AUGUST 2 1979

Dockets Nos. 50-266
and 50-301

Mr. Sol Burstein
Executive Vice President
Wisconsin Electric Power Company
231 West Michigan Street
Milwaukee, Wisconsin 53201

REGULATORY DOCKET FILE COPY

Dear Mr. Burstein:

The Commission has issued the enclosed Amendments Nos. 39 and 44 to Facility Operating License Nos. DPR-24 and DPR-27 for the Point Beach Nuclear Plant, Units Nos. 1 and 2. The amendments add license conditions related to the completion of fire protection modifications and are in partial response to your submittals dated November 1, 1976, June 20, and November 7, 1977, January 13, February 1, February 14, March 15, September 22 and December 29, 1978.

We have discussed the contents and conditions of this license amendment with members of your staff and we understand that you have agreed to this license amendment. Nevertheless, you understand that by the provisions of 10 CFR Part 2 paragraph 2.204, you may demand a hearing with respect to all or any part of the amendment within twenty (20) days from the date of this letter. If you do not demand a hearing, this amendment will become effective on the expiration of that twenty (20) day period.

You are requested to propose revised Technical Specifications related to facility modifications described herein and submit them for our review no later than 90 days before the modifications are implemented. Certain items listed in Section 3.1 of the enclosed Safety Evaluation Report (SER) are marked with an asterisk or otherwise stated to require additional information in the form of design parameters, test results, or acceptance criteria to assure that the design is acceptable prior to actual implementation of these modifications. We request that you submit this information at least 90 days prior to the schedule provided in SER Table 3.1.

Also, for our administrative convenience and to correct an error in paragraph identification which was made when we issued Amendment Nos. 38 and 43 on May 11, 1979, we are reissuing new pages 2 through 5 for Facility Operating License Nos. DPR-24 and DPR-27.

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OFFICE ➤						
SURNAME ➤						
DATE ➤						

We have determined that no license amendment fee is required to accompany your response to aforementioned request. This determination is limited to those applications or requests to incorporate our recommended Technical specifications and those to add surveillance and other requirements for operable systems that have been added at our request. Any other unrelated changes or requests that you might choose to include in the fire protection requests would be subject to amendment fees in accordance with section 170.22 of 10 CFR Part 170.

A copy of the related Notice of Issuance is also enclosed.

Sincerely,

Original Signed By

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 39 to License DPR-24
2. Amendment No. 44 to License DPR-27
3. Safety Evaluation Report
4. FEDERAL REGISTER Notice

cc: w/Enclosures
See next page

OFFICE ➤						
SURNAME ➤						
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

August 2, 1979

Dockets Nos. 50-266
and 50-301

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Executive Vice President
Wisconsin Electric Power Company
231 West Michigan Street
Milwaukee, Wisconsin 53201

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Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 39 to License DPR-24
2. Amendment No. 44 to License DPR-27
3. Safety Evaluation Report
4. FEDERAL REGISTER Notice

cc: w/Enclosures
See next page

cc: Mr. Robert W. Jurgensen
Chief Nuclear Engineer
American Electric Power
Service Corporation
2 Broadway
New York, New York 10004

Gerald Charnoff, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Citizens for a Better Environment
59 East Van Buren Street
Chicago, Illinois 60605

Maude Preston Palenske Memorial
Library
500 Market Street
St. Joseph, Michigan 49085

Mr. D. Shaller, Plant Manager
Donald C. Cook Nuclear Plant
P. O. Box 458
Bridgman, Michigan 49106

Mr. R. Masse
Donald C. Cook Nuclear Plant
P. O. Box 458
Bridgman, Michigan 29160

Mr. Wade Schuler, Supervisor
Lake Township
Baroda, Michigan 49101

Mr. William R. Rustem (2)
Office of the Governor
Room 1 - Capitol Building
Lansing, Michigan 48913

Attorney General
Department of Attorney General
525 West Ottawa Street
Lansing, Michigan 48913

Honorable James Bemenek, Mayor
City of Bridgman, Michigan 49106

Director, Technical Assessment Division
Office of Radiation Programs (AW-459)
U. S. Environmental Protection Agency
Crystal Mall #2
Arlington, Virginia 20460

U. S. Environmental Protection Agency
Federal Activities Branch
Region V Office
ATTN: EIS COORDINATOR
230 South Dearborn Street
Chicago, Illinois 60604

Attorney General
State House
Indianapolis, Indiana 46204

State Board of Health
ATTN: Director, Bureau of Engineering
1330 West Michigan Street
Indianapolis, Indiana 46206

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

WISCONSIN ELECTRIC POWER COMPANY

DOCKET NO. 50-266

POINT BEACH NUCLEAR PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 39
License No. DPR-24

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   B. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   C. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   D. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by adding the following paragraph 3.H.:

   H. The licensee may proceed with and is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.33 of the NRC's Fire Protection Safety Evaluation Report (SER) for the facility dated August 2, 1979 These modifications shall be completed as specified in Table 3.1 of the SER or supplements thereto.

   The licensee is required to implement and maintain the administrative controls identified in Section 6 of the NRC's Fire Protection Safety Evaluation Report on the Facility dated August 2, 1979and supplements thereto.

7909040019

3. This license amendment becomes effective as of August 2, 1979*.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Date of Issuance: August 2, 1979

*Provided no hearing is requested under 10 CFR Part 2 paragraph 2.204.

Amendment Pages for Operating License No. DPR-24

1. This amended license applies to the Point Beach Nuclear Plant Unit No. 2, a closed cycle, pressurized, light water moderated and cooled reactor, and associated steam generators and electric generating equipment (the facility). The facility is located on the licensee's Point Beach site, in the Town of Two Creeks, Manitowoc County, Wisconsin, and is described in the "Final Safety Analysis Report", as supplemented and amended.

2. Subject to the conditions and requirements incorporated here in the Commission hereby licenses

   A. Pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to possess, use, and operate the facility at the designated location on the Point Beach site in accordance with the procedures and limitations set forth in this license;

   B. Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in Final Facility Description and Safety Analysis Report, as supplemented and amended as of March 17, 1976;

   C. Pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

   D. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source of special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;

   E. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess such byproduct and special nuclear materials as may be produced by the operation of the facility, but not to separate such materials retained within the fuel cladding.

3. This amended license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

A. Maximum Power Levels

The licensee is authorized to operate the facility at reactor core power levels not in excess of 1518 megawatts thermal.

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 39 are hereby incorporated in the license. The licensee shall operate the facility in accordance with Technical Specifications.

C. Report

The licensee shall make certain reports in accordance with the requirements of the Technical Specifications.

D. Records

The licensee shall keep facility operating records in accordance with the requirements of the Technical Specifications.

E. Spent Fuel Pool Modification

The licensee is authorized to modify the spent fuel storage pool to increase its storage capacity from 351 to 1502 assemblies as described in licensee's application dated March 21, 1978, as supplemented and amended. In the event that the on-site verification check for poison material in the poison assemblies discloses any missing boron plates, the NRC shall be notified and an on-site test on every poison assembly shall be performed.

F. The licensee shall maintain in effect and fully implement all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.54(p). The approved security plan documents withheld from public disclosure pursuant to 10 CFR 2.790(d), are collective titled "Point Beach Nuclear Plant Modified Amended Security Plan", dated January 4, 1978, as revised September 25, 1978, February 2, and March 29, 1979.

G. Safety Injection Logic

The licensee is authorized to modify the safety injection actuation logic and actuation power supplies and related changes as described in licensee's application for amendment dated April 27, 1979, as supplemented May 7, 1979. In the interim period until the power supply modification has been completed, should any DC powered safety injection actuion channel be in a failed condition for greater than one hour, the until shall thereafter be shutdown using normal procedures and placed in a block-permissive condition for safety injection actuation.

H. The licensee may proceed with an is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.33 of the NRC's Fire Protection Safety Evaluation Report (SER) for the facility dated August 2, 1979. These modifications shall be completed as specified in Table 3.1 of the SER or supplements thereto.

The licensee is required to implement and maintain the administrative controls identified in Section 6 of the NRC's Fire Protection Safety Evaluation Report on the Facility dated August 2, 1979 and supplements thereto.

4. The issuance of this amended license is without prejudice to subsequent licensing action which may be taken by the Commission with regard to the on-going rulemaking hearing on the Interim Acceptance Criteria for Emergency Core Cooling Systems (Docket No. RM 50-1).

5. This amended license is effective as of the date of issuance, and shall expire at midnight on July 25, 2008.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed By

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:
1. Appendix A - Technical Specifications
2. Appendix B - Environmental Technical Specifications

Date of Issuance: March 8, 1973

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

WISCONSIN ELECTRIC POWER COMPANY

DOCKET NO. 50-301

POINT BEACH NUCLEAR PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 44
License No. DPR-27

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   B. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   C. The issuance of this amendment will not be inimical to thee common defense and security or to the health and safety of the public; and

   D. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

   Accordingly, the license is amended by adding the following paragraph 3.H.:

   H. The licensee may proceed with an is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.33 of the NRC's Fire Protection Safety Evaluation Report (SER) for the facility dated August 2, 1979. These modifications shall be completed as specified in Table 3.1 of the SER or supplements thereto.

   The licensee is required to implement and maintain the administrative controls identified in Section 6 of the NRC's Fire Protection Safety Evaluation Report on the Facility dated August 2, 1979 and supplements thereto.

3. This license amendment becomes effective as of August 2, 1979*.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Date of Issuance: August 2, 1979

*Provided no hearing is requested under 10 CFR Part 2 paragraph 2.204.

Amendment Pages for Operating License No. DPR-27

1. This amended license applies to the Point Beach Nuclear Plant Unit No. 2, a closed cycle, pressurized, light water moderated and cooled reactor, and associated steam generators and electric generating equipment (the facility). The facility is located on the licensee's Point Beach site, in the Town of Two Creeks, Manitowoc County, Wisconsin, and is described in the "Final Safety Analysis Report", as supplemented and amended.

2. Subject to the conditions and requirements incorporated here in the Commission hereby licenses

   A. Pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to possess, use, and operate the facility at the designated location on the Point Beach site in accordance with the procedures and limitations set forth in this license;

   B. Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in Final Facility Description and Safety Analysis Report, as supplemented and amended as of March 17, 1976;

   C. Pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

   D. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source of special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;

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The licensee is authorized to operate the facility at reactor core power levels not in excess of 1518 megawatts thermal.

B. Technical Specifications

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FOR THE ATOMIC ENERGY COMMISSION

Original Signed By

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:
1. Appendix A - Technical Specifications
2. Appendix B - Environmental Technical Specifications

Date of Issuance: March 8, 1973

FIRE PROTECTION

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH UNITS 1 AND 2

DOCKET NOS. 50-266/301

August 2, 1979

7909040021

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1.0 INTRODUCTION

Following a fire at the Brown's Ferry Nuclear Station in March 1975, the Nuclear Regulatory Commission initiated an evaluation of the need for improving the fire protection programs at all licensed nuclear power plants. As part of this continuing evaluation, the NRC, in February 1976, published the report by a special review group entitled "Recommendations Related to Browns Ferry Fire," NUREG-0050. This report recommended that improvements in the areas of fire prevention and fire control be made in most existing facilities and that consideration be given to design features that would increase the ability of nuclear facilities to withstand fires without the loss of important functions. To implement the report's recommendations, the NRC initiated a program for reevaluation of the fire protection programs at all licensed nuclear power stations and for a comprehensive review of all new licensee applications.

The NRC issued new guidelines for fire protection programs in nuclear power plants which reflect the recommendations in NUREG-0050. These guidelines are contained in the following documents:

- "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," NUREG-75/087, Section 9.5.1, "Fire Protection," May 1976, which includes "Guidelines for Fire Protection for Nuclear Power Plants" (BTP APCSB 9.5-1), May 1, 1976.

- "Guidelines for Fire Protection for Nuclear Power Plants" (Appendix A to BTP APCSB 9.5-1), August 23, 1976.

- "Supplementary Guidance on Information Needed for Fire Protection Program Evaluation," September 30, 1976.

- "Sample Technical Specifications," May 12, 1977.

- "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," June 14, 1977.

- "Manpower Requirements for Operating Reactors," June 5, 1978.

All licensees were requested to: (1) compare their fire protection programs with the new guidelines; and (2) analyze the consequences of a postulated fire in each plant area.

We have reviewed the licensee's analyses and have visited the plant to examine the relationship of safety-related components, systems and structures with both combustibles and the associated fire detection and suppression systems. Our review has been limited to the aspects of fire protection related to the protection of the public with the NRC's

jurisdiction, i.e., those aspects related to health and safety. We have not considered aspects of the fire protection associated with life safety of onsite personnel and with property protection, unless they impact the health and safety of the public due to the release of radioactive material.

The report summarizes the results of our evaluation of the fire protection program at Wisconsin Electric Power Company's Point Beach Nuclear Plant, Units 1 and 2. The chronology of our evaluation is summarized in Appendix A of this report.

2.0 FIRE PROTECTION GUIDELINES

2.1 General Design Criterion 3 - "Fire Protection"

The Commission's basic criterion for fire protection is set forth in General Design Criterion 3, Appendix A to 10 CFR Part 50, which states:

> "Structures, systems and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions.
>
> "Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and the control room.
>
> "Fire detection and protection systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, system and components important to safety.
>
> "Fire fighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, system and components."

2.2 Supplementary Guidance

Guidance on the implementation of General Design Criterion 3 for existing nuclear power plants have been provided by the NRC staff in Appendix "A" of Branch Technical Position 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants."

Appendix A provides guidance on the preferred and, where applicable, acceptable alternatives to fire protection design for those nuclear power plants for which applications for construction permits were docketed prior to July 1, 1976.

Although this appendix provides specific guidance, alternatives may be proposed by licensees. These alternatives are evaluated by the NRC staff on a case-by-case basis.

Additional guidance which provides clarification of fire protection matters has been provided by the NRC staff in the following documents:

> "Supplementary Guidance on Information Needed for Fire Protection Program Evaluation," October 21, 1976.
>
> "Sample Technical Specifications," May 12, 1977.

"Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," June 14, 1977.

"Manpower Requirements for Operating Reactors," May 11, 1978.

When the actual configuration of combustibles, safety-related structures, systems or components, and the fire protection features are not as assumed in the development of Appendix A or when the licensee has proposed alternatives to the specific recommendations of Appendix A, we have evaluated such unique configurations and alternatives using the defense-in-depth objectives outlined below:

(1) reduce the likelihood of occurrence of fires;

(2) promptly detect and extinguish fires if they occur;

(3) maintain the capability to safely shut down the plant if fires occur; and

(4) prevent the release of a significant amount of radioactive material if fires occur.

In our evaluation, we assure that these objectives are met for the actual relationship of combustibles, safety-related equipment and fire protection features of the facility.

Our goal is a suitable balance of the many methods to achieve these individual objectives; increased strength, redundancy, performance, or reliability of one of these methods can compensate in some measure for deficiencies in the others.

3.0 SUMMARY OF MODIFICATIONS AND INCOMPLETE ITEMS

3.1 Modifications

The licensee plans to make certain plant modifications to improve the fire protection program as a result of both his and the staff's evaluations. The proposed modifications are summarized below. The implementation schedule for these modifications is in Table 3.1. The licensee has agreed to this schedule. The sections of this report which discuss the modifications are noted in parentheses.

Certain items listed below are marked with an asterisk to indicate that the NRC staff will require additional information in the form of design details, test results, or acceptance criteria to assure that the design is acceptable prior to actual implementation of these modifications. The licensee has agreed to provide this information. The balance of the other modifications has been described in an acceptable level of detail.

3.1.1 Emergency Breathing Apparatus

The licensee will provide 10 additional Biopak 60p breathing units with one spare bottle per unit. Each bottle will have a 1-hour capacity. These bottles will be recharged using a cascade oxygen bank that will provide more than 100 60-minute refills (4.4.3). The control room breathing masks will be relocated to a more accessible location and the air supply will be certified acceptable for breathing (4.4.3, 5.2).

*3.1.2 Smoke Exhaust

A manually-actuated smoke exhaust system will be installed for the cable spreading room, control room and computer room (4.4.1, 5.2.6, 5.3.6). Additional portable smoke venting equipment will be provided (4.4.1, 5.8).

3.1.3 Fire Hose Stations

Thirteen additional hose reels with 1½-inch hose will be provided at various areas inside the plant (4.3.1). The two hose reels serving the cable spreading room will be fitted with low velocity fog nozzles and extension pieces (5.3). Booster hose reels with 1-inch hose will also be provided for protection of the control room, cable spreading room, auxiliary feedwater pump room and switchgear room (4.3.1, 5.2, 5.3, 5.4, 5.11). Five hose reels with 100 feet of 1-inch hose will be installed in each containment building (4.3.1, 5.12).

*3.1.4 Fixed Water Suppression Systems

The diesel generator rooms will be upgraded by conversion of the existing system to a wet pipe sprinkler system with flow annunciation in the control

TABLE 3.1

IMPLEMENTATION DATES FOR LICENSEE PROPOSED MODIFICATIONS

	ITEM	DATE
3.1.1	Emergency Breathing Apparatus	9/30/79
3.1.2	Smoke Exhaust	12/31/79
3.1.3	Fire Hose Stations	3/31/80
3.1.4	Fixed Water Suppression Systems	9/30/80
3.1.5	Water Damage Protection	6/30/80
3.1.6	Waterproofing	9/30/79
3.1.7	Drain System	6/30/80
3.1.8	Access for Manual Fire Suppression	12/31/79
3.1.9	Fire Barriers	*
3.1.10	Ventilation Dampers	9/30/80
3.1.11	Curbs and Barriers	9/30/80
3.1.12	Fire Detectors	*
3.1.13	Portable Handlights	Complete
3.1.14	Cable Separation	*
3.1.15	Ventilation System Control Cables	12/30/80
3.1.16	Hydrant House Hose Equipment	Complete
3.1.17	Hydrogen Hazard Fire Protection	3/31/80
3.1.18	Ventilation Flow Monitoring	12/31/79
3.1.19	Portable Fire Extinguishers	Complete
3.1.20	Hydrant Gate Valves	Complete
3.1.21	Interior Hose Station Nozzles	12/31/79
3.1.22	Water Supply - Fire Department Pumper Connection	9/30/79
3.1.23	Carbon Dioxide Hose Reel Nozzles	12/31/79
3.1.24	Diesel Generator Air Intake Structure	9/30/80
3.1.25	Ventilation Duct Penetration Seals	9/30/80
3.1.26	Auxiliary Building Cable Tray Penetration Seals	12/31/80
3.1.27	Containment Building Fire Stops	*
3.1.28	Service Building Penetration Seals	6/30/80
3.1.29	Cable Tray Penetration Seal Qualification	*
3.1.30	Communication System	Complete
3.1.31	Emergency Diesel Generators - Remote Panel	6/30/80
3.1.32	Fire Hydrant Inspections	12/31/79
3.1.33	Control Room Light Fixtures	6/30/80

* These items require significant engineering and procurement lead times and require a considerable amount of containment access to implement them. These modifications shall be completed during the Fall 1980 refueling outage on Unit 1 and the Spring 1981 refueling outage on Unit 2.

room (4.3.1, 5.6). Automatically-actuated sprinkler systems will be installed in the area of safety injection pumps and component cooling water pumps (5.8). A sprinkler system will be installed over the diesel-driven fire pump and the service water pumps (5.14).

*3.1.5 Water Damage Protection

Floor drains will be added in the cable spreading room (5.3). Enclosures for safety-related electrical boxes in the auxiliary feedwater pump area will be upgraded to assure that a water hose stream will not degrade proper functioning (5.11).

3.1.6 Waterproofing

The cable spreading room and nonsafety-related electrical equipment rooms will have an application of water sealant to prevent any water seepage to the rooms below (5.3, 5.4).

3.1.7 Drain System

The drain within the turbine lube oil storage tank curb will be kept plugged to prevent spead of fire via the drain system (4.5).

The baseplate drains for the safety injection pumps and containment spray pumps will be plugged to confine a lube oil leak to the pump baseplate area (5.8).

3.1.8 Access for Manual Fire Suppression

A second doorway will be added at the floor elevation of the cable spreading room to facilitate entry for manual fire suppression (4.12, 5.3). A three-hour rated, gas tight door will be installed between the control room and the cable spreading room (5.3).

*3.1.9 Fire Barriers

The control building walls adjacent to the turbine building will be upgraded to a three-hour rating. Included are the auxiliary feedwater pump room, switchgear room, and diesel generator room (5.1). The cable spreading room and diesel generator room walls will be upgraded to a three-hour fire rating (5.3, 5.6). The control room viewing window will be upgraded to a two-hour fire rating (5.2). The barrier, including penetration seals, separating the service building and general auxiliary building ventilation exhaust filters from the remainder of the auxiliary building will be upgraded to a two-hour fire rating (5.8).

3.1.10 Ventilation Dampers

Fire dampers will be replaced with dampers or doors with fire ratings consistent with those of the barrier penetrated by the ventilation ducts (4.9, 5.1, 5.5, 5.13).

3.1.11 Curbs and Barriers

The height of the curbs around the turbine lube oil reservoir and storage tank will be increased and oil drums will no longer be stored within the storage tank curbed area (4.5, 5.1). A two inch angle curb will be added on the floor beneath each reactor coolant pump (5.12).

*3.1.12 Fire Detectors

Additional fire detectors will be installed in all areas of the plant where there are significant combustibles or where safety-related equipment is located (4.2). The fire detectors in the circulating water pump house will be relocated to increase their effectiveness (4.3.1, 5.14). Fire detectors will be installed within the control building recirculation system charcoal filter cabinets (4.4.2). A detector will be added to the air compressor room (4.15). Fire detectors will be installed within control room cabinets housing redundant safe shutdown cables and equipment (5.2).

3.1.13 Portable Handlights

Eleven portable, battery-powered hand-held lights will be provided for emergency use by the fire brigade (4.6).

*3.1.14 Cable Separation

Cable or conduit that interconnects redundant safety-related cable trays will be rerouted or fire stops added to the trays to remove the combustible pathway in various portions of the auxiliary and control buildings (5.3, 5.4, 5.6, 5.8, 5.9, 5.10, 5.11, 5.12, 5.15).

3.1.15 Ventilation System Control Cables

The diesel generator room ventilation system control cables and junction boxes will be relocated outside the diesel generator rooms (5.6).

3.1.16 Hydrant House Hose Equipment

The four hose houses in the yard will be provided with combination straight/fog nozzles (4.3.1). Additional equipment will be provided to control the flow of water and to permit the use of 1½-inch hoses on outdoor fires (4.3.1).

*3.1.17 Hydrogen Hazard Fire Protection

Excess flow and manual isolation valves will be installed in the auxiliary building hydrogen supply header at its point of entry into the auxiliary building (5.9). Fire barriers will be installed between the hydrogen lines and adjacent safety-related cables and equipment in the auxiliary building (5.8, 5.9). The hydrogen header will be rerouted in the turbine building to avoid passing over the turbine lube oil reservoir (5.1).

3.1.18 Ventilation Flow Monitoring

Annunciation will be provided in the control room for the loss of ventilation in the battery rooms (5.5.6).

3.1.19 Portable Fire Extinguishers

Additional portable extinguishers will be provided at the entrances to the battery rooms and inside the control room and switchgear room (4.3.3, 5.2, 5.4, 5.5).

3.1.20 Hydrant Gate Valves

Four additional post-indicating valves will be installed in the main fire loop header (4.3.1).

3.1.21 Interior Hose Station Nozzles

Selected interior hose stations will be provided with fixed-fog type nozzles (4.3.1, 5.4).

3.1.22 Water Supply - Fire Department Pumper Connection

The fire department siamese pumper connection at the lakeside pump house will be provided with a sign to indicate the connection point (4.3.1).

*3.1.23 Carbon Dioxide Hose Reel Nozzles

The nozzles for the control room carbon dioxide hose reels will be modified to facilitate manual suppression inside control room panels (4.3.2, 5.2).

*3.1.24 Diesel Generator Air Intake Structure

A two-hour fire rated enclosure will be provided around the existing diesel generator air intake structure so that combustion and ventilation air can be ducted directly from outdoors as well as from inside the turbine building. Remotely operated manual dampers will be provided for air supply lineup (5.1).

*3.1.25 Ventilation Duct Penetration Seals

Ventilation duct penetration seals will be upgraded to provide a two-hour fire rated seal in the switchgear room (5.4).

*3.1.26 Auxiliary Building Cable Tray Penetration Seals

Cable tray penetration seals will be added at penetrations through auxiliary building cubicle walls to provide a three-hour rated seal where fire spread could affect safety-related cables or equipment in another area (5.8, 5.9, 5.10).

*3.1.27 Containment Building Fire Stops

Fire stops will be added to certain cable trays that pass through containment building compartment walls to minimize combustible pathways between compartments (5.12).

*3.1.28 Service Building Penetration Seals

The penetrations in barriers between the service building and safety-related areas will be sealed, or the seals upgraded, to provide three-hour fire resistance (5.13).

*3.1.29 Cable Tray Penetration Seal Qualification

Cable tray penetration seals in all safety-related fire barriers will be upgraded to provide three-hour fire resistance. The fire rating for these seals will be established by testing in accordance with ASTM E-119 standards. Test reports and data will be provided by the licensee (4.9.1).

3.1.30 Communication System

Radio repeaters will be provided so that radio communications will be possible in all plant areas (4.7).

3.1.31 Emergency Diesel Generators - Remote Panel

A remote panel will be provided in each diesel generator room to permit startup and loading of the associated diesel generator in the event of fire damage to the diesel generator controls in the control room (5.2).

*3.1.32 Fire Hydrant inspections

The licensee will develop administrative procedurers to implement fire hydrant inspections on a periodic basis (4.3.1).

*3.1.33 Control Room Light Fixtures

The licensee will either verify that the control room flourescent light fixture diffusers have a flame spread rating of 25 or less, replace the diffusers with materials having the appropriate flame spread rating or provide an evaluation of the hazard posed by the existing diffusers (5.2).

3.2 Incomplete Items

Information has been provided by the licensee on the following items for which the staff review is incomplete. We will evaluate this information and address the incomplete items in a supplement to this report.

3.2.1 Safe Shutdown Capability

The licensee has proposed the use of fire retardant coatings or cable tray barrier materials (i.e., Kaowool blankets and Marinite boards) in a number of plant areas to provide sufficient protection to safe shutdown cables such that safe shutdown capability in a fire situation would be assured. These plant areas where safe shutdown capability could be jeopardized by a fire are identified in Section 5.0 of this report. In the cable spreading room, the licensee has proposed additional measures to assure safe shutdown. The licensee has provided information to demonstrate the capability to achieve safe shutdown conditions in the event of a fire in any one of the following areas# after the implementation of these additional proposed fire protection measures: cable spreading room (5.3), switchgear room (5.4), auxiliary building (5.8, 5.9, 5.10), auxiliary feedwater pump area (5.11), containment buildings (5.12) and the containment facades (5.16).

The significance of safe shutdown capability is discussed in Section 4.1 of this report. The staff will assess the information submitted by the licensee to determine whether additional action or additional modifications should be required.

3.2.2 Circulating Water Pump House Fire Protection

The licensee has proposed modifications to the fire protection system in the circulating water pumphouse as described in Section 5.1.4 of this report. A review by the staff is required to evaluate the adequacy of the proposed modifications to assure function of the motor-driven fire pump and a sufficient number of service water pumps to support safe hot and cold shutdown in the event of a fuel oil fire at the diesel-driven fire pump (5.14).

3.2.3 Fire Brigade Size

The staff has recommended a minimum onsite fire brigade of five members. The licensee has proposed a fire brigade of at least four trained members to be maintained onsite at all times. The staff will evaluate the basis for the proposed fire brigade size (6.1).

3.2.4 Fire Brigade Training Frequency

The licensee's proposed training program includes practice sessions on a 2-year cycle, whereas the staff has recommended that practice sessions for the fire brigade be conducted annually. The staff will evaluate the basis for the proposed fire brigade training frequency (6.2).

The numbers in parentheses following the description of the fire area refer to the sections of the report in which the subject is discussed at greater length.

3.2.5 Smoke Detection System Qualification

We have recommended that bench tests be performed to verify that the detectors provided at the plant will promptly detect products of combustion from materials in the areas where detectors are installed. We have also recommended that in-situ tests be performed on detectors to verify that they are located so as to provide early warning of fires. The licensee proposes to rely on the bench tests by the detector manufacturers' quality assurance programs. The licensee also proposes to verify the operability of the detectors as part of the licensee's quality assurance program at the time of installation. The staff will evaluate the basis for the licensee's proposals to verify the adequacy of the detectors used at the plant and the locations at which the detectors are installed (4.2).

3.2.6 Reactor Coolant Pump Lube Oil Collection

The licensee has proposed to add curbs and drain piping to the existing oil deflector cones on the reactor coolant pumps. A review of this design by the staff is required before it is judged adequate to prevent a large reactor coolant pump lube oil fire in the containment building (5.12).

4.0 EVALUATION OF PLANT FEATURES

4.1 Safe Shutdown Systems

There are several arrangements of safe shutdown systems which are capable of achieving safe shutdown during and subsequent to a fire. The exact arrangement available in a fire situation will depend upon the effects of the fire on such systems, their power supplies and their control stations. The required safe shutdown systems are separated into two divisions, either of which is capable of achieving safe shutdown. For some of the safe shutdown functions, alternate safety-related systems have been provided which constitute a backup capability for the redundant safe shutdown systems.

During or subsequent to a fire, the reactor can be placed and maintained at safe hot shutdown by inserting sufficient negative reactivity, removing decay heat and providing makeup water to the reactor coolant system. The reactor trip system is used to insert negative reactivity. When additional negative reactivity is required, borated water can be supplied from the refueling water storage tanks by one of three charging pumps provided for that unit. Alternatively, one of the two safety injection pumps per unit may be used to provide reactor coolant system boration. Decay heat is removed by blowdown of steam via the steam generator code safety valves or the steam generator atmospheric steam dump valves. Auxiliary feedwater must be provided for safe hot shutdown to provide makeup to the steam generators. One turbine-driven auxiliary feedwater pump is provided for each reactor unit. The two motor-driven auxiliary feedwater pumps are shared by both units. Each reactor unit requires one auxiliary feedwater pump for safe shutdown. Reactor coolant makeup to each unit is provided by one of the three charging pumps or by one of the two safety injection pumps. Reactor coolant pressure is maintained by the pressurizer heaters or by compressing the pressurizer steam bubble and controlling pressure with the charging pumps. Two of the six service water pumps are required to provide cooling water for equipment used to maintain hot shutdown.

To achieve and maintain safe cold shutdown, additional equipment is required. For the cold shutdown condition, decay heat is removed from the reactor coolant system by the residual heat removal system, the component cooling water system, and the service water system. An additional service water pump is required for safe cold shutdown.

As discussed in Section 5.0 of this report, redundant divisions of safe shutdown systems in the plant are not always separated by sufficient distance or by fire barriers. Fire protection already exists in some of these areas of concern, and additional fire protection will be provided. However, even after completion of the proposed fire protection modifications, there will remain certain concerns about the adequacy of assurance that safe shutdown can be achieved and maintained after a postulated fire

in certain areas. The areas of concern are the following: cable spreading room, switchgear room, auxiliary building, reactor containment, containment facade, the auxiliary feedwater pump area and the circulating water pumphouse.

The licensee has provided information to demonstrate that plant hot shutdown conditions can be achieved and maintained immediately after a postulated fire and loss of offsite power in all of the areas of concern identified above. A preliminary evaluation of this information indicates that the licensee has not provided sufficient information to verify the following for each area:

(1) Redundant divisions of cable and equipment are not located in the area or, if they are, that adequate separation exists to assure that manual suppression activities will prevent loss of redundant divisions.

(2) Redundant divisions are adequately separated by physical distance or other passive fire protection measures (e.g., coatings, Kaowool blankets, or other barriers) to assure that adequate time will exist to allow manual suppression to prevent loss of redundant divisions.

(3) Alternate shutdown equipment and cable exists outside the area of concern.

In addition, a preliminary evaluation of information submitted by the licensee indicates that this information does not adequately demonstrate that the plant will have the capability to achieve and maintain safe cold shutdown within 72 hours of a postulated fire in all areas of concern.

We will perform a more detailed evaluation of the licensee's information and address the capability for safe shutdown in a supplement to this report.

4.2 Fire Detection and Signaling Systems

A fire detection and signaling system is provided in various portions of the plant which transmits alarm and supervisory signals to the control room where they are annunciated at the fire panel. In addition to handling fire detector signals, the system transmits indications of water flow from the sprinkler and deluge extinguishing systems, actuation of manual fire alarm pull boxes, and the status of the fire protection water system including: fire pump running, fire pump trouble, and low fire water system pressure.

Zone indicating units are provided in areas monitored by fire detectors and are arranged to alarm audibly and visually upon actuation of a detector. Each smoke detector is also provided with an alarm lamp which illuminates upon actuation of the detector. The system conforms to those provisions of National Fire Protection Association Standard NFPA 72D which apply to nuclear plant installations.

Smoke and heat detectors have been provided in selected areas of the plant. However, some areas containing or exposing safety-related systems are not monitored by fire detectors or the fire detectors are too sparsely distributed to assure prompt response. The licensee has proposed to install additional detectors in the following areas which are presently either unprotected or inadequately covered.

Location

1. Containments, Units 1 and 2
2. Diesel generator rooms
3. Cable spreading room
4. Battery rooms
5. Auxiliary building, all elevations
6. Control building, elevation 60 feet
7. Control room
8. Electric switchgear room, elevation 8 feet
9. Auxiliary feed pump area
10. Pipeways, Units 1 and 2
11. Facade areas, Units 1 and 2
12. Auxiliary feed pump local control station
13. Auxiliary boiler day tank rooms
14. Service building corridor
15. Turbine building lube oil area, Units 1 and 2

The addition of these fire detectors will substantially decrease the probability for undetected fires to damage safety-related equipment if the detectors are qualified to detect the products of combustion in the area of use and if located to assure early warning of a fire. The method to be used for qualification of the detectors and their location has not yet been resolved with the licensee.

We will address the adequacy of the detection system in a supplement to this report after resolution of the method of qualification for the detectors and their location.

4.3 Fire Control Systems

4.3.1 Water Systems

(1) Water Supply

Water for fire protection is obtained directly from Lake Michigan through two inlet forebays at the lakeside pump house. The water is drawn in through two separate travelling screens supplying suction to two automatic-starting fire pumps. A secondary water supply is available by having fire department pumpers take suction from the lake and discharge through hose lines to the fire water system by connecting to the siamese fire department connection at the lakeside pump house. The licensee has proposed to provide a sign at the siamese connection to indicate the connection point.

We conclude that the basic water supply system conforms to the provisions of Appendix A to BTP 9.5-1 and is, therefore, acceptable.

(2) Fire Pumps

There are two vertical shaft, centrifugal fire pumps provided at the lakeside pump house, each designed to discharge 2,000 gallons per minute at a pressure of 125 pounds per square inch. One pump is driven by a 220-horsepower diesel engine with fuel supplied from a 250-gallon day tank located within the pump house which is sufficient for eight hours of running time. Additional fuel is available from the buried emergency fuel storage tank. The second fire pump is driven by an electric motor with power supplied from one of the emergency generator systems in the event that normal power is lost.

The fire water system is kept pressurized at 125 pounds per square inch by an electric-driven jockey pump connected to the system with a 550-gallon accumulator tank. Both fire pumps are automatic starting through approved fire pump controllers with indication, alarm and manual starting capability provided at the control room. The electric motor-driven fire pump starts automatically upon a drop in the fire water system to 95 pounds per square inch. The diesel-driven fire pump will start upon a further drop in pressure of the fire water system to 80 pounds per square inch after a 10-second time delay. The jockey pump and the fire pumps can also be manually controlled at the pump house.

The jockey pump and fire pumps are all located within a fence enclosure measuring approximately 25 feet by 40 feet, which also contains the safety-related service water pumps, and the travelling screen washing pumps. The two fire pumps are separated by approximately 22 feet, and the service water pumps are separated from the fire pumps by approximately 7 feet--all measured centerline to centerline of pump heads. The fire pump controllers are also located in the enclosure. In an emergency, the two 1,100 gallons per minute at 108 pounds per square inch screen washing pumps can be aligned to pump into the fire water system.

Although the capacity of the water supply is adequate, both fire pumps are susceptible to damage from a single fire because of the lack of separation between the pumps. The adequacy of the fire protection afforded the fire water pumps is discussed in Section 5.14 of this report.

We find that the fire water pumping capacity conforms to the provisions of Appendix A to BTP 9.5-1 and is, therefore, acceptable.

(3) Fire Water Piping System

Each of the two fire pumps has a separate discharge line to a 10-inch cast iron underground fire water loop which encircles the plant. The

discharge piping from the fire pumps is provided with valves arranged so a single break in the discharge piping will not remove both pumps from service. All fire protection systems including hydrants, automatic fixed suppression systems and manual hose reels are supplied from the underground fire water yard loop. Post-indicator type sectionalizing valves are provided in the yard main loop strategically located in order to minimize the effects of a single break in the loop to the fire protection systems. All interior fire protection systems can be supplied from two directions assuring continuity of service even if one feed is shut off or a break should occur in one of the supply mains.

All automatic sprinkler and deluge system control valves in the fire protection system are electrically supervised with visual indication in the control room. All critical manually operated valves, that is yard main post indicator valves, fire header isolation valves and hose station isolation valves, are provided with tamper-proof seals and are under administrative control. The position of these valves is checked for correctness and documented on a monthly basis.

Seven yard hydrants have been provided at approximately 250-foot intervals. Four of these hydrants are provided with hose houses containing 250 feet of 2½-inch hose and other manual fire fighting tools. Hose threads are compatible with the local fire department. The licensee has proposed to provide combination straight/fog nozzles at the four hose houses. There are, however, no conversion fittings to permit the use of 1½-inch hose at the hydrant hose houses, nor is there any 1½-inch hose at these structures. The 2½-inch hose is unsuitable for use inside the plant buildings and for most anticipated outside applications. Also, there are no 2½-inch hydrant gate valves for the control of hose water flow at the hydrants. The licensee will provide the following at each of the four hydrant hose houses:

(a) Two 2½-inch hydrant gate valves,

(b) Three 50-foot lengths of 1½-inch rubber-lined, mildrew proof jacketed fire hose,

(c) Two 1½-inch adjustable shutoff nozzles, and

(d) One 2½-inch x 1½-inch 1½-inch gated wye (siamese) with a 2½-inch female connection and two 1½-inch male connections.

Auxiliary gate valves (curb box valves) are not provided in the laterals supplying the hydrants. To repair or perform maintenance work on a hydrant, it is necessary to shut down a portion of the underground yard main which also supplies the fixed water suppression systems and hose stations. Four new post-indicating valves will be added in the yard fire main loop to ensure that hydrants can be isolated without also causing loss of suppression capability to

safety-related areas or to areas that pose a hazard to safety-related areas.

Problems have been reported regarding freezing of fire hydrant barrels. The licensee will develop administrative procedures to visually inspect each required yard fire hydrant to verify that the hydrant barrel is dry and that the hydrant is not damaged. This inspection should be performed at least once per 6 months: once during March, April or May and once during September, October or November.

We conclude that, subject to implementation of these modifications, the fire water piping system satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

(4) Interior Fire Hose Stations

Interior hose reels equipped with 1½-inch rubber-covered hose have been provided throughout most of the plant; however, some areas are beyond the reach of interior hose streams. There are no hose stations provided within containment. The licensee has proposed to add 13 hose stations equipped with 1½-inch diameter hose:

Hose Reel		Location	Elevation
1.	HR-40, HR-41	Electrical Equipment Room #319	26 feet
2.	HR-38	Containment Spray Addition Pump and Monitor Tank Room #187	26 feet
3.	HR-39	Chemical Mixing Tank Room #185	26 feet
4.	HR-35	Chemical Laundry, Drain Tank Room #158	8 feet
5.	HR-36, HR-43	Component Cooling Water Pump Room #142	8 feet
6.	HR-37	Cryogenic Decay Tank Room #168	8 feet
7.	HR-42	Concentrates Holdup Tank, Transfer Pump Room #215	26 feet
8.	HR-44	Auxiliary Building Room #190	26 feet
9.	HR-45, HR-46	Auxiliary Building	46 feet
10.	HR-47	Auxiliary Building Room #251	52 feet

The licensee will also install additional hose stations with 100 feet of 1-inch hose and ball shutoff variable fog nozzles for the protection of the control room and switchgear room. Five hose reels

with 100 feet of 1-inch hose will be installed in each containment building.

The nozzles at the existing hose stations are designed to go from shutoff to solid stream to spray mode, and back to the solid stream position in order to shut off the flow. Thus, when the spray mode of operation is required, the nozzles must first be adjusted through the solid stream mode. The solid stream mode of operation presents a shock hazard to fire fighters and could cause damage to sensitive electrical equipment in certain areas of the plant. The licensee will equip hose reels with "all fog" type nozzles where those hose reels serve areas of potential shock hazard or areas housing equipment that could be damaged by a straight water stream.

We conclude that, subject to implementation of these modifications, the interior hose installation satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

(5) Sprinkler Systems

Several types of sprinkler systems have been provided which include wet pipe, dry pipe and deluge type. In general, areas with high combustible loading or significant fire hazards are protected by water type extinguishing systems as listed below:

(a) Wet Pipe Automatic Sprinkler Systems

- Service building - ready stores, mezzanine
- Service building - ready stores, under mezzanine
- Heating boiler room
- Oil tank rooms
- Turbine building - condenser
- Turbine building - ground floor
- Turbine building - intermediate floor
- Lube oil transfer pump and tank

The diesel generator rooms are provided with a manually-actuated sprinkler system connected to the service water supply.

(b) Dry Pipe Automatic Sprinkler Systems

- Warehouse
- Compressor building

(c) Deluge Automatic Sprinkler Systems with Pneumatic Rate-of-Rise Detection

- Main and auxiliary high voltage transformers
- Station auxiliary low voltage transformers
- Hydrogen seal oil unit and reservoirs 1 and 2
- Turbine oil reservoir and purification units 1 and 2

(d) Deluge Automatic Sprinkler with Fusible Link Actuation

- Control room emergency ventilation system charcoal filters

Except as noted below, the sprinkler systems conform to the applicable provision of the National Fire Protection Association Standards NFPA 13 and NFPA 15 and utilize Underwriters Laboratories listed heads, valves and actuating equipment. The manual sprinkler system in the diesel generator rooms is supplied by the service water system and utilizes nonlisted/approved operating control valves. The diesel generator rooms are normally unoccupied and a fire in this area would develop to full intensity quickly because of the flammable liquids present. If a diesel fuel oil fire reached full intensity prior to manual actuation of the present deluge system, structural damage and damage to the deluge system itself could occur. For these reasons the manual sprinkler system protecting the diesel generator rooms will be upgraded to an automatic wet pipe sprinkler system with flow alarm annunciation in the control room.

We conclude that, subject to the implementation of the above modification, the existing sprinkler systems conform to the provisions of Appendix A to BTP 9.5-1 and are, therefore, acceptable. Other areas, however, will require sprinkler protection and are addressed in Section 5.0 of this report.

(6) Foam

A fixed three percent concentrate protein foam extinguishing system is provided at the two above ground fuel oil storage tanks. Operation of the foam system is provided by actuation of rate-of-rise pneumatic detectors located under the tank cover. The foam concentrate tank, proportioner, control valves and a foam hose reel are located at the fuel oil pump house.

We conclude that the foam system is adequate for its intended use and satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

(7) Effects of Suppression Systems on Safety Systems

We have reviewed the effects of: (1) breaks in fire protection piping that may result in water flooding damage to safety-related equipment; (2) cracks in fire protection piping that may result in water spray damage to safety-related equipment, or that may impair suppression capability of both primary and backup means of suppression; and (3) inadvertent fire protection system actuation that may result in damage to safety-related equipment.

In most areas, curbs, drains and the mounting of equipment above floor level minimizes the potential for flooding damage. In other areas, water will drain out doors or via stairways or through grating

to lower elevations, such that the standing water would not affect safety-related equipment. In addition, valves have been provided to isolate sections of piping inside buildings to preclude the buildup of water and thus prevent equipment from being incapacitated due to flooding. Safety-related equipment at the lowest levels of the auxiliary building, (-)5 feet and (-)19 feet elevations, are mounted adequately above the floor levels and will not be subject to flooding damage.

Water flows from automatic suppression systems are annunciated on the fire panel in the control room. Flows from manual hose stations are not annunciated, but they will cause the fire pump to start, thereby transmitting a "fire pump running" signal to the control room. A flow from the fire protection water system can thus be inferred.

We conclude that with proper implementation of the changes proposed in Section 4.3.1(5), the potential for damage by fire protection system actuation or failure is minimal and that the fire protection system will be adequate to assure against loss of protection by pipeline breaks and cracks.

4.3.2 Gas Fire Suppression Systems

There are no total flooding nor local application fixed gaseous suppression systems provided in the main building complex. A carbon dioxide (CO_2) suppression system is installed in the remote gas turbine building, and a Halon 1301 suppression system has been provided in the record storage vault located in the visitors center building. The installations conform to the applicable provision of National Fire Protection Association Standards NFPA 12A and NFPA 12B. Neither of these areas is safety-related, nor would a fire in either area expose safety-related equipment.

Two carbon dioxide hose reels are provided in the control room with sufficient hose to reach all areas of the room. As discussed in Section 5.2 of this report, the licensee will modify the CO_2 discharge nozzles to facilitate manual suppression of fires in confined spaces.

We find that, subject to the implementation of the above described modification, the gas suppression systems will provide five extinguishment in the areas in which they are provided. This satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.3.3 Portable Fire Extinguishers

Dry chemical, carbon dioxide and pressurized water fire extinguishers have been distributed throughout all areas of the plant in accordance with National Fire Protection Association standards. As discussed in Section 5.0 of this report, the licensee will provide additional fire extinguishers for the battery rooms, control room and switchgear room.

We conclude that with the above described additions, adequate portable fire extinguishers of the appropriate type will be available throughout the plant for manual fire fighting.

4.4 Ventilation Systems and Breathing Equipment

4.4.1 Smoke Removal

The normal ventilation systems in most areas of the plant could be used for smoke removal for some types of fires although not specifically designed for this purpose. The fans and other equipment in the air handling systems are not designed to withstand high temperatures, and could be incapacitated by the heat from a significant fire if the combustion products were not diluted with fresh air. Although the capacity and configuration of the normal air handling systems is inadequate for effective smoke removal in some areas, portable smoke venting equipment is available and could be used to supplement the installed systems. Eight 960 cfm portable fan units are currently available for smoke control. Additional portable smoke venting equipment will be provided and a manually-actuated smoke exhaust system will be installed for the cable spreading room, control room and computer room. The portable smoke venting equipment will consist of one 5500 cfm gasoline engine driven smoke ejector and one 5200 cfm electric motor driven smoke ejector.

We find that smoke removal capability for the plant satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.4.2 Filters

Charcoal filters for the control building recirculation system are provided with an automatically actuated deluge water suppression system. Suppression systems are not required for the auxiliary building exhaust, service building exhaust and the containment purge system charcoal filters since decay heat would be insufficient to cause ignition. These filters are housed in metal cabinets and are sufficiently remote from ignition sources. The containment purge filters are remote from safety-related equipment and are normally isolated from the containment. The licensee proposes to add detectors in the areas of the auxiliary building and service building exhaust system charcoal filters and control building recirculation system charcoal filters to enhance manual response time. The detectors for the control building recirculation system will be located within the charcoal filter cabinets.

We find that, subject to implementation of these modifications, fire protection for combustible filters satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.4.3 Breathing Equipment

The breathing units and spare bottles presently provided are not adequate to supply the fire brigade with a six-hour reserve supply. There is no

capability for recharging air bottles. The licensee proposes to provide 10 additional Biopack 60p units with one spare bottle per breathing unit. Each bottle has a 1-hour capacity. These bottles will be recharged using a cascade oxygen bank that will provide more than 100 60-minute refills.

As discussed in Section 5.2 of this report, the licensee will relocate the air breathing masks provided for emergency use by control room personnel and the air supply will be certified acceptable for breathing.

We conclude that, with the addition of the proposed breathing units and relocation of the control room masks, emergency breathing capability is adequate for plant control and manual fire fighting activities.

4.5 Floor Drains

Floor drains from areas housing equipment that contain oil are routed to oil retention sumps. Both diesel generator day tank curbs are drained to the same sump but the oil from one day tank is prevented from flowing to the other diesel generator room by normally shut shear gate valves in the drain line to the sump. The turbine lube oil reservoir curbs are drained to a sump; these drains are normally plugged. The licensee will increase the height of the lube oil reservoir and lube oil storage tank curbs to assure that the full contents of the reservoirs will be contained plus an added margin for fire suppression water. The drain for the storage tank curb will be kept plugged. The storage of oil drums within the curbed area will be discontinued.

The adequacy of drains to remove fire suppression water is addressed in Section 4.3.1(7) of this report.

We conclude that, with the implementation of the above described modifications, the curbs and drains will be adequate to prevent the spread of combustible liquid fires.

4.6 Lighting Systems

Plant-wide emergency lighting power is supplied from either the normal plant AC power supply or from the emergency diesel generators. Limited DC emergency lighting is provided in selected plant areas to accommodate safe shutdown activities. The DC lighting power is supplied by the emergency diesel generator through inverters or by the station batteries. The cables for all emergency lighting are run from emergency lighting panels in rigid steel conduit, which are separate from other electrical raceways. The licensee has agreed to provide 11 portable battery-powered, hand-held lights for emergency use by the fire brigade. The lights will be designated for emergency purposes and their use and maintenance will be controlled through administrative procedures.

We conclude that, subject to implementation of the above described modifications, the normal lighting system, DC lighting system, or the use of portable hand-held lights will provide adequate lighting in a fire emergency, and the lighting system is, therefore, acceptable.

4.7 Communications Systems

The normal in-plant communications system consists of a two-channel page and talk system with headsets strategically located throughout the plant. Backup power for this system is from the emergency bus. The licensee has indicated that there are sufficient headsets available to support remote shutdown and fire fighting efforts.

A portable radio system is available for fire emergencies. Radio transmissions from FM radios are available to communicate with all plant areas, except containment, the pipeways and the lowest elevations in the plant. Repeaters will be provided so that radio communication will be possible in all plant areas.

We find that, subject to implementation of the above-described modification, the communication system will be adequate to coordinate fire fighting and plant operations in the event of a fire emergency.

4.8 Electrical Cable Combustibility

Safety-related electrical cables used at Point Beach were required to pass the vertical flame resistance tests in accordance with Insulated Power Cable Engineer's Association (IPCEA) test S-19-81, Section 6.19.6. Also, a test was conducted in which a bundle of jacketed cables was suspended with both ends approximately five inches above an open container of oil. The span was approximately five feet. The burning oil engulfed the cables for five minutes. Cables are considered to pass the above flame tests if the material fails to propagate five minutes after the flame source is removed. The safety-related and nonsafety-related 600-Volt instrumentation cables were required to pass the IPCEA and oil fire tests. The safety-related 600-Volt power and control cables were required to pass the IPCEA tests. The Institute of Electrical and Electronics Engineers (IEEE) test requirements were not in effect at that time. We find that retest to the IEEE 383 procedures and criteria would not provide information that would alter our recommendations or conclusions regarding the acceptability of the jacketing and insulation. Wherever there is concern that rapid flame propagation from an electrical fire will compromise redundant safety-related divisions, a qualified flame retardant coating or material will be used to minimize this likelihood. On this basis, we find the electrical cables used at Point Beach acceptable.

4.9 Fire Barrier Penetrations

4.9.1 Electrical Cable Penetrations

Cable tray penetrations in existing walls, floors and ceilings are sealed with various configurations utilizing Flamemastic 71A coating, Kaowool ceramic fiber blanket, and Marinite insulating board. These existing horizontal and vertical cable tray penetration seals have not been qualified as rated fire stops in accordance with ASTM E-119 standards. The vertical and horizontal cable tray penetrations in all safety-related fire barriers will be upgraded to a three-hour fire rating. The penetration

seal design will be tested in accordance with ASTM E-119 standards. Test reports and data will be provided by the licensee.

We find that, subject to implementation of the above described modifications, protection for electrical cable penetrations of fire barriers satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.9.2 Fire Doors

The licensee has proposed to upgrade certain fire rated doors to three-hour barriers and to install a new fire rated door in the cable spreading room. In other plant areas the licensee has 1½-hour rated doors installed on two-hour rated walls. Based upon the combustible load in these areas, we have determined that the 1½-hour rated doors are sufficient.

We find that, subject to modification of fire doors as discussed in Section 5.0 of this report, the protection afforded by fire doors satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.9.3 Ventilation Duct Penetrations

The licensee has proposed to upgrade fire dampers in the walls of certain safety-related areas in order to maintain a fire rated barrier. Details of the fire damper modifications in these areas are discussed in Section 5.0 of this report.

We find that, subject to modification of fire dampers as discussed in Section 5.0 of this report, the protection afforded by fire doors satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.10 Separation Criteria

The horizontal separation criteria at Point Beach requires a minimum of two feet between redundant divisions of safety-related cable for the same unit, or a fire barrier consisting of ½-inch Marinite-36 board extending at least one foot above the cable tray (or to the ceiling) and one foot below the cable tray (or to the floor) is installed. A horizontal separation of two feet was also used between the corresponding division of safety-related cable in Units 1 and 2.

Cable trays of redundant systems of the same unit have a minimum vertical separation of two feet. Wherever less than two feet minimum vertical separation is maintained, a barrier equivalent of ½-inch thick Marinite-36 board is placed between the two redundant systems. The Marinite board extends one foot on each side of the cable tray system. When redundant safety-related cable trays cross over each other with a separation of less than a distance of six inches, a noncombustible insulating mineral wool blanket is installed in the cable tray.

This separation criteria does not provide reasonable assurance that both divisions of cable would not be involved in a single fire in many plant areas. As discussed in Section 5.0 of this report, the licensee will provide additional fire protection for cables. Nonsafety-related cables that interconnect redundant divisions of safety-related cable will be rerouted or fire stops will be provided in the nonsafety-related cable trays. The licensee also proposes to install Marinite insulating board barriers between redundant divisions of safe shutdown cables and to install Kaowool ceramic fiber blankets in cable trays in certain safety-related areas of the plant. The licensee will demonstrate the capability of the insulating boards and blankets to prevent fire damage to redundant safe shutdown cable.

We will address the adequacy of cable separation with the proposed fire protection features in a supplement to this report.

4.11 Fire Barriers

Generally, fire areas are enclosed by floors, walls and ceilings which have a two-hour rating. Areas with high combustible loading, such as the heating boiler day tank rooms and turbine lube oil storage tank room, are surrounded by barriers with at least three-hour fire ratings. As discussed in Section 5.0 of this report, barriers in some areas are being upgraded to a three-hour rating. Areas not having barriers with a three-hour rating are found acceptable on the basis of a light combustible loading or that redundant safe shutdown equipment will not be jeopardized.

We find that, subject to implementation of the modifications described in Section 5.0 of this report, fire barriers in the plant will be adequate to contain fires and are, therefore, acceptable.

4.12 Access and Egress

At present, access for manual fire fighting is adequate except in the cable spreading room. The licensee will add a second doorway on the floor level of the cable spreading room to improve access for fire fighting. Upon implementation of the above modification, we find that there is adequate provision for entry into all areas for fire fighting.

4.13 Toxic and Corrosive Combustion Products

The products of combustion of many polymers are toxic to humans and corrosive to metals. Prompt fire detection and extinguishment are relied on to minimize the quantity of such products. Additionally, means for smoke removal are provided or will be provided, as discussed in Section 4.4 of this report. The fire brigade will also be provided with and trained in the use of emergency breathing apparatus for manually fighting fires involving such materials.

We find that, subject to implementation of the modifications described in this report, the measures taken to minimize the development of toxic and

corrosive combustion products satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

4.14 Nonsafety-Related Areas

We have evaluated the separation by distance or by fire barriers between safety and nonsafety-related areas to ensure that fires in such areas will not adversely affect the ability to safely shut down the plant.

4.15 Instrument Air

The instrument air system is not safety-related and loss of this system will not prevent safe shutdown. The air supply is only used during safe shutdown to control the speed of charging pumps and to operate atmospheric steam dump valves. On complete loss of air supply, the charging pumps can be operated at minimum speed, which is sufficient for safe shutdown. In addition, safety injection pumps would be available to perform this charging function. Steam vent valves can be operated manually.

Detection and fire suppression methods described elsewhere in this report are expected to provide adequate protection to the instrument air supply lines to assure their availability. The redundant instrument air compressors are located, along with the service air compressors, in an enclosure separated from other plant areas by two-hour fire rated barriers. All cable in the room is in conduit. Because of the possibility of a compressor lube oil fire, the licensee will provide a detector in this room to minimize the damage to these compressors and thus minimize the number of manual operations required for safe shutdown.

We find that, subject to implementation of the modifications described in this report, the potential for damage to the instrument air system will be minimized. Accordingly, we will find the fire protection measures for the instrument air system satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

5.0 EVALUATION OF SPECIFIC PLANT AREAS

The licensee has performed a fire hazards analysis of the facility to determine the combustibles present in various plant areas, to identify the consequences of fires in safety-related and adjoining nonsafety-related areas, and to evaluate the existing and proposed fire protection systems.

The results of the fire hazards analysis, other docketed information, and site visit observations were used in the staff's evaluation of specific plant areas. The staff's evaluation is discussed in the following sections.

5.1 Turbine Building

5.1.1 Safety-Related Equipment

There is no safety-related equipment or cabling located in the turbine building. The only safety concern is the effect of the worst case turbine building fire on the two-hour rated reinforced concrete walls separating the turbine building from the auxiliary and control buildings.

5.1.2 Combustibles

Some of the combustibles in this area consist of lube oil, miscellaneous workshop material, and hydrogen.

5.1.3 Consequences if No Fire Suppression

The licensee has identified the worst case turbine building fire as that which occurs in the turbine lubrication and control areas. The turbine lube oil storage area contains 12,300 gallons of oil located at the north end of Unit 2 at elevation 8 feet. Because this room is 200 feet from the nearest safety-related area, the potential worst case effect of this fire on safety-related areas would be the collapse of the turbine building roof. The licensee has indicated that both the control and auxiliary buildings are designed to withstand seismic forces. The turbine building is not. The seismic design of the control and auxiliary buildings mitigates against any adverse effects that the collapse of the turbine building roof will have on the auxiliary or control building walls.

The turbine lubricating oil reservoirs for Units 1 and 2 are 18 feet from the control building walls. Both reservoirs are provided with oil retention dikes and floor drain sumps. The control building walls are two-hour rated. An uncontrolled lube oil fire could degrade and breach the two-hour rated fire wall.

The heating boiler room is part of the Unit 2 turbine building and could contain 550 gallons of fuel oil. It is located next to the water treatment area and Unit 2 facade. An unmitigated fire in this room is not expected to affect safe shutdown.

5.1.4 Fire Protection Systems

The turbine building is provided with fire hose stations and several automatic wet pipe sprinkler systems. The sprinkler systems cover portions of the general area of the turbine building on the 8-foot and 26-foot elevations adjacent to the control and auxiliary buildings and the area under the condensers. An automatic deluge system protects the turbine lube oil reservoirs and the hydrogen seal oil units. The heating boiler room is also provided with an automatic sprinkler system. The turbine oil and lubricant storage area is enclosed in a three-hour rated enclosure with the exception of a 1½-hour rated fusible link fire damper. An eight-inch curb is provided around the tank and the room is protected with an automatically-actuated sprinkler system.

An automatically-actuated dry chemical system is provided for suppression of an oil fire in the turbine bearings.

5.1.5 Adequacy of Fire Protection

The 1½-hour rated fire damper in the turbine oil and lubricant storage area is inadequate. The eight-inch curbing around the storage tank is insufficient to contain the tank contents plus fire suppression water.

The rating of the control building walls adjacent the turbine lubricating oil reservoirs is inadequate to protect the safety-related areas of the control building from a lube oil fire. In addition, the 18-inch dike height around the reservoirs is not sufficient to contain lube oil leakage within the area protected by the reservoir sprinkler systems.

The turbine lube oil reservoir for Unit 1 is located on the 8-foot elevation of the turbine building. An open hatch above the reservoir interconnects the 8-foot elevation and the 26-foot elevation of this building. The combustion air intakes for the two emergency diesel generators are located within the turbine building on the 26-foot elevation, approximately 35 feet and 60 feet, respectively, from the Unit 1 reservoir. Smoke from a lube oil reservoir fire could be drawn into the diesel generator combustion air intakes and prevent diesel starting during the intial automatic starting sequence. If the diesels do not start during the initial attempts, the diesel-driven air compressors must be started manually to supply additional compressed air for diesel generator starting. There is not reasonable assurance that the automatic deluge system would extinguish a lube oil reservoir fire before sufficient smoke is generated to affect operation of both emergency diesel generators. Further, it is likely that smoke from a lube oil reservoir fire would incapacitate the diesels prior to manual extinguishment of the fire if the reservoir deluge system does not function. Although plant shutdown could commence without offsite power or emergency power from the diesel generators, a source of AC power would be needed eventually to prevent core damage. The licensee has not adequately shown that there is reasonable assurance that the diesels could be successfully started in time to supply safe shutdown power following manual suppression of a lube oil fire.

The automatic sprinkler system provides adequate protection for the heating boiler room.

5.1.6 Modifications

The licensee has proposed the following modifications:

(1) Fire detectors will be added to the heating boiler room.

(2) The fire damper in the turbine oil and lubrication storage room will be replaced with a three-hour fire door damper.

(3) The curbing around the lube oil storage tank and around the lube oil reservoirs will be raised to ensure that the full tank contents can be contained with an appropriate margin for fire suppression water. The storage of oil drums within the lube oil storage tank curb will be discontinued.

(4) The control building walls that could be affected by a turbine lube oil reservoir fire will be upgraded to a three-hour rating including fire dampers, fire doors and penetration seals.

(5) One fire detector will be added to each turbine lube oil area.

(6) To preclude the possibility of the plant hydrogen header from increasing the severity of postulated fires, the hydrogen header will be rerouted in the turbine building to avoid passing over the turbine lube oil reservoir.

(7) A two-hour fire rated enclosure will be provided around the existing air intake structures for the diesel generators so that combustion and ventilation air can be ducted directly from outdoors as well as from inside the building to ensure start-up capability in the event of a turbine building fire. Remote manually-operated fire dampers will be provided to interrupt air intake from inside the building in the event of a lube oil fire.

Subject to implementation of the above modifications, we find that the fire protection for the turbine building satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.2 Control Room

5.2.1 Safety-Related Equipment

The control room contains safety-related control cabinets and a walk-through instrument tunnel. The instrument tunnel includes panels which contain redundant safety-related wiring and equipment. Some of these safety-related equipment and cables are normally used for safe shutdown.

5.2.2 Combustibles

The combustibles in the area consist of electrical cable insulation and jacketing, plastic parts of electrical components, and small quantities of Class A combustibles. A kitchenette is located behind the instrument panels and is open to the control room. The overhead flourescent light fixtures have plastic diffusers; the combustibility of this material has not been described by the licensee.

The control room is separated from other plant areas by doors, floor, roof, and walls having a minimum rating of two hours with the exception of the viewing window adjacent the turbine building.

5.2.3 Consequences if No Fire Suppression

A postulated fire in the control room has the potential for damaging significant amounts of safety-related equipment. In addition, a postulated fire in certain control room panels could damage control cables for redundant safety systems that are required for safe shutdown. However, control of safe hot shutdown systems except for the emergency diesel generators can also be achieved at remote shutdown panels in the event of fire damage to control room cables and equipment. Safe cold shutdown can be achieved and maintained regardless of damage to control room cables and equipment. Smoke and dripping plastic from combustion of the light fixture diffusers could result in evacuation of the control room.

5.2.4 Fire Protection Systems

There is no fire detection system currently monitoring fires in the control room. Two wall mounted 75-pound carbon dioxide units with hose reels containing enough hose to reach all areas of the room are provided for fire fighting purposes. Backup protection is provided by two water hose reels equipped with fog nozzles located nearby outside the control room.

5.2.5 Adequacy of Fire Protection

The fire protection system within the control room is judged to be inadequate to ensure normal control of redundant safe shutdown systems. Without fire detectors within the control room and within the control panels, there is no reasonable assurance that fires will be detected and extinguished early. Further, the carbon dioxide extinguishers may not be able to suppress certain electrical or Class A fires.

The control room and computer room ventilation system can be manually placed in a recirculation mode to assure the habitability of these spaces in the event of a fire outside the area. This mode provides for 100 percent recirculation of air through the charcoal filter units. However, these areas have no provision for smoke venting for a fire inside these rooms except through the charcoal filters. Such usage would damage the filters, possibly causing ignition of the charcoal.

There are four breathing masks connected to a manifold system which would supply control room personnel with air from an oil-less compressor. The quality of this air supply for breathing for a long-term fire has not been verified. The breathing masks are currently stored within the control room instrument tunnel. In the event of a fire inside the control room instrument tunnel, the breathing masks would be inaccessible and, because of their proximity to combustible wiring insulation, could be damaged by the fire.

5.2.6 Modifications

The licensee proposes the following improvements in fire protection for the control room:

(1) Fire detectors will be added in the control room general area and inside cabinets housing redundant safe shutdown cables and equipment.

(2) The viewing window will be upgraded to a two-hour fire rating, consistent with the existing rating of the walls.

(3) A manually-actuated smoke exhaust system will be installed as part of the same exhaust system used for the computer room.

(4) Two portable 2½-gallon pressurized water extinguishers will be located inside the control room.

(5) The control room breathing masks will be relocated so as to be more readily available and less susceptible to damage and the air supply will be certified acceptable for breathing.

(6) The discharge nozzle of the existing carbon dioxide extinguishing equipment in the control room will be modified to facilitate manual suppression of fires in the confined walk-through instrument tunnel.

(7) Two hose reels with 100 feet of 1-inch hose and fixed fog nozzles will be installed outside the control room at the entrances to this room from the turbine building.

(8) A remote panel will be provided in each diesel generator room to permit startup and loading of the associated diesel generator in the event of fire damage to the diesel generator controls in the control room.

(9) Verification will be provided that the flame spread rating of the control room flourescent light fixture diffusers is less than 25. Because the light diffuser manufacturer is no longer in business, the flame spread rating will be established by a suitable test or evaluation by the licensee. Alternatively the licensee will demonstrate that the hazard (i.e., number of diffusers and their locations) is within acceptable limits.

Subject to implementation of the above-listed modifications, we find that the fire protection for the control room satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.3 Cable Spreading Room

5.3.1 Safety-Related Equipment

The cable spreading room is located on the 26-foot elevation directly beneath the control room and directly above the auxiliary feedwater pump room, which itself is adjacent the emergency switchgear and battery rooms. The cable spreading room contains redundant divisions of safety-related cables, motor control centers, transformers, reactor protection system relay cabinets, and other safety-related equipment for both Units 1 and 2.

5.3.2 Combustibles

The combustibles in this area consist of a large amount of electrical cable insulation and jacketing and plastic portions of electrical and electronic components located inside cabinets. The transformers contain a noncombustible fluid. Cable trays and supports are of total steel construction. Most of the cable is routed six feet above the floor.

5.3.3 Consequences if No Fire Suppression

An unmitigated fire in the cable spreading room could damage redundant divisions of cable and motor control centers required for safe shutdown of both units. The control cables for redundant safe hot and cold shutdown equipment are routed through the cable spreading room; however, the control of safe hot shutdown equipment can be transferred to remote shutdown panels located outside the room. The control of safe cold shutdown operations cannot be performed from the control room or remote shutdown panels in the event of cable spreading room fire damage to safe cold shutdown equipment control cables. However, the licensee has stated, subject to further verification, that safe cold shutdown equipment could be placed in service manually in the event of fire damage to these control cables. The only power cables in the room are short sections of cable in conduit which penetrate the floor of the room and directly enter the bottom of the motor control centers. Some of these power cables are for redundant safe hot and cold shutdown systems. Loss of redundant motor control centers could prevent safe shutdown.

5.3.4 Fire Protection Systems

The cable trays in this room are totally enclosed. Each tray has also been provided with ½-inch thick full width Kaowool insulating blanket between the cables and the tray cover. One wheeled 100-pound carbon dioxide extinguisher and one wheeled 150-pound dry chemical extinguisher are the primary means of fire suppression. A hose station and portable extinguishers are provided as backup fire suppression. Two smoke detectors that alarm in the control room provide notification of a smoke buildup in the cable spreading room.

5.3.5 Adequacy of Fire Protection

Access to the cable spreading room for fire fighting purposes is through two entrances, one at the cable spreading room floor elevation and the other from an open spiral staircase leading down from the control room. The two-hour rated control room door exposes the control room to the effects of a fire in the cable spreading room. The capability of the cable tray design to retard flame propagation has not been demonstrated by test; it is expected that the solid covers, although providing a retardant to flame spread, would not permit rapid access to a fire. Manual use of the wheeled carbon dioxide and chemical extinguishers does not allow for the prompt extinguishment of cable tray fires near the ceiling level of the cable spreading room. Because the cable spreading room has a recirculation ventilating system with makeup supply, there are no fixed provisions for exhausting the products of combustion of a fire; therefore, the smoke and toxic gases would hamper manual fire fighting efforts.

5.3.6 Modifications

The licensee has proposed the following modifications:

(1) Eight additional detectors will be provided. The total number of detectors will be ten.

(2) The penetrations, fire dampers and doors will be upgraded to a three-hour rating.

(3) Where nonsafety-related cabling runs between redundant channels, fire stops will be provided by coating the interposing cable section with a fire retardant coating or cables will be re-routed to remove the combustible pathway.

(4) Floor drains will be installed to prevent accumulation of fire suppression water around the motor control centers.

(5) Two 1½-inch hose reel stations fitted with low velocity fog nozzles and extension pieces will also be added outside the cable spreading room. Two 1-inch hose stations fitted with ball shutoff variable fog nozzles will also be installed.

(6) A second three-hour rated door will be installed in the southeast corner wall.

(7) A manually-actuated smoke exhaust system, including fan, ductwork, dampers, and controls will be installed in the cable spreading room. The proposed smoke exhaust system will exhaust products of combustion outside the building so as not to inadvertently actuate fire detectors in other plant areas or expose other safety-related areas to smoke damage. The exhaust fan motor cabling and control will be located outside the cable spreading room.

(8) A sealant will be applied to the floor in order to prevent water seepage into the rooms below.

(9) A three-hour fire rated door with friction seal will be installed between the control room and the cable spreading room.

We find that the above listed modifications represent a significant improvement to the fire protection system for the safety-related equipment and cables in the cable spreading room. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications, however, does not provide reasonable assurance that safe shutdown would not be prevented by a fire in the cable spreading room. The licensee has proposed further modifications involving the installation of a preaction sprinkler system which, in conjunction with the existing cable tray system and above-listed modifications, is expected by the licensee to assure protection for redundant safe shutdown systems. However, the overall fire protection system in the cable spreading room requires further evaluation by the staff and licensee.

We will address the adequacy of the cable spreading room fire protection for safe shutdown cables and equipment in a supplement to this report after completion of the evaluation of this matter.

5.4 Switchgear Room

5.4.1 Safety-Related Equipment

The switchgear room contains safeguards switchgear for both divisions A and B of Units 1 and 2. Safety-related cable trays, conduit, distribution panels, and battery chargers for the station batteries are also present.

5.4.2 Combustibles

The combustibles in this room consist of electrical cable insulation and jacketing and plastic portions of electrical components within switchgear.

5.4.3 Consequences if No Fire Suppression

Because redundant switchgear are separated by 5½ feet, it is not expected that a single fire would damage both divisions of switchgear. However, an unmitigated fire in the switchgear room could damage cable for redundant divisions of safe shutdown systems for both Units 1 and 2. Two-hour fire barriers separate the switchgear room from other plant areas. An unmitigated fire is expected to remain within the boundaries of the room.

5.4.4 Fire Protection Systems

Wheeled and hand-held portable extinguishers utilizing both carbon dioxide and dry chemicals are provided. One ionization detector is provided for fire detection. One hose station is provided as backup fire protection.

5.4.5 Adequacy of Fire Protection Systems

Access for manual fire fighting is through two entryways. The fire hose at hose station HR-13 is not provided with a fog nozzle. In addition, the cable trays in the room appear to be at least eight feet above the floor. Except for the power and control cables associated with the service water pumps, all the safe shutdown cables in the switchgear room are routed in conduit. The cable trays that contain the service water pump cables are not interspersed between nonsafety-related cable trays and do not cross over any cable trays. However, the capability of extinguishing a fire with the carbon dioxide and dry chemical wheeled units is not adequate. There is no reasonable assurance that a fire would be extinguished before redundant divisions of safe shutdown cabling are damaged.

5.4.6 Modifications

The licensee has proposed the following modifications:

(1) The ventilation penetration seals will be upgraded to a two-hour rating.

(2) Cable interconnecting redundant divisions of safety-related cable trays will be rerouted or fire stops will be installed in the trays to eliminate the combustible pathways. Cable in conduit joining the pull boxes for redundant divisions of safety-related cable will be rerouted.

(3) Additional fire detectors will be installed.

(4) The floors of the electrical equipment room located directly above the switchgear room will be sealed to prevent water leakage.

(5) Three portable 2½-gallon pressurized water extinguishers will be added.

(6) A fog nozzle will be added to hose station HR-13.

(7) Two hose reels with 100 feet of 1-inch hose and all-fog nozzles with bail shutoff will be provided outside the switchgear room within 20 feet of the doors to this room.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables in the switchgear room. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications, however, does not provide adequate assurance that safe shutdown would not be prevented by a fire in the switchgear room. The licensee has also proposed to cover the cables in all cable trays in the switchgear room with Kaowool ceramic fiber insulating blanket. Information has been provided by the licensee

to demonstrate the effectiveness of Kaowool to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. Our evaluation of this information has not been completed.

We will address the adequacy of the fire protection for safe shutdown cables in the switchgear room in a supplement to this report after completion of the evaluation of this matter.

5.5 Station Battery Rooms

5.5.1 Safety-Related Equipment

There are two emergency battery rooms supplying DC power to Units 1 and 2. One battery room supplies DC power for one division of both Units 1 and 2; the second battery room provides DC power for the redundant division of both Units 1 and 2. The only safety-related equipment in these rooms are the batteries and their corresponding cabling.

5.5.2 Combustibles

The combustibles in this area consist of a small amount of electrical cable insulation and jacketing and the battery casings themselves. An exhaust system is used to maintain hydrogen concentration below explosive limits.

5.5.3 Consequences if No Fire Suppression

An unsuppressed fire in a battery room could cause the loss of one of the two sets of battery banks. In addition, the nonrated ventilation louver to the adjacent emergency switchgear room may provide a path of smoke and hot gases to or from the switchgear room.

5.5.4 Fire Protection Systems

Since the fire loading in these rooms is relatively small, the licensee proposes to use portable carbon dioxide and dry chemical extinguishers and a hose station to suppress any postulated fire.

5.5.5 Adequacy of Fire Protection

There are no fire detectors in either battery room. The lack of fire detection hinders rapid manual fire fighting response. Because the ventilation flow is not automatically supervised, the possibility of loss of flow and hydrogen buildup to explosive levels in pockets exists. In addition, portable fire extinguishers are not readily available near the battery room entrances.

5.5.6 Modifications

The licensee has proposed the following modifications to improve the fire protection program:

(1) One fire detector will be added to each battery room.

(2) The ventilation louver between the battery and switchgear rooms will be upgraded to a two-hour rating.

(3) Portable pressurized water fire extinguishers (2½-gallon) will be added in the switchgear room for the protection of the battery rooms.

(4) Annunciation of the loss of ventilation in the battery rooms will be provided in the control room.

We find that, subject to implementation of the above described modifications, the fire protection for the battery rooms satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.6 Emergency Diesel Generator Rooms

5.6.1 Safety-Related Equipment

The two emergency diesel generators, which are shared between Units 1 and 2, are housed in separate rooms at elevation eight feet of the control building. The two emergency diesel generator day tanks each have a 550-gallon capacity and are located inside their respective diesel generator rooms. Certain safety-related conduits common to both diesel generators traverse both rooms. The service water system supply piping for diesel generator cooling is separated by division, one division traversing each diesel generator room.

5.6.2 Combustibles

The combustibles in each room consist almost entirely of fuel and lube oil. Each diesel has a 550-gallon wall mounted tank and an integral base mounted 550-gallon tank. There is comparatively little cable insulation present.

5.6.3 Consequences if No Fire Suppression

An unmitigated fire involving all the fuel and lube oil in one diesel generator room could affect the operability of the diesel generator not involved in the fire, since electrical cable necessary to operate one diesel generator traverses the compartment with the fire.

5.6.4 Fire Protection Systems

Each diesel generator room is provided with a manually-actuated dry pipe sprinkler system. Floor drains are provided to drain fire fighting water. One ionization detector which alarms in the control room is provided in each diesel generator room. The walls of each room are two-hour fire rated, except for the exhaust ventilation louvers. Ventilation inlets are equipped with automatically and manually-actuated fire dampers.

5.6.5 Adequacy of Fire Protection

The two-hour fire wall rating may not be adequate to withstand an unmitigated fire. In addition, conduits carrying safety- and nonsafety-related cable for each diesel generator pass through both rooms. Finally, the manually-actuated dry pipe sprinkler system does not provide sufficient assurance that the worst case fire in the diesel generator room will be extinguished promptly and not affect the structural integrity of the control building or spread to other areas, such as the compressor room, switchgear room, or turbine building.

Each diesel generator room contains two ventilation/combustion air fans which provide full redundancy. The power supply cables are run independently to each fan from its respective motor control center panel. However, the control cables and junction boxes are located in a single room with distribution to both diesel room ventilating systems. In the event of a fire in this room, both ventilating systems could become inoperative.

5.6.6 Modifications

The licensee has proposed the following modifications:

(1) The three generator room walls common with other plant areas will be upgraded to a three-hour rating, including dampers and penetrations.

(2) Conduits for each diesel generator passing through both rooms will be rerouted or the circuitry redesigned to avoid the possibility of a single fire affecting both diesel generators.

(3) One ionization detector per room will be added.

(4) The diesel generator room ventilation system control cables and junction boxes will be relocated outside the diesel generator rooms.

(5) The manually-actuated dry pipe sprinkler system in each room will be upgraded to a wet pipe system operated automatically with flow annunciation in the control room.

We find that, subject to implementation of these modifications, the fire protection for the diesel generator rooms satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.7 Auxiliary Building - Elevation (-)19 Feet and Elevation (-)5 Feet

5.7.1 Safety-Related Equipment

The residual heat removal pumps for both units are located in separate cubicles on the lower elevation. There are two pumps serving each unit and one pump per unit is required for cold shutdown. Redundant safety-related valves for Unit 1 are located in a pipe chase which extends from the lower elevation up to the 8-foot elevation. These valves are required

for containment isolation following a loss-of-coolant accident but are not required for safe shutdown in a fire situation. Redundant residual heat removal cables are routed in conduit on both elevations. Residual heat removal heat exchangers for both units are located on the (-)5-foot elevation and extend up to the 8-foot elevation. A fan cooling unit for the residual heat removal pump area is located on the (-)5-foot elevation. This cooling unit is not required for shutdown since the pump rooms can also be cooled by the auxiliary building ventilation system. Residual heat removal flow control valves on the (-)5-foot elevation are normally used for cold shutdown but are not essential since alternate modes of heat transfer control are available.

5.7.2 Combustibles

The low fire loading in this area is due to pump lubricating oil and cable in conduit. There is no cable in cable trays on either elevation.

5.7.3 Consequences if No Fire Suppression

A pump lube oil fire or cable fire would damage equipment of one safe shutdown division but would not directly damage safe shutdown equipment of the redundant division or equipment for the other unit due to barriers, separation and conduit protection for cable. However, an unmitigated fire could possibly raise the ambient temperature in stagnant air flow regions sufficiently to damage redundant equipment.

These elevations are connected with each other and with the eight-foot elevation by an open stairway, a hatchway and a pipe chase. However, because the cables are routed in conduit and there are no other combustible paths between elevations, a fire would be confined to a single elevation.

5.7.4 Fire Protection Systems

Portable extinguishers are located on the (-)19-foot elevation and near the stairway on the 8-foot elevation. There are no hose stations within reach of these areas. There are no detectors nor fixed suppression systems on either elevation.

5.7.5 Adequacy of Fire Protection

The lack of early detection and an available hose stream could result in a fire that could not be extinguished by portable extinguishers. Significant damage would occur to at least one division of safe shutdown equipment.

5.7.6 Modifications

The licensee has proposed to install an early warning fire detector in each of the pump cubicles on the (-)19-foot elevation and a similar detector in the corridor of both elevations. Fire hose stations, as

described in Section 5.8 of this report, will be installed on the 8-foot elevation of the auxiliary building which will provide manual extinguishment capability for the lower elevations.

We find that, subject to implementation of these modifications, the fire protection for the (-)19-foot and (-)5-foot elevations of the auxiliary building satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.8 Auxiliary Building - Elevation 8 Feet

5.8.1 Safety-Related Equipment

Redundant components and cable for safety-related and safe shutdown systems of both units are located throughout this elevation. The four containment spray pumps (two per unit) and four safety injection pumps (two per unit) are located together in the same compartment. The safety injection pumps can be used to provide an alternate source of borated water during plant shutdown. This pump compartment is connected by open doorways with the area containing the four component cooling water pumps which serve both units. At least one component cooling water pump per unit is required for safe cold shutdown. The safety injection pump compartment is also open to the area containing the two charging pump control stations for Unit 1. One station has the controls for two charging pumps and the other station controls the third charging pump. At least one of the three charging pumps per unit is required for safe hot shutdown of that reactor. The charging pumps are located in individual cubicles with open doorways facing the charging pump control stations. The three charging pumps and two control stations for Unit 2 are also located on this elevation. Pipes, valves, tanks, motor control centers, instrument racks and heat exchangers for one or more of the following safety-related safe shutdown systems are located on this elevation: residual heat removal system, chemical and volume control system, and component cooling water system.

Each containment is joined to this elevation of the auxiliary building by two separate pipeway structures which are located within the containment facades. Pipeway 1 and lower pipeway 2 extend from the auxiliary building to the Unit 1 containment. Pipeway 4 and lower pipeway 3 join the auxiliary building to the Unit 2 containment. These pipeways are enclosed on five sides and are open to the auxiliary building on the sixth side. Safety-related cable and valves are located in all four pipeways.

5.8.2 Combustibles

Cable insulation is a significant combustible on the eight-foot elevation of the auxiliary building and provides a combustible pathway throughout this elevation. A significant amount of cable is routed in open cable trays in pipeway 4, and provides a combustible pathway into the auxiliary building. Cable is routed in conduit in pipeway 1 to within four feet of the penetrations into containment. All the cable in lower pipeways 2

and 3 is routed in conduit and there are no other combustibles in these pipeways.

Each charging pump contains 11 gallons of lube oil and each safety injection pump contains 1 gallon of lube oil. Each of the four hydraulic control units for motor-operated valves contains 4 gallons of combustible fluid. Other pumps contain smaller amounts of lube oil. Absolute and charcoal filters are used on this elevation for the auxiliary building exhaust system and the service building and general auxiliary building exhaust systems. Hydrogen pipelines are routed through the elevation passing through two charging pump rooms, near the charging pump controllers and in the component cooling pump area.

5.8.3 Consequences if No Fire Suppression

Redundant safe shutdown equipment on the entire elevation is interconnected by corridors, open areas and open equipment cubicles. Cables, pumps and motor control centers for redundant safe shutdown equipment are located in open areas or in equipment cubicles that are generally without doors and that open onto the corridors and open areas. Unsealed cable tray penetrations through the cubicle walls provide combustible pathways to the corridors and open areas. Redundant cable divisions are routed in close proximity to each other and to equipment containing oil and charcoal. Consequently, we expect that an unmitigated fire on this elevation could prevent safe shutdown by damaging redundant equipment or cable of one or more shutdown systems for one or both units.

This elevation of the auxiliary building is separated from other plant areas by two-hour fire rated walls, sufficient to prevent an unsuppressed fire from propagating to other buildings. Cable tray penetrations to other auxiliary building elevations are sealed.

Safety-related cables could be damaged by a fire in pipeways 1 and 4, but loss of all cables in either pipeway would not affect safe hot shutdown. A fire in pipeway 1 could damage cable to a motor-operated valve required for cold shutdown. However, this valve could be operated manually inside containment in time to support cold shutdown operations. An unmitigated fire in pipeway 4 could propagate to the auxiliary building. A cable fire in lower pipeways 2 and 3 would be confined to the cable in the affected conduit and no significant damage would be expected. A fire in a pipeway would not be expected to spread to the containment facade or to other pipeways.

5.8.4 Fire Protection Systems

Fire protection is provided by portable extinguishers and a single hose station.

5.8.5 Adequacy of Fire Protection

The single hose station on the eight-foot elevation of the auxiliary building does not reach all areas of this elevation. With additional fire hose stations on this elevation sufficient to reach all areas, manual fire fighting would be unhampered. Exhaust ventilation is provided for each pipeway near the containment end which would facilitate entry for manual fire fighting. Because of the lack of fire detectors on this elevation, a fire could evolve beyond the suppression capabilities of the portable extinguishers currently provided. The present fire protection does not provide reasonable assurance that a fire will not result in damage to redundant safe shutdown cable and equipment.

Design features in the hydrogen pipeline on this elevation would limit the amount of hydrogen that could leak from the pipeline. In addition, since the noble gases present in these pipelines are radioactive, the building radiation monitors in the exhaust ventilation system would detect leakage. The flat ceilings and forceful ventilation would prevent buildup of hydrogen from a pipe leak. However, a fire involving leaking hydrogen could impinge on safety-related cables or equipment until the leakage was detected and isolated.

The auxiliary building ventilation exhaust fans and their power supplies are located on this elevation. A fire in the area could incapacitate the auxiliary building ventilation system.

5.8.6 Modifications

The licensee has proposed to add smoke and heat detectors throughout the eight-foot elevation of the auxiliary building. Detectors will be installed in pipeways 1 and 4 in accordance with National Fire Protection Association Standard NFPA 72D, with a minimum of two detectors per pipeway. Four hose stations will be added to assure manual suppression capability at all locations on this level, including the pipeways.

Cable tray penetration seals will be added at penetrations through cubicle walls to provide a three-hour rated seal where fire spread could affect safety-related cables or equipment in another area. The licensee will provide test data to verify the rating of existing and proposed cable tray penetration seals.

The nonsafety-related cable that interconnects redundant safety-related cable trays will be rerouted or fire stops will be provided so that combustible pathways between redundant cable will be eliminated.

The baseplate drains for the safety injection pumps and the containment spray pumps will be shut to prevent the spread of lube oil beyond each pump's baseplate area. This will prevent spread of oil fires over the floor and mitigate the damage to adjacent pumps. However, a safety injection pump lube oil fire could still damage the redundant pump. Because of the alternate safe shutdown function of these pumps and the

many combustible pathways on this elevation, the licensee will provide an automatically-actuated sprinkler system to protect these pumps such that fire damage will be confined to a single pump. The sprinkler system nozzles will be oriented to minimize water spray to pumps and motors unaffected by the fire.

The four component cooling pumps are located in close proximity in an area with a significant quantity of electrical cable. At least two of these pumps must be available for normal cold shutdown of the two units; one pump can be used to bring both units to cold shutdown over an extended duration. The licensee will install an automatically-actuated water suppression system to protect the four component cooling water pumps such that fire damage will be confined to a single pump. The sprinkler system nozzles will be oriented to minimize water spray to pumps and motors unaffected by the fire.

Charcoal and absolute filters for the service building and general auxiliary building ventilation exhaust are housed in metal cabinets in area 159. Fire detectors will be installed in this area. Absolute filters and charcoal filters (5,150 pounds) are located in a room adjacent to area 159. The two areas are now separated by an unrated barrier. The barrier will be upgraded to provide 2-hour fire protection with all penetrations sealed and the unrated doors replaced with 1½-hour fire rated doors.

Fire barriers will be installed between the hydrogen lines and the safe shutdown equipment and cable as required to provide suitable separation from a fire involving leaking hydrogen.

Portable smoke venting equipment will be provided to assure smoke venting capability in the event of fire damage to the auxiliary building exhaust system.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables on the eight-foot elevation of the auxiliary building. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications, however, does not provide adequate assurance that safe shutdown would not be prevented by a fire on this elevation of the auxiliary building. The licensee has also proposed to cover the cables in certain cable trays with Kaowool ceramic fiber insulating blanket and to protect redundant divisions of safe shutdown cable with Marinite board barriers. Information has been provided by the licensee to demonstrate the effectiveness of Kaowool and Marinite board to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. Our evaluation of this information has not been completed.

We will address the adequacy of the fire protection for safe shutdown cables in a supplement to this report after completion of the evaluation of this matter.

5.9 Auxiliary Building - Elevation 26 Feet

5.9.1 Safety-Related Equipment

This elevation houses safety-related components of the chemical and volume control system for both units. Boric acid transfer pumps, boric acid heat tracing transformers and volume control tanks are used during safe shutdown operations, but alternate safety-related equipment can be used for boration and letdown. That is, the safety injection system can be used as an alternate flow path, and the refueling water storage tank can be used as an alternate source of borated water.

Redundant safety-related cable is routed through various areas of this elevation in open ladder trays and conduit. Motor control centers for a single division of both units are located in the same compartment on this elevation. There are no redundant safe hot shutdown cables on the 26-foot elevation of the auxiliary building.

Each containment is joined to this elevation of the auxiliary building by a pipeway structure which is located within the containment facade. Upper pipeway 2 extends from the auxiliary building to the Unit 1 containment. Upper pipeway 3 joins the auxiliary building to the Unit 2 containment. These pipeways are enclosed on five sides and are open to area 187 of the auxiliary building on the sixth side. Safety-related piping, valves and cable are located in these pipeways.

5.9.2 Combustibles

The significant combustible in the safety-related areas of this elevation is cable insulation. Cable concentrations are heaviest in the containment spray additive tank room (area 187) and in the pipeways to containment. Combustible radwaste, including used filters, is drummed in a nonsafety-related area on this elevation. The radwaste drumming area and decontamination area are separated from safety-related areas by the bottom of the spent fuel pools. Hydrogen pipelines are routed through various safety-related areas on this elevation.

The boric acid transfer pumps are canned type and contain no lube oil. The boric acid heat tracing transformers are dry type and contain no combustible fluid.

5.9.3 Consequences if No Fire Suppression

A fire originating in most areas of this elevation would be confined, by barriers and lack of combustible pathways, to nonsafety-related equipment or to single divisions of safe shutdown systems. However, area 187, an open floor area on this elevation, contains a heavy concentration of cable with redundant divisions of safety-related cable trays in close proximity

or interconnected by nonsafety-related cable. An unmitigated fire would damage much of the cable in this area. Redundant boric acid transfer pumps and boric acid heat tracing transformers could also be damaged by an unmitigated fire in this area. Although the pumps and transformers are used for safe shutdown, alternate systems are available on the eight-foot elevation of the auxiliary building. An unsuppressed fire could also damage two safety-related motor control centers, incapacitating components of a single division for both units. A fire in this area would not prevent safe hot shutdown.

Areas 184 and 185 and the pipeways to containment are open to area 187. All of these areas contain safety-related cable in open trays and an unmitigated fire could damage much of this cable and expose safety-related cables in area 187 to a fire. A fire in these areas would not prevent safe hot shutdown.

Safety-related cable could be damaged by a fire in upper pipeways 2 and 3, but loss of all cables in either pipeway would not affect safe hot shutdown. A fire in upper pipeway 2 could damage cable to a valve required for safe cold shutdown. However, this valve could be operated manually inside containment in time to support cold shutdown operations. An unmitigated fire in either pipeway could propagate to the auxiliary building.

5.9.4 Fire Protection Systems

Fire protection is provided by portable fire extinguishers located throughout this elevation and a single fire hose station located near the decontamination area. There are no fixed suppression or detection systems located on the 26-foot elevation of the auxiliary building or in the connecting pipeways.

5.9.5 Adequacy of Fire Protection

The single hose station on the 26-foot elevation of the auxiliary building reaches only the radwaste drumming area and the decontamination area. With additional fire hose stations on this elevation, manual fire fighting would be unhampered. Exhaust ventilation is provided for each pipeway near the containment end which would facilitate entry for manual fire fighting. Because of the lack of fire detectors in all areas, a fire could evolve beyond the capabilities of the portable extinguishers currently provided. An essentially unmitigated fire would result.

Hydrogen is present in the ½-inch diameter noble gas recirculation system pipe and in the 3/4-inch diameter hydrogen supply header. Design features in these pipelines would limit the amount of hydrogen which could leak from the pipelines. The gases in the noble gas recirculation system are radioactive, and leakage would be detected by the building radiation monitors in the exhaust ventilation system. The flat ceilings and forceful ventilation would prevent buildup of hydrogen from a pipe leak.

However, a fire involving leaking hydrogen could impinge on safety-related cable or equipment.

5.9.6 Modifications

The licensee has proposed to add fire detectors throughout the 26-foot elevation of the auxiliary building. Detectors will be added to upper pipeways 2 and 3 in accordance with National Fire Protection Association Standard NFPA 72D with a minimum of two detectors per pipeway. Also, hose stations will be added on this level to assure manual suppression capability at all locations, including the pipeways. Fire detection will be provided for the radwaste area to minimize the delay in initiating manual suppression efforts and thus minimize the release of radioactive materials particularly from used ventilation filters.

The licensee has determined that nonsafety-related cable interconnects redundant safety-related cable trays. The interconnecting cable will be rerouted or fire stops provided so that pathways between redundant cable will be eliminated.

Cable tray penetration seals will be added to penetrations through cubicle walls to provide a three-hour fire rated seal where fire spread could affect safety-related cables or equipment in another area. Test data will be provided to verify the rating of existing and proposed cable tray penetration seals.

Excess flow and manual isolation valves will be installed in the hydrogen supply header at its point of entry into the auxiliary building to automatically isolate small leaks in this line. Fire barriers will be installed between the hydrogen lines and safe shutdown equipment and cable as required to provide suitable separation from a fire involving leaking hydrogen.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables on the 26-foot elevation of the auxiliary building. We therefore conclude that the licensee should proceed with implementing the modifications.

A fire on this elevation of the auxiliary building would not prevent safe hot shutdown. However, the ability to achieve safe cold shutdown following a fire on this elevation has not been verified. The licensee has proposed to cover the cables in certain cable trays on this elevation with Kaowool ceramic fiber insulating blankets to provide further fire protection. Information has been provided by the licensee to demonstrate the effectiveness of Kaowool to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. A review of this information by the staff is required to verify that safe cold shutdown can be achieved within 72 hours of a fire on this elevation of the auxiliary building after application of the Kaowool blanket.

We will address the adequacy of the fire protection for safe cold shutdown cables on the 26-foot elevation of the auxiliary building in a supplement to this report after completion of the evaluation of this matter.

5.10 Auxiliary Building - Elevation 46 Feet and Above

5.10.1 Safety-Related Equipment

Boric acid tanks and component cooling water surge tanks and heat exchangers for both units are located on the 46-foot elevation of the auxiliary building. At least one division of component cooling water equipment is required for safe cold shutdown. Alternate supplies of borated water are available to perform the shutdown function of the boric acid tanks.

Redundant safety-related cable in trays and conduit is routed through the 46-foot elevation. There are also two safety-related motor control centers, one per unit, serving equipment of one safety division. There are no redundant safe hot shutdown cables on these elevations.

The 46-foot elevation houses spent fuel pool equipment including spent fuel pool cooling pumps, heat exchangers, skimmer pumps and filters. This equipment is safety-related but not required for safe shutdown.

The 52-foot and 66-foot elevations house nonsafety-related ventilation equipment. There are no safety-related cables or equipment on these elevations.

5.10.2 Combustibles

The combustibles in the spent fuel pool equipment area consist of cable insulation and a small amount of pump lube oil. Cable insulation is a significant combustible in the boric acid tank area (area 239), and in the nonsafety-related electrical equipment rooms (areas 245 and 246).

The heating boiler day tanks are located in separate cubicles on the 52-foot elevation. Each of the two tanks contains 550 gallons of fuel oil.

Areas 272 and 273 on the 66-foot elevation each house a containment purge filter cabinet. Each filter cabinet contains 3,780 pounds of charcoal.

5.10.3 Consequences if No Fire Suppression

An unsuppressed fire in the boric acid tank area (area 237) would not be expected to damage the boric acid tanks, component cooling water surge tanks or component cooling water heat exchangers. However, due to the heavy concentration of cables, a considerable quantity of cable could be damaged. In some cases, cable trays of redundant safety-related divisions are in close proximity and cable of one division in conduit passes over cable trays of the other division. In a few locations, nonsafety-related

cable interconnects cable trays of redundant divisions. Therefore, it is expected that redundant safety-related cable would be damaged by an unsuppressed fire. None of the cables in this room are required for safe hot shutdown.

Safety-related motor control centers would also be damaged by an unsuppressed fire in the boric acid tank area. Because the loss of both motor control centers would only affect a single division of each unit, there would be no effect on safe shutdown.

The boric acid tank area is located between two electrical equipment rooms that contain a heavy concentration of cable trays. An unsuppressed fire in either electrical equipment room could spread to the boric acid tank area through the existing cable tray penetration seals.

An unsuppressed fire in either of the heating boiler day tank cubicles would be confined to the affected cubicle and would not damage safety-related equipment. Similarly, a fire in the containment purge charcoal filters on the 66-foot elevation of the auxiliary building would have no effect on safe shutdown due to the separation from safety-related equipment.

An unsuppressed fire on the 46-foot elevation would be expected to propagate to lower elevations of the auxiliary building through the existing cable tray penetration seals.

An unsuppressed fire in the spent fuel pool equipment area could damage fuel pool cooling pumps and their associated cable. An alternate method of pool cooling can be instituted if these components are damaged. There would be no effect on safe shutdown nor release of radioactivity but a fire originating here could propagate to other areas, including the containment penetration area, through the existing penetration seals.

5.10.4 Fire Protection Systems

Fire protection is provided by portable extinguishers located throughout these elevations and by two hose stations on the 66-foot elevation. An automatic wet pipe sprinkler system is provided in each of the heating boiler day tank rooms. There are no other fixed suppression systems nor detection systems on the 46-foot, 52-foot and 66-foot elevations of the auxiliary building.

5.10.5 Adequacy of Fire Protection

The lack of detectors and hose stations in the boric acid tank area could result in extensive cable damage and propagation of fire to or from the adjacent electrical equipment areas. Even if quickly detected, a fire in this area could incapacitate redundant safety-related divisions due to the proximity of redundant cables and interconnections between redundant trays. Conduit would not be expected to provide adequate protection if close to a large cable tray fire.

The construction of the heating boiler day tank rooms along with the installed sprinkler systems would be expected to confine a fire to the affected compartment and to extinguish it. However, there is no hose station available to provide backup extinguishing capability.

Hose stations on the 66-foot elevation provide adequate protection for the charcoal filters. Access for manual fire fighting is adequate on the 46-foot, 52-foot and 66-foot elevations.

5.10.6 Modifications

Cable trays are routed from the spent fuel pool area to the containment penetration area. The licensee proposes to upgrade the penetration seals to the containment penetration area to provide two-hour fire rated seals. The licensee will provide automatic detection, with annunciation in the control room, for the spent fuel pool equipment area to minimize damage to this equipment and fire propagation to the boric acid tank area.

The licensee will provide automatic detection in the boric acid tank area and in the adjacent electrical equipment areas.

The cable tray penetration seals between the boric acid tank area and the adjacent electrical equipment areas will be upgraded to provide a three-hour fire rated barrier to cable tray fire propagation.

The licensee will provide detectors in the heating boiler day tank rooms. The licensee will provide additional hose stations, with a maximum of 100 feet of 1½-inch hose per station, so that all areas of the 46-foot and 52-foot elevations, including the day tank rooms, can be reached by at least one hose stream.

The licensee will reroute all cable that interconnects redundant cable trays or provide fire stops to eliminate combustible pathways.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables on these elevations of the auxiliary building. We therefore conclude that the licensee should proceed with implementing the modifications.

A fire on these elevations of the auxiliary building would not prevent safe hot shutdown. However, the ability to achieve safe cold shutdown following a fire on the 46-foot elevation has not been verified. The licensee has proposed to cover the cables in all cable trays in the boric acid tank area on the 46-foot elevation with Kaowool ceramic fiber insulating blanket to provide further fire protection. Information has been provided by the licensee to demonstrate the effectiveness of Kaowool to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. A review of this information by the staff is required to verify that safe cold shutdown can be achieved within 72 hours of a fire on the 46-foot elevation of the auxiliary building after application of the Kaowool blanket.

We will address the adequacy of the fire protection for safe cold shutdown cables on the 46-foot elevation of the auxiliary building in a supplement to this report after completion of the evaluation of this matter.

5.11 Auxiliary Feedwater Pump Room and Local Control Station

5.11.1 Safety-Related Equipment

The auxiliary feedwater pump room contains the four auxiliary feedwater pumps and two remote shutdown panels for both Units 1 and 2. One remote shutdown panel contains division A controls for Units 1 and 2 and the redundant panel houses division B controls for both units. Steam generator level and pressure indication and the controls for the auxiliary feedwater pumps, service water pumps, and containment fan coolers are available at these panels. The loss of the control room because of a fire would require operation from these remote shutdown panels and two local control station panels located in the auxiliary building. Charging pump control, pressurizer pressure and level indication is available at these other local control stations. A three-hour fire rated personnel access tunnel partially separates the pump area from the remote safe shutdown panels.

5.11.2 Combustibles

The combustibles in this area consist primarily of electrical cable insulation and jacketing and small amounts of auxiliary feedwater pump lube oil. The room is currently used as a storage area and contains lubricating, servicing, and cleaning products.

5.11.3 Consequences if No Fire Suppression

An unmitigated fire may affect the capability to use the auxiliary feedwater pumps to bring either Units 1 or 2 to a safe shutdown condition, and conduit crossovers between redundant divisions provide a potential path for fire propagation which may affect control from the safe shutdown panels.

5.11.4 Fire Protection Systems

There are no fire detectors installed in the auxiliary feedwater pump room. Means of fighting a fire in this room is through the use of portable extinguishers and two fire hose stations. Area boundaries have two-hour fire rated walls and 1½-hour rated doors.

5.11.5 Adequacy of Fire Protection

The fire protection system for this room is inadequate. It may be possible for a cable tray fire to propagate to its redundant counterpart through interconnecting conduit. In addition an auxiliary feedwater pump lube oil fire may result in fire propagation out of the individual pump bays via the cable trays. The lack of smoke detection does not allow for

a rapid response to fight the fire manually. Adequate drainage facilities exist for fire suppression water. The use of portable ventilation equipment for smoke exhaust is suitable.

The remote shutdown panels are separated from each other by 30 feet. There is no direct combustible pathway between the two panels. The capability to bring the plant to a safe shutdown condition remotely from the control room is adequate by operation from the two charging pump panels and two remote shutdown panels.

5.11.6 Modifications

The licensee has proposed to implement the following modifications:

(1) Nine fire detectors will be added; four will be placed in the auxiliary feedwater pump area and five will be placed over the safe shutdown panels.

(2) Conduit crossovers between safety-related divisions will be rerouted or fire stops provided to eliminate combustible pathways.

(3) Enclosures for safety-related electrical boxes will be upgraded to assure that a water hose stream will not degrade proper functioning.

(4) Two 1-inch hose reels will be installed and fitted with all-fog nozzles with ball shut off.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables in the auxiliary feedwater pump area. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications, however, does not provide adequate assurance that safe shutdown would not be prevented by a fire in this area. The licensee has also proposed to cover the cables in all cable trays in the area with Kaowool ceramic fiber insulating blanket and to protect redundant divisions of safe shutdown cable with Marinite board barriers. Information has been provided by the licensee to demonstrate effectiveness of Kaowool and Marinite board to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. A review of this information by the staff is required before the proposed cable protection system is judged adequate to assure that redundant divisions of safe shutdown cable will not be damaged by a fire in the auxiliary feedwater pump area.

We will address the adequacy of the fire protection for safe shutdown cables in a supplement to this report after completion of the evaluation of this matter.

5.12 Containment

5.12.1 Safety-Related Equipment

The containment houses the following safety-related equipment: reactor coolant system, accumulators, containment fan coolers, valves, instrumentation, pressurizer and associated cabling.

5.12.2 Combustibles

The significant combustibles inside containment include: electrical cable insulation, lube oil from two reactor coolant pumps, and charcoal filters in the ventilation system. The cable insulation is primarily concentrated in specific sections of containment. The containment electrical penetrations are located primarily in two different sections of the containment.

5.12.3 Consequences if No Fire Suppression

The worst case reactor coolant pump lube oil fire resulting in the combustion of 175 gallons of lube oil in 4½ minutes from an uncurbed pool of oil beneath the reactor coolant pumps could produce higher than design air temperature inside containment.

In addition, certain cable tray fires inside key sections of containment may be able to spread to other sections and involve redundant divisions of safety-related cables, including those required for safe shutdown.

5.12.4 Fire Protection Systems

The containment is an entirely open structure, sectionalized by biological shields and missile barriers consisting of reinforced concrete. The primary means of fire protection is through the manual use of portable extinguishers located at the various containment elevations. One smoke detector is installed above each reactor coolant pump cubicle.

5.12.5 Adequacy of Fire Protection

There are an insufficient number of fire detectors located throughout the containment. There is not reasonable assurance that a fire in selected key sectors could be detected and manually suppressed before redundant divisions of safety-related cable are compromised. In addition, the portable extinguishers are not capable of suppressing the worst case fire inside containment. There are no hose stations inside containment, and the licensee has not indicated his capability to use manual hose stations located outside containment to suppress a containment fire. There is no curb to contain the oil from a reactor coolant pump lube oil spill.

5.12.6 Modifications

The licensee has proposed the following modifications to upgrade the fire protection program:

(1) A total of 46 heat and smoke detectors will be added at key locations within the containments of Units 1 and 2.

(2) Fire stops will be added to certain cable trays that pass through walls separating compartments within containment to minimize combustible pathways between compartments.

(3) The licensee will reroute conduit or provide fire stops to eliminate combustible pathways between cable trays of two redundant divisions in the Southwest quadrant, outside the missile barrier, at elevation 21 feet to 46 feet.

(4) Five hose reels, each with 100 feet of 1-inch hose, will be installed within each containment building. These hose reels will be supplied from the service water system and will reach all combustible materials in containment.

(5) A two inch angle curb will be added on the floor under each reactor coolant pump to limit the spread of pump lube oil.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables in the containment buildings. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications, however, does not provide adequate assurance that safe shutdown would not be prevented by a fire in the containment building. The licensee has also proposed to cover the cables in certain trays in the containments with Kaowool ceramic fiber insulating blanket or fire retardant coating. Information has been provided by the licensee to demonstrate effectiveness of the Kaowool or the coating to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. Our review of this information has not been completed.

The licensee has also proposed to install curbs and drain piping on the existing oil deflector cones on the reactor coolant pumps. Pump lube oil that leaks onto the deflector cones would be diverted via the curbs and drain piping to four 55-gallon drums located on the 8-foot elevation of the containments. The closed drums would be connected in parallel and would be provided with vents. A review of this design by the staff is required before it is judged adequate to prevent a large reactor coolant pump lube oil fire in the containment buildings.

We will address the adequacy of the fire protection for safe shutdown cables in the containment buildings and the adequacy of the proposed reactor coolant pump lube oil collection system in a supplement to this report after completion of the evaluation of this matter.

5.13 Service Building

5.13.1 Safety-Related Equipment

The service building contains no safety-related equipment but adjoins safety-related buildings. The service building includes the machine shop, chemistry laboratory, decontamination room, offices, locker rooms, health physics areas, storage areas and access control area.

5.13.2 Combustibles

The significant combustibles in the service building are primarily paper and protective clothing. There are also wood, combustible chemicals and some cable insulation present. The ready stores and clothes storage on the 26-foot elevation and an office on the 40-foot elevation have high fire loadings.

5.13.3 Consequences if No Fire Suppression

Considerable damage to nonsafety-related areas would result from an unsuppressed fire within the service building. The fire loadings in some areas are very high and could possibly cause structural damage. Generally, the two-hour fire rated barriers between the service building and safety-related areas would prevent damage to safety-related equipment. Cable tray penetration seals with a two-hour rating will prevent the propagation of cable fires through service building walls. Smoke and hot gases could spread from a fire in the service building to the auxiliary building via unsealed or inadequately sealed pipe and ventilation duct penetrations.

5.13.4 Fire Protection Systems

Fire protection is provided by three fire hose stations on the 26-foot elevation and two fire hose stations on the 40-foot elevation. Portable extinquishers rated for Class B and C fires and for Class A, B and C fires are provided throughout the building. An automatically-actuated sprinkler system is installed to protect the ready stores area and ready stores mezzanine. There are no fire detectors in this building.

5.13.5 Adequacy of Fire Protection

Most areas in the service building are either continuously or intermittently occupied and a fire would not be expected to evolve beyond the existing manual suppression capability. However, if fire suppression activities are delayed, a fire could propagate through unsealed penetrations.

5.13.6 Modifications

The licensee will install a fire detector in the chemistry laboratory that alarms in the control room. The licensee will also replace existing 1½-hour fire rated ventilation dampers with dampers consistent with the

rating of the service building walls shared with other areas. The licensee will verify that all penetrations in barriers between the service building and safety-related areas are sealed to provide at least two hour fire protection or upgrade the seals where necessary.

We find that, subject to implementation of these modifications, assurance is provided that a fire in the service building will have no affect on safe shutdown capability. Accordingly, we find that fire protection for this area satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.14 Circulating Water Pump House

5.14.1 Safety-Related Equipment

The six safety-related service water pumps are located in the circulating water pump house along with the four nonsafety-related circulating water pumps. Three service water pumps provide the necessary cooling for safe cold shutdown; only two pumps are required for safe hot shutdown. In addition, both the diesel-driven and motor-driven fire pumps are located in this building. Nonsafety-related fire system jockey pump, travelling water screens, screen wash pumps and motor control centers are also located in the pump house. Except for missile barrier walls between the circulating water pumps and the service water pumps and a metal security wall around the service water pump and fire pump area, there are no barriers inside the building. The fire pumps and service water pumps are all in close proximity to each other.

5.14.2 Combustibles

The major combustibles in the pump house are 250 gallons of diesel fuel in the fire pump day tank, 10 gallons of lube oil in the diesel engine, and 37 gallons of lube oil per circulating water pump. In addition, various transient fire loads were observed in the pump house during the site visit. These combustibles included two outboard marine engines with integral fuel tanks, plastic bags of trash, and a drum of grease (inside the fuel oil day tank curb).

5.14.3 Consequences if No Fire Suppression

A fire involving the contents of the fuel oil day tank could occur in two locations. A ruptured tank would drain into the curbing below the tank in one corner of the building. The tank is about 50 feet from the service water pumps and fire pumps. Therefore, a fire in the curbed area would have little direct affect on the pumps. However, the exposed steel building structure could be damaged. Other equipment damage could be expected due to high temperatures within the building. The diesel fuel oil could also leak from a broken piping connection at the diesel engine. A fire at the diesel engine would destroy both fire pumps and their cables and all service water pumps.

Lube oil leakage from a circulating water pump would drain to a lower elevation of the pump house. There is no equipment in this lower elevation and damage would be confined to one circulating water pump.

5.14.4 Fire Protection Systems

Fire protection is provided by portable fire extinguishers and two hose stations inside the pump house as well as exterior hose installations. There are six ionization-type fire detectors equally spaced in the pump elevation of the building.

5.14.5 Adequacy of Fire Protection

The pump house is a locked building that is normally unoccupied. A lube oil or diesel fuel fire of high intensity in this building could cause significant damage to the service water pumps and the redundant fire pumps and their cables before manual suppression efforts are initiated. A service water pump lube oil fire would not be expected to involve more than the service water pumps immediately adjacent to the affected pump leaving three pumps for shutdown if manual suppression efforts are not delayed. The service water pump main power cables are embedded in the concrete floor slab. Manual fire fighting access for a small fire would be adequate. Smoke venting is by two roof fans separated by 80 feet.

5.14.6 Modifications

The licensee has proposed the following modifications to the circulating water pump house fire protection system:

(1) The existing six ionization-type fire detectors will be relocated to provide more rapid response to a fire in the vicinity of the diesel-driven fire pump and fuel oil day tank.

(2) A sprinkler system will be installed over the diesel-driven fire pump and the service water pumps.

We find that the above listed modifications represent a significant improvement to the fire protection for the circulating water pump house. We therefore conclude that the licensee should proceed with implementing the modifications.

Implementation of the above listed modifications does not provide adequate assurance that a diesel fuel fire at the diesel-driven fire pump would not damage service water pumps required for safe shutdown and the motor-driven fire pump. The staff is concerned that the service water pumps and the other fire pump would be damaged, and safe shutdown prevented, in the event of failure of the sprinkler system. The licensee has also proposed to install a curb around the diesel-driven fire pump and to provide a floor drain in the curbed area. The floor drain would divert fuel oil leakage to the circulating water pump pit area on the lower elevation of the pumphouse. A review of this proposal by the staff is required before

the overall fire protection for the service water pumps and fire pumps is judged adequate.

We will address the adequacy of the fire protection afforded the service water pumps and the fire pumps in a supplement to this report after completion of the evaluation of this matter.

5.15 Yard Area

5.15.1 Safety-Related Equipment

The safety-related equipment in the yard area includes the fuel oil transfer pumps and the underground cable runs for the service water pump cable.

5.15.2 Combustibles

The major combustible hazard areas in the yard are the fuel oil storage tanks, fuel oil pumphouse, oil-filled transformers, gas turbine building and warehouse.

5.15.3 Consequences if No Fire Suppression

An unsuppressed fire in the yard area would not present a hazard to safety-related systems because of intervening distances or barriers. The two fuel oil storage tanks are diked to contain the contents of the tanks should a rupture occur. A fire in the fuel oil pump house could incapacitate both redundant fuel oil pumps, thus eliminating the makeup fuel supply to the diesel driven emergency generators. However, the diesel generators have day tanks containing a five-hour fuel supply, and should sustained diesel operation be required for a longer period, fuel can be readily brought in from offsite.

Electric cabling for the diesel fire pump is routed between the two redundant service water pump cable divisions underground in the yard. A fire could propagate to redundant service water cable by way of this interconnection and incapacitate the service water system. Such a fire could prevent safe shutdown.

5.15.4 Fire Protection Systems

Yard hydrants and hose lines stored in hose houses are available for manual suppression of a fire in the yard area as discussed in Section 4.3.1(3) of this report. The oil-filled transformers are protected by automatic water spray systems. Building walls adjacent to the transformers are protected by a water spray system which provides a water curtain for the exterior walls in the event of a transformer fire. The two fuel oil storage tanks in the yard area are protected by an automatic fixed foam extinguishing system.

5.15.5 Adequacy of Fire Protection

The existing yard fire protection systems are adequate to protect equipment required for safe shutdown with the exception of the service water pump cables routed through the yard.

5.15.6 Modifications

The licensee will reroute the diesel fire pump cable which currently interconnects redundant division service water pump cables. This will assure that a single fire in the yard will not incapacitate both redundant service water divisions.

We find that, subject to implementation of this modification, the fire protection for the yard area satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.16 Facade

5.16.1 Safety-Related Equipment

Each containment is enclosed in a rectangular, unheated, metal-sided facade that is bounded by the two-hour fire rated walls of the auxiliary building on two sides. The area is open from the grade elevation to the roof. Safety-related equipment includes the refueling water storage tank, electrical cables, steam generator blowdown isolation valves, containment purge valves, main steam isolation valves, and main steam safety valves. The atmospheric steam dump valves are also located in the facades. All cables at the containment electrical penetrations are nonsafety-related. The safe shutdown equipment are the electrical cables for one diesel fuel oil transfer pump and the safety and atmospheric dump valves from the main steam lines.

5.16.2 Combustibles

The combustibles in this fire area consist primarily of electrical cable, a heavy concentration of which is above pipeway 1.

5.16.3 Consequences if No Fire Suppression

A cable tray fire could incapacitate one of the two fuel oil transfer pumps that supply the diesel generators. Because cable for the redundant fuel oil transfer pump is not routed through the facade, the remaining pump would still be available to supply both diesels.

An unmitigated cable fire would not affect redundant safety valves but could damage cable for the atmospheric steam dump valves, necessitating manual operation of the valves. Because forced smoke venting would not be available, the buildup of toxic and corrosive combustion products from an unmitigated cable fire would hinder manual operation of the atmospheric steam dump valves and could damage their valve controllers.

5.16.4 Fire Protection Systems

Existing fire protection consists of manual portable extinguishers.

5.16.5 Adequacy of Fire Protection

Portable extinguishers alone will not be capable of suppressing a deep-seated cable tray fire. The lack of fire detectors could result in significant loss of cable due to delay in initiating manual suppression.

5.16.6 Modifications

The licensee has proposed the following modifications:

(1) Fire detectors will be installed at selected locations in the facades for both Units 1 and 2.

(2) Hose stations will be installed in the auxiliary building with the capability to reach all combustibles in the facades with interior hose.

We find that the above listed modifications represent a significant improvement to the fire protection for safety-related equipment and cables in the containment facades. We therefore conclude that the licensee should proceed with implementing the modifications.

A fire in the facades would not prevent safe hot shutdown. However, the ability to achieve safe cold shutdown following a fire in the facades has not been verified. The licensee has proposed to cover the cables in certain cable trays in the facades with Kaowool ceramic fiber insulating blankets to provide further fire protection. Information has been provided by the licensee to demonstrate the effectiveness of Kaowool to retard the propagation of fire from tray to tray and to limit fire damage within an affected tray. A review of this information by the staff is required to verify that safe cold shutdown can be achieved within 72 hours of a fire in a facade after application of the Kaowool blanket.

We will address the adequacy of the fire protection for safe cold shutdown cables in the containment facades in a supplement to this report after completion of the evaluation of this matter.

6.0 ADMINISTRATIVE CONTROLS

General

The administrative controls for fire protection consist of the fire protection organization, fire brigade training, the controls over combustibles and ignition sources, the prefire plans and procedures for fighting fires, and the quality assurance provisions for fire protection. The licensee has provided a description of the elements of his administrative controls for fire protection by submittals dated November 1, 1976, February 1, September 22 and December 29, 1978. These are detailed in the following sections.

6.1 Organization

The licensee's fire protection organization defines the organizational responsibilities and lines of communication between the various positions involved in the fire protection program, the qualification requirements of the key positions in the fire protection program, and the composition of the fire brigade. The fire protection organization encompasses positions extending from the Wisconsin Electric Power Company President down to the Plant Operations Supervisor. These management and staff positions are responsible for formulation, implementation, and assessment of the fire protection program. The licensee has described the organizational responsibilities for inspection, training, testing and review of proposed work activities and the station documents that define these and other responsibilities as related to plant fire protection. The licensee has also described the qualification requirements that have been established for the positions responsible for formulating and implementing the fire protection program, training instructors, and for service in the fire brigade.

The licensee has proposed a fire brigade of at least four trained members to be maintained onsite at all times. This excludes three members of the minimum shift crew necessary for safe shutdown of the plant and any personnel required for other essential functions during a fire emergency. Our review of the licensee's proposal has not been completed. We will address the adequacy of the fire brigde size in a supplement to this report.

We find that, subject to the resolution of the fire brigade size, the fire protection organization conforms to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and is, therefore, acceptable.

6.2 Fire Brigade Training

The fire brigade training program consists of classroom instruction, fire drills and fire fighting practice sessions. The fire brigade training program contains the following essential elements: identification of fire hazards, location and proper use of fire fighting equipment, advanced training in direction and coordination for brigade leaders, and use of prefire plans. Preplanned drills and practice sessions are provided to assure personnel understanding and familiarization with the operation of the fire fighting equipment provided. In addition, the training program will be expanded to include: the proper method of fighting fires inside buildings, toxic characteristics of expected products of combustion, and a detailed review of fire fighting procedures and procedure changes.

We find the licensee's fire brigade training program acceptable, with the exception of the proposed schedule for brigade practice sessions. The licensee's proposed training program includes practice sessions on a two-year cycle, whereas the staff has recommended that practice sessions be conducted annually. The licensee's proposal does not meet the staff guidelines. Further, the licensee has not provided sufficient justification for the staff to conclude that the proposal provides an acceptable alternative to the NRC's guidelines on training programs for fire brigade members. We will address the acceptability of the licensee's proposal on a generic basis in a supplement to this report.

We find that, with the exception of the above described proposal for practice sessions, the fire brigade training program conforms to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and is, therefore, acceptable.

6.3 Control of Combustibles

Administrative controls have been established to minimize the amount of combustibles that a safety-related area may be exposed to. These controls include: regular plant tours by plant management and staff to insure that no combustibles are stored in safety-related areas; assignment of specific plant areas for storage of combustibles; and a review of all maintenance requests and modifications for special fire protection requirements. In addition, existing permanent wood structures within the plant are being replaced with fire retardant structures.

We find that, subject to implementation of the above described changes, the control of combustibles conforms to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and is, therefore, acceptable.

6.4 Control of Ignition Sources

Administrative controls have been established to protect safety-related equipment from fire damage or loss resulting from work involving ignition

sources. Safety-related areas have been posted as "No Smoking Allowed." The plant Fire Brigade Chief or Assistant Chief's authorization is required for issuance of an "Ignition Source Control Permit" in all areas of the plant except those posted as "Designated Welding Areas." This permit requires such items as: the removal of moveable combustible material from the work area; use of trained and equipped fire watches; and a check of the oxyacetylene equipment before it is moved into the work area.

We find that the control of ignition sources conforms to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and is, therefore, acceptable.

6.5 Fire Fighting Procedures

The licensee has described the fire fighting procedures that have been established to prescribe the actions to be taken by the individual discovering the fire, the control room operators, and the members of the fire brigade. New fire fighting procedures will be developed for the control room, cable spreading room, 4160 Volt switchgear room, and emergency diesel generator rooms. Strategies will be established for fighting fires in all safety-related areas and areas presenting a hazard to safety-related equipment. These strategies will identify the combustibles located in the area, the methods of fighting fires in the area, access, ventilation and smoke removal, radiological and toxic hazards, and systems and components that should be kept cool while fighting a local fire. The licensee will develop a program to better coordinate and effectively use the assistance of the offsite fire departments. This program will include security indoctrination, plant tours, and training in basic radiation hazards for members of the local fire department.

We find that, subject to the implementation of the above described changes, the fire fighting plans and procedures conform to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and is, therefore, acceptable.

6.6 Quality Assurance

The design, procurement, installation, testing and administrative controls for the fire protection program will be controlled in accordance with the Point Beach Nuclear Plant's 10 CFR Part 50, Appendix B, quality assurance program, implementing the quality assurance provisions contained in Branch Technical Position 9.5-1, Appendix A.

We find that the quality assurance provisions conform to the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and are, therefore, acceptable.

7.0 TECHNICAL SPECIFICATIONS

The Technical Specifications were modified on January 23, 1978 to include limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. As indicated in the transmittal letter for the January 23, 1978 license amendment, the Fire Brigade minimum manning is less than the minimum number given in the generic staff position, Minimum Fire Brigade Shift Size. The staff is continuing to evaluate your justification for a smaller brigade size (4 members vs. 5 members), and will address this subject in a supplement to this report.

Following the implementation of the modifications of fire protection systems and administrative controls resulting from this review, the Technical Specifications will be similarly modified to incorporate the limiting conditions for operation and surveillance requirements for these modifications.

8.0 CONCLUSIONS

The licensee has performed a fire hazards analysis and has proposed certain modifications to improve the fire protection program. Additional modifications have been proposed by the licensee during the course of our review, which are based upon the fire hazards analysis and our onsite evaluation of the fire protection program. These proposed modifications are summarized in Section 3.1. In addition, we have concluded that the licensee should implement certain evaluations or improvements related to the fire protection program. These are summarized in Section 3.2. Significant steps are being taken to provide additional assurance that safe shutdown can be accomplished and the plant can be maintained in a safe condition during and following potential fire situations. Additional evaluation of incomplete items, discussed in the preceding sections, will be necessary before we can conclude that the overall fire protection at the Point Beach facility will satisfy the provisions of Branch Technical Position 9.5-1 and Appendix A thereto, which the staff has established for satisfactory long-term fire protection.

We find that the licensee's proposed modifications described herein are acceptable both with respect to the improvements in the fire protection program that they provide and with respect to continued safe operation of the facility, while the remaining items are completed.

In the report of the Special Review Group on the Browns Ferry Fire (NUREG-0050) dated February 1976, consideration of the safety of operation of all operating nuclear power plants pending the completion of our detailed fire protection evaluation was presented. The following quotations from the report summarize the basis for the Special Review Group's conclusion that the operation of the facility need not be restricted for public safety:

> "Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent (see Section 3.3 of [NUREG-0050]). The Review Group believes that steps already taken since March 1975 (see Section 3.3.2) have reduced this frequency significantly."
>
> "Based on its review of the events transpiring before, during and after the Browns Ferry fire, the Review Group concludes that the probability of disruptive fires of the magnitude of the Browns Ferry event is small, and that there is no need to restrict operation of nuclear power plants for public safety. However, it is clear that much can and should be done to reduce even further the likelihood of disabling fires and to improve assurance of rapid extinguishment of fires that occur. Consideration should be given also to features that would increase further the ability of nuclear facilities to withstand large fires without loss of important functions should such fires occur."

We recognize that the "Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission," NUREG/CR-0400 (The Lewis Committee Report), states that this Review Group is unconvinced of the correctness of the WASH-1400 conclusion that fires contribute negligibly to the overall risk of nuclear plant operation. In the Commission's Policy Statement dated January 18, 1979, "NRC Statement on Risk-Assessment and the Reactor Safety Study Report (WASH-1400) in Light of the Risk-Assessment Review Group Report," the Commission indicated on page 3 that it "accepts the Review Group Report's conclusion that absolute values of the risks presented by WASH-1400 should not be used uncritically either in the regulatory process or for public policy purposes and has taken and will continue to take steps to assure that any such use in the past will be corrected as appropriate. In particular, in light of the Review Group conclusions on accident probabilities, the Commission does not regard as reliable the Reactor Safety Study's numerical estimate of the overall risk of reactor accident."

In summary, it is our conclusion that the operation of the facility, pending resolution of the incomplete items and the implementation of all facility modifications, does not present an undue risk to the health and safety of the public based on our concurrence with the Browns Ferry Special Review Group's conclusions identified above, giving due consideration to the Commission Policy Statement, as well as the significant improvements in fire protection already made at the facility since the Browns Ferry fire. These include establishment of administrative controls over combustible materials and use of ignition sources, training and staffing of a fire brigade, and issuance of technical specifications to provide limiting conditions for operation and surveillance requirements for fire protection systems.

We have determined that the license amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR Section 51.5(d)(4) that an environmental statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

9.0 CONSULTANTS' REPORT

Under contract to the Nuclear Regulatory Commission, Brookhaven National Laboratory has provided the services of fire protection consultants who participated in the evaluation of the licensee's fire protection program and in the preparation of this report. Their report, "Fire Protection in Operating Nuclear Power Plants, Point Beach Nuclear Plant, Units 1 and 2, Safety Evaluation Report Review," dated April 27, 1979, discusses several matters which have been addressed in this report. Those elements of the consultants recommendations which we have not adopted are identified in Appendix "B" along with our bases therefor.

APPENDIX A

CHRONOLOGY

In February 1976, the report by the NRC Special Review Group was issued as NUREG-0050, "Recommendations Related to the Browns Ferry Fire."

On May 1, 1976, Standard Review Plan Section 9.5.1, "Fire Protection," was issued, incorporating the various recommendations contained in NUREG-0050.

By letter dated May 11, 1976, Wisconsin Electric Power Company (WEPCO) was requested to compare the existing fire protection provisions at their facilities with new NRC guidelines as set forth in Standard Review Plan Section 9.5.1, "Fire Protection," dated May 1, 1976, and to describe (1) the implementation of the guidelines met, (2) the modifications or changes underway to meet the guidelines that will be met in the near future, and (3) the guidelines that will not be met and the basis therefor.

By letter dated September 30, 1976, Wisconsin Electric Power Company was requested to provide the results of a fire hazards analysis and propose Technical Specifications pertaining to fire protection. Wisconsin Electric Power Company was also provided a copy of Appendix A which includes acceptable alternatives to the guidelines of Standard Review Plan Section 9.5.1.

On November 1, 1976, Wisconsin Electric Power Company provided a submittal responding to our request of May 11, 1976.

By letter dated December 2, 1976, we provided model Technical Specifications and requested submittal of fire protection Technical Specifications.

On January 3-7, 1977, the fire protection review team visited the site to review the fire protection systems used at the plant.

On March 4, 1977, a meeting was held in Bethesda, MD, to discuss the proposed fire hazards analysis and to address certain staff concerns.

On April 26, 1977, we transmitted a list of staff questions and positions to the licensee.

On June 20, 1977, Wisconsin Electric Power Company responded to the staff letter of September 27, 1976 by submitting a fire hazards analysis.

On July 28, 1977, Wisconsin Electric Power Company responded to the staff letter of December 2, 1977 by submitting a proposed list of fire protection Technical Specifications.

On September 6-9, 1977, a review team visited the Point Beach site in order to discuss administrative controls and to review the existing and proposed manual fire fighting systems.

On November 11, 1977, we transmitted an additional list of staff positions to the licensee.

By letters dated January 13, February 15 and March 15, 1978, WEPCO responded to the staff's letter of November 11, 1977.

On August 14, 1978, we transmitted another list of staff positions to the licensee.

By letter dated September 22 and December 29, 1978, WEPCO responded to the staff letter of August 14, 1978.

APPENDIX B

DISCUSSION OF CONSULTANTS' REPORT

Under contract to Nuclear Regulatory Commission, Brookhaven National Laboratory has provided the services of fire protection consultants who participated in the evaluation of the licensee's fire protection program and in the preparation of the Safety Evaluation Report (SER). Their letter, "Fire Protection in Operating Nuclear Power Stations - Point Beach Units 1 and 2 - Safety Evaluation Report Review," dated April 27, 1979, concurs with the staff conclusions noted in the Safety Evaluation Report.

The consultant's recommendation, which we have not adopted, along with our basis therefor is as follows:

1. Consultant's Recommendation - Valve Supervision (Section 4.3.1)

Electrical valve supervision should be provided on all valves controlling fire water systems and sectionalizing valves. The present proposal of incorporating administration controls and locks should be unacceptable. See letter dated July 13, 1977 to Mr. R. L. Ferguson from Mr. R. E. Hall.

Staff Response:

The NRC guidelines on valve supervision are given in Appendix "A" of Branch Technical Position (BTP) 9.5-1 of the Standard Review Plan. These guidelines permit, as an alternative to electrical supervision, an administrative program to assure that valves are maintained in the proper position. Such a program includes locking valves with strict key control or sealing valves with tamper-proof seals. Periodic inspections are to be performed to verify that the method of securing the valve is intact.

These measures are consistent with the requirements imposed for supervising valves in safety-related systems, and provide adequate assurance that valves are maintained in the appropriate position. The licensee's program for value supervision is consistent with NRC guidelines (see Safety Evaluation Report Section 4.3.1.3). In addition, the plant technical specifications require a monthly check of all valves in the flow path to fire suppression systems. We find that a significant increase in plant safety would not result from the use of electrical supervision of all valves controlling fire water systems and sectionalizing valves.

2. Consultant's Recommendation: Flourescent Light Diffusers (Section 5.2)

We recommend that the control room flourescent light diffusers have a flame spread rating not to exceed 25. If the licensee can demonstrate that the existing ones meet this criteria they are satisfactory; if not we

recommend that the existing control room light diffusers be replaced by ones having a flame spread rating of 25 or less.

Staff Response:

This recommendation was adopted in the final draft of the SER with the licensee's committment to attempt to establish an appropriate test to verify the flame spread of the diffusers.

3. Consultant's Recommendation: Fire Hydrant Inspection (Section 4.3.1.3)

We recommend that the fire hydrants be inspected each fall for proper drainage and again in the spring after the freezing season is past, to assure that no freeze damage has occurred.

Staff Response:

This recommendation was adopted in the final draft of the SER with the licensee's committment to implement administrative procedures for inspecting those hydrants which are required to protect safety-related areas or equipment.

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-266 and 50-301

WISCONSIN ELECTRIC POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 39 and 44 to Facility Operating License Nos. DPR-24 and DPR-27 issued to Wisconsin Electric Power Company (the licensee), which revised the licenses for operation of the Point Beach Nuclear Plant Unit Nos. 1 and 2, located in the Town of Two Creeks, Manitowoc County, Wisconsin. The amendments will become effective twenty days after issuance, unless a hearing has been requested.

The amendments add a license condition relating to the completion of facility modifications for fire protection.

The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the licensee's letters dated November 1, 1976, June 20, 1977, November 7, 1977, January 13, 1978 and February 1, 1978, February 15, 1978, September 22, 1978 and December 20, 1978; (2) Amendment No. 39 to License No. DPR-24,

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(3) Amendment No. 44 to License No. DPR-27; and (4) the Commission's related Safety Evaluation Report appended to letter dated August 2, 1979. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the University of Wisconsin, Stevens Point Library, Stevens Point, Wisconsin 54481. A copy of items (2), (3) and (4) may be obtained upon request addressed to the U. S Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland this 2nd day of August, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors