September 19, 1978

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Docket No. 50-336

Northeast Nuclear Energy Company
ATTN: Mr. W. G. Counsil, Vice President
Nuclear Engineering and Operations
Post Office Box 270
Hartford, Connecticut 06101

Gentlemen:

The Commission has issued the enclosed Amendment No. 43 to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2. This amendment consists of changes to the Technical Specifications in accordance with your application dated August 2, 1978, The attached Safety Evaluation addresses your submittals dated June 2, 1976, February 28, 1977, April 12, July 11 and 14, August 2 and 17, 1978, and our observations at the Millstone site during the week of May 1, 1978, and on May 27, 1978.

This amendment adds a license condition relating to the completion of facility modifications and implementation and maintenance of administrative controls for fire protection and modifies the Technical Specifications by:

- o increasing the number of operable fire water pumps to three;
- o adding four areas of the turbine building where spray and/or sprinkler systems are required; and
- o adding numerous areas of the turbine building where fire hose stations are required.

These Technical Specifications are effective on the date of issuance of this amendment.

By letter dated March 3, 1978, we issued other Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. You are requested to propose, where appropriate, revised Technical Specifications related to facility modifications described in the attached Safety Evaluation. Such a request should be submitted for our review no

Cont. 1
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Docket No. 50-336

Northeast Nuclear Energy Company
ATTN: Mr. W. G. Counsil, Vice President
Nuclear Engineering and Operations
Post Office Box 270
Hartford, Connecticut 06101

Gentlemen:

The Commission has issued the enclosed Amendment No. to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2. This amendment consists of changes to the Technical Specifications in accordance with your application dated August 2, 1978. The attached Safety Evaluation addresses your submittals dated June 2, 1976, February 28, 1977, April 12, July 11 and 14, August 2 and 17, 1978, and our observations at the Millstone site during the week of May 1, 1978, and on May 27, 1978.

This amendment adds a license condition relating to the completion of facility modifications and administrative controls for fire protection and modifies the Technical Specifications by:

- increasing the number of operable fire water pumps to three;
- adding four areas of the turbine building where spray and/or sprinkler systems are required; and
- adding numberour areas of the turbine building where fire hose stations are required.

These Technical Specifications are effective on the date of issuance of this amendment.

By letter dated March 3, 1978, we issued other Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. You are requested to propose, where appropriate, revised Technical Specifications related to facility modifications described in the attached Safety Evaluation. Such a request should be submitted for our review no

later than 90 days before the modifications are implemented. Certain items listed in Section 3.0 of the enclosed Safety Evaluation are marked with an asterisk to indicate that the NRC staff will required 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. Please submit the additional information at least 90 days prior to the implementation of the modifications.

We have determined that no license amendment fee is required to accompany your response to the above 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.

Some of your proposed Technical Specifications have been slightly modified to meet our requirements. These modifications have been discussed with and accepted by your staff.

Copies of the Notice of Issuance and the report of our fire protection consultants, letter from Robert E. Hall to R. L. Ferguson dated August 1, 1978, are also enclosed.

Sincerely,

Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Enclosures:
1. Amendment No. 43
2. Safety Evaluation
3. Notice
4. Consultant's Report

cc w/enclosures: See next page

STSB
JMcGough
9/13/78

subject to note

OFFICE➤	ORB#4:DOR	ORB#4:DOR	ORB#1:DOR	PSB:DOR	OELD	C-ORB#4:DOR
SURNAME➤	RIngram	MConner	TWambach	GLainas	BSmith	RWReid
DATE➤	9/14/78	9/19/78	9/15/78	9/13/78	9/14/78	9/19/78

cc w/enclosure(s):
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Hartford, Connecticut 06103

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Natural Resources Defense Council
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Washington, D.C. 20005

Mr. Albert L. Partridge, First Selectman
Town of Waterford
Hall of Records - 200 Boston Post Road
Waterford, Connecticut 06385

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cc w/enclosures & incoming dtd:
8/2/78
Connecticut Energy Agency
ATTN: Assistant Director, Research
and Policy Development
Department of Planning and Energy
Policy
20 Grand Street
Hartford, Connecticut 06106

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

THE CONNECTICUT LIGHT AND POWER COMPANY,
THE HARTFORD ELECTRIC LIGHT COMPANY,
WESTERN MASSACHUSETTS ELECTRIC COMPANY, AND
NORTHEAST NUCLEAR ENERGY COMPANY

DOCKET NO. 50-336

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.43
License No. DPR-65

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

   A. The application for amendment by The Connecticut Light and Power Company, The Hartford Electric Light Company, Western Massachusetts Electric Company, Northeast Nuclear Energy Company (the licensees) dated August 2, 1978, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

   C. 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;

   D. 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

   E. 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, Facility Operating License No. DPR-65 is hereby amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by changing paragraph 2.C.(2) and adding paragraph 2.C.(4) to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 43 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

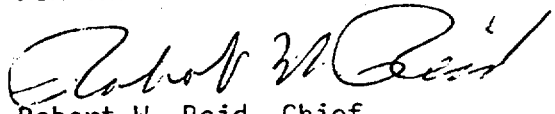
(4) Fire Protection

The licensee may procees with and is required to complete the modifications identified in Section 3 of the NRC's Fire Protection Safety Evaluation on the facility dated September 19, 1978, These modifications shall be completed by the end of the refueling outage presently scheduled for summer 1980.

The licensee is required to implement and maintain the administrative controls identified in Section 6 of the NRC's Fire Protection Safety Evaluation on the facility dated September 19, 1978. The administrative controls shall be in effected by December 31, 1978.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 19, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 43

FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Pages

3/4 7-33
3/4 7-34
3/4 7-35
3/4 7-36
3/4 7-37
3/4 7-38
3/4 7-40

PLANT SYSTEMS

3/4.7.9 FIRE SUPPRESSION SYSTEMS

FIRE SUPPRESSION WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.9.1 The fire suppression water system shall be OPERABLE with:

a. Three high pressure pumps, each with a capacity of at least 1800 gpm, with their discharge aligned to the fire suppression header,

b. Two water supplies, each with a minimum contained volume of 200,000 gallons, and

c. An OPERABLE flow path capable of taking suction from the fire water tanks and transferring the water through distribution piping with OPERABLE sectionalizing control or isolation valves to the yard hydrant curb valves and the first valve ahead of the water flow alarm device on each sprinkler, hose standpipe or spray system riser required to be OPERABLE per Specifications 3.7.9.2 and 3.7.9.3.

APPLICABILITY: At all times.

ACTION:

a. With one pump and/or one water supply inoperable, restore the inoperable equipment to OPERABLE status within 7 days or, in lieu of any other report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days outlining the plans and procedures to be used to provide for the loss of redundancy in this system. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

b. With two pumps inoperable, establish a continuous fire watch of the turbine building with backup fire suppression equipment within 1 hour; restore the inoperable equipment to OPERABLE status within 14 days or, in lieu of any other report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the equipment to OPERABLE status. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

LIMITING CONDITION FOR OPERATION (Continued)

c. With the fire suppression water system otherwise inoperable:

1. Establish a backup fire suppression water system within 24 hours, and

2. Submit a Special Report in accordance with Specification 6.9.2:

a) By telephone within 24 hours,

b) Confirmed by telegraph, mailgram or facsimile transmission no later than the first working day following the event, and

c) In writing within 14 days following the event, outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.7.9.1.1 The fire suppression water system shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying the contained water supply volume.

b. At least once per 31 days on a STAGGERED TEST BASIS by starting each pump and operating it for at least 15 minutes on recirculation flow.

c. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path is in its correct position.

d. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.

SURVEILLANCE REQUIREMENTS (Continued)

e. At least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and:

1. Verifying that each pump develops at least 1800 gpm at a system head of 100 psig,

2. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel, and

3. Verifying that each high pressure pump starts (sequentially) to maintain the fire suppression water system pressure $\geq$ 75 psig.

f. At least once per 3 years by performing a flow test of the system in accordance with Chapter 5, Section 11 of the Fire Protection Handbook, 14th Edition, published by the National Fire Protection Association.

4.7.9.1.2 The fire pump diesel engine shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying;

1. The fuel storage tank contains at least 125 gallons of fuel, and

2. The diesel starts from ambient conditions and operates for at least 20 minutes.

b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank, obtained in accordance with ASTM-D270-65, is within the acceptable limits specified in Table 1 of ASTM D975-74 when checked for viscosity, water and sediment.

c. At least once per 18 months, during shutdown, by:

1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for the class of service, and

2. Verifying the diesel starts from ambient conditions on the auto-start signal and operates for $\geq$ 20 minutes while loaded with the fire pump.

SURVEILLANCE REQUIREMENTS (Continued)

4.7.9.1.3 The fire pump diesel starting 24-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1. The electrolyte level of each battery is above the plates, and

2. The overall battery voltage is $\geq$ 24 volts.

b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of the battery.

c. At least once per 18 months by verifying that:

1. The batteries, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration, and

2. The battery-to-battery and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.

SPRAY AND/OR SPRINKLER SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.9.2 The following spray and/or sprinkler systems shall be OPERABLE:

a. Diesel Generator Rooms

b. Diesel Generator Day Tank Rooms

c. Cable Vault (Aux. Building)

d. Cable Vault (Turbine Building)

e. Hydrogen Seal Oil Unit

f. Turbine Building Northeast Corner

g. Turbine Building 31'6"/14'6" - North

h. Turbine Building 31'6"/14'6" - South

i. Lube Oil Room

APPLICABILITY: Whenever equipment in the spray/sprinkler protected areas is required to be OPERABLE.

