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① Suppl. 1 to SER dtd 8/14/80
Supple 2 to SER dtd 4/15/80

MAY 23 1979

Docket Nos. 50-277
and 50-278

Mr. Edward G. Bauer, Jr., Esquire
Vice President and General
Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Dear Mr. Bauer:

The Commission has issued the enclosed Amendments Nos. 53 and 53 to Facility Operating Licenses No. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station Units No. 2 and 3. These amendments add license conditions relating to the completion of facility modifications for fire protection as described in your submittal dated October 21, 1976, as supplemented by letters dated April 14, 1977, August 12, 1977, September 15, 1977, February 22, 1978, August 11, 1978 and December 20, 1978.

Your submittal dated February 16, 1979 contained certain changes from previous committments. We have not completed our review of this latest submittal. However, the Safety Evaluation supporting the Amendments is annotated to indicate these deviations.

By Amendment Nos. 39 and 39 to DPR-44 and DPR-56 we issued Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems. We request that you provide revised Technical Specifications related to facility modifications required by the amendments.

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

Const CCP

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OFFICE						
SURNAME						
DATE						

Copies of the report of our fire protection consultant (letter, Brookhaven National Laboratory to NRC dated April 6, 1979) and a related Notice of Issuance of the Amendments are also enclosed.

Sincerely,

Original signed by
Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendment No. 53 to DPR-44
2. Amendment No. 53 to DPR-56
3. Safety Evaluation
4. BNL letter dtd 4/6/79
5. Notice

cc w/enclosures:
See next page

*SEE PREVIOUS YELLOW FOR CONCURRENCES

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

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 53
License No. DPR-44

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

   A. The submittals by Philadelphia Electric Company (the licensee) dated October 21, 1976, April 14, 1977, August 12, 1977, September 15, 1977, February 22, 1978, August 11, 1978 and December 20, 1978, comply 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, operating license DPR-44 is amended by adding paragraph 2.C.(5) to read as follows:

   2.C.(5) The licensee may proceed with and is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.16 of the NRC's Fire Protection Safety Evaluation (SE), dated May 23, 1979. for the facility. These modifications will be completed in accordance with the schedule in Table 3.1 of the SE and supplements thereto.

   In addition, the licensee shall submit the additional information identified in Table 3.2 of this SE in accordance with the schedule contained therein.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Date of Issuance: May 23, 1979

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

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 53
License No. DPR-56

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

   A. The submittals by Philadelphia Electric Company (the licensee) dated October 21, 1976, April 14, 1977, August 12, 1977, September 15, 1977, February 22, 1978, August 11, 1978 and December 20, 1978, comply 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, operating license DPR-56 is amended by adding paragraph 2.C.(4) to read as follows:

   2.C.(4) The licensee may proceed with and is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.16 of the NRC's Fire Protection Safety Evaluation (SE), dated May 23, 1979 for the facility. These modifications will be completed in accordance with the schedule in Table 3.1 of the SE and supplements thereto.

   In addition, the licensee shall submit the additional information identified in Table 3.2 of this SE in accordance with the schedule contained therein.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Date of Issuance: May 23, 1979

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

FIRE PROTECTION

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U. S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

PHILADELPHIA ELECTRIC COMPANY

PUBLIC SERVICE ELECTRIC & GAS COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

PEACH BOTTOM UNITS 2 AND 3

DOCKET NOS. 50-277/278

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1.0 INTRODUCTION

Following a fire at the Browns 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 recommendation, the NRC initiated a program for reevaluation of the fire protection programs at all licensed nuclear power stations and for a comprehensive review of all new licensee applications.

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

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

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

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

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

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

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

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

We have reviewed the licensee's analyses and have visited the plant to examine the relationship of safety-related components, systems and structures with both combustibles and the associated fire detection and suppression system. Our review has been limited to the aspects of fire protection related to the protection of the public within the NRC's jurisdiction, i.e., those aspects related to health and safety. We have not considered aspects of the fire protection associated with life safety of onsite personnel and with property protection, unless they impact the health and safety of the public due to the release of radioactive material.

The report summarizes the results of our evaluation of the fire protection program at Philadelphia Electric Company's Peach Bottom Atomic Power Station, Units 2 and 3. 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 material shall be used wherever practical throughout the unit, particularly in locations such as the containment and the control room.
>
> "Fire detection and fighting 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 both his and the staff's evaluations. The proposed modifications are summarized below. The implementation schedule for these modifications is in Table 3.1. The licensee has agreed to this schedule. The sections of this report which discuss the modifications are noted in parentheses.

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

*3.1.1 Fire Detection Systems

The licensee has proposed to install additional smoke detectors in the following areas:

(1) Residual heat removal pump rooms (4.2, 5.6, 5.12)

(2) Reactor Core Isolation cooling pump rooms (4.2, 5.12)

(3) Core spray pump rooms (4.2, 5.6, 5.12)

(4) Refueling floor of the reactor buildings (4.2, 5.10) (NOTE 1)

(5) Enclosed rooms within the control room complex (4.2, 5.2)

(6) Cable spreading room (4.2, 5.3)

(7) Diesel generator rooms (4.2, 5.15)

(8) Diesel generator auxiliary room (4.2, 5.15)

(9) High pressure service water pump rooms to replace the existing heat detectors (4.2, 5.16)

(10) Battery rooms (4.2, 5.5)

NOTE 1: In the licensee's submittal dated February 16, 1979, the licensee indicated that he has reevaluated this proposal and no longer considers it necessary. Since this submittal is still under review, we will report our findings in a supplement to this evaluation.

TABLE 3.1

IMPLEMENTATION DATES FOR PROPOSED MODIFICATIONS

	ITEM	DATE
3.1.1	Fire Detection Systems	Design Complete - 9 months from date of SER Modification Complete - 18 months after NRC approval of design
3.1.2	Water Suppression Systems	Design Complete - 9 months from date of SER Modification Complete - 18 months after NRC approval of design
3.1.3	Hose Stations	12 months from date of SER
3.1.4	Portable Extinguishers	12 months from date of SER
3.1.5	Fire Doors	6 months from date of SER
3.1.6	Ventilation Equipment	12 months from date of SER
3.1.7	Fire Barrier Penetration Seals	18 months after NRC approval of design
3.1.8	Air Breathing Equipment	3 months from date of SER
3.1.9	Emergency Lighting	3 months from date of SER
3.1.10	Communications	3 months from date of SER
3.1.11	Control of Combustibles	18 months from date of SER
3.1.12	Yard Hydrants	18 months from date of SER
3.1.13	Hose Cart Stations	18 months from date of SER
3.1.14	Administrative Controls/ Procedures	9 months from date of SER, with the following exceptions: 1) 3 months for fire fighting procedures 2) 6 months for control of combustibles
3.1.15	Fire Water System Valve Supervisions	18 months from date of SER
3.1.16	Diesel Fuel Tank Fill Connection	Complete

3.1.2 Water Suppression Systems

*A. Fire Suppression systems will be installed:

(1) On elevation 116' of the Turbine building for protection of anticontamination clothing stored in this area (4.8, 5.1). An acceptable alternative is to permanently relocate the anticontamination clothing to an area separated from safe shutdown equipment by a 3-hour fire barrier.

(2) Recirculation pump motor generator set lube oil pump rooms (4.3, 5.4) NOTE 1

(3) Baling area of the radwaste building (4.3, 5.13)

B. Heat reflecting shields will be provided for sprinklers under the grating in the main turbine lube oil reservoir rooms (4.3, 5.1).

3.1.3 Hose Stations

(1) All hose stations will be fitted with sufficient hose length to permit effective application of a hose stream to all safety-related equipment serviced by the particular station (4.3, 5.9, 5.11).

(2) All hose stations will have the hose connected to the station valve (4.3).

(3) All hose stations will be equipped with a ball shut-off valve (4.3).

(4) Additional hose will be provided to serve the 180 feet and 214 feet elevations of the reactor buildings (4.3).

3.1.4 Portable Extinguishers

(1) Two 2 1/2 gallon pressurized water extinguishers will be installed in one or more of the enclosed rooms within the control room complex (4.3, 5.2).

(2) All welding carts will be equipped with portable extinguishers or administrative controls will be implemented to ensure that fire extinguishers are located in the immediate area where welding is being performed (4.3).

Note 1: The licensee's submittal dated February 16, 1979 stated that this item is being re-reviewed by investigating the feasibility of using a fire resistant fluid in the MG-set drives. We will report our findings in a supplement to this evaluation.

(3) Two carbon dioxide extinguishers will be installed in both the corridor on the west side of the switchgear rooms and in the turbine building on the east side of this area (4.3, 5.4).

3.1.5 Fire Doors

(1) The watertight doors in the center section of the circulating water pump structure will be electrically supervised (5.16).

*(2) Doors to the condensate pump room will be upgraded (5.13).

3.1.6 Ventilation Equipment

(1) Three portable air handling units will be provided for smoke removal (4.4, 5.6).

(2) The licensee will verify that smoke can be exhausted from a torus compartment fire to a suitable location as described in procedures (4.4).

(3) Battery room ventilation air flow system will be upgraded to include exhaust air flow detector (5.5).

*3.1.7 Fire Barrier Penetration Seals

Mechanical seals will be evaluated and upgraded as necessary (4.9, 5.6, 5.7, 5.8, 5.9, 5.12, 5.15).

3.1.8 Air Breathing Equipment

A supply of 72 extra canisters for the Chemox masks will be provided (4.4).

3.1.9 Emergency Lighting

Twenty-two portable battery-powered hand-held lights will be provided (4.6).

3.1.10 Communications

Six portable two-way radio units will be procured for use of the fire brigade (4.7).

3.1.11 Control of Combustibles

*(1) A curb or doorsill will be installed to prevent the flow of combustible liquids under the doors between the individual diesel generator rooms at the 127 foot elevation (4.5, 5.15).

(2) The curb around the hydrogen seal oil unit will be upgraded (4.5, 5.1).

(3) The motor-generator set oil pump room drains will be plugged, separated, or provided with backwater valves to prevent an oil pathway via the motor-generator set room drainage system (4.5).

(4) The health physics cleaning and repair operations for breathing equipment will be permanently relocated from the 116 foot elevation corridor of the radwaste building (5.13).

(5) A curb will be added at the door of the diesel fire pump room (4.5, 5.16). A fusible link shutoff valve or high temperature shutoff switch to the fuel transfer pump will be provided to limit the flow of diesel fuel into the diesel fire pump room during a fire (5.16).

(6) Curbs for the reactor feed pump turbine lube oil reservoirs at the 135 feet elevation will be raised to contain the full contents of the reservoir and a 20 minute sprinkler flow (4.5, 5.1).

(7) Metal cabinets will be provided for storage of protective clothing or the clothing will be relocated from elevation 116 of the turbine building (5.1).

(8) Flammable liquid cabinets will be provided in laboratories (5.1).

3.1.12 Yard Hydrants

(1) The hydrant in the middle of the west side will be rotated to allow both hose connections to be used (4.3).

(2) The environmental station pipe will be relocated or the licensee will take other corrective measures to provide adequate clearance for use of the hydrant wrench.

3.1.13 Hose Cart Houses

An additional hose cart will be installed in the yard west of the reactor building. This cart and the existing hose carts will contain, as a minimum (4.3, 5.18):

(1) 150 feet of 2-1/2-inch hose

(2) Two 75-foot lengths of 1-1/2-inch hose

(3) One gated wye having a female 2-1/2-inch inlet and two 1-1/2-inch male outlets

(4) Two 1-1/2-inch and one 2-1/2 inch adjustable spray nozzles

(5) Hydrant and hose coupling spanner wrenches

(6) One 2-1/2-inch hydrant gate valve.

3.1.14 Administrative Controls/Procedures

The licensee will implement appropriate procedures to insure that:

(1) Hose houses will be maintained free of ice and snow that might hinder access (4.3);

(2) Each hydrant will have the caps removed, threads lubricated, and barrel checked in the fall of each year (4.3);

(3) Procedures are developed for the use of portable smoke removal equipment (4.4);

(4) Pilot and alarm lights for detectors are properly illuminated at control panels (4.2);

(5) Fire doors are inspected semiannually to verify self closing mechanisms and latches are in proper working order (4.9, 5.15);

(6) A stepladder will be provided in the control room to provide access to the space above the suspended ceiling (5.2);

(7) Unnecessary combustibles are not stored in the control room complex (5.2);

(8) Prefire strategy plans include manual trip of the auxiliary boiler fuel oil transfer pump (5.15).

(9) Clarification will be provided to demonstrate compliance of the licensee's administrative controls with staff guidelines or justification for deviations will be provided (6.0).

3.1.15 Fire Water System Valve Supervision

Chairs and locks will be provided on all nonoperating valves controlling the flow of fire water, and administrative controls will be instituted to provide assurance that the fire protection valves are maintained in the appropriate position (4.3, 5.18). Operating valves such as gate valves for deluge control and main discharge valves will be electrically supervised.

3.1.16 Diesel Fuel Tank Fill Connection

The area around the diesel fuel tank fill connection will be regraded to prevent a fire involving spilled fuel from affecting the circulating water pumphouse (5.18).

3.2 Incomplete Items

In addition to the licensee's proposed modifications, several incomplete items remain. The licensee will complete the evaluations necessary to resolve these items in accordance with the schedule contained in Table 3.2. 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 modications identified in Section 3.1. We will address the resolution of these incomplete items in a supplement to this report.

3.2.1 Safe Shutdown Analysis

The licensee performed a safe shutdown analysis by assuming a design basis fire in each fire zone and that all equipment within that zone as well as all equipment whose cabling passed through that zone was disabled. His analysis did not address the capability to achieve and maintain both hot and cold shutdown and did not consider the effects of loss of offsite power on shutdown capability. The licensee has agreed to perform a reevaluation of his analysis which includes these staff-identified assumptions (4.1). (NOTE 1)

3.2.2 Cable Separation Criteria

The licensee will evaluate the adequacy of redundant division cable separation for protection against fire (4.10).

The licensee will evaluate the need for modifications to insure that no single panel in the control room contains redundant equipment without a solid fire barrier (5.2).

3.2.3 Fire Detection Systems

(1) The licensee agreed to evaluate the need for additional early fire detectors in:

a. Fire Zones 5H, 5J, 5K 13H, 13J, 13K, 19, 27, 20, 30, 21, 29, 23 and 31 (5.7, 5.8, 5.9)

b. Ceiling above the control room (5.2)

c. Enclosed panels in the control room which contain redundant channels (5.2)

d. Torus compartment and instrumentation rack rooms (5.6).

NOTE 1: The licensee's submittal dated February 16, 1979 indicated that his analysis will be in conformance with the NRC criteria except with regard to the assumptions concerning loss of offsite power. We will report our findings in a supplement to the report.

TABLE 3.2

LICENSEE SUBMITTAL DATES FOR INCOMPLETE ITEMS

	ITEM	DATE
3.2.1	Safe Shutdown Analysis	June 30, 1979
3.2.2	Cable Separation Criteria	Complete (1)
3.2.3	Fire Detection Systems	Complete (1)
3.2.4	Water Suppression Systems	Complete (1)
3.2.5	Gas Suppression System	Complete (1)
3.2.6	Fire Doors	Complete (1)
3.2.7	Interior Hose Stations	Complete (1)
3.2.8	Fire Barrier Penetration Seals	Complete (1)
3.2.9	Ventilation Ducts	Complete (1)
3.2.10	Control of Combustibles	Complete (1)
3.2.11	Forcible Entry Tool	Complete (1)
3.2.12	Exterior Hose Tests	Complete (1)
3.2.13	Hose Houses	Complete (2)
3.2.14	Emergency Lighting	Complete (1)
3.2.15	Hydrant Fittings	September 1, 1979

(1) Letter, PECO to NRC, dated February 16, 1979
(2) Letter, PECO to NRC, dated December 20, 1978

(2) The licensee agreed to have a qualified fire protection engineer review the smoke detector installation design to ensure that the placement and sensitivity of the detectors will adequately provide early warning (4.2, 5.3, 5.11).

(3) The licensee agreed to study the feasibility of installing remote alarm lamps for new or existing detectors which are obstructed from sight in large rooms with multiple detectors (4.2).

(4) The licensee will evaluate the necessity for installing additional detectors in all of those areas that contain safety-related equipment and those areas that pose a hazard to safety-related areas (4.2, 5.1, 5.2, 5.13). NOTE 1

3.2.4 Water Suppression Systems

The licensee will evaluate the adequacy of protection in:

(1) Recombiner Building (4.14, 5.17)

(2) Fire Zones 4C, 12C (5.14)

(3) Recombiner building for the ventilation system filters (4.4).

3.2.5 Gas Suppression System

The licensee will evaluate the practicality and need for automatic actuation of the carbon dioxide system in the cable spreading room (4.3, 5.3).

3.2.6 Fire Doors

The licensee will evaluate:

(1) the modifications which are necessary to insure that fire doors are electrically supervised or otherwise maintained closed (4.9, 5.2, 5.12, 5.13).

(2) Doors to the reactor feed pump turbine lube oil reservoir to determine the need to upgrade them to provide a 3 hour fire rating (5.1).

3.2.7 Interior Hose Stations

The licensee will evaluate:

NOTE 1: The licensee's submittal dated February 16, 1979 presented rationale for not installing detectors in several plant areas. We will report our findings in a supplement to this report.

(1) The need for additional hose stations and access ladders in the torus compartments (4.3, 6.5)

(2) The feasibility of installing variable gallonage nozzles at stations servicing the control room complex, cable spreading room, and emergency switchgear rooms (4.3, 5.2, 5.3, 5.4).

3.2.8 Fire Barrier Penetration Seals

(1) The licensee will investigate the practicality of sealing the open pipe penetrations separating zones 4B from 12B and 4C from 12C (5.14).

(2) The licensee will provide a detailed description and evaluation of electrical and mechanical penetration seals (4.9).

3.2.9 Ventilation Ducts

The licensee will evaluate the necessity of modifying the ventilation in the control room complex by installing, as necessary, manual or automatic closing devices for dampers (5.2).

3.2.10 Control of Combustibles

The licensee will evaluate the need for modification to control the spread of combustibles in:

(1) Reactor feed pump turbine lube oil reservoir rooms (4.5),

(2) Diesel fire pump room (4.5),

(3) Main turbine lube oil storage tank room (4.5, 5.1),

(4) Recirculation pump motor-generator set room and motor-generator set oil equipment rooms (4.5, 5.14).

3.2.11 Forcible Entry Tool

The licensee will evaluate the need for a forcible entry tool to be provided in each hose cart (4.3).

3.2.12 Exterior Hose Tests

The licensee will evaluate the need to hydrostatically test all hose stored in outside hose cart houses annually at a pressure 50 PSI above maximum service pressure (4.3).

3.2.13 Hose Houses

The licensee will evaluate the need to provide two hose houses at the east side of the plant, at the hydrants nearest the northeast and southeast corners of the turbine building (4.3). Each hose house should contain, as a minimum, the following equipment:

(1) 150 feet of 2-1/2-inch hose

(2) Two 75-foot lengths of 1-1/2-inch hose

(3) One gated wye having a female 2-1/2-inch inlet and two 1-1/2-inch male outlets

(4) Two 1-1/2-inch and one 2-1/2-inch adjustable spray nozzles

(5) One forcible entry tool (Halligan or similar)

(6) Hydrant and hose coupling spanner wrenches

(7) One 2-1/2-inch hydrant gate valve.

3.2.14 Emergency Lighting

The licensee will evaluate the need to provide fixed emergency lighting consisting of fixed sealed beam units with individual battery power supplies for access to and egress from the control room, the cable spreading room, the emergency switchgear and battery rooms, and the ground floor below via stairway No. 9 (4.6).

3.2.15 Hydrant Fittings

The licensee will evaluate the need to provide two double female adapters for use by a fire department pumper in pumping fire water directly from the inlet pond to a hydrant. These fittings should be stored in a central location (4.3.1).

4.0 EVALUATION OF PLANT FEATURES

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 combinations available in a fire situation will depend upon the effects of the fire on such systems, their power supplies, and their control stations. To assure the safe shutdown of the reactor plant, those systems and components which: a) insert negative reactivity into the reactor core, b) control cooldown of the primary reactor coolant system, and c) maintain reactor coolant inventory, should be protected in the event of a fire and measures should be taken to insure their availability.

There are two independent systems with the capability to insert negative reactivity to shut down the reactor and bring the plant to a safe shutdown power condition. These systems are the control rod scram system and the standby liquid control system. The former is an inherently fail-safe system in that a loss of electrical control power initiates the safety action. The standby liquid control system requires power to operate and there is redundancy of active components in the system.

There are two primary safety-related methods that can be used to bring the plant to safe shutdown conditions. The first alternative method includes the use of the following systems and components:

(1) high pressure coolant injection system,

(2) residual heat removal system, and

(3) high pressure service water system.

The second alternative method includes the use of the following systems and components:

(1) main steam relief valves,

(2) core spray system,

(3) residual heat removal system, and

(4) high pressure service water system.

Other safety-related methods of plant shutdown could be used depending upon the location and severity of the fire. These other methods use combinations of the above-listed equipment plus the reactor core isolation cooling system.

In addition to the above-listed safety-related methods for plant shutdown, the normal method of shutdown can be utilized in some situations when normal or offsite power is available by using the following systems and components:

(1) turbine bypass valves,

(2) circulating water system,

(3) feedwater and condensate system,

(4) residual heat removal system, and

(5) high pressure service water system.

Under conditions for which offsite power is unavailable, the diesel generators and station batteries provide the electrical power required to insure safe shutdown. The emergency service water system provides a supply of cooling water to the diesel generators and other selected shutdown equipment during a loss of offsite power.

The majority of the system components required for safe shutdown are located in separate fire areas to preclude fire damage to redundant systems. In other 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 redundant safe shutdown systems could not be damaged by fires, automatic suppression systems and manual fire fighting supported by fire detection and manual suppression equipment are used to limit fire damage.

It is not possible at this time to positively evaluate the adequacy of the fire protection to ensure the safe shutdown capability of Peach Bottom, Units 2 and 3. The licensee's analysis of the effects of fire on safe shutdown equipment did not address the capability to achieve and maintain both hot and cold shutdown and did not consider the effects of the loss of offsite power on safe shutdown capability.

The licensee will reevaluate all plant areas to determine the potential effects of fire on safe shutdown capability. The following will be considered as functional requirements for a safe shutdown:

1. Placing the reactor in a subcritical condition and maintaining the reactor subcritical indefinitely.

2. Bringing the reactor to hot shutdown conditions and maintaining it at hot shutdown for an extended period of time (i.e., longer than 72 hours) using only normal sources of cooling water.

3. Maintaining the reactor coolant system inventory indefinitely using only normal sources of makeup water.

4. Bringing the reactor to cold shutdown conditions within 72 hours.

Where all of the redundant equipment (including cable in conduit) available to perform any of the above functions is located in a single fire area, the specific separation that exists and any combustible material between the redundant equipment will be identified. The evaluation of the effects of fire on the capability to perform functions 1, 2 and 3 above will assume loss of offsite power, will give no credit for actions by plant personnel to repair damage to equipment and will consider that all control actions necessary for these functions will be maintained in the control room or at the remote shutdown panels.

We will address the overall adequacy of the fire protection system to ensure safe shutdown capability in a supplement to this report after completion of the licensee's evaluation of this matter.

4.2 Fire Detection and Signaling Systems

A fire detection and signaling system is provided in various portions of the plant which transmits alarm and supervisory signals to the control room where they are annunciated at the fire panel. In addition to handling fire detector signals, the system transmits indications of water flow from the sprinkler and deluge extinguishing systems as well as the status of the fire protection water system including: fire pump mode and system pressure. The system also indicates operation of the carbon dioxide extinguishing systems and in all cases indicates the zone from which the alarm or supervisory signal initiated. Supervisory alarm signals are displayed at the fire alarm panel in the control room and show the location of the affected area in the event of loss of power, under voltage, short or open circuits, or ground faults. Power is supplied from the emergency AC power system.

Each area monitored by detectors is provided with a local control panel incorporating a "power on," pilot light and a key operated "reset" switch. During the site visit, it was noted that some of the pilot lights were not illuminated or were very dim. The licensee will restore these lamps to their original intensity.

The fire detectors are equipped with neon lamps which illuminate when the detector is in the alarm mode. Some detectors, however, are located in areas where they are obscured from view by other equipment. The licensee has indicated that the feasibility of installing remote alarm lamps at these locations will be studied. The licensee will relocate some of the existing detectors which are inaccessible for testing and servicing.

Smoke and heat detectors have been provided in selected areas of the plant, although some areas of the plant containing or exposing safety-related equipment are not monitored by fire detectors. The licensee has proposed to install additional detectors in the following areas which are presently unprotected.

1. Unit 2

Fire Zone	Equipment
1	Residual heat removal pump and heat exchanger
2	Residual heat removal pump and heat exchanger
3	Residual heat removal pump and heat exchanger
4A	Residual heat removal pump and heat exchanger
5A	Core spray pump
5B	Core spray pump
5D	Core spray pump
5E	Core spray pump
60	Reactor core isolation cooling pump

2. Unit 3

Fire Zone	Equipment
9	Residual heat removal pump and heat exchanger
10	Residual heat removal pump and heat exchanger
11	Residual heat removal pump and heat exchanger
12A	Residual heat removal pump and heat exchanger
13A	Core spray pump
13B	Core spray pump
13D	Core spray pump
13E	Core spray pump
63	Reactor core isolation cooling pump

The licensee will also install detectors in the following areas:

3. At the ceilings above Units 2 and 3 reactor building refueling floors (NOTE 1)

4. In all enclosed rooms of control room complex, except the lavatory

5. In all rooms of the diesel generator building.

6. The existing thermal fire detectors in the high pressure service water pump rooms of the circulating water pumphouse will be replaced with early warning fire detectors.

NOTE 1: In the licensee's submittal dated February 16, 1979, the licensee indicated that he has reevaluated this proposal and no longer considers it necessary. We will report our findings in a supplement to this evaluation.

7. In the cable spreading room.

8. In the battery rooms.

The licensee will evaluate the need for the following modifications recommended by the staff:

1. Early warning fire detectors should be provided in other specific fire zones as discussed in Section 5.0 of this report.

2. Verification should be provided that the placement and sensitivity of existing and proposed fire detectors will give adequate early warning alarm for the various areas and materials monitored. This verification will be by in situ testing or by inspection by a qualified fire protection engineer.

3. Early warning fire detectors should also be provided in areas that contain safety-related equipment and in areas posing a hazard to safety-related areas.

We will address the adequacy of the fire detection and signaling systems in a supplement to this report after completion of the above-described licensee's evaluations.

4.3 Fire Control Systems

4.3.1 Water Systems

4.3.1(1) Water Supply

Water for fire protection is obtained directly from Conowingo Pond; a body of water formed by dams across the Susquehanna River. The water is drawn in through a screen structure and then to the intake structure through isolable ponds. A secondary source of water can be obtained by taking suction from the inlet pond by a fire department pumper and discharging through hose lines connected to a hydrant. The licensee should provide two double female adaptors to this outside fire department pumper; this should be stored at a central location.

We find that the water supply meets the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.3.1(2) Fire Pumps

Two vertical shaft, centrifugal fire pumps, each with a design capacity of 2,500 gallons per minute, (GPM), at a pressure of 125 pounds per square inch gage, (PSIG), are provided. One of the fire pumps is diesel engine driven with a base-mounted 120 gallon day tank adequate for approximately 4.3 hours of running time. The day tank is supplied through a transfer pump from a buried 500 gallon fuel supply located adjacent to the pump structure. Additional fuel is also available from other onsite underground diesel fuel storage tanks.

The second fire pump is electric motor driven with power supplied from an emergency power bus.

Pressurization of the fire water system is maintained by an interconnection with the service water system. Both fire pumps can be started from the control room or at the intake structure by means of the Underwriters Laboratory listed fire pump controllers. The pumps are adequately separated from each other both spatially and by barriers.

The diesel-driven fire pump is enclosed in a masonry walled room within the Unit 2 high pressure service water pump compartment. The fire pump enclosure has a fire rating of 3 hours established by the rating of the fire damper in the wall. The diesel fire pump room is also protected by an automatic sprinkler system. The electric driven fire pump is located in the adjacent Unit 3 high pressure service water pump compartment which is separated from the Unit 2 pumps by a steel bulkhead and a watertight door. A heat detector and a manual hose reel is provided in each high pressure service water pump compartment.

We find that the fire pumps satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

4.3.1(3) Fire Water Piping System

Separate 12-inch supply lines to the 12-inch underground yard main encircling the plant is provided from each of the fire pumps. The connection points of these supply lines with the yard main system are approximately 10-feet apart with a post indicator valve between. This arrangement provides assurance that a break in one of the supply pipes will not remove both fire pumps from supplying water to the yard main system.

All fire protection systems utilizing water as the extinguishing agent are supplied from the underground fire loop and yard main. Post indicator type sectionalizing valves are strategically located along the yard main in order to minimize the effects of a pipe break. Further flexibility is provided by an interconnection of the fire protection system within the turbine building to the yard main system at the north, south and east sides of the plant.

Separate interior headers are not provided within the plant for fixed water extinguishing systems and manual hose stations. However, the main headers are fed from both ends and cross connections are provided, thus satisfying the requirements of Appendix A to BTP 9.5-1 for combined systems.

Most post indicator valves and header gate valves were provided with seals. The gate valves controlling the flow from the fire pumps and the sectionalizing valves in the turbine building, however, are not provided with any devices for supervising the position of the valves

except for administrative procedures. The licensee will provide either chains and locks or supervision on all valves controlling the flow of fire protection water, and administrative controls will be instituted to provide assurance that the fire protection valves are maintained in the appropriate position.

Exterior fire hydrants are installed around the plant at approximately 250-foot intervals with the maximum spacing between hydrants of 290-feet. Curb box valves are provided in the laterals supplying each hydrant, enabling maintenance operations to be performed without shutting down any portion of the fire water main yard loop. The hydrant hose threads are compatible with the local fire department.

None of the eleven hydrants are provided with fixed hose houses although hose cart houses are provided at three locations in the yard area. Each of the three hose carts contains 300-feet of 2-1/2 inch hose on a reel, 400-feet of 1-1/2-inch hose on a reel, one siamese gated wye, one 2-1/2-inch straight stream play pipe, two 1-1/2-inch spray nozzles, hydrant wrench and hose spanners.

The licensee has proposed to provide one additional hose cart house similarly equipped along the west side of the plant. The following additional equipment will also be provided by the licensee at each hose cart house:

1. One 2-1/2-inch hydrant gate valve

2. One 2-1/2-inch fog nozzle

3. One 1-1/2-inch fog nozzle with applicator.

The licensee will also insure by administrative procedures that the equipment inventories in the houses are maintained and that the houses are kept free of ice and snow that might hinder access. The licensee will also make the following modifications to the existing hydrants in the yard:

1. The hydrant in the middle of the yard on the west side of the plant will be rotated to allow both hose connections to be used.

2. The hydrant located at the southeast corner of the turbine building which was found to be leaking will be repaired.

3. A maintenance program will be established for the hydrants which will require that each hydrant have the caps removed, threads lubricated and barrel checked in the fall of each year to insure that there is no standing water remaining in the barrel or at the hydrant valve.

4. The location of the environmental station pipe will be changed so it does not interfere with the rotation of the hydrant wrench for the adjacent fire hydrant.

There presently are no hose houses with connected hose along the east side of the plant. A fire on this side of the plant would require moving a hose cart from its house to a hydrant on the east side and connecting the hose. In the event of a fire involving the turbine lube oil storage and equipment rooms, the time required to utilize the fire fighting equipment on the existing hose carts is considered unacceptable.

The licensee will evaluate the need for the following modifications recommended by the staff.

1. A forcible entry tool, (Halligan or similar), should be provided in each hose cart.

2. All hose stored in outside houses should be hydrostatically tested annually at a pressure 50 PSI above maximum service pressure.

3. Two hose houses should be provided at the east side of the plant located at the hydrants nearest the northeast and southeast corners of the turbine building. Each house should contain, as a minimum, the following equipment:

   a. 150 feet 2-1/2-inch hose

   b. Two 75-foot lengths of 1-1/2-inch hose

   c. One gated wye having a female 2-1/2-inch inlet and two 1-1/2-inch male outlets

   d. Two 1-1/2-inch and one 2-1/2-inch adjustable spray nozzles

   e. One forcible entry tool (Halligan or similar)

   f. Hydrant and hose coupling spanner wrenches

   g. One 2-1/2-inch hydrant gate valve.

We will address the adequacy of exterior fire protection systems in a supplement to this report after completion of the above-described licensee's evaluation.

4.3.1(4) Interior Fire Hose Stations

A total of 97 interior hose stations each equipped with 100-feet of 1-1/2-inch single jacket hose with adjustable spray nozzles have been provided throughout the plant including secondary containment.

The hose is not presently connected to the hose station valves which will result in a delay in applying water in the event of a fire. The licensee has agreed to connect all the interior hose to the hose station valves.

The licensee has stated that a survey performed by their safety department confirms that all safety-related areas and areas that pose a fire exposure threat to safety-related areas can be reached by presently installed interior fire hose or additional hose will be provided. This survey, however, determined that two nonsafety-related areas at the 180 and 214-feet elevations of the reactor buildings could not be reached by presently installed interior fire hose. The licensee will provide additional hose to cover these areas.

The licensee's technical specifications presently require that all interior fire hose be hydrostatically tested at 50 PSI above service pressure at least every three years, and is considered acceptable.

The licensee will provide a ball shut-off valve immediately before the nozzle at all interior hose stations.

The licensee will evaluate the need for the following modifications recommended by the staff:

1. Additional hose stations should be provided in the torus compartments because of access problems with the existing hose stations.

2. All hose stations serving the control room complex, cable spreading room and emergency switchgear rooms should be provided with variable gallonage nozzles.

We will address the adequacy of the interior fire hose stations in a supplement to this report after completion of the above-described licensee evaluation.

4.3.1(5) Sprinkler Systems

Various types of automatic and manually-actuated sprinkler systems have been provided at selected high hazard areas of the plant. These systems include wet pipe automatic sprinkler systems, manually-initiate pre-action systems, and both manual and thermal detector-actuated deluge systems. The design and installation of these sprinkler systems conform to the provisions of the National Fire Protection Association standards 13 and 15.

In general, sprinkler systems have been provided where hazardous concentrations of combustibles exist such as at oil storage and equipment areas. Automatic deluge water spray systems are provided at the outside main auxiliary transformers and at the startup transformer at the southwest corner of the turbine building. Water

suppression systems are also provided inside the plant to protect the charcoal filters in the standby gas treatment system and the recombiner building ventilation systems.

The license will provide sprinkler protection in the baling area of the radwaste building on the 135 feet elevation of the turbine building, and in the recirculation pump motor generator set lube oil rooms on the 116 feet elevation; and will also provide reflective sheet metal shields above the sprinkler heads located below the grating walkway in the turbine lube oil equipment rooms.

Several areas of the plant contain significant amounts of combustibles, both normal and transient, which would pose a fire hazard to safety-related equipment. Additional sprinkler protection requirements are addressed in Section 5 of this report for specific plant areas.

We find that subject to the implementation of these modifications, the automatic sprinkler systems satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

4.3.1(6) Foam Extinguishing Systems

There are no foam extinguishing systems protecting safety-related systems or equipment at this plant. The fuel oil storage tank in the yard is protected by a fixed foam system which is adequate for the hazard.

4.3.1(7) Effects of Suppression Systems on Safety Systems

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

In most areas, curbs, drains and the mounting of equipment above the floor level minimizes the potential for flooding damage. In other areas, water will drain out doors or via stairways or through grating to lower elevations, such that the standing water would not affect safety-related equipment. In addition, valves have been provided to isolate sections of fire protection system piping inside buildings to preclude the buildup of water and thus prevent equipment from being incapacitated due to flooding.

Water flows from automatic suppression systems are annunciated on the fire panel in the control room. Flows from manual hose stations are not annunciated, but they will cause the fire pump to start, thereby transmitting a "fire pump running" signal to the control

room. A flow from the fire protection water system can thus be inferred.

We find that the protection from inadvertent or required operation of a suppression system satisfies the objectives identified in Section 2.2 and is, therefore, acceptable.

4.3.2 Gas Fire Suppression Systems

All the gaseous fire suppression systems at this facility are carbon dioxide (CO_2) and include fixed systems with manual actuation, fixed system with automatic rate-of-rise thermal actuation and manual application hose reels. Manually-actuated total flooding fixed systems are provided in the cable spreading room and the computer room. Automatically-initated systems with predischarge alarms are provided in the diesel generator rooms and the high pressure coolant injection pump rooms. Carbon dioxide hose reels with sufficient hose to reach all areas of the room are provided in the control room and at the high pressure turbine bearing lube oil pumps. Carbon dioxide agent is stored in low pressure refrigerated tanks at three locations, along with the required piping, manifolds and valves.

The acceptance test results of the installed carbon dioxide systems confirm that the concentrations of carbon dioxide meet the requirements of the National Fire Protection Association standard 12 entitled, "Carbon Dioxide Extinguishing Systems."

The licensee will evaluate the need for providing automatic actuation of the carbon dioxide extinguishing systems in the cable spreading room as recommended by the staff.

We will address the adequacy of the carbon dioxide extinguishing systems in a supplement to this report after completion of the above-described licensee's evaluation.

4.3.3 Portable Fire Extinguishers

Portable and wheeled fire extinguishers are provided throughout the plant including 58 pressurized water, 178 carbon dioxide (CO_2) and 336 dry chemical units.

The licensee will provide additional extinguishers as discussed in Section 5 of this report. All welding carts will be equipped with portable extinguishers or administrative controls will be implemented to ensure that fire extinguishers are located in the immediate area where welding is being performed.

We find that subject to the provisions of these additional units, the quantity, type and distribution of portable extinguishers conform to the provisions of Appendix A to BTP 9.5-1 and are therefore, acceptable.

4.4 Ventilation Systems and Breathing Equipment

4.4.1 Smoke Removal

The purge mode of operation of the control room ventilation system is the only system specifically designed for smoke removal. In most other plant areas the normal air handling systems can be used for smoke removal; however, their effectiveness may be limited by several factors. The fans and/or equipment in the air handling systems are not designed to withstand high temperatures, and could 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. Fusible link dampers in fire area ventilation systems may require opening at the damper before attempting to use normal ventilation equipment for smoke removal.

Emergency ventilation systems, which can use emergency power supplies if normal power supplies are lost, serve the following safety-related areas: emergency switchgear and battery rooms, diesel generator rooms, safety-related pump rooms and pump structure safety-related pump and nonsafety-related fire pump rooms. Most of the plant ventilation systems are designed with redundant components which increases the likelihood of their availability during a fire. However, in some areas ventilation system controls, motor control centers and power feeds are located within the areas served by the ventilation system. There may not be sufficient separation or redundancy of ventilation system components to assure the necessary ventilation system operation for smoke removal.

The licensee will provide portable air handling units consisting of three fire service explosion-proof smoke ejectors (5000 cfm each) and flexible ducting for smoke removal throughout the plant. Procedures will be developed for use of this equipment by the fire brigade in all areas of the plant where they would be effective. Verification will be provided that the capability exists to exhaust smoke from a torus compartment fire to a suitable location.

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

4.4.2 Filters

Charcoal filters are used in the standby gas treatment system, the recombiner building ventilation system and the control room emergency ventilation system. The charcoal filters in each redundant division of the standby gas treatment system and the recombiner building ventilation system are provided with automatically-actuated water suppression systems. In addition, heat detectors which alarm in the control room are provided in the filter ductwork of both systems. Hose stations are provided as backup protection for the standby gas

treatment system filters and recombiner building ventilation system.

The charcoal filters in the control room emergency ventilation system are not protected by a fixed suppression system. Because these filters are normally isolated and are housed in steel plenum chambers, they are not susceptible to ignition and a fire in these filters would not affect control room habitability during operation of the normal control room ventilation system. The filters are located in an area with safety-related equipment and cable; the fire protection for this area is discussed in Section 5.13 of this report.

The absolute filters used in all areas of the plant have steel separators and frames and less than five percent combustible material in the filter media.

We find that fire protection for all combustible filters except the recombiner building ventilation system filters satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable. The adequacy of the fire protection for the recombiner building ventilation system filters will be addressed in a supplement to this report after completion of the licensee's evaluation of the recombiner building as discussed in Section 5.17 of this report.

4.4.3 Breathing Equipment

A total of 38 self-contained breathing units (Chemox masks) are provided throughout the plant. Each Chemox mask is provided with two cartridges; each cartridge has a service life of one hour. These masks have been approved by the National Institute for Occupational Safety and Health (NIOSH) until March 31, 1979. If approval is not extended beyond this date, the licensee will replace the Chemox masks with approved air breathing equipment. The licensee will add 72 additional Chemox cartridges, designated for fire fighting at central locations, to provide an extra six hours breathing capacity for twelve people.

We find that, subject to implementation of this modification, emergency breathing capability is adequate for plant control and manual fire fighting activities.

4.5 Floor Drains

The turbine lube oil equipment areas at elevation 135 feet and the hydrogen seal oil units at elevation 116 feet of the turbine building are drained by individual drain lines with no branch connections. The drains from the individual diesel generator rooms are located two feet above the common header and each drain line is provided with a backwater valve to prevent the spread of combustible liquids between rooms in the diesel generator building. The potential for spread of combustible liquids via the floor drains for all combustible liquid areas has not yet been addressed by the licensee.

Some combustible liquid tanks are contained within curbs whose drain valves are normally shut. Other curbs have open valves at the floor drain leading to a short length of drain pipe. There is normally a shut valve at the end of the open-ended drain pipe. These curbs are not drained to oil retention sumps but are drained when necessary into 55-gallon drums positioned at the end of the drain pipes. These curbs would have to contain almost the full contents of the oil tank in the event of a tank rupture because of the configuration and operation of the drain system.

The curbs for the reactor feed pump turbine lube oil reservoir rooms on the 150 feet elevation are adequate to contain the full contents of the reservoir plus a margin for fire suppression water. Other curbs, including the reactor feed pump turbine lube oil reservoir room curbs at elevation 135 feet do not provide adequate capacity to prevent the spread of combustible liquids. Of particular concern is the curb around the three main turbine lube oil storage tanks for each unit. This curb does not provide adequate volume to contain the oil in all three storage tanks. In the event of a fire and failure of the automatic fire suppression system, rupture of all three tanks could occur. Lube oil could possibly spread to areas of the turbine building containing safety-related and safe-shutdown cables. Structural damage to the turbine building could also result from an unconfined lube oil fire.

The licensee has proposed the following modifications to prevent the spread of combustible liquids:

1. The curb around the hydrogen seal oil units will be upgraded to contain the oil plus a margin for fire suppression water.

2. The curbs for the reactor feed pump turbine lube oil reservoirs at elevation 135 feet will be upgraded to contain the full contents of the reservoir plus an added margin for fire suppression water.

3. A curb or doorsill will be installed to prevent the flow of combustible liquids under the doors between the individual rooms at the 127 feet elevation of the diesel generator building.

4. A curb will be added at the door to the diesel fire pump room to contain the volume of the day tank and a suitable sprinkler flow.

5. The recirculation pump motor-generator set pump room drains will be plugged, separated or provided with backwater valves to prevent an oil pathway via the drainage system.

We find that the above-listed modifications represent a significant improvement in preventing the spread of combustible liquids. We therefore conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following modifications recommended by the staff:

1. The reactor feed pump turbine lube oil reservoir rooms floor drainage system should be modified, if necessary, to prevent the spread of oil outside the room via the drains.

2. The diesel fire pump room floor drains should be modified, if necessary, to prevent the spread of fuel oil outside the room via the drains.

3. The dikes in the main turbine lube oil storage tank rooms should be upgraded to contain the full contents of all tanks in the room plus the quantity of fire suppression water needed to suppress a postulated fire. This may be accomplished by increasing the height of the existing curbs or by adding curbs at the room doors. If curbs are added at the doors, verification should be provided that an oil fire in this room will not spread to other areas via the floor drains located outside the existing curbs.

4. Curbing should be provided within the motor-generator set rooms and motor-generator set oil equipment rooms to contain the oil from a leak at the oil reservoirs or oil lines to the room of origin.

The adequacy of drains to remove fire suppression water is addressed in Section 4.13.1(7) of this report.

We will address the adequacy of the curbs and drains to prevent the spread of combustible liquids in a supplement to this report after completion of the above-listed licensee's evaluations.

4.6 Lighting Systems

In addition to the normal plant lighting system, emergency AC and DC lighting fixtures are provided throughout the plants. The emergency DC fixtures are normally powered from an emergency AC supply but automatically transfer to the station batteries upon loss of AC power. The emergency AC fixtures are normally powered from a regular AC lighting panel that automatically transfers to emergency AC upon loss of regular AC.

The licensee has performed an analysis to verify that in the event of a fire anywhere in the plants, lighting would be available in those areas where local manual operations are necessary to safely shut the plants down. The licensee has not, however, shown that lighting for access to certain critical areas (i.e., control room, emergency switchgear and battery rooms, and cable spreading room) would be available in the event of a fire in these areas. The staff has recommended that the licensee install fixed, eight hour battery

powered sealed beam units to provide lighting for stairway 9 which can be used to access these areas from the outside for manual fire fighting.

To further facilitate access to remote areas of the plant, the licensee will provide 22 portable battery powered hand-held lights designated for emergency use only. A quantity of these lights will be stored in an emergency equipment cabinet located just outside the entrance to the main control room at the head of stairway 9.

We will address the adequacy of the lighting system in a supplement to this report.

4.7 Communication Systems

The licensee relies primarily on the fixed public address (PA) system and a separate private automatic branch exchange (PABX) telephone system for normal communication within the plant. Due to loud background noise and the potential for fire damage, such fixed systems are not always effective for fire fighting operations. To overcome these problems the licensee will provide at least six portable two-way radio units capable of communicating with all areas of the plant for use of the fire brigade. These units will be under the administrative control of the Shift Supervisor (Fire Brigade Leader), or the Shift Superintendent.

We find that the existing communications equipment, when augmented by the portable radio units the licensee will add, satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

4.8 Electrical Cables

The cable construction used for control and power circuits consists of cross-linked polyethelene insulation with a flame retardant neoprene jacket. The flame test standard for cables, IEEE-383-1974, was not in effect at the time these cables were purchased and installed. These cables were, however, required to pass a special flame resistance test detailed in the purchase specification. This test is essentially the oily rag test outlined in IEEE-383-1974. Therefore, the power and control cables used at Peach Bottom are capable of passing IEEE-383-1974.

Some cables are jacketed with PVC. These are cables that are used for low level instrument signals. The cables are predominately routed in trays dedicated to instrument cables. Less than .3% (by volume) of the cables in all the safeguard trays are PVC-jacketed.

The licensee does not use flame retardant coatings on the cables installed at the plant. The licensee does include the cable insulation and jacket material in the combustible loading tabulations of the plant areas.

Therefore, in reviewing the adequacy of the fire protection system for the various plant areas discussed in Section 5.0, we assumed that a fire could propagate between cables if they were not separated sufficiently for the combustibles in that area. Appropriate fire protection will be provided as discussed in Section 5.0 as required.

4.9 Fire Barrier Penetrations

Fire barriers such as walls, floors, and ceilings are penetrated by ventilation ducts, electrical raceways, mechanical piping systems, and doors. A discussion of the adequacy of plant design features which are intended to prevent fires from propagating across fire barriers via these types of penetrations is provided below.

4.9.1 Electric Cable and Conduit Penetrations

Fire barriers for areas containing safety-related equipment contain both sealed and unsealed electrical cable and conduit penetrations. Those penetrations that are sealed, were sealed using materials and methods which have not been tested by the licensee to verify their effectiveness as a fire barrier. The licensee will submit a detailed description and evaluation of the electrical penetrations seals (including drawings, material lists and test procedures and results where applicable). This description will be evaluated to determine further remedial measures required. In those cases where the licensee will install new seals or will replace existing seals, the replacement seals will be qualified by an independent testing laboratory in accordance with ASTME-119 under conditions and to criteria acceptable to the staff.

We will address the adequacy of the electric penetration seals in a supplement to this report after completion of the above described licensee evaluation.

4.9.2 Fire Doors

Some of the doors which penetrate fire barriers separating safety-related areas are required to be watertight and therefore are not fire rated. Where a hazard to safety-related equipment exists, the licensee has proposed to modify the installation to prevent fire propagation through the door, or provide justification to maintain the original design.

Fire doors will be inspected semiannually to verify that self-closing mechanism and latches are in good working order. The licensee will evaluate the need to provide electrical supervision of fire doors from the control room or to maintain closure by:

1. locking closed and inspecting weekly, or

2. providing automatic release mechanisms and inspecting monthly to verify that doorways are free of obstructions, or

3. providing self-closing mechanisms and inspecting daily.

Areas protected by automatic total flooding gas suppression systems will be provided with electrically supervised self-closing fire doors except for the following:

1. Watertight doors to the diesel generator building: security system will be used to ensure closure in lieu of installing self-closing devices.

2. One door associated with HPCI room: licensee will evaluate the practicality of including supervision of this door in the security system.

We will address the adequacy of fire door supervision in a supplement to this report after completion of the above described licensee evaluation.

4.9.3 Ventilation Duct and Pipe Penetrations

Fire barriers for areas containing safety-related equipment contain both sealed and unsealed pipe and ventilation duct penetrations, and some ventilation ducts without three hour rated fire dampers. The existing penetration seals use materials and methods which have not been tested by the licensee to verify their effectiveness as a fire barrier. The licensee has committed to review all mechanical seal penetrations and will submit his evaluation and recommendations to upgrade existing seals and to seal open penetrations.

New penetration seals that are installed or existing seals which must be replaced will be qualified by an independent testing laboratory in accordance with ASTME-119 under conditions and to criteria acceptable to the staff. The licensee's commitment to seal open penetrations, if required, and to install additional fire dampers or to upgrade the existing penetration seals and fire dampers where necessary are included in the separate discussion for each area in Section 5.0 of this report.

We will address the adequacy of ventilation duct and pipe penetration seals in a supplement to this report after completion of the above described licensee evaluation.

4.10 Separation Criteria

The current NRC staff guidance provided in Regulatory Guide 1.75, "Physical Independence of Electric Systems," was not available at the time that the Peach Bottom plants were designed and constructed. Nevertheless, the licensee was cognizant of the need to provide electrical separation for redundant divisions of electrical equipment.

Cables for redundant safety-related equipment divisions were routed with what was believed at the time to be adequate separation. In most cases redundant safety-related systems components (e.g., pumps, diesel generators) are separated by distance or barriers.

The licensee has compared the existing separation with the provisions of Regulatory Guide 1.75 and states that with only minor exceptions the design of the plants is in conformance with the Guide. The existing plant design does provide electrical separation; however, at many locations the existing physical separation provides little or no protection against fire. There are areas in the plant where redundant electrical equipment (including cables) may not be sufficiently separated for the combustible loading in that area. The licensee will evaluate the adequacy of separation in these areas and will submit recommendations for remedial action. After the licensee has completed the work discussed above, we will report the results of our complete evaluation of the adequacy of the fire protection for these areas in a supplement to this report.

4.11 Fire Barriers

Barriers separating fire areas have fire resistance ratings of two or three hours, adequate to contain the postulated fire within the fire area. In some cases, fire areas are divided into fire zones by barriers having a zero fire rating. This lack of fire resistance is attributable, for the most part, to open or inadequate penetration seals, inadequate floors or open hatches. However, the barriers themselves have adequate fire resistance. In some locations, the licensee will upgrade the penetration seal or door installation to contain the effects of a potential fire. In other fire zones where the barrier cannot be upgraded, modifications to the fire protection system will be made to prevent spread of fire to adjacent fire zones. These modifications are discussed in Section 5.0 of this report.

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

4.12 Access and Egress

Most safety-related areas have adequate access for manual fire fighting. Immediate access to the drywell is not possible during reactor operation. However, the drywells are inerted with a nitrogen atmosphere during reactor operation and combustion is not possible. Some compartments in the radwaste and reactor buildings have a single doorway, and access for manual fire fighting may be hampered by smoke. However, as discussed in Section 4.4.1 of this report, the licensee will provide portable smoke removal equipment and develop procedures for its use to facilitate access in such areas. Upon implementation of the above modification, we find that there is adequate provision for entry into all areas for fire fighting.

4.13 Toxic and Corrosive Combustion Products

The products of combustion of many polymers are toxic to humans and corrosive to metals. Prompt fire detection and extinguishment are relied on to minimize the quantity of such products. Additionally, means for smoke removal are provided or will be provided as discussed in Section 4.4 of this report. The fire brigade will also be provided with and trained in the use of emergency breathing apparatus for manually fighting fires involving such materials. We find that, subject to implementation of the modifications described in this report, the measures taken to minimize the development of toxic and corrosive combustion products satisfy the objectives identified in Section 2.2 of this report and are, therefore, acceptable.

4.14 Nonsafety-Related Areas

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

The licensee will evaluate the potential for fires in the offgas recombiner building causing unacceptable releases of radioactivity. If fires may cause unacceptable releases, modifications such as barriers, fire retardant coatings, fire detection and fire suppression systems will be required to assure that fires will not cause unacceptable releases. We will address the adequacy of the fire protection in the recombiner building to prevent unacceptable releases of radioactivity in a supplement to this report after completion of the licensee's evaluation of this matter.

4.15 Instrument Nitrogen System

The main steam relief valves are supplied by the instrument nitrogen system and are used for one method of safe shutdown. Cables for the instrument nitrogen system containment isolation valves are routed, along with cables for other methods of safe shutdown, in the recirculation pump motor generator set rooms in the radwaste building. A fire in this area could damage the cables and cause the instrument nitrogen system containment isolation valves to fail shut, cutting off the nitrogen supply to the main steam relief valve operators from the nitrogen compressors. However, five of the relief valves are equipped with accumulators which permit approximately six operations cycles for each valve. Or, the accumulator nitrogen pressure can be used to hold the valves open to establish a cooldown rate instead of cycling the relief valves. In addition, the nitrogen system containment isolation valves, located outside the drywell, can be bypassed using the installed test connections on both sides of the isolation valve. An air supply can then be established to repressurize the accumulators from the service air system compressor.

The instrument nitrogen system compressors are located in the radwaste building. The service air compressors for the two reactor units are

located at opposite ends of the turbine building and can be interconnected between units and with the instrument nitrogen system. The air compressors can be supplied with power from the emergency buses.

In addition to the redundancy and separation of the service air and instrument nitrogen systems, modifications to the fire protection system will provide further assurance that either instrument air or nitrogen will be available if required for shutdown.

We find that, subject to the implementation of modifications throughout the plant, the fire protection for the instrument nitrogen/service air systems satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.0 EVALUATION OF SPECIFIC PLANT AREAS

5.1 Turbine Building

5.1.1 Safety-Related Equipment

Cables for safety-related shutdown equipment, including decay heat removal pumps, are located on the 116 feet elevation of the turbine building in fire zone 78B. Safety-related cables are also routed through the corridor between the switchgear rooms and the radwaste building on the 135 feet elevation. This corridor, in fire zone 78A, also contains cable for a nonsafety-related valve which must operate for safe shutdown. The control room, cable spreading room/computer room, emergency switchgear rooms and battery rooms are in the control building which is located within the turbine building. The control building is a structurally separate building and is discussed in Sections 5.2, 5.3, 5.4, and 5.5 of this report.

5.1.2 Combustibles

Considerable quantities of oil are located in the turbine building, but most of the oil tanks and reservoirs are located in separate rooms. The main turbine lube oil storage tanks for each unit are in separate three-hour fire rated enclosures along with the electrohydraulic control system reservoirs and pumps for that unit. A three-hour fire rated enclosure is provided for the drummed lube oil storage area. The hydrogen seal oil reservoirs for each unit area are separated from each other by distance in an open area of fire zone 78B on the 116 feet elevation. The reactor feed pump turbine lube oil reservoirs are located in four separate rooms. Pipelines for the main turbine lube oil system and reactor feed pump turbine lube oil system are routed through the turbine building fire zones 78V and 78W.

Electrical cable insulation provides another significant source of combustible material throughout the turbine building. In addition, hydrogen supply piping to the turbine generators is routed from the storage tanks outside the turbine building through fire zones 78V and 78W and terminates in a control cabinet in fire zone 78B on the 116 feet elevation of the turbine building. The hydrogen piping passes through the Unit 2 lube oil storage tank room. A propane pipeline is routed from the storage cylinder outside the turbine building to the laboratories on the 116 feet elevation. The propane control cabinet is located in fire zone 78B outside the laboratories. Propane piping passes through the Unit 3 lube oil storage tank room. Other combustibles in the turbine building include bottled welding gases, stores of protective clothing, lumber, and small quantities of solvents, chemicals and lubricants. Most of the lumber is coated with a fire retardant paint.

5.1.3 Consequences if No Fire Suppression

In the turbine building, the largest fire area (i.e., area completely enclosed by three-hour fire rated barriers) is that area designated as fire area 78 in the licensee's fire protection report. This area is composed of a number of fire zones, each of which has one or more barriers or barrier penetrations with a zero fire rating. The possibility of fire propagation between all zones in fire area 78 has not been adequately assessed by the licensee although the condition of the barrier which results in the zero rating has been described.

There are two critical fire zones in the turbine building identified as fire zones 78A and 78B. Fire zone 78A includes large areas on the 91 feet 6 inches, 116 feet, 135 feet and 165 feet elevations. Fire zone 78B includes compartments on the 116 feet and 135 feet elevations. The compartments within each of these fire zones are interconnected by unsealed penetrations, open stairwells and hatches and open archways. The zero-rated barrier between fire zones 78A and 78B is a partial wall on the 116 feet elevation. Smoke, hot gases and possibly fire could propagate from one of these zones to the other.

Both fire zones 78A and 78B contain cables for safe shutdown equipment. These cables could be damaged in an unmitigated turbine building fire. The consequences with regard to safe hot and cold shutdown capability after an unmitigated fire in these fire zones have not been adequately addressed by the licensee. Although the safe shutdown cables in fire zone 78B are routed in conduit, the conduit does not provide adequate protection against a fire involving the considerable quantities of combustibles within this fire zone, including hydrogen and propane, and the transient combustibles which would normally be expected in the turbine building.

An unmitigated fire in a reactor feedwater pump turbine lube oil reservoir room could spread to other areas of the turbine building due to inadequately protected barrier penetrations in one wall of each of the four lube oil reservoir rooms. This lack of adequate fire rating is due to an improper installation of the fire door in each of these rooms. Even if confined to the individual lube oil rooms, an unmitigated fire in a reactor feed pump turbine lube oil reservoir room could cause turbine building structural damage. Also, an unmitigated fire in the main turbine lube oil storage tank rooms, lube oil reservoir rooms or drummed oil storage room could cause structural damage to the turbine building.

5.1.4 Fire Protection Systems

Many areas of the turbine building are provided with fixed water suppression systems. Each of the two seal oil reservoirs and pumping units at the 116 feet elevation in fire zone 78B are protected by an automatically-actuated sprinkler system. The main turbine lube oil storage tank rooms, the drummed lube oil storage room, the four reactor feed pump turbine lube oil rooms and the main turbine lube

oil reservoir rooms are protected by wet pipe sprinkler systems. Other fixed water suppression systems are provided in the turbine generator equipment areas on the 91 feet 6 inches, 116 feet and 135 feet elevations.

Fire hose stations and portable fire extinguishers are provided throughout the turbine building. Large wheeled carbon dioxide extinguishers are provided in a few locations. The main turbine bearings are provided with fittings to which a 350-pound wheeled dry chemical container may be connected for extinguishment of a bearing fire.

Fire detectors are provided in the laboratories on the 116 feet elevation and near the seal oil units on the 116 feet elevation.

5.1.5 Adequacy of Fire Protection

In the main turbine lube oil reservoir rooms, sprinkler heads are located beneath an open grating at the 150 feet elevation. These sprinkler heads are not provided with heat shields to ensure banking of heat and prompt operation of the sprinklers. A delay in extinguishing a small fire in these rooms could result in a larger, more destructive fire.

Fire hoses are provided in the turbine lube oil storage tank rooms and lube oil reservoir rooms. These hoses would not be available for fire fighting in the event of a large fire in these rooms. A fire hose from a hose station in an adjacent area of the turbine building is accessible; however, it does not provide complete coverage of the rooms. Hoses on elevation 116 in the lube oil storage room can be used in the reservoir room, however complete coverage is not provided. The yard hydrants can be also used to provide coverage of these areas.

There are areas in the turbine building with concentrations of combustibles that are not protected with fixed suppression systems or fire detectors and which constitute a hazard to safety-related cable in open trays and conduit. Large stores of protective clothing are located in an open area on the 116 feet elevation in fire zone 78B. This clothing is stored on wooden shelves and in open drums and is not provided with fixed suppression or detection. This storage area constitutes an unnecessary hazard to nearby cabling. Flammable liquids are stored in the open in the laboratories on the 116 feet elevation. Welding and cutting equipment is stored in an unprotected area on the 116 feet elevation in fire zone 78A.

Curbs are provided to contain leakage from the main turbine lube oil storage tanks and reservoirs, the reactor feed pump turbine lube oil reservoirs, and the hydrogen seal oil units. The drummed lube oil storage room is also curbed. These curbed areas either have no floor drains or the drains are kept shut. The curb surrounding the

lube oil storage tanks will not contain all the oil stored in the tanks. A lube oil fire in this room could spread to fire zone 78A. The curbs for the reactor feed pump turbine lube oil reservoirs on the 135 feet elevation are inadequate to prevent the spread of a lube oil fire outside the room. The reactor feed pump turbine lube oil reservoir curbs on the 150 feet elevation will contain the full contents of the reservoir plus an added margin for fire suppression water. The curb for the drummed oil storage room is adequate.

5.1.6 Modifications

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

1. Metal cabinets will be provided for the storage of protective clothing on the 116 feet elevation. Sprinklers will be installed above this area. An acceptable alternative to these modifications is to permanently relocate the protective clothing to an area separated from safe shutdown equipment by a 3-hour fire barrier.

2. A flammable liquid cabinet will be provided for the storage of flammable liquids in the laboratories.

3. The sprinklers under the grating in the main turbine lube oil reservoir room will be upgraded by providing them with heat-reflecting metal shields.

4. The doors to the reactor feed pump turbine lube oil reservoir rooms will be properly installed to provide three-hour fire rated door installations.

5. The curb around the hydrogen seal oil units will be upgraded to contain the oil plus an added margin for fire suppression water.

6. Curbs for reactor feed pump turbine lube oil reservoirs on the 135 feet elevation will be raised to contain the full contents of the reservoirs and a 20 minute sprinkler flow.

The licensee will evaluate the need for the following fire protection modifications recommended by the staff:

1. Early warning fire detectors should be provided in all areas of the turbine building where safety-related cables or cables for safe shutdown equipment are routed.

2. The dikes in the main turbine lube oil storage tank rooms should be upgraded to contain the full contents of all tanks in the room plus the quantity of fire suppression water needed to suppress a postulated fire. This may be accomplished by increasing the height of the existing curbs or by adding curbs at the

room doors. If curbs are added at the doors, verification should be provided that an oil fire in this room will not spread to other areas via the floor drains outside the existing curb.

The licensee will also reevaluate the turbine building with regard to the safe shutdown requirements of cable and equipment located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location in the turbine building will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the turbine building in a supplement to this report after completion of the above-described licensee's evaluations.

5.2 Control Room Complex

The control room complex is a separate enclosed area at the 165 feet elevation in the turbine building auxiliary bay area between the turbine generators and the radwaste building. The complex consists of the main control room at the center and enclosed office spaces, small work shops and a kitchenette at opposite ends of the complex. A suspended ceiling above the complex provides a space for ventilation ductwork and a moderate amount of nonsafety-related electrical cable.

The only space within the control room complex which contains safety-related equipment is the main control room which serves both units. The main control room is a continuously manned station which contains all of the instrumentation and control equipment necessary to operate the plant under both normal and emergency conditions. The equipment includes the redundant control cables, indicating instruments, and control switches used to trip the reactor and to maintain it in a safe shutdown condition.

5.2.2 Combustibles

The combustible material in the area consists of electrical cable insulation, parts of electrical components in panels and consoles, and moderate amount of Class A combustibles such as log books, drawings, operating procedures and computer printouts. The majority of the Class A combustibles are located in the enclosed spaces adjacent to the main control room.

5.2.3 Consequences if No Fire Suppression

An unmitigated fire in the main control room could damage a significant amount of safety-related control equipment including redundant divisions of safe shutdown equipment. A fire anywhere in the control room complex could force an evacuation of the main control room. In

most cases, equipment damage or a forced evacuation would not prevent a safe shutdown because the plants can be shut down using remote shutdown panels located outside the control room. However, there are some enclosed panels which contain redundant equipment that is not isolated from the remote shutdown panels. A fire in one of these panels could result in equipment damage that would prevent a safe shutdown from a single control location. In such an event, operators would have to manually position valves or operate electrical devices at several different remote locations.

With regard to fire protection for equipment and cables required for safe shutdown, the information provided by the licensee in his shutdown analysis is not sufficient for us to determine the adequacy of fire protection. The specific information required is discussed in Section 4.1 of this report.

5.2.4 Fire Protection Systems

The control room complex is bounded on all sides by concrete which provides a three-hour fire barrier. Ventilation ducts which penetrate the barrier are provided with fire dampers. Individual spaces within the complex are separated by walls and metal doors with no specified fire rating. Access to the complex is via two three-hour fire-rated doors from the turbine building.

Four smoke detectors are installed below the suspended ceiling in the central area of the complex. The licensee relies upon manual actions by plant personnel to suppress a fire. With the exception of the space above the suspended ceiling, the area is relatively uncongested with adequate space for manual fire fighting. Portable dry chemical and carbon dioxide extinguishers are provided throughout the complex. Two carbon dioxide hose reels are mounted in the north and south ends of the main control room. These hose reels contain sufficient hose (100 feet each) to reach all areas of the control room that contain electrical equipment. Two 1 1/2 inch hose stations are located in the turbine building near the entrances to the main control room. These hose stations are equipped with sufficient hose to apply a water fog stream to all areas of the control room complex.

The control room complex ventilation system can be manually isolated to prevent smoke from entering the area as a result of fires in other areas of the plant. In the event of a fire in the area itself, ventilation equipment can be manually initiated to clear the control room of smoke. Self-contained breathing units are located in the turbine building just outside each of the entrances to the main control room.

5.2.5 Adequacy of Fire Protection

The existing fire detection system and manual fire suppression equipment do not provide adequate assurance that an incipient fire

in the enclosed panels within the main control room would be detected and suppressed before it could become fully developed and disable redundant safety-related equipment.

No early warning fire detection system is installed above the suspended ceiling or in the enclosed spaces within the complex adjacent to the main control room. The equipment available for applying water to fires involving Class A combustibles within the enclosed spaces is not acceptable. The walls between these spaces and the main control room contain openings and ventilation ducts with no provisions to prevent the spread of smoke from these areas to the main control room. These areas are an unnecessary hazard to the occupancy of the main control room.

5.2.6 Modifications

The licensee has proposed the following modifications to improve fire protection in the control room complex:

1. A stepladder of adequate length to reach the cables in the space above the suspended ceiling of this room will be provided. This ladder will be stored at a dedicated location in the control room complex with a sign affixed reading "For Emergency Use - Do Not Remove From Control Room."

2. Two 2-1/2 gallon pressurized water portable extinguishers will be installed in one or more of the enclosed rooms within the control room complex.

3. All enclosed rooms within the control room complex except the lavatory will be provided with smoke detectors.

4. The housekeeping administrative control procedure will require that unnecessary combustible material should not be stored in the control room complex.

We find that the above modifications represent an improvement to the fire protection for the control room complex. We, therefore, conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following fire protection system modifications recommended by the staff:

1. Modifications should be made to assure that no redundant equipment (including cables) required for safe shutdown, is located in a single panel without a solid fire barrier between compartments containing the redundant equipment. The functions that should be considered required for safe shutdown are discussed in Section 4.1 of this report.

2. All enclosed panels containing redundant safety-related equipment should be provided with an early warning smoke detection system.

3. Hose stations located in the turbine building adjacent to the control room complex should be equipped with a variable gallonage fog nozzle with a ball-type shut off.

4. All doors to enclosed rooms should be automatically closed in the event of fire or maintained closed at all times by administrative procedures. Ventilation ducts and openings in the walls and doors between these enclosed rooms and the main control room should be fitted with dampers that are equipped with either manual or automatic closing devices to prevent smoke and heat from entering the main control room. If a manual closing device is used, it should be capable of being operated from within the main control room at the opening to the room and a permanent sign should be posted at the device stating that it should be operated in the event of a fire in an adjacent area.

5. All exposed cables above the suspended ceiling should be covered with a fire retardant material which has been demonstrated effective by testing. In lieu of covering the cables, the licensee may consider installing smoke detectors in this space located in accordance with the applicable NFPA standards.

6. The licensee agreed to perform a reevaluation of his shutdown analyses which includes staff-identified assumptions.

We will address the adequacy of the fire protection for the control room complex in a supplement to this report after completion of the above-described licensee evaluations.

5.3 Cable Spreading Room

5.3.1 Safety-Related Equipment

The cable spreading room is a space approximately 130 feet by 60 feet, located at the 150 feet elevation directly below the control room and above the emergency switchgear and battery rooms. Safety-related and nonsafety-related control cables for both units are located in the room. Cables for the individual units are generally located in opposite halves of the single room. However, at the center of the room cables for both units come together and are not separated by a barrier. Only a small number of power cables are present and these cables are in conduit. Auxiliary control equipment (e.g., relays and terminal boards) for both units are also located in the room at opposite ends.

A totally enclosed space, approximately 20 feet by 40 feet, is located at the center of the cable spreading room and houses the plant computers. This space is separated from the rest of the cable spreading room by a three-hour fire barrier. The computers themselves are not safety related.

5.3.2 Combustibles

The combustibles in this area consist of a large amount of electrical cable insulation and plastic portions of electrical and electronic components located in cabinets.

5.3.3 Consequences if No Fire Suppression

An unmitigated fire in the cable spreading room could damage redundant safety-related equipment for both units including equipment required for safe shutdown. In such an event manual operations by plant personnel at several remote locations in both units would be required to achieve a safe shutdown.

With regard to fire protection for equipment and cables required for safe shutdown, the information provided by the licensee in his shutdown analysis is not sufficient for us to determine the adequacy of fire protection. The specific information required is discussed in Section 4.1 of this report.

5.3.4 Fire Protection Systems

The cable spreading room is bounded on all sides by concrete which provides a three-hour fire barrier. The doors at either end of the room are three hour fire rated. These doors have self closing devices and will be electrically supervised by the security system from the control room.

Four smoke detectors are installed in the area (two in the cable spreading room and two in the computer room). The licensee relies upon manual actions by plant personnel to suppress a fire once it has been detected. The primary means of suppressing a fire is a fixed manually actuated total flooding CO_2 system. As a backup, portable CO_2 and dry chemical extinguishers are located throughout the area. Two 1-1/2 inch hose stations are located nearby in the turbine building. These hose stations are equipped with lengths of hose sufficient to apply a water fog stream to all areas of the cable spreading room. The floor space within the area is relatively uncongested; however, above the 7 feet level to the 15 feet high ceiling, the space is extremely congested with cables in cable trays and conduit.

5.3.5 Adequacy of Fire Protection

The two smoke detectors located in the cable spreading room do not provide an adequate early warning fire detection system. These detectors are not readily visible from the floor level but it is known that one is located adjacent to the ventilation supply duct. It is doubtful that a detector located in such a heavy air flow could be effective.

The combination of an inadequate early warning fire detection system and no automatic fire suppression system make it unlikely that an incipient fire would be detected and extinguished before it could become fully developed. A deep-seated fire may not be extinguished by the total flooding CO_2 system. Due to the extreme congestion of electrical cables in this area, manual fire fighting may not be effective against a deep-seated fire. If a high temperature deep-seated fire were to develop in the aluminum open ladder type cable trays, the structural integrity of these trays could be threatened, making manual fire fighting extremely hazardous. Therefore, the existing fire protection system is not considered adequate to prevent damage to redundant safety-related equipment including equipment required for safe shutdown.

5.3.6 Modifications

The licensee has proposed to upgrade the existing fire detection system by the installation of additional smoke detectors in the cable spreading room. The licensee will investigate the location and number of detectors and will develop a means to assure that the placement of detectors is adequate to carry out the detection function. We will address the adequacy of the fire detection system in a supplement to this report after completion of the above-described licensee investigation.

The licensee will evaluate the need for the following fire protection system modifications recommended by the staff:

1. The existing manually initiated total flooding CO_2 system should be converted to an automatically initiated system.

2. Hose stations located in the turbine building adjacent to the cable spreading room should be equipped with a variable gallonage fog nozzle with a ball-type shut off.

The licensee will also reevaluate the cable spreading room with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location in the cable spreading room will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the cable spreading room in a supplement to this report after completion of the above-described licensee evaluations.

5.4 Emergency Switchgear Rooms

5.4.1 Safety-Related Equipment

There are four completely enclosed emergency switchgear rooms for each unit. These rooms are located adjacent to each other at the 135 feet elevation of the turbine building directly below the cable spreading room.

The emergency switchgear rooms contain safety-related electrical equipment such as reactor protective system motor generator sets, motor control centers, and station battery chargers. Much of the equipment in these rooms is required for safe shutdown. In general, redundant equipment is not located in the same room. However, electrical cables in conduit pass from one room through another room at the ceiling level.

5.4.2 Combustibles

The combustible material in these areas consists primarily of electrical cable insulation.

5.4.3 Consequences if No Fire Suppression

An unmitigated fire in one of the emergency switchgear rooms could damage safety-related equipment. Since each of the rooms is surrounded by a concrete fire barrier, it is unlikely that a fire could spread to adjacent rooms. On this basis, the licensee has performed an analysis and concluded that at least one method to safely shut the plants down would be available in the event of a fire in any of the emergency switchgear rooms. We have reviewed the licensee's shutdown analysis and, as discussed in Section 4.1 of this report, we have determined that the licensee's conclusion appears to be based on certain assumptions with which the staff does not agree. Therefore, based on the information we have received to date, we must assume that redundant equipment required for a safe shutdown from a single control station could be damaged by an unmitigated fire in one of the emergency switchgear rooms. However, in such an event, plant personnel could manually operate required safe shutdown equipment at remote locations.

5.4.4 Fire Protection System

The individual emergency switchgear rooms are bounded on all sides by concrete which provides a three-hour fire barrier. The doors to, and between, the rooms are three-hour fire rated. These doors have self-closing devices which will be electrically supervised by the security system from the control room.

Each of the emergency switchgear rooms is provided with an early warning fire detector which alarms locally and in the control room.

The licensee relies upon manual actions by plant personnel to suppress a fire once it has been detected. The rooms themselves are relatively uncongested with adequate space for manual fire fighting. Portable carbon dioxide and dry chemical extinguishers are located in the rooms or nearby. Also, 1-1/2 inch hose stations are located in the vicinity of all the rooms. These hose stations are equipped with lengths of hose sufficient to apply a water fog stream to all of the emergency switchgear rooms.

5.4.5 Adequacy of Fire Protection

Due to the low combustible loading and installed fire detection system in each room, reliance on manual fire fighting is considered acceptable for safety-related equipment not required for safe shutdown. The modifications recommended in Section 5.4.6 below are proposed to enhance the existing manual fire fighting capability.

With regard to fire protection for equipment required for safe shutdown, the information provided by the licensee in its shutdown analysis is not sufficient for use to determine the adequacy of the fire protection system. The specific information required is discussed in Section 4.1 of this report.

5.4.6 Modifications

The licensee has proposed the following modification to improve fire protection in the emergency switchgear rooms:

> Two portable CO_2 extinguishers will be installed, both in the corridor on the west side of the emergency switchgear rooms, and in the turbine building on the east side of the emergency switchgear rooms (total of four CO_2 extinguishers).

We find that the above modification represents an improvement to the fire protection for the emergency switchgear rooms. We therefore, conclude that the licensee should proceed with implementing the modification.

The licensee will evaluate the need for the following fire protection system modification recommended by the staff:

> The hose stations located in the turbine building adjacent to the emergency switchgear rooms and in the corridor on the east side of the emergency switchgear rooms should be equipped with a variable gallonage fog nozzle with a ball type shut off.

The licensee will also reevaluate the emergency switchgear rooms with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system as modified, provides adequate assurance that a fire in any room will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of fire protection for the emergency switchgear rooms in a supplement to this report after completion of the above-described licensee evaluations.

5.5 Station Battery Rooms

5.5.1 Safety-Related Equipment

There are four station battery rooms. A separate room is provided for each safety-related equipment division battery. However, the bus cables for one division battery are routed in rigid steel conduit through the other redundant division battery room. At least one battery for each unit is required for safe shutdown from the control room or remote shutdown panels.

5.5.2 Combustibles

The combustible material in the area consists of the plastic battery cases and a small amount of electrical cable insulation.

5.5.3 Consequences if No Fire Suppression

A fire which damages one of the station batteries would result in a loss of automatic or remote control of a single division of safety-related equipment used for safe shutdown. If such a fire remained undetected and all of the battery cases became involved, the redundant battery bus cables routed through the area in conduit could also be damaged.

5.5.4 Fire Protection Systems

Each battery room is bounded on all sides by a concrete three-hour fire barrier. Ventilation ducts which penetrate the barrier are provided with fire dampers. The doors to, and between, the battery rooms are three-hour fire rated. These doors have self-closing devices which will be electrically supervised by the security system from the control room.

The licensee relies upon manual actions by plant personnel to detect and suppress a fire. The battery rooms themselves and the areas used for access to the battery rooms are relatively uncongested with adequate space for manual fire fighting. Portable carbon dioxide and dry chemical extinguishers are located nearby. Also 1-1/2 inch hose stations are located in the turbine building within reach of all the battery rooms.

5.5.5 Adequacy of Fire Protection

The lack of an early warning fire detection system for the battery rooms is not acceptable. A fire involving the battery cases could become fully developed and generate substantial heat before plant

personnel become aware of the fire and take action to suppress it. Such a fire could be a hazard to the bus cables for the redundant batteries which are routed in conduit through the other division battery room.

The licensee relies upon ventilation air flow out of the exhaust duct in each battery room to maintain hydrogen levels below an explosive concentration. The existing ventilation system air flow monitoring system does not monitor the exhaust air flow from each individual battery room. Instead the differential air pressure across the main exhaust fans is monitored. This system may not be sensitive enough to detect a reduction in ventilation air flow for a single battery room.

With regard to fire protection for equipment and cables required for safe shutdown, the information provided by the licensee in his shutdown analysis is not sufficient for us to determine the adequacy of fire protection. The specific information required is discussed in Section 4.1 of this report.

5.5.6 Modifications

The licensee has proposed the following modifications to improve fire protection in the station battery rooms:

1. A smoke detector system which alarms in the control room will be installed in each battery room (a means will be developed to assure that the placement of detectors is adequate to carry out the detection function).

2. The existing ventilation air flow detection system will be upgraded to include an air flow detector in each battery room upstream of the exhaust damper for the room.

We find that the above modifications represent an improvement to the fire protection for the station battery rooms. We, therefore, conclude that the licensee should proceed with implementing the modifications.

The licensee will reevaluate the station battery rooms with regard to safe shutdown requirements of equipment and cables located there as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system as modified, provides adequate assurance that a fire in the battery rooms will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the shutdown battery rooms in a supplement to this report after completion of the above-described licensee evaluations.

5.6 Reactor Building - Elevations 91 Feet 6 Inches and 116 Feet

5.6.1 Safety-Related Equipment

There are three residual heat removal systems pumps and four core spray pumps, along with the cable for the pumps, on the 91 feet 6 inches elevation in each reactor building. The fourth residual heat removal system heat exchangers are located on gratings at the 116 feet elevation above the associated residual heat removal pump. There are two residual heat removal pumps and two core spray pumps in each safety division. Safety-related cables for shutdown equipment are located in the compartments which enclose the torus for each unit. Two safety-related instrument racks are located in separate compartments on the 116 feet elevation in each reactor building.

5.6.2 Combustibles

The significant combustibles in the pump rooms include pump lubricating oil and cables. There are 35 gallons of lube oil associated with each residual heat removal pump. During the site visit, protective clothing in open drums was located in the Unit 3 pump rooms during the refueling outage for that unit. A hydrogen cylinder was noted in a residual heat removal heat exchanger room. The only signficant combustibles in the torus compartments and instrument rack rooms are the cables.

5.6.3 Consequences if No Fire Suppression

Two of the residual heat removal pumps and all of the core spray pumps are isolated from each of the other pumps by a two or three-hour fire rated wall. Therefore, it is unlikely that a fire involving one of these pumps would spread to other equipment on the 91 feet 6 inches elevation of the reactor building. However, the licensee has not verified the adequacy of the pipe, ventilation duct and cable tray penetration seals to prevent the spread of fire. The loss of a single pump would not affect the capability for safe shutdown.

The room containing the third reactor building residual heat removal pump and heat exchanger connects by an open archway with a residual heat removal system equipment room in the radwaste building. The equipment in the two rooms belongs to the same safety division. It is possible that the pumps or their cables in both rooms could be damaged by the heat buildup from an unmitigated fire involving 35 gallons of pump lube oil, the hydrogen from the hydrogen cylinder in the heat exchanger room and any protective clothing or transient combustibles in the room. However, such a fire would be confined to the two equipment rooms, and the two redundant residual heat removal pumps of the other division would still be available for shutdown.

The two instrument rack rooms associated with the same reactor unit are located on opposite sides of the reactor building and are separated

by intervening three-hour fire-rated barriers. The equipment in both rooms would not be damaged by the same unmitigated fire. The loss of the equipment in one room would not significantly affect safe shutdown capability.

The core spray pump rooms and the instrument rack rooms of each unit are part of the same fire area - designated by the licensee in the fire protection program report as fire area 5 in the Unit 2 reactor building and fire area 13 in the Unit 3 reactor building.* These fire areas, composed of individual fire zones, each of which shares at least one zero-rated barrier with an adjacent zone, extend up to the 195 feet elevation in both reactor buildings. The zero fire rating between the instrument rack rooms and the core spray pump rooms is due to open duct penetrations. There are also unsealed duct penetrations between the instrument rack rooms and the safety-related rooms of fire zone 5H (13H) on the 135 feet elevation of the reactor building. Smoke and hot gases from a fire in a core spray pump room or instrument rack room would spread upward to other zones within fire area 5 (13). Open penetrations can also provide a path for the spread of fire between zones when combustibles are present on both sides of the penetration.

Cables for safe shutdown equipment are routed in the torus compartments. Preliminary evaluations indicate that redundant divisions of such cable could be damaged by an unmitigated fire but the licensee has not adequately addressed the consequences relative to safe hot and cold shutdown from fire damage to these cables.

The torus compartment is adjacent to other safety-related areas of the reactor building. The licensee has not verified the adequacy of the cable tray penetrations. There is not reasonable assurance that a cable tray fire in the torus compartment would be confined to that location. The torus compartment shares a zero-rated barrier with fire zone 5H (13H) on the 135 feet elevation of the reactor building due to unsealed pipe sleeve penetrations. Therefore, smoke, hot gases and possibly fire would be expected to spread to other zones within fire area 5 (13) in the event of a fire in the torus compartments.

5.6.4 Fire Protection Systems

The closest fire hose stations on these elevations are located in the radwaste building and in the turbine building. Portable dry chemical and carbon dioxide fire extinguishers are provided in the instrument rack rooms, in some of the pump rooms and on the lowest level of the torus compartments.

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*The Unit 2 and Unit 3 reactor buildings are essentially identical. Therefore, subsequent discussion on the reactor buildings will address Unit 2 fire zones and areas. The corresponding fire zone or fire area number for Unit 3 will be given in parentheses.

5.6.5 Adequacy of Fire Protection

The lack of fire detection in the pump rooms and instrument rack rooms would permit a fire to burn unnecessarily causing damage to safety-related equipment. Fire hose from the presently-installed hose stations will reach all the safety-related areas on these elevations.

The cables in the torus compartments are above the 116 feet elevation and are accessible only by a catwalk which is located between the stacks of cables around the outer circumference of the torus. The catwalk is accessible only by ladder from the 91 feet 6 inches elevation of the torus compartment. Because there are no fire detectors in the torus compartments and there is limited access to the cables for manual suppression, a fire in the torus compartment could burn unchecked. Manual fire fighting would be awkward because of the cramped conditions and poor visibility. Smoke removal by the normal ventilation system could be inadequate in the event of a significant fire.

5.6.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the lower elevations of the reactor buildings:

1. Early warning fire detectors will be provided in the residual heat removal pump rooms and core spray pump rooms.

2. All mechanical penetrations will be evaluated to determine the adequacy of the seals to prevent the propagation of fire across the penetrations. Seals will be installed and existing seals upgraded as necessary.

3. Portable smoke removal equipment will be provided with the capability to exhaust smoke to a suitable location in the event of a fire in the torus compartments.

We find that the above-listed modifications represent a significant improvement to the fire protection system for the lower elevations of the reactor buildings. We, therefore, conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following fire protection modifications recommended by the staff:

1. Early warning fire detectors should be provided in the torus compartments and instrument rack rooms.

2. In each torus compartment, the ladders to the catwalk should be relocated so that there are four ladders with each one adjacent to a different door from the pump rooms to the torus

compartments. The ladders should be designed to permit access to the catwalk by fire brigade members wearing emergency breathing units.

3. In each torus compartment, four fire hose stations should be provided on the catwalk, one at the head of each ladder. Sufficient hose should be provided at each hose station such that all parts of the cable tray system are accessible from two hose stations.

The licensee will also reevaluate these elevations of the reactor buildings will regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location on these elevations will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the lower elevations of the reactor buildings in a supplement to this report after completion of the above-described licensee's evaluations.

5.7 Reactor Building - Elevation 135 Feet

5.7.1 Safety-Related Equipment

The large open area on this elevation is identified in the licensee's fire protection report as fire zone 5H (fire zone 13H in the Unit 3 reactor building). Fire zone 5H (13H) contains control rod drive hydraulic units, emergency motor control centers and DC motor control centers, all safety-related. Other safety-related cables and equipment on this elevation are housed within separated three-four fire rated enclosures as follows:

1. Fire area 19(27) - outboard isolation valves,
2. Fire area 20(30) - neutron monitoring equipment and drywell electrical penetrations for safety-related cable,
3. Fire area 21(29) - outboard isolation valves,
4. Fire area 23(31) - outboard isolation valves and drywell electrical penetrations for safety-related equipment.

5.7.2 Combustibles

Cable insulation is the major permanently installed combustible material located in fire zone 5H(13H). During the site visit, a 55-gallon drum of oil was stored next to a motor control center in

fire zone 13H and a protective clothing change area was located in fire zone 13H for the Unit 3 refueling outage. The other enclosures on this elevation have low fire loadings resulting from small amounts of cable.

5.7.3 Consequences if No Fire Suppression

Fire zone 5H(13H) is part of fire area 5(13) which extends from the 91 feet 6 inches elevation up through the 195 feet elevation of the reactor building and houses much of the safe shutdown equipment for the associated reactor unit. Unsealed duct openings or pipe sleeves connect fire zone 5H(13H) with the lower elevations and with the torus compartment. An open hatch and miscellaneous unsealed penetrations connect fire zone 5H(13H) with fire zone 5J(13J) on the 165 feet elevation. An unmitigated fire in fire zone 5H(13H) could result in the spread of smoke, hot gases and possibly fire to other elevations and damage cable and equipment required for safe shutdown on this and other elevations of the reactor building.

Even if a fire did not spread beyond fire zone 5H(13H), control and power cables for redundant safe shutdown systems could be damaged. A preliminary evaluation indicates that safe shutdown by normal procedures would be prevented by damage to these redundant systems.

A fire in fire area 20(30) could damage redundant safe shutdown cable routed through the area in conduit. Conduit would not by itself protect redundant divisions in an exposure fire. The licensee has not adequately addressed the consequences to safe hot and cold shutdown as the result of fire damage to redundant safe shutdown cables in fire area 20(30).

Fire areas 19(27), 20(30), 21(29) and 23(31) are enclosed in three-hour fire-rated barriers. However, the licensee has not demonstrated the adequacy of the penetration seals to prevent the spread of fire across these barriers.

5.7.4 Fire Protection Systems

Fire protection is provided by portable extinguishers and by four hose stations located on this elevation in each reactor building. Floor drains are provided to remove fire-suppression water.

5.7.5 Adequacy of Fire Protection

The lack of early warning fire detection on this elevation is unacceptable in view of the potential for fire damage to safety-related and safe shutdown cables. Because of the proximity of redundant divisions of safe shutdown cables in fire zone 5H(13H), both divisions of cables could be damaged before a fire is detected and suppressed in this fire zone.

5.7.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the 135 feet elevation of the reactor buildings:

1. All mechanical penetrations will be evaluated to determine the adequacy of the seal to prevent the propagation of fire across the penetration. Seals will be installed and existing seals upgraded as necessary.

We find that the above modification represents an improvement to the fire protection for this elevation of the reactor buildings. We, therefore, conclude that the licensee should proceed with implementing the modification.

The licensee will evaluate the need for the following fire protection system modifications recommended by the staff:

1. Early warning fire detectors should be provide in fire areas 19(27), 20(30), 21(29) and 23(31), and in fire zone 5H(13H).

2. Modifications should be made as necessary (e.g., relocate one redundant division of safe shutdown cable and equipment to outside of the area) to demonstrate by analysis that both plants can be safely shutdown regardless of damage to any equipment and cables located in fire zone 5H or 13H. Or, modifications should be proposed to assure that a postulated fire will not damage redundant divisions in fire zones 5H and 13H. The adequacy of any proposed modifications should be demonstrated effective by test and/or analysis for the equipment configuration at the plant. The possible deleterious effects of combustion products and water or other fire suppression agents must be considered. External ignition sources and transient combustibles must also be considered.

The licensee will also reevaluate this elevation of the reactor buildings with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location on this elevation will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for this elevation of the reactor buildings in a supplement to this report after completion of the above-described licensee's evaluations.

5.8 Reactor Building - Elevation 165 Feet

5.8.1 Safety-Related Equipment

This elevation is composed of individual compartments adjacent to the drywell, surrounded by a large open area. The large open area, along with an adjoining isolation valve compartment, is identified in the licensee's fire protection program report as fire zone 5J (fire zone 13J in the Unit 3 reactor building). Fire zone 5J(13J) contains cable, emergency load centers, motor control centers, and outboard isolation valves, all safety-related. Fuel pool cooling water pumps and fuel pool service water booster pumps are also located in this fire zone. The other compartments on this elevation contain nonsafety-related reactor water cleanup system pumps and heat exchangers.

5.8.2 Combustibles

There is a moderately high fire loading in fire zone 5J(13J) due almost entirely to cable. On the site visit, an open 55-gallon drum filled with used protective clothing was noted in fire zone 13J. The other compartments on this elevation have low fire loadings due to small amounts of cable and miscellaneous combustibles.

5.8.3 Consequences if No Fire Suppression

Power and control cables, motor control centers and load centers of redundant divisions of safety-related equipment could be damaged by an unmitigated fire in fire zone 5J(13J). A preliminary evaluation indicates that safe shutdown by normal procedures would be prevented by damage to these redundant systems.

The other compartments on this elevation, with one exception, are separated from fire zone 5J(13J) by three-hour fire-rated barriers. It is unlikely that a fire in one of these compartments would breach a barrier. However, the licensee has not verified the adequacy of the cable penetrations to prevent spread of a cable fire. A fire confined to one of the isolated compartments would have no effect on safe shutdown.

One compartment, fire zone 5M(13M), shares one wall with a zero fire rating with fire zone 5J(13J). The lack of a fire rating for this wall is due to an unsealed duct penetration. Smoke, hot gases and possibly fire could spread from fire zone 5M(13M) to other zones in the reactor building via the unsealed penetrations in the wall shared with fire zone 5J(13J).

Fire zone 5J(13J) is part of fire area 5(13) which extends from the 91 feet 6 inches elevation to the 195 feet elevation of the reactor building. The zones within fire area 5(13) are interconnected by

unsealed penetrations and open hatches. An unmitigated fire in fire zone 5J(13J) could result in the spread of smoke, hot gases and possibly fire to other zones which also contain safety-related shutdown equipment.

The fuel pool cooling pumps are located in the open floor area of fire zone 5J(13J) with no barriers between the individual pumps. All three pumps could be damaged by an unmitigated fire in this zone. However, these pumps are not required for safe shutdown and fuel pool cooling can be provided, without these pumps, by the residual heat removal system. Although removable spool pieces must be installed to permit use of the residual heat removal system for fuel pool cooling, considerable time is available before bulk pool boiling if the fuel cooling pumps are incapacitated.

5.8.4 Fire Protection System

Fire protection is provided by fire hose stations and portable fire extinguishers on this elevation. Floor drains are provided to remove fire suppression water.

5.8.5 Adequacy of Fire Protection

The lack of fire detectors in fire zone 5J(13J) could permit a significant cable fire to develop. Even with early fire detection, a fire, especially one involving transient combustibles, could involve both divisions of safe shutdown cables in fire zone 5J(13J) because of the proximity of redundant divisions.

5.8.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the 165 feet elevation of the reactor buildings:

1. All mechanical penetrations will be evaluated to determine the adequacy of the seal to prevent the propagation of fire across the penetration. Seals will be installed and existing seals upgraded as necessary.

We find that the above modification represents an improvement to the fire protection for this elevation of the reactor buildings. We, therefore, conclude that the licensee should proceed with implementing the modification.

The licensee will evaluate the need for the following fire protection system modifications recommended by the staff:

1. Early warning fire detectors should be provided in fire zone 5J(13J).

2. Modifications should be made as necessary (e.g., relocate one redundant division of safe shutdown cable and equipment to outside of the area) to demonstrate by analysis that both plants can be safely shutdown regardless of damage to any equipment and cables located in fire zone 5J or 13J. Or, modifications should be proposed to assure that a postulated fire will not damage redundant divisions in fire zones 5J and 13J. The adequacy of any proposed modifications should be demonstrated effective by test and/or analysis for the equipment configuration at the plant. The possible deleterious effects of combustion products and water or other fire suppression agents must be considered. External ignition sources and transient combustibles must also be considered.

The licensee will also reevaluate this elevation of the reactor buildings with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location on this elevation will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for this elevation of the reactor buildings in a supplement to this report after completion of the above-described licensee's evaluations.

5.9 Reactor Building - Elevations 180 feet, 195 feet and 214 feet

5.9.1 Safety-Related Equipment

The 195 feet elevation of the reactor buildings consists of the drywell and spent fuel pool enclosures, a large open area, an enclosed ventilation equipment area and two small compartments. The large open area is identified in the licensee's fire protection program report as fire zone 5K(13K). Fire zone 5K(13K) contains safety-related cable along with the standby liquid control system pumps and tanks. The reactor building ventilation equipment on the 195 feet elevation and on the 214 feet elevation mezzanine is not safety-related. There is no safety-related equipment on the 180 feet elevation.

5.9.2 Combustibles

The major combustibles in fire zone 5K(13K) and in the ventilation equipment rooms is cable insulation. The absolute filters in the ventilation equipment rooms have metal frames and separators, and less than five percent combustible material in the filter media.

5.9.3 Consequences if No Fire Suppression

An unmitigated fire in fire zone 5K(13K) would damage equipment and cable used for safe shutdown. The licensee has not adequately addressed the consequences to safe hot and cold shutdown of fire damage to safe shutdown cables in fire zone 5K(13K).

Fire zone 5L(13L) on the 195 feet elevation contains no equipment but has a moderately high fire loading. A fire, if confined to fire zone 5L(13L), would have no effect on safe shutdown.

Fire zone 5K(13K) is part of fire area 5(13) which extends from the 91 feet 6 inches elevation to the 195 feet elevation. An open hatch and unsealed penetrations connect fire zone 5K(13K) with fire zone 5J(13J) on the 165 feet elevation which contains redundant divisions of safe shutdown equipment and cable. An unmitigated fire in fire zone 5K(13K) could spread to the lower elevations of the reactor building and damage safey-related cable and equipment.

5.9.4 Fire Protection Systems

Fire protection for the 195 feet elevation is provided by fire hoses and portable fire extinghishers. Portable fire extinguishers are also located on the 214 feet elevation mezzanine. Floor drains are provided on both elevations.

5.9.5 Adequacy of Fire Protection

There are no fire detectors on the 180 feet, 195 feet, or the 214 feet elevation. This lack of early fire detection could lead to unnecessary damage to safety-related equipment and cable and the spread of smoke and hot gases throughout the reactor buildings. All areas of the 180 feet and 214 feet elevations are accessible from the presently-installed fire hose stations.

5.9.6 Modifications

The licensee has proposed the following modifications to improve the fire protection on the 180 feet, 195 feet and 214 feet elevations:

1. Additional fire hose will be installed to provide coverage to 180 feet and 214 feet elevations.

2. All mechanical penetrations will be evaluated to determine the adequacy of the seal to prevent the propagation of fire across the penetration. Seals will be installed and existing seals upgraded as necessary.

We find that the above-listed modifications represent a significant improvement to the fire protection for these elevations of the

reactor buildings. We therefore conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following fire protection system modifications recommended by the staff:

1. Early warning fire detectors should be provided in fire zones 5K and 13K.

The licensee will also reevaluate these elevations of the reactor buildings with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location on these elevations will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for these elevations of the reactor buildings in a supplement to this report after completion of the above-described licensee's evaluations.

5.10 Reactor Building - Elevation 234 Feet

5.10.1 Safety-Related Equipment

Refueling equipment and the top of the spent fuel pool are located at this elevation. None of this equipment is required for safe shutdown.

5.10.2 Combustibles

Large quantities of plastic bags and sheeting, protective clothing and paper floor covering were noted in the Unit 3 refueling area on the site visit by the staff during the Unit 3 refueling outage.

5.10.3 Consequences if No Fire Suppression

Since there is no safety-related equipment on this elevation, an unsuppressed fire confined to this elevation would have no effect on safe shutdown capability. However, there is a hatchway in the floor of this elevation and although the hatch is normally closed, an unmitigated fire could spread to a lower elevation, causing damage to safety-related equipment there.

5.10.4 Fire Protection Systems

Fire protection is provided by fire hose stations and portable extinguishers located on this elevation. Floor drains are provided to remove fire suppression water.

5.10.5 Adequacy of Fire Protection

There are no fixed suppression systems nor detection systems on this elevation. Manual suppression would be adequate to control a fire on this elevation and to prevent damage to safety-related equipment if manual suppression efforts are initiated without excessive delay.

5.10.6 Modifications

The licensee will install fire detection on this elevation which will alarm locally and in the control room. NOTE 1

We find that, subject to implementation of this modification, the fire protection for the 234 feet elevation of the reactor buildings satisfies the objectives identified in Section 2.2 of this report and is, therefore, acceptable.

5.11 Reactor Building - Drywell

5.11.1 Safety-Related Equipment

Safety-related equipment in the drywell includes the reactor vessel, reactor recirculation pumps, piping, valves and electrical cabling.

5.11.2 Combustibles

Combustibles in this area consists of approximately 125 gallons of lube oil contained in the recirculation pumps and electrical cable insulation.

5.11.3 Consequence if No Fire Suppression

An unmitigated lube oil fire in the drywell could generate a sufficient amount of heat to damage electrical cabling which may affect the plant's shutdown capability. The licensee has not adequately addressed the consequences to safe hot and cold shutdown from a fire in the drywell.

5.11.4 Fire Suppression Systems

During operation, the drywell is maintained in a nitrogen atmosphere, the nitrogen inerting serves as protection by preventing the initiation of fires. However, there are times (e.g., up to 24 hours after startup and 24 hours prior to a scheduled shutdown) when the drywell is not required by technical specifications to be inerted.

NOTE 1 In the licensee's submittal dated February 16, 1979, the licensee indicated that he has reevaluated this proposal and no longer considers it necessary. Since this submittal is still under review, we will report our findings in a supplement to this evaluation.

There are three general area smoke detectors in each drywell that alarm in the control room. Smoke detectors are not provided in the air recirculation system.

Hose stations and portable extinguishers are not provided in the drywell area. However, during refueling and maintenance operations, hose stations and portable extinguishers located in the reactor building are available for use in the drywell area. Specifically, from the existing hose stations located on the 135 foot elevation of the reactor building, it is possible to direct a stream of water to the 119 foot elevation below the recirculation pumps where oil would accumulate.

5.11.5 Adequacy of Fire Protection

The nitrogen atmosphere will provide acceptable protection against fires during plant operations in which inerting is required by technical specifications. During periods of operation when the drywell is deinerted redundant shutdown systems may be damaged as a result of a fire. During refueling and maintenance operations, when the drywell is also deinerted, manual fire fighting would be needed to suppress a fire in the drywell.

The lack of sufficient hose to reach the 119 foot elevation of the drywell from 135 foot elevation of the reactor building is unsatisfactory. The capability to direct a stream of water to the 119 foot elevation is not a satisfactory alternative to providing sufficient hose.

5.11.6 Modifications

The licensee will provide extra hose at hose stations in the reactor building serving the drywell.

The licensee will develop a means to verify the effectiveness of the installed smoke detectors to promptly detect a fire in each drywell area.

The licensee will also reevaluate the drywell area with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location of the drywell area will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of fire protection for the drywell area in a supplement to this report after completion of the above-described licensee's evaluations.

5.12 Radwaste Building - Elevation 91 feet 6 inches

5.12.1 Safety Related Equipment

The safety-related equipment in this area includes residual heat removal pumps and heat exchangers, high pressure coolant injection pumps, reactor core isolation cooling pumps and the standby gas treatment system fans and filters. Cabling and instrument racks in rooms 8 and 46 are also safety-related as are the control and power cables serving the safety-related pumps which are required for safe shutdown.

5.12.2 Combustible

The significant combustibles at this elevation of the radwaste building are the lube oil associated with the pump motors and the electrical cable insulation.

5.12.3 Consequences if No Fire Suppression

Potential lube oil fires would be limited to a single pump since all pumps are contained within separate enclosures. However, the effect on safe hot and cold shutdown due to fire damage to cabling in all these areas has not been adequately addressed by the licensee. All compartments in this area except for fire zone 4A(12A) are enclosed with 3-hour fire-rated barriers. The licensee has not addressed the adequacy of cable tray penetration seals in this area. Cable tray penetrations through the wall separating room number 24 of the radwaste building from the turbine building were noted during the site visit to exhibit cracks in the fire retardant coating. Also, the doors to stairway number 34 and to the standby gas treatment room were wedged open. Pipe sleeve penetrations from zone 4A on the 91 feet 6 inch and 116 feet elevations to fire zone 4C on the 135 feet elevation could spread smoke and hot gases to other safety-related areas of the radwaste building.

5.12.4 Fire Protection Systems

The high pressure coolant injection pump rooms, fire zones 59 and 62, are provided with carbon dioxide extinguishing systems automatically activated by heat detectors. The charcoal filters in the standby gas treatment equipment room, fire zone 70, are protected by a deluge water suppression system automatically activated by heat detectors. Fire protection in the remaining areas is limited to portable extinguishers and manual hose stations.

5.12.5 Adequacy of Fire Protection

The automatic fixed extinguishing systems protecting the high pressure coolant injection and the standby gas treatment charcoal filters are adequate for the hazard. Manual suppression is considered adequate due to the low fire loading and compartmented configuration in

controlling fires in the remaining areas of this elevation although these rooms are unattended much of the time and the lack of early warning detection would unnecessarily increase the potential damage to safety-related equipment.

5.12.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for elevation 91 feet 6 inches in the radwaste building:

1. Early warning fire detection will be provided in the residual heat removal, reactor core isolation cooling, and core spray pump rooms.

2. All mechanical penetrations will be evaluated to determine the adequacy of the seals to prevent the propagation of fire across the penetrations. Seals will be installed and existing seals upgraded as necessary.

We find that the above-listed modifications represent a significant improvement to the fire protection for this elevation of the radwaste building. We therefore conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following fire protection modifications recommended by the staff:

1. Fire doors should be electrically supervised or otherwise maintained in the closed position as discussed in Section 4.9.2 of this report.

The licensee will also reevaluate this elevation of the radwaste building with regard to safe shutdown requirements of equipment and cables located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides assurance that a fire at any location on this elevation will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the 91 feet 6 inches elevation of the radwaste building in a supplement to this report after completion of the above-described licensee's evaluation.

5.13 Radwaste Building - Fire Zone 72A

5.13.1 Safety-Related Equipment

This fire zone encompasses portions of the radwaste building on the 116-feet, 135-feet and 165-feet elevations.

Room number 154 on the 116-feet elevation is a corridor between the door to the turbine building and the radwaste building stairway. At the time of the site visit this area was used as a health physics work area for cleaning and repair of respirators. The upper levels of the corridor contain safety-related cable trays. A hatchway communicates with the radwaste compactor area at the 135-feet elevation. The hatchway continues to the 165-feet elevation which contains safety-related cable trays, remote shutdown panels and control room/switchgear room ventilation equipment.

5.13.2 Combustibles

The combustibles in this fire zone include: 116-feet elevation - Electrical cable insulation, anticontamination trash, plastic sheets and bags, rubber boots and plastic/rubber respirator components. 135-feet elevation - Electrical cable insulation, cardboard drums or resin, "Pyro-Kure" paper, wooden crates, large quantities of solid radwaste in drums and crates. 165-feet elevation - Electrical cable insulation, charcoal filters, plastic sheeting, brooms, mops, anti-contamination trash.

5.13.3 Consequences if No Fire Suppression

An unsuppressed fire in this zone could result in significant damage to both divisions of safety-related components and cable, including components for safe shutdown. The licensee has not adequately addressed the consequences to safe hot and cold shutdown resulting from a fire in this fire zone.

The doors between the consensate pump rooms and the corridor at the 116-feet elevation are fitted with grill openings covered with light gage aluminum plates. The door between the corridor and the turbine building has no fire rating. A fire originating in this area could spread to the corridor, (room 154), which is heavily loaded with combustibles. From the corridor, a fire could spread to the 135-feet and 164-feet elevations via the hatchway and the wedged-open doors of stairway No. 34 which is also used to store combustible materials.

A fire involving the fan room on the 165-feet elevation could affect safety-related cabling and could also expose the control room emergency ventilation system and the remote shutdown panels.

5.13.4 Fire Protection Systems

Portable dry chemical and carbon dioxide extinguishers are distributed throughout the area and coverage by manual hose stations is provided. The fan room, (No 381) on the 165-feet elevation is provided with two ionization type fire detectors.

5.13.5 Adequacy of Fire Protection

The quantity, type and placement of portable extinguishers are considered acceptable. The licensee has determined that all locations in this fire zone can be reached by presently installed interior fire hose.

There is no detection or fixed suppression in the 116-feet elevation corridor which has a high combustible loading due to health physics cleaning and repair operations. A fire in this corridor could spread to other safety-related locations within this fire zone. The doors to the condensate pump rooms from the corridor are not adequate to resist the passage of fire. An uncontrolled stairway door in this corridor could, if left open, permit the spread of fire to other elevations.

The lack of early warning fire detection throughout this fire zone could result in unnecessary damage to safety-related cables and equipment.

5.13.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for fire zone 72A of the radwaste building:

1. The fire resistance of the doors to the condensate pump rooms from the adjacent corridor will be upgraded. This will be accomplished by replacing the existing grills with the materials and fastening methods necessary to achieve the required fire rating.

2. All combustible storage and operations using combustible materials will be removed from the corridor on 116-feet elevation.

3. Sprinklers will be provided in the compacting area on the 135-feet elevation.

We find that the above-listed modifications represent a significant improvement to the fire protection for fire zone 72A in the radwaste building. We, therefore, conclude that the licensee should proceed with implementing the modifications.

The licensee will evaluate the need for the following fire protection modifications recommended by the staff:

1. Fire doors should be electrically supervised or otherwise maintained in the closed position as discussed in Section 4.9.2 of this report.

2. Early warning fire detection should be provided throughout all areas of fire zone 72A which contain or expose safety-related cabling or equipment to a fire.

The licensee will also reevaluate this fire zone with regard to safe shutdown requirements of equipment and cables located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location in the fire zone will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for fire zone 72A of the radwaste building in a supplement to this report after completion of the above-described licensee's evaluation.

5.14 Radwaste Building - Fire Zones 4B, 4C, 12B & 12C

5.14.1 Safety-Related Equipment

Fire zones 4B and 4C are associated with reactor unit 2 and fire zones 12B and 12C are associated with reactor unit 3.

Fire zones 4B and 12B on the 116-feet elevation contain safety-related emergency motor control centers and DC motor control centers. These zones also contain nonsafety-related water pumps, heat exchangers and the oil pumps and reservoirs for the recirculation pump motor generator sets. Fire zones 4C and 12C on the 135-feet elevation contain safety-related cable trays. Also located in these zones are nonsafety-related recirculation pump motor generator sets.

5.14.2 Combustibles

The combustibles in these fire zones include electrical cable insulation, and the lubricating oil in the reservoirs, piping and motors.

5.14.3 Consequences if No Fire Suppression

Because of the high combustible loading introduced by the oil associated with the motor generator sets, a significant fire can be postulated in these areas. Oil from a ruptured reservoir or pipe in the motor generator set room or associated lube oil equipment room could spread a fire to adjacent areas by oil passing under the doors. A fire in the motor generator set lube oil equipment room, (fire zones 4C and 12C) can spread to the motor generator set room, (fire zones 4B and 12B), through unsealed pipe penetrations.

An unmitigated fire in fire zone 4B(12B) could damage redundant safety-related equipment and cables including those required for safe shutdown. However, the licensee has not adequately addressed the consequences to both hot and cold safe shutdown as the result of a fire in these areas.

5.14.4 Fire Protection Systems

Facilities provided for manual firefighting include dry chemical and carbon dioxide portable extinguishers and manual hose stations. Ionization type fire detectors are provided in zone 4C(12C) which contain the motor generator sets.

5.14.5 Adequacy of Fire Protection

The existing fire protection provisions in these fire zones are considered inadequate for the hazard. Fire zone 4B (12B) which contains the motor generator lube oil reservoir and pumps is not provided with detectors or fixed extinguishing systems. An oil fire from a ruptured reservoir or pipe in either of the rooms housing the motor generator sets or the lube oil equipment could spread because of the lack of curbing and result in extensive damage to the equipment in these areas.

5.14.6 Modifications

The licensee has proposed the following modification to improve the fire protection in these fire zones in the radwaste building:

1. An automatic sprinkler will be provided in the motor generator set lube oil pump rooms, fire zones 4B and 12B.

We find that this modification is an improvement to the fire protection system for these fire zones. We, therefore, conclude that the licensee should proceed with implementing the modification.

The licensee will evaluate the need for the following fire protection modifications recommended by the staff:

1. Automatic sprinkler protection should be provided in fire zones 4C and 12C.

2. The open pipe penetrations through the floor slabs separating zones 4B and 12B from 4C and 12C should be sealed with a watertight, three-hour fire-rated sealant method.

3. Curbing should be provided within fire zones 4B, 4C, 12B and 12C to contain the oil from a leak at the oil reservoir or oil lines to the room of origin.

The licensee will also reevaluate these fire zones in the radwaste building with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire at any location in these fire zones will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for fire zones 4B, 4C, 12B, and 12C in the radwaste building in a supplement to this report after completion of the above-described licensee's evaluations.

5.15 Diesel Generator Building

5.15.1 Safety-Related Equipment

Safety-related equipment in the diesel generator building consists of four emergency diesel generators, associated day tanks and support equipment, and the emergency cooling tower booster pump. The diesel generators are located in separate rooms, each having a three-hour fire-rated barrier. The day tanks are located in separate three-hour rated enclosures within each associated diesel generator room. The auxiliary bay of the building contains the emergency cooling tower booster pump and safety-related cables.

5.15.2 Combustibles

The combustibles consist of 500 gallons of fuel in each of the four day tanks, lube oil, electrical insulation, and oil in an overflow tank in the auxiliary bay.

5.15.3 Consequences if No Suppression

An unsuppressed fire in one of the emergency diesel generator rooms could cause a loss of one division of safety-related equipment for one unit if normal and backup offsite power were not available. An unsuppressed fire in the auxiliary bay could cause loss of the emergency cooling tower booster pump and could damage redundant division of safe shutdown cables. The licensee has not adequately addressed the consequences to safe hot and cold shutdown as the result of fire damage to equipment and cables in the auxiliary bay.

5.15.4 Fire Protection System

Two heat detectors which alarm locally and in the control room are provided in each diesel generator room. A fixed automatically actuated total flooding CO_2 system is provided in each diesel generator room. Manual actuation of the CO_2 system is also provided at the exterior personnel access door to each diesel generator room. Each diesel generator room and the auxiliary bay is also provided with two 20 pound dry chemical portable extinguishers and a 20 pound carbon dioxide extinguisher. Two fire hydrants with hose cart houses are located in the vicinity of the diesel generator building with sufficient hose to support manual fire fighting operations in the building. Two Chemox breathing masks are located at the northeast corner of the building.

5.15.5 Adequacy of Fire Protection

The fire-rated doors between adjacent diesel generator rooms do not have curbs to prevent the seepage of combustible fluids under the doors. Penetrations in the walls between diesel generator rooms may not have a three-hour fire rating, thereby permitting a fire in one room to spread to an adjacent room. The fire-rated doors between adjacent diesel generator rooms have self-closing and latching devices which are not in good working condition. The fire detection systems in the diesel generator rooms are of a type that is not adequate to detect small fires.

The auxiliary bay of the diesel generator building does not have provision for early warning fire detection. The auxiliary bay is exposed to fire hazards from combustible fluids in the 1000 gallon capacity overflow sump and oil being pumped by the auxiliary boiler fuel oil transfer pump. A fire caused by these combustible fluids could damage redundant shutdown equipment and cables.

5.15.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the emergency diesel generator building:

1. A threshold will be provided to prevent the flow of combustible liquids under the doors between the individual diesel generator rooms at the 127 ft. elevation.

2. The self-closing and latching devices on all doors at all elevations in the building will be inspected and repaired or replaced as necessary.

3. All penetrations in the walls between individual rooms in the diesel generator building will be inspected and as necessary all penetrations will be sealed to a three-hour fire rating.

4. Additional smoke detectors will be provided to supplement the existing heat detectors in the diesel generator rooms.

5. A smoke detection system will be installed in the auxiliary room.

6. The requirement to manually trip the auxiliary boiler fuel oil transfer pump from outside the auxiliary bay will be included in the pre-fire strategy plan for the area.

We find the above modifications represent an improvement to the fire protection for the emergency diesel generator building. We, therefore, conclude that the licensee should proceed with implementing the modifications.

The licensee will also reevalute the auxiliary bay of the diesel generator building with regard to safe shutdown requirements of equipment and cable located here as discussed in Section 4.1 of this report. Verification will be provided that the fire protection system, as modified, provides adequate assurance that a fire in the auxiliary bay will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of fire protection for the diesel generator building in a supplement to this report after completion of the above-described licensee's evaluation.

5.16 Circulating Water Pumphouse

5.16.1 Safety-Related Equipment

The circulating water pumphouse contains eight safety-related high pressure service water pumps, their motor control centers, and two emergency service water pumps. Nonsafety-related equipment includes: six service water pumps, six circulating water pumps and the associated switches, controls and wiring. The structure also contains the diesel engine-driven, and electric motor-driven fire pumps.

5.16.2 Combustibles

The combustibles of primary concern are the pump lubricating oil and the insulation on wiring and within electrical equipment. The structure also contains the fire pump diesel fuel oil day tank and engine lube oil reservoir. During the site visit, transient combustible materials associated with maintenance operations on the pumps and equipment were evident in the structure.

5.16.3 Consequences if No Suppression

The circulating water pumphouse is divided into three separate compartments by 3-hour fire-rated walls and unrated watertight steel doors. Although these doors are not tested for fire resistance, they are of substantial construction and are expected to provide adequate fire resistance. The center compartment of the structure is further divided into two rooms by a steel bulkhead and a watertight door. One of these subdivided compartments contains the four high pressure service water pumps and one emergency service water pump for reactor unit 3 and the electric motor driven fire pump. The other room contains the four high pressure service water pumps for reactor unit 2, one emergency service water pump and the diesel engine driven fire pump which is enclosed within a separate 3-hour fire-rated masonry block room. Openings through the walls of the diesel fire pump room include a 3-hour fire door and a 3-hour fire damper.

The diesel-driven fire pump is equipped with a base mounted, fuel day tank containing approximately 120 gallons. The day tank is supplied from an underground tank located adjacent to the entrance door to the pumphouse. Fuel is transferred from the storage tank to the day tank by means of a transfer pump.

A fire originating in the diesel fuel, lube oil, or transient materials could involve all the equipment in one compartment of the pumphouse. A fire in the diesel fire pump room could spread to the adjacent high pressure service water pumps by diesel fuel passing under the door.

An unmitigated fire in one of the high pressure service water pump rooms could affect all four safety-related pumps in this area. The fire however, would not be expected to spread to the adjacent high pressure service water pump room providing the watertight door in the bulkhead separating these rooms is closed.

The high pressure service water pumps are required for torus cooling during a shutdown. The licensee has not adequately addressed the consequences to safe hot and cold shutdown due to a fire in the high pressure service water pump rooms.

A fire in one of the two circulating water pump rooms would not endanger safety-related equipment in the other room providing the watertight doors to the high pressure service water pump rooms are closed.

5.16.4 Fire Protection System

The diesel engine driven fire pump room is protected by a wet pipe automatic sprinkler system. Additional fire protection equipment provided includes dry chemical and carbon dioxide portable extinguishers and manual hose reel stations. Two rate-of-rise thermal detectors are provided in each circulating water pump room and one detector is provided in each high pressure service water pump room.

5.16.5 Adequacy of Fire Protection

The fire detectors throughout the structure initiate an alarm upon rising temperature but are not sensitive to smoke nor other non-thermal products of combustion. In normally unoccupied areas containing safety-related equipment, such as the high pressure service water pump rooms, the lack of early warning fire detection is unacceptable. Although a security guard is on duty in the pumphouse at all times it cannot be assured that the watertight doors separating the compartments will be closed at all times in order to prevent a fire in one room from spreading to the adjacent rooms.

There are no provisions for preventing a flow of diesel fuel from a ruptured day tank or fuel line from spreading to adjacent rooms by running under the door of the diesel fire pump room. There are also no provisions for automatically shutting off the flow of fuel oil from the underground storage tank to the diesel fire pump day tank in the event of a fire in the diesel fire pump room.

5.16.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the circulating water pumphouse:

1. The existing thermal fire detectors in the high pressure service water pump rooms will be replaced with early warning type smoke detectors.

2. The watertight doors separating the compartments within the pumphouse will be monitored by the security system administrative procedures and maintained in the closed position.

3. Curbing will be provided at the door to the diesel fire pump room of sufficient height to contain the volume of the diesel fuel day tank plus a suitable margin for fire suppression water.

4. A fusible link shutoff valve or a high temperature shutoff switch to the fuel transfer pump will be provided to limit the flow of diesel fuel into the diesel fire pump room during a fire.

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

The licensee will also reevaluate the circulating water pumphouse with regard to safe shutdown requirements of equipment and cables located here as discussed in Section 4.1 of this report. Verification will be provided that the fire at any location in the pumphouse will not prevent safe hot and cold shutdown of both units.

We will address the adequacy of the fire protection for the circulating water pumphouse in a supplement to this report after completion of the above-described licensee's evaluation.

5.17 Recombiner Building

5.17.1 Safety-Related Equipment

The equipment in this building is used to reduce the radioactivity of the gaseous releases from both reactor units. None of this equipment is required for safe shutdown.

5.17.2 Combustibles

The major combustibles on the 135 feet elevation are compressor lube oil and trash. During the site visit a drum of oil was stored on the stairway to the 146 feet elevation mezzanine. The mezzanine contains hydrogen in the off-gas recombiner system, cables in open ladder trays, and trash. Charcoal filters, hydrogen and plastic material are the significant combustibles on the 157 feet elevation. The charcoal filter trains are isolated from one another and enclosed in a steel plenum located in a masonary enclosure.

5.17.3 Consequences if No Fire Suppression

The fire rating of the recombiner building interior barriers has not been described by the licensee. However, because of the explosive nature of the gaseous combustibles and the continuity of solid and liquid combustibles, an unmitigated fire could involve much of the equipment in the recombiner building. The consequences of such a fire, in terms of radiation release from the off-gas recombiner system and the recombiner building ventilation system charcoal filters, have not been adequately addressed by the licensee.

5.17.4 Fire Protection Systems

A fire hose station is provided on the 136 feet elevation and on the 157 feet elevation. Portable extinguishers are located on these elevations as well as on the 146 feet elevation mezzanine. The recombiner building ventilation system charcoal filters are provided with an automatically-actuated water sprinkler system. There is one heat detector on the 135 feet elevation and four heat detectors on the 157 feet elevation. Floor drains are provided on all elevations.

5.17.5 Adequacy of Fire Protection

Since the licensee did not address the recombiner building in the fire hazards analysis, the details of the fire protection system are not known. An evaluation cannot, therefore, be made of the adequacy of the fire protection.

5.17.6 Modifications

The licensee will evaluate the potential for an unmitigated fire in the recombiner building to cause an unacceptable release of radioactivity to the site boundary. The evaluation should be performed in accordance with guidelines in Regulatory Guide 1.98. The release from both off-gas recombiner trains as well as the ventilation system charcoal filters should be used in the evaluation unless it can be demonstrated that an unmitigated fire would not involve all of this equipment. The potential for gas explosions and the spread of fire via cables and other combustibles should be considered.

We will address the adequacy of the fire protection for the recombiner building in a supplement to this report after completion of the licensee's evaluation of this matter.

5.18 Yard Area

5.18.1 Safety-Related Equipment

The safety-related equipment in the yard area includes underground cables to the high pressure service water pumps in the pumphouse, underground cables to the diesel generator building, underground diesel fuel storage tanks, and the emergency cooling tower.

5.18.2 Combustibles

The combustibles in the yard area include: oil filled transformers, underground diesel storage tanks, construction equipment storage and the auxiliary boiler houses and associated fuel oil storage tank. In addition, the potential exists for the introduction of significant combustibles such as fuel oil trucks.

5.18.3 Consequences if No Fire Suppression

In general, an unsuppressed fire in the yard area would not present a significant fire exposure to safety-related systems because of intervening distance or barriers.

A specific hazard is the possibility of a fire during refueling of the underground diesel fire pump fuel tanks. A fire in this area could expose the high pressure service water pumps within the building. The safety-related equipment in the emergency cooling tower is separated by barriers, and a fire in any compartment would not spread to adjacent compartments.

5.18.4 Fire Protection Systems

The main and start-up transformers are protected by automatic water spray systems. The auxiliary boiler's fuel oil tank is protected by a fixed foam system. The auxiliary boiler building houses the foam system controls and is provided with a hose reel connected to the foam system supply.

Hydrants are spaced along the underground fire water loop at intervals of approximately 250 feet. Metal sheds housing hose carts and other firefighting equipment are provided at three locations around the yard area.

5.18.5 Adequacy of Fire Protection

The spacing of outside hydrants is considered adequate but the three existing hose cart houses are inadequate. The distance between the

hose cart houses and the grades around the plant perimeter plus the time to connect and lay hose requires an unacceptably long time before application of water is possible. In some areas inside the plant, notably at the turbine lube oil storage and equipment rooms, backup firefighting capability is provided by hose streams connected to the exterior hydrants. The lack of hose houses along the east side of the plant will result in delays in implementing this capability.

During the site visit, it was noticed that some of the outside post indicator valves were provided with wire ties holding the operating handle in the open position. Some post indicator valves did not have the wire ties nor any other physical means of assuring the valves are in the open position.

5.18.6 Modifications

The licensee has proposed the following modifications to improve the fire protection for the yard area:

1. An additional hose cart house will be provided near the center hydrant on the west side of the plant.

2. Additional equipment will be provided in the hose cart houses and improved procedures for inspections and maintenance of yard fire-fighting equipment will be implemented as discussed in Section 4.3.1(3) of this report.

3. The area around the diesel fuel tank fill connection will be regraded to prevent a fire involving spilled fuel from affecting the circulating water pumphouse.

4. Chains and locks will be provided on all post indicator valves.

We find that, subject to implementation of the above-listed modifications, 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 administrative controls for fire protection consist of the fire protection organization, the fire brigade's training, the controls over combustibles and ignition sources, the prefire plans and procedures for fighting fires, and the quality assurance provisions for fire protection.

The licensee's description of the administrative controls is not adequate to permit a conclusion by the staff. We have recommended that the licensee's administrative controls follow the guidelines set forth in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." The licensee will provide clarification of his Administrative Controls to demonstrate compliance with staff guidelines or provide adequate justification for any deviations.

Our evaluation of the administrative controls for fire protection will be issued in a supplement to this report.

7.0 TECHNICAL SPECIFICATIONS

The Technical Specifications have previously been modified to incorporate interim Technical Specifications which include limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. Following the implementation of the modifications of fire protection systems 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, which are based upon the fire hazards analysis and our onsite evaluation of the fire protection program. These proposed modifications are summarized in Section 3.1. In addition, we have concluded that the licensee should implement certain evaluations or improvements related to the fire protection program. These are summarized in Section 3.2. Significant steps are being taken to provide additional assurance that safe shutdown can be accomplished and the plant can be maintained in a safe condition during and following potential fire situations. Additional evaluation of incomplete items, discussed in the preceding sections, will be necessary before we can conclude that the overall fire protection at the Peach Bottom Atomic Power Station facility will satisfy the provisions of BTP 9.5-1 and Appendix A thereto, which the staff has established for satisfactory long-term fire protection.

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

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

> "Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent (see Section 3.3 of [NUREG-0050]). The Review Group believes that steps already taken since March 1975 (see Section 3.3.2) have reduced this frequency significantly.
>
> "Based on its review of the events transpiring before, during and after the Browns Ferry fire, the Review Group concludes that the probability of disruptive fires of the magnitude of the Browns Ferry event is small, and that there is no need to restrict operation of nuclear power plants for public safety. However, it is clear that much can and should be done to reduce even further the likelihood of disabling fires and to improve assurance of rapid extinguishment of fires that occur. Consideration should be given also to features that would increase further the ability of nuclear facilities to withstand large

fires without loss of important functions should such fires occur."

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

We have determined that the license amendments do 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 amendments involve 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 these amendments.

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

9.0 CONSULTANTS' REPORT

Under contract to 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 report, "Fire Protection in Operating Nuclear Power Stations Peach Bottom, Units 2 and 3," dated April 6, 1979 discusses several matters which have been addressed in the SER. The consultants' report contains recommendations which have, for the most part, been incorporated in this report. The consultants' recommendation on valve supervision which we have not adopted, along with our basis therefor is identified in Appendix B.

APPENDIX A

CHRONOLOGY

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

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

By letter dated May 11, 1976, Philadelphia Electric 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 therefore.

By letter dated September 27, 1976, Philadelphia Electric Company was requested to provide the results of a fire hazards analysis and propose Technical Specifications pertaining to fire protection. Philadelphia Electric Company was also provided a copy of Appendix A which includes acceptable alternatives to the guidelines of SRP 9.5.1.

On October 26, 1976, Philadelphia Electric Company provided a submittal responding to our request of May 11, 1976.

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

By letter dated February 2, 1977 (as supplemented by letter dated July 18, 1977), the Philadelphia Electric Company proposed interim technical specifications on existing fire protection systems.

On March 28 - April 1, 1977 the fire protection review team visited the site to review the fire protection systems used at the plant.

On April 14, 1977 Philadelphia Electric Company responded to the staff letter of September 27, 1976 by submitting a fire hazards analysis.

During the week of May 8, 1977, we transmitted to the licensee informally a list of staff questions and positions for early licensee review.

On June 16, 1977, a meeting was held in Bethesda, MD to discuss staff questions and positions.

On June 30, 1977, the staff positions and questions were transmitted by letter to the licensee.

By letter dated August 12, 1977, the licensee provided additional information as requested in the staff letter of June 30, 1977.

By letter dated September 15, 1977, the licensee responded to the positions in the staff letter of June 30, 1977.

On September 20-22, 1979, a fire review team visited the site to review adminstrative controls and manual fire fighting techniques at the plant.

By letter dated January 16, 1978, we transmitted a copy of "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

By letter dated February 22, 1978, Philadelphia Electric Company responded to our request of January 16, 1978.

On February 28, 1978, we issued Amendments to incorporate Technical Specifications into the licenses for Peach Bottom 2 and 3.

By letter dated July 7, 1978, we requested additional information on Administrative Control.

In July 24-25, 1978, a Fire Review Team visited the site to review certain areas of the plant.

By letter dated August 11, 1978 Philadelphia Electric Company responded to our July 7, 1978 request.

By letter dated November 17, 1978 we provided a list of staff concerns and positions with a request for additional information.

By letter dated December 20, 1978 as supplemented February 16, 1979 Philadelphia Electric Company provided a response to our request of November 17, 1978.

APPENDIX B

DISCUSSION OF CONSULTANT'S 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 report, "Fire Protection in Operating Nuclear Power Stations - Peach Bottom Units 2 and 3, Evaluation Report Review" discusses a recommendation which was not adopted. The consultant's recommendation which we have not adopted, along with our basis therefor is identified herein.

Valve Supervision

"Electrical valves 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" to Branch Technical Position (BTP) 9.5-1 of the Standard Review Plan. These guidelines permit, as an alternative to electrical supervision, an administative 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 tamperproof 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 require a monthly check of all valves in the flow path to fire suppression systems.

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
Upton, New York 11973

Department of Nuclear Energy

(516) 345-2144

April 6, 1979

Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Robert L. Ferguson
Plant Systems Branch

Dear Bob:

Subject: Fire Protection in Operating Nuclear Power Stations
Peach Bottom Units 2 and 3, Safety Evaluation Report Review

The Safety Evaluation Report, as developed jointly by the NRC staff and Brookhaven National Laboratory (BNL), adequately reflects the concerns and recommendations of the consultants. Throughout the reevaluation of Peach Bottom 2 and 3, there has been general agreement between the NRC staff and the BNL consultants. Based on present data, the proposed fire protection, as set forth in the SER, will give reasonable assurance that the health and safety of the public is not endangered. The following exception represents a differing engineering point of view that should be evaluated by the NRC staff.

Valve Supervision

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

Manual Equipment

4.3.1(1) - We recommend the following be added "Provide two double female adapters to the outside fire department pumper; store at a central equipment location."

Hydrant Inspection

4.3.1(3)c - We recommend adding after the word year "To insure that there is no standing water remaining in the barrel or at the hydrant valve."

The preceding statements are based on a detailed reevaluation of the fire protection program as implemented by the Philadelphia Electric Company at the Peach Bottom Units 2 and 3 Nuclear Power Station. The analysis covered a review of the fire prevention, detection and suppression capabilities of the plants as interfaced with the nuclear systems requirements. This was accomplished by utilizing a review team concept with members from BNL and the Nuclear Regulatory Commission Division of Operating Reactors staff.

The fire protection evaluation for Peach Bottom Units 2 and 3 is based on an analysis of documents submitted by the Philadelphia Electric Company to the Nuclear Regulatory Commission and a site visit. The site visit was conducted by Mr. E. Sylvester and Mr. P. Atherton of the NRC; Mr. Ingemar Asp of Gage-Babcock and Associates, Inc. under contract to BNL; and Mr. J. Townley, consultant to BNL. Mr. Townley was under contract to BNL to review the manual fire fighting capabilities of the station along with administrative controls.

The Peach Bottom review has been conducted under the direction of Mr. E.A. MacDougall and myself of Reactor Engineering Analysis Group at BNL.

We have reviewed the analyses submitted by the licensee and have visited 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 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 onsite personnel and with property protection, unless they impact the health and safety of the public due to the release of radioactive material. The proposed modifications represent a significant increase in the level of protection against serious fire associated hazards.

Respectfully yours,

Robert E. Hall

Robert E. Hall, Group Leader
Reactor Engineering Analysis

REH:EAM:sd

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-277 AND 50-278

PHILADELPHIA ELECTRIC COMPANY ET AL.

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 53 and 53 to Facility Operating Licenses Nos. DPR-44 and DPR-56 to Philadelphia Electric Company, Public Service Electric & Gas Company, Delmarva Power & Light Company, and Atlantic City Electric Company, (the licensees), which revised the licenses for operation of the Peach Bottom Atomic Power Station, Units 2 and 3 (the facilities), located in York County, Pennsylvania. The amendments are effective as of the date of issuance.

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

The licensee's submittals comply 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 amendments. Prior public notice of the amendments was not required since the amendments do not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the licensee's submittals dated October 21, 1976, April 14, 1977, August 12, 1977, September 15, 1977, February 22, 1978, August 11, 1978 and December 20, 1978, (2) Amendment Nos. 53 and 53 to Licenses Nos. DPR-44 and DPR-56 and (3) 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 Government Publications Section, State Library of Pennsylvania, Education Building, Commonwealth and Walnut Streets, Harrisburg, Pennsylvania. A single copy of items (2) and (3) 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 23rd day of May 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors