recycle Evaporator Feed Pump Room	26,783	less than 30 min
168 Chemical and Laundry Drain Tank Room	52,037	less than 1 h
175 Hallway	29,580	less than 30 min
154 Waste Evaporator Steam Generator Room, 155 Passageway to Unit 2, 160 Hatch Area, 161 Corridor, 162 Hallway, 163 WDS Panel Room, 164 Laundry and Hot Shower Tank Room, 177 Pump Room, and 178 Filter Room	27,995(b)	less than 30 min(b)
215 Duct and Pipe Chase	0	0
176 Secondary Spent Resin Storage Tank Room	0	0
179 Valve Room/ Combustible Storage (c)	2,724	less than 30 min
180 Recycle Evaporator Steam Generator Room, 186 Boric Acid Area, and 187 Hydro Test Pump Room	23,636(d)	less than 30 min(d)
204 Waste Evaporator Package Room	4,963	less than 30 min

219 Pipe Chase	0	0
203 Waste Condenser Tanks and Pump Room, 205 Passageway to Unit 1, 207 Hatch Area, 208 Corridor, 209 Hallway, 218 Chiller Unit Room, 222 Corridor, 237 Corridor, and 253 Valve Compartment	40,542(e)	less than one hr. (e)
156 Holdup Tank Room	11,209	less than 30 min
157 Holdup Tank Room	13,879	less than 30 min
158 Holdup Tank Room	10,769	less than 30 min
188 Boric Acid Tank Area	619	less than 30 min
206 Heat Exchanger Room	6,305	less than 30 min
220 Valve Compartment Room	3,200	less than 30 min
230 Recycle Evaporator Package Room	17,048	less than 30 min
231 Sluice Pump Room	17,258	less than 30 min
232 Sluice Filter Room	25,132	less than 30 min
236 Duct Chase	0	0

216 Valve Compartment Area	6,549	less than 30 min
217 Volume Control Tank Room	0	0
221 Primary Spent Resin Storage Tank Room	0	0
238 Cask Storage Area, 239 Transfer Canal, 240 Spent Fuel Pool Room, and 348 Cask Wash Area	1,234(f)	less than 30 min(f)
447 Cask Wash Storage Area/ Combustible Storage(c)	21,236	less than 30 min
309 Hatch Area, 312 Corridor, 325 Counting Room, 322 Hallway, 316 Passageway to Unit 2, 327 Valve Access Area, 332 MCC 2A, 307 Valve Compartment Room, 310 Valve Compartment Room, and 330 Chiller Surge Tanks Pump Room	29,989(g)	less than 30 min(g)
301 Seal Water Filter Room, 302 Recycle Evaporator	392(h)	less than 30 min(h)

Feed Filter Pump, 303 Reactor Coolant Filter Room, 304 Waste Monitor Tank Filter Room, 311 Recycle Evaporator Concentrates Filter Room, 313 Floor Drain and Laundry Tank Filter Room, 314 Waste Evaporator Feed Filter Room, 315 Recycle Waste Condenser Filter Room, and 305 Seal Injection Filter Room		
306 Recycle Evapoartor Feed Demin. Room	0	0
308 Waste Condensate and Monitor Tank Demin. Room	0	0
323 Sample Room	35,280	less than 30 min
324 High Activity Radioactive Lab	23,950	less than 30 min
326 Gas Analyzer Room	1,889	less than 30 min
329 Pipe Tunnel	0	0

331 Valve Access Area	10,936	less than 30 min
342 Spent Fuel Pool Pump	5,247	less than 30 min
340 Demin- eralizer Compartment	0	0
328 BTR Demin. Room	0	0
601 Drumming Area, 602 Passageway, and 603 Drum Storage Area Combustible Storage Area	2,141(1)	less than 30 min(1)
604 Passage	3,859	less than 30 min
605 Blowdown Pumps and Surge Tank Room	8,885	less than 30 min
606 Filter Room	7,208	less than 30 min
607 Filter Room	563	less than 30 min
608 Blowdown Heat Exchanger Room	1,720	less than 30 min
609 Storage Room	3,891	less than 30 min
610 Valve Compartment Room	616	less than 30 min
341 Pipe Chase	0	0

445 Spent Fuel Pool Heat Exchanger Room, and 448 SFPC Pump Room	24,570(j)	less than 30 min(j)
451 Filter Room	0	0
449 Demineralizer Room	0	0
450 Valve Compartment	0	0
406 Decontamination	5,702	less than 30 min
407 Hot Machine Shop	4,488	less than 30 min
409 Hallway, 410A 600-V Load Center, 410B 600-V Load Center, 405 Hatch Room, 419 Demineralizer Hatch Area, 408 Hallway, 422 Corridor, 446 Hallway, and 423 Valve Compartment	35,737(k)	less than 30 min(k)
420 Drum Storage Room, and 421 Drumming Station Room	12,212(l)	less than 30 min(l)
424 Demineralizer Compartment	0	-
425 Demineralizer Compartment	0	-

425 Demineralizer Compartment	0	-
426 Demineralizer Compartment	0	-
427 Demineralizer Compartment	0	-
418 Auxiliary Building and Containment Purge Vent Equipment Room	58,754	less than 45 min
404 Filter Hatch Room/ Combustible Storage (c)	306	less than 30 min
403 Hot Instr. Shop	3,852	less than 30 min
402 Passage to Unit 2, 417 Corridor, 430 Disrobe Area, 435 Hot Shower, 439 Drying Area, 441 Drying Area, 434 Passage, 433, and 415.	57,839(m)	less than 45 min(m)
443 Locker Room	3,376	less than 30 min
440 Laundry Area	20,626	less than 30 min
438 Hot Water Heater Room	4,770	less than 30 min
432 Corridor	61,284	less than 45 min

454 Lobby	0	-
462 Non Radioactive Vent Equipment Room	7,673	less than 30 min
463 Storage Room	4,542	less than 30 min
464 Storage Room	7,818	less than 30 min
467 SFP Heat Exchanger Room	1,704	less than 30 min
429 Containment Purge Air Equipment Room	188,885	less than 2-1/2 h
431 Health Physics Room	28,391	less than 30 min
461 Environmental Low Activity Lab	18,077	less than 30 min
436 Hot Toilet	296	less than 30 min
437 Hot Janitor	-	-
442 First Aid Room	9,933	less than 30 min
478 Motor Control Center Room	39,085	less than 30 min
504 Stairwell No. 6 Floor, E1 184 Ft - 0 in.	925	less than 30 min

505 Spent Fuel Pool Vent Equipment Room	27,117	less than 30 min
506 Component Cooling Surge Tank Room	947	less than 30 min
170 Letdown Heat Exchanger Room	2,198	less than 30 min

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- a. Applies to rooms, 151, 152, 165, and 166 collectively.
- b. Applies to rooms 154, 155, 160, 161, 162, 163, 164, 177, and 178 collectively
- c. These rooms are occasionally utilized as combustible storage areas, particularly during outage periods. They will have three-hour rated boundaries, smoke detection, and sprinkler systems that provide a density of 0.30 gal/m/ft² upon completion of modifications.
- d. Applies to rooms 180, 186, and 187 collectively.
- e. Applies to rooms, 203, 205, 207, 208, 209, 218, 222, 237, and 253.
- f. Applies to rooms 238, 239, 240, and 348.
- g. Applies to rooms 309, 312, 325, 322, 316, 327, 332, 307, 310, and 330 collectively.
- h. Applies to rooms 301, 302, 303, 304, 311, 313, 314, 315, and 305 collectively.
- i. Applies to rooms 601, 602, and 603 collectively.
- j. Applies to rooms 445 and 448 collectively.
- k. Applies to rooms 409, 410A, 410B, 419, 408, 422, 446, and 423 collectively.
- l. Applies to rooms 420 and 421 collectively.
- m. Applies to rooms 402, 417, 430, 435, 439, 441, 434, 433, and 415 collectively.

Smoke detection systems are installed in all rooms containing safe-shutdown equipment (except rooms 236 and 341) or where there is appreciable combustible material. Automatic suppression is provided in the following rooms 160 (partial), 161, 162, 163, 164, 168, 175, 205 (partial), 207 (partial), 208, 209, 222, 312 (partial), 316, 322, 402, 403, 404, 415 (consealed space), 417 (consealed space), 420, 421, and 447. The 5-kV disconnect switches in room 161 and the load centers in rooms 410A and 410B have an automatic heat-actuated CO2 suppression system. Hose stations are installed throughout the fire area and are spaced in such a manner to provide an effective hose line to all rooms in Fire Area 1-004. Portable extinguishers and portable smoke removal equipment are provided on each elevation.

The licensee justified the acceptability of this exemption request on the basis of the existing fire protection, their proposed modifications and their alternative shutdown actions associated with Unit 1 Auxiliary Building elevations 100 FF. - 0 in., 121 Ft. - 0 in., 130 ft. - 0 in., 139 ft. - 0 in., 155 ft., - 0 in., 175 ft. - in., and 184 ft. - 0 in. (Fire Area 1-004).

8.3 Evaluation

Based on our evaluation of the electrical distribution system associated with MCC (1A) Q1R17B001A-A and (1B) Q1R17B001B-B demonstrates that a fire would be limited to one MCC and/or its associated power feed and would not effect the redundant MCC and/or its associated power feed. Therefore, only one train of redundant electrical distribution could be lost due to a credible fire in area 1-004. MCC 1A is located in room 332, el 139 ft. - 0 in. having its power feed continue through room 312 then up to el 155 ft - 0 in. MCC 1B is located in room 209 el 121 ft. - 0 in. having its power feed exit this room into an adjacent fire area. The redundant MCCs are separated by a 2-ft-thick reinforced concrete floor at el 139 ft - 0 in. Unsealed penetrations located in the subject floor have been reviewed and will not effect the separation afforded by the concrete floor. The minimum horizontal separation between components is approximately 60 ft. between MCC 1B (el 121 ft. - 0 in.) and MCC 1A power feed (el 155 ft. - 0 in.). This 60 ft horizontal separation has complete automatic suppression coverage at el 121 ft. - 0 in.

In addition our evaluation of dc power distribution panels, 1F and 1C demonstrates that a fire limited to one dc distribution panel and/or its associated power feed and would not effect the redundant panel and/or its associated power feed. Therefore, only one train of redundant dc distribution panels could be lost.

DC distribution panel 1C is located in room 312, el 139 ft. - 0 in., and dc distribution panel 1F is located in room 209, el 121 ft - 0 in. The redundant dc distribution panels are separated by a 2-ft-thick reinforced concrete floor at el 139 ft. - 0 in. Unsealed penetrations located in the subject floor have been reviewed and will not effect the

separation afforded by the concrete floor. The minimum horizontal separation between these redundant panels is approximately 40 ft. and has complete automatic suppression coverage at el 121 ft. - 0 in. and 139 ft. - 0 in. A smoke detection system is installed in all rooms containing the subject equipment. The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. Manual hose stations, portable extinguishers, and portable smoke removal equipment are available for use on the subject elevations.

Room 464 of Fire Area 1-004 contains cabling and pressure instruments for steam generator A. Based upon a review of unsealed penetrations in the subject wall and the approximate 32-ft. horizontal separation between redundant steam generator pressure instruments and cabling, a credible fire in room 464 would not propagate into room 462. Early warning provided by the smoke detection system in room 464 would provide adequate time for fire brigade personnel to extinguish the fire in room 464. In addition, initiation of the automatic fixed suppression system and the barriers provided for redundant cabling in room 462 would protect the redundant S/G B and C instrumentation. For a fire in room 462 a portable extinguisher and manual hose station are available for use in room 464.

A fire rated barrier has been provided in room 462 for redundant steam generator instrument cabling raceway 2IE047, 2IE048, 3IE017, 4IE019, and 4IE017. The barrier extends from pull box to wall penetration or to pressure instrument. The barrier consists of two 1-in. layers of Kaowool and an overall layer of Zetex fabric. A fire rated barrier inside the following conduits is provided where they attach to pull boxes located in room 462. This barrier is the same as those provided inside conduit which penetrates a fire rated barrier penetration. The conduits are 2IE045, 2IE047, 3IE018,, 3IE020, 4IE017, and 4IE019. An automatic fire partial suppression system presently covers the area of modification in the eastern portion of room 462.

Room 462 of Fire Area 1-004 contains S/G A, B, and C pressure instruments and associated cabling for the pressure instruments. Based upon the modification, the existing raceway barriers, smoke detection, and fixed suppression in the area, a credible fire in room 462 would not effect the ability to monitor S/G A pressure. One functional steam generator is sufficient for safe shutdown. The evaluation of the instrument air system demonstrated that a fire would be limited to one train of redundant PORV instrument air header isolation valve cabling.

