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February 28, 1978

Docket No. 50-261

Carolina Power & Light Company
ATTN: Mr. J. A. Jones
Senior Vice President
336 Fayetteville Street
Raleigh, North Carolina 27602

Gentlemen:

The Commission has issued the enclosed Amendment No. 31 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2. This amendment consists of changes to the license and the Technical Specifications and is in partial response to your submittals of December 29, 1976, June 23, September 9, September 16, September 28, September 30, October 27, November 17, and November 28, 1977, and January 5, 1978.

This amendment adds a license condition relating to the completion of facility modifications for fire protection. It also revises the Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. The enclosed Technical Specifications have been somewhat modified from those proposed in your September 9, 1977 submittal. These Technical Specifications, as modified and agreed to by your staff, shall become effective 30 days after the date of issue.

Your submittals dated June 23, September 30, November 17, 1977 and January 5, 1978, provide additional information in regard to some of the items identified in the Safety Evaluation as requiring additional information. These submittals are under review and the results of that review will be included in a supplement to the enclosed Safety Evaluation after completion of our review. You must also submit the remaining information of Section 3.2 according to the schedule given in Table 3.2 of the Safety Evaluation.

SEE RPT

W

Copies of the Safety Evaluation, Notice of Issuance, and the report of our fire protection consultants (BNL-NUREG 23724) are also enclosed.

Sincerely,

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

Enclosures:
1. Amendment No. 31 to DPR-23
2. Safety Evaluation
3. Notice
4. BNL-NUREG 23724

cc w/enclosures:
See next page

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Shaw, Pittman, Potts & Trowbridge
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Branch (AW-459)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S.W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region V Office
ATTN: EIS COORDINATOR
245 Courtland Street, N.E.
Atlanta, Georgia 30308

cc w/enclosure(s) and incoming
dtd: 12/29/76; 6/23, 9/9, 9/16,
9/28, 9/30, 10/27, 11/17, 11/28/77;
and 1/5/78
Office of Intergovernmental Relations
116 West Jones Street
Raleigh, North Carolina 27603

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

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 31
License No. DPR-23

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

   A. The application for amendment by Carolina Power and Light Company (the licensee) dated December 29, 1976, as supplemented and revised September 9, 1977, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

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

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

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

2. Accordingly, Facility Operating License No. DPR-23 is hereby amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and by the following additional changes:

   A. Change paragraph 3.B. to read:

      B. Technical Specifications

      The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 31 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

   B. Add paragraph 3.E. as follows:

      E. The licensee may proceed with and is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.27 of the NRC's Fire Protection Safety Evaluation (SE) on the facility dated February 28 , 1978. These modifications shall be completed as specified in Table 3.1 of the SE. In addition, the licensee shall submit the additional information identified in Table 3.2 of this SE in accordance with the schedule contained therein. In the event these dates for submittal cannot be met, the licensee shall submit a report, explaining the circumstances, together with a revised schedule.

3. This license amendment becomes effective 30 days after the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid

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

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 28, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 31

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Revise Appendix A Technical Specifications as follows:

Remove Pages	Insert Pages
Table of Contents (Page 2)	Table of Contents (Pages 2 and 3)
1-4	1-4
-	3.14-1 - 3.14-5
-	4.14-1 - 4.14-3
-	6-1a
6-3 & 6-4	6-3 & 6-4
6-12 & 6-13	6-12 - 6-13a
6-14	6-14
6-22	6-22

New pages and the changed areas on the revised pages are shown by marginal lines.

Section	Title	Page
3.10.5	Part Length Control Rod Banks	3.10.6
3.10.6	Inoperable Full Length and Part Length Control Rods	3.10.7
3.10.7	Power Ramp Rate Limits	3.10.7
3.10.8	Required Shutdown Margins	3.10.8
3.11	Movable In-Core Instrumentation	3.11-1
3.12	Seismic Shutdown	3.12-1
3.13	Shock Suppressors (Snubbers)	3.13-1
3.14	Fire Protection System	3.14-1
3.14.1	Fire Detection Instrumentation	3.14-1
3.14.2	Fire Suppression Water System	3.14-1
3.14.3	CO_2 Fire Protection System	3.14-2
3.14.4	Fire Hose Stations	3.14-2a
3.14.5	Fire Barrier Penetration Fire Seals	3.14-3
4.0	Surveillance Requirements	4.1-1
4.1	Operational Safety Review	4.1-1
4.2	Primary System Surveillance	4.2-1
4.3	Primary System Testing Following Opening	4.3-1
4.4	Containment Tests	4.4-1
4.4.1	Operational Leakage Rate Tests	4.4-1
4.4.2	Isolation Valve Tests	4.4-3
4.4.3	Post Accident Recirculation Heat Removal System	4.4-3
4.4.4	Operational Surveillance Program	4.4-5
4.5	Emergency Core Cooling, Containment Cooling and Iodine Removal Systems Tests	4.5-1
4.5.1	System Tests	4.5-1
4.5.2	Component Tests	4.5-2
4.6	Emergency Power System Periodic Tests	4.6-1
4.6.1	Diesel Generators	4.6-1
4.6.2	Diesel Fuel Tanks	4.6-2
4.6.3	Station Batteries	4.6-2
4.7	Secondary Steam and Power Conversion System	4.7-1
4.8	Auxiliary Feedwater System	4.8-1
4.9	Reactivity Anomalies	4.9-1
4.10	Radioactive Effluents	4.10-1
4.11	Reactor Core	4.11-1
4.12	Refueling Filter Systems	4.12-1
4.13	Shock Suppressors	4.13-1
4.14	Fire Protection System	4.14-1
5.0	Design Features	5.1-1
5.1	Site	5.1-1
5.2	Containment	5.2-1
5.2.1	Reactor Containment	5.2-1
5.2.2	Penetrations	5.2-1
5.2.3	Containment Systems	5.2-2
5.3	Reactor	5.3-1
5.3.1	Reactor Core	5.3-1
5.3.2	Reactor Coolant System	5.3-2
5.4	Fuel Storage	5.4-1
5.5	Seismic Design	5.5-1
6.0	Administrative Controls	6-1
6.1	Responsibility	6-1
6.2	Organization	6-1
6.3	Facility Staff Qualifications	6-4
6.4	Training	6-4
6.5	Review and Audit	6-4
6.6	Reportable Occurrence Action	6-13
6.7	Safety Limit Violation	6-13

Section	Title	Page
6.8	Procedures	6-14
6.9	Reporting Requirements	6-14
6.10	Record Retention	6-23
6.11	Radiation Protection Program	6-25
6.12	Deleted	6-25
6.13	High Radiation Area	6-28

1.8 Quadrant Power Tilt

The quadrant power tilt is defined as the ratio of maximum to average of the upper excore detector currents or the lower excore detector currents whichever is greater. If one excore is out of service, the three in-service units are used in computing the average.

1.9 Fire Suppression Water System

A fire suppression water system shall consist of: a water source; pumps; and distribution piping with associated sectionalizing control or isolation valves.

1.10 Staggered Test Basis

A Staggered Test Basis shall consist of:

a. A test schedule for n systems, subsystems, trains or designated components obtained by dividing the specified test interval into n equal subintervals.

b. The testing of one system, subsystem, train or designated components at the beginning of each subinterval.

3.14 FIRE PROTECT SYSTEMS

Applicability: Applies to the operating status of the fire detection instrumentation, fire suppression systems, fire barriers, and to the administrative controls required for a comprehensive fire protection and prevention program. The requirements of these specifications shall apply to an area or areas when equipment in that area or areas is required to be operable.

Objectives: To assure the operability of Fire Protection Systems.

Specification:

3.14.1 Fire Detection Instrumentation

3.14.1.1 As a minimum, the fire detection instrumentation for each fire detection zone shown in Table 3.14.1 shall be OPERABLE.

3.14.1.2 With the number of operable fire detection instruments less than required by Table 3.14.1:

a. Within one (1) hour, increase the inspection frequency of the zone with the inoperable instrument(s) to at least once per hour, and

b. Restore the inoperable instrument(s) to operable status within 14 days or in lieu of any other report required by Specification 6.9.2, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.3.g within the next 30 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the instrument(s) to operable status.

BASIS

OPERABILITY of the fire detection instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety related equipment and is an integral element in the overall facility fire protection program.

In the event that a portion of the fire detection instrumentation is inoperable, the establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is returned to service.

3.14.2 Fire Suppression Water System

3.14.2.1 The Fire Suppression Water System shall be OPERABLE with:

a. Two high pressure pumps, each with a capacity of 2500 gpm, with their discharge aligned to the yard loop, and

b. An operable flow path capable of taking suction from the Unit 2 intake structure and transferring the water through distribution piping with operable sectionalizing, control or isolation valves.

3.14.2.2 With less than the above required equipment OPERABLE:

Restore the inoperable equipment to operable status within seven days or in lieu of any other report required by Specification 6.9.2, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.3.g within the next 30 days outlining the plans and procedures to be used to provide for the loss of redundancy in this system.

3.14.2.3 With no Fire Suppression Water System OPERABLE:

a. Establish a backup fire suppression water system within 24 hours, and provide prompt notification with written followup in accordance with Specification 6.9.2a. The written followup report shall contain information outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status, or

b. Be in hot shutdown within twelve hours and in cold shutdown within the next 24 hours.

3.14.3 <u>CO_2 Fire Protection System</u>

3.14.3.1 The diesel generator CO_2 Fire Protection System shall be OPERABLE:

a. With a complete bank of fully charged CO_2 cylinders in service,

b. With the system aligned to deliver to the protected area, and

c. With automatic initiation logic operable.

d. A CO_2 cylinder shall be deemed fully charged if it contains not less than 90% of the full charge weight.

3.14.3.2 With the CO_2 Fire Protection System in a condition of readiness less than required by the above:

a. Ensure that backup fire suppression equipment is available within one hour.

b. If the affected diesel generator is running, immediately post a continuous fire watch. A continuous fire watch shall be maintained until the CO_2 fire protection system is restored to operability or until the diesel generator has been shutdown.

c. Restore the system to OPERABLE status within 14 days or, in lieu of any other report required by Specification 6.9.2, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.3.g within the next 30 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

3.14.4 Fire Hose Stations

3.14.4.1 Each fire hose station in Table 3.14.2 shall be OPERABLE.

3.14.4.2 With a hose station in Table 3.14.2 inoperable, route an additional equivalent capacity hose to the unprotected area from an operable hose station within one hour.

BASIS

The OPERABILITY of the fire suppression systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety related equipment is located. The fire suppression system consists of the water system, CO_2, and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety related equipment and is a major element in the facility fire protection program.

In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the affected equipment can be restored to service.

In the event that the fire suppression water system becomes inoperable, immediate corrective measures must be taken since this system provides the major fire suppression capability of the plant. The requirement for a twenty-four hour report to the Commission provides for prompt evaluation of the acceptability of the corrective measures to provide adequate fire suppression capability for the continued protection of the nuclear plant.

3.14.5 Fire Barrier Penetration Fire Seals

3.14.5.1 All penetration fire barriers protecting safety related areas shall be functional when equipment in those areas are required to be operable.

3.14.5.2 With the penetration fire barrier non-functional:

a. The operability of the fire detection systems providing coverage for the fire areas on either side of the penetration shall be verified within one hour.

b. If either of the detection systems are inoperable, a continuous fire watch shall be established on at least one side of the affected penetration within one hour.

BASIS

The functional integrity of the fire barrier penetration seals ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. This design feature minimizes the possibility of a single fire rapidly involving several areas of the facility prior to detection and extinguishment. The fire barrier penetration seals are a passive element in the facility fire protection program and are subject to periodic inspections.

During periods of time when the seals are not functional, verification of fire detection system operability is required to insure that prompt detection capability exists in the vicinity of the penetration barrier. Should an area detection system be inoperable the fire watch will provide the required protection until the seal is restored to functional status.

TABLE 3.14.1

FIRE DETECTION INSTRUMENTATION

Location	Instrumentation	
	Heat	Smoke
Rod Control Room	3	0
South Cable Vault	2	2
North Cable Vault	1	1
Cable Spread Room	2	2
Safeguards Room	2	2
Battery Room	1	1
A Diesel Room	2	0
B Diesel Room	2	0
Emergency Switchgear Room	4	2

TABLE 3.14.2

HOSE STATIONS

Location	Elevation
1. Entrance to Cable Spread Room	242
2. Emergency Bus Room	246
3. Waste Disposal Panel Area	226
4. MCC 10 Area	226
5. Primary Water Pump Area	226
6. Boric Acid Batch Tank Room	246
7. Containment Entrance Area	226
8. Hose House near Intake Structure	226

4.14 FIRE PROTECTION SYSTEM

Applicability:

Applies to periodic testing and surveillance program for Fire Protection System.

Objective:

To verify the ability of the Fire Protection System components to function as required and to prevent system degradation.

Specification:

4.14.1.1 Fire Detection Instrumentation

Each of the fire detectors in the fire detection zones in Table 3.14.1 shall be demonstrated OPERABLE at least once per 6 months by performance of a CHANNEL FUNCTIONAL TEST.

4.14.1.2 The non-supervised circuits between local panels associated with the detector alarms of each of the required fire detection instruments and the main alarm panel shall be demonstrated OPERABLE at least once per month in accordance with approved procedures.

4.14.2 Fire Suppression Water System

The Fire Suppression Water System shall be demonstrated OPERABLE:

a. At least once per month on a STAGGERED TEST BASIS by starting each pump from ambient conditions and operating it for $\geq$ N minutes. Note: N = 15 for the electric motor driven fire pump, and N = 60 for the propane engine driven fire pump.

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

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

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

1. Verifying that each pump develops at least 2500 gpm at a system pressure of 125 psig,

2. Verifying that each high pressure pump starts sequentially from ambient conditions to restore the fire suppression water supply pressure to $\geq$ 125 psig and runs for $\geq$ N minutes while loaded with the fire pump. Note: N = 15 for the electric motor driven fire pump, and N = 60 for the propane engine driven fire pump.

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

4.14.3 CO_2 System

The diesel generator CO_2 system shall be demonstrated OPERABLE:

a. At least once per 6 months by verifying the weight of each high pressure cylinder.

b. At least once per 18 months by verifying the system valves and associated ventilation dampers actuate automatically and manually, as appropriate, to a simulated actuation signal. A brief flow test or equivalent shall be made to verify flow from each nozzle.

4.14.4 Fire Hose Stations

Each fire hose station listed in Section 3.14 shall be verified OPERABLE:

a. At least once per month by visual inspection of the station to assure all equipment is available.

b. At least once per 18 months by removing the hose for inspection and re-racking and replacing all gaskets that are degraded in the couplings.

c. At least once per three years, partially open each hose station valve to verify valve operability and no blockage.

d. At least once per three years hydrotest the hose at each hose station per NFPA 198 except that the test pressure shall be at least 50 psi greater than the maximum zero flow pressure at that station.

4.14.5 Fire Barrier Penetration Seals

4.14.5.1 Penetration fire barriers shall be verified to be functional by a visual inspection:

a. At least once per 18 months, and

b. Prior to declaring a fire penetration seal functional following repairs or maintenance.

4.14.6.1 The fire pump propane engine shall be demonstrated OPERABLE:

a. At least once per month by verifying:

1. The fuel storage tank contains at least 250 gallons of fuel, and

2. See Specification 4.14.2.a.

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

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

2. See Specification 4.14.2.d.2.

4.14.6.2 The fire pump propane engine starting battery bank and charger shall be demonstrated OPERABLE:

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

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

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

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

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

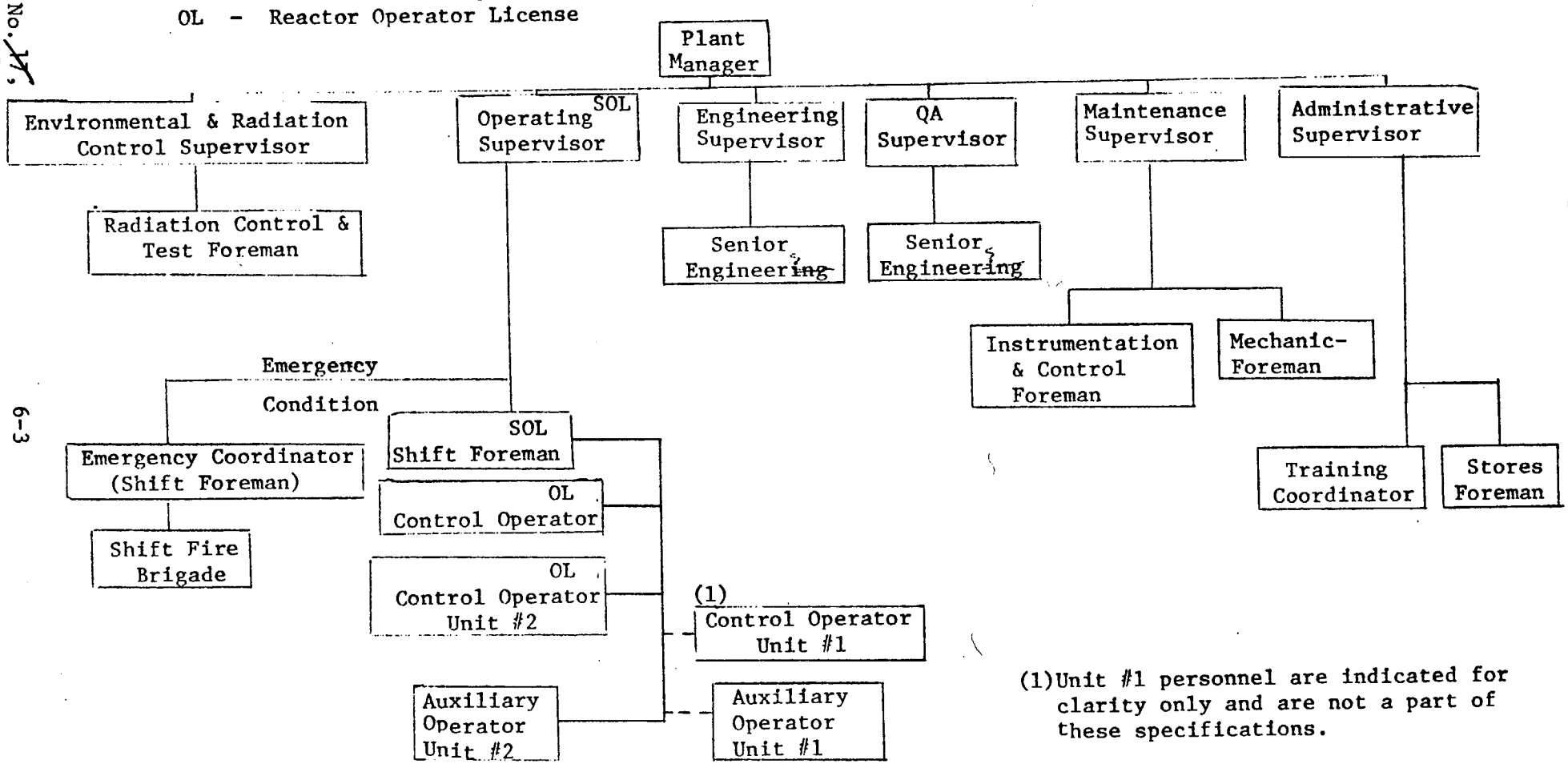
1. The batteries show no visual indication of physical damage or abnormal deterioration, and

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

6.2.2.f. A Plant Fire Brigade of at least 5 members shall be maintained on site at all times. This excludes three members of the minimum shift crew necessary for safe shutdown of the plant and any personnel required for other essential functions during a fire emergency.

CONDUCT OF OPERATIONS CHART

SOL - Senior Reactor Operator License
OL - Reactor Operator License



(1) Unit #1 personnel are indicated for clarity only and are not a part of these specifications.

Figure 6.2-2

6.3 Facility Staff Qualifications

6.3.1 Each member of the facility staff shall meet or exceed ANSI N18.1-1971 with regard to the minimum qualifications for comparable positions.

6.4 Training

6.4.1 A retraining and replacement training program for the facility staff shall be maintained under the direction of the Administrative Supervisor and shall meet or exceed the requirements and recommendations of Section 5.5 of ANSI N18.1-1971 and Appendix "A" of 10 CFR Part 55.

6.4.2 A training program for the Fire Brigade shall be maintained under the direction of the Plant Manager and shall meet or exceed the requirements of Section 27 of the NFPA Code 1975, except that training sessions shall be conducted at least quarterly.

6.5 Review and Audit

Organizational units for the review and audit of plant operations shall be constituted and have the responsibilities and authorities outlined below:

6.5.1 Plant Nuclear Safety Committee (PNSC)

6.5.1.1 Purpose

As an effective means for regular review, evaluation, and maintenance of plant operational safety, a Plant Nuclear Safety Committee (PNSC) has been established. The committee is chaired by the Plant Manager and composed of plant supervisory personnel.

6.5.1.2 Composition

The Plant Nuclear Safety Committee shall be composed of the following:

(a) Chairman: Plant Manager

f. The Security Plan and implementing procedures at least once per two years.

g. The Facility Fire Protection Program and implementing procedures at least once per 24 months.

h. Any other area of facility operation considered appropriate by the Corporate Quality Assurance Audit Section or the Senior Vice President - Power Supply.

6.5.3.2 Responsibility

The Manager - Corporate Quality Assurance Audit is charged with the overall responsibility for the corporate quality assurance audit program as follows:

a. Selects auditors.

b. Has access to records and personnel necessary in performing the audits.

6.5.3.3 Personnel

a. Audit personnel will be independent of the area audited. Selection for auditing assignments is based on experience or training which establishes that their qualifications are commensurate with the complexity or special nature of the activities to be audited. In selecting auditing personnel, consideration will be given to special abilities, specialized technical training, prior pertinent experience, personal characteristics, and education.

b. Qualified outside consultants or other individuals within organizations reporting to the Chief Operating Officer will be used to augment the audit teams when necessary.

6.5.3.4 Reports

Results of audit are approved by the Manager - Corporate Quality Assurance Audit and transmitted directly to the Company Chief Executive Officer and

the Chief Operating Officer as well as to the Senior Vice President - Power Supply, Vice President - System Planning & Coordination, and others as appropriate within 30 days after the completion of the audit.

6.5.3.5 The corporate quality assurance audit program shall be conducted in accordance with written, approved procedures.

6.5.4 Fire Prevention and Loss Prevention

6.5.4.1 An independent fire protection and loss prevention inspection and audit shall be performed annually utilizing either qualified offsite personnel or an outside fire protection firm.

6.5.4.2 An inspection and audit of the fire protection and loss prevention program shall be performed by an outside qualified fire consultant at intervals no greater than three years.

6.6 Reportable Occurrence Action

6.6.1 The following actions shall be taken in the event of a reportable occurrence:

a. The Commission shall be notified and/or a report submitted pursuant to the requirements of Specification 6.9.

b. Each Reportable Occurrence Report shall be submitted to the Manager of Corporate Nuclear Safety and the Manager of Nuclear Generation.

6.7 Safety Limit Violation

6.7.1 The following actions shall be taken in the event a Safety Limit is violated:

a. The provisions of 10CFR50.36(c)(1)(i) shall be complied with immediately.

b. The Safety Limit violation shall be reported to the Commission, the Manager of Nuclear Generation and the Manager of Corporate Nuclear Safety within 24 hours.

c. A Safety Limit Violation Report shall be prepared. The report shall be reviewed by the PNSC. This report shall describe (1) applicable circumstances preceding the violation, (2) the effects of the violation upon facility components, systems of structures, and (3) corrective action taken to prevent recurrence.

d. The Safety Limit Violation Report shall be submitted to the Commission, the Manager of Corporate Nuclear Safety and the Manager, Nuclear Generation within 14 days of the violation.

6.8 Procedures

6.8.1 Written procedures and administrative policies shall be established, implemented and maintained that meet or exceed the requirements and recommendations of Sections 5.1 and 5.3 of ANSI N18.7-1972 and Appendix "A" of USNRC Regulatory Guide 1.33 dated 11/3/72 except as provided in 6.8.2 and 6.8.3 below.

6.8.2 Proposed operating procedures, overall plant operating procedures, system descriptions, emergency procedures, fuel handling procedures, periodic test procedures, procedures for equipment maintenance which may affect nuclear safety, annunciator procedures, Fire Protection Program implementation procedures, and any other procedures determined by the Plant Manager to affect nuclear safety, shall be reviewed by the PNSC and approved by the Plant Manager. Prior to implementation, proposed changes to these procedures must also be reviewed and approved in this manner.

6.8.3 Temporary changes to procedures of 6.8.2 above may be made provided:

a. The intent of the original procedure is not altered.

b. The change is approved by two members of the plant management staff, at least one of whom holds a Senior Reactor Operator's License.

c. The change is documented, reviewed by the PNSC and approved by the Plant Manager within three weeks of implementation.

d.	Inservice Inspection	4.2	After five years of operation
e.	Containment Sample Tendon Surveillance	4.4	Upon completion of the inspection at 5 and 25 years of operation
f.	Post-operational Containment Structural Test	4.4	Upon completion of the test at 3 and 20 years of operation
g.	Fire Protection System	3.14	As specified by limiting condition for operation.

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2

DOCKET NO. 50-261

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1.0 INTRODUCTION

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

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

This report summarizes the results of our evaluation of the fire protection program at Carolina Power and Light Company's H. B. Robinson Steam Electric Plant, Unit 2. The chronology of our evaluation is summarized in Appendix A of this report.

2.0 FIRE PROTECTION GUIDELINES

2.1 Overall Objectives

The overall objectives of the fire protection program in a nuclear power plant are to:

(1) reduce the likelihood of occurrence of fires;

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

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

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

2.2 General Design Criterion 3 - "Fire Protection"

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

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

Guidance on the implementation of General Design Criterion 3 for existing nuclear power plants is provided in Appendix A of Branch Technical Position 9.5-1 "Guidelines for Fire Protection for Nuclear Power Plants." We have used the guidance in Appendix A, where appropriate. We have also evaluated alternatives proposed by the licensee to assure that the overall objectives outlined in Section 2.1 are met for the actual relationship of combustibles, safety-related equipment, and fire protection features.

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 balance of other modifications has been described in an acceptable level of detail.

3.1.1 Fire Dampers

Fire dampers will be added to duct work penetrations in rated fire barriers of 16 different fire areas within the plant (4.9).

3.1.2 Fire Detectors *

Automatic fire detection devices will be added in 18 fire areas within the plant (4.2). Those portions of the existing fire detection system which are not supplied from an emergency power source will be connected to an emergency power source (4.2).

3.1.3 Fire Doors

Fire doors will be upgraded in 18 different fire areas in the plant. Seventeen of these fire doors will be upgraded to 3-hour ratings, the remaining door will be upgraded to 3/4-hour rating (4.9).

3.1.4 Fire Retardant Cable Coating*

Fire retardant coating will be applied to cables located in 13 different fire areas of the plant (4.8).

TABLE 3.1

IMPLEMENTATION DATE FOR LICENSEE PROPOSED MODIFICATIONS

	ITEM	DATE
3.1.1	Fire Dampers	End of 1979 Refueling Outage
3.1.2	Fire Detectors	End of 1979 Refueling Outage
3.1.3	Fire Doors	End of 1979 Refueling Outage
3.1.4	Fire Retardant Cable Coating	End of 1979 Refueling Outage
3.1.5	Carbon Dioxide Extinquishing Systems	End of 1979 Refueling Outage
3.1.6	Automatic Sprinkler System	End of 1979 Refueling Outage
3.1.7	Preaction Sprinkler System	End of 1979 Refueling Outage
3.1.8	Storage of Combustible Materials	February 1978
3.1.9	Halon Extinquishing System	End of 1979 Refueling Outage
3.1.10	Interior Hose Stations	End of 1979 Refueling Outage
3.1.11	Portable Fire Extinguishers	End of 1979 Refueling Outage
3.1.12	Hydrogen Piping	End of 1979 Refueling Outage
3.1.13	Separate Fire Water Connection	End of 1979 Refueling Outage
3.1.14	Self-Contained Breathing Apparatus	End of 1979 Refueling Outage
3.1.15	Fire Fighting Equipment Storage Building	End of 1979 Refueling Outage
3.1.16	Portable Ventilation Equipment	End of 1978
3.1.17	Insulation of Pipes	End of 1979 Refueling Outage
3.1.18	Diesel Generator Room Ventilation Fans	End of 1979 Refueling Outage
3.1.19	Computer Tape Storage Cabinet	End of 1978
3.1.20	Control Room Kitchen	End of 1979 Refueling Outage
3.1.21	Lube Oil Shielding System	End of 1979 Refueling Outage
3.1.22	Sound Powered Telephone Cable	End of 1979 Refueling Outage
3.1.23	Battery Room Ventilation Air Flow Monitor	End of 1979 Refueling Outage
3.1.24	Electrical Cable Penetrations	End of 1979 Refueling Outage
3.1.25	Diesel Generator Fuel Supply	July 1978
3.1.26	Diesel Room Fire Door	End of 1979 Refueling Outage
3.1.27	Diesel Room Floor Drain Backflow Prevention	End of 1979 Refueling Outage

3.1.5 Carbon Dioxide Extinguishing Systems

Automatic carbon dioxide extinguishing systems will be installed in the north and south cable vaults (4.3.2).

