

December 29, 1986

Docket Nos. 50-348
and 50-364

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

Dear Mr. McDonald:

DISTRIBUTION

~~Docket Files~~

NRC PDR
Local PDR
PAD#2 Rdg
H. Denton/R. Vollmer
T. Novak
E. Rossi
ORAS
D. Miller
T. Conlon
J. Stang

E. Reeves (2)
OGC-Bethesda
E. Jordan
R. Grimes
J. Partlow
N. Thompson
T. Barnhart (8)
ACRS (10)
OPA
P. Madden

SUBJECT: TECHNICAL EXEMPTIONS FROM THE REQUIREMENTS OF 10 CFR 50
APPENDIX R FOR THE JOSEPH M. FARLEY NUCLEAR PLANT UNITS 1 AND 2

By letter dated March 13, 1985, you advised that you conducted a second review of the fire areas in Units 1 and 2. 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, 10 CFR 50 Appendix R Fire Hazards Analysis Reevaluation: February 1985."

Our letter dated November 19, 1985, granted thirty-three exemptions and withheld granting exemptions for sixteen fire areas. We have completed our review of your remaining sixteen exemption requests. By letters dated October 18, 1985, January 27, and July 16, 1986, you provided additional justifications and special circumstances required by regulatory changes (see 50 FR 50764) in 10 CFR 50.12(a). These justifications and special circumstances have been evaluated and accepted.

Therefore, we now grant the remaining sixteen 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.

Mr. R. P. McDonald

- 2 -

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

Sincerely,

Original signed by:
Thomas M. Novak

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

Enclosures:

1. Notice of Exemption
2. Safety Evaluation

cc w/enclosures:
See next page

LA:PAD#2
D:Mer
10/29/86

PM:PAD#2
EReeves:hc
10/30/86

BWD
J:ang
10/31/86

D:PAD#2
LRubenstein
10/16/86

NGC
WShields
10/14/86

as marked
10/14/86
PAD-DPLA
TNovak
10/10/86

Ed 10/18/86
Corrected SE only -
after re-review
with Reg. II reviewer -
Administrative Corrections.

Mr. R. P. McDonald
Alabama Power Company

Joseph M. Farley Nuclear Plant

cc:

Mr. W. O. Whitt
Executive Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291-0400

Mr. Louis B. Long, General Manager
Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202

Chairman
Houston County Commission
Dothan, Alabama 36301

Ernest L. Blake, Jr., Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N.W.
Washington, DC 20037

Robert A. Buettner, Esquire
Balch, Bingham, Baker, Hawthorne,
Williams and Ward
Post Office Box 306
Birmingham, Alabama 35201

Resident Inspector
U.S. Nuclear Regulatory Commission
Post Office Box 24 - Route 2
Columbia, Alabama 36319

D. Biard MacGuineas, Esquire
Volpe, Roskey and Lyons
918 16th Street, N.W.
Washington, DC 20006

Charles R. Lowman
Alabama Electric Corporation
Post Office Box 550
Andalusia, Alabama 36420

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, Suite 2900
Atlanta, Georgia 30303

Claude Earl Fox, M.D.
State Health Officer
State Department of Public Health
State Office Building
Montgomery, Alabama 36130

Mr. J. D. Woodard
General Manager - Nuclear Plant
Post Office Box 470
Ashford, Alabama 36312

UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter

Docket Nos. 50-348
and 50-364

ALABAMA POWER COMPANY

(Joseph M. Farley Nuclear Plant
Unit Nos. 1 and 2)EXEMPTION

I.

The Alabama Power Company (the licensee) is the holder of Facility Operating License Nos. NPF-2 and NPF-8 which authorizes operation of the Joseph M. Farley Nuclear Power Plant, Unit Nos. 1 and 2. These licenses provide, 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 March 13, 1985, the licensee submitted the results of their Appendix R fire hazards analysis reevaluation dated February 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 forty-nine additional exemptions from the specific provisions of Section III.G of Appendix R for certain fire areas in Unit No. 2 and for certain areas shared by Units 1 and 2. The Commission granted thirty-three of the forty-nine requests for exemption by letter dated November 19, 1985. 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 Nos. 1 and 2. Subsequently, the Commission granted twenty-seven exemptions on September 10, 1986, for certain fire areas of Unit No. 1 as a result of the Unit 1 fire hazards analysis reevaluation dated May 1985. By letters dated October 18, 1985, January 27, and July 16, 1986, the licensee modified the earlier exemption requests and provided relevant "special circumstances" as additional justifications.

Based on our review of the licensee's submittals 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 the remaining sixteen fire areas in Unit No. 2 and certain areas shared by Units 1 and 2, 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.

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 the Farley site 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)(ii)).

IV.

Accordingly, the Commission has determined pursuant to 10 CFR Part 50.12(a), that the additional sixteen 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 sixteen requested exemptions from Appendix P. of 10 CFR 50 Section III.G as specifically identified in the Safety Evaluation dated December 29, 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 (November 17, 1986, 51 FR 41550).

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 29th day of December, 1986

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 NOS. 1 AND 2
DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated March 13, 1985, the licensee submitted the results of their Appendix R fire hazards analysis reevaluation, dated February 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 49 additional exemptions from the specific provisions of Section III.G of Appendix R for fire areas in Unit 2 and fire areas shared by Units 1 and 2.

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

Based on our evaluation of the licensee's February 1985 submittal, 10 CFR 50 Appendix R fire hazards analysis reevaluation and our site visit during the week of July 29, 1985, we concluded that for 16 of the 49 exemption requests additional technical information was required and some additional fire protection modifications (i.e., additional safe shutdown system modifications and raceway fire barrier) were necessary in order to assure that the licensee's alternative fire protection and shutdown configurations represented an equivalent level of safety to that achieved by compliance with Section III.G of Appendix R. Therefore, the licensee committed to provide the necessary fire protection and safe shutdown system modifications and the additional technical information to support the outstanding exemption requests.

By letters dated October 18, 1985, and January 27, 1986, the licensee provided the additional technical information to substantiate the technical equivalency of these exemptions and committed to provide additional fire protection features in certain plant fire areas.

Therefore, based on our evaluation of the licensee's October 18, 1985 submittal, we conclude that the licensee's proposed fire protection and safe shutdown system 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 represent an equivalent level of safety to that achieved by compliance with Section III.G of Appendix R:

- Service Water Intake Structure - fire area 72 (Exemption Request 1-3)
- Unit 2 Auxiliary Building, Cable Chase Train B - fire area 2-030 (Exemption Request 1-4)
- Unit 2 Auxiliary Building, Switchgear Room Train B - fire area 2-021 (Exemption Request 1-10)
- Unit 2 Auxiliary Building, CRDM Switchgear Room - fire area 2-023 (Exemption Request 1-11)
- Unit 2 Auxiliary Building to Diesel Building, Cable Tunnel Train B - Fire Area 2-076 (Exemption Requests 1-12 and 2-26)
- Unit 2 Auxiliary Building, Elevation 100 feet - 0 inches, Charging Pump Rooms and Storage Areas - fire area 2-005 (Exemption Request 2-8)
- Unit 2 Auxiliary Building, Electrical Penetration Rooms Train A - Fire Area 2-035 (Exemption Request 2-9)
- Unit 2 Auxiliary Building Vertical Cable Chase - fire area 2-013 (Exemption Request 2-15)
- Unit 2 Auxiliary Building, Electrical Penetration Room Train B and Penetration Room Filtration System Equipment Room - fire area 2-034 (Exemption Request 2-18)
- Unit 2 Auxiliary Building, Train B Inside Cable Chase - fire area 2-009 (Exemption Request 2-19)
- Unit 2 Auxiliary Building Cable Chase Train A - fire area 2-031 (Exemption Request 2-21)
- Unit 2 Auxiliary Building, Elevation 100 feet - 0 inches, 121 feet - 0 inches, 127 feet - 0 inches, 139 feet - 0 inches, 155 feet - 0 inches and 175 feet - 0 inches - fire area 2-006 (Exemption Request 2-35)
- Unit 2 Auxiliary Building, Elevation 83 feet - 0 inches, 100 feet - 0 inches and 121 feet - 0 inches - fire area 2-001 (Exemption Request 2-36)
- Unit 2 Auxiliary Building, Elevation 100 feet - 0 inches, 121 feet - 0 inches, 130 feet - 0 inches, 139 feet - 0 inches, 155 feet - 0 inches and 184 feet - 0 inches - fire area 2-004 (Exemption Request 2-37)
- Fire areas in Unit 1, Unit 2 and Fire Areas shared by Units 1 and 2 - Fireproofing of Structural Supporting Steel (Exemption Request 2-38)

- Fire Areas in Units 1 and 2 Auxiliary Building, the Diesel Generator Building and Service Water Intake Structure - Fire Door Installation Deviations (Exemption Request 1-41)

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 fire areas documented by the above exemption requests are as follows:

2.0 SERVICE WATER INTAKE STRUCTURE - FIRE AREA 72 (EXEMPTION REQUEST 1-3)

2.1 EXEMPTION REQUESTED

The licensee, in its exemption request 1-3, 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 be enclosed by a fire barrier having a one-hour fire rating and that automatic fire suppression be installed throughout the fire area.

2.2 DISCUSSION

Fire Area 72 is separated from areas 73 and 74 by 3-hour fire-rated walls and is bounded by non-rated exterior walls, floors, and ceilings. Fire area 72 is separated into five fire zones by non-rated zone barriers. Zone 72A consists of the pump deck at elevation 188 feet - 6 inches and strainer pit at elevation 167 feet - 3 inches. Zone 72A communicates with zone 72C and 72D through non-fire-rated doors in the zone boundary. Zones 72C and 72D communicate with zone 72E through open doorways. Zones 72B and 72E communicate with the outside through non-rated doors.

The Unit 2 side of the pump deck contains the following Unit 2 redundant service water pump lube and cooling water pumps. In addition, the following suction valves and suction valve local control stations are located under the pump deck:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q2P16M002A-A	Unit 2 Service Lube and Cooling Pump Train-A.
Q2P16M002B-B	Unit 2 Service Water Lube and Cooling Pump Train-B.
Q2P16V719A-A	Unit 2 Service Water Lube and Cooling Pump Train-A Suction Valve.
Q2P16V719B-B	Unit 2 Service Water Lube and Cooling Pump Train-B Suction Valve.
Q2P16G508A-A	Local Control Station for Service Water Train-A Valve Q2P16V719A-A.

Q2P16G508B-B Local Control Station for Service Water Train-B Valve
Q2P16V719B-B.

According to the licensee's analysis, the subject pumps, valves and local control stations are used to provide lube and cooling water to the service water pump bearings, and are located in the sprinkler area of the pump deck.

The pumps are mounted in the southwest corner of the pump deck and have a horizontal separation of 18 inches on center. The pumps are electrically driven, each having a motor rated 7.5 hp at 550 V-ac. The pump bearings are oil lubricated with each pump casing having an oil reservoir of 4 ounces. The valves are mounted on the west wall of the pump deck at elevation 192 feet - 6 inches and have a horizontal separation of 9 inches on center.

The local control stations are located in the southwest corner of the strainer pit at elevation 171 feet - 3 inches and have a horizontal separation of 5 feet on center.

The Unit 2 side of the strainer pit contains the following redundant Unit 2 service water header strainer motor operated inlet valves and swing pump motor operated discharge valves:

<u>VALVES</u>	<u>FUNCTION</u>
Q2P16V511-A	Service Water Train A Strainer Inlet Valve
Q2P16V508-B	Service Water Train B Strainer Inlet Valve
Q2P16V507-A	Service Water Swing Pump Q2P16M001C-AB Discharge to Train A
Q2P16V506-B	Service Water Swing Pump Q2P16M001C-AB Discharge to Train B

The above strainer valves are separated horizontally by 19 feet - 6 inches on center. In addition, the above discharge valves are separated horizontally by 5 feet on center.

In addition, the Unit 1 side of the strainer pit contains the following redundant Unit 1 service water header strainer motor operated inlet valves and swing pump motor operated discharge valves:

<u>VALVES</u>	<u>FUNCTION</u>
Q1P16V511-A	Service Water Train-A Strainer Inlet Valve
Q1P16V508-B	Service Water Train-B Strainer Inlet Valve

Q1P16V507-A Service Water Swing Pump Q1P16M001C-AB Discharge to Train A

Q1P16V506-B Service Water Swing Pump Q1P16M001C-AB Discharge to Train B

The above strainer and discharge valves are separated horizontally 20 feet and 6 feet-6 inches on center, respectively.

Fire area 72 Zone A contains redundant safe-shutdown service water Train-A and -B cables shared by Unit 1 and Unit 2. Cabling associated with the following valves are routed through Fire Area 72 Zone A:

<u>VALVE NO.</u>	<u>FUNCTION</u>	<u>PRE-FIRE POSITION</u>	<u>REQUIRED POST-FIRE POSITION</u>
QSP16V505-A	Service Water Train-A Discharge to Wet Pit	Closed	Closed
QSP16V507-A	Service Water Train-A Discharge to Storage Pond Flume	Open	Open
QSP16V506-B	Service Water Train-B Discharge to Wet Pit	Closed	Closed
QSP16V508-B	Service Water Train-B Discharge to Storage Pond Flume	Open	Open

The licensee's analysis of the effects of fire upon the Trains-A and -B circuits located in fire area 72 Zone A shows that the subject valves could change from their pre-fire position.

Fire Area 72 Zones A and E contain redundant Unit 1 and Unit 2 service water Trains-A and -B cables. The condition exists when the swing service water pumps Q1P16M001C-AB and/or Q2P16M001C-AB are lined up to their respective B Trains. Cabling associated with the following valves are routed through Fire Area 72 Zones A and E:

<u>VALVE NO.</u>	<u>FUNCTION</u>	<u>PRE-FIRE POSITION</u>	<u>REQUIRED POST-FIRE POSITION</u>
Q1P16V507-A	Service Water Pump Q1P16M001C-AB Discharge to Train-A	Closed	Closed
Q2P16V507-A	Service Water Pump Q2P16M001C-AB Discharge to Train-A	Closed	Closed

The licensee's analysis of the effects of the fire on the Train-A valve circuits located in Fire Area 72 Zones A and E, shows that the subject Train-A valves could change from their pre-fire position. The pre-fire position of valves Q1P16V507-A and Q2P16V507-A is required to be maintained to insure that the service water headers are not cross-connected when only the B Train of service water pumps are operational.

In addition, Fire Area 72 Zones A and B contain redundant Unit 1 and Unit 2 service water Trains-A and -B cables. The condition exists when the swing service water pump Q1P16M001C-AB and/or Q2P16M001C-AB are lined up to their respective A Trains. The redundant Train-B cables associated with the following valves are routed through Fire Area 72 Zones A and B:

<u>VALVE NO.</u>	<u>FUNCTION</u>	<u>PRE-FIRE POSITION</u>	<u>REQUIRED POST-FIRE POSITION</u>
Q1P16V506-B	Service Water Pump Q1P16M001C-AB Discharge to Train-B	Closed	Closed
Q2P16V506-B	Service Water Pump Q2P16M001C-AB Discharge to Train-B	Closed	Closed

The licensee's analysis of the effects of the fire on the Train-B valve circuits located in Fire Area 72 Zones A and B shows that the subject Train B valves could change from their pre-fire position. The pre-fire position of valves Q1P16V507-B and Q2P16V507-B are required to be maintained to insure that the service water headers are not cross-connected when only the A Train of service water pumps are operational.

Fire Area 72 Zones D and E contain the following redundant Unit 1 and Unit 2 service water swing pump cables (This condition exists when the swing service water pumps Q1P16M001C-AB and/or Q2P16M001C-AB are powered from their respective B Trains):

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1R18A501A-A	Service Water Swing Pump Q1P16M001C-AB Train-A Disconnect Switch
Q2R18A501A-A	Service Water Swing Pump Q2P16M001C-AB Train-A Disconnect Switch

The Train-B cables enter the disconnect switch via bottom entry embedded conduit that is not exposed at any other point in Zones D and E.

The following redundant Unit 1 and Unit 2 service water swing pump cables are located in fire area 72 Zones B and C (This condition exists when the

swing service water pump Q1P16M001C-AB and/or Q2P16M001C-AB are powered from their respective A Trains):

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1R18A501B-B	Service Water Swing Pump Q1P16M001C-AB Train-B Disconnect Switch
Q2R18A501B-B	Service Water Swing Pump Q2P16M001C-AB Train-B Disconnect Switch

The Train-A cables enter the disconnect switch via bottom entry embedded conduit that is not exposed at any other point in Zones B and C.

Fire Area 72 Zone A also contains the following redundant safe-shutdown service water Trains-A and -B pumps for Unit 1 and Unit 2:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q1P16P001A-A	Unit 1 Service Water Pump Train-A
Q1P16P001B-A	Unit 1 Service Water Pump Train-A
Q1P16P001C-AB	Unit 1 Service Water Swing Pump
Q1P16P001D-B	Unit 1 Service Water Pump Train-B
Q1P16P001E-B	Unit 1 Service Water Pump Train-B
Q2P16P001A-A	Unit 2 Service Water Pump Train-A
Q2P16P001B-A	Unit 2 Service Water Pump Train-A
Q2P16P001C-AB	Unit 2 Service Water Swing Pump
Q2P16P001D-B	Unit 2 Service Water Pump Train-B
Q2P16P001E-B	Unit 2 Service Water Pump Train-B

The above subject pumps are separated horizontally by 5 feet on center.

The combustible materials associated with Fire Area 72 consists primarily of cable insulation and lubricating oil. The following summarizes the fire loading associated with each of the fire zones in Fire Area 72:

	<u>ROOM NUMBERS/ TITLES</u>	<u>COMBUSTIBLE MATERIAL</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
1)	Fire Zone A Service Water Pump Room	Lubricating Oil	6,104	Less Than 30 mins.
		Cable Insul.	13,330	
2)	Fire Zone B Switchgear Room Train B	Cable Insul.	37,547	Less Than 30 mins.

3)	Fire Zone C 5kv Disconnect Switch Room Train-B	Cable Insul.	255	Less Than 30 mins.
4)	Fire Zone D Disconnect Switch Room Train-A	Cable Insul.	255	Less Than 30 mins.
5)	Fire Zone E Switchgear Room Train-A	Cable Insul.	36,544	Less Than 30 mins.

Fire Area 72 fire detection capabilities are provided throughout the area. The fire detection system is designed to alarm locally and annunciate in the control room. Manual fire hose suppression capability for Fire Area 72 is provided via the two fire hose/hydrant houses located directly outside the service water building within the security fence.

The service water pumps are protected by a preaction sprinkler system. This system utilizes fusible element type water spray nozzles installed in a directional configuration in order to provide optimum coverage to the hazard area. In addition to the sprinkler protection there are steel radiant heat shield walls and concrete curbs installed between the service water pumps.

Two additional preaction sprinkler systems provide coverage to the entire pump deck, the area in the strainer pit beneath the pump deck, and to safe-shutdown cabling in the upper northeast corner of the service water pump room.

In addition to the sprinkler protection in the northeast corner; one train of the redundant cabling in this area is enclosed in an equivalent one hour fire barrier.

The switchgear in Fire Zones B, C, D and E are protected by an automatic carbon dioxide suppression system which is designed to suppress a fire internal to the cabinets.

Portable fire extinguishers are located throughout Fire Zones A, B, C, D, and E.

The licensee justifies the acceptability of the exemption requested on the basis of the existing fire protection, their alternative shutdown actions and the proposed fire protection modifications associated with Fire Area 72.

2.3 EVALUATION

The entire pump deck at elevation 188 feet - 6 inches is covered by preaction sprinkler systems, which provide coverage for pumps Q2P16M002A-A and Q2P16M002B-B, and valves Q2P16V719A-A and Q2P16V719B-B. In addition, the service water pumps and the floor area immediately around them are provided with a preaction spray system. The strainer pit at elevation 167 feet - 3 inches also has preaction sprinkler system coverage for local control stations Q2P16G508A-A and Q2P16G508B-B. Train A of the redundant safe shutdown raceway that services the subject equipment is protected by a barrier (two 1-inch thick wraps of Kaowool blanket) having a fire rating greater than that of the projected fire, which is less than 1/2 hour maximum severity. The entire fire area is provided with detection. Therefore, adequate fire protection features exist to ensure that a fire in Zone A will not affect both redundant trains of service water. In order to increase the responsiveness of the preaction sprinkler system protecting the Units 1 and 2 service water pumps the licensee committed to provide heat collector over each fusible element spray nozzle in the system. In addition, the licensee committed to correct the sprinkler obstruction problems associated with the Unit 2 service lube oil and cooling pump area by relocating the lighting fixture above the pumps.

The strainer pit at elevation 167 feet - 3 inches has preaction sprinkler system coverage for the redundant valves Q2P16V511-A, Q2P16V508-B, Q2P16V507-A, and Q2P16V506-B. The raceways that service Q2P16V511-A and Q2P16V507-A are protected by a barrier (two one-inch thick wraps of Kaowool blanket) having a fire rating greater than that of the projected fire, which is less than 1/2 hour maximum severity. The entire fire area is provided with detection. The strainer inlet valves are separated by 19 feet - 6 inches on center and the swing pump discharge valves are separated by 5 feet on center. There is minimal intervening combustible material between the redundant valves consisting of cable insulation. In addition, the Train-A cable in the area of these valves is wrapped with a fire resistive material (Kaowool).

In addition, the strainer pit at elevation 167 feet - 3 inches has preaction sprinkler system coverage for the redundant valves Q1P16V511-A, Q1P16V508-B, Q1P16V507-A, and Q1P16V506-B. The raceways that service Q1P16V511-A and Q1P16V507-A are protected by a barrier (two 1-inch-thick wraps of Kaowool blanket) having a fire rating greater than that of the projected fire, which is less than 1/2 hour maximum severity. The entire fire area is provided with detection. The strainer inlet valves are separated by 20 feet on center and the swing pump discharge valves are separated by 6 feet - 6 inches on center. There is minimal intervening combustible material between the redundant valves consisting of cable insulation. In addition, the Train-A cable in the area of these valves has been wrapped with a fire resistive material (Kaowool).

Valves QSPV16V505-A, QSP16V507-A, QSP16V506-B, and QSP16V508-B - The requirement to shift service water discharge from the circ water canal to recirculate to the service water pond is a long term one, not required for 24 hours and can be accomplished by manually repositioning the subject valves as required. Plant procedures will be written to incorporate the above action for a fire in Fire Area 72 Zone A.

Placing into service Q1P16M001C-AB or Q2P16M001C-AB swing service water pump is required when one of the normal train pumps is out of service for maintenance or repair. To preclude the repositioning of the subject valves, after the respective swing pump alignment is performed, the power will be removed from the appropriate swing pump opposite train discharge valve, i.e., when the swing pump is aligned to Train-B, the Train-A service water valve (Q1P16V507-A and/or Q2P16V507-A) will be maintained in the closed position by administratively removing power to the valve. Plant procedures will be revised by the licensee to incorporate the above action.

Placing into service Q1P16M001C-AB or Q2P16M001C-AB swing service water pump is required when one of the normal train pumps is out of service for maintenance or repair. To preclude the repositioning of the subject valves, after the respective swing pump alignment is performed, the power will be removed from the appropriate swing pump opposite the train discharge valve, i.e., when the swing pumps (Q1P16M001C-AB and/or Q2P16M001C-AB) are aligned to Train-A, the Train-B service water valve (Q1P16V506-B and/or Q2P16V506-B) will be maintained in the closed position by administratively removing the power to the valve. Plant procedures will be revised by the licensee to incorporate the above action.

The Train-B cables enter the disconnect switch via bottom entry embedded conduit that is not exposed at any other point in Zones D and E. The disconnect switch and switchgear in these zones have an automatic carbon dioxide fire detection and suppression system for protection. Zones D and E are separated from Zones A, B, and C by non-rated reinforced concrete walls. The sprinkler system in Zone A will act as a water curtain to prevent the spread of a fire from Zones A, B, and C to Zones D and E via the non-rated walls and doors in Zone A. Therefore, adequate fire protection features exist to ensure that a fire in Zones A, B, or C will not affect both redundant trains of service water.

In addition, the Unit 1 and Unit 2 swing pump power is supplied from 4160 V switchgear Train-A, located in Zone E, and Train-B, located in Zone B. The pump power circuit breaker is key interlocked with its associated disconnect switch. Therefore, power from the redundant Trains-A and -B sources will not be in the disconnect switch at one time. In addition, the redundant Trains-A and -B disconnect switches are key interlocked, preventing both switches being closed at one time.

The Train-A cables enter the disconnect switch via bottom entry embedded conduit that is not exposed at any other point in Zones B and C. The disconnect switch and switchgear in these zones have an automatic carbon dioxide fire detection and suppression system for protection. Zones B and C are separated from Zones A, D, and E by non-rated reinforced concrete walls. The sprinkler system in Zone A will act as a water curtain to prevent the spread of a fire from Zones A, D, and E to Zones B and C via the non-rated walls and doors in Zone A. Therefore, adequate fire protection features exist to ensure that a fire in Zones A, D, or E will not affect both redundant trains of service water.

The entire pump deck at elevation 188 feet - 6 inches is covered by preaction sprinkler systems which provide coverage for the Units 1 and 2 Train-A and -B service water pump deck area. Additionally, the pumps and the floor area immediately around them are covered by a preaction spray system. The Unit 1 and Unit 2 service water pumps are separated by a concrete block wall which extends approximately 20 feet out from the south zone barrier onto the pump deck. The individual unit Trains-A and -B pumps are separated by curbs and partial height barriers of fire-rated construction located on either side of the swing pump. These barriers act as radiant heat shields and prevent the spread of an oil spill from one train to the other. The installed sprinkler and spray systems will act as a water curtain to prevent a fire on the pump deck from spreading to the redundant train or opposite unit service water pumps. The raceways servicing the Train-A service water pumps for both units have been protected by a barrier (two 1-inch thick wraps of Kaowool blanket) having a fire rating greater than that of the projected fire, which is less than 1/2 hour maximum severity. The entire fire area is provided with detection. Therefore, adequate fire protection features exist to ensure that a fire in Zone A will not effect both redundant trains of service water.

An associated circuit review indicated that adequate coordination is not provided between safe-shutdown circuits and associated nonsafe-shutdown circuits powered from 125V DC Distribution Panels 1N, 2N, 1M, and 2M. The safe-shutdown circuits from these distribution panels provide control power for safe-shutdown breakers. A short circuit in an associated cable from one of the distribution panels could result in a loss of power to the panel, and therefore, a loss of control power to the safe-shutdown breakers powered from the affected panel.

A loss of power to one of the 125V DC Distribution Panels 1N, 2N, 1M or 2M will result in the loss of breaker control power for the following safe-shutdown loads controlled from that panel as shown below.

Distribution Panel 1N:	4 kV Breaker DL02 to Load Center L 600 V Load Center Tie Breaker e1 05 Service Water Pump 1C Service Water Pump 1D Service Water Pump 1E 600V Load Center Breaker e1 09 4 kV Tie Breaker DG02
Distribution Panel 2N:	Service Water Pump 2C Service Water Pump 2D Service Water Pump 2E 4 kV Breaker DL02 to Load Center L
Distribution Panel 1M:	4 kV Breaker DK02 to Load Center K 600 Load Center Tie Breaker EK05 Service Water Pump 1A Service Water Pump 1B Service Water Pump 1C 600V Load Center Breaker EK03
Distribution Panel 2M:	Service Water Pump 2A Service Water Pump 2B Service Water Pump 2C 4 kV Breaker DK02 to Load Center K 4 kV Tie Breaker DF02

A loss of breaker control power from the single affected panel will not interrupt the operation of the load powered by the breaker. However, electrical control of the breaker including breaker protection circuits and handswitch operation will not be functional. A loss of power to one of the subject DC distribution panels will not preclude any necessary control and operation of safe-shutdown equipment. Should the need arise, manual operation of the affected breaker would be possible.

The licensee has initiated a design change to improve the breaker coordination which will ensure that the required safe shutdown equipment is isolated from associated non-safety circuits. This design change is scheduled to be installed prior to the end of the Unit 1 seventh refueling outage currently scheduled to commence during the fourth quarter of 1986.

In addition, by letter dated May 31, 1985, the licensee committed to revise the Unit 1 procedures associated with service water swing pump plant operations and perform the required sprinkler system modifications associated with the service water pumps by the end of the Unit 1 seventh refueling outage. The licensee, by letters dated March 13, 1985 and October 18, 1985, also committed to revise the Unit 2 procedures associated with service water

swing pump plant operations and perform the required sprinkler system modifications associated with the service water pump and lube oil at cooling pump areas by the end of the Unit 2 refueling outage.

All other shutdown systems associated with Fire Area 72 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 Fire Area 72, safe shutdown could be achieved and maintained.

2.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection configuration, in conjunction with its proposed modifications, will provide an acceptable level of fire protection to that required by technical requirements of 10 CFR 50 Appendix R, Section III.G.2. Therefore, the licensee's request for exemption for Fire Area 72 should be granted.

3.0 UNIT 2 AUXILIARY BUILDING, CABLE CHASE TRAIN-B - FIRE AREA 2-030 (EXEMPTION REQUEST 1-9)

UNIT 2 AUXILIARY BUILDING, SWITCHGEAR ROOM TRAIN-B - FIRE AREA 2-02, (EXEMPTION REQUEST 1-10)

UNIT 2 AUXILIARY BUILDING, CRDM SWITCHGEAR ROOM - FIRE AREA 2-023 (EXEMPTION REQUEST 1-11)

UNIT 2 AUXILIARY BUILDING TO DIESEL BUILDING CABLE TUNNEL TRAIN-B - FIRE AREA 2-076 (EXEMPTION REQUESTS 1-12 and 2-26)

3.1 EXEMPTIONS REQUESTED

The licensee in its exemption requests 1-9, 1-10, 1-11 and 1-12 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 cabling to be enclosed by a fire barrier having a one-hour fire rating.

In addition, the licensee in its exemption requests 1-10, 1-12 and 2-26, requested exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 to the extent that it requires an automatic fire suppression system to be installed throughout fire area 2-021 and automatic fire detection system to be provided throughout fire area 2-076.

3.2 DISCUSSION

Fire area 2-030 consists of rooms 2249 (elevation 121 feet - 0 inches and 139 feet - 0 inches) and 2252 (elevation 127 feet - 0 inches). All fire area boundary walls, floors, and ceilings are 3-hour fire rated except for a

non-rated bulkhead between this area and the cable tunnel (area 2-076). A UL Class A fire-rated door exists between rooms 2249 and 2235 (area 2-023). The door between room 2252 and cable tunnel (area 2-076) is a non-fire-rated watertight door. A fire-resistant coating has been applied to the watertight door on the fire area 2-076 side.

Fire area 2-021 consists of rooms 2229 and 2233 at elevation 121 feet - 0 inches and is bounded by 3-hour fire-rated walls, ceilings, and floors. The area boundary doors are UL Class A fire-rated.

Fire area 2-023 consists only of room 2235 at elevation 121 feet - 0 inches and is bounded by 3-hour fire-rated floors, ceilings, and walls. The area boundary doors are UL Class A fire-rated doors.

Fire area 2-076 consists of a cable tunnel running from the Unit 2 auxiliary building to the diesel building. The fire area boundary walls, floor, and ceiling are 3-hour fire rated except for a non-rated bulkhead between this fire area and fire area 2-030. A UL Class A fire-rated door exists between the cable tunnel and the diesel building, and a non-fire-rated watertight door exists between the cable tunnel and the auxiliary building (area 2-030). A fire-resistant coating has been applied to the water tight door leading into the auxiliary building.

Fire Areas 2-030, 2-021, 2-023 and 2-076 contain electrical Train-B control cables associated with the shared Diesel Generator 2C start-stop circuit. An analysis of the effects of a fire upon these cables shows that DG-2C would fail to start and align to 4.16 kV Bus 1J.

Fire area 2-076 also contains electrical power and control cables for electrical Train-B distribution system.

The analysis of the potential effects of a fire in Fire Area 2-076 shows that the plant could lose Train-B emergency diesel backup power. In the event of a postulated loss of offsite power along with a fire in this area, the plant could lose the total electrical Train-B system and make the following redundant safe shutdown components inoperable in the closed position.

EQUIPMENT

FUNCTION

N2P19HV3885-B	Instrument Air to Penetration Room
Q2B13HV2228-B	Backup Air/Nitrogen Supply to Pressurizer PORVs
Q2B31PCV0445A-A	Pressurizer PORV, Train-A
Q2B31PCV0444B-B	Pressurizer PORV, Train-B
Q2E21HV8145-N	Pressurizer Auxiliary Spray

In addition, these Fire Areas (2-030, 2-021, 2-023 and 2-076) contain electrical Train-B control cables associated with the following safe shutdown components.

EQUIPMENTFUNCTION

QSP16V506-B	Service Water Train-B Emergency Recirc. to Wetpit
QSP16V508-B	Service Train-B Emergency Recirc. to Pond

An analysis of the effects of a fire upon these cables shows that the subject valves could fail in the closed position and become inoperable.

In addition, Unit 1 service water valve Q1P16V538-B, which returns water to wetpit/pond could fail in the normal closed position due to loss of power to MCC-1P.

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:

FIRE AREAFIRE LOAD BTU/FT²

2-030	423,898
2-023	68,002
2-021	109,062
2-076	39,000

A smoke detection system and automatic water suppression system are installed in fire area 2-030. The manual fire brigade hose station located in room 2234 (area 2-020) is available for use in this area.

An area smoke detection system is installed in fire area 2-021. In addition, in fire area 2-021, 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 the total flooding carbon dioxide systems in each piece of equipment. A water hose located in room 2234 (area 2-020) outside room 2235 and a carbon dioxide hose reel located in room 2210 (area 2-020) are available to the fire brigade as backup.

In fire area 2-023, ionization smoke detectors are provided which activate total flooding Halon system, activate alarm bell in room 2234 (area 2-020), and annunciate in the main control room. A water hose installed in room 2234 (area 2-020) outside of room 2235 is available as a back up.

Fire area 2-076 is protected by an automatic sprinkler suppression system.

The licensee justifies the acceptability of the 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

During normal plant operation, the service water is lined up to discharge to the river through open valve Q1P16V545-B. The requirement to shift the service water discharge from the circulating water canal to recirculate to the service water pond is a long term one (not required for 24 hours). Recirculation can be accomplished by manually repositioning valves QSP16V506-B and QSP16V508-B, as required.

When service water discharge is lined up for recirculating mode to the pond (required when necessary to conserve pond inventory), the effects of a fire could cause immediate loss of Train-B service water. However, the controls of Train-B service water discharge valve Q1P16V545-B to the river are not affected by a fire in either area 2-030, 2-021, 2-023 or 2-076 and operator action will be taken to open the valve and reinstate Train-B service water, until recirc to the pond can be re-established by manual operation of QSP16V506-B and QSP16V508-B.