ACTION:

a. With one or more of the above required spray and/or systems inoperable, establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s) within 1 hour; restore the system to OPERABLE status within 14 days or, in lieu of any other report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.9.2 Each of the above required spray and/or sprinkler systems shall be demonstrated OPERABLE:

SURVEILLANCE REQUIREMENTS (Continued)

a. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.

b. At least once per 18 months:

1. By performing a system functional test which includes simulated automatic actuation of the system; and:

a) Verifying that the automatic valves in the flow path actuate to their correct positions on a simulated test signal, and

b) Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.

2. By inspection of the spray headers to verify their integrity, and

3. By inspection of each nozzle to verify no blockage.

c. At least once per 3 years by performing an air or water flow test through each open head spray/sprinkler header and verifying each open head spray/ sprinkler nozzle is unobstructed.

FIRE HOSE STATIONS

LIMITING CONDITION FOR OPERATION

3.7.9.3 The fire hose stations shown in Table 3.7-2 shall be OPERABLE.

APPLICABILITY: Whenever equipment in the areas protected by the fire hose stations is required to be OPERABLE.

ACTION:

a. With one or more of the fire hose stations shown in Table 3.7-2 inoperable, route an additional equivalent capacity fire hose to the unprotected area(s) from an OPERABLE hose station within 1 hour or establish a continuous fire watch with backup fire suppression equipment for the unprotected area(s).

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.9.3 Each of the fire hose stations shown in Table 3.7-2 shall be demonstrated OPERABLE:

a. At least once per 31 days by visual inspection of the station to assure all required equipment is at the station.

b. At least once per 18 months by:

1. Removing the hose for inspection and re-racking, and

2. Replacement of all degraded gaskets in couplings.

c. At least once per 3 years by:

1. Partially opening each hose station valve to verify valve OPERABILITY and no flow blockage.

2. Conducting a hose hydrostatic test at a pressure at least 50 psig greater than the maximum pressure available at that hose station.

TABLE 3.7-2

FIRE HOSE STATIONS

Hose Station Number	Bldg/Elevation	Area
1-7	Turbine/14'6"	Turbine Building
8-14	Turbine/31'6"	Turbine Building
15-21	Turbine/54'6"	Turbine Building
22	Auxiliary/-45'6"	Center of Open Area
23	Auxiliary/-25'6"	Near Elevator
24	Auxiliary/-5'0"	Near Elevator
25	Auxiliary/14'6"	Near Elevator
26	Auxiliary/38'6"	Spent Fuel Pool - Northwest corner
27	Auxiliary/14'6"	Boric Acid Batch Tank area
28	Auxiliary/14'6"	Near MCC 22-1E (B51)
29	Auxiliary/14'6"	Railway access
30	Auxiliary/38'6"	Spent Fuel Pool - South Wall
31	Auxiliary/14'6"	Outside Diesel Room
34	Auxiliary/38'6"	Southeast corner stairway

FIRE PROTECTION

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT 2

DOCKET NO. 50-336

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

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 license 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 Northeast Nuclear Energy Company's (the licensee or NNECO) analyses and have visited the Millstone Nuclear Power Station, Unit No. 2 (the facility) to examine the relationship of safety-related components, systems and structures with both combustibles and the associated fire detection and suppression systems. Our review was based on the licensee's proposed program for fire protection as described in the following docketed information:

(1) Licensee's Fire Protection Program Review dated February 1977;

(2) The fire protection review team's site visit of May 1 to 4, 1978;

(3) The licensee's responses to staff concerns, dated July 14 and August 2, 1978.

Our review has been limited to the aspects of fire protection related to the protection of the public from the standpoint of radiological health and safety. We have not considered aspects of fire protection associated with life safety of on-site personnel and with property protection, unless they impact the health and safety of the public due to the release of radioactive material.

This report summarizes the result of our evaluation of the fire protection program at Millstone Nuclear Power Station, Unit No. 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, systems 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, systems and components."

2.2 Supplementary Guidance

Guidance on the implementation of GDC-3 for existing nuclear power plants has 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 materials 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 measures 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 the licensee's and the staff's evaluation. Such proposed modifications are summarized below. Further detail is provided in the licensee's submittals. The sections of this report which discuss the modifications are noted in parentheses. All modifications will be completed by the end of the refueling outage presently scheduled for summer 1980.

Certain items listed below are marked with an asterisk to indicate that the NRC staff will require additional information in the form of general design parameters to assure that the design is acceptable prior to actual implementation of these modifications. The balance of the other modifications have been described in an acceptable level of detail.

3.1.1 Fire Detection Systems

Early warning automatic fire detection system will be provided in the following areas:

*(1) Control boards and cabinets in the control room and above two short cable runs above the false ceiling of the control room (5.1).

(2) In the two D-C equipment rooms located below the cable spreading area existing heat detectors will be replaced with ionization detectors (5.6).

(3) In the low pressure safety injection pump rooms, charging pump area, and at elevations -45, -25 and -5 feet in the auxiliary building where redundant safety-related cables are routed (5.8).

*(4) Above the cable trays at the penetration areas inside containment and in the reactor coolant pump areas (5.10).

(5) In the intake building where safety-related pumps are located (5.14).

3.1.2 Fire Water Supply

A sectional control valve will be provided in the fire water header cross connection to permit isolation of portions of the suppression systems protecting the auxiliary and control building (4.3.1.e).

3.1.3 Yard Hydrants

Additional manual fire fighting tools will be provided in each hose house (4.3.1.c), (5.16).

The undermining of the hydrant adjacent to the gas turbine building will be repaired and the cause corrected (4.3.1.e), (5.16).

A hydrant surveillance program will be initiated to insure proper hydrant operation by inspecting the hydrants in the fall and the spring for proper operation. (4.3.1.c), (5.16).

3.1.4 Hose Stations

A central location will be provided for storing spare fire fighting equipment (4.3.1.c).

Hose nozzles of the high velocity Rockwood spray type with ball shut-off will be replaced with 1½-inch "All Fog" adjustable nozzles to provide adequate reach. The ball type shut off feature will be retained (4.3.1.d).

Additional hose or additional hose stations will be provided such that sufficient hose reach is provided to protect safety-related areas (4.3.1.d), (5.3), (5.8).

A booster hose station with 200 feet of 3/4-inch hose will be provided in the stairwell leading from the control room to the cable spreading room and at the emergency access hatch in the control room HVAC equipment room (5.1), (5.2).

A dry pipe hose standpipe system will be installed to provide fire water suppression capability for the combustibles in containment (5.10).

3.1.5 Water Suppression Systems

* Additional spray nozzles will be added to the upper cable vaults deluge system in the vertical riser area (5.3).

Spray nozzles for the east half of the upper cable vault will be lowered to provide effective water coverage (5.3).

Sprinklers in the area west of the lower cable vault which are connected to the cable vault deluge system will be provided with a separate connection independent of the cable vault deluge system (5.3).

* Automatic sprinklers will be provided for the railroad and truck accessway in the auxiliary building (5.8).

The turbine building sprinkler systems will be extended to provide coverage of the auxiliary feed pump cables at elevation 14 feet (5.13).

* A preengineered Halon suppression system will be provided to protect the Unit 1 fire pump house (5.15).

3.1.6 Foam Suppression

The licensee will provide a manual foam suppression capability for oil fires (4.3.1.f).

3.1.7 Portable Extinguishers

Two 17-lb Halon 1211 extinguishers will be provided in the control room (4.3.3), (5.1).

Portable fire extinguishers will be provided for the cable spreading room (4.3.3), (5.2).

3.1.8 Fire Doors

The door to the computer room will be replaced with a 1½-hour fire rated door (5.1).

The hatchway entrance to the cable spreading room will be modified to provide three-hour rated protection (5.2).

The auxiliary building switchgear room door to the turbine building will be replaced with a three-hour fire rated door (5.4).

The door between the two D-C equipment rooms will be replaced with a three-hour fire rated door (5.6).

The faulty self-closing mechanism on one of the battery room doors will be repaired (5.7).

A three-hour fire rated door will be provided between the diesel generator rooms (5.11).

3.1.9 Supervision of Fire Doors

Fire doors for safety-related areas will be inspected semiannually to verify that self closing mechanisms and latches are in good working order. Unsupervised and unlocked self closing fire doors for safety related areas will be inspected daily to verify that they are in the closed position (4.9).

3.1.10 Valve Supervision

All post indicator valves and isolation valves in the fire water piping systems will be electrically supervised or administratively controlled by the use of locks or tamperproof seals, and periodic inspections will be made to verify that valves are in the proper position (4.3.1.c).

3.1.11 Ventilation Equipment

Three fire service smoke ejectors of the explosion proof type, rated for 9,500 CFM each, will be provided for fire brigade use (4.4.1).