Train A Instrument Air cabling is located in rooms 168, 163, and 162, el 100 ft. - 0 in., and rooms 322, and 323, el 139 ft. - 0 in. Train B Instrument Air cabling is located in rooms 203 and 209, el 121 ft - 0 in. The redundant cables are separated by a 2-ft.-thick reinforced concrete floor at el 121 ft. - 0 in. and 139 ft. - 0 in. Unsealed penetrations in the subject floors have been reviewed and will not effect the separation afforded by these concreted floors. The train A cables have full suppression coverage on el 100 ft. - 0 in. and el 139 ft. - 0 in. Train B

cables have full suppression coverage on el 121 ft. - 0 in. A smoke detection system is installed in all rooms containing the subject cabling. The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. Manual hose stations and portable extinguishers are available for use on the subject elevations.

Fire induced failures in control and power cables for the battery charging room coolers, and battery room exhaust fans and dampers could potentially result in the loss of ventilation in both the redundant Train A and B battery and battery charger rooms. A failure of the ventilation system will not result in a failure of the redundant Train-A or -B 125 V-dc battery systems. Therefore, the potential fire induced failure of the power and control cable for the redundant battery and battery charger room ventilation fans and dampers will not result in the loss of systems necessary to achieve and maintain hot shutdown conditions. The safe shutdown requirement for battery and battery charger room ventilation is a long term requirement. If ventilation is lost due to a fire in area 1-004, either portable ventilation equipment will be installed in the effected room(s) or the damaged ventilation system will be repaired within 20 hours of post-fire hot shutdown initiation to insure that battery room hydrogen concentrations do not exceed acceptable limits.

Our evaluation of boration/makeup, depressurization and reactor coolant pump seal integrity evaluation was based on the following modifications:

A fire rated barrier is being provided for Train-A power cable raceway ADDA21, ADDA18, ADDA15, and ADDA09. The subject barrier will extend the complete route of the Train-A charging pump power cable in Fire Area 1-004.

The existing fire rated barrier on raceway BFDB03 is being extended and a fire rated barrier for raceway BHFA03 is being provided along its entire length on el 100 ft. - 0 in. In addition, an open penetration approximately 2 ft. - 6 in. north of column 18 and 15 ft. - 8 in. west of column N, el 121 ft. - 0 in., floor slab has been sealed.

In conjunction with the above modifications, it can be demonstrated that a fire involving the in-situ combustibles would be limited to only one train of redundant charging pump power cabling and charging pump cooler power and control cabling.

Train-A Charging Pump power cabling is located in rooms 161, 162, 163, and 168. Train-B cabling is located in rooms 175, 160, 159, 158, 157, 156, 155, 154, 153, 152, 151, 165, and 166. The redundant Charging Pump power cables are provided with a barrier (two 1-in.-thick wraps of Kaowool blanket) having a fire rating greater than that of the projected fire in the following rooms in Fire Area 1-004: Train A in rooms 161, 162, 163, and 168; Train B in rooms 175, 160 and 159. Full fixed suppression coverage is provided in rooms 163, 162, 161, 160, 175, and 186. In addition, the redundant power cables are separated minimally by a 2-ft-thick reinforced concrete wall bounding rooms 159, 158, 157, 156, 154, 153, 152, 151, 165,

and 166, with the exception of room 155 where there is approximately 32 ft. of separation. Unsealed penetrations in the subject walls have been reviewed and the walls are considered to afford adequate separation.

A smoke detection system is installed in all rooms containing the subject Charging Pump cabling. The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. Manual hose stations, portable extinguishers, and portable smoke removal equipment are available for use on this elevation.

E1 100 ft. - 0 in. contains redundant charging pump room cooler power and control cables. Train-B cables are protected by a fire rated barrier which extends to a point of 40-ft. horizontal separation from the redundant Train-A cables. Automatic fired suppression and smoke detection systems provide coverage for the subject cables.

E1 121 ft. - 0 in. contains the same redundant charging pump room cooler cables which have a minimum horizontal separation of approximately 40 ft. The Train-B power and control cables are provided with automatic suppression and smoke detection coverage for their entire route on this elevation.

Fire induced failures (hot shorts) to the cables associated with S/G-1C supply valve to the turbine driven auxiliary feedwater pump (TDAFW) could cause the subject valves to open, causing auto start of the TDAFW pump and the dragging of steam from S/G-1C. In the unlikely event of multiple hot shorts occurring, this condition can be mitigated by manually tripping the TDAFW pump throttle valve Q1N12MOV3406-A.

Loss of dc distribution panel 1C would render the main steam atmospheric relief valves electrically inoperable. One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The subject valves are not located in Fire Area 1-004. The capability to control steam generator pressure and reactor coolant system temperature with the use of the manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, a fire in area 1-004 would not prevent the operation of at least one redundant atmospheric relief valve.

Instrumentation cables for the source range neutron flux monitors N1C55NE0031-P1 and N1C55NE0032-P2 traverse Fire Area 1-004 through conduit embedded in the floor slab at e1 155 ft. - 0 in., and are accessible through embedded pull boxes on this elevation.

The instrumentation cables for the neutron flux monitors Q1C55NE0048A-A are routed through Fire Area 1-004 on e1 100 ft. - 0 in., 121 ft. - 0 in. and 139 ft. - 0 in. The amplifier Q1C55NM0048-A for the neutron flux monitor is located on elevation 139 ft. - 0 in.

The redundant Neutron Flux Monitor cables are separated by a 2-ft-thick reinforced concrete floor slab at el 155 ft. - 0 in. Unsealed penetrations in the subject floor slab have been reviewed and are considered not to effect the separation afforded by the concrete floor.

Based on our evaluation of the reactor coolant boundary integrity, the effects of fire upon redundant RCS and pressurizer sample line isolation valves show that it would take multiple hot shorts to energize the solenoids to open all valves. In the unlikely event of multiple hot shorts (induced from adjacent control cables in the shared raceway) occurring, the condition can be mitigated for the Train-A powered valves Q1P15HV3765-A and Q2P15HV3103-A by removing power from all cables in the shared raceway. This can be accomplished by opening the supply breaker on 125 V-dc switchgear 1A (Q1R42B001A-A) for 125 V-dc distribution panel 1C (Q1R41L001C-A). Distribution panel 1A is located in Fire Area 1-018 room 0224.

Fire induced failures (hot shorts) within the control cables for the transfer relay cabinet Q1H22L002-A could cause control for the pressurizer power operated relief and blocking valves and the reactor head vent valves to shift from their normal main control board alignment to the remote hot shutdown panel. Subsequent fire induced failures (hot shorts from adjacent control cables in the shared raceway) of the control cables of Q1B31PCV0445A-A, pressurizer power operated relief valve, and Q1B13SV2213A-A and Q1B13SV2214A-A, reactor head vent valves, could result in the valves (MOV) becoming electrically inoperative in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 1B (Q1R41L001BA) in Fire Area 1-043 room 0343, go to transfer relay cabinet TRC-1 in Fire Area 1-035 room 0347 and manually shift transfer relays TR1 (Q1B13SV2213A-A), TR2 (Q1B13SV2214A-A), TR3 (Q1B13PCV0445A-A), and TR5 (Q1B13MOV8000A-A). This will place control back into the control room and allow the operator to mitigate the letdown.

Room 163 (area 1-004) contains an automatic fixed suppression system which provides suppression coverage in the area of the subject non-fire rated steel hatch cover. In addition, our evaluation of the safe shutdown circuits in room 163 (Fire Area 1-004) and room 103 (Fire Area 1-001) showed that physical separation between redundant safe shutdown cabling in each fire area was adequate. Therefore, with the detection system provided in rooms 163 and 103 and the suppression provided in the area of the hatch in room 163, fire rating of the subject hatch cover is not required.

The existing sprinkler systems in rooms 345 (1-042) and 454 (1-004) will serve the purpose of a water curtain to prevent the passage of fire from Fire Area 1-004 to the adjacent fire area via the non-rated steel hatch.

Rooms 236 (duct chase), 341 (pipe chase), and 342 (spent fuel pool pump room) have safe shutdown control and instrumentation cabling which pass through them and smoke detection is not provided.

The licensee has committed to install smoke detection in room 342. Room 236 (duct chase) contains safe shutdown cabling. All cabling in this chase is routed in conduit. The duct chase is considered to have low in-situ combustibles. The duct chase runs vertically from el 121 ft. - 0 in. through 139 ft. - 0 in. and 155 ft. - 0 in. Based on our evaluation there is no redundant safe shutdown cabling in room 236 therefore, the addition of fire detection in this room would not enhance the plant's ability to achieve safe shutdown with a fire in this plant location.

Room 341 (pipe chase) contains safe shutdown cabling. All cabling in this pipe chase is installed in conduit. The pipe chase is considered to have low in-situ combustibles. The pipe chase exits the auxiliary building at el 139 ft - 0 in. which is below grade. Based on our evaluation it was determined that there were no redundant safe shutdown cabling in room 341. Therefore, the addition of the fire detection in this room would not enhance the plant's ability to achieve safe shutdown with a fire in this plant area.

By letter dated May 31, 1985, the licensee committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain control of the transfer relays associated with the PORVs and the reactor heat vent valves, restoration of the battery room ventilation system, tripping of the TDAFW pump, manual control of one main steam atmospheric relief valve, and isolation of RCS and pressurizer sample line isolation valves. These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage. In addition, the licensee has also committed to install additional fire detection, raceway fire barrier enclosures and extend the sprinkler coverage around the steel hatch cover separating Fire Areas 1-004 and 1-001 by the end of the Unit 1 seventh refueling outage currently scheduled for the fourth quarter of 1986.

All other shutdown systems associated with Fire Area 1-004 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50 Appendix R, Section III.G.2. As a result, there is reasonable assurance if a fire were to occur in any of the rooms identified in Section 8.2 safe shutdown could be achieved and maintained.

8.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R Section III.G.2 and that no additional fire protection features are required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for the Unit 1 auxiliary building elevation 100 ft. - 0 in., 121 ft. - 0 in., 130 ft. - 0 in., 139 ft. - 0 in., 155 ft. - 0 in., 175 ft. - 0 in., and 184 ft. - 0 in (Fire Area 1-004) should be granted.

9.0 UNIT 1 AUXILIARY BUILDING STAIRWELL NO. 2 - FIRE AREA 1-S02 (EXEMPTION REQUEST 1-22)

9.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-22 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 to the extent it requires the installation of an automatic fire suppression system.

9.2 DISCUSSION

Fire Area 1-S02 extends vertically from el 77 ft. - 0 in. to its ceiling at el 163 ft. - 0 in. All fire area boundary walls are at a minimum two-hour fire rated. All doors are Class B fire doors with the exception of door 317A (el 139 ft. 0 - in.) and the door in the ceiling (el 163 ft. - 0 in.) which are Class A fire doors.

Fire area 1-S02 contains redundant safe shutdown control cabling that is required for operation of the following safe shutdown systems and supporting functions which are not separated by a distance greater than 20 ft. with no intervening combustibles.

- a. Instrument Air (Containment Supply)
- b. Component Cooling Water System
- c. Reactor Coolant Pump Seal Integrity
- d. Boration/Makeup
- e. Reactor Coolant System Boundary Integrity
- f. Residual Heat Removal System

The licensee's reevaluation of the potential effects of a fire upon these cables has shown that fire induced failures could result in component maloperation which would impair the operation of the above systems and functions.

Combustible materials in Fire Area 1-S02 primarily consists of cable insulation. The fire loading associated with this area is approximately 39,678 BTU/Ft.

No automatic fire suppression system is provided in this fire area. However, the fire area is protected by an automatic smoke detection system which alarms locally and is annunciated in the main control room. In addition, all redundant cabling associated with the subject safe shutdown functions are wrapped with a fire barrier material consisting of two 1-inch thick Kaowool blankets and an overall wrap of Zetex woven fabric. Manual hose stations are provided at all floor elevations and can provide hose coverage throughout the stairwell.

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection associated with auxiliary building stairwell No. 1 (Fire Area 1-S02).

9.3 EVALUATION

Redundant safe shutdown cabling in Fire Area 1-S02 has been enclosed in a fire barrier and an early warning smoke detection system will be provided. The in-situ combustibile fire loading in area 1-S02 is low and consists only of cable insulation with a maximum fire severity of less than one-hour, which is less than the fire rating of the proposed raceway fire barriers. In addition, all non-safe shutdown cables in this fire area are enclosed in conduit.

All other shutdown systems associated with Fire Area 1-S02 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50 Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in the Unit 2 auxiliary building stairwell No. 1 safe shutdown could be achieved and maintained.

9.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R, Section III.G.2. Therefore, the licensee's request for exemption for the No. 1 stairwell (Fire Area 1-S02) should be granted.

10.0 UNIT 1 AUXILIARY BUILDING, ELECTRICAL PENETRATION ROOM, TRAIN B AND PENETRATION ROOM FILTRATION SYSTEM EQUIPMENT ROOM - FIRE AREA 1-034 (EXEMPTION REQUEST 1-35)

10.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-35 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2.c to the extent that it requires one train of redundant safe shutdown cable and equipment to be enclosed by a one-hour fire-rated barrier and the installation of an automatic fire suppression system.

10.2 DISCUSSION

Fire Area 1-034 consists of rooms 334 and 317 at el. 139 ft. - 0 in. The walls, ceilings, and floors forming the area boundary are 3-hour fire rated.

These rooms communicate via two stainless steel pipes used in the penetration room filtration system. The stainless steel pipes are encased in concrete and contain no combustibles. A expanding cork non-fire rated penetration seal is installed for the portion of the area boundary along the containment wall.

UL Class A fire rated doors exist between rooms 334 and 333 (area 1-035), 334 and stairwell no. 2, and 317 and 322 (area 1-004).

The licensee's reevaluation indicates that Fire Area 1-034 contains power and control cables and equipment (MCC-1V) associated with the following valve:

<u>Equipment</u>	<u>Function</u>
Q1P16MOV3130B-B	Service Water Inlet to CCW HX-1B

Valve Q1P16MOV3130B-B is required to be maintained open to maintain service water flow to CCW heat exchanger 1B. In the event that CCW pump-1C and CCW heat exchanger 1C are out of service for maintenance and the swing CCW pump 1B is aligned to electrical Train-A power, the effects of a fire in area 1-034 upon the control cables of valve Q1P16MOV3130B-B could fail the valve in the closed position causing loss of service water to the CCW heat exchanger 1B.

In addition, Fire Area 1-034 contains MCC-1V associated with the following valves:

<u>Equipment</u>	<u>Function</u>
Q1E21MOV8130B-B	Charging Pump Suction Header Isolation Valve
Q1E21MOV8133B-B	Charging Pump Discharge Header Isolation Valve

For a fire in this area, seal injection flow will be established using either charging pump 1A or charging pump 1B aligned to electrical Train-A power. Valves Q1E21MOV8130B-B (suction header) and Q1E21MOV8133B-B (discharge header) are required to be maintained in the open position to supply seal injection water from the RWST through charging pumps 1A or 1B. Due to the effects of a fire in this area upon the control cables for the subject valves, the valves could fail in the closed position and become inoperable. This will cause the plant to lose seal injection water and seal integrity. These valves cannot be locked in the open position because they are needed for train separation during a LOCA event.

Fire Area 1-034 also contains power and control cables and equipment MCC-1V associated with the following valves:

<u>Equipment</u>	<u>Function</u>
Q1E21MOV8109A-B	Charging Pump 1A Miniflow Valve
Q1E21MOV8109B-B	Charging Pump 1B Miniflow Valve

Valve Q1E21MOV8109A-B or Q1E21MOV8109B-B is required to be maintained in the open position to establish miniflow for charging pumps 1A or 1B, respectively. Due to the effects of a fire in this area upon the control cables for the subject valves, the valves could fail in the closed position and become inoperable, thereby isolating charging pump miniflow.

Control cables associated with the following RCS and pressurizer sample valves are located in Fire Area 1-034:

<u>Equipment</u>	<u>Function</u>
Q1P15HV3332-B	Pressurizer Liquid Sample CTMT Isolation-Valve
Q1P15HV3881-B	Pressurizer Liquid CTMT Isolation-Valve
Q1P15HV3765-A	RCS Hot Leg Sample Line CTMT Isolation-Valve
Q1P15HV3333-B	RCS Hot Leg Sample Line CTMT Isolation-Valve

RCS and pressurizer sample line valves Q1P15HV3333-B, Q1P15HV3765-A, Q1P15HV3332-B, and Q1P15HV3881-B are required to be maintained in the closed position to maintain RCS boundary integrity. Due to the effects of a fire in this area upon the control cables of the subject valves, the valves could fail in the open position and become inoperable.

<u>Equipment</u>	<u>Function</u>
Q1B31PCV0444B-B	Pressurizer PORV
Q1B13MOV8000B-B	Pressurizer PORV Block Valve
Q1B13SVV2213B-B	Reactor Head Vent Valve
Q1B13SV2214B-B	Reactor Head Vent Valve

The subject cables are associated with control from both hot shutdown panel and main control board. Fire induced failures having multiple hot shorts could cause the reactor inventory to letdown via the PORV and reactor head vent paths.

Instrumentation cable for the following safe shutdown instrumentation is located in Fire Area 1-034:

<u>Equipment</u>	<u>Function</u>
Q1B31PT0455-P1	Pressurizer Pressure Transmitter
Q1B31PT0444-4	Pressurizer Pressure Transmitter
Q1B31PT0444Z-4	Pressurizer Pressure Transmitter
Q1B31PT0456-P2	Pressurizer Pressure Transmitter
Q1B31PT0457-P3	Pressurizer Pressure Transmitter
N1B31PT0445-3	Pressurizer Pressure Transmitter

At least one of the above pressure transmitter signals is required for safe shutdown. Due to the effects of a fire in this area upon the instrumentation cables of the pressurizer pressure transmitters, all the pressure transmitter signals will be lost.

Combustible materials in Fire Area 1-034 primarily consist of cable insulation, plastic panel parts and charcoal filter media. The following summarizes the fire loadings associated with this fire area:

<u>Room Number</u>	<u>Fire Load BTU/FT</u>
334 Electrical Penetration Room Train B	90,955
317 Penetration Filtration Equipment Room	24,606

Smoke detectors are provided in rooms 317 and 334. A manual hose station located in room 316 (area 1-004) is available for use by the fire brigade fire fighting operations in this area.

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection, proposed modifications and their alternative shutdown actions associated with Unit 1 Auxiliary Building electrical penetration room Train B and penetration room filtration system equipment room (Fire Area 1-034).

10.3 Evaluation

In order to preclude the spurious operation of service water inlet to CCW heat exchanger 1B isolation valve Q1P16MOV130B-B will be maintained in the open position by racking out the power at the MCC breaker whenever CCW pump 1C and CCW heat exchanger 1C are out of service.

A design modification is proposed to install disconnect breakers in the power supply circuits of charging pump isolation valves outside the electrical penetration room during the next outage of sufficient duration subsequent to design and procurement completion. The next outage is currently scheduled to commence during the fourth quarter of 1986. In the interim, the operators will be instructed of the potential inadvertent closure of the charging pump suction and discharge valves in the event of a fire in this area.

The licensee's analysis shows that the charging pump can be run safely with miniflow isolated and with a maximum of 24 gal/m of seal injection flow for a period of 1 hour. This will allow the operator time to deenergize MCC-1V and take manual action to open the valve and reestablish the miniflow. In addition, the 1C charging pump is still available and can be utilized to support RCS makeup if required.

The open position of the RCS and pressurizer sample line valves will allow an RCS sample to flow to the VCT, through the sample cooler. This flow is of no immediate significance for safe shutdown. An operator action will be performed to close manual valves Q1P15V051A and Q1P15V051B to stop the flow of RCS and pressurizer liquid. Valves Q1P1V051A and Q1P15V051B are located in the sample room 323 outside of Fire Area 1-034.

Fire induced failure (hot short) of the individual control cables for Q1B31PCV0444B-B (reactor head vent valve) Q1B13SV2213B-B and Q1B13SV2214B-B (reactor head vent valves), could result in the valves being energized to open. The power operated relief blocking valve could become electrically inoperable in the open position. In the unlikely event of the multiple fire induced failures (hot shorts from adjacent control cables in the shared raceway) occurring, this condition can be mitigated by removing 125 V-dc power from cables in the shared raceway. This can be accomplished by opening breakers on the 125 V-dc switchgear bus 1B (Q1R42B001B-B) for 125 V-dc distribution panels 1D, 1E, and 1F, feeder breaker 12 on 123 V-dc distribution panel N1R41L001G-N, and breaker 15 on 125 V-dc distribution panel N1R41L001H-N.

Instrumentation cable for pressurizer pressure transmitter Q1B31PT0455-P1 has been rerouted out of Fire Area 1-034 so that pressurizer pressure signal from at least one pressure transmitter, Q1B31PT0455-P1, is available.

By letter dated May 31, 1985, the licensee committed to develop a detailed procedure specifically for this fire area covering the manual operator actions to restore the control of the PORVs and reactor head vent valves, isolation RCS and pressurizer sample line valves, pre-fire alignment of CCW heat exchanger valves and the reestablishment of charging pump miniflow. This procedure will be fully implemented by the end of the Unit 1 seventh refueling outage, currently scheduled for the fourth quarter of 1986.

All other shutdown systems associated with Fire Area 1-034 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in Unit 1 auxiliary building electrical penetration room Train B and penetration room filtration system equipment room (fire area 1-034) safe shutdown could be achieved and maintained.

10.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R, Section III.G.2, and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for Unit 1 auxiliary building electrical penetration room Train B and penetration room filtration room (fire area 1-034) should be granted.

11.0 UNIT 1 AUXILIARY BUILDING FIRE AREAS 1-004 AND 1-005 UNIT 2 AUXILIARY BUILDING FIRE AREAS 2-004 AND 2-005 (EXEMPTION REQUEST 1-40)

11.1 Exemption Requested

The licensee in their exemption request 1-40 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 in that it requires separation of fire areas by a barrier having a three-hour fire rating.

11.2 Discussion

Non-fire rated reach-rod penetrations are located in the walls between the following rooms for Units 1 and 2:

<u>Room Numbers/Titles</u>	<u>Number of Penetrations</u>
173 Charging/Safety Injection Pump Room (Fire Area 1-005) and 161 Corridor (Fire Area 1-004)	2
171 Combustible Storage Area (Fire area 1-005) and 170 Letdown Heat Exchange Room (Fire Area 2-004)	8
175 Corridor (1-005) and 173, 174, 181 Charging Pump Rooms (Fire Area 1-004)	5
2173 Charging/Safety Injection Pump Room (Fire Area 2-005) and 2161 Corridor (Fire Area 2-004)	3
2170 Letdown Heat Exchange Room (Fire Area 2-004) and 2171 Combustible Storage Area (Fire Area 2-005)	10
2175 Corridor (Fire Area 2-005) and 2173, 2174, 2181 Charging Pump Rooms (Fire Area 2-0004)	6

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection associated with Fire Areas 1-004, 1-005, 2-004, and 2-005.

11.3 Evaluation

The reach-rod penetrations are non-fire rated, nor can they be fire rated. These penetrations range in size from 2 in., to 10 in., with the majority being of the 2 in. size. The cross-sectional area of all penetrations is reduced by using a welded steel plate on one side penetrated by the reach-rod. The only opening in the penetration is the gap between the rod and the steel plate which allows for the operation of the reach-rod. The fire severity in the affected rooms is less than 30 minutes for all cases. In addition, there is a sprinkler system installed in rooms 161, 179, 2161, and 2179 and smoke detection systems in all rooms which will provide early warning capability and protection from the spread of a fire from one room to the next. Therefore, the existence of these non-rated penetrations will not affect the ability of the plant to achieve safe shutdown. If a fire were to occur in any of the rooms identified in section 11.2 above.

11.4 Conclusion

Based on our evaluation, we conclude that the non-fire rated reach-rod design and the existing fire protection configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50 Appendix R, Section III.G.2. Therefore, the licensee's request for exemption for the reach-rod penetrations associated with the fire barrier walls separating rooms 173 and 161, 175 and 173, 175 and 174, 175 and 181, 171 and 170, 2173 and 2161, 2170 and 2171, 2175 and 2173, 2175 and 2174, and 2175 and 2181 should be granted.