In fire area 2-076 failure of valve Q2E21HV8145-N in the closed position will disable the pressurizer auxiliary spray system which provides one method to achieve depressurization of the RCS.

Pressurizer PORVs Q2B31PCV0445A-A and Q2B31PCV0444B-B provide another means of achieving RCS depressurization. Valves N2P19HV3885-B and Q2B13HV2228-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 Q2B31PCV0445A-A and Q2B31PCV0444B-B. PORV Q2B31PCV0444B-B will also be inoperable due to loss of the Train-B dc power supply; however, the Train-A dc supply to PORV Q2B31PCV0445A-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 hand wheel operation of valve N2P19HV3885-B.

Once air is restored, PORV Q2B31PCV0445A-A will be operable to achieve RCS depressurization.

The licensee, by letter dated March 13, 1985, committed to develop detailed procedures for Fire Areas 2-030, 2-023, 2-021 and 2-076 which will identify the manual operator actions necessary to regain normal control of the service water system and regain the control of a pressurizer PORV in the event of a fire in fire area 2-076.

These procedures will be fully implemented by the end of the Unit 1 seventh refueling outage.

In addition, the cables which are associated with the 4.16 kV Bus 1J power the river water pumps which are considered non-safe shutdown equipment. Loss of river water pumps will not affect Unit 1 safe shutdown.

The watertight door between auxiliary building (area 2-030) and cable tunnel (area 2-076) does not comply with 3-hour fire-rated boundary requirements. However, a fire in area 2-030 propagating into area 2-076 will not have any additional impact on Unit 1 safe shutdown because the same redundant safe shutdown function cables are contained in both the areas. In addition, the fire-resistant coatings on the subject door will be placed under the licensee's fire protection surveillance program.

All other shutdown systems with the fire areas identified in Section 3.0 have redundant counterparts in other fire areas or are located in plant areas which meet the requirements of 10 CFR 50, 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 safe 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 the fire areas identified in Section 3.0 above should be granted.

4.0 UNIT 2 AUXILIARY BUILDING, ELEVATION 100 FT. - 0 INCHES CHARGING PUMP ROOMS AND STORAGE AREAS - FIRE AREAS 2-005 (EXEMPTION 2-8)

4.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-8 requested an exemption from the requirements of 10 CFR 50, Appendix R, Section III.G. to the extent that it requires a three-hour fire barrier between redundant cabling and equipment. In addition, within fire area 2-005, the licensee is requesting an exemption from the requirements of Appendix R in that it requires one train of redundant safe shutdown cable and equipment to be enclosed in a one-hour fire barrier and the installation of automatic suppression throughout the area.

4.2 DISCUSSION

Fire area 2-005 consists of the three charging pump rooms (2173, 2174, and 2181), and a hallway (2172). The fire area boundary walls, floors, and ceilings are 3-hour fire-rated except for the containment wall, and all fire area boundary doors are fire rated. Self expanding cork is installed between the fire area boundary walls and the containment wall.

The fire area contains all three charging pumps, related valves and air handling units. Each charging pump is redundant to the other two. The redundant charging pumps, valves, and air handling units are located in separate rooms. The pump room walls internal to fire area 2-005 are watertight and of two feet thick reinforced concrete. However, the watertight penetration seals and watertight doors in the subject walls are not fire rated.

Room 2172 in fire area 2-005 contains the control cables and valves for the RWST charging pump suction (LCV115B and LCV115D), the control cables and valves for the RWMT charging pump suction and boric acid dilution injection to the VCT (FCV0113B-A and FCV0114B-A). In addition, control cables for the RWMT to the boric acid blender and boric acid flow control valves (FCV0114B-A and FCV0113A-A) transit this room. These components provide redundant suction of makeup water from the RWMT or the RWST. Complete fire barriers and full suppression coverage is not provided for the valves or cables. The analysis of the effects of a fire upon the subject cables in the area shows that the RWST isolation valves could become electrically inoperative in the closed position or 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 Q2B31PCV0445A-A and Q2B13MOV8000A-A and the reactor head vent valves Q2B13SV2213A-A and Q2B13SV2214A-A are located in fire area 2-005. The subject cables are associated with the control function from the hot shutdown panel Q2H21NBAFF2605G-A. In addition, control cables which shift control from the main control board to the hot shutdown panel via the transfer relay cabinet Q2H22L002-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.

Combustibles associated with fire area 2-005 primarily consist of cable insulation and lube oil. The following summarizes the fire loading associated with the rooms bounded by fire area 2-005:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Room 2173 Charging/ Safety Injection Pump Room	27,563	Less than 30 minutes

Room 2174 Charging/Safety Injection Pump Room	28,508	Less than 30 minutes
Room 2181 Charging/Safety Injection Pump Room	47,414	Less than one hour
Room 2171 Combustible Area, Room 2172 Hallway and Room 2182 Contamination Storage Area	31,820	Less than 30 minutes

A smoke detection system is installed throughout fire area 2-005. Manual hose station, carbon dioxide hose reel, portable dry chemical extinguishers, portable carbon dioxide extinguishers, and portable smoke removal equipment located in the corridor just outside the fire area are available for fire brigade use for a fire in fire area 2-005. In addition, an automatic sprinkler system is installed in room 2172.

The licensee justifies the acceptability of this exemption request on the basis of the existing fire protection features and their alternative shut-down actions associated with this fire area.

4.3 EVALUATION

The redundant charging pumps, valves, and air handling units are located in independent, highly segregated rooms. Rooms 2171 and 2182 do not contain redundant safe shutdown cabling or equipment. An analysis was performed to demonstrate that a fire limited to one of the four areas identified below would not jeopardize the safe shutdown of the plant:

1. RM 2181 - Train-A Charging Pump Room
2. RM 2174 - Swing Charging Pump Room
3. RM 2173 - Train-B Charging Pump Room
4. RMs 2172, 2171, 2182 - Storage rooms and hallway

The following justification is provided to show that a fire would be contained in one of the four areas listed above.

The charging pump rooms (2173, 2174, and 2181) are watertight with two feet thick reinforced concrete walls. The penetrations in the pump room walls internal to fire area 2-005 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 pump servicing the room. In addition, there is a fixed suppression system installed in room 2172 (hallway) which provides additional protection in the area of the pump room doors which communicate with this hallway. A smoke detection system is installed throughout the area including the three charging pump rooms. The maximum combustible loading in any room of this fire is estimated to be, less than 48,000 Btu/ft² with a maximum fire severity of less than one hour. Based upon the fire protection provided, a fire involving the in-situ combustibles would be contained within the plant area of origin. In order to ensure that the configuration and the fire protection characteristics of the charging pump rooms are maintained the licensee has committed to include the penetrations which are sealed into the surveillance program.

A fire barrier has been provided for raceway sections AHF15A, AHD12B, AIE258, AIE12B and AIE15B in rooms 2182 and 2172 of fire area 2-005. These barriers protect cables for the boric acid flow control and the RWST to the boric acid blender valves (FCV0113A-A and FCV0114B-A) as they transit rooms 2182 and 2172 of fire area 2-005. These subject barriers also provide protection for the RWST charging pump suction, boric acid dilution injection to the VCT cables (FCV0113B-A and FCV0114A-A) and the redundant RWST charging pump suction train-A cables (LCV0115B-A), with separation of approximately 10 feet. Partial suppression coverage is provided for the subject cables and valves in this area of FCV0113B-A and FCV0114A-A. There is approximately 15 feet of separation between the RWST charging pump suction valve and cables (FCV0113B-A) and the redundant train-B RWST suction valve and cables (FCV0113B-A) and the redundant train B RWST suction valve and cables (LCV0115D-B). Again partial suppression coverage is provided in the area of FCV0113B-A and FCV0114A-A. Detection is provided in the area of the subject components. Due to the barriers provided, the spatial separation, detection and partial suppression coverage and the low in-situ combustible loading exposure fire would not affect both redundant sources of borated makeup water. In the event of a fire in room 2181, the train-B RWST isolation valve, LCV115D-B, will be operable. An automatic suppression system covers the raceway to be protected with the exception of 18 feet of raceway sections AHF15A, AHD12B and AIE15B in room 2172 and 10 feet of AHF15A and AHD12B in room 2182.

In the unlikely event that a fire in this area causes a loss of these three independent sources of reactor makeup water, the additional fire barriers that have been installed in Rooms 2182 and 2172 will ensure that a fire induced RCS letdown will not exist thus increasing the time margin available to establish makeup. Reactor decay heat will be sufficient to maintain RCS temperature and thereby prevent shrinkage of the RCS until manual action can be taken to restore makeup water. In addition, the reactor coolant pump seal integrity can be maintained by the normal seal injection flow path from the VCT or by using component cooling water. These flow paths will not be affected by a fire in this area; therefore, the integrity of the pump seals will not be jeopardized while makeup is being established.

Fire induced failures (hot shorts) in room 2181 in the control cables for the transfer relay cabinet Q2H22L002-A could cause control for the pressurizer power operated relief valves (PORV) and block 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 Q2R31PCV0445A-A, pressurizer PORV Q2R13SV2213A-A, and Q2R13SV2214A-A reactor head vent valves, could result in the valves being energized to open. The PORV block valves 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 relay thereby shifting control to the main control board. To remove power from the transfer relay, open breaker 9 on dc distribution panel 2C (Q2R41L001C-A) located in room 2312, fire area 2-004. Then go to transfer relay cabinet TRC-1 (Q2H22L002-A) in fire area 2-035 room 2347 and manually shift transfer relays TR1 (Q2R13SV2213A-A), TR2 (Q2R31MOV8000A-A) placing control back to the main control board to allow the operator to mitigate the letdown.

The licensee, by letter dated March 13, 1985, committed to develop detailed procedures specifically for this fire area covering the manual operator actions required to regain RCS makeup and regain the control of the PORVs and reactor head vent valves. The licensee committed to have these procedures fully implemented by the end of the Unit 2 refueling outage.

All other shutdown systems associated with fire area 2-005 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 if a fire occurred in any of the rooms associated with fire area 2-005, that 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 fire area 2-005 should be granted.

5.0 UNIT 2 AUXILIARY BUILDING, ELECTRICAL PENETRATION ROOMS TRAIN-A - FIRE AREA 2-035 (EXEMPTION REQUEST 2-9)

5.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-9 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G. 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 throughout the area.

5.2 DISCUSSION

Fire area 2-035 consists of rooms 2333 and 2347 at elevation 139 feet - 0 inches. All fire area boundary wall, ceilings, and floors are 3-hour fire rated except for the containment wall. Fire area boundary doors are fire rated.

This fire area contains electrical Train-A equipment, power and control cables associated with the following redundant safe shutdown and equipment:

EQUIPMENT

FUNCTION

Q2E21MOV8106-A	Charging Pumps Miniflow Isolation Valve
Q2E23MOV3764A-A	MDAFW Pump Discharge Valve
Q2E23MOV3764D-A	MDAFW Pump Discharge Valve
Q2E23MOV3764F-A	MDAFW Pump Discharge Valve
Q2E21MOV8131A-A	Charging Pump Suction Header Isol. Valve
Q2E21MOV8133A-A	Charging Pump Discharge Header Isol. Valve
N2B21TE413-P1	RCS Loop-1 Hot Leg Temp. Indication
N2B21TE423-P1	RCS Loop-2 Hot Leg Temp. Indication
N2B21TE433-P1	RCS Loop-3 Hot Leg Temp. Indication
Q2E21MOV8107-A	Charging Pump to RCS Isol. Valve

The licensee's analysis of the potential effects of a fire upon the subject raceways and equipment indicates that the above valves could shift position from their required safe shutdown position and become inoperative, and the plant could lose indication from the instrument loops affected.

In addition, fire area 2-035 contains control cables for the Train-A pressurizer power operated relief and blocking valves Q2B31PCV0445A-A and Q2B13MOV8000A-A, and the reactor head vent valves Q2B13SV2213A-A and Q2B13SV2214A-A. The subject cables are associated with control from both the hot shutdown and main control board. A fire induced failure having multiple hot shorts could cause the reactor inventory to letdown via the PORV and reactor head vent paths.

Fire area 2-035 contains control cables for the Train-A charging pump isolation valve Q2E21MOV8107-A. An analysis of the effects of a fire upon these cables shows that this valve could fail in the closed position and become inoperative. This will disable normal charging of the RCS.

Combustibles in fire area 2-035 primarily consists of cable insulation material and plastic panel parts. The following summarizes the fire loading associated with the rooms bounded by fire area 2-035:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Room 2333 and 2347 Electrical Penetration Room	83,542	Less than 1-1/2 hours

Fire area 2-035 is provided with a smoke detection system which alarms locally and is annunciated in the main control room. The fire hose station in room 2312 (Fire Area 2-004) is available for manual fire brigade fire-fighting operations in fire area 2-035.

The licensee justifies the acceptability of this exemption request on the basis of the existing fire protection features, their proposed modifications, and their alternative shutdown actions associated with this fire area.

5.3 EVALUATION

Valve Q2E21MOV8106-A is required to be maintained open to establish charging pump miniflow. In the event this valve fails closed, miniflow will be discontinued. According to the licensee's analysis, the charging pump can be run safely with miniflow isolated and with a minimum of 24 gal/m of seal injection flow for a period of up to 1 hour.

This will allow the operator time to de-energize MCC-2U and take manual action to open the valve and reestablish miniflow. In addition, the operating charging pump flow can be increased by opening the following valves from the main control room.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q2E21MOV8801B-B	Boron Injection Tank Outlet Isol. Valve
Q2E21MOV8803B-B	Boron Injection Inlet Isol. Valve

The increased flow on charging pump will reduce heating of the pump due to miniflow isolation and allow additional time for a manual action to open the miniflow valve. Letdown path is available through head vent valves Q2B13SV2213B-B and Q2B13SV2214B-B.

Fire induced failures in control cabling could potentially result in closure of motor driven auxiliary feedwater pump discharge valves (Q2N23MOV3764A-A, Q2N23MOV3764D-A, and Q2N23MOV3764F-A). This would limit the ability to provide auxiliary feedwater to a steam generator for cooldown to the turbine

driven auxiliary feedwater pump. In addition, this same fire would cause the loss of the normal ac supply to the turbine driven auxiliary feedwater uninterruptible power supply (UPS) Q2N23L001-AB.

Upon loss of the normal ac supply, the UPS will then be supplied from battery power. The subject battery has a 2-hour capacity and, upon depletion, manual control must be taken to continue cooldown. The following is a listing of those components that will require manual operation:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q2N12HV3235A	Steam to TDAFW from S/G B
Q2N12HV3235B	Steam to TDAFW from S/G C
Q2N12HV3226	TDAFW Steam Admission
Q2N23HV3228A	Feedwater to S/G A
Q2N23HV3228B	Feedwater to S/G B
Q2N23HV3228C	Feedwater to S/G C

The 2 hours provided by battery power is adequate for existing procedures for manual operation to be implemented.

In lieu of manual operation of the turbine driven AFW pump system, the motor driven AFW pump discharge valves could be manually repositioned. This would facilitate use of the motor driven AFW pumps.

For a fire in this area, seal injection flow will be established using either charging pump 2C or charging pump 2B aligned to electrical Train-B power. Valve Q2E21MOV8131A-A (suction header) and valve Q2E21MOV8133A-A (discharge header) are required to be maintained in the open position to supply seal injection water from the RWST through charging pump 2B. 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 inoperative. This will cause the plant to lose seal injection water and seal integrity. These valves cannot be locked open because they are needed for train separation during a LOCA event. The licensee proposes to install disconnect switches outside the electrical penetration room during the next refueling outage.

Potential loss of all three loops of hot leg temperature indicators could result due to fire induced cable failure in this fire area for RTDs N2E21TE413-P1, N2B21TE423-P1, and N2B21TE433-P1.

A review of the core exit thermocouple circuits shows that these cables are outside fire area 2-035 and the plant operator will have core temperature readings available at the in-core rack NGIC2501D-N and plant computer.

In addition to the core exit temperature indication availability, a design change to be installed as a result of R.G. 1.97 will provide cable separation and redundant signal processing and indication for RCS hot leg temperature loop N2R21TE433. Based upon the R.G. 1.97 commitment schedule, implementation of the modification is currently planned for the fourth refueling outage.

Fire induced failure (hot short) of the individual control cables for power operated relief valve Q2R31PCV0445A-A and for reactor head vent valves Q2B1315V2213A-A and Q2B135V2214A-A could result in the valves being energized to open. The PORV block valve could become electrically inoperative 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 breaker on the 125 V-dc switchgear bus 2A (Q2R42B001A-A) for 125 V-dc distribution panels 2A, 2B, and 2C.

Failure of the valve Q2E21MOV8107-A in the closed position will cause loss of normal RCS charging. Charging pump flow to seal injection is available. In case of uncontrolled letdown via head vents or PORVs, a manual action to open the valve Q2E21MOV8107-A will be initiated. In addition, control room action can be taken to open the valves Q2E21MOV8801B-B and Q2E21MOV8803B-B for charging through the Boron Injection Tank.

The licensee, by letter dated March 13, 1985, committed to develop detailed procedures specifically for this fire area covering the manual operator actions to regain charging pump miniflow, establish manual operation of the auxiliary feedwater system, regain control of the pressurizer PORVs, and initiate RCS charging through the boron injection tank. The licensee intends to have these procedures fully implemented by the end of the Unit 2 fourth refueling outage.

All other shutdown systems associated with fire area 2-035 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 if a fire occurred in any of the rooms associated with fire area 2-035, that upon completion of the proposed modifications safe shutdown could be achieved and maintained.

5.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configurations, in conjunction with 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 fire area 2-035 should be granted.

6.0 UNIT 2 AUXILIARY BUILDING VERTICAL CABLE CHASE - FIRE AREA 2-013 (EXEMPTION REQUEST 2-15)

6.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-15 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.6.2., to the extent that it requires one train or redundant safe shutdown cabling to be enclosed by a fire barrier having a one-hour fire rating.

6.2 DISCUSSION

Fire area 2-013 consists of rooms 2227 (elevation 128 feet - 0 inches), 2300 (elevation 141 feet - 0 inches), 2466 (elevation 155 feet - 0 inches) and 2500 (elevation 168 feet - 6 inches). All fire area boundary walls, floors, and ceilings are 3-hour fire rated and fire area boundary doors are fire rated.

Fire area 2-013 contains electrical Train-B power and control cables for the Train-B power distribution system and control cables for the following redundant safe shutdown equipment.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
N2P19M001A-N	Service Air Compressor A
N2P19M001B-N	Service Air Compressor B
N2P19M001C-N	Service Air Compressor C

The licensee's analysis of the potential effects of a fire upon these cables shows that the plant could lose the entire electrical Train-B power distribution system and the total service air system. Due to the loss of the electrical Train-B distribution system and service air, the following redundant safe shutdown components could become inoperable in the closed position.

<u>EQUIPMENT</u>	<u>FUNCTION</u>
N2P19HV3885-B	Instrument Air to Penetrations Room
Q2B13HV2228-B	Backup Air/Nitrogen Supply to PORVs
Q2B31PCV0445A-A	Pressurizer PORV Train-A
Q2B31PCV0444B-B	Pressurizer PORV Train-B
Q2E21HV8145-N	Pressurizer Auxiliary Spray

Combustible materials in fire area 2-013 primarily consists of cable insulation. The following summarizes the fire loading associated with the rooms bounded by fire area 2-013:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>FIRE SEVERITY</u>
Rooms 2227, 2300, 2466, and 2500 Vertical Cable Chase	256,281	Less Than 3-1/2 hours

Ionization smoke detection and automatic water suppression capabilities are provided throughout fire area 2-013. In addition, fire extinguishers and two fire hose stations are located outside room 2300 in fire area 2-042 and are available to the fire brigade for manual fire fighting operations in fire area 2-013.

The licensee justifies the acceptability of the exemption requested in Section 6.1 on the basis of existing fire protection and their alternative shutdown actions associated with fire area 2-013.

6.3 EVALUATION

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 nitrogen 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 N2P19HV3885-B can be manually operated to restore air to the pressurizer PORVs.

By letter dated March 13, 1985, the licensee committed to develop a detailed procedure specifically for fire area 2-013 which will identify the manual operator actions required to regain the control of the pressurizer PORVs.

All other safe shutdown systems associated with fire area 2-013 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 fire area 2-013, safe shutdown could be achieved and maintained.

6.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and safe 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 fire area 2-013 should be granted.

7.0 UNIT 2 AUXILIARY BUILDING, ELECTRICAL PENETRATION ROOM TRAIN-B, AND PENETRATION ROOM FILTRATION SYSTEM EQUIPMENT ROOM - FIRE AREA 2-034 (EXEMPTION REQUEST 2-18)

7.1 EXEMPTION REQUESTED

The licensee, in their exemption request 2-18, 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 in a fire barrier having a one-hour fire rating and the installation of automatic suppression capabilities throughout the fire area.

7.2 DISCUSSION

Fire area 2-034 consists of 2334 and 2317 at elevation 139 feet - 0 inches. The walls, ceilings, and floors forming the area boundary are three-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.

UL Class-A fire-rated doors exist between rooms 2334 and 2333 (area 2-034), 2334 and 2322 (area 2-004), and 2317 and 2322 (area 2-004).

Fire area 2-034 contains electrical Train-B equipment, power and control cables, electrical Train-A control, and control power supply cables associated with the following safe shutdown equipment:

EQUIPMENT

FUNCTION

Q2P16MOV3130B-B	Service Water Inlet to CCW HX-2B
Q2E21MOV8130B-B	Charging Pump Suction Header Isolation Valve
Q2E21MOV8133B-B	Charging Pump Disch. Header Isolation Valve
Q2E21MOV8109A-B	Charging Pump 2A Miniflow Valve
Q2E21MOV8109B-B	Charging Pump 2B (Swing) Miniflow Valve
Q2E21MOV8108-B	Charging Pump to RCS Isol. Valve
Q2P15HV3333-B	RCS Hot Leg Sample Line CTMT Isolation Valve
Q2P15HV3765-A	RCS Hot Leg Sample Line CTMT Isolation Valve

Q2P15HV3103-A	Pressurizer Liquid Sample Line CTMT Isolation Valve
Q2P15HV3332-B	Pressurizer Liquid Sample Line CTMT Isolation Valve
Q2N11PV3371A-A	Main Steam Atmospheric Relief Valve (S.G.-2A)
Q2N11PV3371B-A	Main Steam Atmospheric Relief Valve (S.G.-2B)
Q2N11PV3371C-A	Main Steam Atmospheric Relief Valve (S.G.-2C)

The licensee's analysis of the potential effects of a fire in this area upon the cables and equipment shows that the subject valves could shift position from their required safe shutdown position or become inoperative.

In addition, Fire area 2-034 contains control cables for the Train-B pressurizer power operated relief and blocking valves Q2B31PCV0444B-B and Q2B13MOV8000B-B, and reactor head vent valves Q2B13SV2213B-B and Q2B13SV2214B-B. The subject cables are associated with control from both the hot shutdown and main control board. A fire induced failure having multiple hot shorts could cause the reactor inventory to letdown via the PORV and reactor heat vent paths.

The fire area also contains control cables for the Train-B charging pump isolation valve Q2E21MOV8108-B and regenerative heat exchanger discharge valve Q2E21HV8146-B. An analysis of the effects of a fire upon these cables shows that these valves could fail in the closed position and become inoperable.

The combustible materials associated with fire area 2-034 consists primarily of cable insulation, piping insulation, plastic panel parts and charcoal filter media. The following summarizes the fire loading associated with the rooms located in fire area 2-034:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Room 2234 Electrical Penetration Room Train B	90,995	Less than 1-1/2 hour
Room 2317 Penetration Room, Filtration Equipment Room	24,606	Less than 30 mins.

Smoke detection capabilities are provided throughout rooms 2317 and 2334 in fire area 2-034. In addition, a manual fire hose station is located in rooms 2316 (Fire Area 2-004) and is available for use by the fire brigade in fire Area 2-034.

The licensee justified the acceptability of exemption request 2-18 on the basis of the existing fire protection, their alternative shutdown actions and their proposed modifications associated with fire area 2-034.

7.3 EVALUATION

The effects of a fire in area 2-034 upon the control cables of valve Q2P16MOV3130B-B could fail the valve in the closed position causing a loss of service water to CCW heat exchanger 2B. This condition can impact safe-shutdown only when CCW heat exchanger 2B is aligned and operating as the Train A heat exchanger. Plant procedures will be written to maintain valve Q2P16MOV3130B-B in the open position by racking out the MCC breaker whenever CCW exchanger 2B is aligned and operating as the Train-A heat exchanger.

For a fire in this area, seal injection flow will be established using either charging pump 2A or charging pump 2B aligned to electrical Train-A power. Valve Q2E1MOV8130B-B (suction header) and Q2E21MOV8133B-E (discharge header) are required to be maintained in the open position to supply seal injection water from the RWST through charging pump 2A or 2B. 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 inoperative. These valves cannot be locked open because they are needed for train separation during a LOCA event. The licensee has committed to install disconnect switches outside the electrical penetration room during the next refueling outage.

Valve Q2E21MOV8109A-B or Q2E21MOV8109B-E is required to be maintained in the open position to establish miniflow for charging pump 2A or 2B, 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 inoperative. In the event these valves fail closed, the miniflow will be discontinued. The licensee's analysis indicates that the charging pump can be run safely with miniflow isolated and with a minimum 24 gal/hr of seal injection flow for a period of up to one hour.

This will allow the operator time to de-energize MCC-2V and take manual action to open the miniflow valve corresponding to the operating charging pump. In addition, the operating charging pump flow can be increased by opening the following valves from the main control room:

EQUIPMENT

FUNCTION

Q2E21MOV8801A-A	Boron Injection Tank Outlet Isol. Valve
Q2E21MOV8903A-A	Boron Injection Tank Inlet Isol. Valve

The increased flow on charging pump will reduce heating of the pump due to miniflow isolation and allow additional time for a manual action to open the miniflow valves. Letdown path is available through head vent valves Q2B13SV2213A-A and Q2B13SV2214A-A.

RCS and pressurizer sample line valves Q2P15HV3332-B, HV3333-B, HV3765-A and HV3103-A 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 inoperative. The open position of these valves will allow an RCS sample to flow to the VCT through the sample coolers. This flow is of no immediate significance for safe shutdown. An operator action will be performed to close the manual valves Q2P15V051A and Q2P15V051B to stop the flow of RCS and pressurizer liquid. The valves Q2P15V051A and Q2P15V051B are located in the sample room 2323 outside of fire area 2-034.

Fire area 2-034 contains dc control power supply cable for the main steam atmospheric relief valves Q2N11PV3371A-A, 3371B-A, and 3371C-A. Due to the effect of a fire in this area upon this cable, the subject valves could fail in the closed position and become 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 open 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 could be accessible despite a fire in area 2-034. 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 2-034 would not prevent the operation of at least one redundant atmospheric relief valve.

Fire induced failure (hot short) of the individual control cables for Q2B31PCV0444B-B power operated relief valve and Q2B13SV2213B-B, Q2B13SV2214B-B reactor head vent valves, could result in the valves to be energized to open. The power operated relief blocking valve (MOV) 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 breaker on the 125 V-dc switchgear bus 2B (Q2R42B001B-B) for 125 V-dc distribution panels, 2D, 2E, and 2F.

Failure of the valves Q2E21MOV8108-B and Q2E21HV8146-B in the closed position will cause loss of normal RCS charging. Charging pump flow to seal injection is available. In case of uncontrolled letdown via head vents or PORVs, a control room action can be initiated to open the valves Q2E21MOV8801A-A and Q2E21MOV8803A-A for charging through boron injection tank.

The licensee by letter dated March 13, 1985, committed to develop detailed procedures specifically for this fire area covering manual operator actions to regain charging pump mini-flow, establish reactor coolant pump seal injection, isolation of RCS and pressurizer sample lines, control of a main steam atmospheric relief valve, regain control of pressurizer PORA and reactor head vent valves and initiating RCS charging through the boron injection tank. The licensee intends to have these procedures fully implemented by the end of the Unit 2 refueling outage.

All other shutdown systems associated with fire area 2-034 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 any of the rooms associated with fire area 2-034, that upon completion of the proposed modifications safe shutdown could be achieved and maintained.

7.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configurations, in conjunction with 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 no additional fire protection is required to satisfy Section III.G.3. Therefore, the licensee's request for exemption for Fire area 2-034 should be granted.

8.0 TRAIN-B INSIDE CABLE CHASES. AUXILIARY BUILDING - FIRE AREA 2-009 (EXEMPTION REQUEST 2-19)

UNIT 2 AUXILIARY BUILDING TO DIESEL BUILDING CABLE TUNNEL TRAIN E - FIRE AREA 2-076 (EXEMPTION 2-26)

8.1 EXEMPTIONS REQUESTED

The licensee in their exemption requests 2-19 and 2-26 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.B.2, to the extent that it requires that one train of redundant safe shutdown cabling be enclosed by a fire barrier having a one hour fire rating.

In addition, the licensee in exemption request 2-26 requested an exemption from 10 CFR 50 Appendix R, Section III.G.2, to the extent that it requires the installation of fire detection in fire area 2-076.

8.2 DISCUSSION

Fire area 2-009 consists of rooms 2117, 2198, 2247, 2338, 2246 and 2344 and are separated from all plant areas by three hour fire rated fire barriers constructed from reinforced concrete. All penetrations through fire area 2-009 are sealed with silicone foam or Nelson Fittings.

Airtight UL Class-A doors are located between rooms 2198 and 2185 (area 2-6) and between rooms 2338 and 2335 (area 2-41); an airtight UL Class-A door exists between rooms 2344 and 2343 (area 2-41).

Fire area 2-076 consists of a cable tunnel running from the Unit-2 auxiliary building to the diesel building. The fire area boundary walls, floor, and ceiling are 3-hour fire rated, except for a non-rated bulkhead between this fire area and area 2-030. A UL Class A fire-rated door exists between the cable tunnel and the diesel building and a non-fire-rated watertight door exists between the cable tunnel and the auxiliary building (area 2-030). A fire resistant coating has been applied to the watertight door.

Fire areas 2-009 and 2-076 contain electrical Train-B power and control cable raceways. The analysis of the potential effects of a fire in this area upon cabling shows that the plant could lose the entire electrical Train-B system. Due to loss of the electrical Train-B system, the following redundant safe shutdown valves could become inoperable in the closed position.

EQUIPMENTFUNCTION

N2P19HV3885-B	Instrument Air to Penetration Room
Q2B13HV2228-B	Backup Air/Nitrogen Supply to Pressurizer PORVs
Q2B31PCV0445A-A	Pressurizer PORV, Train-A
Q2B31PCV0444B-B	Pressurizer PORV, Train-B
Q2E21HV8145-N	Pressurizer Auxiliary Spray
N2P19HV3825-A	Instrument Air to Penetration Room

Fire area 2-009 contains control cables for the Train-B pressurizer power operated relief and blocking valves Q2B31PCV0444B-B and Q2B13MOV8000B-B, and the reactor head vent valves Q2B13SV2213B-B and Q2B13SV2214B-B. The subject cables are associated with control from both the hot shutdown and main control board. A fire induced failure having multiple hot shorts could cause the reactor inventory to letdown via the PORV and reactor head vent paths.

In addition, a fire in fire area 2-009 could affect auxiliary feedwater isolation valves Q2N23MOV3764B, Q2N23MOV3764C and Q23MOV3764E which are redundant to one another in that they isolate flow in redundant auxiliary feedwater supply lines. Control cables associated with these valves are routed through fire area 2-009 the licensee's analysis of the potential fire effects on these cables indicates that spurious operation of the auxiliary feedwater isolation valves could occur.

Fire area 2-009 also contains a control cable for the CCW heat exchanger 2B service water discharge valve (Q2P16SV3009-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 2B is aligned and operating as the Train-A heat exchanger.

The combustibles associated with fire areas 2-009 and 2-076 consist primarily of cable insulation. The following summarizes the fire loading associated with the rooms located in these fire areas:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Rooms 2117, 2198, 2247, 2338 Cable Chase (Fire Area 2-009)	2,921,199	Less than 9 hours
Rooms 2246, 2344 Cable Chase (Fire Area 2-009)	180,180	Less than 2-1/2 hours
Cable Tunnel Train-B (Fire Area 2-076)	39,000	Less than 30 minutes

A smoke detection system and automatic water suppression system are provided throughout fire area 2-009. In addition, water hoses and portable extinguishers located in rooms 2185 (area 2-6) and 2319 (area 2-42) are available for use in the area.

Fire area 2-076 is protected by an automatic sprinkler system.

The licensee justifies the acceptability of the exemption requests identified in Section 8.1 on the basis of the existing fire protection configuration, their alternative shutdown actions and their proposed fire protection modification associated with fire area 2-009.

8.3 EVALUATION

Fire failures, caused by a fire in either Fire Area 2-009 or 2-076, will cause valve Q2E21HV8145-N to fail in the closed position and will disable the pressurizer auxiliary spray system which provides one method to achieve depressurization of the RCS. Pressurizer PORVs Q2B31PCV0445A-A and Q2B31PCV0444B-B provide another means of achieving RCS depressurization. Valves N2P19HV3885-B, N2P19HV3825-A and Q2D13HV2228-B will fail in the closed position as a result of fire damage. This will isolate the instrument air supply to the pressurizer PORVs Q2B31PCV0445A-A and Q2B31PCV0444B-B. PORV Q2B31PCV0444B-B will also be inoperable due to loss of the Train-B dc power supply. However, the Train-A dc supply to PORV Q2B31PCV0445A-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 hand wheel operation of valves N2P19HV3885-B and N2P19HV3825-A which are located outside of Fire Areas 2-009 and 2-076.

Once air is restored, PORV Q2B31PCV0445A-A will be operable to achieve RCS depressurization.

Fire induced failure (hot shorts) caused by a fire in Fire Area 2-009 in the individual control cables for Q2B31PCV0444B-B power operated relief valve, and Q2B13SV2213B-B and Q2B13SV2214B-B reactor head vent valves could cause the valves to be energized to open. The PORV block valve could become electrically inoperative 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 a breaker on the 125 V-dc switchgear bus 2B (Q2R42B001B-B) for 125 V-dc distribution panels 2D, 2E, and 2F.

In Fire Area 2-009, the licensee has committed to protect the control cable associated with at least one of the auxiliary feedwater isolation valves with an equivalent one-hour fire barrier consisting of two one-inch layers of kaowool blanked with an overall layer of Zetex fabric. This modification should ensure that auxiliary feedwater will be available if a fire were to occur in Fire Area 2-009.

In addition, to preclude spurious valve movement cause by a fire in Fire Area 2-009, valve Q2P16SV3009-B will be de-energized to ensure it remains in the open position whenever CCW heat exchanger 2B is aligned and operating as the Train A heat exchanger.

Therefore, by letter dated March 13, 1985, the licensee committed to protect one train of control cabling associated with the auxiliary feedwater isolation valves with a equivalent one-hour fire barrier in fire area 2-009, develop detailed procedures specifically for these fire areas with regard to regaining the control of a pressurizer PORV and isolating the Train B pressurizer PORV, reactor head vent and pressurizer block valves from a hot shot spurious signal. The licensee intends to have the raceway fire barrier installed and the procedures necessary to satisfy the fire effects associated with fire areas 2-009 and 2-076 fully implemented by the end of the Unit 2 fourth refueling outage,

The watertight door and bulkhead between auxiliary building (area 2-030) and cable tunnel (area 2-076) does not comply with 3-hour fire-rated boundary requirements. However, a fire in area 2-076 propagating into the area 2-030 will not have any additional impact on Unit 2 safe shutdown because the same redundant safe shutdown function cables are contained in both areas. In addition, the fire resistant coatings on the subject door will be placed under the licensee's fire protection surveillance program.

All other safe shutdown systems associated with fire areas 2-009 or 2-076 have redundant counterparts in other fire areas or are located in other 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 fire area 2-009, upon completion of the proposed modifications or in fire area 2-076, 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 configurations, in conjunction with 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 fire areas 2-009 and 2-076 should be granted.

9.0 UNIT 2 AUXILIARY BUILDING CABLE CHASE TRAIN-A - FIRE AREA 2-031 (EXEMPTION REQUEST 2-21)

9.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-21 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 cabling to be enclosed in a fire barrier having a one-hour fire rating.

9.2 DISCUSSION

Fire area 2-031 consist of rooms 2250 (elevation 121 feet - 0 inches and 139 feet - 0 inches) and 2251 (elevation 127 feet - 0 inches). All area boundary walls, floors, and ceilings are 3-hour fire-rated except for a non-rated bulkhead between this fire area and the cable tunnel (area 2-075). A non-fire-rated watertight door exists between room 2251 and cable tunnel (area 2-075), and a UL Class A fire-rated door exists between rooms 2250 and 2235 (area 2-023). A fire-resistant coating has been applied to the watertight door on fire area 2-076 side.

A fire in area 2-031 could potentially result in fire damage to the electrical circuitry of both Unit 1 and Unit 2 Train-A diesel generators. This condition along with an assumed loss of offsite power for Unit 2 could result in following safe shutdown equipment and instrumentation being affected:

EQUIPMENT

FUNCTION

Q2N11PV3371A-A	Main Steam Atmospheric Relief Valve (S.G.-2A)
Q2N11PV3371B-A	Main Steam Atmospheric Relief Valve (S.G.-2B)
Q2N11PV3371C-A	Main Steam Atmospheric Relief Valve (S.G.-2C)

The analysis of the potential effects of loss of power for the main steam atmospheric relief valves has shown that the valves could become inoperable in the closed position.

INSTRUMENTATION

FUNCTION

N2B21TE413 (Loop 1)	RCS Hot Leg Temperature, Indication
N2B21TE423 (Loop 2)	RCS Hot Leg Temperature, Indication
N2B21TE433 (Loop 3)	RCS Hot Leg Temperature, Indication
Q2C55NE0048A-A	Post-Accident Neutron Flux Monitor
N2C55NE0031-P1	Source Range Neutron Flux Monitor
N2C55NE0032-P2	Source Range Neutron Flux Monitor

The licensee's analysis of the potential effects caused by loss of power to the instrumentation listed above has shown that a loss of power to the instrument loops could result.

The combustible materials primarily associated with fire area 2-031 consists of cable insulation. The following summarizes the fire loading associated with the rooms located within fire area 2-031:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Rooms 2250 and 2251 Cable Chase Train-A	794,491	Less than nine hours

Fire area 2-031 is protected by an automatic fire/smoke detection system and an automatic sprinkler system. In addition, the fire hose station located in room 2234 (Fire area 2-020) is available for fire brigade fire fighting operations in this area.

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 modifications associated with fire area 2-031.

9.3 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 2-031. 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 2-031 would not prevent the operation of at least one redundant atmospheric relief valve.

Each of the RCS loop hot leg temperature instrumentation loops is powered from channelized inverter 2A. Inverter 2A is powered from 600 V-ac MCC 2A or 125 V-dc bus 2A. A fire in area 2-031 could result in loss of the 600 V-ac power supply to inverter 2A; however, inverter 2A will continue to operate from 125 V-dc bus 2A and will supply power to 120 V-ac distribution panel 2J for a minimum of two hours. If after 2 hours power is lost, RCS hot leg temperature is available from the core exit temperature indication in the main control room from the core exit thermocouples. Core exit temperature indication will not be affected by a fire in area 2-031. In addition to the alternate dc power supply and core exit temperature indication availability, a design change will be installed as a result of R.G. 1.97 to provide a redundant power supply and to provide cable separation and redundant signal processing and indication between RCS hot leg temperature loops N2B1TE413, N2B21TE423, and N2B21TE433. Based upon the R.G. 1.97 commitment schedule, implementation of the modification is currently planned for the fourth refueling outage. After plant implementation of this modification, a fire in area 2-031 will not affect the ability to monitor one loop of RCS hot leg temperature.

Post-accident neutron flux monitor Q2C55NE0048A-A is powered from inverter 2F. Source range neutron flux monitors N2C55NE0031-P1 and N2C55NE0032-P2 are powered from channelized inverters 2A and 2B. Inverters 2A, 2B, and 2F are all powered from 600 V-ac MCC 2A or 125 V-dc bus 2A. Therefore, neutron flux monitoring following potential fire damage in area 2-031 and the resultant loss of 600 V-ac MCC 2A 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 and RHR Hx No. 1 and No. 2 sample valves Q2P15HV3105-B and Q2P15HV3106-B for determination of the boron concentration and shutdown margin following a fire area 2-031.

The licensee, by letter dated March 13, 1985, committed to develop detailed procedures specifically for fire area 2-031 which identify the manual operator actions required to regain control of one main stream atmospheric relief valve and those actions necessary to monitor boron concentration utilizing the RCS sampling system. The licensee intends to have these procedures fully implemented by the end of the Unit 2 fourth refueling outage.

All other shutdown systems associated with fire area 2-031 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 fire area 2-031, upon completion of the proposed modifications, safe shutdown could be achieved and maintained.

9.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and safe shutdown configurations, in conjunction with 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 fire area 2-031 should be granted.

10.0 UNIT 2 AUXILIARY BUILDING, ELEVATION 100 FEET - 0 INCHES, 121 FEET - 0 INCHES, 127 FEET - 0 INCHES, 139 FEET - 0 INCHES, 155 FEET - 0 INCHES, AND 175 FEET - 0 INCHES - FIRE AREA 2-006 (EXEMPTION REQUEST 2-35)

10.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-35 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 cable and equipment to be enclosed by a barrier having a one-hour fire rating and the installation of automatic fire suppression systems throughout the fire.

10.2 DISCUSSION

Fire area 2-006 consists of the following rooms:

Elevation 100 Feet - 0 Inches

Room 2167	Combustible Storage Room
Room 2185	Component Cooling Water Heat Exchanger Room
Room 2189	Plant Heating Equipment Room
Room 2190	Motor Control Center 2E Room
Room 2191	Auxiliary Feedwater Pump Room (Train-A)
Room 2192	Auxiliary Feedwater Pump Room (Train-B)
Room 2193	Auxiliary Feedwater Pump Room (Turbine Driven)
Room 2194	Lower Equipment Room
Room 2195	Access Hatch Area

Elevation 127 Feet - 0 Inches

Room 2236	Duct Chase
Room 2241	Main Steam and Feedwater Valve Room
Room 2242	Pipe Chase
Room 2243	Pipe Chase

The floors, walls, and ceilings of fire area 2-006 that form the boundary between area 2-006 and adjacent fire areas are reinforced concrete and rated for three hours with the exception of a hatchway with a steel plate cover between room 2185 (area 2-006) and room 2234 (area 2-020), and a steel bolted access plate in the duct chase room 2236 (area 2-006) and room 2346 (area 2-041) on elevation 139'-0". 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 Class G rated with two exceptions. There are non-rated doors between stairway No. 1 and room 2190 and between stairway No. 1 and room 2241. These doors are watertight and pressure tight respectively.

The auxiliary feedwater system cables and equipment complies with 10 CFR 50 Appendix R, Section III.G.2.c throughout fire area 2-006 with the exception of the pump rooms. The Train-A, Train-B, and turbine driven auxiliary feedwater pumps are located in rooms 2192, 2191, and 2193 respectively. Cabling and equipment within the pump rooms are not protected by fire barriers, automatic suppression is not provided, and all three pump rooms are located in the same fire 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 2-006 with the exception of the component cooling water heat exchanger room (2185). This room contains all three component cooling water (CCW) pumps. The CCW pumps are located on 21 feet centers and fire barriers are provided for the pump control and power cables. However, there are small quantities of intervening combustibles consisting primarily of cable insulation between the pumps which 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 feet 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. Automatic fire suppression is provided over the CCW pumps, CCW valves, and the other protected cables in room 2185. However, automatic fire suppression coverage is not provided for the complete room.

Cables for the redundant main steam isolation valves traverse rooms 2185, 2189, 2190, and 2194 on elevation 100 feet - 0 inches are unprotected by fire barriers and in close proximity to one another. In the main steam and feedwater valve room (2241) on elevation 127 feet - 0 inches, the redundant main steam isolation valves are back-to-back in each of the three main steam lines and the associated valves control cables are separated by less than 20 feet. An automatic fire detection system is provided in room 2241, but fire barriers are not provided over the redundant main steam isolation valves and related control cabling, and an automatic fire suppression system is not provided.

Control cables for the redundant main steam atmospheric relief valves (MSARV) traverse rooms 2185, 2189, 2190, and 2194 on elevation 100 feet - 0 inches. These cables are separated by less than 20 feet in the rooms mentioned above. One train of the redundant MSARV control cables is not protected by a fire barrier on elevation 100 feet - 0 inches. The local control station and related control cabling for all three MSARVs are located together in room 2189. Fire barriers are not provided to protect the local control stations or control cabling. On elevation 127 feet - 0 inches, the three valves and their control cabling are located in one room (2241). Adjacent valves are within 20 feet of one another. Fire barriers are not provided to protect the valves or control cabling and fire suppression is not provided in room 2241.

The combustibles in fire area 2-006 primarily consists of cable insulation and pump lube oil. The following summarizes the fire loading associated with the rooms in fire area 2-006:

<u>ROOM NUMBERS/ TITLES</u>	<u>FIRE LOAD (BTU/FT²)</u>	<u>MAXIMUM FIRE SEVERITY</u>
Room 2167 Combustible Storage Room	5,323	Less than 30 mins.
Room 2185 Component Cooling Water Heat Exchanger Room	34,775	Less than 30 mins.
Room 2191 Auxiliary Feedwater Pump Room	20,107	Less than 30 mins.
Room 2192 Auxiliary Feedwater Pump Room	26,411	Less than 30 mins.
Room 2189 Plant Heating Equipment Room, Room 2190 Control Center 2E Room, Room 2194 Equipment Room, Room 2193 Auxiliary Feedwater Pump Room, and Room 2195 Access Hatch Room	27,634	Less than 30 mins.

Room 2236 Duct Chase	0	0
Room 2241 Main Steam and Feedwater Valve Room	3,869	Less than 30 mins.
Room 2242 Pipe Chase	1,287	Less than 30 mins.
Room 2243 Pipe Chase	1,670	Less than 30 mins.

A detection system covers the entire area except for rooms 2195, 2236, 2242, and 2243. Room 2167 has a wet-pipe sprinkler system which activates a local fire alarm bell trouble horn, and annunciates in the control room. Automatic water suppression systems are provided for rooms 2189, 2190, 2194, and a portion of room 2185. The suppression system in room 2185 will be modified to provide direct, unobstructed coverage to the CCW pumps.

Heat detectors are provided in the 5-kV disconnect switch in room 2185 which alarm both locally and in the control room. The 5-kV disconnect switch cabinets are provided with a total-flooding carbon dioxide system which is activated by the heat detectors. Two water hose stations, located in rooms 2185 and 2189, are provided. A portable extinguisher is located in room 2185 outside of room 2167. A hose station in room 2234 (area 2-20) will be available for use in this area. Automatic water suppression systems are provided for rooms 2185, 2189, 2190, and 2194 to protect electrical cable from exposure fires.

The licensee justifies the acceptability of this exemption on the basis of the existing fire protection, their alternative shutdown actions, and their proposed fire protection modifications associated with fire area 2-006.

10.3 EVALUATION

An analysis was performed by the licensee which demonstrated that a fire limited to one of the auxiliary feedwater (AFW) pump rooms would not defeat the auxiliary feedwater system. A fire in any one of the pump rooms would impact the AFW system only to the extent that one AFW pump and AFW flow to one steam generator could be disabled.

The AFW pump rooms are highly segregated watertight rooms with 2-feet 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 rain into the sump servicing the room. The combustible loading of any one pump room is estimated to be less than 30,000 Btu/ft² 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 carbon dioxide 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 systems, and the availability of equipment for use by the fire brigade substantiates the contention 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. Credit has been taken for the separation afforded by the subject pump room boundaries. To ensure that the as-built configuration is maintained, the sealed penetrations will be placed in the licensee's fire barrier surveillance program.

A smoke detection system is installed throughout the area. An automatic sprinkler system is installed over the CCW pumps and in areas where cables are concentrated. The sprinkler system will be modified in order to provide direct unobstructed impingement on the CCW pumps. The combustible loading in the room is less than 35,000 Btu/ft² 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-foot 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 carbon dioxide system which is activated by the heat detectors.

The CCW pump cables are wrapped with two 1-inch layers of Kaowool with the exception of the Train-A cables for the swing CCW pump which are wrapped with a single 1-inch 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 the 1-inch 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 feet. Intervening combustibles between redundant valves are minimal, consisting primarily of cable insulation.

The licensee's fire hazards analysis has shown that a postulated fire in rooms 2185, 2189, 2190, 2194, or 2241 would potentially result in spurious operation of the main steam isolation valves. 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 effected by a fire in area 2-006.

The main steam atmospheric relief valves (MSARV) are located in the main steam and feedwater valve room (2241) on elevation 127 feet - 0 inches. The backup air compressors and local control station for the atmospheric relief valves are located in the plant heating equipment room (2189) on elevation 100 feet - 0 inches. 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 throughout both rooms. An automatic sprinkler system covers the plant heating equipment room. The main steam and feedwater valve room does not have sprinkler coverage because of the high temperature piping in the room.

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-feet in height. One main steam line lies in each bay. The main steam lines and their atmospheric relief valves are on 18-foot centers and separation of the valves control cabling of redundant MSARVs is maximized between the bays. 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 elevation 127 feet - 0 inches 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 in rooms 2185, 2189, 2190, and 2194 on elevation 100 feet - 0 inches, the atmospheric relief valves located in room 2241 on elevation 127 feet - 0 inches are provided with hand wheels such that the valves may be manually operated or closed without electrical controls or air supplies. Due to the degree of separation provided between MSARVs and related control cabling in room 2241, the minimal combustible loading, the presence of an early warning smoke detection system, and the administrative controls imposed at the plant to limit access to room 2241 during plant operations, a credible fire in room 2241 would not result in the inability to operate the MSARV associated with one steam generator.

By letter dated March 13, and October 18, 1985, the licensee committed to implement the proposed fire protection sprinkler modifications in the CCF pump room, incorporate the penetration seals associated with the AFW pump rooms into the fire barrier penetration seal surveillance program and develop a procedure to regain the control of the MSARVs by the end of the Unit 2 fourth refueling outage.

Pipe chases (rooms 2242 and 2243), duct chase (room 2236), and the access hatch area (room 2195) are not provided with automatic fire detection and fire suppression systems in fire area 2-006. A non-fire-rated and checkered steel plate is located at elevation 155 feet - 0 inches at the outside exit of room 2195. Rooms 2242, 2243, 2236, and 2195 do not contain any safe shutdown equipment or cabling, and therefore a postulated fire in these rooms will not result in the inability to achieve safe shutdown.

All other shutdown systems associated with fire area 2-006 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 in fire area 2-006 safe shutdown could be achieved and maintained.

10.4 CONCLUSION

Based on our evaluation, we conclude the licensee's alternative fire protection and shutdown configuration, in conjunction with their proposed fire protection modification in the CCW pump room, 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 rooms associated with fire area 2-006 should be granted.

11.0 UNIT 2 AUXILIARY BUILDING, ELEVATION 83 FEET - 0 INCHES, 100 FEET - 0 INCHES, AND 121 FEET - 0 INCHES - FIRE AREA 2-001 (EXEMPTION REQUEST 2-36)

11.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-36 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 to the extent it requires one train of redundant safe shutdown cable to be enclosed by a barrier having a one-hour fire rating and automatic fire suppression.

11.2 DISCUSSION

Fire area 2-001 consists of the following rooms:

Elevation 83 Feet 0 Inches

Room 2101	Waste Decay Tank Room
Room 2102	Valve Compartment Room
Room 2103	Corridor
Room 2104	Passageway to Unit 1
Room 2105	Catalytic Hydrogen Recombiner A Room
Room 2106	Catalytic Hydrogen Recombiner B Room
Room 2108	Waste Monitor Tank Room
Room 2109	Waste Monitor Tank Pump Room

Room 2110	Monitor Control Panel Elevation Room
Room 2111	Containment Spray Pump Room A
Room 2112	Access to Tendon Access Gallery
Room 2113	Valve Encapsulation
Room 2114	Pipe Chase
Room 2115	Hallway
Room 2118	Floor Drain Tank Room
Room 2119	Waste Holdup Tank Room
Room 2120	Corridor
Room 2121	Floor Drain Tank Pump Room
Room 2122	Waste Evaporator Feed Pump Room
Room 2123	Pipe Chase
Room 2124	Valve Encapsulation
Room 2125	Containment Spray Pump Room B
Room 2126	Pipe Chase
Room 2127	Pipe Chase
Room 2128	RHR heat Exchanger Room
Room 2129	RHR Low head Pump Room B
Room 2130	Pipe Chase
Room 2131	RHR Low Head Pump Room A

Elevation 100 Feet. - 0 Inches

Room 2183	Tendon Access Gallery Entrance
Room 2184	Piping Penetration Room
Room 2169	Pipe and Duct Chase
Room 2196	Tendon Access Gallery

Elevation 121 Feet - 0 Inches

Room 2223	Piping Penetration Room
-----------	-------------------------

All of the fire area boundary walls, floors, and ceilings are rated as 3-hour fire barriers except for a non-rated steel hatch cover between the ceiling of room 2103 and the floor of room 2163 (area 2-4). All electrical and piping penetrations sealed for a three-hour rating. All doors in the boundary walls are UL Class A or Class B rated.

A fire induced failure in the control cable for instrument air isolation valve Q2P19HV3611 in fire area 2-001 may cause the valve to fail closed. A loss of instrument air causes the normal charging line isolation valve Q2E21HV8146 and the alternate charging line isolation valve Q2E21HV8147 to fail open. It may be necessary to close these valves during the course of shutdown to isolate charging flow.

A fire induced failure in the control cable for the pressurizer PORV backup air/nitrogen supply valve Q2B13HV2228-B and N2P19HV3825-A may cause the valve to fail closed. If instrument air isolation valve Q2P19HV3611 or N2P19HV3825-A and the pressurizer PORV backup air/nitrogen supply valve

Q2B13HV2228-B 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.

In addition, control cables associated with the three redundant atmospheric relief valves are routed through fire area 2-001. An analysis of potential effects of a fire upon these cables has shown that the subject valve could become inoperable in the closed position.

Power and control cables associated with charging pump miniflow isolation valve MOV8106-A are also routed through fire area 2-001. An analysis of the potential effects of a fire upon these cables has shown that MOV8106-A could close and isolate the charging pump miniflow line.

Control cables for the Train A pressurizer power operated relief and blocking valves Q2B31PCV0445A-A and Q2B13MOV8000A-A, and the reactor head vent valves Q2B13SV2213A-A and Q2B13SV2214A-A are located in fire area 2-001. The subject cables are associated with the control function from the hot shutdown panel Q2H21NBAFP2605G-A. In addition, control cables which shift control from the main control board to the hot shutdown panel via the transfer relay cabinet Q2H22L002-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.

The combustible materials associated with the rooms in fire area 2-001 primarily consist of cable insulation, lube oil, plastic panel parts and charcoal filter media. Based on the licensee's fire loading calculations, it was determined that the maximum fire severity expected if a fire were to occur in any of the rooms in fire area 2-001 would be less than 30 minutes.

A detection system covers the majority of the area. Exceptions to this coverage are rooms 2112, 2114, 2115, 2123, 2126, 2127, 2130, 2169, and 2196. The western half of the piping penetration room on elevation 121 feet - 0 inches is the only part of fire area 2-001 covered by automatic suppression.

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

The licensee justifies this exemption on the basis of the existing fire protection features and their alternative shutdown actions associated with fire area 2-001.

11.3 EVALUATION

Instrument air isolation valves Q2P19HV3611 and N2P19HV3825-A are equipped with a handwheel to facilitate manual operation. In the event the valve fails closed an operator can manually open them. This action will restore instrument air to the charging line isolation valves and the pressurizer PORVs. Consequently action would not have to be taken on the pressurizer PORV backup air/nitrogen supply valve Q2B13HV2228-B.

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 2-001. 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 2-001 would not prevent the operation of at least one redundant atmospheric relief valve.

Valve Q2E21MOV8106-A is required to be maintained open to establish charging pump miniflow. In the event this valve fails closed, miniflow will be discontinued. The charging pump can be run safely with miniflow isolated and with a minimum of 24 gpm of seal injection flow for a period of up to one hour. This will allow the operator time to take manual action to open the valve and re-establish miniflow. In the interim, normal charging flow can be established. The increased flow through the operating charging pump will reduce heating of the pump and allow additional time for a manual action to open the miniflow valve.

Fire induced failures (hot shorts) to the control cables for the transfer relay cabinet Q2H22L002-A could cause control for the power operated relief and blocking valves and the reaction head vent valves, to shift from their normal main control board alignment to the remote hot shutdown panel. Subsequent fire induced failures (hot shorts for adjacent control cables in the shared raceway) of the control cables for Q2B31PCV0445A-A, power operated relief valve, Q2B13SV2213A-A, and 2B13SV2214A-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 shots occurring, this condition can be mitigated by removing power from the transfer relay and manual operation (handle) of the effected relay, thereby shifting control to the main control board. To remove power from the transfer relay open breaker 9 on dc distribution panel 2C (Q2R41L001C-A), located in room 2312, fire area 2-004. Then go to transfer relay cabinet TRC-1 (Q2H22L002-A) in Fire area 2-035 room 2347 and manually shift transfer relays TR1 (Q2B13SV2213A-A), TR2 (Q2B13SV2214A-A), TR3 (Q2B31PCV0445A-A) and TR5 (Q2B31MOV8000A-A) placing control back to the main control board to allow the operator to mitigate the letdown.

By letter dated March 13, 1985, the licensee committed to develop detailed procedures to regain control of the instrument air system, one of the three mainstream atmospheric relief valves, charging pump miniflow and the pressurizer PORVs and block valves and have them fully implemented by the end of the Unit 2 fourth refueling outage.

The rooms in fire area 2-001 without detection (2112, 2114, 2115, 2123, 2126, 2127, 2130, 2169, and 2196) contain little or no combustible material and contain no safe shutdown cable or equipment. The western half of the piping penetration room on elevation 121 feet - 0 inches is the only part of the fire area 2-001 covered by an automatic suppression system. This is the only part of the fire area 2-001 that has cables or equipment that are associated with redundant hot shutdown systems. One train of redundant cables are provided with fire barriers consisting of two 1-inch. layers of Kaowool blanket with overall layer of Zetex cloth with this area.

All other shutdown systems associated with fire area 2-001 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 fire area 2-001 safe shutdown could be achieved and maintained.

11.4 CONCLUSION

Based on our evaluation, we conclude 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 the rooms associated with fire area 2-001 should be granted.

12.0 UNIT 2 AUXILIARY BUILDING, ELEVATION 100 FEET - 0 INCHES 121 FEET - 0 INCHES, 130 FEET - 0 INCHES, 139 FEET - 0 INCHES, 155 FEET, - 0 INCHES, AND 184 FEET - 0 INCHES - FIRE AREA 2-004 (EXEMPTION REQUEST 2-37)

12.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-37 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 barrier having a 1-hour fire rating, the installation of automatic fire suppression systems and smoke detection system installed throughout the fire area.

12.2 DISCUSSION

Fire area 2-004 consist of the following rooms:

Elevation 100 Feet. - 0 Inches

Room 2151	Waste Gas Decay Tank Rooms
Room 2152	Valve Compartment Room
Room 2153	Waste Gas Compressor Room
Room 2154	Waste Evaporator Steam Generator Room
Room 2155	Passageway to Unit 1

Room 2156	Holdup Tank Room
Room 2157	Holdup Tank Room
Room 2158	Holdup Tank Room
Room 2159	Recycle Evaporator Feed Pump Room
Room 2160	Hatch Area
Room 2161	Corridor
Room 2162	Hallway
Room 2163	WDS Control Panel Room
Room 2164	Storage Room
Room 2165	Waste Gas Decay Tank Room
Room 2166	Waste Gas Decay Tank Room
Room 2168	Chemical and Laundry Drain Tank Room
Room 2170	Letdown Heat Exchanger Room
Room 2175	Hallway
Room 2176	Secondary Spent Resin Storage Tank Room
Room 2177	Pump Room
Room 2178	Filter Room
Room 2179	Valve Room/Combustible Storage
Room 2180	Recycle Evaporator Steam Generator Room
Room 2186	Boric Acid Area
Room 2187	Hydro Test Pump Room
Room 2188	Boric Acid Tank Area

Elevation 121 Feet - 0 Inches

Room 2203	Waste Condenser Tanks and Pump Room
Room 2204	Waste Evaporator Package Room
Room 2205	Passage to Unit 1
Room 2206	Heat Exchanger Room
Room 2207	Hatch Area
Room 2208	Corridor
Room 2209	Hallway
Room 2215	Duct and Pipe Chase
Room 2216	Valve Compartment Area
Room 2217	Volume Control Tank Room
Room 2218	Chiller Unit Room
Room 2219	Pipe Chase
Room 2220	Valve Compartment Room
Room 2221	Primary Spent Resin Storage Tank Room
Room 2222	Corridor
Room 2230	Recycle Evaporator Package Room
Room 2231	Spent Resin Pump Room
Room 2232	Spent Resin Filter Room
Room 2237	Corridor
Room 2238	Cask Storage Area
Room 2239	Transfer Canal
Room 2240	Spent Fuel Pool Room
Room 2253	Valve Compartment

Elevation 130 Feet - 0 Inches

Room 2601	Drumming Area
Room 2602	Passageway
Room 2603	Drum Storage Area
Room 2604	Passage
Room 2605	Blowdown Pumps and Surge Tank Room
Room 2606	Filter Room
Room 2607	Filter Room
Room 2608	Blowdown Heat Exchanger Room
Room 2609	Storage Room
Room 2610	Valve Compartment Room

Elevation 139 Feet - 0 Inches

Room 2301	Seal Water Filter Room
Room 2302	Recycle Evaporator Feed Filter Room
Room 2303	Reactor Coolant Filter Room
Room 2304	Waste Monitor Tank Filter Room
Room 2305	Seal Injection Filter Room
Room 2306	Recycle Evaporator Feed Demineralizer Room
Room 2307	Valve Compartment Room
Room 2308	Waste Condensate and Monitor Tank Demineralizer Room
Room 2309	Hatch Area
Room 2310	Valve Compartment Room
Room 2311	Recycle Evaporator Concentrates Filter Room
Room 2312	Corridor
Room 2313	Floor Drain and Laundry Tank Filter Room
Room 2314	Waste Evaporate Feed Filter Room
Room 2315	Recycle Waste Condenser Filter Room
Room 2316	Passage to Unit 1
Room 2321	Sample Panel Room
Room 2322	Hallway
Room 2323	Sample Room
Room 2324	High Activity Radioactive Lab
Room 2325	Counting Room
Room 2326	Gas Analyzer Room
Room 2327	Valve Access Area
Room 2328	BTR Demineralizer Room
Room 2329	Pipe Tunnel
Room 2330	Chiller Surge Tank Pump Room
Room 2331	Valve Access Area
Room 2332	MCC. 2A Area
Room 2340	Demineralizer Compartment
Room 2341	Pipe Chase
Room 2342	Spend Fuel Pool Pump Room
Room 2447	Cask Wash Storage Area/Combustible Storage
Room 2348	Case Wash Area

Elevation 155 Feet - 0 Inches

Room 2402	Passage to Unit 1
Room 2403	New Resin Storage
Room 2404	Filter Hatches Room/Combustible Storage
Room 2405	Hatch Room
Room 2408	Hallway
Room 2409	Hallway
Room 2410A	600-V Load Center (Station Service Transformer Room)
Room 2410B	Clean Storage Room
Room 2418	Auxiliary Building and Containment Purge Vent Equipment Room
Room 2419	Demineralizer Hatch Area
Room 2422	Corridor
Room 2423	Valve Compartment
Room 2424	Demineralizer Compartment
Room 2425	Demineralizer Compartment
Room 2426	Demineralizer Compartment
Room 2427	Demineralizer Compartment
Room 2429	Containment Purge Air Equipment Room
Room 2445	Spent Fuel Pool Heat Exchanger Room
Room 2446	Hallway
Room 2448	SFPC Pump Room
Room 2449	Demineralizer Room
Room 2450	Valve Compartment
Room 2451	Filter Room
Room 2467	SFP Heat Exchanger Room
Room 2478	Motor Control Center Room

Elevation 148 Feet - 0 Inches

Room 2504	Stair No. 6
Room 2505	Spent Fuel Pool Vent Equipment Room
Room 2506	Component Cooling Water Surge Tank 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. Self-expanding cork is installed in portions of the area boundary along the containment wall. A steel bolted access plate is installed in the duct chase room 2215 (area 2-004) and room 2317 (area 2-034) on elevation 139'-0". 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 2-004 which bound other fire areas are rated for three-hour. All internal floors of fire area 2-004 are reinforced concrete, and exposed structural steel has been protected by fire proofing. To ensure that the as-built configuration is maintained, those sealed penetrations for which credit has been taken will be placed in the licensee's fire barrier surveillance program.

Fire area 2-004 contains redundant safety-related MCCs (2A) Q2R17B001A-A, (2B) Q2R17B001B-B, (2CC) Q2R17B098-A and (2DD) Q2R17B099-B which power for various Train-A and Train-B safe shutdown components. Power supply cabling and subject motor control centers are not protected by fire barriers, full coverage automatic suppression is not provided.

In addition, this fire area contains redundant safety related DC distribution panels (2C) Q2R41L001C-A and (2F) Q2R41L001F-B.

Train-A and Train-B cabling for redundant condensate water storage tank level indication Q2P11LT515-A and Q2P11LT516-B are routed through this fire area. The cabling for the subject safe-shutdown components are not protected by fire barriers and full area automatic suppression coverage.

Fire area 2-004 contains redundant instrument air system dc power and control cabling which serve N2P19SV 3825-A (instrument penetration room isolation valve), Q2P19SV3611-A (instrument air containment isolation valve) Train-A and Q2B13SV2228-B (power relief valve backup air supply) Train-B. The dc power and control cabling for the subject safe shutdown components are not protected by barriers, and full coverage automatic suppression is not provided.

Redundant power and control cables of both motor driven auxiliary feedwater pump (AFW) room coolers, associated feedwater valves, the turbine driven AFW pump, associated steam admission valves and associated feedwater valves are routed through this area. The subject power and control cabling is not protected by fire barriers, and full coverage automatic fixed suppression is not provided.

In addition, Fire Area 2-004 contains redundant power and control cabling of battery charging room coolers Q2E16M006A-A and Q2E16M006B-B (Trains-A and -B, respectively), and battery room exhaust fans and exhaust dampers Q2V47C012A-A, Q2V47C012B-B, Q2V47MOV3644-A, and Q2V47MOV3643-B (Trains-A and -B, respectively). The subject power and control cabling is not protected by barriers, and full coverage automatic fixed suppression is not provided.

DC distribution panel (2C) Q2R41L001C-A which supplies solenoid power for atmospheric relief valves, Q2N11PV3371A, Q2N11PV3371B, and Q2N11PV3371C are located in fire area 2-004. Subject dc distribution panel is not protected by barriers.

Fire area 2-004 also contains redundant power and control cabling, MCCs Q2R17B098A, Q2R17B099B, and terminal boxes A2TB025, B2TB025, and service water valves Q2P16V539-A, Q2P16V546-A, Q2P16V538-B, and Q2P16V545-B Trains-A and -B, respectively. The subject cabling and equipment is not protected by barriers, and automatic fixed suppression is not provided.

Redundant instrumentation cabling and equipment Q2C55NM0048-A of neutron flux monitoring Q2C55NE0048A-A (post accident neutron flux monitor), N2C55NE0031-P1, and N2C55NE0032-P2, (source range neutron flux monitors) are located in the subject fire area. The subject instrumentation cabling and equipment is not protected by barriers, and 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, charging pump room coolers and charging system valves:

- Fire area 2-004 contains redundant charging pump Trains-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 routes in the fire area.
- Fire area 2-004 contains the Train-B charging pump room cooler, Q2E16M001C-B, power cables which are required for continued operation of the Train-B charging pump Q2E21M001C-B. The Train-B charging pump room cooler power cable, redundant power and control cabling, and power disconnect switches, Q2R18A001A-A and Q2R18A001B-B, required for operation of the swing charging pump Q2E21M001B-AB, from Train-A power are located in close proximity on elevation 100 feet - 0 inches of fire area 2-004. Fire barriers have not been provided to protect the Train-B charging pump room cooler power cable or the redundant power and control cabling and power disconnect switches required for Train-A operation of the swing charging pump. In addition, a portion of the Train-B charging pump room cooler power cable is routed on elevation 121 feet - 0 inches above the power and control cabling and disconnect switches required for Train-A operation of the swing charging pump. An unsealed penetration exists in the floor slab of elevation 121 feet - 0 inches, which separates the charging pump room cooler power cable on elevation 121 feet - 0 inches from the redundant power cabling and power disconnect switches required for Train-A operation of the swing charging pump located on elevation 100 feet - 0 inches.
- During normal plant operation and during the early stages of shutdown the charging pumps take suction from the volume control tank (VCT). The capacity of the VCT is such that the letdown line must be open in order to replenish the tank as long as the charging pumps are taking suction from it. During the shutdown process the charging pump suction is switched from the VCT to the refueling water storage tank (RWST). Fire area 2-004 contains power and control cables for the redundant RWST to charging pump suction valves (LCV115B and LCV115D), VCT isolation valves (LCV115C and LCV115E), and their power and control cables. The subject power and control cables and valves are not protected by fire barriers and full automatic fire suppression is not provided.

- ° Fire area 2-004 also contains redundant Trains-A and -B charging pump room coolers power and control cables. One train of redundant power and control cables is not provided a fire-rated barrier for its entire route in the fire area, nor is full suppression coverage provided for both redundant trains throughout the entire route in the fire area.

The combustible materials associated with the rooms in fire area 2-004 primarily consists of cable insulation, lube oil, pipe insulation and plastic panel parts. Based on the licensee's fire loading calculations, it was determined that the maximum fire severity expected if a fire were to occur in any of the rooms in fire area 2-004 would be less than one hour.

Smoke detection systems are installed in all rooms containing safe-shutdown equipment (except room 2341) or applicable combustible material. Automatic suppression is provided in the following rooms: 2160, 2161, 2162, 2163, 2175, 2179, 2205 (partial), 2207, 2208, 2209, 2312 (partial), 2316, 2322, 2402, 2403, 2404, and 2447. Heat collectors will be installed on all sidewall mounted sprinkler/spray nozzles in room 2161 to increase their responsiveness to a fire condition. The 5-kV disconnect switches in room 2161 have an automatic heat-actuated carbon dioxide suppression system. Hose stations are installed throughout the fire area and are spaced in accordance with requirements of NFPA 14. Portable carbon dioxide extinguishers and portable smoke removal equipment are provided on each elevation.

Room 2341 (pipe tunnel) has one train of safe-shutdown control and instrumentation cabling which passes through it and smoke detection is not provided.

The licensee justifies this exemption on the basis of the existing fire protection features, their proposed fire protection modifications and their alternative shutdown actions associated with the rooms bounded by fire area 2-004.

12.3 EVALUATION

An analysis was performed by the licensee to demonstrate 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, based on our evaluation of the licensee's analysis, only one train of redundant electrical distribution could be lost due to a credible fire in area 2-004.

MCC 2A is located in room 2332 elevation 139 feet - 0 inches having its power feed continue through room 2312 thence up to elevation 155 feet - 0 inches. MCC 2B is located in room 2209 elevation 121 feet - 0 inches having its power feed exit this room into an adjacent fire area. The redundant MCCs are separated by a 2-foot thick reinforced concrete floor at elevation 139 feet - 0 inches. 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 redundant components is approximately 66 feet between MCC 2B (elevation 121 feet - 0 inches)

and MCC 2A power feed (elevation 155 feet - 0 inches). This 66 feet of horizontal separation has complete automatic suppression coverage on elevation 121 feet - 0 inches.

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

In addition, our evaluation of dc power distribution panels 2C and 2F demonstrate that a fire would be limited to one dc distribution panel and/or its associated power feed and would not effect the redundant dc distribution panel and/or its associated power feed. Therefore, only one train of redundant dc distribution panels could be lost.

Dc distribution panel 2C is located in room 2312 elevation 139 feet - 0 inches and dc distribution panel 2F is located in room 2209 elevation 121 feet - 0 inches. The redundant dc distribution panels are separated by a 2-foot-thick reinforced concrete floor at elevation 139 feet - 0 inches. 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 55 feet and has complete automatic suppression coverage on elevation 121 feet - 0 inches.

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 carbon dioxide extinguishers, and portable smoke removal equipment are available for use on the subject elevations.

Loss of dc distribution panel 2C would render the main steam atmospheric relief valves electrically inoperable. 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 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 2-004. 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 2-004 would not prevent the operation of at least one redundant atmospheric relief valve.

Condensate water storage tank level indication Train-A cabling is located in rooms 2402, 241C A, 2409, 2405, 2419, and 2478, on elevation 155 feet - 0 inches. Train-B cabling is located in rooms 2209, 2208, 2222, 2230, and 2231, elevation 121 feet - 0 inches, and rooms 2605, 2609, and 2608, elevation 130 feet - 0 inches. The redundant cables are separated by two, 2-foot-thick reinforced concrete floors at elevation 139 feet - 0 inches and 155 feet - 0 inches. Unsealed penetrations located in the subject floors have been reviewed and will not affect the separation afforded by the concrete floor. The Train-B cabling at elevation 121 feet - 0 inches is provided with automatic fixed suppression over 95 percent of its route.

A smoke detection system is installed in all rooms containing condensate water storage tank level indication cabling. The detection system would provide early warning of a fire, allowing the fire brigade adequate time to respond. Manual hose stations, portable carbon dioxide extinguishers, and portable smoke removal equipment are available for use on the subject elevations.

In addition, Train-A instrument air cabling is located in rooms 2168, 2163 and 2162 elevation 100 feet - 0 inches, and room 2321, elevation 139 feet - 0 inches. Train-B cabling is located in rooms 2209, 2208, and 2218, elevation 121 feet - 0 inches. The redundant cables are separated by two 2-foot-thick reinforced concrete floors at elevation 121 feet - 0 inches and 139 feet - 0 inches. Unsealed penetration in the subject floors have been reviewed and will not effect the separation afforded by the concrete a floors. The Train-A cables have full suppression coverage on elevation 100 feet - 0 inches, and Train-B cables full suppression coverage on elevation 121 feet - 0 inches. Based on our evaluation, it appears that a fire would be limited to one train of redundant PORV instrument air header isolation valve cabling.

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

Fire induced failures in control and power cabling could potentially result in the loss of redundant motor driven auxiliary feedwater pump room coolers and feedwater regulation valves. This would limit the ability to provide auxiliary feedwater to a steam generator for cooldown to the turbine driven auxiliary feedwater pump. In addition this same fire would cause the loss of the normal ac supply to the turbine driven auxiliary feed water uninterruptible power supply (UPS) Q2N23L001-AB.

Upon loss of the normal ac supply, the UPS will then be supplied from battery power. The subject battery has a two-hour capacity and upon depletion manual control must be taken, to continue cooldown. The following is a listing of those components that will require manual operation:

<u>EQUIPMENT</u>	<u>FUNCTION</u>
Q2N12HV3235A	Steam to TDAFW from S/G 1B
Q2N12HV3235B	Steam to TDAFW from S/G 1C
Q2N12HV3226	TDAFW Steam Admission
Q2N23HV3228A	Feedwater to S/G 1A
Q2N23HV3228B	Feedwater to S/G 1B
Q2N23HV3228C	Feedwater to S/G 1C

The two hours provided by battery power is adequate for existing procedures for manual operation to be implemented. Plant procedures will be revised to include the above action for a fire in area 2-004.

Fire induced failures in control and power cables could potentially result in the loss of ventilation in both the redundant Trains-A and -B battery and battery charger rooms. A failure of the ventilation systems will not result in 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 2-004, either portable ventilation equipment will be installed in the effected room or the damaged ventilation system will be repaired within 20 hours of post-fire hot shutdown initiation to insure that battery room hydrogen concentration do not exceed acceptable limits.

An exposure fire in area 2-004 could cause a loss of Train-A service water flow. The effects of the fire upon the control cable for valve Q2P16V546-A could close and cause the loss of Train-A service water flow. Train-B service water is available. In addition the effects of a fire upon the power and control cables for valves Q2P10V539-A, Q2P16V538-B, and Q2P16V545-B could cause them to become electrically inoperative. A long term requirement (greater than 24 hours) is to shift the service water discharge from the river and recirc. to the service water pond. Manual operation of the subject valves is required to perform the line up of service water to pond recirc. In addition, aligning Train-A to recirc. to pond by manual operation, service water Train-A will be restored to service. Plant procedures will be revised to include the above actions for a fire in area 2-004.

Instrumentation cables for the source range neutron flux monitors N2C55NE0031-P1 and N2C55NE0032-P2 traverse fire area 2-004 through conduit embedded in the floor slab at elevation 155 feet - 0 inches, and are accessible through embedded pullboxes on this elevation. The instrumentation

cables for the neutron flux monitor Q2C55NE0048A-A are routed through fire area 2-004 on elevation 100 feet - 0 inches, 121 feet - 0 inches, and 139 feet - 0 inches. The amplifier Q2C55NM0048-A for neutron flux monitor is located on elevation 139 feet - 0 inches. The redundant cables are separated by a 2-foot-thick reinforced concrete floor at elevation 155 feet - 0 inches. Unsealed penetrations in the subject floor slab have been reviewed and will not effect the separation afforded by the concrete floor therefore, a credible fire in area 2-004 would not cause the loss of redundant neutron flux monitoring.

Train-A charging pump power cabling is located in rooms 2161, 2162, 2163, and 2168. Train-B cabling is located in rooms 2175, 2160, 2159, 2158, 2157, 2156, 2155, 2154, 2153, 2152, 2165, and 2166. The redundant power cables are provided with a fire-rated barrier in the following rooms of fire area 2-004: Train-A in rooms 2161, 2162, 2163, and 2168, Train B in rooms 2175, 2160, and 2159. Full fixed suppression coverage is provided in rooms 2163, 2162, 2161, 2160, and 2175. Heat collectors will be installed on all sidewall sprinkler heads in room 2161 to increase their responsiveness to a fire condition. In addition, the redundant power cables are separated at a minimum with a 2-foot-thick reinforced concrete wall bounding rooms 2159, 2158, 2157, 2156, 2155, 2154, 2153, 2152, 2151, 2165, and 2166, with the exception of room 2155 where there is approximately 24 feet of separation with no intervening combustibles. Unsealed penetrations in the subject walls have been reviewed and the walls are considered to afford adequate separation.

Therefore, based on our evaluation which was performed based on a one hour fire rated barrier being installed for Train-A power cable raceway ADDIC —, ADD18A and ADD21A throughout fire area 2-004, it would appear that a fire would be limited to one train of redundant charging pump power cabling.

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

Raceways BFD02B, BFD03B, and BFD06B carry the Train-B charging pump room cooler power cable through the portions of fire area 2-004 on elevation 100 feet - 0 inches where this cable is in close proximity to redundant Train-A cables has been wrapped with two 1-inch layers of Kaowool and an overall layer of Zetex fabric. An automatic fire suppression system presently covers the area. In addition, the blockout located 11 feet - 0 inches east of Col. M, 2 feet - 4 inches south of Col. 20 which communicates between elevation 100 feet - 0 inches and 121 feet - 0 inches will be sealed. Based on the implementation of this modification one train of the redundant charging pump room cooler power and control cables are protected by a fire rated barrier and has a 40-foot horizontal separation from the opposite train cables. Automatic suppression and smoke detection systems provide coverage for the subject Train-B power and control cables and the intervening 40 feet of separation on elevation 100 feet - 0 inches.

Elevation 121 feet - 0 inches contains the same redundant cables which have a minimum horizontal separation of 40 feet. The Train-B power and control cables are provided automatic suppression and detection coverage for the entire route on this elevation.

In addition, redundant Trains-A and -B charging pump room cooler power and control cables are separated by a 2-foot-thick reinforced concrete slab floor at elevation 121 feet - 0 inches. Unsealed penetrations in the floor slab at elevation 121 feet-0 inches have been reviewed and are considered not to effect the separation afforded by the floor. In conclusion, a credible fire in fire area 2-004 could not effect both trains of redundant charging pump room cooler power and control cables.

In order to ensure that the RWST is available for RCS makeup, the raceway associated with the required RWST function will be provided with a fire barrier of a rating greater than the maximum fire severity of less than 30 minutes in the Boric Acid Area (RM 2186). This should ensure that a source of borated makeup water is available from the RWST and will not require any manual operator action. In the boric acid area (RM 2186) automatic fire suppression is not provided. However, the raceway fire barrier and the area fire detection system in conjunction with fire brigade's firefighting capabilities provide an adequate level of fire protection boric acid area. Those raceways to the protected are BFD2GD, BFD21B, BHF457 and BHF42.

The licensee's analysis of the potential effects of a fire in fire area 2-004 on the power and control cables for VCT isolation valves LCV115C and LCV115E, and in the power and control cables for RWST to charging pump suction isolation valves LCV115B and LCV115D has shown that the valve will fail in their pre-fire positions and become electrically inoperable. The normal operating (pre-fire) position of valves LCV115C and LCV115E is open, and the normal operating (pre-fire) position of valves (LCV115B and LCV115D) is closed. The cabling for LCV115D has been protected by the fire barrier installed in the proposed modification above and will not fail in the closed position.

In addition, in fire area 2-004 fire induced failures (hot shorts) to the control cables for the transfer relay cabinet Q2H22L002-A could cause control for 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 Q2B13SV2213A-A and Q2B13SV2214A-A reactor head vent valves would result in the valves being energized to open. 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.

To remove power from the transfer relay open breaker 9 on dc distribution panel 2C (Q2R41L001C-A) located in room 2312 fire area 2-004. Then go to transfer relay cabinet TRC-1 (Q2H22L002-A) in fire area 2-035 room 2347 and manually shift transfer relays TR1 (Q2B13SV2213A-A), TR2 (Q2B13SV2214A-A), TR3 (Q2B31PCV0445A-A), and TR5 (Q2B31MOV8000A-A) placing control back to the main control board to allow the operator to mitigate the letdown. If it is found that the sampling line isolation valves have not had spurious action as described below then power isolation for the transfer relay may be accomplished by opening breaker 0 on dc distribution panel 2C (Q2R41L001C-A) fire area 2-004 room 2132.

An analysis of the effects of fire upon subject redundant RCS and pressurizer sampling line isolation valves shows that it would take multiple hot shorts to energize the solenoid to open all the valves. In the unlikely event of the multiple hot shorts (induced from adjacent control cables in the shared raceway) occurring, the condition can be mitigated for the Train-A powered valves Q2P15HV3765-A and Q2P15HV3103-A by removing power from all cables in the shared raceway. This can be accomplished by opening the supply breaker on the 125 V-dc switchgear 2A (Q2R42B001A-A) in fire area 2-018 room 2224 for 125 V-dc distribution panel 2C (Q2R41L001C-A).

By letter dated March 13, 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 head vent valves, restoration of the battery room ventilation system, manual control of the TDAFW pump, manual control of one main steam atmospheric relief valve, manual service water valve line up to the service water pond, and the isolation of RCS and pressurizer sampling line isolation valves. These procedures will be implemented by the end of the Unit 2 fourth refueling outage. In addition, the licensee has also committed to install heat collectors on the sidewall mounted sprinkler/spray nozzles in room 2161, seal a floor slab blockout on elevation 121 feet - 0 inches and install a raceway fire barrier in the boric acid room 2186 by the end of the Unit 2 refueling outage.

Room 2341 (pipe chase) contains safe-shutdown cabling. All cabling in this pipe chase including the subject safe shutdown cabling is enclosed in conduit. The pipe chase is considered to have no in situ combustible. The pipe chase exits the auxiliary building at elevation 139 feet - 0 inches which is below grade. This transition from room 2608 to room 2341 has a concrete wall with all penetration considered watertight. As there is no redundant safe-shutdown cabling in room 2341. Due to the low in situ combustible loading and the very low probability of a transient combustible being introduced, the installation of a smoke detection system is not required.

All other shutdown systems associated with fire area 2-004 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, upon completion of the licensee's fire protection modifications there is reasonable assurance if a fire were to occur in any of the rooms identified in Section 12.2 safe shutdown could be achieved and maintained.

12.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire protection and shutdown configuration, in conjunction with their proposed fire protection 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 Unit 2 auxiliary building elevation 100 feet 0 inches, 121 feet - 0 inches, 130 feet - 0 inches, 139 feet - 0 inches, 155 feet - 0 inches, 175 feet - 0 inches, and 184 feet - 0 inches (fire area 2-004) should be granted.

13.0 FIRE AREAS IN UNIT 1, UNIT 2, AND FIRE AREAS SHARED BY UNITS 1 AND 2 - FIRE PROOFING OF STRUCTURAL SUPPORTING STEEL (EXEMPTION REQUEST 2-38)

13.1 EXEMPTION REQUESTED

The licensee in their exemption request 2-38 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G.2 to the extent that it requires the structural steel supporting raceway fire barrier assemblies to be protected by a fireproofing material having a fire rating of one hour.

13.2 DISCUSSION

The following raceway have been protected by a fire barrier enclosure having a one-hour fire rating:

<u>RACEWAY NO.</u>	<u>ROOM</u>	<u>FIRE AREA</u>
AEN007	0072A	72A
AEN008	0072A	72A
AHP193	0072A	72A
AHS126	0072A	72A
AHS127	0072A	72A
AHT033	0072A	72A
BON129	0072A	72A
BON132	0072A	72A
BHP093	0072A	72A
BHP094	0072A	72A
BHQ108	0072A	72A
BHR42C	0072A	72A

BHR45C	0072A	72A
BHR48C	0072A	72A
BHRC42	0072A	72A
BHRC43	0072A	72A
BHRC48	0072A	72A
BHS063	0072A	72A
BHS268	0072	72A
BHT061	0072A	72A
BHT130	0072A	72A
CDN002	0072A	72B
BON198	0072B	1-001
AEF-4B	0223	
AEF016	0223	1-001
21E044	0462	1-004
21E045	0462	1-004
21E047	0462	1-004
21E048	0462	1-004
31E017	0462	1-004
31E018	0462	1-004
31E020	0462	1-004
31E021	0462	1-004
41E016	0462	1-004
41E017	0462	1-004
41E019	0462	1-004
41E020	0462	1-004
ADDA09	0161	1-004
ADDA15	0162	1-004
ADDA15	0161	1-004
ADDA18	0163	1-004
ADDA18	0162	1-004
ADDA21	0168	1-004
ADDA21	0163	1-004
BDE-09	0175	1-004
BDE-09	0160	1-004
BDE-0A	0175	1-004
BDE-12	0160	1-004
BDE-15	0160	1-004
BFD803	0160	1-004
BFD803	0175	1-004
BFD806	0175	1-004
BFD812	0175	1-004
BFD815	0175	1-004
BFD821	0175	1-004
BFD821	0180	1-004
BFD821	0186	1-004
BFD82G	0186	1-004
BHF-21	0160	1-004
BHF-24	0160	1-004
BHF-24	0175	1-004
BHF-27	0175	1-004

BHF-33	0175	1-004
BHF-36	0175	1-004
BHF-41	0175	1-004
BHF-42	0175	1-004
BHF-42	0180	1-004
BHF-42	0186	1-004
BHF025	0186	1-004
BHFA03	0160	1-004
AEF028	0172	1-005
AFD-30	0172	1-005
AHDB12	0182	1-005
AHDB12	0172	1-005
AHF031	0172	1-005
AHFA15	0172	1-005
BFDB2G	0172	1-005
AHE-03	0190	1-006
AHE-06	0190	1-006
BDDA03	0190	1-006
BDDA06	0190	1-006
BDDA06	0189	1-006
BDDA09	0189	1-006
BDDA09	0185	1-006
BDDA0A	0190	1-006
BDDA12	0185	1-006
BDDA1A	0185	1-006
BDDA1B	0185	1-006
BEE016	0194	1-006
BFDDOM	0194	1-006
BHD100	0185	1-006
BHDE06	0185	1-006
BHDE09	0185	1-006
BHE-12	0185	1-006
BHE010	0185	1-006
BHE011	0185	1-006
BHF032	0185	1-006
CDD003	0185	1-006
CDD004	0185	1-006
BHD-12	0117	1-009
BHMZ09	0117	1-009
21E044	0500	1-013
21E044	0466	1-013
21E044	0300	1-013
AEM085	0300	1-013
AEM085	0227	1-013
AHE139	0227	1-013
AHE133	0300	1-013
AHJ029	0227	1-013
AHJ029	0300	1-013
A1D175	0227	1-013

AHD102	0244	1-020
AHD102	0210	1-020
AHD102	0245	1-020
AHE072	0210	1-020
AHE133	0211	1-020
AHJ029	0211	1-020
21E044	0319	1-042
31E021	0319	1-042
41E020	0319	1-042
BEE-0A	0319	1-042
BEE010	0319	1-042
BHD-51	0319	1-042
BHD-63	0319	1-042
BHF-C33	0319	1-042
BH8Z27	0319	1-042
BHM-60	0319	1-042
BHM161	0319	1-042
BHJX63	0319	1-042
BHJX64	0319	1-042
BHJZ33	0319	1-042
BHLZ45	0319	1-042
B1J-33	0319	1-042
21E044	0455	1-043
21E044	0444	1-043
31E021	0455	1-043
31E021	0444	1-043
41E020	0455	1-043
41E020	0444	1-043
AHD130	1-S02	1-S02
AHE071	1-S02	1-S02
BHJ511	1-S02	1-S02
BHJV18	1-S02	1-S02
BHJW12	1-S02	1-S02
BHKZ18	1-S02	1-S02
ADN390	0072A	72A
ADN391	0072A	72A
AEN251	0072A	72A
AEN252	0072A	72A
AEP310	0072A	72A
AEP320	0072A	72A
AHP193	0072A	72A
AHP443	0072A	72A
AHP850	0072A	72A
AHS376	0072A	72A
AHS419	0072A	72A
AHS421	0072A	72A
AHT033	0072A	72A
AHZ281	0072A	72A
BDN379	0072A	72A
BHQ108	0072A	72A

BHR42C	0072A	72A
BHR45C	0072A	72A
BHR48C	0072A	72A
BHRC42	0072A	72A
BHRC45	0072A	72A
BHRC48	0072A	72A
BHS063	0072A	72A
BHS268	0072A	72A
BHS358	0072A	72A
CDN252	0072A	72A
BHJ251	2223	2-001
BHM03S	2223	2-001
BHM06S	2223	2-001
BHM09S	2223	2-001
ADD18A	2163	2-004
ADD18A	2162	2-004
ADD1C-	2161	2-004
ADD1C-	2162	2-004
ADD21A	2168	2-004
ADD21A	2163	2-004
AED454	2209	2-004
AED454	2316	2-004
AED454	2312	2-004
AEM302	2312	2-004
AEM302	2322	2-004
AEM302	2209	2-004
AFDOAE	2175	2-004
AFD12G	2175	2-004
AFD36-	2175	2-004
AFD3B-	2175	2-004
AHD18B	2175	2-004
AHD360	2175	2-004
AHF21A	2175	2-004
A1D21B	2175	2-004
BDE06-	2175	2-004
BDE09-	2175	2-004
BDE09-	2160	2-004
BDE12-	2160	2-004
BDE15-	2159	2-004
BDE15-	2160	2-004
BFD02B	2160	2-004
BFD03B	2160	2-004
BFD03B	2175	2-004
BFD06B	2175	2-004
BFD12B	2175	2-004
BFD21B	2186	2-004
BFD2GB	2186	2-004
BHF03A	2160	2-004
BHF21-	2160	2-004

BHF21-	2159	2-004
BHF24-	2175	2-004
BHF24-	2160	2-004
BHF27-	2175	2-004
BHF33-	2175	2-004
BHF42	2186	2-004
BHF457	2186	2-004
AHD12B	2182	2-005
AHD12B	2172	2-005
AHF15A	2182	2-005
AHF15A	2172	2-005
A1D12B	2172	2-005
A1D158	2172	2-005
A1d258	2172	2-005
CDD255	2172	2-005
ADD12-	2185	2-006
Add1A-	2185	2-006
ADD18-	2185	2-006
AHD365	2185	2-006
BDD03A	2190	2-006
BDD06A	2189	2-006
BDD06A	2190	2-006
BDD09A	2185	2-006
BDD0AA	2190	2-006
BDD12A	2185	2-006
BDD1AA	2185	2-006
BDD18A	2185	2-006
BFD03D	2190	2-006
BFD06D	2189	2-006
BFD06D	2190	2-006
BFD09D	2185	2-006
BFD0LJ	2185	2-006
BFD0MJ	2185	2-006
BFD0SJ	2185	2-006
BFD12D	2185	2-006
BHD03C	2190	2-006
BHD06E	2185	2-006
BHD09E	2185	2-006
BHD15C	2185	2-006
BHD314	2185	2-006
BHD349	2185	2-006
BHD35D	2185	2-006
BHE12-	2185	2-006
BHE260	2185	2-006
BHE261	2185	2-006
CDD253	2185	2-006
CDD254	2185	2-006
BHM09Z	2338	2-009

21E294	2300	2-013
21E294	2466	2-013
21E294	2500	2-013
AHM291	2201	2-014
AHE322	2210	2-020
AHF463	2245	2-020
AHF485	2210	2-020
AHF486	2210	2-020
AHF487	2210	2-020
A1D305	2211	2-020
A1D305	2244	2-020
A1D305	2210	2-020
21E294	2319	2-042
3EE251	2319	2-042
31E271	2319	2-042
4EE251	2319	2-042
41E270	2319	2-042
BEE0A-	2319	2-042
BHD57-	2319	2-042
BHF33C	2319	2-042
BHF443	2319	2-042
BHG27Z	2319	2-042
BHH60	2319	2-042
BHJ33Z	2319	2-042
B1D03D	2319	2-042
B1J33-	2319	2-042
21E294	2452	2-043
21E294	2462	2-043
21E295	2462	2-043
21E296	2462	2-043
31E268	2462	2-043
31E269	2462	2-043
31E270	2462	2-043
31E271	2452	2-043
31E271	2462	2-043
41E266	2462	2-043
41E270	2462	2-043
41E270	2452	2-043
AHE321	2-S02	2-S02
BHJ12W	2-S02	2-S02
BHJ18V	2-S02	2-S02
BHJ21V	2-S02	2-S02
BHK18Z	2-S02	2-S02
BHK21Z	2-S02	2-S02

The structural steel members which support the above protected raceway have not been protected by a fireproofing material with a one hour fire rating.

13.3 EVALUATION

All safety-related tray and conduit supports which support raceways that are protected by a fire barrier have been evaluated by the licensee to determine the effects of a one hour ASTM E-119 exposure fire on the subject supports.

The assumptions utilized by the licensee's analysis were as follows:

- ° Maximum temperature attained in the area of fire influence is 1700°F for approximately one hour.
- ° The maximum area of fire influence is equal to that of a fire with a base of 20 feet in diameter.
- ° The weld strength is equivalent to that of the structural supporting steel material.
- ° A seismic event is not postulated to occur concurrently with the fire.

Therefore, based on our evaluation of the licensee's analysis, it was determined utilizing the properties of steel at elevated temperatures as given in the American Iron and Steel Institutes "Fire-Resistance Steel Frame Construction," second edition June 1974, that the structural steel supports affected by the area of fire influence were of adequate strength to ensure that the raceway identified in Section 13.2 will retain their integrity for the required one hour fire duration.

13.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's Appendix R raceway structural steel analysis demonstrated that its load carrying characteristics of the steel would be adequate to maintain the raceway fire barrier integrity after an exposure to a fire having a one hour fire severity. Therefore, the licensee's request for exemption should be granted.

14.0 FIRE AREAS IN UNIT 1 AND UNIT 2 AUXILIARY BUILDING, THE DIESEL GENERATOR BUILDING AND SERVICE WATER INTAKE STRUCTURE - FIRE DOOR INSTALLATION DEVIATIONS (EXEMPTION REQUEST 1-41)

14.1 EXEMPTION REQUESTED

The licensee in their exemption request 1-41 requested an exemption from the technical requirements of 10 CFR 50 Appendix R, Section III.G to the extent that the fire door installations deviate from the requirements of National Fire Protection Association (NFPA) Standard No. 80.

14.2 DISCUSSION

NFPA Standard for Fire Doors and Windows (NFPA 80) specifies the maximum clearance between the bottom of a fire-rated door and its sill or the floor. Deviations in these clearances could result in the doors potentially having a rating of less than three hours. NFPA 80.3-6.1 states that the noncombustible clearance between the bottom of flush mounted doors and a raised noncombustible sill shall not exceed 3/8-inch, or where there is no sill, the maximum clearance between the bottom of the door and the floor shall not exceed 3/4-inch. The following fire doors deviates slightly from this standard:

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
101	104 & Unit 2	Hallway to Unit 2 - WS	83'
150	155 & Unit 2	Hallway to Unit 2 - WS	100'
163	183 & 162	Hallway E of Spray Add Tank	100'
155	172 & 161	Corridor to Chg Pump Area	100'
102	103 & 107	Corridor to Storage Room	83'
*105	Str. #2 & 115	Stairwell - WS to Spray Pumps	77'
165	116 & 185	Entry to Cable Chase - CCW	100'
169	Str. #1 & 185	Stairwell to CCW	100'
201	254 & Unit 2	HSP Room to Unit 2	121'
207	202 & 210	Communications Room	121'
202	205 & Unit 2	Hallway to Unit 2 - C	121'
*205	208 & Str. #8	Stairwell - ES	121'
203	207 & Unit 2	Corridor to Unit 2 - ES	121'
210	212 & 213	Battery Room 1B	121'
217	226 & 225	SWGR 1B to Charger Room	121'
216	213 & 225	Charger Room to Corridor	121'
211	213 & 214	Corridor to Battery Room A	121'
219	228 & 229	Corridor to SWGR Room - N	121'
223	234 & 235	Corridor to CRDM Room - N	121'
224	234 & 235	Corridor to CRDM Room - S	121'
225	234 & Str. #1	Stairwell - WS	121'
227	233 & 235	CRDM to SWGR Room	121'
240	250 & 235	Half Door to Cable Chase - E	121'
301	319 & Unit 2	Corridor to Unit 2 - WS	139'
302	316 & Unit 2	Corridor to Unit 2 - C	139'
304	309 & Unit 2	Big Door to Unit 2 - ES	139'
318	333 & 334	Room between Elect. Pen Pms - W	139'
311	317 & 322	Pen Filtr Room	139'
312	318 & 319	Corridor to Cable Spr Room - N	139'
324	335 & 338	SWGR Room to Cable Chase - M	139'
322	343 & 339	Corridor to SWGR Room - S	139'

*This door has automatic smoke/heat detection on one side only.

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
447	429 & Str. #2	Stairwell to Radwaste Vent Room	155'
402	405 & Unit 2	Double Doors Corridor to 2 - ES	155'
411	409 & Str. #2	Stairwell - WS	155'
*333	604 & Str. #10	Hallway to Stairwell	130'

DIESEL BUILDING

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
*732	56C & Cable Tunnel	SWGR Room to West Tunnel	155'
734	56A & 56B	Center Foyer to E SWGR	155'
715	56A & 61	SWGR to 1-2A Diesel Room	155'
716	56A & 60	SWGR to 1C Diesel Room	155'
717	56B & 59	Foyer to 2B Diesel Room	155'
718	56C & 58	SWGR to 1B Diesel Room	155'
719	56C & 57	SWGR to 2C Diesel Room	155'
701	71 & 61	South Hallway to 1-2A Diesel	155'
704	71 & 60	South Hallway to 1C Diesel Room	155'
707	71 & 59	South Hallway to 2B Diesel Room	155'
710	71 & 58	South Hallway to 1B Diesel Room	155'
713	71 & 57	South Hallway to 2C Diesel Room	155'
700	71 & 66	Hallway to 1-2A Day Tank Room	155'
703	71 & 65	Hallway to 1C Day Tank Room	155'
706	71 & 64	Hallway to 2B Day Tank Room	155'
709	71 & 63	Hallway to 1B Day Tank Room	155'
712	71 & 62	Hallway to 2C Day Tank Room	155'
*731	56A & Cable Tunnel	SWGR Room to East Tunnel Unit II	155'
*733	56C & Cable Tunnel	SWGR Room to West Tunnel Unit II	155'

SERVICE WATER BUILDING

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
851	72C & 73	Foyer to 1B Battery Room	155'
853	72D & 74	Foyer to 1A Battery Room	155"

UNIT 2

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
*2105	Str. #2 & 2115	Stair No. 2	77'
*2154	Str. #8 & 2160	Stair No. 8	100"
2155	2172 & 2161	Corridor	100"
2159	Str. #2 & 2162	Hallway	100'
2163	2183 & 2162	Hallway	100'
2165	2197 & 2185	CCW HX Room	100'

<u>DOOR NO.</u>	<u>BETWEEN ROOMS</u>	<u>LOCATION DESCRIPTION</u>	<u>ELEVATION</u>
2167	2198 & 218	CCW HX Room	100'
2169	Str. #1 & 2185	Stair No. 1	100'
*2205	Str. #1 & 2185	Hatch Area	121'
2207	2202 & 2210	Corridor	121'
2212	Str. #2 & 2209	Hallway	121'
2215	2224 & 2225	Battery Charger Room	121'
2216	2225 & 2213	Battery Service Room	121'
2217	2226 & 2225	Battery Charger Room	121'
2222	2233 & 2228	Corridor	121'
2223	2235 & 2234	Hallway	121'
2224	2235 & 2234	Hallway	121'
2225	2234 & Str. #1	Stair No. 1	121'
2227	2235 & 2233	Switchgear Room	121'
2214	2249 & 2235	Control Sys. Cab. Room	121'
*2305	Str. #8 & 2309	Hatch Area	139'
2312	2318 & 2319	Corridor	139'
2317	2334 & 2322	Hallway	139'
2318	2333 & 2334	Elec. Pene. Room	139'
2319	2337 & 2335	Load Center Room	139'
2322	2343 & 2339	Corridor	139'
2324	2338 & 2335	Load Center Room	139'
2329	2604 & 2602	Blow Down Panel Room	130'
*2333	2604 & Str. #10	Stair No. 10	130'
*2335	2609 & Str. #10	Stair No. 10	130'
2403	2405 & 406	Decon Room	155'
2404	2408 & 407	Hot Machine Shop	155'
2406	2405 & 407	Hot Machine Shop	155'
*2407	2405 & Str. #8	Stair No. 8	155'
*2431	2422 & Str. #10	Stair No. 10	155'
2439	2452 & Str. #1	Stair No. 1	155'
2447	2429 & Str. #2	Stair No. 2	155'
2327	2339 & 2346	MG Set Room	139'

*This door has automatic smoke/heat detection on one side only.

14.3 EVALUATION

The fire doors identified in Section 14.2 above, exceed NFPA 80 gap specifications. In a majority of the fire door installations, the NFPA criteria is exceeded by less than 3/4 of an inch. Most of the excessive clearances result from an unintentional unevenness of or slope in the concrete floors.

Smoke or heat detection systems are installed on both sides of the affected doors except as noted. There are fourteen fire door exceptions categories. Eleven of these exceptions involve stairwells; nine instances wherein the stairwell does not have detection, and two instances where small unprotected vestibules (Rooms 115 and 2115) are adjacent to protected stairwells. The remaining three exceptions involve doors between the diesel generator building switchgear rooms and the diesel generator-auxiliary building cable tunnels. These doors all have smoke detection on their diesel generator building side and automatic water suppression systems on their tunnel side. The in-situ combustible loading in the vicinity of the bottom of the doors is minimal. Transient loads are unlikely to be located near the doors because access to fire doors is routinely kept clear. Since the excessive gaps are located at the bottom of the doors, passage of smoke and heat is minimized in the event of a fire. The results of a liquid spill near a door with excessive clearance would not differ significantly from one near a door with prescribed clearance since a flow path exists under both doors. Therefore, the existence of the gaps at the bottom of the fire doors greater than those recommended in the NFPA 80 does not prevent each door from performing its intended function.

14.4 CONCLUSION

Based on our evaluation, we conclude that the licensee's alternative fire door configurations for those doors identified in Section 14.2 above, will provide an acceptable 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 should be granted.

Dated: December 29, 1986

Principal Contributor:

P. Hadden