3.1.6 Automatic Sprinkler System

An automatic sprinkler system will be installed in the center portion of the lower level auxiliary building hallway (4.3.1).

3.1.7 Preaction Sprinkler System

A preaction sprinkler system will be installed in the Solid Waste Handling Room (4.3.1).

3.1.8 Storage of Combustible Materials

The dry ion exchange resin formerly stored in four safety-related areas of the plant, has been removed and stored in a separate area of the facility where it will present no hazard to safe shutdown. Introduction of dry resin into safety-related areas will be controlled in the future by administrative procedures (5.13.2).

3.1.9 Halon Extinguishing System

Automatic total flooding Halon 1301 extinguishing systems will be installed in the cable spreading room and electrical equipment area (4.3.2).

3.1.10 Interior Hose Stations

Three new interior hose stations will be installed: one serving the pipe alley; one serving the control room and the analog instrument room and one serving the residual heat removal pump pit (5.10.6, 5.20.6, 5.29.6).

The 50-foot lengths of hose at the hose stations nearest to the north cable vault, south cable vault, rod drive power supply room, filter structure of containment exhaust fans and north end of the lower level auxiliary building hallway will be replaced with 100-foot lengths of hose (4.3.1).

Pin-type hose racks will be replaced with hose reels.

3.1.11 Portable Fire Extinguishers*

One 2-1/2 gallon pressurized water portable fire extinguisher will be added in the control room area (4.3.3).

The licensee has committed to provide several large, pressurized water extinguishers in the containment cable penetration area (4.3.3).

3.1.12 Hydrogen Piping

The hydrogen supply piping to the chemical and volume control tank will be rerouted so that it does not pass through safety related areas (5.9.6).

3.1.13 Separate Fire Water Connection

A separate connection will be provided to the fire main loop so that manual hose stations and proposed automatic sprinkler systems will not both be impaired by a single failure. Appropriate isolation valves will be installed (4.3.1).

3.1.14 Self-Contained Breathing Apparatus

Additional air bottles and a charging system will be provided for the self-contained breathing apparatus to meet the requirement of BTP 9.5-1 (4.4).

3.1.15 Fire Fighting Equipment Storage Building

A fire fighting equipment storage building will be provided to house portable lanterns, batteries, air packs, air compressor(s), and other emergency equipment.

3.1.16 Portable Ventilation Equipment

Portable air blowers with flexible ducts will be provided for smoke and heat removal in conjunction with fire fighting efforts (4.4).

3.1.17 Insulation of Pipes *

Three-hour fire rated insulation will be installed on the section of the "A" diesel generator fuel supply line which is routed through the "B" diesel generator room, and the section of "B" diesel service water line which is routed through the "A" diesel generator (5.1.6).

3.1.18 Diesel Generator Room Ventilation Fans

The controls for the diesel generator room ventilation systems will be modified so that flame detectors to be installed in these rooms will deenergize the ventilation supply and exhaust fan in the affected room (5.1).

3.1.19 Computer Tape Storage Cabinet

A more stable mounting will be provided for the metal cabinet located in the control room HVAC equipment room in which are stored paper tapes for the plant process computer (5.16.6).

3.1.20 Control Room Kitchen

Permanent kitchen appliances will be installed in the kitchen area of the control room, in lieu of the temporary equipment presently there. A class "C" fire door and a fire detector will also be installed in the kitchen (5.20.6).

3.1.21 Lube Oil Shielding System*

A lube oil spill protection and control system has been proposed to be installed around each reactor coolant pump motor to prevent contact of lube oil, with hot pump surfaces (5.27.6).

3.1.22 Sound Powered Telephone Cable

The sound powered telephone cable will be relocated to a penetration in the north cable vault to provide physical separation between this cable and the cable serving the public address system.

3.1.23 Battery Room Ventilation Monitoring

Ventilation system supply and exhaust damper positions will be monitored. Combined with the existing ventilation fan status monitor, this will provide the required ventilation air flow monitor (5.14.6).

3.1.24 Electrical Cable Penetrations*

Electrical cable penetrations of fire barriers will be upgraded to provide fire resistance commensurate with that of the barrier (4.9).

3.1.25 Diesel Generator Fuel Supply

The licensee will revise his operating procedure for the diesel generator fuel supply system to provide improved assurance of termination of the fuel supply to a diesel generator which is involved in a fire while the fuel supply to the unaffected diesel is maintained (5.1).

3.1.26 Diesel Room Fire Door

The licensee has committed to provide two ultraviolet type flame detectors in each diesel generator room. These detectors, which are independent of air flow patterns in the room and independent of the Cardox system, will be connected in 1-of-2 logic to release the gravity-operated diesel generator room door upon occurrence of a fire (5.1).

3.1.27 Diesel Room Floor Drain Backflow Prevention

The licensee has committed to install backflow prevention devices in the floor drains of the diesel generator rooms. This will prevent spilled fuel in one diesel generator room from entering the other diesel generator room via the floor drain system (5.1).

3.2 Incomplete Items

Our review of certain items of the licensee's fire protection program is not yet complete. The incomplete items are listed below. In some cases our review is incomplete because additional information is needed from the licensee. The schedule for the licensee's submission of information known to be needed at this time is given in Table 3.2. This schedule has been established such that if our review indicates the need for further modifications, they can be implemented on a schedule consistent with the completion schedule for the modifications listed in Section 3.1. We will address the resolution of these incomplete items in a supplement to this safety evaluation. The sections of the safety evaluation which address these items are noted in parentheses.

3.2.1 Auxiliary Shutdown System

An auxiliary shutdown system, independent of the control room, the cable spreading room, the electrical equipment room and other critical areas will be provided. Our review of the design of this system is not yet complete (4.1).

TABLE 3.2

SUBMITTAL DATES FOR INCOMPLETE ITEMS

	ITEM	DATE
3.2.1	Auxiliary Shutdown System	(a)
3.2.2	Fire Door Supervision	June 30, 1978
3.2.3	Propane Tank and Piping	March 31, 1978
3.2.4	Containment General Area	(a)
3.2.5	Containment Cable Penetration Area	March 31, 1978
3.2.6	Administrative Controls	March 31, 1978
3.2.7	Fire Water System Rupture Analysis	April 28, 1978
3.2.8	Fire Hose Replacement	(a)
3.2.9	Fire Hydrant Cold Weather Protection	April 28, 1978

(a) Staff is reviewing licensee submittal(s). Need for additional information not determined.

3.2.2 Fire Door Supervision

Following completion of the physical security evaluation, any remaining nonsupervised fire doors protecting safety-related areas will be identified and a method proposed for insuring these doors remain closed (4.9).

3.2.3 Propane Tank and Piping

Our evaluation of the licensee's analysis addressing the fire hazard associated with the propane tank supplying the propane engine driven fire water pump has not been completed (5.1).

3.2.4 Containment General Area

Our evaluation of fire protection in the containment general area has not been completed (5.27).

3.2.5 Containment Cable Penetration Area

Our evaluation of fire protection in the containment cable penetration area has not been completed (5.25).

3.2.6 Administrative Controls

Our evaluation of the administrative controls for fire protection has not been completed (6.0).

3.2.7 Fire Water System Rupture Analysis

Our evaluation of the effect of rupture of fire water system piping on safety related systems or components has not been completed (4.3.1.7).

3.2.8 Fire Hose Replacement

Our evaluation of the type of fire hose needed for replacement and new installations has not been completed (4.3.1.4).

3.2.9 Fire Hydrant Cold Weather Protection

Our evaluation of the inspection program needed to protect hydrants against damage due to freezing temperatures and provide early detection of damage due to freezing has not been completed (4.3.1.3).

4.0 EVALUATION OF PLANT FEATURES

4.1 Safe Shutdown Systems

There are several arrangements of safety-related systems, which can be used to shut down the reactor and cool the core during and subsequent to a fire. The exact arrangement available in a fire situation will depend upon the effects of the fire on such systems, their power supplies, and control stations. The general functional requirements for safe shutdown are:

(1) to monitor and control the primary system coolant inventory,

(2) to remove decay heat,

(3) to control reactivity,

(4) to monitor reactor neutron level to assure that subcriticality is maintained, and

(5) to provide auxiliary services required by the components which directly perform these functions.

The systems auxiliaries, and major components required to fulfill these requirements are as follows:

(1) Primary System Coolant Inventory Control

Charging Pump or Safety Injection Pump
Pressurizer Level Instruments
Chemical and Volume Control System Letdown Valves
Pressurizer Pressure Indicator

(2) Decay Heat Removal

Auxiliary Feedwater Pump
Steam Generator Level Indicator
Relief Valves

(3) Reactivity Control

Boric Acid Pumps

(4) Monitor Reactor Neutron Level

Startup Neutron Channel

(5) Auxiliaries

Component Cooling Pump
Service Water Pump
480V AC Electric Power
125V DC Electric Power

The following systems and equipment are provided to then maintain the plant in a safe shutdown condition:

(1) Primary System Coolant Inventory Control

Following a reactor trip, the primary temperature will automatically reduce to the no-load temperature condition as dictated by the steam generator temperature conditions. This reduction in the primary water temperature reduces the primary water volume and if continued pressure control is to be maintained, primary water makeup is required.

The primary system coolant inventory is maintained by controlling the level in the pressurizer. In normal circumstances the chemical and volume control system, which includes the charging pumps, is used for makeup. Water may readily be obtained from normal sources, i.e., the volume control tank. Alternatively, following reactor trip the safety injection pumps and the refueling water storage tank could provide another means of pressurizer level control.

(2) Decay Heat Removal

Following a normal plant shutdown, an automatic steam dump control system bypasses steam to the condenser and maintains the reactor coolant temperature at its no-load value. This implies the continued operation of the steam dump system, condensate circuit, condenser cooling water, feed pumps and steam generator instrumentation. Failure to maintain water supply to the steam generators would result in steam generator dry-out after some 400 seconds and loss of the secondary system for decay heat removal. Redundancy and full protection where necessary are built into the system to ensure the continued operation of the steam generator units. If the automatic steam dump control system is not available, independently controlled relief valves on each steam generator maintain the steam pressure. These relief valves are further backed up by coded safety valves on each steam generator. The steam relief facility is adequately protected by redundancy and local protection. For decay heat removal, it is necessary only to maintain control on one steam generator.

For the continued use of the steam generators for decay heat removal, it is necessary to provide a source of water, a means of delivering

that water and, finally, instrumentation for pressure and level indication. Feedwater may be supplied to the steam generators by the electrical auxiliary feed pumps or by the steam-driven auxiliary feed pump. For control from outside the control room these pumps and associated valves have local controls. Level indication for the individual steam generators is present with one set visible from the auxiliary feedwater pumps and one set visible from the main feed control valves. Pressure indication for individual steam generators is visible from the auxiliary feedwater pumps.

(3) Reactivity Control

Following a normal plant shutdown to hot shutdown condition, soluble poison may be added to the primary system to assure subcriticality. For boron addition, the chemical and volume control system is used. Routine boration requires the use of boric acid transfer pumps with tanks and associated piping. The boric acid transfer pumps supply concentrated boric acid to the charging pumps, which then pump it to the reactor coolant system.

Note that with the reactor held at hot shutdown conditions, boration of the plant is not required immediately after shutdown. The xenon transient does not decay to the equilibrium level until some 10 to 15 hours after shutdown, and a further period would elapse before the reactivity shutdown margin provided by the full length control rods had been cancelled.

(4) Monitor Reactor Neutron Level

A nuclear instrumentation low level (startup) channel is required to monitor core activity during the shutdown condition.

(5) Auxiliaries

For long-term maintenance of safe shutdown conditions, component cooling and service water are also required.

Multiple outside sources of power are available to the plant for both normal operation and shutdown functions. Normal operations utilize both outside and unit-generated power. Separation of these two sources is maintained in the 4160-volt, 480-volt and lower voltage systems. Safety-related plant equipment is arranged electrically so that redundant items receive their power from the two different sources.

A substantial degree of capability for safe shutdown from outside the control room now exists. This includes local control stations for various pumps which provide controls independent of the cable spreading and control rooms. In the event of fire in a critical area such as the control room,

the cable spreading room or the emergency switchgear area, the capability of achieving safe shutdown must be maintained. To assure this capability provisions will be made to enable plant operators to shut down and maintain the plant in a safe condition by means of additional controls and alternative power connections outside the control room.

Modifications will be made to provide:

- 4160- and 480-volt breaker operations to supply power to vital 480-volt buses,
- control stations to operate and supply power to a charging pump, a component cooling pump, a service water pump, and a boric acid pump, from these 480-volt buses,
- operation of the steam-driven auxiliary feed pump by local valve manipulation, and
- additional instrumentation as required.

With a few exceptions, the original plant design was such that redundant safe shutdown components were protected from being damaged by a single fire by spatial separation. As a result of both the licensee's and the staff's review, where redundant components required for the safe shutdown are located in the same fire area and there is insufficient spatial separation to provide reasonable assurance that the redundant components could not be disabled by a single fire, either an alternate system will be provided to perform an equivalent function or an automatic suppression system will be installed to provide a greater degree of assurance that such components will not be disabled by a single fire. Detailed discussion of the arrangement of the safe shutdown system can be found in Section 5 of this report where fire hazards in each specific plant area are evaluated.

We have determined that, subject to the above described modifications, a sufficient number of systems and components will be available to perform the shutdown function following a fire.

4.2 Fire Detection and Signaling Systems

The installed fire detection and signaling system transmits alarm and supervisory signals to two zone indicating units and a fire indicating unit in the electrical equipment room and to the fire alarm box in the analog instrument room. Fire alarm signals at the fire alarm box and zone indicating units show the location of the operating fire detection device. Supervisory alarm signals at the fire alarm box, fire indicating unit and zone indicating unit show the location of the affected area in the event of loss of power, undervoltage, short or open circuits or ground faults. Receipt of an alarm or supervisory signal at the fire alarm box will be indicated visually and audibly in the control room. Some portions of the fire detection system are powered from lighting circuits which are not

connected to plant emergency power. The licensee will connect these portions of the fire detection system to emergency power when the additional detection systems are installed.

At present, 10 ionization type smoke detectors and 15 fixed temperature/rate of rise heat detectors are installed in seven areas of the plant. Except in the north cable vault and the turbine building switchgear room where local alarms are not provided, these detectors alarm locally as well as in the electrical equipment room and the analog instrument room. The analog instrument room also receives signals indicating waterflow in the automatic deluge systems, actuation of the automatic carbon dioxide system, and operation of the fire pumps. A local alarm is also provided at each riser for waterflow in deluge systems, and at the carbon dioxide system.

The plant presently does not have a complete fire detection coverage and some areas containing safety-related systems or open to areas which contain such systems, do not have fire detection systems. To protect these areas, the licensee will provide additonal detectors and detection systems.

Where ionization type smoke detectors are presently installed or are proposed to be installed, the licensee has committed to supply for each area, available manufacturer's test data or certifications confirming that the detectors are appropriate for the types of combustibles likely to be present in that area. In addition, the licensee has committed to audit the installation design for all types of smoke detectors to assure that proper consideration has been given to the effect of room geometry and air flow patterns per NFPA 72E. We will request the licensee to furnish us with a report of the audit describing the audit procedure, the installation criteria and the results of the audit. If our review of the licensee's submittals indicates the need for modifications, we will act to ensure prompt implementation of the needed modifications.

We find that, subject to implementation of the above described modifications, the fire detection system satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

4.3.1 Water Systems

4.3.1.1 Water Supply

Fire water is obtained directly from Lake Robinson via a single intake structure. Two physically separated automatic fire pumps are provided with separate suction lines.

In the unlikely event that blockage of the intake structure should occur, the licensee could open the isolation valves connecting the Unit No. 1 fire loop with the Unit No. 2 fire loop. The Unit No. 1 fire loop is supplied from a separate intake structure on Lake Robinson, with separate automatic fire pumps. The Unit 1 fire pumps are more than 50 feet from the Unit No. 2 fire pumps. The distance between the connections to the Unit No. 2 fire loop from the Unit No. 2 intake structure line, and the connection from the Unit No. 1 fire loop is approximately 150 ft. If required, an offsite fire department could pump water from the discharge canal into the fire loop; a suitable adapter coupling is provided in the nearest hose house for connection between the pumper and the fire hydrant.

We find that the water supply satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

4.3.1.2 Fire Pumps

Two vertical shaft centrifugal fire pumps are provided, each with a design capacity of 2,500 gallons per minute at a 290 ft. head (125 pounds per square inch, gauge). One of the pumps is propane engine driven, supplied by a five hundred gallon capacity horizontal propane tank, located near the intake structure. The second pump is electric motor driven, supplied with power from 480 volt bus No. 3, which is powered by the startup transformer. An automatic bus transfer would shift the load to the auxiliary transformer on loss of the startup transformer. The propane engine driven fire pump is located on the east side of the Intake Structure, and the motor driven fire pump is located on the west side of the Intake Structure.

An automatic electric jockey pump maintains the pressure in the fire water piping system when the system is not in use. Both the fire pumps are arranged to start automatically when the pressure in the fire water system decreases. The electric pump starts at 100 pounds per square inch gauge and the propane driven pump starts at 90 pounds per square inch gauge. Both pumps can be manually controlled at the Intake Structure. The electric motor-driven pump can also be controlled from the analog instrument room.

The licensee has provided his evaluation of the hazards associated with the fuel supply for the propane engine driven fire pump. He has also committed to install additional physical protection for the fuel supply line and an automatic fuel shutoff valve at the propane tank in accordance with NFPA 37 and NFPA 58. The staff's conclusions with respect to this subject will be presented in a supplement to this evaluation.

4.3.1.3 Fire Water Piping System

The two fire pumps have a common discharge through a twelve inch underground main into a ten-inch underground fire water loop which encircles the plant.

All yard fire hydrants, automatic water suppression systems and interior fire hose lines are supplied by the fire loop. Sectionalizing valves of the post indicator type are provided on the fire loop to permit partial pipeline isolation without interruption of service to the entire system. The licensee will install isolation valves at the connection of the ten inch fire line from the Unit 1 fire loop to the Unit 2 fire loop, and provide separate headers for automatic sprinkler systems to be installed in the reactor auxiliary building. The licensee will also provide barriers around all fire hydrants and post indicator valves to protect against vehicular damage.

Electrical supervision, to monitor the position of fire water system control valves, is not provided. A means of sealing these valves open will be provided, and this in combination with administrative controls and periodic inspections will be used to assure that valves are maintained open.

Five yard fire hydrants are provided at approximately 50 foot intervals around the exterior of the plant except at the north end of the plant, where the distance between hydrants is somewhat larger. A hose house located near each fire hydrant contains 2-1/2 inch diameter fire hose and other manual firefighting tools. A sixth hose house is centrally located between the reactor and Turbine Building, a seventh is located at the intake structure, and one hose house is located outside the Unit 2 fence east of the auxiliary building. Standard fire hose threads are used on all fire protection equipment, and the threads are compatible with those used by the local public fire departments.

We find that, subject to the implementation of the above described modifications, the fire water piping systems satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

Our evaluation of the inspection program needed to protect hydrants against damage due to freezing temperatures and to provide early detection of damage due to freezing has not been completed. Similarly, our evaluation of the type of fire hose needed for replacement of presently defective hose and for new installations has also not been completed. Our conclusions with respect to these issues will be presented in a supplement to this evaluation.

4.3.1.4 Interior Fire Hose Stations

A total of 24 interior hose stations, each presently equipped with 50 feet of 1-1/2 inch diameter hose, have been provided throughout all portions of the plant except containment. There are presently several safety-related areas containing combustible materials that are beyond the reach of the existing hose lines. The licensee will provide additional hose stations or additional lengths of hose at existing stations so that sufficient hose reach is provided to protect all the areas of the auxiliary building.

Hose racks originally used for unlined hose are being used to store rubber lined hose. The licensee has committed to replace these with suitable hose reels or hose racks designed and sized for lined hose.

The nozzles on the interior hose lines are 1-1/2" spray nozzles. In areas with electrical hazards, "electrically safe" hose nozzles have been provided on the hose station nearest these areas.

We find that, subject to the implementation of the above described modifications, the interior fire hose stations satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

Our evaluation of the type of fire hose needed for replacement of presently defective hose and for new installations has not been completed. Our conclusions with respect to this subject will be presented in a supplement to this evaluation.

4.3.1.5 Automatic Sprinkler Systems

Four automatic deluge systems are provided for nonsafety-related high fire hazard areas. These areas are the outside oil-filled main transformers; the unit auxiliary and start up transformers; the turbine lube oil purification and storage area; and the hydrogen seal oil unit and hydrogen manifold area. These deluge systems are actuated by pneumatic rate of rise fire detection devices.

Preaction sprinker stems will be installed in the uxiliary Building lower hallway (in the vicinity of the air compressors), and in the solid waste handling room. The systems will include appropriate air pressure monitoring and regulating components, and water flow alarms. Systems materials, components and design features including spacing of sprinkler heads will be in accordance with NFPA 13.

We find that subject to the implementation of the above described modifications, the design of the automatic water suppression systems satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.3.1.6 Foam

The plant maintains no foam fire fighting equipment.

4.3.1.7 Effects of Suppression System on Safety Systems

The licensee has indicated that inadvertent operation of existing or proposed water suppression systems will not adversely affect safety-related equipment. Water suppression systems are not provided or proposed for the cable spreading room, the control room and the electrical equipment area which could be affected by a water spray. The licensee will provide an auxiliary shutdown system with electric power and control independent of these areas.

There are no safety-related systems which are disabled by actuation of a fire protection system by direct interlock.

We find that, subject to the implementation of the above described modifications, the protection from inadvertant or required operation of a suppression system satisfies the objectives identified in Section 2.1 and is, therefore, acceptable.

Our evaluation of the effect of rupture of fire water system piping on safety related systems or components has not been completed. Our conclusions with respect to this subject will be presented in a supplement to this evaluation.

4.3.2 Gas Fire Suppression Systems

A total flooding carbon dioxide system protects the diesel generator rooms. The system is actuated by pneumatic heat actuated devices and is not dependent upon electric power. The system can also be manually actuated, either at the cylinder bank or from a remote location. Actuation of ultraviolet type flame detectors (to be installed) will operate a release which will allow the diesel generator room sliding fire door to close under the force of gravity.

The licensee will modify the room ventilation system to close both the room intake and exhaust ventilation dampers and to automatically secure the room supply and exhaust ventilation fans on actuation of either one of the two flame detectors to be installed in each diesel generator room.

To provide additional fire protection capability in the cable vaults, a carbon dioxide extinguishing system will be installed. The carbon dioxide system will be total flooding and meet the applicable requirements of NFPA 12. In each cable vault, a distribution system will be provided. The system will be designed to preclude direct discharge of carbon dioxide

on cables, cable trays or equipment. Operation of the system will be initiated automatically by cross-zoned fire detectors. Manual actuation will be provided for each cable vault immediately outside the area. Automatic fire dampers in all ventilation penetrations of these areas will be supplied and all dampers in either cable vault will be closed automatically upon initiation of a fire alarm signal in that cable vault.

To provide additional fire protection capability in the cable spreading room and electrical equipment room, Halon 1301 extinguishing systems will be installed in each room. The Halon systems will be total flooding and will be designed in accordance with the applicable requirements of NFPA 12A. Operation of the system shall be initiated automatically by cross zoned fire detectors. In addition, manual actuation will be provided for each area immediately outside the area. Automatic fire dampers in all ventilation penetrations of these areas will be supplied and all dampers in either room will be closed automatically upon initiation of two fire alarm signals for that area.

We find that, subject to the implementation of the above described modifications the gas suppression systems satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.3.3 Portable Fire Extinguishers

Both hand held and wheeled dry chemical and carbon dioxide portable fire extinguishers are provided throughout the plant in accordance with the guidelines contained in NFPA 10.

The licensee will install large, pressurized water and/or foam extinguishers in the containment for additional fire protection. The licensee will also install a 2-1/2 gallon, portable water extinguisher in the control room.

We find that the portable fire extinguishers satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.4 Ventilation Systems and Breathing Equipment

Ventilation systems are provided for all plant areas except the turbine-generator area, which is located out-of-doors. These ventilation systems are, however, neither designed nor constructed to remove smoke and heat in the event of a fire. In most plant areas where the ventilation duct penetrates the fire barrier, fusible link fire dampers are to be provided. There are no provisions to reopen these dampers, once automatically closed to allow smoke venting via the ventilation system. In the other areas where automatic gas systems are either currently installed or proposed, the dampers will be modified to be closed automatically by motor-operators with the actuation of the gas system.

Portable air handling units, consisting of fire service smoke ejectors and flexible ducting, will be provided for smoke and heat removal.

Ten self-contained breathing units, with one spare bottle for each unit, have been provided at the facility, dedicated for emergency use. Of the ten units, two are stored in the control room and the remainder at the entrance to the auxiliary building. Additional bottles of air, and a recharging system, will be provided to conform with the requirement of Appendix A to BTP 9.5-1.

We find that subject to the implementation of the above described modifications the breathing air units and portable ventilation equipment will conform to the provisions of Appendix A to BTP 9.5-1 and are, therefore, acceptable.

4.5 Floor Drains

Floor drains have been provided in areas protected by automatic water suppression systems. Drains are also provided in all areas where manual hoses are likely to be used, with the exception of the control room, the cable spreading room and the electrical equipment room. In these areas, fire water will be drained out through the door openings.

In areas where large quantities of combustible liquids are stored, floor drains are available to remove possible leakage and/or spill of the liquid. None of these drains are equipped with back flow valves. However, all drains except those in the diesel generator rooms are in nonsafety-related areas. Drains from diesel generator rooms are connected into a single line before being routed outdoors to a storm drain. The licensee has committed to install backflow prevention devices in the diesel generator room drains to prevent a possible backflow of flammable liquids from one diesel generator room to the other via the drain system.

We find that subject to the implementation of the above described modification the floor drain systems will conform to the provisions of Appendix A to BTP 9.5-1 and are, therefore, acceptable.

4.6 Lighting System

In addition to the normal plant lighting, emergency lighting is provided by the station d.c. power. Because the plant lighting systems are divided into a number of circuits, a fire in an area could cause loss of both normal and emergency lighting in the fire area, but would not cause loss of lighting to areas served by other circuits.

A number of battery-operated portable lanterns are stored in the control room and the auxiliary building; these lanterns are dedicated for emergency use and are sufficient in number for the fire brigade.

We find that the emergency lighting provided for both the operating personnel and the fire brigade is sufficient to deal with emergency conditions.

4.7 Communication Systems

Communication within the plant is provided by two systems - a five station public address (PA) system and a sound powered telephone system. Portable radio transceivers are also provided for emergency use, capable of operating in all areas of the plant, except containment.

Currently the PA and sound powered phone systems enter containment through the same penetration. The licensee has committed to relocate the sound powered phone system to another penetration to provide physical separation between these redundant systems.

We find that, subject to the implementation of the above described modification, there is reasonable assurance that in the event of a fire, communications can be maintained as necessary to coordinate fire fighting and essential plant operations.

4.8 Electrical Cables

In the plant areas outside the containment, cable jacket and insulation material is polyvinyl chloride. Inside the containment, cable insulation is silicone rubber. The flame test standard for cables IEEE 383 was not in effect at the time electrical cables were purchased and installed at H. B. Robinson. Cables in critical areas, inside and outside containment will be coated with a flame retardant coating. Detailed discussion of these areas can be found in Section 5.0 of this report.

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. Both Class A and Class B fire doors have been provided as well as some unrated doors in fire barriers. The licensee has proposed to upgrade doors in fire barriers such that the fire rating of the doors will be commensurate with the requirements of the fire area involved. Electrical supervision will be provided to assure that certain fire doors are kept closed, as part of the plant's security plan.

A list of nonsupervised fire doors protecting safety-related areas will be submitted following the evaluation of the physical security program. The licensee will also submit his proposed method for assuring these doors remain closed. We will address the acceptability of such measures in a supplement to this report.

Ventilation openings in fire barriers exist without rated fire damper protection. The licensee will install three hour fire rated dampers unless a lesser rating is appropriate for a specific lesser rated fire barrier.

The licensee will modify or replace cable penetration fire barriers that do not have an appropriate fire rating as demonstrated by testing of that design, with barriers having a design that has been tested and shown to have the required fire rating. The licensee has stated that test data supporting the acceptability of the upgraded cable penetrations will not be available before June 1978. We will review this data when it is available.

We find that, subject to the implementation of the above described modifications, the fire barrier penetrations will conform to the provisions of Appendix A to BTP 9.5-1 and are, therefore, acceptable.

4.10 Separation Criteria

Design and construction of H. B. Robinson Unit 2 predates development of current industry standards on physical separation. In certain areas of the plant, separation of cables is insufficient to provide reasonable assurance of continued operability of one train of redundant safety-related systems as a result of a single postulated fire.

A safe shutdown capability will be preserved in the event of a fire by: (1) providing an auxiliary shutdown capability independent of areas where a single fire could involve both divisions of safety-related cables; (2) installation of a total flooding automatic Halon system in the cable spreading room and electrical equipment area, and (3) applying a flame retardant coating to the cables in these two rooms and other safety-related areas of the plant. A detailed description of these provisions is given in Section 5.0 of this report.

Details of the auxiliary shutdown system design are being provided by the licensee. We will report on the results of our review on the acceptability of such system design in a supplement to this report.

4.11 Fire Barriers

Plant fire areas have been established such that the area is either enclosed or bounded by adequate space that is free of combustibles to prevent the spread of fire to other areas. Most areas inside the Auxiliary Building have enclosing floors, walls, and ceilings of sufficient thickness to provide a fire resistance rating of three hours or more.

Where barriers of less than three-hour rating were determined to be acceptable, their acceptability was based on other protective features; location, combustible loading and/or consequence of a fire on plant operation and shutdown capability.

4.12 Access and Egress

All safety-related areas except the containment are reasonably accessible for manual fire fighting. Escape and access routes, clearly marked, are provided by stairways internal and external to the Auxiliary and Turbine Buildings.

During a normal operation, the containment is sealed; access is provided through an interlocked double-door personnel air-lock. Special procedures must be followed to gain access, increasing the response time of the fire brigade. The acceptability of the fire protection program inside containment will be addressed in a supplement to this Safety Evaluation.

4.13 Toxic and Corrosive Combustion Products

The products of combustion of many plastic materials, including cable insulation and jacket materials, are toxic to humans and corrosive to metals. Prompt fire detection and extinguishment are relied upon to minimize the quantities of such products. Additional means of smoke removal will be provided as noted in Section 4.4. The fire brigade is provided with, and trained in the use of emergency breathing apparatus for fighting fires involving such materials.

We find that the precautions taken to minimize the effects of toxic and corrosive products satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.14 Nonsafety-Related Areas

We have evaluated the distance or fire barrier which separates areas not containing safety-related equipment from adjoining safety-related areas and conclude that a fire in such areas will not adversely affect the ability to safely shut down the plant. The basis for this conclusion is presented in Section 5 of this report, in the discussion of the various fire areas.

4.15 Instrument Air

Systems in the plant which have pneumatic instruments and controls that may be required for safe shutdown depending on the location of a postulated fire, are the chemical and volume control system, the safety injection system and the feedwater system.

The licensee has evaluated the effects of a fire induced loss of the air supply to these systems. The results of this evaluation have determined that such an event would not cause transients more severe than those that have been analyzed in the FSAR, and would not affect the recovery from the transient or prevent safe shutdown.

5.0 EVALUATION OF SPECIFIC PLANT AREAS

5.1 Diesel Generator Rooms (Fire Areas No. 1 and No. 2)

5.1.1 Safety-Related Equipment

Each of the two redundant diesel generator rooms contains a diesel generator unit along with associated safety-related control panels, cabling, and fuel oil day tank.

5.1.2 Combustibles

Combustibles in the areas include diesel-generator lubricating oil, diesel fuel oil, and electrical cable insulation.

5.1.3 Consequences of No Fire Suppression

An unsuppressed fire in one diesel generator would cause loss of availability of one of the redundant divisions of safety-related equipment if normal a.c. power sources were not available. The cooling water supply line and the day tank fuel oil makeup supply line are common to both diesel generator rooms; drain lines for both diesel generator rooms extend to a common header without traps or backflow (check) valves. With this present arrangement of diesel auxiliaries a fire in either diesel generator room could cause loss of both diesel generators.

5.1.4 Fire Protection Systems

A total flooding CO_2 system, actuated automatically by two pneumatic actuated heat detectors in each room, has been provided as the primary means of fire suppression in each room. Local predischarge alarm, automatic door closure, automatic fuel oil shutoff and annunciation in the control room are provided. Two dry chemical, type BC portable extinguishers and a manual hose station are available as backup.

5.1.5 Adequacy of Fire Protection

The total flooding carbon dioxide suppression system should be adequate to extinguish a fire in this area, provided the design concentration of carbon dioxide is maintained for a sufficient period of time to permit the temperature of heated materials to fall below the ignition temperature of the combustibles; however, continued operation of the ventilation system will dilute the concentration of carbon dioxide and reduce its effectiveness. The type and location of existing detectors may not afford prompt detection and consequently delay closing of the sliding fire door to the room which provides isolation from the redundant diesel generator.

The present arrangement and separation of diesel generator auxiliaries including the automatic door operators, cooling water supply, fuel oil

makeup, and floor drain system does not insure that the fire will not affect both redundant divisions.

5.1.6 Modifications

The licensee has proposed to modify this area as follows:

(1) Insulate the portion of the fuel oil makeup line to the "A" diesel generator which is located in the "B" room and those portions of the service water lines to the "B" diesel generator which are in the "A" room to provide three-hour protection for these lines.

(2) Provide two ultraviolet type flame detectors connected in 1-of-2 logic for each diesel generator room. These are in addition to the existing heat detectors.

(3) Modify the controls for the room ventilation systems and dampers so that these systems are shutdown and the dampers closed upon detection of a fire by one of the UV flame detectors in the room.

(4) Modify the controls for the normally open gravity-powered sliding door for each room so that it is released to close upon detection of a fire by one of the UV flame detectors in the room.

(5) Modify the valve alignment in the diesel fuel supply system to improve the assurance that the fuel supply to a diesel generator room experiencing a fire will be terminated.

(6) Install a smoke seal in the bus bar penetrations in the diesel generator room walls. Although the seal will not have a defined fire rating it will consist of fire resistant material similar to that employed in cable penetration seals.

(7) Install backflow prevention devices in the floor drains.

With regard to item 6, above, although we would prefer a smoke seal with a defined fire rating, the licensee has been unable to obtain a unit which meets both the extended fire resistance and electrical requirements of such a seal. Inasmuch as the principal purpose of the seal is to prevent excessive loss of the CO_2 extinguishing agent so that the fire can be promptly extinguished, we conclude that an unrated seal with basic fire resistant properties is acceptable.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.2 Safety Injection Pump Room (Fire Area No. 3)

5.2.1 Safety-Related Equipment

The safety-related equipment in this area includes the containment spray pumps, and the safety injection pumps.

5.2.2 Combustibles

The combustibles in this area are limited to cable insulation and lube oil. Lube oil contained in the pumps is less than 10 gallons total.

5.2.3 Consequences of No Fire Suppression

A fire in this area could cause the loss of one or more pumps. These pumps, however, are not required for safe shutdown. An unsuppressed fire in this area could also spread into adjacent safety-related areas.

5.2.4 Fire Protection Systems

Portable extinguishers and hose stations in the adjacent hallway are available for manual fire fighting.

5.2.5 Adequacy of Fire Protection

Because of the limited amount of combustibles in this area, manual suppression would be adequate to suppress a fire. The existing protection, however, is inadequate to prevent spread of a fire into the auxiliary building ground level hallway.

5.2.6 Modifications

The licensee has proposed the following modifications. A combination of heat and smoke detectors will be provided in this room. A three-hour rated fire barrier with a fire door will be provided to separate this room from the ground level auxiliary building hallway. Fusible link operated fire dampers will be provided in ventilation duct penetrations. A flame retardant coating will be applied to the electrical cables in this room.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisifes the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.3 Charging Pump Room (Fire Area No. 4)

5.3.1 Safety-Related Equipment

This area contains safety-related electrical cables and pumps for both divisions of the charging system.

5.3.2 Combustibles

The major combustible loading in this area is lubricating oil: approximately 40 gallons of oil are contained in each of the three charging pumps.

5.3.3 Consequences of No Fire Suppression

A fire in the charging pump room could result in the loss of both divisions of the charging system. This could preclude initial makeup of primary coolant until system pressure had been reduced below the shutoff head of the safety injection pumps. After this pressure had been reached, the safety injection pumps could be used to maintain an adequate inventory.

5.3.4 Fire Protection Systems

A manual hose station is provided in the hallway outside of the room.

5.3.5 Adequacy of Fire Protection

Manual suppression would be adequate to suppress a fire in this room, although lack of detection would allow the fire to continue unnecessarily and possibly damage more than one pump.

5.3.6 Modifications

The licensee has proposed the following modifications. Automatic heat and smoke detectors will be provided in this area, and a three-hour rated fire door will be installed at the entrance to the area from the hallway.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.4 Component Cooling Water Pump Room (Fire Area No. 5)

5.4.1 Safety-Related Equipment

This room houses three component cooling pumps, two component cooling heat exchangers, the boric acid tanks and two boric acid transfer pumps. At least one component cooling pump and one component cooling heat exchanger are required for safe shutdown.

5.4.2 Combustibles

Combustibles in this area include cable insulation, various plant supplies and transient combustibles including alcohol used for cleaning and decontamination of tools and equipment.

5.4.3 Consequence of No Fire Suppression

Good spatial separation is provided between the three divisions of component cooling pumps and the associated cables. However, because this room is used as a work and storage area, stored and transient combustibles provide pathways for the spread of fire between redundant divisions. Therefore, physical separation between redundant divisions of equipment and electrical cables does not assure that the fire damage would be limited to a single division.

5.4.4 Fire Protection Systems

Portable extinguishers and a manual hose station are available in the hallway adjacent to the room.

5.4.5 Adequacy of Fire Protection

Manual suppression would be inadequate to control a fire because of the high concentration of stored combustibles and of the safety significance of the equipment located in this area.

5.4.6 **Modifications**

The licensee has proposed the following modifications. A combination of smoke and heat detectors will be installed in this area, a flame retardant coating will be applied to electric cables, a three-hour rated fire door will be provided and fire dampers will be installed in ventilation duct penetrations. The licensee has also committed to include explicit provisions in his Administrative Procedures which will prohibit the use of this area as a storage area for combustibles or as a work area, except for work on systems installed in this area. In addition, the licensee will provide an auxiliary safe shutdown system. Our review of this system will include evaluation of the capability of providing safe shutdown independent of the pumps located in this area. If such a capability is concluded to be not feasible, the need for an enhanced fire suppression capability in the Component Cooling Pump Room will be determined.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.5 Hot Chemical Laboratory and Counting Room (Fire Area No. 6)

5.5.1 Safety-Related Equipment

None.

5.5.2 Combustibles

Miscellaneous laboratory chemicals and supplies.

5.5.3 Consequences of No Fire Suppression

A fire in this area could spread to adjacent fire areas containing redundant divisions of safety-related cables.

5.5.4 Fire Protection Systems

Portable extinguishers and a manual hose station, located in the adjacent hallway, are available for fire fighting.

5.5.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to confine a fire and preclude possible significant damage to redundant divisions of safety-related cables in the adjacent fire areas.

5.5.6 Modifications

The licensee has proposed the following modifications. Automatic fire detection and a fire door will be installed in this area. In addition, appropriately rated fire dampers will be installed in the ventilation ducts.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.6 Auxiliary Feedwater Pump Room (Fire Area No. 7)

5.6.1 Safety-Related Equipment

Two motor-driven auxiliary feedwater pumps with associated valves and electrical cable are located in this fire area.

5.6.2 Combustibles

Combustibles in the area include small amounts of lube oil and cable insulation.

5.6.3 Consequence of No Fire Suppression

A postulated fire in this area could spread to adjacent fire areas containing redundant divisions of safety-related cables.

5.6.4 Fire Protection System

The area is provided with a high temperature alarm which would alert the plant operators. A hose station, located in the adjacent hallway, is available for manual fire fighting in the area.

5.6.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to confine a fire and preclude possible significant damage to redundant divisions of safety-related cables in the adjacent fire areas.

5.6.6 Modifications

The licensee has proposed the following modifications. Automatic fire detection will be added to this room and the existing fire doors will be replaced with doors having a three-hour rating. A flame retardant coating will be applied to the electrical cables in this room, and appropriately rated fire dampers will be installed in the ventilation penetrations.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.7 Cable Vaults (Fire Areas No. 9 and No. 34)

5.7.1 Safety-Related Equipment

Safety-related components in the area are safety-related cables and the reactor trip switchgear.

5.7.2 Combustibles

Combustibles in these areas consist of cable insulation.

5.7.3 Consequences of No Fire Suppression

Containment penetrations for redundant cables of the reactor protection system and the engineered safeguard system are separated by division in the north and the south cable vaults. Because of an inadequate fire rating for the door between these two areas, a fire in either area could result in a loss of one or both divisions of safety-related equipment in containment.

5.7.4 Fire Protection Systems

Two heat and two smoke detectors provide automatic fire detection in the area, which initiates a local alarm and an alarm-annunciation in the control room. A portable CO_2 extinguisher and a hose station are available for manual fire fighting.

5.7.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to prevent significant damage to the cables in these areas.

5.7.6 Modifications and Recommendations

The licensee has proposed the following modifications. A total flooding automatic carbon dioxide extinguishing system will be installed in each cable vault, the existing fire doors will be replaced with three-hour rated fire doors and flame retardant coating will be applied to electrical cables in these areas.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.8 Auxiliary Building Hallway, Lower Level (Fire Area 10A, 10B and 10C)

5.8.1 Safety-Related Equipment

This area contains safety-related cables from both redundant electrical divisions and safety-related motor control centers.

5.8.2 Combustibles

Combustibles in this area consist of cable insulation, lube oil for air compressors, and hydrogen supply piping to the chemical and volume control tank, and transient combustibles.

5.8.3 Consequences of No Fire Suppression

Because of limited physical separation in some locations in the hallway (as little as three feet), an unsuppressed fire could damage cables of both electrical divisions.

5.8.4 Fire Protection Systems

Portable extinguishers and hose stations are available for manual fire fighting in the area.

5.8.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to control a fire and prevent damage to redundant equipment.

5.8.6 Modifications

The licensee has proposed the following modifications. Hydrogen piping will be rerouted out of this area and an automatic fire detection system will be installed. Flame retardant coating will be applied to the cables in this hallway and a sprinkler system will be installed to protect the area near the service water booster pumps and air compressors. The licensee will also provide an auxiliary shutdown system with equipment and electrical cable independent of this area.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.9 Demineralizer Room, Waste Evaporator Equipment Room, Nonregenerative Heat Exchanger Room, Pipe Alley, and Waste Hold Tank Room (Fire Areas 10D Through 10H and 14)

5.9.1 Safety-Related Equipment

Safety-related equipment in these areas are the Residual Heat Exchangers in Fire Zone 10H.

5.9.2 Combustibles

There is no significant quantity of combustibles in these areas except in Fire Area 10G where there is cable insulation and some clothing stored in metal drums.

5.9.3 Consequences of No Fire Suppression

An unsuppressed fire in Fire Area 10D through 10F will have no effect on safe shutdown, however, a well developed fire involving the combustible material in Fire Zone 10G would fill the adjacent safety-related areas with a large quantity of heat and smoke, and possibly damage safety-related cables in these areas.

5.9.4 Fire Protection Systems

Portable extinguishers and manual hoses are available for fire fighting in these areas.

5.9.5 Adequacy of Fire Protection

Manual suppression would be adequate to suppress a fire in any of these areas. Lack of a fire barrier between Fire Zone 10G and the balance of the auxiliary building would not be acceptable with a high combustible loading in this areas, because of the possibility of damaging safety-related equipment in the adjacent areas.

5.9.6 Modification

The licensee has proposed the following modifications. A new hose station will be provided at the center of the pipe alley. Fire dampers will be installed in the ventilation duct in the demineralizer room, nonregenerative heat exchanger room, pipe alley, and waste holdup tank room. A three-hour rated fire door will also be added to the waste holdup tank room. In addition, the licensee has committed to include explicit provisions in his Administrative Procedures which will prohibit storage of combustibles in Fire Area 10G.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.10 Auxiliary Building Entrance Area (Fire Area No. 11)

5.10.1 Safety-Related Equipment

None

5.10.2 Combustibles

Clothing stored in the area constitutes the majority of the combustibles. Some wood shelves are also located in the area.

5.10.3 Consequences of No Fire Suppression

An unsuppressed fire in this area could spread into adjacent areas of the auxiliary building thereby possibly involving one or both divisions of redundant safety-related equipment.

5.10.4 Fire Protection Systems

Portable extinguishers and a hose station are available for manual fire fighting.

5.10.5 Adequacy of Fire Protection

Manual suppression would be adequate to suppress fire in this area. Fire doors in the area are inadequate to prevent a fire in this area from spreading to nearby safety-related areas.

5.10.6 Modifications

The licensee has proposed the following modifications. A three-hour rated fire door will be added to separate this area from areas in the ground level auxiliary building containing safety-related equipment. Doors leading into upper levels of the building from a stairwell in this area will be upgraded to a three-hour fire rating.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.11 Solid Waste Handling Room (Fire Area No. 13)

5.11.1 Safety-Related Equipment

None.

5.11.2 Combustibles

Miscellaneous clothing and papers.

5.11.3 Consequences of No Fire Suppression

An unsuppressed fire in the area could disperse radioactive material into the ventilation system.

5.11.4 Fire Protection Systems

Portable extinguishers and hose stations located outside the area are available for manual fire fighting.

5.11.5 Adequacy of Fire Protection

Manual suppression may not be adequate to prevent a fire in this area from releasing radioactive materials into the ventilation system.

5.11.6 Modifications

The licensee has proposed the following modifications. A preaction sprinkler system actuated by a combination of smoke and heat detectors will be installed in the area. The licensee will also install a three-hour rated fire door, and install fire dampers in the ventilating system.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.12 Auxiliary Building Hallway, Upper Level (Fire Areas 14A through 14G except 14D)

5.12.1 Safety-Related Equipment

Redundant divisions of safety related cables are routed along the sides of the hallway with a spatial separation of a minimum of three feet. Other equipment in the area are the volume control tank, the waste gas system, the containment purge and hydrogen control systems and the auxiliary building ventilation system.

5.12.2 Combustibles

Combustibles in this area include cable insulation and charcoal in the filters.

5.12.3 Consequences of No Fire Suppression

Both divisions of redundant safety-related cables could be damaged by an unsuppressed fire in this area, thereby possibly precluding safe shutdown. Loss of other equipment in the area will not affect the safe shutdown of the plant.

5.12.4 Fire Protection Systems

Portable extinguishers and hose stations are available for manual fire fighting.

5.12.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to control fires and prevent damage to redundant equipment.

5.12.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed in the hallway, electrical cables in the hallway area will be coated with a flame retardant coating and an auxiliary shutdown system with equipment and electrical cabling independent of this fire area will be installed.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.13 Chemical Storage Area, Boric Acid Batching Tank (Fire Area No. 14D)

5.13.1 Safety-Related Equipment

There is no safety-related equipment in this area.

5.13.2 Combustibles

An insignificant quantity of combustibles is located in this area, consisting of maintenance equipment and supplies.

5.13.3 Consequences of No Fire Suppression

Loss of the equipment in this area would have no impact on the safe shutdown of the plant. However, the absence of a rated fire door might allow a fire to spread to adjacent areas containing safety related equipment.

5.13.4 Fire Protection Systems

Manual hose and portable extinguishers are available for manual fire fighting.

5.13.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to contain a fire and prevent possible damage to redundant safety related equipment adjacent to this area.

5.13.6 Modification

The licensee will provide a three-hour rated fire door and install fusible link fire dampers in the ventilation ducts to separate the area from adjacent safety-related areas by a three-hour barrier.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.14 Station Battery Room (Fire Area No. 15)

5.14.1 Safety-Related Equipment

Both divisions of the d.c. power system, including battery chargers, are located in this room, with the batteries of the two divisions separated by a missile barrier approximately five feet high.

5.14.2 Combustibles

Combustibles in the room consist of plastic battery cases and electrical insulation. A combustible hydrogen concentration could develop if there was an extended interruption of the ventilation system.

5.14.3 Consequences of No Fire Suppression

An unsuppressed fire in the room could affect redundant divisions of the safety-related d.c. power system.

5.14.4 Fire Protection Systems

A portable CO_2 extinguisher and the hose station in a nearby area are available for manual fire fighting. One heat and one smoke detector are installed in the area.

5.14.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent the loss of redundant safe shutdown equipment.

5.14.6 Modifications

The licensee has proposed the following modifications. The door to the room will be replaced with a door having a three-hour fire rating, the ventilation system will be upgraded to compensate for the reduction in air flow caused by the installation of the fire door and an alarm will be provided in the control room which will signal closure of the inlet or the exhaust louver. This additional alarm, supplemented by the existing status lights of the ventilation fan, will provide an acceptable means of air flow monitoring. The licensee has also committed to provide an auxiliary shutdown system utilizing a separate source of D.C. power which is independent of this area.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.15 Heating and Ventilation Equipment Room for the Control Room (Fire Area No. 16)

5.15.1 Safety-Related Equipment

The control room emergency ventilation system is the only safety-related equipment in the area.

5.15.2 Combustibles

The combustibles in this area include 210 pounds of charcoal in the charcoal filters and a metal cabinet containing paper computer tapes.

5.15.3 Consequences of No Fire Suppression

An unsuppressed fire in the area has the potential to damage both the normal and the emergency control room ventilation systems; however, the control room remains habitable even with the loss of both systems. In the unlikely event that the control room has to be abandoned, the plant could still be shut down from local stations.

5.15.4 Fire Protection Systems

Portable extinguishers and a manual hose provide manual fire suppression capability.

5.15.5 Adequacy of Fire Protection

Manual fire suppression would be adequate to suppress a fire in this room, although lack of detection would allow the fire to continue unnecessarily.

5.15.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed in this area and stable mounting will be provided for the computer tape storage cabinet located in this room.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.16 Unit 2 Cable Spreading Room, Computer Room (Fire Area No. 18)

5.16.1 Safety-Related Equipment

Both divisions of safety-related cables and relay cabinets are located in this area.

5.16.2 Combustibles

Combustibles in this area consist of a large quantity of electric cable insulation and paper associated with the computer.

5.16.3 Consequences of No Fire Suppression

Because of the limited separation between redundant divisions of cables in some locations in this area, a fire in this area could involve both divisions of safety-related systems served by cables passing through this area and thus, jeopardize the safe shutdown capability.

5.16.4 Fire Protection Systems

Portable extinguishers and hose stations are available for manual fire fighting. An automatic fire detection system is installed in this area, consisting of two heat and two smoke detectors. Isolation of the area is provided by a wall and a door with a fire rating of 1-1/2 hours.

5.16.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent loss of control of redundant safe shutdown equipment.

5.16.6 Modifications

The licensee has proposed the following modifications. An automatic total flooding Halon extinguishing system and four additional fire detectors will be installed in the area. Motor operated fire dampers will be installed in the ventilation system to isolate the area upon actuation of the Halon system. All exposed cables in the area will be coated with a flame retardant coating. An auxiliary shutdown system will be installed to provide a safe shutdown capability independent of this area.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.17 Electrical Equipment Area (Fire Area No. 19)

5.17.1 Safety-Related Equipment

Safety-related equipment in this area includes both divisions of emergency power buses, safety-related cabling, safety-related relays, motor control centers (MCC's) and the seal water injection tank.

5.17.2 Combustibles

Combustible material in the area consists of a large quantity of cable insulation.

5.17.3 Consequences of No Suppression

An unsuppressed fire in this area could involve both divisions of safety-related equipment and jeopardize the capability for safe shutdown.

5.17.4 Fire Protection Systems

Automatic fire detection is available in this area with a total of six heat and four smoke dectors. A manual hose station and portable extinguishers are available for manual fire fighting.

5.17.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent loss of control of redundant safe-shutdown equipment.

5.17.6 Modifications

The licensee has proposed the following modifications. An automatic total flooding Halon system will be installed in this area. The licensee will also install fire dampers which close automatically upon detection of a fire, provide upgraded fire doors, and apply a flame retardant coating to the electrical cables. An auxiliary shutdown system independent of this area will also be provided.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.18 Rod Control Room (Fire Area No. 20)

5.18.1 Safety-Related Equipment

The safety-related components in this area consist of both divisions of safety-related cables which pass through this area.

5.18.2 Combustibles

Combustibles in this area consist of electrical cable insulation.

5.18.3 Consequences of No Fire Suppression

A detailed analysis was performed and it was concluded that a fire in the rod control cabinets will not prevent rod insertion. However, since redundant divisions of safety-related cables are routed through this area, an unsuppressed fire in this area could result in a damage equivalent to simultaneous fires in both cables vaults.

5.18.4 Fire Protection Systems

Automatic fire detection is presently provided by three heat detectors which provide alarm and annunication in the control room. A hose rack and portable extinguishers are available for manual fire fighting.

5.18.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent the loss of redundant safe shutdown equipment.

5.18.6 Modifications

The licensee has proposed the following modifications. The licensee will provide upgraded fire doors, install fire dampers in the ventilation ducts and apply a flame retardant coating to the electrical cables. An auxiliary shutdown system independent of this area will also be provided.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.19 Control Room (Fire Area No. 21B)

5.19.1 Safety-Related Equipment

The control room contains safety-related cables and controls.

5.19.2 Combustibles

The combustibles in this area consist of electrical cable insulation, electrical components in panels and consoles, and some Class A combustibles such as log books, drawings, operating procedures, and computer printouts.

5.19.3 Consequences of No Fire Suppression

An unsuppressed fire in the control room has the potential for disabling a significant number of safety-related components in both divisions.

A postulated fire in certain control room cabinets or consoles may affect redundant systems since, in some cases, redundant systems are located in the same cabinet or console.

5.19.4 Fire Protection System

One carbon dioxide portable extinguisher and one dry chemical portable extinguisher are provided inside the control room for manual fire fighting.

5.19.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent the loss of redundant safe shutdown equipment.

5.19.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed with detectors located in the safety-related cabinets and consoles, a three-hour rated fire door will be installed at the entrance to the analog instrument room, and an auxiliary shutdown system independent of this area will be provided. Electrical cable and conduit penetrations will be upgraded to conform to tested

designs. A manual hose station will be added at the corner of the control room adjacent to the door to the analog instrument room. The flow of water into the section of the standpipe located in the control room will be controlled by a motor-operated deluge valve outside the control room with a control for this valve provided at the hose station. The licensee will install a self-closing Class C fire door at the entrance to the kitchen, and install a single station smoke detector in the kitchen. A 2-1/2 gallon pressurized water extinguisher will be added. The licensee also committed to modify circuits as necessary to assure that a fire in the control room could not disable the proposed auxiliary shutdown system.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Sectio 2.1 of this report and is, therefore, acceptable.

5.20 Relay Room - "Hagan" Room (Fire Area No. 21C)

5.20.1 Safety-Related Equipment

Safety-related instrumentation for both electrical divisions are located in this area.

5.20.2 Combustibles

The combustibles in the area include cable insulation and paper.

5.20.3 Consequences of No Fire Suppression

In the unlikely event of a large exposure fire, redundant instrumentation for functions essential for safe shutdown could be damaged.

5.20.4 Fire Protection Systems

Portable extinguishers are provided for manual fire fighting.

5.20.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent the loss of redundant safe shutdown equipment.

5.20.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed in this room, a new hose station will be installed at the entrance to this room, and an auxiliary shutdown system will be provided which is independent of this room.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.21 New and Spent Fuel Storage Areas, Hot Machine Shop and Large Equipment Decontamination Area (Fire Areas No. 22, 23, 24A and 24B)

5.21.1 Safety-Related Equipment

The only safety-related equipment in these areas is the spent fuel storage pool and the related auxiliaries.

5.21.2 Combustibles

There are small amounts of combustibles in these areas, consisting of clothing, paper, flammable solvent and machine oil in the machine shop. During refueling outages, additional transient combustibles will be introduced into the fuel storage areas.

5.21.3 Consequences of No Fire Suppression

An unsuppressed fire in any of these areas will not compromise the shutdown capability of the plant. In all but the spent fuel storage area, there is only an insignificant amount of radioactive material and its release as a result of fire is inconsequential. Spent fuel is stored underwater; it is not credible that a fire in the spent fuel storage area could release radioactive materials contained in the spent fuel.

5.21.4 Fire Protection Systems

Hose lines from yard hydrants are available for fire fighting in the new fuel storage area. An interior hose station and portable extinguishers are available for manual fire fighting in all other areas. During refueling outages the area will be continuously manned.

5.21.5 Adequacy of Fire Protection

Existing fire protection systems are adequate to contain and suppress a fire in any of these areas.

5.21.6 Modifications

No modification will be made to these areas.

We find that the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.22 Turbine Building Class I Area (Fire Area 25A)

5.22.1 Safety-Related Equipment

The safety-related equipment in the area includes the steam turbine driven auxiliary feedwater pump.

5.22.2 Combustibles

The combustibles in this area consist of fuel oil in the piping to the auxiliary boiler and lube oil in the main turbine lube system.

5.22.3 Consequences of No Fire Suppression

An unsuppressed fire in the area could incapacitate the steam driven auxiliary feedwater pump. However, this pump is backed up by two electric motor operated auxiliary feedwater pumps located elsewhere.

5.22.4 Fire Protection Systems

A manual hose station, portable extinguishers and large, wheeled extinguishers are available for manual fire fighting in this area. Fuel oil supply to the boiler can be shut off at three different locations. A three-hour rated fire barrier separates this area from the safety-related equipment in the auxiliary building.

5.22.5 Adequacy of Fire Protection

Manual suppression will be adequate to control a fire in this area. The outer wall of the auxiliary building and the fire door provide an adequate barrier to isolate a fire in this area from the safety-related equipment inside the auxiliary building.

5.22.6 Modifications

No modifications will be made to this area.

We find that the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.23 Turbine Building Protected Area (Fire Area 25B through 25D)

5.23.1 Safety-Related Equipment

There is no safety-related equipment located in this area.

5.23.2 Combustibles

There are large amounts of oil in the turbine lube oil reservoir and storage tanks, and in the hydrogen seal oil unit. There is also a large quantity of hydrogen in the generator and the associated hydrogen system.

5.23.3 Consequences of No Fire Suppression

A fire in this area without suppression could cause serious damage to the turbine generator and components in the turbine area. However, such damage would have no effect on the integrity of the adjacent containment

and the auxiliary building. The only safety-related equipment which could be affected is the steam turbine driven auxiliary feedwater pump. Loss of this pump is acceptable as discussed in Section 5.22.3.

5.23.4 Fire Protection System

These zones are protected from fire by automatically actuated deluge systems. Actuation is alarmed locally and in the control room. Manual hose stations and portable extinguishers are available as backup.

5.23.5 Adequacy of Fire Protection

The deluge systems are adequate to control fires in this area. Manual hose stations provide backup for the automatic systems.

5.23.6 Modifications

No modification in the fire protection will be made to this area.

We find that the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.24 Main, Unit Auxiliary and Startup Transformers (Fire Area 26A and 26B)

5.24.1 Safety-Related Equipment

None of these transformers are classified as safety-related.

5.24.2 Combustibles

Each of these transformers contains a large quantity of transformer oil.

5.24.3 Consequences of No Fire Suppression

Fire damage to any of these transformers will not affect safe shutdown of the plant.

5.24.4 Fire Protection Systems

Automatically actuated deluge systems are installed for primary fire suppression in these transformers with manual hose stations, yard hydrants and extinguishers as backup.

5.24.5 Adequacy of Fire Protection

The automatic deluge systems are adequate to suppress postulated transformer fires. Manual hose stations provide backup for the automatic systems.

5.24.6 Modifications

No modification to the existing fire protection will be made in this area.

We find that the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.25 Containment Cable Penetration Area (Fire Area No. 27A)

5.25.1 Safety-Related Equipment

Both divisions of safety-related cabling from the north and the south cable vaults are located in the area.

5.25.2 Combustibles

Cable insulation is the only combustible in the area under normal operating conditions.

5.25.3 Consequences of No Fire Suppression

An unsuppressed fire in the area might involve both divisions of safety-related cables and affect instrumentation necessary to safely shut down the reactor.

5.25.4 Fire Protection Systems

Portable dry chemical extinguishers are the only means presently available for suppressing a fire in the area.

5.25.5 Adequacy of Fire Protection

The existing fire protection would not be adequate to control fires in this area and prevent the loss of redundant safe shutdown equipment.

5.25.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed in this area, large, pressurized water extinguishers will be provided inside containment for use in fighting fires in this area and flame retardant coating will be applied to the cables in this area. The acceptability of the fire protection measures provided for this area will be addressed in a supplement to this evaluation.

5.26 Primary Coolant Pumps (Fire Area No. 27B)

5.26.1 Safety-Related Equipment

There are three primary coolant pumps around the reactor which are safety-related. There is also instrumentation, required for the safe plant shutdown, in adjacent areas.

5.26.2 Combustibles

The major combustible in the area is approximately 175 gallons of lube oil in each of the three pumps. There also is some electrical insulation associated with the power and control cables and instrumentation wiring.

5.26.3 Consequences of No Fire Suppression

A significant fire could result from ignition of the lubricating oil from the primary coolant pumps, but the presence of concrete partitions would not allow the fire to spread to other areas. Loss of the coolant pump function could result from such a fire but automatic reactor trip would occur and no other systems required for safe shutdown would likely be affected. Class I piping is protected from fire effects by external insulation and massive support members could withstand fire of this severity.

5.26.4 Fire Protection Systems

Portable extinguishers are available in the area, for manual fire suppression.

5.26.5 Adequacy of Fire Protection

Existing fire protection would not be adequate to detect and suppress fires.

5.26.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed in this area, and an oil spill protection and control system will be installed around each reactor coolant pump to prevent lube oil from contacting hot pump surfaces. Manual hose capability will be provided from hose stations outside the containment.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.27 Containment General Area (Fire Area No 27C)

5.27.1 Safety-Related Equipment

Safety-related equipment in containment includes primary coolant piping, accumulators, the pressurizer, instrumentation, hydrogen recombiners, containment air coolers, valves and associated cabling.

5.27.2 Combustibles

Combustibles in this area include electrical cable insulation and filter charcoal.

5.27.3 Consequences of No Fire Suppression

Effects of an unsuppressed fire inside containment is still under study. We will report on the results of such study in a supplement to this report.

5.27.4 Fire Protection Systems

Manual hose stations located outside containment and portable extinguishers are available to combat fires inside containment.

5.27.5 Adequacy of Fire Protection

The adequacy of the fire protection in the containment will be reported as a supplement to this report.

5.27.6 Modifications

The licensee has proposed the following modifications. Smoke detectors will be installed in the air recirculation units, and pressurized water extinguishers will be provided for manual fire suppression.

Our evaluation of the fire protection for the area is not complete. We will report on the result of our evaluation in a supplement to this report.

5.28 RHR Pump Pit (Fire Area No. 28)

5.28.1 Safety-Related Equipment

The two RHR pumps in the area are safety-related. At least one RHR pump is required for safe shutdown.

5.28.2 Combustibles

Combustibles in the area include approximately 16 gallons of lube oil and a small amount of electrical cable insulation.

5.28.3 Consequences of No Fire Suppression

The two pumps are separated by a 12-foot high concrete barrier. Accordingly, there is little likelihood a fire involving one pump could spread to the other. Power cables above the pit are not separated by a fire barrier and are vulnerable to damage from a single well-developed exposure fire.

5.28.4 Fire Protection System

Portable extinguishers are available for manual fire fighting in this area.

5.28.5 Adequacy of Fire Protection

Existing fire protection is not adequate to detect and control fires and prevent inoperability of redundant safety-related equipment.

5.28.6 Modifications

The licensee has proposed the following modifications. An automatic fire detection system will be installed for this area (one detector over each pump). The licensee will also install a manual hose station outside of the pump pit area.

We find that, subject to implementation of the above described modifications, the fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.29 Intake Structure (Fire Area No. 29)

5.29.1 Safety-Related Equipment

The safety-related equipment in this area includes service water pumps and associated auxiliaries.

5.29.2 Combustibles

Major combustibles in the area are lube oil in the pumps and a 500 gallon propane tank which supplies the propane engine-driven fire pump.

5.29.3 Consequences of No Fire Suppression

A lube oil fire in any pump is not likely to spread and involve all four service water pumps. Only one service water pump is needed for safe shutdown of the plant. A fire or explosion caused by leaking propane vapor or liquid may have the capability of incapacitating all service water pumps, thereby jeopardizing the safe shutdown capability of the plant.

5.29.4 Fire Protection System

Yard fire hydrants are available for manual fire suppression.

5.29.5 Adequacy of Fire Protection

Manual suppression would be adequate to control a fire in this area. However, suppression could not provide protection against explosions caused by leaking propane.

5.29.6 Modifications

The staff's review and acceptance of the licensee's proposed modifications to the propane tank and propane transfer system will be addressed in a supplement to this report.

5.30 Plant Yard Area (Fire Areas No. 30 through 33)

5.30.1 Safety-Related Equipment

Safety-related equipment in this area includes the diesel oil storage tank, and the refueling water storage tank.

5.30.2 Combustibles

Combustibles in the area include 25,000 gallons of diesel oil in the storage tank and transient combustibles. Coal storage for Unit 1 is more than 100 feet from the nearest tank. The diesel oil storage tank is at least 75 feet from any other safety related tank.

5.30.3 Consequences of No Fire Suppression

Loss of any one of the water tanks will not impair safe plant shutdown. An unsuppressed fire in the diesel oil storage tank would interrupt the fuel supply to the day tanks, and limit the emergency diesel generator operating capability. A fire in this area, however, would not in itself require operation of the diesel generators, thus the limitation in fuel supply would not affect safe shutdown. Spilled oil will be contained by the dike built around the tank so that the oil fire would not spread into other sections of the yard area.

5.30.4 Fire Protection Systems

Yard fire hydrants and additional equipment from nearby building areas are available for manual fire suppression.

5.30.5 Adequacy of Fire Protection

Manual suppression is adequate to suppress a fire in this area.

5.30.6 Modifications

No modification is necessary.

We find that fire protection for this area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

6.0 ADMINISTRATIVE CONTROLS

The administrative controls for fire protection consist of the fire protection organization, the qualifications and training for fire protection personnel, the controls to be exercised over combustibles and ignition sources, plans and procedures for fighting fires in the various plant areas, and the quality assurance provisions for fire protection.

The licensee's proposed administrative controls are being reviewed for conformance with the guidelines set forth in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." Our evaluation of the administrative controls for fire protection will be issued in a supplement to this report.

7.0 TECHNICAL SPECIFICATIONS

The licensee submitted a description of the fire protection program for the facility. As discussed in preceding sections, this program is under detailed review by the NRC. Following the implementation of the modifications of fire protection systems and administrative controls resulting from this review, the Technical Specifications will be modified to incorporate the limiting conditions for operation and surveillance requirements for these modifications.

In the interim, until we complete our detailed review, we have concluded that it is appropriate to amend the facility license by incorporating into the Technical Specifications operability and surveillance requirements for the existing fire protection equipment and systems. In addition, the amendment would include administrative requirements for the implementation of the fire protection program.

By letter dated September 30, 1976, we requested the licensee to submit Technical Specifications for the presently-installed fire protection equipment at this facility. By letter dated December 29, 1976, the licensee proposed such Technical Specifications. Based on our review and consideration of that response and the responses of other licensees, we modified certain action statements and surveillance frequencies in order to provide more appropriate and consistent specifications which we forwarded to the licensee by letter of June 16, 1977. That letter also requested submittal of appropriately revised specifications. The licensee responded by letter dated September 9, 1977. We have reviewed the licensee's responses and have made modifications where necessary to assure conformance to the fullest extent practicable with our requirements as set forth in the sample Technical Specifications. These modifications have been agreed to by the licensee.

The guidelines for Technical Specifications that we developed and sent to all licensees are based on assuring that the fire protection equipment currently installed for the protection of safety-related areas of the plant is operable. This assurance is obtained by requiring periodic surveillance of the equipment and by requiring certain corrective actions to be taken if the limiting conditions for operation cannot be met. These guidelines also include administrative features for the overall fire protection program such as interim fire brigade requirements, training, procedures, management review and periodic independent fire protection and loss prevention program inspections.

The equipment and components existing at this facility and included in the scope of these Technical Specification requirements are fire detectors, the fire suppression systems, the hose stations, and penetration fire barriers

for piping and cabling penetrations. Operability of the fire detection instrumentation provides warning capability for the prompt detection of fires, to reduce the potential for damage to safety-related equipment by allowing rapid response of fire suppression systems. In the event that the minimum coverage of fire detectors cannot be met, hourly fire patrols are required in the affected area until the inoperable instrumentation is restored to operability. The operability of the fire suppression systems provides capability to confine and extinguish fires. In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the inoperable equipment is returned to service. In the event that the fire suppression water system becomes inoperable, a backup fire protection water system is required within 24 hours and a report to the NRC is required within 24 hours to provide for prompt evaluation of the acceptability of the corrective measures for adequate fire suppression capability. The functional integrity of the penetration fire barriers provides protection to confine or retard fires from spreading to adjacent portions of the facility. During periods of time when a fire barrier is not functional and fire detectors on either side of the barrier are not operable, a continuous fire watch is required to be maintained in the vicinity of the affected barrier to provide fire prevention methods and prompt detection and suppression in the event of a fire.

Therefore, we have found these specifications acceptable on an interim basis until such time that all licensee information on incomplete items has been submitted (Section 3.2) and our final review is complete, required equipment is installed and operable, and final specifications have been developed and issued.

8.0 CONCLUSIONS

The licensee has performed a fire hazards analysis and has proposed certain modifications to improve the fire protection program. Additional modifications have been proposed by the licensee during the course of our review, which are based upon the fire hazards analysis and our onsite evaluation of the fire protection program. These proposed modifications are summarized in Section 3.1. In addition, we have concluded that the licensee should implement certain evaluations or improvements related to the fire protection program. These are summarized in Section 3.2. Significant steps are being taken to provide additional assurance that safe shutdown can be accomplished and the plant can be maintained in a safe condition during and following potential fire situations. Additional evaluation of incomplete items, discussed in the preceding sections, will be necessary before we can conclude that the overall fire protection at H. R. Robinson 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 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.

> "A probability assessment of public safety or risk in quantitative terms is given in the Reactor Safety Study (WASH-1400). As the result of the calculation based on the Browns Ferry fire, the study concludes that the potential for a significant release of radioactivity from such a fire is about 20% of that calculated from all other causes analyzed. This indicates that predicted potential accident risks from all causes were not greatly affected by consideration of the Browns Ferry fire. This is one of the reasons that urgent action in regard to reducing risks due to potential fires is not required. The study (WASH-1400) also points out that 'rather straightforward measures, such as may already exist at other nuclear plants, can significantly reduce the likelihood of a potential core melt accident that might result from a large fire.'
>
> "Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent (see Section 3.3 of [NUREG-0050]). The Review Group believes that steps already taken since March 1975 (see Section 3.3.2) have reduced this frequency significantly.

"Based on its review of the events transpiring before, during and after the Browns Ferry fire, the Review Group concludes that the probability of disruptive fires of the magnitude of the Browns Ferry event is small, and that there is no need to restrict operation of nuclear power plants for public safety. However, it is clear that much can and should be done to reduce even further the likelihood of disabling fires and to improve assurance of rapid extinguishment of fires that occur. Consideration should be given also to features that would increase further the ability of nuclear facilities to withstand large fires without loss of important functions should such fires occur."

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

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

9.0 Consultants' Report

Brookhaven National Laboratory under contract to the NRC has provided the services of fire protection consultants who participated in the evaluation of the fire protection program. They have also participated in the preparation and review of this safety evaluation report. Their report, "Fire Protection in Operating Nuclear Power Stations - H. B. Robinson, Unit No. 2, BNL NUREG 23724, dated December 1977, discusses many items which have been addressed in this report. The consultants recommendations which we have not totally adopted are discussed in Appendix "B". Our basis for not adopting these recommendations is given therein. A copy of the consultants' report is included as Appendix C.

Dated: February 28, 1978

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, Carolina Power and Light (CP&L) 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, (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 of September 30, 1976 and October 1, 1976, CP&L was requested to provide the results of a fire hazards analysis and proposed Technical Specifications pertaining to fire protection. CP&L was also provided a copy of Appendix A which includes acceptable alternatives to the guidelines of SRP 9.5.1.

By letter of December 1, 1976, we provided model Technical Specifications and requested submittal of fire protection Technical Specifications.

On December 29, 1976, CP&L provided a submittal responding to our requests of May 11 and October 1, 1976 including proposed Technical Specifications for fire protection.

On March 29-31, 1977, the DOR fire protection review team visited the H. B. Robinson Unit 2 facility. On March 31, 1977, a meeting was held at the Robinson facility at which the review team presented positions and requests for additional information.

On June 2-3, 1977, a meeting was held in Bethesda, Maryland to discuss review team concerns and positions, and to discuss items not resolved at the March 31, 1977 meeting.

By letter of June 16, 1977, CP&L was requested to submit revised Technical Specifications for fire protection based on existing plant equipment.

On June 23, 1977, CP&L submitted the additional information requested and responses to staff positions taken during the site visit and June 2-3, 1977 meeting.

On July 11, 1977, a meeting was held in Bethesda, Maryland to discuss outstanding issues.

By letter of August 1, 1977 CP&L was requested to provide additional information pertinent to the fire protection review.

By letter of September 7, 1977, CP&L was requested for written commitment to certain fire protection measures and to provide additional information pertinent to the fire protection review.

On September 9, 1977, CP&L provided revised Technical Specificatons in response to our letter of June 16, 1977.

By letter of September 12, 1977, CP&L requested to provide written commitments to additional fire protection measures and to provide additional information pertinent to the fire protection review.

On September 16, 1977, CP&L provided a submittal responding to our request of August 1, 1977.

On September 28, 1977, CP&L provided a submittal supplementing their submittal of June 23, 1977.

On September 30, 1977, CP&L provided a submittal responding to our requests of September 7 and 12 of 1977.

By letter of October 7, 1977, CP&L was requested to provide written commitments to additional fire protection measures and to provide additional information pertinent to the fire protection review.

On October 27, 1977, CP&L provided a submittal partially responding to our request of October 7, 1977.

On November 17, 1977, CP&L provided additional responses to our request of November 17, 1977.

On November 28, 1977, CP&L provided information on administrative controls at H. B. Robinson, Unit No. 2, based on their review of the NRC document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

On January 5, 1978, CP&L provided responses to nine issues telecopied to them by the NRC on December 15, 1977.

APPENDIX B

DISCUSSION OF CONSULTANTS' REPORT

Under Contract to Nuclear Regulatory Commission, Brookhaven National Laboratory has provided the services of fire protection consultants who participated in the evaluation of the licensee's fire protection program and in the preparation of the safety evaluation report (SER). Their report, "Fire Protection in Operating Nuclear Power Stations - H. B. Robinson, Unit No. 2," BNL NUREG-23724, dated December 1977, discusses several matters which have been addressed in the SER. The consultant's report contains recommendations which have, for the most part, been implemented during our evaluation. The consultant's recommendations which we have not adopted, along with our basis therefor, are identified herein. We have also responded to concerns identified in the consultant's report which were not addressed in their summary of recommendations. Some of these concerns have been satisfied by subsequent proposed modifications by the licensee.

1.0 Recommendations Not Adopted

The following recommendations are presented in Part I, Sections II and III of the consultant's report.

1.1 Fire Water System Control Valves

"The use of seals or locks on fire water system control valves should not be accepted, especially in connection with protection of safety-related areas."

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 administrative program to assure that valves are maintained in the proper position. Such a program includes locking valves with strict key control or sealing valves with tamper proof seals. Periodic inspections are to be performed to verify that the method of securing the valve is intact.

These measures are consistent with the requirements imposed for supervising valves in safety-related systems, and provide adequate assurance that valves are maintained in the appropriate position. The licensee's program for valve supervision is consistent with NRC guidelines. In addition, the plant Technical Specifications are being revised to require a monthly check of all valves in the flow path to fire suppression systems.

1.2 Heat and Smoke Venting

"In several areas of the auxiliary building, the utility proposes to remove heat and smoke from a fire area by forcing fresh air into the fire area. Since these areas are typically rooms opening into a hallway, this would result in filling the hallway with heat and smoke, compounding the difficulty of fire fighting. A much more effective measure would be to exhaust heat and smoke from the fire area to the outside of the plant, using either fixed or portable ventilation fans and ducts."

Staff Response: In rooms of the Auxiliary Building which do not open to the outside, smoke removal by forcing fresh air into room would not normally be initiated until the room atmosphere had been cooled sufficiently, by fixed sprinkler operation or manual hose fogging, to permit entry by fire fighting personnel. Thus, only minor quantities of heat would be expelled into the hallway. Although expulsion of smoke into the hallway would reduce visibility, air supply masks are available for use in such an environment. In addition, the supply of fresh air to the room would help dilute the smoke concentrations in the building, and one of the plant's two smoke ejectors could be used, if needed, to vent smoke from the hallway to the exterior.

Toxicity and corrosiveness are two major concerns associated with smoke evolution. The toxicity of combustion products would require the use of the available breathing apparatus as noted above. Corrosive combustion products could have a long term deleterious effect on equipment, but would not have an effect on safe shutdown which occurs over a relatively short time span.

In order to discharge smoke directly to the outside of the Auxiliary Building, a long duct would be required. In discussions with the consultant, subsequent to preparation of his report, he agreed that frictional loss through such a long duct may prove to be too great to produce a meaningful flow rate for smoke removal when used in conjuction with a commercially available smoke ejector.

It is therefore concluded that a significant improvement in fire fighting would not result from the extensive plant redesign and modification required to install a fixed smoke removal system.

1.3 Fire Hazard Analysis Methodology

"The Fire Hazard Analysis submitted by the Utility for the Robinson plant is deficient in a number of respects. These deficiencies involve such basic areas as the determination of burning rates of combustibles, fire duration, rate of evolution of smoke and hot gases from a fire, fire barrier and separation distance analysis, and protection feature requirements, and in particular the use of the combustible loading (or fire load) concept as the sole basis for determination of fire hazard in an area."

Staff Response: Most deficiencies identified are inherent in the inexactness of the fire protection engineering. There is no analytical method available which could yield more precise and/or reliable information. The combustible loading concept, although inprecise, is widely recognized to yield an acceptable level of approximation for estimating the fire severity. The only protective feature requirement in H. B. Robinson which is determined by the result of the combustible loading calculation is the rating of the fire barrier. Fire barriers in the plant have ratings of 1, 2 or 3-hour compared with the calculated fire severity ranging from 2 to 119 minutes. We have evaluated the plant, area by area, to insure that an additional margin of safety is provided, against the possible uncertainty involved in the method, for the rating of the barrier with respect to the calculated fire severity.

1.4 Sensitivity of Smoke Detectors

"There is evidence that ionization-type smoke detectors will not always respond promptly to the thermal decomposition products of polyvinyl chloride."

Staff Response: The licensee has committed to supply the staff with available manufacturer's test data or certifications showing that the smoke detectors in each area are appropriate for the types of combustibles likely to be present in that area.

1.5 Protection Against Oil Fire in Containment

"Portable extinguishers may not be effective against an oil fire in containment. The Utility should evaluate this hazard further."

Staff Response: The staff agrees with the concern of the consultant. Because of this concern, the licensee has committed to install an oil leakage and collection system around each reactor coolant pump. This system will direct and collect leakage of lubricating oil from the pump and prevent it from contacting hot surfaces. By providing these systems, therefore, the likelihood and severity of oil fires inside containment is significantly reduced. Based upon the licensee's commitment to provide these systems, the consultant agrees that his concern has been satisfactorily resolved.

1.6 Cable Separation

"The Utility should either analyze on a circuit-by-circuit basis the potential effect of fires in areas where a single fire could damage both safety channels." "No details have been provided on any testing or engineering analysis to establish the effectiveness of the separation criteria used."

Staff Response: The proposed auxiliary shutdown system will provide a safe shutdown capability independent of cabling in those areas where both divisions of cables could be damaged by a single fire. (See Section 3.2.1 of this evaluation.)

1.7 Acceptable Damage Limit

"It is recommended that NRC establish more definitive guidelines or criteria regarding acceptable damage limits for a single channel so that cost effective protective packages can be developed."

Staff Response: As stated in Appendix A to BTP 9.5-1, Section D.1, the NRC accepts damage to a single division of safety systems. This damage may be to one or several components depending on the system arrangement and the zone of influence of the postulated fire.

1.8 Smoke Spread Through Ventilation System

"Heat operated fire damper systems may not function quickly enough to prevent spread of smoke and corrosive combustion products from area to area."

Staff Response: Using heat actuated dampers to isolate a fire area is a well established practice in fire protection. Depending upon the smoke generation characteristics of the combustibles and the actuation temperature of the damper, some smoke will unavoidably escape into the ventilation system before the damper is closed. However, such leakage would be highly diluted by the return air flow from the other rooms. In the unlikely event that significant smoke leakage takes place via the exhaust dampers prior to closing, the toxicity and corrosiveness of the smoke would have no effect on the safe shutdown of the plant.

1.9 Fire Water Demand Study

"The CP&L submittal does not provide the demand information (volume and pressure) required for each automatic deluge system. Until this information is received it is not possible to determine the adequacy of the fire water supply system. A single fire pump may be unable to supply water at sufficient pressure for both a single sprinkler system and fire hoses."

Staff Response: The licensee states that such an analysis has been made and has submitted design information. If our review indicates the design is deficient we will act to ensure implementation of appropriate modifications.

1.10 Effect of Closing Sectional Valve

"The utility should analyze the effect of the closing of a single sectional valve in the fire loop on the volume and pressure of water delivered to an area by hoses and/or sprinkler systems."

Staff Response: The licensee states that such a study has been performed and has submitted the results of the study. If our review indicates the design is deficient, we will act to ensure implementation of appropriate modifications.

The following recommendation was presented in Part II, Section VII of the consultant's report.

1.11 Pumping Test of Backup Fire Water

"Run a test using a municipal fire pump drafting from the lake, pumping into the nearest fire hydrant, and determine if reliable emergency fire protection water backup can be provided in this manner. Include a flow test from a distant hydrant."

Staff Response: The plant fire water supply meets the NRC guideline, as specified in Appendix A to BTP 9.5-1, that 100% capacity be available with one pump inactive. If further assurance of the adequacy of the fire water supply is required (beyond the NRC guideline) a more reliable backup is readily available from the Unit No. 1 fire water pumps which are interconnected through the yard fire water main. The licensee does not believe such a test would be prudent because it would require shutdown of the normal fire water supply system. The licensee will, however, run a static test to demonstrate the ability of a municipal fire pump to draw water from Lake Robinson and pressurize the hydrant system. We conclude that such a test is a prudent and acceptable means for confirming the capability of a municipal fire pump backup.

2.0 Incomplete Items

The following recommendations were presented in Part II, Section VII of the consultant's report. The staff's conclusions with respect to these issues will be presented in a supplement to this evaluation.

2.1 Fire Hose Replacement

"Replace all hose found defective with (not less than) 400 psi test jacketed lined hose with mildew resistant jacket."

Staff Response: The licensee states that the present 300 psi test hose is acceptable for his fire water supply system. We will request the licensee to provide technical justification for its acceptability. Our conclusions with respect to this issue will be presented in a supplement to this evaluation.

2.2 Fire Hydrant Cold Weather Protection

"Inspect all fire hydrants for drainage of the "dry barrels" immediately prior to potential freezing temperatures, and for proper functioning after freezing winter weather."

Staff Response: The licensee states that 17 years experience at the H. B. Robinson site, including the winter of 1976-1977, has not revealed a freezing problem with fire hydrants. We will request the licensee to provide further justification for omission of these inspections in view of the eventual degradation of hydrant valve seats. Our conclusions with respect to this issue will be presented in a supplement to this evaluation.

The following recommendation was presented in Part I, Section III of the consultant's report. The staff's conclusions with respect to this issue will be presented in a supplement to this evaluation.

2.3 Fire Door Supervision

"Waiting until after implementation of the new physical security program to identify fire doors which the utility does not intend to supervise electrically guarantees that they will not be electrically supervised. Identifying these doors in advance would permit a door-by-door evaluation of the need for electrical supervision while a full range of option is still open."

Staff Response: The licensee will submit to the NRC following the completion of physical security evaluation a list of non-supervised fire doors. We will also review his proposed method of insuring these doors remain closed. If electrical supervision is found necessary for certain fire doors by the subsequent staff evaluation, we will act to ensure implementation of such provisions.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-261

CAROLINA POWER & LIGHT COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 31 to Facility Operating License No. DPR-23, issued to Carolina Power & Light Company (the licensee), which revised Technical Specifications for operation of the H. B. Robinson Steam Electric Plant, Unit No. 2 (the facility) located in Darlington County, Hartsville, South Carolina. The amendment becomes effective 30 days after the date of issuance.

This amendment adds a license condition relating to the completion of facility modifications for fire protection. It also revises the Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. Additional operating and surveillance requirements for the modifications being performed will be added to the Technical Specifications after the modifications are completed.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the licensee's submittals dated December 29, 1976, June 23, September 9, September 16, September 28, September 30, October 27, November 17 and November 28, 1977, and January 5, 1978, (2) Amendment No. 31 to License No. DPR-23, 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 Hartsville Memorial Library, Home and Fifth Avenues, Hartsville, South Carolina. A 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 28th day of February 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid

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