3.1.12 Air Breathing Equipment

An onsite recharge capability for air breathing equipment will be provided which has the capability of recharging 30 air bottles over a four-hour period (4.4.2

3.1.13 Fire Barrier Penetrations

Fire barrier penetration seals will be provided with a fire rating equal to the rating of the fire barrier penetrated, up to three hours, or as stated for the following areas:

(1) The unsealed electrical cable penetrations to the cable spreading room will be sealed (5.2).

(2) The unsealed penetrations to the diesel generator rooms will be provided with three-hour rated seals (5.11).

(3) The unsealed penetration for the diesel generator day tank rooms will be provided with three-hour rated seals (5.12).

(4) The unsealed penetrations in the walls of the turbine lube oil storage facility will be sealed to provide a three-hour fire rating (5.13).

(5) The unsealed penetrations between the Unit 1 and Unit 2 pumphouses will be sealed (5.15).

Combustible materials used as dams for sealing cable penetrations in the cable spreading area will be removed where they exist (4.9).

3.1.14 Protection of Redundant Conduit

Where redundant cables in conduit are exposed to cable tray fire hazards in the containment, they will be protected by suitable fire barriers or the cables in conduit will be rerouted (5.10).

3.1.15 Control of Combustibles

Plastic barrels used to collect contaminated clothing in the auxiliary building will be replaced with steel barrels (5.8).

Clothing storage lockers will be relocated or protected by area spray system so as not to expose safety-related cables (5.8).

All wood in safety-related areas will be replaced with treated fire retardant lumber or treated with fire retardant coating (5.8).

Housekeeping will be improved to remove transient materials from safety-related areas (5.8), (5.9).

The combustible enclosure housing instruments at the west penetation area will be replaced by a non-combustible construction (5.9).

An oil spill curb will be provided for the door leading from the diesel generator room to the auxiliary building hallway (5.11).

Floor drains will be provided for the diesel fuel oil day tank rooms (5.12).

The paint storage area in the turbine building near the auxiliary feedwater pump area will be removed (5.13).

3.1.16 Emergency Lighting

The licensee will provide additional fixed lighting units and check their operation in accordance with the manufacturer's recommendations. The fixed battery operated lighting units in containment will be serviced during refueling outages. Additional portable battery operated lighting units will be located at the containment entrance and at strategic locations through out safety-related areas. Batteries for portable hand lights will be dated and will be periodically replaced in accordance to the manufacturer's recommendations (4.6 and 5.10).

3.1.17 Fire Fighting Access

Tray supports in the upper cable vault will be relocated where necessary to improve fire fighting access (4.12).

Fixed ladder access will be provided to the cable spreading room through an emergency hatch (5.3).

3.2 Incomplete Items

In addition to the licensee's proposed modifications, several incomplete items remain, as discussed below. The licensee will complete the evaluations necessary to resolve these items in accordance with the schedule contained in Table 3.1. This schedule has been established such that should these evaluations identify the need for additional modifications, they can be implemented on a schedule consistent with completion of the modifications identified in Section 3.1. We will address the resolution of these incomplete items in a supplement to this report.

3.2.1 Cable Spreading Area

The licensee will conduct an evaluation to determine a suitable method to provide isolation, separation or protection of redundant safety-related cables in the cable spreading area (4.1), (5.2).

3.2.2 Protection of Redundant Cable Trays

The consequences of fire damage to systems required for safe shutdown will be determined where the physical separation of cables in the auxiliary building may not preclude damage to redundant safety-related systems. Fire retardant coatings, automatic sprinkler, suitable fire barriers or early warning detection will be provided to assure that fire damage does not result in a loss of shutdown capability where prompt action is not taken to suppress fires in these areas (5.2), (5.8).

3.2.3 Smoke Detection Systems Tests

The licensee is evaluating a method to conduct in situ tests with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance (4.2).

3.2.4 Cable Fire Barrier Penetrations Test Data

Test data will be provided to demonstrate the adequacy of electrical cable fire barrier penetrations (4.9).

3.2.5 Reactor Coolant Pump Lube Oil Fire Hazards

The licensee is evaluating a method of oil collection or routing to prevent the spread of oil or the use of alternative types of lubricants to reduce the fire hazards associated with the reactor coolant pump lube oil systems (5.10).

Table 3.1

Schedule of License Submittals

Item		Schedule
3.2.1	Cable Spreading Area	07/01/79
3.2.2	Protection of Redundant Cable Trays	03/01/79
3.2.3	Smoke Detection System Tests	07/01/79
3.2.4	Cable Fire Barrier Penetrations Test Data	07/01/79
3.2.5	Primary Coolant Pump Lube Oil Fire Hazard	07/01/79

4.0 EVALUATION OF PLANT ARRANGEMENT

4.1 Safe Shutdown Systems

There are several combinations of safe shutdown systems, which are capable of shutting down the reactor and cooling the core during and subsequent to a fire. The licensee has identified these systems in his fire hazards analysis. The combinations available in a fire situation will depend upon the effects of the fire on such systems, their power supplies, and their control stations.

Most of the system components required for safe shutdown are located in separate fire areas to preclude fire damage to redundant systems. In many areas of the plant, physical separation of redundant safe shutdown systems is adequate to prevent fire damage to redundant systems. Where physical separation alone does not assure that systems could not be damaged by fire, additional measures will be taken to assure that fires do not result in damage to redundant shutdown systems. The licensee will conduct a study of the physical routing of electrical cables for safe shutdown systems in the auxiliary building to determine the extent of protective measures required for areas where cable insulation or exposure fires could damage redundant systems.

We have evaluated the separation between redundant safe shutdown systems and components to determine that they are either separated from each other or protected by suppression systems such that a fire will not affect redundant equipment, and therefore a sufficient number of systems and components will be available to perform their shutdown function following a fire. The adequacy of separation between redundant shutdown equipment is discussed in Section 5.2 of this report.

4.2 Fire Detection and Signaling Systems

Fire detection and signaling systems are provided which transmit alarm and supervisory signals to the control room. Supervisory signals are provided to indicate the location of the affected area or unit. The fire detection is powered from two 120-V regulated A-C sources. An inverter connected to the station batteries supplies power to these panels upon the loss of normal A-C power.

Visual and distinct audible annunciation is provided in the control room for detection systems, deluge system actuation and supervisory signals.

The plant presently does not have complete fire detection coverage and some areas containing or exposing safety-related systems do not have fire detection systems. To protect these areas smoke detectors will be provided in a number of safety-related areas as noted in Section 5.0 of this report.

The licensee is evaluating a method to conduct in situ tests with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly reduce or prevent detection response. Bench tests will

be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance.

We find that, subject to implementation of additional detection systems, the fire detection system will provide prompt response to fires. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.3 Fire Control System

4.3.1 Water Systems

a. Water Supply

The fire-water supply consists of two 250,000 gallon fire water tanks feeding three fire pumps. The piping to the tanks is so arranged that each pump can take suction from either of both tanks.

Fire-water supply tanks are valved to ensure that a leak in one tank would not cause the loss of the remaining tank. Water is automatically supplied to the tanks through a 12-inch connection to the city water main. This connection has the capability to refill a tank in 8 hours. The tanks have high and low level alarms annunciating in the control room. Off site fire departments could draft water from the intake or discharge canals to provide an additional source of fire water.

We find that the water supply is adequate to meet the site fire water needs for all potential fires. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

b. Fire Pumps

Three horizontal shaft, centrifugal fire pumps are provided in two separate buildings adjacent to the two water storage tanks. Each pump has a design capacity of 2000 gpm at 100 psig. One pump is diesel driven with an eight hour fuel supply located within the room. The remaining two pumps are electrically operated. One pump is supplied power from Unit 1 and the other is supplied power from Unit 2. The Unit 1 electric fire pump, upon the loss of offsite power, is automatically transferred to standby power. The Unit 2 pump can be manually connected to standby power. The loss of power to either pump is annunciated in the control room. Two fire water pumps can provide sufficient fire water to meet the requirements for the largest fire water demand for fixed suppression systems plus an adequate allowance for fire hose streams.

The three pumps start automatically when the pressure in the mains drop. The first electric pump will start when the pressure drops to 95 psig. The second electric pump will start at 85 psig while the diesel will start at 75 psig. All the pumps have controllers approved for fire pump service. Supervisory pressure in the fire main system is maintained by a 50-gpm electric jockey pump.

We find that the fire pumps have adequate capacity to supply the site fire water demand. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

c. Fire Water ing System

The fire pumps discharge directly into the yard loop through individual valved discharge lines. The loop encircles both units with the north end above ground passing through the condensate polishing facility. A cross connection passes through Unit 2 turbine building, and auxiliary and control building. Off this cross connection hose station risers and water suppression systems are fed for these buildings.

All yard hydrants are supplied from this loop and have curb box valves for isolation of the hydrant for maintenance and repair. Sectional valves are strategically located to isolate various sections of the mains to keep impairment of systems to a minimum. All post indicator valves and isolation valves in the fire water piping system will be electrically supervised or administratively controlled by the use of locks or tamperproof seals, and periodic inspections will be made to verify that the valves are in the proper position. Valves supplying water to individual protection systems and some interior cross connection isolation valves have electrical supervision installed, which provides further information on the system status.