12.0 SUMMARY AND CONCLUSION ON TWENTY-TWO SPECIFIC FIRE AREA EXEMPTIONS FOR UNIT 1

Based on our evaluation of the licensee's May 1985, 10 CFR 50 Appendix R fire hazards analysis re-evaluation provided by letter dated May 31, 1985, and on our site visit during the week of August 19, 1985, we conclude that the licensee's alternate fire protection configurations in the following plant fire areas represented an equivalent level to safety to that achieved by compliance with Section III.G of Appendix R:

Unit 1 Auxiliary Building Cable Chase Train A - Fire Area 1-008
(exemption request 1-14)

Unit 1 Auxiliary Building Switchgear Train B - Fire Area 1-021
(exemption request 1-15)

Unit 1 Auxiliary Building Vertical Cable Chase - Fire Area 1-013
(exemption request 1-16)

Unit 1 Auxiliary Building to Diesel Building Cable Tunnel Train A -
Fire Area 1-075 (exemption request 1-18)

Unit 1 Auxiliary Building, El. 100 ft. - 0 in., 121 ft. - 0 in., 130 ft. - 0 in., 139 ft. - 0 in., 155 ft. - 0 in., 175 ft. - 0 in., and 184 ft. - 0 in., Fire Area 1-004 (exemption request 1-39)

Units 1 and 2 Various Auxiliary Building Fire Areas (exemption 1-40)

- Unit 1 Auxiliary Building Control Rod Drive Switchgear Room Train B - Fire Area 1-023 (exemption request 1-19)
- Unit 1 Auxiliary Building Train A Battery Room - Fire Area 1-017 (exemption request 1-20)
- Unit 1 Train A DC Switchgear Room, Auxiliary Building, EL. 121 ft. - 0 in. - Fire Area 1-018 (exemption 1-21)
- Unit 1 Auxiliary Building Stairwell No. 2 - Fire Area 1-502 (exemption request 1-22)
- Unit 1 Auxiliary Building, EL. 139 ft. - 0 in. - Fire Area 1-041 (exemption request 1-23)
- Unit 2 Auxiliary Building, EL. 139 ft. - 0 in. - Fire Area 2-401 (exemption request 1-24)
- Unit 1 Auxiliary Building, EL. 139 Ft. - 0 In. - Fire Area 1-042 (exemption request 1-25)
- Unit 1 Train B DC Switchgear Room, Auxiliary Building, EL. 121 Ft. - 0 in. - Fire Area 1-019 (exemption request 1-27)
- Unit 1 Auxiliary Building Battery Room Train B - Fire Area 1-016 (exemption request 1-28)
- Unit 1 Auxiliary Building Cable Chase Train B - Fire Area 1-030 (exemption request 1-29)
- Unit 1 Auxiliary Building to Diesel Building Cable Tunnel Train B - Fire Area 1-076 (exemption request 1-30)
- Unit 1 Auxiliary Building, Local Hot Shutdown Panel Room - Fire Area 1-012 (exemption request 1-32)
- Unit 1 Auxiliary Building Cable Chase Train A - Fire Area 1-031 (exemption request 1-33)
- Unit 1 Auxiliary Building, EL. 100 ft. - 0 in. Charging Pump Rooms and Storage Areas - Fire Area 1-005 (exemption request 1-34)
- Unit 1 Auxiliary Building Electrical Penetration Room Train B and Penetration Room Filtration System Equipment Room - Fire Area 1-034 (exemption request 1-35)
- Unit 1 Auxiliary Building Electrical Penetration Room Train A - Fire Area 1-035 (exemption request 1-37)

Dated:

Principal Contributors:

**P. Madden
E. Reeves**



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
ALABAMA POWER COMPANY
JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NO. 1
DOCKET NO. 50-348

1.0 INTRODUCTION TO ATTACHMENT

This safety evaluation is an Attachment to Enclosure 2, the safety evaluation which concluded that twenty-two exemptions of twenty-seven exemptions requested by the licensee for Unit 1 were acceptable. The remaining exemptions are considered in this Attachment. The same general criteria and introduction applies to this Attachment also.

By letter dated October 18, 1985, the licensee provided the additional technical information to substantiate the technical equivalency of the five remaining exemptions. The licensee also committed to provide additional fire protection modifications as described in specific plant fire areas for Unit 1.

Our evaluations of the licensee's revised alternate fire protection configurations and their justifications regarding the plant's alternative ability for specific redundant shutdown functions to achieve and maintain safe shutdown conditions for fire conditions which affect those specific fire areas are as follows:

2.0 NON-RAD SIDE CORRIDOR - AUXILIARY BUILDING EL 121 FT. - 0 IN - FIRE AREA 1-020 (EXEMPTION REQUEST 1-17)

2.1 EXEMPTION REQUESTED

The licensee, in their exemption request 1-17, requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 to the extent that it requires on train of redundant safe shutdown cables to be enclosed by a one-hour fire rated barrier.

2.2 DISCUSSION

Fire Area 1-020 consists of rooms 234, 228, 221, 210, 213, 244, 225, and 245 which constitute the corridor, battery service area, and battery room mezzanine on el 121 ft. - 0 in. on the non-rad side of the auxiliary building.

Fire Area 1-020 contains control and power cables for the train-B electrical distribution system. An analysis of the potential effects of fire induced failures of these cables demonstrated that the plant could experience a

total loss of the electrical train-B distribution system. This could result in the following instrument air isolation valves becoming inoperable in the closed position. These valves isolate the primary air and backup air/N₂ to the pressurizer Power Operated Relief Valves (PORVs):

<u>EQUIPMENT</u>	<u>FUNCTION</u>
N1P19HV3885-B	Instrument Air to the Penetrations Room
Q1B13HV2228-B	Backup Air/N ₂ Supply to Pressurizer PORVs

In addition, hot shutdown (HSP) control cables for the following safe shutdown components are routed through Fire Area 1-020:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1B31PCV0445A-A	Pressurizer Power Operated Relief Valve
Q1B13MOV8000A-A	Pressurizer PORV Block Valve
Q1B13SV2213A-A	Reactor Head Vent Valve
Q1B13SV2214A-A	Reactor Head Vent Valve

The subject cables are associated with control functions from the hot shutdown panel. In addition, control cables which shift control from the main control board to the hot shutdown panel via transfer relays are in this fire area. A fire induced failure causing multiple hot shorts could cause these components to become inoperable in either a closed or opened condition, resulting in the plant's inability to depressurize, letdown, or maintain the RCS boundary as may be required.

Fire Area 1-020 contains instrumentation cables for redundant condensate storage tank level instrument channels.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1P15LT515-A	CST Level Train A
Q1P15LT516-B	CST Level Train A

The licensee's re-evaluation shows that both trains of CST level indication could be damaged by the fire.

Fire Area 1-020 also contains HSP control cabling associated with the following safe shutdown components:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1N11SV3368AC-A	Main Steam Isolation SG-1A
Q1N11SV3369BC-A	Main Steam Isolation SG-1B
Q1N11SV3369CC-A	Main Steam Isolation SG-1C

The subject cables are associated with the control function from hot shutdown panel Q1H21NBAFP2605G-A. In addition, control cables which shift control from the main control board to the hot shutdown panel via transfer

relay cabinet Q1H22L003-A are in this fire area. A fire induced failure causing multiple hot shorts could cause these components to become inoperable in the open position. In addition, electrical train-B main steam isolation valves could become inoperable in the open position due to loss of the electrical train-B distribution system.

Control cabling associated with post-fire operation of the following safe shutdown components are routed through Fire Area 1-020:

<u>EQUIPMENT</u>	<u>FUCNTION</u>
Q1N11PV3371A-A	Main Steam Atmospheric Relief Valve (S.G.-1A)
Q1N11PV3371B-A	Main Steam Atmospheric Relief Valve (S.G.-1B)
Q1N11PV3371C-A	Main Steam Atmospheric Relief Valve (S.G.-1C)

The potential effects of a fire upon these cables demonstrate that these valves could become electrically inoperable in the closed position.

Since, a fire in area 1-020 could result in the loss of the train-B electrical distribution system. This could cause the following samples valves to fail closed:

<u>VALVES</u>	<u>FUNCTION</u>
Q1P15SV3881-B	Pressurizer Sample
Q1P15SV3332-B	Pressurizer Sample
Q1P15SV3101-B	RCS Loop 1 Hot Leg Sample
Q1P15SV3333-B	RCS Hot Leg Sample
Q1P15SV3105-B	RHR Heat Exchanger Sample
Q1P15SV3106-B	RHR Heat Exchanger Sample

In addition, cables for neutron flux monitors N1C55NE0031-P1, N1C55NE0032-P2, and Q1C55NE0048A-A are in the fire area. An analysis of the potential effects of fire induced failures of these cables demonstrated that these monitors may become inoperable.

Control cables for the following valves are routed through Fire Area 1-020.

<u>VALVES</u>	<u>FUNCTION</u>
Q1E21LCV0115B-A	RWST to Charging Pump Suction
Q1E21LCV0115D-B	RWST to Charging Pump Suction

Control cables in Fire Area 1-020 for Q1E21LCV0115B-A and Q1E21LCV0115D-B are associated with control of the valves from the hot shutdown panel. In addition, control cables which shift control from the main control board to the hot shutdown panel via transfer relays are in the fire area. A fire induced failure causing multiple hot shorts could cause these components to become electrically inoperable in the closed position. At a point in the shutdown process, one of these valves may be required to be open in order to line up the charging pump suction to the RWST.

Two hatchways in room 234 directly above one another have non-rated steel plate covers. These hatchways communicate with Fire Areas 1-042 and 1-006.

The door between room 235 (Fire Area 1-023) and 234 (Fire Area 1-020) is provided with removable transoms. The door and transom assembly cannot be certified as UL Class A.

The combustible materials in Fire Area 1-020 primarily consists of cable insulation and plastic panel parts. The following fire loading is associated with the rooms bounded by Fire Area 1-020:

<u>Room Number and Title</u>	<u>Combustible Material</u>	<u>Fire load (BTU/FT²)</u>	<u>Maximum Fire Severity</u>
210 Corridor, 211 Corridor, 213 Battery Service Room, 228 Corridor, and 234 Hallway.	Cable Insulation	27,754	Less Than 30 minutes
244 Battery Room "B", 245 Battery Room "A", and 225 Battery Charger Area	Cable insulation, and Plastic Panel Parts	14,556	Less Than 30 minutes

An ionization smoke detection system provides coverage to the entire fire area. Automatic water suppression systems covers the entire fire area except room 225.

A CO₂ hose reel is located in room 210 and a water hose is provided in rooms 211 and 234 for manual fire brigade firefighting purposes. Portable extinguishers are provided throughout the area.

All doors in the boundary fire barrier walls of Fire Area 1-020 are three-hour UL fire rated Class A doors except for the transom door between rooms 235 (Fire Area 1-023) and 234 (Fire Area 1-020) and the UL Class B (one/one half-hour fire rated) door which exists between room 234 and stairway No. 1.

The licensee justifies the acceptability of this exemption request on the basis of the existing fire protection, and their alternative shutdown actions associated with Unit 1 non-rad side corridor area (Fire Area 1-020).

2.3 EVALUATION

A fire in Fire Area 1-020 could affect pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV044B-B which provides a means of achieving RCS depressurization. Valves N1P19HV3885-B and Q1B13HV2228-B will fail in the closed position on the loss of train B DC Control Power. This will isolate the instrument air

supply to the pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV0444B-B. PORV Q1B31PCV0444B-B will also be inoperable due to loss of the train-B DC power supply. However, the train-A DC supply to PORV Q1B31PCV0444A-A is not affected due to a fire in this area. Since only one of the PORVs is required for RCS depressurization, and RCS depressurization is a long-term requirement, the operator has adequate time to take manual action to restore the instrument air by handwheel operation of valve N1P19HV3885-B located in room 189 (Fire Area 1-006). Once air is restored, PORV Q1B31PCV0445A-A will be operable to achieve RCS depressurization.

Fire induced failures (hot shorts) within the control cable for the transfer relays could cause control of the valves to shift from the main control board to the remote hot shutdown panel. Subsequent fire induced failures (hot short from adjacent control cables in the shared raceway or open circuits) of the control cables for pressurizer PORV Q1B31PCV0445A-A and reactor head vent valves, Q1B13SV2213A-A and Q1B13SV2214A-A could result in the valves failing in undesirable positions. The power relief blocking valve (MOV) could become electrically inoperative in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 1B (Q1R41L001B-A) in Fire Area 1-043 room 0343. Then go to transfer relay cabinet Q1H22L002-A in Fire Area 1-035 room 347 and manually shift transfer relays TR1 (Q1B13SV2213A-A), TR2 (Q1B13SV2214A-A), TR3 (Q1B13PCV0445A-A), and TR5 (Q1B13MOV8000A-A) restoring control to the main control board to allow the operator to mitigate the letdown.

In addition, fire induced failures (hot shorts) within control cables for the transfer relays could cause control for the main steam isolation valves Q1N11SV3369AC-A, Q1N11SV3369BC-A, and Q1N11SV3369CC-A to shift from the main control board to the remote hot shutdown panel. Subsequent fire induced failures of the cables for the main steam isolation valves listed above, could result in the valves becoming inoperable in the open position. In the unlikely event of the multiple hot shorts occurring, this condition can be mitigated by removing power from the transfer relays and manually resetting the affected relays (handle is provided), thereby shifting control to the main control board. This will enable the plant to maintain main steam isolation using the train-A isolation valves. To remove power from transfer relays, open breaker 17 on 125V dc distribution panel 1B. Then go to transfer relay cabinet TRC-2 (Q1H22L003-A) located in Fire Area 1-006, room 0190 and manually shift transfer relays TR6 (Q1N11SV3369AC-A), TR7 (Q1N11SV3369BC-A) and TR8 (Q1N11SV3369CC-A), placing control back to main control board, to allow operator to achieve main steam isolation.

One of the three main steam atmospheric relief valves and related steam generator is required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator would establish manual control of the atmospheric

relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in Fire Area 1-020. The capability to control steam generator pressure and reactor coolant system temperature with the use of manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, a fire in Fire Area 1-020 would not prevent the operation of at least one redundant atmospheric relief valve.

A fire in Fire Area 1-020 could result in a loss of train-B power. Therefore, this justification addresses the operation of the Train A RWST to charging pump suction valve only. In the unlikely event of the multiple hot shorts occurring, the valve can be aligning by removing power from the transfer relay and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 1B (Q1R41L001B-A) in Fire Area 1-043 Room 0343. Then go to transfer relay cabinet Q1H22L002-A in Fire Area 1-035 room 347 and manually shift transfer relay TR4 (Q1E21LCV0115B-A) restoring control to the main control board to allow the operator to align charging pump suction to the RWST. In the interim, charging flow can be maintained with make-up via the normal make-up system.

By letter dated May 31, 1985, the licensee committed to develop detailed procedures specifically for Fire Area 1-020. These procedures will identify the manual operator actions required to regain control of the pressurizer PORVs transfer relays for PORVs, main steam isolation valves and RWST charging pump suction valves and the main steam atmospheric relief valves and establish CST level indication. These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

The door/transom assembly, separating rooms 235 (Fire Area 1-023) and 234 (Fire Area 1-020) is provided with a removable transom in order to facilitate the movement of large electrical equipment. The door and frame assembly associated with this door meets the UL fire test criteria and they bear a Class A UL label. However, since the transom is removable, the subject door/transom assembly cannot be listed as Class A by UL. The respective transom has been certified by the manufacturer as being constructed of materials and in a manner similar to that of a Class A fire door. Therefore, based on the construction, the installation of these doors, and the configuration of the in-situ combustibles in these fire areas, we have reasonable assurance that a fire involving the in-situ combustibles in any of the subject fire areas would not propagate through the transom opening and spread into the adjacent fire area.

The sprinkler system installed in room 234 will serve the purpose of a water curtain to prevent the passage of a fire from Fire Area 1-020 to the adjacent fire areas via the non-rated steel hatches. Sprinkler systems

existing in the hatch area of the fire areas above and below room 234 will prevent the spread of fire from these areas into Fire Area 1-020.

All other shutdown systems associated with Fire Area 1-020 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms associated with Fire Area 1-020, safe shutdown could be achieved and maintained.

2.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for non-rad corridor, auxiliary building elevation 121 ft. -0 in. (Fire Area 1-020) should be granted.

3.0 UNIT 2 AUXILIARY

BUILDING - EL. 139 FT. - 0 IN. - FIRE AREA 2-042 (EXEMPTION REQUEST 1-26)

3.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-26 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 to the extent that it requires one train of redundant safe shutdown cables to be enclosed by a fire barrier having a one-hour fire rating.

3.2 DISCUSSION

Unit 2 Fire Area 2-042 is separated from Unit 1 Fire Area 1-042 by reinforced concrete walls having a three-hour fire rating, with all piping and electrical penetrations sealed for a three-hour fire rating. The door separating these two fire areas is a UL listed Class A door.

A fire in Unit 2 Fire Area 2-042 could potentially result in damage to the electrical circuitry of both Units 1 and 2 train-A diesel generators. This condition along with an assumed loss of offsite power (LOSP) for Unit 1 could cause loss of the following main steam atmospheric relief valves, RCS hot leg temperature instrumentation, and neutron flux monitoring instrumentation:

EQUIPMENT

FUNCTION

Q1N11PV3371A-A
Q1N11PV3371B-A
Q1N11PV3371C-A

Main Steam Atmospheric Relief Valve (S.G.-1A)
Main Steam Atmospheric Relief Valve (S.G.-1B)
Main Steam Atmospheric Relief Valve (S.G.-1C)

N1B21TE413 (LOOP-1)	RCS Hot Leg Temperature, Indication
N1B21TE423 (LOOP-2)	RCs Hot Leg Temperature, Indication
N1B21TE433 (LOOP-3)	RCS Hot Leg Temperature, Indication
Q1C55NE0048A-A	Post-Accident Neutron Flux Monitor
N1C55NE0031-P1	Source Range Neutron Flux Monitor
N1C55NE0032-P2	Source Range Neutron Flux Monitor

The combustible materials in Fire Area 2-042 (Corridors 2319, 2339 and hallway 2345) consists primarily of cable insulation. The fire loading associated with Fire Area 2-042 is approximately 32,455 BTU/FT².

The door between room 2346 (Fire Area 2-041) and 2345 (Fire Area 2-042) is provided with a removable transom. The door and transom assembly cannot be certified as UL Class A.

A detection system is provided for all rooms in Fire Area 2-042. Four portable extinguishers are located in rooms 2319 and 2339. Two water hose stations are located in room 2319. A CO₂ hose reel is presently located in room 2339 and a water hose in room 2345. An automatic water suppression system covers the area except for room 2339. Appropriate barriers are provided for one train of safe shutdown electrical cabling.

The licensee justifies the acceptability of the exemption on the basis of the existing fire protection, their proposed RG 1.97 modifications and their alternative shutdown actions associated with the Unit 2 Auxiliary Building, elevation 139 ft.-0 in. corridor 2319, corridor 2339 and hallway 2345 (Fire Area 2-042).

3.3 EVALUATION

One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator would establish manual control of the atmospheric relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in area 2-042.

Each RCS loop hot leg temperature instrumentation loop is powered from channelized inverter-1A. Inverter-1A is powered from 600 V-ac MCC 1A or 125 V-dc bus 1A. A fire in area 2-042 along with an assumed loss of offsite power (LOSP) could result in loss of the 600 V-ac power supply to inverter 1A; however, inverter 1A will continue to operate from 125 V-dc bus 1A and will supply power to the instrument loops for a minimum of 2 hours. If after two hours power is lost, RCS hot leg temperature indication is

available from the core exit thermocouples. Core exit temperature indication will not be affected by a fire in area 2-042. In addition to the alternate dc power supply for a minimum of two hours and core exit temperature availability, a design change to be installed as a result of RG 1.97 will provide a redundant signal processing and indicating between RCS hot leg temperature loops N1B21TE413, N1B21TE423, and N1B21TE433. Based upon the RG 1.97 commitment schedule, implementation of the modification is currently planned for the seventh refueling outage presently scheduled to commence during the fourth quarter of 1986. After implementation of this modification, a fire in Fire Area 2-042 will not affect the ability to monitor one loop of RCS hot leg temperature.

Source range neutron flux monitors N1C55NE0031-P1 and N1C55NE0032-P2 are powered from channelized inverters 1A and 1B. The post-accident neutron flux monitor Q1C55NE0048A-A is powered from inverter-1F. Inverters 1A, 1B, and 1F are all powered from 600 V-ac MCC 1A or 125 V-dc bus-1A. Therefore, neutron-flux monitoring following potential fire damage in Fire Area 2-042 and the resultant loss of 600 V-ac MCC 1A will be available for a minimum of two hours. A RCS sample can be obtained after initiation of the RHR system by using portions of the RCS sampling system and RHR Heat Exchanger No. 1 and 2 sample valves Q1P15HV3105-B and Q1P15HV3106-B for determination of the boron concentration and shutdown margin following a fire in Fire Area 2-042.

By letter dated May 31, 1985, the licensee committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain the control of one main steam atmospheric relief valve and to monitor RCS boron concentration. The licensee intends to have these procedures fully implemented by the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

The door assembly between rooms 2346 (Fire Area 2-041) and 2345 (Fire Area 2-042) is provided with a removable transom to facilitate the movement of large equipment. The door and frame assembly associated with this door meets the UL fire test criteria and they bear a Class A UL label.

However, since the transom is removable, the subject door/transom assembly cannot be listed as Class A by UL. The respective transom has been certified by the manufacturer as being constructed of materials and in a manner similar to that of a Class A fire door. Therefore, based on the construction, the installation of these doors, and the configuration of the in-situ combustibles in these fire areas, we have reasonable assurance that a fire involving the in-situ combustible in any of the subject fire areas would not propagate through the transom opening and spread into the adjacent fire area.

All other shutdown systems associated with Fire Area 2-042 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms

associated with fire area 2-042, safe shutdown could be achieved and maintained.

3.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration's will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for Fire Area 2-042 (corridors 2319, 2339 and hallway 2345) should be granted.

4.0 TRAIN B INSIDE CABLE CHASES, AUXILIARY BUILDING-FIRE AREA 1-009 (EXEMPTION REQUEST 1-31)

4.1 EXEMPTION REQUESTED

The licensee in their exemption (request 1-31) requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 to the extent that it requires one train of redundant safe shutdown cables to be enclosed by a one-hour fire rated barrier.

4.2 DISCUSSION

Fire Area 1-009 consists of cable chase rooms 117 and 246 and are separated from all other plant areas by three-hour fire rated fire barriers constructed of reinforced concrete. All piping and electrical penetrations through Fire Area 1-009 boundary are sealed with silicone foam or Nelson Frame Fittings and the door openings are provided with three hour fire rated doors.

Fire Area 1-009 contains control and power cables for the train-B electrical distribution system. An analysis of the potential effects of fire induced failures of these cables demonstrates that the plant could experience a total loss of the electrical train-B distribution system. This could result in the following instrument air isolation valves becoming inoperable in the closed position. These valves isolate the primary air and backup air/N₂ to the pressurizer PORVs.

EQUIPMENT

FUNCTION

N1P19HV3885-B
Q1B13HV2228-B

Instrument Air to Penetration Room
Backup Air/N₂ Supply to Pressurizer PORVs

Auxiliary feedwater isolation valves Q1N23MOV3764B, Q1N23MOV3764C, and Q1N23MOV3764E are redundant to one another from the point of view that they isolate flow in redundant auxiliary feedwater supply lines. Control cables for all three valves are routed through the fire area. The analysis of the potential effects of a fire on these control cables shows that spurious

operation of the auxiliary feedwater isolation valves could occur, resulting in auxiliary feedwater flow isolation.

In addition, Fire Area 1-009 contains a control cable for the CCW heat exchanger 1B service water discharge valve (Q1P16SV3009-B). A fire induced failure resulting in a hot short from adjacent cables in the same raceway, could energize the solenoid and close the valve. This condition can impact safe-shutdown only when CCW heat exchanger 1B is aligned and operating as the train-A heat exchanger.

Multiple cable failures can cause the redundant steam generator 1C main steam isolation valves (Q1N11SV3369BC-A and Q1N11SV3370BC-A) to become electrically inoperative in the open position.

A fire causing multiple hot shorts (shorts between control cables sharing the same raceway) could cause the train-B pressurizer PORV, (Q1B31PCV0444B-B) and/or the train-B reactor vessel head vent valves (Q1B13SV2213B-B and Q1B13SV2214B-B) to open. The pressurizer PORV blocking valve (Q1B13MOV8000B-B) could become electrically inoperative in the open position.

The combustible materials in Fire Area 1-009 primarily consist of cable insulation. The following fire loading is associated with the rooms bounded by Fire Area 1-009:

<u>Room Number And Title</u>	<u>Combustible Material</u>	<u>Fire Load (BTU/FT²)</u>	<u>Maximum Fire Severity</u>
117 Cable Chase	Cable Insulation	2,921,199	Less Than 4 hours
246 Cable Chase	Cable Insulation	180,180	Less Than 2½ hours

A smoke detection system and automatic water suppression system are provided throughout the chase. In addition, water hoses and portable extinguishers located in room 185 (Fire area 1-6) and room 319 (Fire area 1-42) are available for use in the area by the fire brigade.

The licensee justifies the acceptability of this exemption request on the basis of the existing fire protection configuration, their alternative shutdown actions and the proposed fire protection modifications associated with cable chases 117 and 246 (Fire Area 1-009).

4.3 EVALUATION

A fire in Fire Area 1-009 could affect pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV0448-B which provides a means of achieving RCS depressurization. Valves N1P19HV3885-B and Q1B13HV2228-B will fail in the closed position on the loss of train-B power Distribution.

This will isolate the instrument air supply to the pressurizer PORVs Q1B31PCV0445A-A and Q1B31PCV0444B-B. PORV Q1B31PCV0444B-B will also be inoperable due to loss of the train-B DC power supply. However, the train-A DC supply to PORV Q1B31PCV0444A-A is not affected due to a fire in this area. Since only one of the PORVs is required for RCS depressurization, and RCS depressurization is a long-term requirement, the operator has adequate time to take manual action to restore the instrument air by handwheel operation of valve N1P19HV3885-B located in room 189 (Fire Area 1-006). Once air is restored, PORV Q1B31PCV0445A-A will be operable to achieve RCS depressurization.

In order to preclude auxiliary feedwater flow isolation, due to a fire in Fire Area 1-009, the control cables associated with at least one of the auxiliary feedwater isolation valves will be protected by an equivalent one-hour fire barrier enclosure which will consist of two 1-inch layers of Kaowool blanket with an overall layer of Zetex fabric.

In addition, in order to preclude the loss of CCW, when the 1B heat exchanger is aligned and operating as the train-A heat exchanger, plant procedures will be written to maintain valve Q1P16SV3009-B in the open position by removing power.

In the event that the steam generator 1C main steam isolation valves fail to isolate due to fire induced failures, the main turbine stop valves would provide isolation.

In the event that the multiple hot shorts caused by a fire in Fire Area 1-009 occur, the condition can be mitigated by removing 125 V-dc power from cables in the shared raceway. This can be accomplished by opening the breaker on 125 V-dc switchgear bus 1B (Q1R42B001B-B) for 125 V-dc distribution panels 1D, 1E, and 1F. In the interim, alternate charging flow is available to keep up with the spurious letdown. Plant procedures will be written to incorporate the above actions for a fire in this area.

The licensee, by letter dated May 31, 1985, committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain control of the pressurizer PORVs and assure CCW to the 1B heat exchanger when it is aligned and operating as the train-A heat exchange. In addition, the licensee committed to enclose, in Fire Area 1-009, one train of control cables associated with one of the auxiliary feedwater isolation valves in a one-hour equivalent fire barrier. The licensee intends to have the fire barrier installed and have the procedures fully implemented by the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

All other shutdown systems associated with Fire Area 1-009 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms associated with Fire Area 1-009, safe shutdown could be achieved and maintained.

4.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection configurations and their proposed modifications will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2. Therefore, the licensee's request for exemption for Fire Area 1-009 should be granted.

5.0 UNIT 1 AUXILIARY BUILDING, EL. 83 FT. - 0 IN., 100 FT. - 0 IN., AND 121 FT. - 0 IN. - FIRE AREA 1-001 (EXEMPTION 1-36)

5.1 EXEMPTION REQUESTED

The licensee in their exemption (request 1-36) requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 to the extent that one train of redundant safe shutdown cables be enclosed by the one-hour fire barrier and that automatic fire suppression be installed throughout the fire area.

5.2 DISCUSSION

Fire Area 1-001 consists of the following rooms:

EL 83 Ft - 0 In.

Room 101	Waste Decay Tank Room
Room 102	Valve Compartment Room
Room 103	Corridor
Room 104	Passageway to Unit 2
Room 105	Catalytic H ₂ Recombiner A Room
Room 106	Catalytic H ₂ Recombiner B Room
Room 107	Storage Room
Room 108	Waste Monitor Tank Room
Room 109	Waste Monitor Tank Pump Room
Room 110	Monitor Control Panel Room
Room 111	Containment Spray Pump Room A
Room 112	Access to Tendon Access Gallery
Room 113	Valve Encapsulation
Room 114	Pipe Chase
Room 115	Hallway
Room 118	Floor Drain Tank Room
Room 119	Waste Holdup Tank Room
Room 120	Corridor
Room 121	Floor Drain Tank Pump Room
Room 122	Waste Evaporator Feed Pump Room
Room 123	Pipe Chase
Room 124	Valve Encapsulation
Room 125	Containment Spray Pump Room B
Room 126	Pipe Chase
Room 127	Pipe Chase

Room 128	RHR Heat Exchanger Room
Room 129	RHR Low Head Pump Room B
Room 130	Pipe Chase
Room 131	RHR Low Heat Pump Room A

E1 100 Ft - 0 In.

Room 183	Tendon Access Gallery Entrance
Room 184	Piping Penetration Room
Room 169	Pipe and Duct Chase
Room 196	Tendon Access Gallery

E1 121 Ft - 0 In.

Room 223	Piping Penetration Room
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Floors and walls forming the area boundary are of reinforced concrete. The ceiling of room 223 has tendon access openings to room 334 (Fire Area 1-34). Steel plates with three-hour rated coatings and which are topped by removable concrete slabs have been installed over the tendon access openings. There is a non-rated steel hatch cover over the hatchway between rooms 103 and 163 (Fire Area 1-004).

An airtight, UL Class B door is installed between room 223 and stairway No. 2. The door between rooms 184 and 162 (Fire Area 1-4) is an airtight UL Class A door. Non-airtight Class B doors are installed between rooms 110 and 115 and stairway No. 2.

Penetrations through the area boundary are sealed with silicone foam. Three-hour rated fire dampers are installed between rooms 169 and 163 (Fire Area 1-4).

A hatchway in the ceiling of room 103 communicates with room 163 (Fire Area 1-004). A non-rated steel plate covers the hatchway.

Control cables for instrument air isolation valves Q1P19HV3611 and Q1P19HV3825 are routed through area 1-001. A fire induced failure in the control cable for either valve could cause the valve to fail closed. The subsequent loss of instrument air would cause the normal charging line isolation valve Q1E21HV8146 and the alternate charging line isolation valve Q1E21HV8147 to fail opened. It may be necessary to close these valves during the course of shutdown to isolate charging flow.

The control cable for the pressurizer PORV backup air/N₂ supply valve Q1B13HV2228-B is also routed through area 1-001. A fire induced failure in the control cable could cause the valve to fail close. If the pressurizer PORV backup air/N₂ supply valve (Q1B13HV2228-B) and either instrument air isolation valves (Q1B13HV3611 or Q1P19HV3825) fail closed, the pressurizer PORVs will be inoperable in the closed position. Operation of the pressurizer PORVs may be required to achieve depressurization of the RCS.

Fire induced failures (hot shorts) within the control cables for the transfer relay cabinet Q1H22L002-A could cause control for the power operated relief and blocking valves and the reactor head vent valves to shift from their normal main control board alignment to the remote hot shutdown panel.

Subsequent fire induced failures (hot shorts from adjacent control cables in the shared raceway) of the control cables for Q1B31PCV0445A-A, pressurizer power operated relief valve, and Q1B13SV2213A-A and Q1B13SV2214A-A, reactor head vent valves, could result in the valves being energized to open. The power relief blocking valve (MOV) could become electrically inoperative in the opened position.

Control cables associated with the three redundant atmospheric relief valves are routed through Fire Area 1-001. An analysis of potential effects of a fire upon these cables has shown that the subject valves could become inoperable in the closed position.

Train-A cables for the following equipment are routed through room 183 in Fire Area 1-001:

Train-A Charging Pump Room Cooler - Q1E16M001A-A
 Swing Charging Pump - Q1E21M001B-AB
 Swing Charging Pump Room Cooler - Q1E16M001B-AB
 Train-A RWST Isolation Valve - Q1E21LCV0115B-A

Train-B cables for the following equipment are routed through room 223 in Fire Area 1-001:

Train-B Charging Pump Room Cooler - Q1E16M001C-B
 Swing Charging Pump Room Cooler - Q1E16M001B-AB (power cable to MCC)

The cables associated with these two groups of equipment are redundant to one another.

The combustible material in Fire Area 1-001 consist of cable insulation, lube oil, charcoal filter media, and plastic panel parts. The following fire loadings are associated with the room bounded by the Fire Area 1-001:

<u>Room Number And Title</u>	<u>Combustible Material</u>	<u>Fire Load (BTU/FT²)</u>	<u>Maximum Fire Severtiy</u>
101-Waste Gas Decay Tank Room, 102-Valve compartment room and 103-corridor	Cable Insulation	1,252	Less Than 30 minutes

105-Catalytic H2 Recombiner "A" Room, and 106-Catalytic H2 Recombiner "B" Room	Cable Insulation and Plastic Panel Parts	7,634	Less Than 30 minutes
107-Storage Room, and 104-Passageway To Unit 2	Cable Insulation and Charcoal Filter Media	22, 561	Less Than 30 minutes
109-Waste Monitor Tank Pump Room - 110-Monitor Control Pannel Room	Cable Insulation, Lube Oil, and Plastic Panel Parts	5,742	Less Than 30 minutes
108 Waste Monitor Tank Room	Cable Insulation, and Charcoal Filter	19,457	Less Than 30 minutes
169 Duct and Pipe Chase	None	0	0
118 Floor Drain Tank Room	Cable Insulation	831	Less Than 30 minutes
119 Waste Holdup Tank Room	Cable Insulation	2,711	Less Than 30 minutes
120 Corridor	Cable Insulation	5,540	Less Than 30 minutes
121 Floor Drain Tank Pump Room	Cable Insulation, and Lube oil	21,402	Less Than 30 minutes
122 Waste Evaporator Feed Pump Room	Cable Insulation, and Lube oil	21,402	Less Than 30 minutes
127 Pipe Chase	None	0	0
128 RHR Heat Exchanger Room	Cable Insulation	2,607	Less Than 30 minutes
129 RHR Low Head Pump Room B	Cable Insulation	3,837	Less Than 30 minutes
130 Pipe Chase	None	0	0
131 RHR Low Head Room A	Cable Insulation	6,332	Less Than 30 minutes

126 Pipe Chase	None	0	0
124 Valve Encapsulation	Cable Insulation	6,329	Less Than 30 minutes
125 Containment Spray Pump Room B	Cable Insulation, and Lube oil	3,569	Less Than 30 minutes
114 Pipe Chase	Cable Insulation	3,885	Less Than 30 minutes
111 Containment Spray Pump Room A	Cable Insulation,	3,469	Less Than 30 minutes
113 Valve Encapsulation	Cable Insulation	3,333	Less Than 30 minutes
115 Hallway	Cable Insulation	1,655	Less Than 30 minutes
112 Access to Tendon Access Gallery	Cable Insulation	175	Less Than 30 minutes
196 Access to Tendon Access Gallery	Cable Insulation	175	Less Than 30 minutes
123 Pipe Chase	None	0	0
183 Tendon Access Gallery Entrance and 184 Piping Penetration Room	Cable Insulation	6,405	Less Than 30 minutes
223 Piping Penetration room	Cable Insulation,	40,625	Less Than 1 hour

A detection system covers the majority of the area. Exceptions to this coverage are rooms 112, 114, 115, 123, 126, 127, 130, 169, and 196. The western half of the piping penetration room on el 121 ft - 0 in. and the floor area of room 184 beneath the covered tendon hatchway into room 223 above are the only parts of Fire Area 1-001 covered by automatic sprinkler system.

Portable extinguishers, smoke removal equipment, and water hose cabinets are located throughout the fire area for use by the fire brigade.

The licensee justifies the acceptability of this exemption request on the basis of the existing plant fire protection features, the proposed sprinkler modifications and their alternative shutdown actions associated with Fire Area 1-001.

5.3 EVALUATION

Instrument air isolation valves Q1P19HV3611 and Q1P19HV3825 located in rooms 184 (Fire Area 1-001) and 189 (Fire Area 1-006) respectively, are equipped with a handwheel to facilitate manual operation. In the event that one or both valves fail closed, an operator can manually open them. This action will restore instrument air to the charging line isolation valves and pressurizer PORVs. Consequently, action would not have to be taken on the pressurizer PORV backup air/N₂ supply valve Q1B13HV2228-B.

In the unlikely event of the multiple hot shorts occurring in control cables in the transfer relay associated with the control of the pressurizer PORVs and block valves, this condition can be mitigated by removing power from the transfer relays and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 1B (Q1R41L001B-A) in Fire Area 1-043 Room 0343. Then go to transfer relay cabinet TRC-1 in Fire Area 1-035 room 347 and manually shift transfer relays TR1 (Q1B13SV2213A-A), TR2 (Q1B13SV2214A-A), TR3 (Q1B13PCV0445A-A), and TR5 (Q1B13MOV8000A-A) restoring control to the main control board to allow the operator to mitigate the letdown.

One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator would establish manual control of the atmospheric relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in area 1-001. The capability to control steam generator pressure and reactor coolant system temperature with the use of the manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, a fire in area 1-001 would not prevent the operation of at least one redundant atmospheric relief valve.

Although both rooms 183 and 223 are in Fire Area 1-001, there is a high degree of separation between them. Room 183 is located on el 100 ft. - 0 in. and room 223 is located on el 121 ft. - 0 in. The routing of the charging pump room cooler cables is such that the redundant groups are separated by 10 ft. horizontally in addition to the vertical separation between elevations. The slab between rooms 183 and 223 is 2 ft. thick and penetrated by only two 8 in. and one 12 in. mechanical penetrations. The part of room 223 through which the train-B charging pump room cooler and the swing charging pump room cooler cables are routed is covered by an automatic sprinkler system and both rooms are protected by automatic smoke detection system.

Therefore, the separation afforded between rooms 183 and 223 will preclude a fire from damaging both redundant trains of cabling associated with the charging pump room coolers.

The licensee committed to modify the sprinkler system installed in the hatchway area of room 163. Upon completion of the sprinkler system modifications, the sprinkler system in room 163 upon activation will form a water curtain which will prevent the spread of fire to other plant areas via the hatchway.

By letter dated May 31, 1985, the licensee committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain the control of the charging line isolation valves, pressurizer PORVs and block valves and the main steam atmospheric relief valves. The licensee intends to have the sprinkler modifications and the procedures fully implemented by the end of the Unit 1 refueling outage currently scheduled to commence during the fourth quarter of 1986.

All other shutdown systems associated with Fire Area 1-001 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms associated with Fire Area 1-001, safe shutdown could be achieved and maintained.

5.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection configurations will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for Fire Area 1-001 should be granted.

6.0 UNIT 1 AUXILIARY BUILDING, EL 100 FT. - 0 IN., 127 FT. - 0 IN., 139 FT. - 0 IN., 155 FT. - 0 IN., AND 175 FT. - 0 IN., FIRE AREA 1-006 (EXEMPTION REQUEST 1-38).

6.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-38 requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 to the extent that one train of redundant safe shutdown cables and equipment be enclosed by a one-hour fire barrier and fire suppression be installed throughout the fire area.

6.2 DISCUSSION

Fire Area 1-006 consists of the following rooms:

E1 100 Ft. - 0 In.

Room 128	RHR Heat Exchanger Room
Room 129	RHR Low Head Pump Room B
Room 130	Pipe Chase
Room 131	RHR Low Heat Pump Room A

E1 100 Ft - 0 In.

Room 183	Tendon Access Gallery Entrance
Room 184	Piping Penetration Room
Room 169	Pipe and Duct Chase
Room 196	Tendon Access Gallery

E1 121 Ft - 0 In.

Room 223	Piping Penetration Room
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Floors and walls forming the area boundary are of reinforced concrete. The ceiling of room 223 has tendon access openings to room 334 (Fire Area 1-34). Steel plates with three-hour rated coatings and which are topped by removable concrete slabs have been installed over the tendon access openings. There is a non-rated steel hatch cover over the hatchway between rooms 103 and 163 (Fire Area 1-004).

An airtight, UL Class B door is installed between room 223 and stairway No. 2. The door between rooms 184 and 162 (Fire Area 1-4) is an airtight UL Class A door. Non-airtight Class B doors are installed between rooms 110 and 115 and stairway No. 2.

Penetrations through the area boundary are sealed with silicone foam. Three-hour rated fire dampers are installed between rooms 169 and 163 (Fire Area 1-4).

A hatchway in the ceiling of room 103 communicates with room 163 (Fire Area 1-004). A non-rated steel plate covers the hatchway.

Control cables for instrument air isolation valves Q1P19HV3611 and Q1P19HV3825 are routed through area 1-001. A fire induced failure in the control cable for either valve could cause the valve to fail closed. The subsequent loss of instrument air would cause the normal charging line isolation valve Q1E21HV8146 and the alternate charging line isolation valve Q1E21HV8147 to fail opened. It may be necessary to close these valves during the course of shutdown to isolate charging flow.

The control cable for the pressurizer PORV backup air/N₂ supply valve Q1B13HV2228-B is also routed through area 1-001. A fire induced failure in the control cable could cause the valve to fail close. If the pressurizer PORV backup air/N₂ supply valve (Q1B13HV2228-B) and either instrument air isolation valves (Q1B13HV3611 or Q1P19HV3825) fail closed, the pressurizer PORVs will be inoperable in the closed position. Operation of the pressurizer PORVs may be required to achieve depressurization of the RCS.

Fire induced failures (hot shorts) within the control cables for the transfer relay cabinet Q1H22L002-A could cause control for the power operated relief and blocking valves and the reactor head vent valves to shift from their normal main control board alignment to the remote hot shutdown panel.

Subsequent fire induced failures (hot shorts from adjacent control cables in the shared raceway) of the control cables for Q1B31PCV0445A-A, pressurizer power operated relief valve, and Q1B13SV2213A-A and Q1B13SV2214A-A, reactor head vent valves, could result in the valves being energized to open. The power relief blocking valve (MOV) could become electrically inoperative in the opened position.

Control cables associated with the three redundant atmospheric relief valves are routed through Fire Area 1-001. An analysis of potential effects of a fire upon these cables has shown that the subject valves could become inoperable in the closed position.

Train-A cables for the following equipment are routed through room 183 in Fire Area 1-001:

Train-A Charging Pump Room Cooler - Q1E16M001A-A
 Swing Charging Pump - Q1E21M001B-AB
 Swing Charging Pump Room Cooler - Q1E16M001B-AB
 Train-A RWST Isolation Valve - Q1E21LCV0115B-A

Train-B cables for the following equipment are routed through room 223 in Fire Area 1-001:

Train-B Charging Pump Room Cooler - Q1E16M001C-B
 Swing Charging Pump Room Cooler - Q1E16M001B-AB (power cable to MCC)

The cables associated with these two groups of equipment are redundant to one another.

The combustible material in Fire Area 1-001 consist of cable insulation, lube oil, charcoal filter media, and plastic panel parts. The following fire loadings are associated with the room bounded by the Fire Area 1-001:

<u>Room Number And Title</u>	<u>Combustible Material</u>	<u>Fire Load (BTU/FT²)</u>	<u>Maximum Fire Severtiy</u>
101-Waste Gas Decay Tank Room, 102-Valve compartment room and 103-corridor	Cable Insulation	1,252	Less Than 30 minutes

105-Catalytic H2 Recombiner "A" Room, and 106-Catalytic H2 Recombiner "B" Room	Cable Insulation and Plastic Panel Parts	7,634	Less Than 30 minutes
107-Storage Room, and 104-Passageway To Unit 2	Cable Insulation and Charcoal Filter Media	22, 561	Less Than 30 minutes
109-Waste Monitor Tank Pump Room - 110-Monitor Control Pannel Room	Cable Insulation, Lube Oil, and Plastic Panel Parts	5,742	Less Than 30 minutes
108 Waste Monitor Tank Room	Cable Insulation, and Charcoal Filter	19,457	Less Than 30 minutes
169 Duct and Pipe Chase	None	0	0
118 Floor Drain Tank Room	Cable Insulation	831	Less Than 30 minutes
119 Waste Holdup Tank Room	Cable Insulation	2,711	Less Than 30 minutes
120 Corridor	Cable Insulation	5,540	Less Than 30 minutes
121 Floor Drain Tank Pump Room	Cable Insulation, and Lube oil	21,402	Less Than 30 minutes
122 Waste Evaporator Feed Pump Room	Cable Insulation, and Lube oil	21,402	Less Than 30 minutes
127 Pipe Chase	None	0	0
128 RHR Heat Exchanger Room	Cable Insulation	2,607	Less Than 30 minutes
129 RHR Low Head Pump Room B	Cable Insulation	3,837	Less Than 30 minutes
130 Pipe Chase	None	0	0
131 RHR Low Head Room A	Cable Insulation	6,332	Less Than 30 minutes

126 Pipe Chase	None	0	0
124 Valve Encapsulation	Cable Insulation	6,329	Less Than 30 minutes
125 Containment Spray Pump Room B	Cable Insulation, and Lube oil	3,569	Less Than 30 minutes
114 Pipe Chase	Cable Insulation	3,885	Less Than 30 minutes
111 Containment Spray Pump Room A	Cable Insulation,	3,469	Less Than 30 minutes
113 Valve Encapsulation	Cable Insulation	3,333	Less Than 30 minutes
115 Hallway	Cable Insulation	1,655	Less Than 30 minutes
112 Access to Tendon Access Gallery	Cable Insulation	175	Less Than 30 minutes
196 Access to Tendon Access Gallery	Cable Insulation	175	Less Than 30 minutes
123 Pipe Chase	None	0	0
183 Tendon Access Gallery Entrance and 184 Piping Penetration Room	Cable Insulation	6,405	Less Than 30 minutes
223 Piping Penetration room	Cable Insulation,	40,625	Less Than 1 hour

A detection system covers the majority of the area. Exceptions to this coverage are rooms 112, 114, 115, 123, 126, 127, 130, 169, and 196. The western half of the piping penetration room on el 121 ft - 0 in. and the floor area of room 184 beneath the covered tendon hatchway into room 223 above are the only parts of Fire Area 1-001 covered by automatic sprinkler system.

Portable extinguishers, smoke removal equipment, and water hose cabinets are located throughout the fire area for use by the fire brigade.

The licensee justifies the acceptability of this exemption request on the basis of the existing plant fire protection features, the proposed sprinkler modifications and their alternative shutdown actions associated with Fire Area 1-001.

5.3 EVALUATION

Instrument air isolation valves Q1P19HV3611 and Q1P19HV3825 located in rooms 184 (Fire Area 1-001) and 189 (Fire Area 1-006) respectively, are equipped with a handwheel to facilitate manual operation. In the event that one or both valves fail closed, an operator can manually open them. This action will restore instrument air to the charging line isolation valves and pressurizer PORVs. Consequently, action would not have to be taken on the pressurizer PORV backup air/N₂ supply valve Q1B13HV2228-B.

In the unlikely event of the multiple hot shorts occurring in control cables in the transfer relay associated with the control of the pressurizer PORVs and block valves, this condition can be mitigated by removing power from the transfer relays and manually aligning the affected relay (handle is provided), thereby shifting control to the main control board. To remove power from the transfer relay open breaker 17 on dc distribution panel 18 (Q1R41L001B-A) in Fire Area 1-043 Room 0343. Then go to transfer relay cabinet TRC-1 in Fire Area 1-035 room 347 and manually shift transfer relays TR1 (Q1B13SV2213A-A), TR2 (Q1B13SV2214A-A), TR3 (Q1B13PCV0445A-A), and TR5 (Q1B13MOV8000A-A) restoring control to the main control board to allow the operator to mitigate the letdown.

One of the three main steam atmospheric relief valves and its related steam generator are required to be operable to achieve steam release for cooldown. The atmospheric relief valves are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. The operator would establish manual control of the atmospheric relief valves by closing the manual air control valves to isolate the air supply and by opening the manual air vent valve to bleed off air from the diaphragm of the valve actuator. Both the air control and air vent valves are located in the vicinity of their associated atmospheric relief valve and would be accessible despite a fire in area 1-001. The capability to control steam generator pressure and reactor coolant system temperature with the use of the manually controlled atmospheric relief valves was demonstrated during the Unit 2 natural circulation and cooldown startup testing. Consequently, a fire in area 1-001 would not prevent the operation of at least one redundant atmospheric relief valve.

Although both rooms 183 and 223 are in Fire Area 1-001, there is a high degree of separation between them. Room 183 is located on el 100 ft. - 0 in. and room 223 is located on el 121 ft. - 0 in. The routing of the charging pump room cooler cables is such that the redundant groups are separated by 10 ft. horizontally in addition to the vertical separation between elevations. The slab between rooms 183 and 223 is 2 ft. thick and penetrated by only two 8 in. and one 12 in. mechanical penetrations. The part of room 223 through which the train-B charging pump room cooler and the swing charging pump room cooler cables are routed is covered by an automatic sprinkler system and both rooms are protected by automatic smoke detection system.

Therefore, the separation afforded between rooms 183 and 223 will preclude a fire from damaging both redundant trains of cabling associated with the charging pump room coolers.

The licensee committed to modify the sprinkler system installed in the hatchway area of room 163. Upon completion of the sprinkler system modifications, the sprinkler system in room 163 upon activation will form a water curtain which will prevent the spread of fire to other plant areas via the hatchway.

By letter dated May 31, 1985, the licensee committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain the control of the charging line isolation valves, pressurizer PORVs and block valves and the main steam atmospheric relief valves. The licensee intends to have the sprinkler modifications and the procedures fully implemented by the end of the Unit 1 refueling outage currently scheduled to commence during the fourth quarter of 1986. All other shutdown systems associated with Fire Area 1-001 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms associated with Fire Area 1-001, safe shutdown could be achieved and maintained.

5.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection configurations will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 and that no additional fire protection is required to satisfy the requirements of Section III.G.3. Therefore, the licensee's request for exemption for Fire Area 1-001 should be granted.

6.0 UNIT 1 AUXILIARY BUILDING, EL 100 FT. - 0 IN., 127 FT. - 0 IN., 139 FT. - 0 IN., 155 FT. - 0 IN., AND 175 FT. - 0 IN., FIRE AREA 1-006 (EXEMPTION REQUEST 1-38).

6.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-38 requested an exemption from the technical requirements of 10 CFR 50, Appendix R, Section III.G.2 to the extent that one train of redundant safe shutdown cables and equipment be enclosed by a one-hour fire barrier and fire suppression be installed throughout the fire area.

6.2 DISCUSSION

Fire Area 1-006 consists of the following rooms:

El 100 Ft. - 0 In.

Room 167	Combustible Storage Room
Room 185	Component Cooling Water Heat Exchanger Room
Room 189	Plant Heating Equipment Room
Room 190	Motor Control Center 1E Room
Room 191	Auxiliary Feedwater Pump Room (Train A)
Room 192	Auxiliary Feedwater Pump Room (Train B)
Room 193	Auxiliary Feedwater Pump Room (Turbine Driven)
Room 194	Lower Equipment Room
Room 195	Access Hatch Area

E1 127 Ft. - 0 In.

Room 241	Main Steam and Feedwater Valve Room
Room 242	Pipe Chase
Room 243	Pipe Chase

The floors, walls, and ceilings of Fire Area 1-006 that form the boundary between area 1-006 and adjacent fire areas are of reinforced concrete and rated for three-hours with the exception of a hatchway with a steel plate cover between rooms 185 (area 1-006) and 234 (area 1-020). All electrical and piping penetrations between adjacent fire areas are sealed for a three-hour rating. All doors between adjacent fire areas are UL Class A or B rated with two exceptions. There are non-rated doors between stairway No. 1 and room 190 and between stairway No. 1 and room 241. These doors are water-tight and pressure tight, respectively.

The two redundant motor driven auxiliary feedwater pumps and the turbine driven auxiliary feedwater (AFW) pump are located within Fire Area 1-006. Cables for all three pumps are routed through the area.

Protection and/or separation of component cooling water system cables and equipment complies with 10 CFR 50, Appendix R section III.G.2.c throughout Fire Area 1-006 with the exception of the component cooling water heat exchanger room (185). This room, contains all three component cooling water (CCW) pumps. The CCW pumps are located on 21-ft. centers and fire barriers are provided for the pump control and power cables. However, there are intervening combustibles consisting primarily of cable insulation between the pumps and the pumps are not provided with fire barriers. In addition, the service water inlet valves to redundant component cooling water heat exchangers (MOV3130A-B, MOV3130B-B, and MOV3130C-A) and service water discharge valves from redundant component cooling water heat exchangers (SV009A-B, SV009B-B, and SV009C-A) are located less than 20 ft. apart. Although the cables for the train-B valves are provided with fire barriers and automatic suppression, the valves themselves are not provided with fire barriers.

Cables for the redundant main steam isolation valves traverse rooms 185, 189, 190, and 194 on e1 100 ft. - 0 in. unprotected by fire barrier and in close proximity to one another. In the main steam and feedwater valve room (241) on e1 127 ft. - 0 in., the redundant main steam isolation valves are

back-to-back in each of the three main steam lines and the associated valve control cables are separated by less than 20 ft.

Control cables for the redundant main steam atmospheric relief valves (MSARV) traverse rooms 185, 189, 190, and 194 on el 100 ft. - 0 in. These cables are separated by less than 20 ft. in the rooms mentioned above. One train of the redundant MSARV control cables is not protected by a fire barrier on el 100 ft. - 0 in. The local control station and related control cabling for all three MSARVs are located together in room 189. Fire barriers are not provided to protect the local control stations or control cabling. On el 127 ft. - 0 in., the three valves and their control cabling are located in one room (241). Adjacent valves are within 20 ft. of one another. Fire barriers are not provided to protect the valves or control cabling, and fire suppression is not provided in room 241.

A hatchway located in room 185 has a non-rated steel plate cover. The hatchway communicates with room 234 (Fire Area 1-020).

The combustible materials in Fire Area 1-006 consists of cable insulation, lube oil, plastic panel parts, and miscellaneous combustibles. The following fire loadings are associated with the rooms bounded by Fire Area 1-006:

<u>Room Number and Title</u>	<u>Combustible Material</u>	<u>Fire Load (BTU/FT²)</u>	<u>Maximum Fire Severity</u>
167 Combustible Storage Room	Cable insulation, and Miscellaneous Material	5,323	Less than 30 min.
185 Component Cooling Water Heat Exchanger Room	Cable insulation, 5-kV disconnect switch, and Lube Oil	34,774	Less than 30 min.
191 Auxiliary Feedwater Pump Room	Cable insulation, and Lube Oil	20,107	Less than 30 min.
192 Auxiliary Feedwater Pump Room	Cable insulation, and Lube Oil	26,411	Less than 30 min.
189 Plant Heating Equipment Room, 190 Motor Control	Cable insulation, and Lube Oil, and Plastic Panel Parts	27,356	Less than 30 min.

Center IE
Room 193
Auxiliary
Feedwater
Pump Room,
194 Equipment
Room and
195 Access
Hatch Room

241 Main Steam and Feedwater Valve Room	Cable insulation	3,869	Less than 30 min.
242 Pipe Chase	Cable insulation	1,287	Less than 30 min.
243 Pipe Chase	Cable insulation	1,670	Less than 30 min.

A detection system covers the entire area except for rooms 195, 242, and 243. Room 167 has a wet-pipe sprinkler system which activates a local fire alarm bell and trouble horn that annunciates in the control room. Automatic water suppression systems are provided for rooms 189, 190, 194, and 185. Heat detectors are provided in the 5-kV disconnect switch in room 185 that alarm both locally and in the control room. The 5-kV disconnect switch cabinets are provided with a total-flooding CO₂ system which is activated by the heat detectors. Two water hose stations, located in rooms 185 and 189, are provided. A portable extinguisher is located in room 185 outside room 167. A hose station in room 234 (area 1-20) will be available for use in this area. Automatic water suppression systems are provided for rooms 185, 189, 190, and 194.

The licensee justifies the acceptability of this exemption request on the basis of the existing plant fire protection features, the proposed sprinkler modifications and their alternative shutdown actions associated with Fire Area 1-006.

6.3 EVALUATION

A fire barrier has been provided over the raceways carrying cables for the train-B motor driven auxiliary feedwater pump throughout Fire Area 1-006 with the exception of the train-B pump room (192). The barrier consists of two 1-in. layers of Kaowool blanket wraps with one overall layer of Zetex woven fabric. The subject raceways are BDDA09, BDDA06, BDDA03, BDDA0A, BEE016, and BFDD0M.

An analysis was performed to demonstrate that a fire limited to one of the AFW pump rooms would not defeat the auxiliary feedwater system. A fire in any one of the pump rooms would cause the loss of one AFW pump and AFW flow to one steam generator.

The AFW pump rooms are highly segregated watertight rooms with 2-foot thick reinforced concrete walls and watertight doors that are maintained closed. Lubricating oil and cable insulation are the only combustibles present in the pump rooms. Leaking oil would be contained within the individual rooms or would drain into the sump servicing the room. The combustible loading of any one pump room is estimated to be less than 30,000 BTU/ft.² with a maximum fire severity of less than 30 minutes.

A smoke detection system is installed in each of the three auxiliary feedwater pump rooms. The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. A manual hose station, portable extinguishers, and portable smoke removal equipment are available for use in the area.

The room construction coupled with a low quantity of combustible material, the presence of smoke detection system, and the availability of equipment for use by the fire brigade ensures that a fire in one of the AFW pump rooms would be confined to the affected room. Such a fire would not prevent auxiliary feedwater flow to at least one steam generator.

In order to ensure that fire will not propagate from one auxiliary feedwater compartment to another, the electrical penetrations and the mechanical pipe penetrations have been sealed with fire resistive silicone foam. The licensee has committed to include these penetrations into their fire barrier surveillance program.

The component cooling water (CCW) pump and heat exchanger room 185 is protected by an automatic smoke detection and sprinkler system. The licensee has committed to modify the sprinkler system, by the end of the Unit 1 seventh refueling outage, in the area of the CCW pumps to provide unobstructed sprinkler protection for the subject pumps. The combustible fire loading in the room is less than 35,000 BTU/ft.² with a maximum fire severity of less than 30 minutes. The detection system in the room would provide early warning of a fire allowing the fire brigade adequate time to respond. A manual hose station, portable extinguishers, and portable smoke removal equipment are available for use in the area.

The CCW pumps are located on 21-ft. centers. Heat detectors are provided in the 5-kV CCW pump disconnect switch which alarms locally and in the control room. The 5-kV disconnect switch cabinets are provided with a total-flooding CO₂ system that is activated by the heat detectors.

The CCW pump cables are wrapped with two 1-in. layers of kaowool with the exception of the train-A cables for the swing CCW pump which are wrapped with a single 1-in. layer. All trains of CCW pump cables are covered by an automatic sprinkler system.

Cables for the train-B service water inlet and discharge valves on the CCW heat exchangers are protected by two 1-in. layers of Kaowool and covered by automatic suppression. Cables for the train-A service water inlet and discharge valves on the CCW heat exchanger are not protected. Although neither train-A or train-B service water valves are provided with fire barriers, the nearest redundant valves are separated by a distance of approximately 10 ft. Intervening combustibles between redundant valves are minimal, consisting primarily of cable insulation.

Due to the existing level of fire detection and protection features provided as discussed above, fire damage in room 185 would be limited such that one train of redundant CCW system components and cabling would be available for safe shutdown.

In the event that the main steam isolation valves fail to isolate due to fire induced failures in the valves or valve control circuitry, the main turbine stop valves would provide isolation of the main steam lines. The main turbine stop valves and related control circuitry would not be affected by a fire in Fire Area 1-006.

The main steam atmospheric relief valves are located in the main steam and feedwater valve room 241 on el 127 ft. - 0 in. The backup air compressors and local control station for the atmospheric relief valves are located in the plant heating equipment room 189 on el 100 ft. - 0 in. The combustible loading of either room is such that the maximum expected fire severity is less than 30 minutes. The main steam and feedwater valve room is a restricted area with limited personnel access during plant operation. A smoke detection system is installed in both rooms. An automatic sprinkler system covers the plant heating equipment room. The main steam and feedwater valve room does not have sprinkler coverage.

The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. A manual hose station, portable extinguishers and portable smoke removal equipment are available for use in both rooms.

The main steam and feedwater valve room is a large room divided into three bays. The bays are separated by partial walls, 14 ft. in height. One main steam line lies in each bay. The main steam lines and their atmospheric relief valves are on 18-ft. centers. The floor of the main steam and feedwater valve room is watertight. The only communication between the main steam and feedwater valve room is an equipment hatch. On el 127 ft. - 0 in. the equipment hatch area is enclosed in a separate room.

In the event of fire induced failures affecting the redundant MSARV control cables or the local control stations located on el 100 ft. - 0 in., the atmospheric relief valves located in room 241 on el 127 ft. - 0 in. are provided with hand wheels such that the valves may be manually opened or closed without electrical controls or air supplies. Due to the degree of separation provided between MSARVs and related control cabling in room 241,

the minimum combustible loading, the presence of an early warning smoke detection system, and the administrative controls imposed at the plant to limit access to room 241 during plant operations, a fire involving the in-situ combustibles in room 241 would not result in the inability to operate the MSARV associated with one steam generator.

The non-fire rated steel plate hatchway cover located in the fire rate floor slab separating rooms 234 (Fire Area 1-020) and 185 is protected by a sprinkler system. The sprinkler system coverage is provided in both rooms and upon sprinkler actuation the system will create a water curtain affect which will prevent fire propagation from Fire Area 1-006 to Fire Area 1-020.

All other shutdown systems associated with Fire Area 1-006 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, Appendix R, Section III.G.2. As a result, there is reasonable assurance that if a fire occurred in any of the rooms associated with Fire Area 1-006, safe shutdown could be achieved and maintained.

6.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection configurations and their proposed modifications will provide an acceptable level of fire protection to that required by the technical requirements of 10 CFR 50, Appendix R, Section III.G.2. Therefore, the licensee's request for exemption for Fire Area 1-006 should be granted.

7.0 SUMMARY AND CONCLUSION FOR REMAINING FIVE SPECIFIC FIRE AREA EXEMPTIONS FOR UNIT 1

Therefore, based on our evaluation of the licensee's October 18, 1985 response, we conclude that the licensee's proposed fire protection modifications and their revised technical justifications pertaining to the plant's alternative ability to achieve and maintain safe shutdown conditions and the existing fire protection configurations in the following plant fire areas represented an equivalent level to safety to that achieved by compliance with Section III.G of Appendix R:

Unit 1 Non-radiation Side Corridor, Auxiliary Building, EL 121 ft. - 0 in. - Fire Area 1-020 (exemption request 1-17)

Unit 2 Auxiliary Building, EL 139 ft. - 0 in. - Fire Area 2-042 (exemption request 1-26)

Unit 1 Train B inside Auxiliary Building Cable Chase - Fire Area 1-009 (exemption request 1-31)

Unit 1 Auxiliary Building, EL 83 ft. - 0 in., 100 ft. - 0 in., and 121 ft. - 0 in. - Fire Area 1-001 (exemption request 1-36)

Unit 1 Auxiliary Building, EL 100 ft. - 0 in., 121 ft. - 0 in., 127 ft. - 0 in., 139 ft. - 0 in., 155 ft. - 0 in., and 175 ft. - 0 in. - Fire Area 1-006 (exemption request 1-38)

Dated:

Principal Contributors:

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