Yard hydrants are strategically located around the exterior of the plant with hose houses provided for each hydrant. A typical hose house is equipped with 250 feet of 2½-inch hose, 150 feet of 1½-inch hose and other manual fire fighting tools. The yard hydrants and equipment provide adequate fire suppression water for yard fire hazards and as backup for interior hose stations.

Additional manual fire fighting tools will be provided in each hose house. A central location will be provided for storing spare fire fighting equipment. The hydrant house threads are compatible with the local fire department.

The undermining of the hydrant adjacent to the gas turbine building will be repaired and the cause corrected. A hydrant inspection program will be initiated to insure proper hydrant operation during an emergency.

We find that, subject to the implementation of the above described modifications, the fire water piping system is adequate to supply the fixed fire water suppression systems and manual hose stations. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

d. Interior Hose Stations

Interior hose stations are strategically located throughout most areas of the plant. Hose stations are of the rack type and are equipped with 50 or 75 feet of neoprene tube, cotton-dacron cover, single jacket fire hose. Hose nozzles of the high velocity Rockwood spray type with ball shut-off have been provided for some hose stations. These nozzles will be replaced with 1½-inch "All Fog" adjustable nozzles to provide adequate reach for cable trays at higher levels.

Additional hose (up to a total of 100 feet) or additional hose stations will be provided such that sufficient hose reach is provided to protect all safety-related areas and areas affecting safety-related areas.

A 3/4-inch booster hose reel with low capacity nozzle will be provided at the southeast stairwell entrance to the cable spreading area and at the emergency exit from the control room HVAC equipment room to the cable spreading area to provide effective manual suppression capability.

We find that, subject to implementation of the above described modifications, the interior fire hose stations are adequate to provide manual fire water suppression capability. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

e. Fixed Water Suppression Systems

Six sprinkler systems and eight deluge systems have been provided to protect specific and area hazards. These areas of coverage include portions of the turbine building, cable vaults and spreading areas, turbine bearings, hydrogen seal oil unit, turbine lube oil, and oil filled transformers. These systems are fed off of a cross connection to the underground which is routed through the turbine, auxiliary and control buildings.

The automatic sprinkler and deluge systems were installed in accordance with the NFPA standard which were in effect at the time the specifications were issued for the systems. Since installation, semiannual inspections have been performed to insure their availability.

A sectional control valve will be provided in the fire water header cross connection to permit isolation of portions of the suppression systems protecting the auxiliary and control building.

Additional automatic sprinklers will be provided in the turbine and the auxiliary buildings as noted in Section 5.0 of this report.

We find that, subject to implementation of the above described modifications, the water suppression systems are adequate to suppress fires for the hazards where provided. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

f. Foam Suppression System

There are no portable or fixed foam suppression systems at the facility. The licensee will provide portable foam suppression capability to provide additional suppression capability for oil fires.

We find that, subject to implementation of the above described modifications, the foam suppression system provides an additional effective capability to suppress combustible liquid fires. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

g. Effects of Suppression Systems on Safety Systems

Inadvertent operation of a fire protection system will not adversely affect safety-related equipment. Low flow capacity hose stations will be provided to protect the cable spreading area and will have sufficient reach to be used in electrical equipment areas. This will minimize the potential for water damage to electrical equipment in these areas.

4.3.2 Gas Fire Suppression Systems

An automatic total flooding Halon 1301 system protects the underfloor space in the computer room. A total flooding CO_2 system protects a temporary storage area and the exciter on the turbine generator. Gas fire suppression systems are not provided to protect any safety-related areas.

4.3.3 Portable Fire Extinguishers

Portable dry chemical, carbon dioxide and water extinguishers have been distributed throughout the plant. The fire extinguishers meet the requirements of the National Fire Protection Association. The extinguisher selection was made in accordance with the type of hazard to be protected.

Two 17-lb. Halon 1211 extinguishers will be provided in the control room. Portable extinguishers will be provided in the cable spreading room.

We find that, subject to the implementation of the above described modification, the portable fire extinguishers provide adequate initial fire suppression capability for small fires. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.4 Ventilation Systems and Breathing Equipment

4.4.1 Ventilation Systems

The plant does not have exhaust systems designed specifically for smoke removal. The normal air handling systems in most areas can be used for smoke removal; however, their effectiveness may be limited. The fans and other equipment in the air handling systems are not designed to withstand high temperatures, and can be rendered inoperative by the heat from a significant fire. The capacity and configuration of the normal air handling systems may be inadequate for effective smoke removal.

Three fire service smoke ejectors of the explosion proof type, rated for 9,500 CFM each will be provided for fire brigade use to vent smoke and heat from fire areas.

We find that, subject to the implementation of the above described modifications, the capability for smoke and heat venting is adequate to insure fire fighting access. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.4.2 Breathing Equipment

Self contained air breathing equipment is strategically located throughout the plant with 26 Scott air pack units and 27 spare bottles. The control room is equipped with two portable air packs and has six breathing air outlets for the control room operators on a fixed system. Breathing air is also supplied by a commercial vendor on a 24-hour basis. A central location has been established on the Turbine Building ground floor where five airpacks with four spare cylinders are available. This location is also equipped with two 15-minute "Stay-Packs" stored on a portable cart for use with either unit. An onsite recharge capability for air breathing equipment will be provided which has the capability of recharging 30 air bottles over a four-hour period.

We find that, subject to the implementation of the above described modifications, the breathing equipment is adequate to insure that fire fighting access can be provided in a hostile environment. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.5 Floor Drains

Floor drains have been provided in areas containing sprinkler and deluge systems with the exception of the diesel generator day tank rooms. Drainage is also provided in areas where manual hose lines would be used with the exception of the control room and switchgear rooms. Water accumulation in these areas would be minimal due to the use of low capacity hose lines. The licensee has proposed to provide the capability to drain the diesel day tank rooms. Drains in areas containing combustible liquids have provisions to prevent the spread of a fire throughout the drain system.

We find that, subject to the above described modifications, the floor drain system is adequate to remove fire suppression water and combustible liquids to prevent damage to safety-related equipment. This satisfies the objectives of Section 2.2 of this report, and is, therefore, acceptable.

4.6 Lighting Systems

The normal lighting system receives its power from the station auxiliary transformers. Upon the loss of these sources, standby sources are made available from the station batteries and the diesel generators to provide an uninterrupted supply of power. These features insure that lighting is continuous for all emergency conditions. The licensee has further insured the availability of adequate lighting by providing fixed seal beam self contained battery operated units at strategic locations in most areas throughout the plant.

The licensee has proposed to provide additional fixed lighting units and to check the operation of these units periodically in accordance with the manufacturer's recommendations. Portable hand held seal beam light units have been provided for fire brigade use. Portable lights will be provided at the containment entrance and at strategic locations throughout safety related areas. The batteries for portable units will be dated and periodically replaced in accordance with the battery manufacturer's recommendations.

We find that, subject to the implementation of procedures to periodically maintain battery operated lighting, the emergency lighting is adequate for both operating personnel and the fire brigade to deal with emergency conditions. This satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.7 Communication Systems

Normal communication within the plant is provided by two installed systems. The first is a page and answer system with stations located throughout the plant. Backup power is provided for this system. A second system consists of telephone stations located throughout the plant. Portable communications radios are provided for emergency use.

We find that, subject to the provision of portable radio communications, the communications are adequate to coordinate fire fighting and safe shutdown activities. This satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.8 Electrical Cables

The electrical cable insulation used in the plant consists mainly of DPR-Hypalon. The flame test standard for cables, IEEE Std 383-1974, was not in effect at the time cables were purchased and installed. Cables have been subsequently tested in accordance with the IEEE-383 Flame Tests and have met these requirements. Fire protection measures have been or will be provided with due consideration for the combustible nature of cable insulation materials.

We find that the electrical cables and fire protection measures as identified herein are adequate to satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

4.9 Fire Barrier Penetrations

Fire barriers are penetrated by doorways, ventilation ducts, electrical cables, piping and conduit. Fire doors for safety-related areas will be inspected semiannually to verify that self closing mechanisms and latches are in good working order. Unsupervised and unlocked self closing fire doors for safety related areas will be inspected daily to verify that they are in the closed position. Wall and floor electrical penetrations are sealed with Dow Corning silicone RTV foam.

Tests have been conducted to demonstrate that the cable penetration seals have an adequate fire rating. A number of unsealed penetrations were observed during the fire protection review site visit. The licensee has proposed to seal these penetrations. In the cable spreading area combustible materials remain which were used to form a dam when the penetrations were sealed. The combustible materials will be removed from these penetrations where they exist. Modifications for fire barrier penetrations in specific plant areas are noted in Section 5.0 of this report.

We find that, subject to the implementation of the above described modifications, the fire barrier penetrations are adequate to prevent the spread of fires. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.10 Separation Criteria

The separation criteria required redundant cables to be separated by 4 feet vertically and 1½ feet horizontally. The separation criteria allowed the use of totally enclosed tray or conduit or the use of Marinite barriers where the minimum separation distance could not be maintained. As noted in Section 5.0 of this report, we have not found that the physical separation of redundant systems is adequate in itself to prevent fire damage to redundant systems. The licensee has proposed modifications to insure that

redundant systems required for safe shutdown would not be lost due to the consequences of fires in such areas.

We find that, with the exception of the cable spreading area which is addressed in Section 5.2 of this report, the existing measures and proposed modifications for fire protection adequately address the physical separation of redundant systems. This satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.11 Fire Barriers

The licensee's fire hazards analysis addressed fire barrier requirements by consideration of the combustibles in each fire area. The potential energy release for all combustibles in an area was calculated. This value was divided by the floor area to obtain a relative combustible loading for the area. With the exception of fire barrier penetrations noted earlier in Section 4.9, the fire barriers consisting of walls, floors, and ceilings are adequate for the combustible loading in the area.

We find that the fire barriers are adequate to prevent fire spread. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.12 Access and Egress

Access to the lower levels of the auxiliary building is by a single enclosed stairway with 1½-hour rated fire doors. The stairway does not have direct egress to the outside. Upper areas of the auxiliary building are accessible by a number of stairways enclosed in at least 1½-hour rated enclosures. Two of the stairways have egress directly to the outside.

Access to the main cable spreading room is from three separate directions. Once within this room, access for fire fighting is extremely difficult due to the maze of cable trays from floor to ceiling. This area is protected by a manual deluge system. The turbine building cable vaults have access doors at each end. The upper cable vault has cable tray supports across the aisleway. These tray supports will be relocated where necessary to provide better firefighting access.

The diesel generator rooms have direct access to the outside and have access between rooms with the north room having access to a walkway in the auxiliary building. All switchgear rooms have at least two access doors. The control room has four means of access to this area.

We find that the provisions for access and egress are adequate for manual firefighting and evacuation in safety-related areas. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

4.13 Toxic and Corrosive Combustion Products

The products of combustion for many plastic materials, most common being cable insulation and jacket materials, are toxic to humans and corrosive to metals. Prompt fire detection and extinguishment are relied upon to

minimize the quantities of such products. Additional means of smoke removal will be provided as an aid in firefighting access as noted in Section 4.4. The fire brigade is provided with and trained in the use of emergency breathing apparatus for fighting fires involving such materials.

We find that adequate precautions have been taken to minimize the effects of toxic and corrosive products. This satisfies the objectives identified in Section 2.2 of this report, and is, therefore, acceptable.

5.0 EVALUATION OF SPECIFIC PLANT AREAS

The licensee has performed a fire hazards analysis of the facility to determine the fire loading of various plant areas and to evaluate the adequacy of 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 of specific areas is discussed in the following sections.

5.1 Control Room

5.1.1 Safety-Related Equipment

The control room contains the controls for normal station operation and for shutdown of the plant under abnormal conditions. Operating indicators, controls, and alarms are mounted on an L-shaped walk-through control board. Auxiliary electrical equipment cabinets are located in the area behind the control boards.

5.1.2 Combustibles

The combustibles in this area include electrical cable and wire insulation, and a small quantity of Class A combustibles such as log books and operating procedures.

5.1.3 Consequences if No Fire Suppression

An unmitigated fire in the control room could damage redundant divisions of safety-related systems required for safe shutdown.

5.1.4 Fire Protection System

Portable CO_2 extinguishers are provided for manual fire suppression capability. Smoke detectors are located next to the return air ducts of the air supply system and would initiate purge on sensing smoke.

5.1.5 Adequacy of Fire Protection

The fire detection system is inadequate to provide for the prompt detection and location of fires in the control room. Hose stations do not exist to provide adequate coverage for the area. The computer room is an exposure fire hazard to the control room due to the absence of fire rated doors separating these areas.

5.1.6 Modifications

The licensee has proposed the following modifications. Two 17-pound Halon 1211 extinguisher units will be provided for the control room. Strategically located ionization smoke detectors will be provided to cover the area where control boards and cabinets are located and to protect two short cable runs, above the false ceiling. Booster hose stations being provided at the entrance to the cable spreading area will provide a controlled water suppression capability for the control room. The door to the computer room will be replaced with a 1-1/2-hour fire rated door.

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

5.2 Cable Spreading Area

5.2.1 Safety-Related Equipment

The cable spreading area is located below the control room and is open on one end which joins with cable vaults that extend into the turbine building. Instrument, control, and power cables are routed through the cable spreading area. Access to the cable spreading area is provided from an enclosed stairwell from the control room above and the D-C equipment room below.

5.2.2 Combustibles

The combustibles in the cable spreading area consist of electrical cable insulation.

5.2.3 Consequences if No Fire Suppression

An unmitigated fire in the cable spreading area would result in the loss of redundant systems required for safe shutdown.

5.2.4 Fire Protection Systems

A fire detection system is provided which consists of ionization smoke detectors and heat detectors. A manual deluge water suppression system is provided with open head spray nozzles located near the ceiling in the area. Ventilation ducts from this area are provided with fire dampers and a fire door is provided at the entrance from the enclosed stairway.

5.2.5 Adequacy of Fire Protection

The cable spreading area is an extremely congested area which is not readily accessible. Cable trays stacked from the floor to near the ceiling barricade the single direct access entrance. A ceiling opening to the HVAC area adjacent to the control room is a non fire-rated penetration. The lack of fire extinguishers in the area or readily accessible hose stations prevents any attempt at manual fire fighting prior to operation of the manual deluge system. Cable penetrations are unsealed in a few areas.

Due to the limited separation between redundant electrical cables for shut down systems, the limited access which prevents effective manual fire fighting, and a concern for the effectiveness of the ceiling mounted manually actuated deluge system, the present fire protection for this area does not provide adequate assurance that fire damage could not result in a loss of shutdown capability.

5.3.6 Modifications

The licensee has proposed the following modifications. An emergency entrance with fixed ladder access to the cable spreading room will be

provided in the ceiling opening to the control room HVAC equipment area. The opening will be protected by three-hour rated construction. Booster hose stations with 200 feet of 3/4-inch hose will be provided at the stairwell and the emergency entrance to the cable spreading area. Portable extinguishers will be located throughout the cable spreading area to provide a readily available fire extinguishing capability when personnel are working in the area. All unsealed electrical cable penetrations will be sealed.

The licensee will conduct an evaluation to determine a suitable method to provide isolation, separation, or protection of redundant safety-related cables in this area. We will address the adequacy of the proposed method to assure the capability for safe shutdown for this area in a supplement to this report.

5.3 Cable Vaults

5.3.1 Safety-Related Equipment

Two cable vaults extend into the turbine building from the cable spreading area. Each cable vault has a concrete wall down the center of the vault to provide a three-hour fire barrier between redundant divisions of safety-related cable trays. The division wall extends into the cable spreading area about 20 feet. The lower cable vault is on the same elevation as the cable spreading room and extends westward into the turbine building for about 100 feet. The upper cable vault rises from the cable spreading area in a vertical shaft upward 20 feet and runs northward for about 140 feet in the turbine building. Access doors are provided at both ends of the upper cable vault and at the west end of the lower cable vault. The cable vaults provide a path for safety-related control and power cables routed to switchgear rooms located above and below the cable vaults.

5.3.2 Combustibles

The combustibles in the cable vaults consist of electrical cable insulation.

5.3.3 Consequences if No Fire Suppression

An unmitigated fire in the cable vaults would result in damage to one division of safety-related cables. Since one end of the cable vaults is open to the cable spreading area, an unmitigated fire could spread to this area.

5.3.4 Fire Protection Systems

The lower cable vault is protected by ceiling mounted open head spray nozzles which are an extension of the cable spreading room deluge system. The upper cable vault is protected by a separate manually actuated deluge system similar to that provided for the cable spreading room and lower cable vault. Fire detection is provided in each cable vault by ionization smoke detectors. Hose stations are provided in the adjacent turbine building.

5.3.5 Adequacy of Fire Protection

The deluge system for the upper cable vault does not provide sufficient water coverage for the vertical entrance to the cable vault. The spray nozzles in the east half of the upper cable vault are located next to a ventilation duct which prevents effective water coverage for all cable trays in the area. The hose stations protecting the upper cable vault do not have sufficient reach nor do they provide a readily available source of fire water.

5.3.6 Modifications

The licensee has proposed to provide additional spray nozzles in the vertical riser area of the upper cable vault deluge system. A hose station will be provided at the north entrance to the upper cable vault. Spray nozzles for the east half of the upper cable vault will be lowered to provide effective water coverage of all cable trays. Sprinklers in the area west of the lower cable vault which are connected to the cable vault deluge system will be provided with a separate connection independent of the cable vault deluge system.

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

5.4 Switchgear Rooms

5.4.1 Safety-Related Equipment

Two 480-volt switchgear rooms, one in the auxiliary building and one in the turbine building, are located above the cable spreading area and lower cable vault, respectively. One division of redundant switchgear is located in each room. Access to the switchgear room in the auxiliary building is provided from the control room, turbine building and other switchgear room. The turbine building switchgear room is accessible from the turbine building, in addition to the door to the other switchgear room. One turbine building switchgear room houses the remote shutdown panel.

5.4.2 Combustibles

The combustibles in the area consist of electrical cable insulation. The majority of the electrical cables which terminate at the switchgear are routed through the floor from the cable vault and cable spreading areas below.

5.4.3 Consequences if No Fire Suppression

An unmitigated fire in either of the switchgear rooms would result in damage to a single division of redundant switchgear. The fire would not spread to other areas due to the provisions of area fire barriers.

5.4.4 Fire Protection Systems

Smoke detectors and portable CO_2 extinguishers are provided in each switchgear room. Hose stations in adjacent areas provide fire water suppression capability.

5.4.5 Adequacy of Fire Protection

A non-rated door provides access to the auxiliary building switchgear room and is inadequate to prevent an exposure hazard from the turbine building.

5.4.6 Modifications

The licensee has proposed to replace the auxiliary building switchgear room door to the turbine building with a three-hour fire-rated door.

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

5.5 High Voltage Switchgear Rooms

5.5.1 Safety-Related Equipment

Two high voltage (H.V.) switchgear rooms are located in the turbine building, located above and below the upper cable vault. One division of redundant H.V. switchgear is located in each switchgear room. A third division of 4160-volt switchgear is located in the lower H.V. switchgear room which provides power to safety-related components which can be operated from either diesel generator unit.

5.5.2 Combustibles

The combustibles in the area consist of electrical cable insulation.

5.5.3 Consequences if No Fire Suppression

An unmitigated fire in these areas would be limited to the loss of a single division of safety-related switchgear.

5.5.4 Fire Protection System

Smoke detectors are installed in each area. Portable CO_2 extinguishers are provided in each area and hose stations nearby in the turbine building provide fire water suppression capability.

5.5.5 Adequacy of Fire Protection

The fire protection for these areas is adequate.

5.5.6 Modifications

We find that the fire protection for the high voltage switchgear rooms satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.6 D-C Equipment Rooms

5.6.1 Safety-Related Equipment

Two D-C equipment rooms are located below the cable spreading area. The equipment located in those areas includes the 125-volt D-C bus and distribution panels, battery chargers, rod drive panels and motor generator sets, vital A-C inverters, and distribution panels. Redundant equipment is located in separate rooms.

5.6.2 Combustibles

The combustibles in the area consist of electrical cable and wire insulation materials.

5.6.3 Consequences if No Fire Suppression

An unmitigated fire in either area would result in the loss of one division of shutdown systems. The area is enclosed within a three-hour rated fire barrier which would prevent the spread of fire to other areas with the exception of the door between those areas.

5.6.4 Fire Protection Systems

Heat rate of rise detectors are located in each area. Portable CO_2 extinguishers are provided in or near these areas. Hose stations from adjacent areas provide fire water suppression capability.

5.6.5 Adequacy of Fire Protection

The rate of rise heat detectors do not provide early warning for the detection of fires in these areas. The nonrated door between these areas does not provide assurance that a fire could not propagate between these two areas.

5.6.6 Modifications

The licensee has proposed to replace the door between these areas with a 3-hour fire-rated door. Existing heat detectors will be replaced with ionizatior detectors in these areas.

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

5.7 Battery Rooms

5.7.1 Safety-Related Equipment

Two separate battery rooms located adjacent to the D-C equipment rooms house the redundant safety-related batteries.

5.7.2 Combustibles

The combustibles in the area consist of a small quantity of electrical cable insulation.

5.7.3 Consequences if No Fire Suppression

An unmitigated fire in the battery room would result in the loss of one of the redundant D-C power sources.

5.7.4 Fire Protection System

Smoke detectors are installed in each room. Portable CO_2 extinguishers are located in adjacent areas and fire hose stations are located nearby.

5.7.5 Adequacy of Fire Protection

The fire door to one of the battery rooms has a faulty self-closing mechanism.

5.7.6 Modifications

The licensee has proposed to repair the faulty self-closing mechanism for the fire door to one of the battery rooms.

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

5.8 Auxiliary Building

5.8.1 Safety-Related Equipment

An enclosed stairwell provides access to three elevations below grade in the auxiliary building. At the lowest elevation, -45 feet, the high and low pressure safety injection pumps and shutdown heat exchangers are located in separate rooms. At elevation -25 feet, separate cubicles are provided for the charging pumps and reactor building closed cooling water heat exchangers and pumps. Safety-related cables are routed in cable trays and conduit throughout many areas of the auxiliary building. Two motor control centers are widely separated at grade elevation, 14 feet.

5.8.2 Consequences if No Fire Suppression

An unmitigated fire in the auxiliary building could result in the loss of redundant shutdown systems.

5.8.3 Combustibles

The major combustible in most areas of the auxiliary building consists of electrical cable insulation. Storage lockers for radiation contamination protective clothing are located in various areas. Work benches and tables in many areas are constructed of ordinary lumber. Plastic barrels are

used to collect contaminated clothing. A 55-gallon drum of acetone base material was located in the charging pump area.

5.8.4 Fire Protection System

Hose stations are located on each elevation of the auxiliary building. Portable dry chemical and CO_2 extinguishers are located throughout the building. Automatic sprinklers are provided in the radwaste drumming storage areas and the maintenance shop.

5.8.5 Adequacy of Fire Protection

The hose stations in the auxiliary building do not have adequate reach to provide fire water coverage of all areas. In many areas clothing storage lockers present an exposure fire hazard to safety-related cables. Transient combustibles are inadequately controlled to reduce the fire hazards in safety-related areas. The physical separation of redundant safety-related cables does not provide adequate assurance that redundant systems required for safe shutdown would not be damaged by fire. The lack of fire detection prevents prompt response to control and extinguish fires in these areas.

5.8.6 Modifications

The licensee has proposed the following modifications. Early warning fire detection will be provided in the low pressure safety injection pump rooms, charging pump area, and at elevations -45, -25, and -5 feet where redundant safety-related cables are routed. Additional hose stations or added lengths of hose will be provided such that all safety-related areas are accessible with hose streams. All wood used in safety-related areas will be replaced with treated fire retardant lumber or treated with fire retardant coating. Plastic barrels used to collect contaminated clothing will be replaced with steel barrels. Clothing storage lockers will be relocated or protected by area spray system so that they do not present an exposure fire hazard to safety-related cables. Housekeeping will be improved to remove transient materials from safety-related areas. An automatic sprinkler system will be provided in the railroad bay area.

The consequences of fire damage to systems required for safe shutdown will be determined where the physical separation of cables may not preclude damage to redundant safety-related systems. Automatic sprinklers or suitable fire barriers will be provided to assure that fire damage does not result in a loss of shutdown capability where prompt action is not taken to suppress fires in these areas. We will address the adequacy of the resolution of this items in a supplement to this report.

We find that, subject to the implementation of the above described modifications, the fire protection for the auxiliary building, with the exception of the protection provided for cable trays, satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.9 Containment Penetration Rooms

5.9.1 Safety-Related Equipment

These rooms adjacent to containment contain cabling which performs safety-related functions. Separate areas are provided for redundant safety-related systems.

5.9.2 Combustibles

The combustibles in these areas consist of cable insulation, spilled grease, and miscellaneous items. A combustible instrument enclosure room is located in the west electrical penetration area.

5.9.3 Consequences if No Fire Suppression

An unmitigated fire in these areas could result in the loss of a single division of cables. The other division of redundant cables are separated by fire walls.

5.9.4 Fire Protection Systems

The electrical penetration rooms are protected by ionization smoke detectors with hose stations in adjacent areas.

5.9.5 Adequacy of Fire Protection

Improvements in housekeeping are necessary to reduce the combustibles in these areas. The combustible enclosure in the west penetration area is an unnecessary addition to the combustible loading in the area.

5.9.6 Modifications

The licensee will clean up the grease and remove transient combustibles from the penetration rooms. The combustible instrument enclosure room in the west electrical penetration area will be replaced with non-combustible construction.

We find, subject to the housecleaning above, the fire protection for these rooms satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.10 Containment

5.10.1 Safety-Related Equipment

The safety-related equipment in the containment includes valves, controls, instrumentation, and electrical cables.

5.10.2 Combustibles

The combustibles inside containment include 137 gallons of lube oil for each reactor coolant pump and electrical cable insulation.

5.10.3 Consequences if No Fire Suppression

An unmitigated fire in the containment could damage redundant divisions of safety-related systems. Cable and component separation will protect redundant safe shutdown systems from damage due to a fire.

5.10.4 Fire Protection Systems

The fire protection inside the containment consists of fire detection at the cable penetration area. Portable extinguishers are located outside the area.

5.10.5 Adequacy of Fire Protection

The lack of fire detection for cable trays throughout the area and in the area of the primary coolant pumps prevents prompt detection of fires in these areas. Manual extinguishers do not have sufficient capability to suppress a fire in cable trays. Adequate means have not been provided to contain a lube oil spill fire in the primary coolant pump area. Fixed battery operated lighting needs to be serviced to replace the electrolyte.

5.10.6 Modifications

The licensee has proposed the following modifications. Detection systems will be provided at the elevation above the cable trays and in the reactor coolant pump areas. A dry pipe hose standpipe system will be installed to provide fire water suppression capability for the combustibles in the containment. The fixed battery operated lighting will be serviced during refueling outages. Additional portable battery operated lighting units will be located near the containment entrance. Where redundant cables in conduit are exposed to cable tray fire hazards, they will be protected by suitable fire barriers or the cables in conduit will be rerouted.

The licensee is evaluating a method of oil collection or routing to prevent the spread of oil or the use of alternative types of lubricants to reduce the fire hazards associated with the reactor coolant pump lube oil systems. We will address the resolution of this item in a supplement to this report.

We find that, subject to the implementation of the above described modifications and resolution of the lube oil system fire hazards, the fire protection for the containment satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.11 Diesel Generator Rooms

5.11.1 Safety-Related Equipment

Each of the two diesel generators are located in separate rooms within the auxiliary building. Associated equipment including control panels and compressors are also located within the rooms. One diesel generator is capable of supplying power for safe shutdown on the loss of offsite power.

5.11.2 Combustibles

The diesel generator crankcase contains 500 gallons of lubricating oil. Associated electrical cables are routed in each room.

5.11.3 Consequences if No Fire Suppression

An unmitigated fire in a diesel generator room would cause the loss of the diesel generator and could seriously threaten the integrity of the rated fire barrier wall and penetrations separating it from the remaining diesel generator.

5.11.4 Fire Protection Systems

A smoke detector is provided in each diesel generator room which alarms in the control room. The rooms are also provided with a manually actuated sprinkler system. A fusible link shutoff valve is provided on the fuel oil feed from the diesel day tanks. Manual firefighting includes a hose station and extinguishers.

5.11.5 Adequacy of Fire Protection

The diesel generators are adequately protected from the effects of an oil fire but the protection between rooms is inadequate due to unsealed penetrations and an unsupervised nonfire-rated water-tight door.

5.11.6 Modifications

The licensee has proposed to provide a three-hour fire rated door between diesel generator rooms. Unsealed wall and ceiling penetrations will be sealed to provide three-hour rated protection. An oil spill curb will be provided at the access doorway to the auxiliary building.

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

5.12 Diesel Generator Day Tank Rooms

5.12.1 Safety-Related Equipment

The diesel day tanks for the diesel generators are located in separate rooms adjacent to each other above the diesel generator rooms.

5.12.2 Combustibles

The combustible in each room consists of 14,000 gallons of diesel fuel.

5.12.3 Consequences if No Fire Suppression

An unmitigated fire in one room could affect the adjacent day tank room or the area adjacent to the room where the diesel air intakes pass through for both generator units.

5.12.4 Fire Protection Systems

An automatic sprinkler system is installed in each room and the tanks are enclosed in individual three-hour rated enclosures except for unsealed penetrations.

5.12.5 Adequacy of Fire Protection

The penetrations to the diesel generator rooms below are not adequately sealed to prevent the spread of fire to adjacent areas. A small curb is provided at the entrance to the day tank rooms but is insufficient to contain the contents of the day tanks. The lack of confinement and drainage facilities could permit the spread of an oil spill fire to adjacent areas.

5.12.6 Modifications

The licensee has proposed the following modifications. The penetrations in the floor will be sealed to provide a three-hour rating. Floor drains will be provided for the day tank rooms.

We find that, subject to the implementation of the above described modification and evaluation, the fire protection for the diesel generator day tanks satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.13 Turbine Building

5.13.1 Safety-Related Equipment

Safety-related equipment in the turbine building includes electrical cables and the auxiliary feedwater pumps.

5.13.2 Combustibles

The combustibles in the turbine building consist of lubricating and seal oil systems and electrical cable insulation. Transient combustibles exist in various portions of the building and include wood, plastic, paints, paint thinner, and other solvents.

5.13.3 Consequences if No Fire Suppression

An unmitigated fire in the turbine lube oil system could extensively damage the turbine building structure. A fire near the entrance to the auxiliary feed pump room could cause the loss of the auxiliary feedwater pumps.

5.13.4 Fire Protection System

The hydrogen seal oil unit and the feedwater pumps are protected by an automatic deluge system. The turbine bearings are protected by a pre-action sprinkler system. The turbine lube oil room is protected by an extra hazard automatic sprinkler system. An automatic carbon dioxide system protects the generator exciter. Many areas of the turbine building are protected by an automatic sprinkler system. All the areas within the turbine building are protected by hose stations and portable extinguishers.

5.13.5 Adequacy of Fire Protection

The electrical cables for the auxiliary feed pumps are inadequately protected from potential damage due to exposure fires. Paint storage in this area is an unnecessary addition to the combustible loading in the area. Unsealed penetrations in the oil storage room are inadequate to contain a fire within this area.

5.13.6 Modifications

The licensee will extend the existing automatic sprinkler system to provide protection in the area of the auxiliary feedwater pump electrical cables at elevation 14 feet. The combustible storage cage and paints and thinners will be removed from the area which expose the auxiliary feedwater pump cables. The penetration in the wall from the lube oil storage room to the turbine building will be sealed to a fire rating equal to the wall but not to exceed three hours.

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

5.14 Intake Building

5.14.1 Safety-Related Equipment

The three service water pumps and their power and control cables are located in the area.

5.14.2 Combustibles

Combustibles in this area consist of the 53 quarts of oil in each service water pump, 200 quarts of oil in each circulating water pump, and electrical cable insulation.

5.14.3 Consequences if No Fire Suppression

An unmitigated fire could result in the loss of the service water pumps.

5.14.4 Fire Protection Systems

Portable extinguishers are placed in strategic locations within the pump house. A hydrant is located within 50 feet of the entrance doors.

5.14.5 Adequacy of Fire Protection

There is no detection system provided in the area. A fire should be detected in the early stages to prevent possible damage to safety-related pumps.

5.14.6 Modifications

The licensee will provide a fire detection system for the intake building.

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

5.15 Fire Pump Houses

5.15.1 Safety-Related Equipment

There is no safety-related equipment in either pump house. An electric and diesel driven fire pump is located in one pump house and a single electric driven fire pump is located in the adjacent structure.

5.15.2 Combustibles

In the Unit 1 pump house the major combustible is the 220 gallon fuel oil tank. In the Unit 2 pump house the combustibles are negligible.

5.15.3 Consequences if No Fire Suppression

An unmitigated fire in the Unit 1 pump house could incapacitate both electric and diesel fuel pumps and may affect the adjacent Unit 2 fire pump through unsealed penetration in a common wall.

5.15.4 Fire Protection System

A portable extinguisher is provided in the Unit 1 pump house. A hydrant is located within 200 feet of the pump houses.

5.15.5 Adequacy of Fire Protection

The Unit 1 pump house is inadequately protected to prevent the loss of both fire pumps due to a fuel oil fire in the area.

5.15.6 Modifications

The licensee will provide a preengineered Halon suppression system for the Unit 1 pump house to prevent an oil fire from affecting both of the fire

pumps in the area. Unsealed penetrations between the pump houses will be sealed.

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

5.16 Yard Area

5.16.1 Safety-Related Equipment

The safety-related equipment in the yard area includes the condensate storage tanks and the primary water storage tanks.

5.16.2 Combustibles

Combustibles in the yard area include the oil in the transformers adjacent to the turbine buildings, hydrogen storage, buried diesel oil storage tank, buried gasoline storage tank, buried fuel oil storage tank, warehouse, trailers and miscellaneous storage.

5.16.3 Consequences if No Fire Suppression

The consequences of an unmitigated fire in the yard area do not impact safe shutdown or safety-related equipment.

5.16.4 Fire Protection Systems

The transformers are protected by automatic deluge systems actuated by thermostatic releases. The warehouse is protected by an automatic sprinkler system. The condensate storage tanks are not exposed by exterior fire hazards. The yard is protected by manual fire protection consisting of a hose house located at each yard hydrant.

5.16.5 Adequacy of Fire Protection

The automatic systems for the various hazards in the yard area are adequate. Hose houses do not have an adequate amount of manual firefighting tools.

5.16.6 Modifications

A hydrant surveillance program will be established for inspecting the hydrants in the fall and the spring for proper operation. Additional firefighting tools will be provided in each hose house. The apparent undermining of the hydrant located at the gas turbine building will be corrected.

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

6.0 ADMINISTRATIVE CONTROLS

The licensee's description of the administrative controls for fire protection as contained in his fire hazards analysis report was not sufficient to permit a conclusion by the staff. We have subsequently recommended that the licensee's administrative controls follow the NRC guidelines set forth in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance." The licensee by letter dated April 12, 1978, has stated that his program for administrative controls is in conformance with the NRC guidelines, except for a few specific areas where deviations were noted and a justification therefor was provided. In response to our letter of June 21, 1978 requesting further information, the licensee further clarified their exceptions by letter dated July 11, 1978. Based on our review of this information and our understanding that the licensee meets or will meet the specific guidance found in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance," except where deviations were described by NNECO in the letters indicated above, we conclude that the licensee has provided an adequate program for fire protection administrative controls with the exception of conducting quarterly drills and training sessions. In addition, we have not yet resolved a difference between the minimum size of the fire brigade based on our evaluation and what the licensee proposes.

We find that, except for the above note three unresolved items, the administrative controls for the fire protection program satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable. We will address the resolution of these three unresolved items in a supplement to this report.

7.0 TECHNICAL SPECIFICATIONS

The Technical Specifications for fire protection were previously modified by Amendment No. 35 issued on March 3, 1978, to include limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. In response to our letter of July 13, 1978, Northeast Nuclear Energy Company proposed the following additional changes to the Millstone Unit No. 2 Technical Specifications:

Section 3.7.9.1 - increase the required number of OPERABLE high pressure fire pumps from two to three to provide adequate capacity for automatic fire suppression with an allowance for manual hose streams.

Section 3.7.9.2 - add five turbine building locations where spray and/or sprinkler systems are required to be OPERABLE to protect safety-related systems located in switchgear rooms and cable vaults.

Section 3.7.9.3 - add 18 turbine building fire hose stations shown in Table 3.7-2 to be OPERABLE to protect safety-related systems located in switchgear rooms and cable vaults.

We find these proposed Technical Specifications to be responsive to our request, insure an adequate supply of fire water, include those spray/andor sprinkler system and hose stations protecting safety-related systems, and are, therefore, acceptable.

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 CONCLUSION

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 of the fire hazards analysis and our onsite evaluation of the fire protection program. These proposed modifications are summarized in Section 3.1. As we have noted in Section 3.2 and Section 6.0, eight items remain to be completed before we can make final conclusions regarding the overall acceptability of the fire protection program at Millstone Unit No. 2. These items will be addressed in a supplement to this report.

In summary, 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 in response to potential fire situations. Upon implementation of the licensee's proposed modifications summarized in Section 3.1, we find that the fire protection program fulfills the following criteria:

(1) Combustibles in safety-related areas are limited to the extent practicable;

(2) Fire detection and suppression systems will minimize the effects of fire on safety-related systems and will not in themselves significantly impair the capability of safety-related systems;

(3) A fire in any fire area will not damage safety-related structures such that they cannot perform their safety function;

(4) A fire in any fire area will not cause the release of amounts of radioactive material in excess of those considered in previous safety evaluations; and

(5) 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 safe operation of the facilities.

We conclude that these modifications will provide significant enhancement of the fire protection program at Millstone Unit No. 2 and should be implemented on the schedule set forth in this SER.

As we have noted in Section 3.2 and Section 6, there remains eight items which must be completed before we can reach a determination concerning whether the fire protection program at this facility will satisfy the objectives identified in Section 2.2 of this report, for satisfactory long term fire protection.

In the interim, the conclusions contained in our evaluation dated November 25, 1977, remain applicable; that based upon the report of the Special Review Group on the Browns Ferry Fire (NUREG-0050) dated February 1976, and subsequent actions taken with respect to control

of ignition sources, imposition of administrative controls on activities that might affect fire safety and emergency operating procedures for ultimate shutdown and cooling methods, that there is reasonable assurance that the health and safety of the public will not be endangered. The following quotation from the report summarizes the basis for our conclusion.

> "A probability assessment of public safety or risk in quantitative terms is given in the Reactor Safety Study (WASH-1400). As the result of the calculation based on the Browns Ferry fire, the study concludes that the potential for a significant release of radioactivity from such a fire is about 20% of that calculated from all other causes analyzed. This indicates that predicted potential accident risks from all causes were not greatly affected by consideration of the Browns Ferry fire. This is one of the reasons that urgent action in regard to reducing risks due to potential fires is not required. The study (WASH-1400) also points out that 'rather straightforward measures, such as may already exist at other nuclear plants, can significantly reduce the likelihood of a potential core melt accident that might result from a large fire.'
>
> "Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent (see Section 3.3 of NUREG-0500). 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 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 51.5(d)(4) that an environmental impact 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 STAFF RESPONSE TO 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 - Millstone Unit 2 - Safety Evaluation Report Review," dated August 1, 1978, concurs with the staff conclusions noted in the Safety Evaluation Report.

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

Consultants' Recommendation:

"Electrical valve supervision should be provided on all valves controlling fire water systems and sectionalizing valves. The present proposal of administrative controls or locks is unacceptable."

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 valve supervision is consistent with NRC guidelines. In addition, the plant technical specifications were revised to 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.

APPENDIX

CHRONOLOGY

In February 1976, the report by the NRC Special Review Group was issued as NUREG-0500, "Recommendations Related to the Browns Ferry Fire."

On May 1, 1976, Standard Review Plan 9.5.1, "Fire Protection," was issued, incorporating the various recommendations contained in NUREG-0500.

By letter dated May 11, 1976, Northeast Nuclear Energy Company was requested to compare the existing fire protection provisions at their facilities with new NRC guidelines as set forth in Standard Review Plan 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 of September 30, 1976, Northeast Nuclear Energy Company was requested to provide the results of a fire hazards analysis and propose Technical Specifications pertaining to fire protection. Northeast Nuclear Energy Company was also provided a copy of Appendix A to BTP 9.5-1 which includes acceptable alternatives to the guidelines of SRP 9.5-1.

On June 2, 1976, Northeast Nuclear Energy Company replied to the Commission's correspondence of May 11, 1976, and indicated that the task group evaluation would provide schedule information requested by the Commission's letter by August 2, 1976.

By letter dated February 28, 1977, Northeast Nuclear Energy Company submitted their report titled, "Fire Protection Program Review - BTP APCSB 9.5-1 - Millstone Unit No. 2."

On February 15, 1978, the staff forwarded to Northeast Nuclear Energy Company the results of our initial review and requests for additional information and staff positions.

By letters dated February 3, 1978, and February 14, 1978, the staff requested that Northeast Nuclear Energy Company review their fire protection programs for conformance with NRC staff guidelines "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

By letter dated March 3, 1978, Amendment No. 35 to Facility License No. DPR-65 for Millstone Unit No. 2 was issued by the Commission to incorporate changes to the Appendix A Technical Specifications to provide requirements for fire protection.

On April 12, 1978, the Northeast Nuclear Energy Company replied to the staff's February 3 and February 14 letters outlining the deviations from the staff's guideline document titled "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

On May 1 through May 5, 1978, the staff's fire protection review team visited the Northeast Nuclear Energy Millstone Unit 2 site.

On May 17, 1978, the staff forwarded by letter its requests for additional information and its staff positions developed as a result of the site visit.

On May 23, 1978, the licensee met with the staff at the NRC offices in Bethesda, Bethesda, Maryland, to resolve questions and concerns.

On May 27, 1978, an inspection of the Millstone Unit 2 containment was made during a shutdown of the unit.

By letter dated June 5, 1978, we forwarded to the licensee the guidance document titled "Manpower Requirements for Operating Reactors."

On June 7, 1978 the fire protection review team met with the licensee at the plant site to discuss fire protection concerns for the Unit 2 containment building.

By letter dated June 21, 1978, the staff replied to the Northeast Nuclear Energy Company letter of April 12, 1978, addressing the exceptions to the administrative controls document titled, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," to which the licensee has not complied.

On June 27, 1978, the licensee met with the staff at the NRC Offices in Bethesda, Maryland, to resolve outstanding concerns.

By letter dated July 11, 1978, the licensee provided a response to the staff positions on administrative controls.

On July 13, 1978, the staff forwarded by letter recommended changes in the Technical Specifications which the staff found necessary for the existing fire protection systems.

By letter dated July 14 and August 2, 1978, the licensee documented proposed changes resulting from the staff review of the fire protection program at Millstone Unit 2.

By letter dated August 2, 1978, Northeast Nuclear Energy Company forwarded to the staff their proposed revisions to their technical specifications.

On August 9, 1978, the staff met with the licensee at the NRC offices in Bethesda, Maryland, to discuss outstanding concerns on administrative controls and on the Technical Specification requirement for fire brigade size.

By letter dated August 17, 1978, Northeast Nuclear Energy Company provided the completion schedule for submittals and all modifications.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-336

NORTHEAST NUCLEAR ENERGY COMPANY,
THE CONNECTICUT LIGHT AND POWER COMPANY,
THE HARTFORD ELECTRIC LIGHT COMPANY, AND
WESTERN MASSACHUSETTS ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 43 to Facility Operating License No. DPR-65 to Northeast Nuclear Energy Company, The Connecticut Light and Power Company, The Hartford Electric Light Company, and Western Massachusetts Electric Company, which amended the license and its appended Technical Specifications for operation of the Millstone Nuclear Power Station, Unit No. 2, located in the Town of Waterford, Connecticut. The amendment is effective as of its date of issuance.

This amendment adds a license condition relating to the completion of facility modifications and the implementation and maintenance of administrative controls for fire protection and modifies the Technical Specifications to require three operable fire pumps and additional spray and/or sprinkler systems and fire hose stations to be operable in the turbine building.

The application for amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. 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 amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment 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 the issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated August 2, 1978, (2) the licensee's submittals dated June 2, 1976, February 28, 1977, April 12, July 11 and 14, August 2 and 17, 1978, (3) Amendment No. 43 to License No. DPR-65, and (4) the Commission's related Safety Evaluation. 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 Waterford Public Library, Rope Ferry Road, Route 156, Waterford, Connecticut. A copy of items (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 19th day of September 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors