Design Basis Specification for the

Plant Fire Protection

CNS-1465.00-00-0006

Rev. 25

Date Originated

March 31, 1991

Duke Energy
Catawba Nuclear Station
Unit(s) 1 And 2

VERIFICATION OF SPECIFICATION

Station and Unit Number: Catawba Nuclear Station, Unit(s) 1 And 2

Title of Specification: **Plant Fire Protection**

Specification Number: **CNS-1465.00-00-0006**

Revision: **25**

This document specifies items related to **QA CONDITION 3.** In accordance with established procedures, document quality has been verified and validated. Signatures certify that the above document was originated, checked, approved, and inspected as noted.

Signature also certifies that a review for determining potential impact to work performed per previous revisions was conducted for this revision.

Previous Work Impacted by this revision: ____ Yes, See Attachment __X__ No

Prepared By: Bruce Fitzpatrick Date: 1/27/15

Design Verified By: Robert S. Nelson Date: 1/28/15

Approved By: James C Herrin Date: 2/4/15

Inspected by Other Teams:

Location/Team _____ Inspected By/Date _____

Location/Team _____ Inspected By/Date _____

Location/Team _____ Inspected By/Date _____

Location/Team _____ Inspected By/Date _____

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Group: _____ Date: _____
Engineering

This is to certify that the above specification has been reviewed by me, the undersigned, and is correct, complete, and in compliance with _____ Edition including the _____ Addendum of ASME Code, Section III, Paragraph _____.

(SEAL)

Signature: _____

Name: _____
Professional Engineer

No. & State: _____

DOCUMENT REVISION DESCRIPTION

(Reference Form 170.1 Rev.0)

REVISION NO.	PAGES or SECTIONS REVISED AND DESCRIPTION
0	Initial Issue - New pages as shown on the Page Revision Description.
1	Revised Appendix A per Minor Mod CE-9584 and Miscellaneous Editorial Changes.
2	Revised Appendix A per Minor Mod CE-10095.
3	Deleted References 4.1.1.2, 4.1.1.2.1 and 4.1.1.2.2 and added References 4.1.1.2.8, 4.1.1.2.9, and 4.1.1.2.10 per Minor Mod CE-10539.
4	Revised Appendix A.2 Part B per NSM CN-21392/00.
5	Revised Appendix A.2 Part B per Minor Mod CE-71568.
6	This revision reformats the Design Basis Specifications from Generalized Markup Language (GML for BookManager) to MS-Word, available on-line in NEDL per Minor Mod CE-71731. This revision does not include any content changes, however, spelling errors have been corrected as encountered. Revision marks are not displayed in the margin for this revision, but will be displayed in future revisions.
7	Revised Appendix A.1 Part A and Appendix A.2 Part B per Minor Mod CE-61808. Revised Appendix A.2 Part B and Appendix A Table 2 per NSM CN-11392/00.
8	Revised Appendix B.18 per Minor Mod CE-73093.
9	Added FHA for the SSF and made miscellaneous editorial corrections per Minor Mod CE-73253.
10	Revised Appendix A-2, Table 4 per NSM CN-11432/01.
11	Revised Appendix A, Section A.1 per CD500716 and CD100064.
12	Revised Table 5 per PIP C-06-03470, Exemption Code G.19.
13	Added Appendix C per PIP C-06-04113, Exemption Code G.6.
14	Revised Appendix A, Section A.2, Part B per PIP C-07-00794, Exemption Code G.5.
15	Revised Appendix A, Section A.1 per CD101453.
16	Revised Appendix A, Section A.1 and Appendix B, Section B.38 per PIP C-08-04588, Exemption Codes G.18 and G.19.
17	Revised Appendix A, section A.1 per EC 91534 (CD500965).
18	Revised Appendix A, section A.1 per PIP C-09-05931, Exemption Code G.18.
19	Revised Section 3.0 and Removed Appendix B per PIP C-10-01294, Exemption Code G.3.

REVISION NO.	PAGES or SECTIONS REVISED AND DESCRIPTION
20	Revised Appendix A, Section A.1 per EC76152 (CN-11436/02).
21	Revised Section 4.1.3 per PIP C-12-00359, Exemption Code G.7.
22	Revised Appendix A, Section A.1 per EC 75788 (CN-21436/02) and PIP C-12-04670, Exemption Code G.7. Also revised Section A.3 per PIP C-12-04670, Exemption Code G.7.
23	Revised Appendix A, Section A.1 per EC104021.
24	Revised Appendix A, Section A.3 per PIP C-13-03855, Exemption Code G.18.
25	Revised Appendix A, Section A.1 per EC92877 (CD501104).

CONTENTS

1. PURPOSE

This specification documents the criteria used to develop the Catawba Nuclear Station Fire Protection Program. It provides Duke Power's position on regulatory fire protection issues and documents the source of this position.

This specification is QA Condition 3.

Each system or structure Design Basis Specification includes a section entitled "Fire Protection". System and structure Design Basis Specifications reference this specification, if applicable.

2. INTRODUCTION

The Nuclear Regulatory Commission issued initial fire protection regulatory positions in reference 4.1.1.4.1, which adopted reference 4.1.1.9.1. The APCSB (Auxiliary Power, Chemical and Systems Branch) Branch Technical Position was generally based on traditional fire protection measures consistent with insurance industry standards for "highly protected risks" and required a fire protection program based on a defense in depth philosophy of the following:

- Administrative programs for fire prevention.
- Suppression/detection systems and fire barriers for alarm and fire control.
- Manual fire fighting capability for fire extinguishment.

Duke Power Company provided a comparison of the Catawba Nuclear Station fire protection program to the requirements of the APCSB Branch Technical Position in December 1977. This response is considered to be a "living" document and is updated as applicable station modifications are completed or reviewed and approved changes are made to the Catawba Nuclear Station Fire Protection Program. The response to the APCSB Branch Technical Position is provided as Appendix A.1 to this specification.

The Catawba Nuclear Station response to the APCSB Branch Technical Position included a detailed discussion of the designated fire areas located in the safety related portions of the plant. The detailed discussion is referred to as the Fire Hazards Analysis and is considered to be a "living" document. The Fire Hazards Analysis is updated as applicable station modifications are completed or reviewed and approved changes are made to the Catawba Nuclear Station Fire Protection Program. The Fire Hazards Analysis is provided as Appendix A.2 to this specification.

In 1981 the NRC issued reference 4.1.1.4.2 (referred to in this specification as "Appendix R"), which is applicable to commercial nuclear stations licensed to operate prior to January 1, 1979. Appendix R contained additional fire protection requirements. These requirements included specific fire protection features for protection of redundant systems required to achieve safe shutdown following a fire in the plant. Although not applicable to Catawba Nuclear Station, the NRC requested that Duke Power Company compare the Catawba Nuclear Station Fire Protection Program to the technical requirements of Appendix R. Duke Power Company submitted this comparison in October 1981. This response is considered to be a "living" document and is updated as applicable station modifications are completed in the plant or reviewed and approved changes are made to the Catawba Nuclear Station Fire Protection Program. This response is provided as Appendix A.3 to this specification. Details of the Catawba Nuclear Station Post Fire Safe Shutdown program are found in reference 4.1.2.1.7.

Also in 1981 the NRC issued Revision 3 to the Standard Review Plan (NUREG 0800) which included the fire protection program requirements applicable to Catawba Nuclear Station. These requirements are found in reference 4.1.1.6.1. The CMEB (Chemical Engineering Branch) Branch Technical Position incorporated the guidance of the APCSB Branch Technical Position and technical requirements similar to Appendix R. The CMEB Technical Branch Position also deleted the APCSB Technical Branch Position. Duke Power Company was not required to submit a comparison of the Catawba Nuclear Station Fire Protection Program to the guidance of the CMEB Branch Technical Position.

The NRC used the previous submittals discussed above and site visits to evaluate the Catawba Nuclear Station fire protection program as compared to the guidance of the CMEB Branch Technical Position. The results of these document reviews, site visits and subsequent negotiations were documented by the NRC in references:

- 4.1.1.3.1
- 4.1.1.3.2
- 4.1.1.3.3
- 4.1.1.3.4
- 4.1.1.3.5

The Catawba Nuclear Station fire protection features provided in accordance with regulatory commitments were incorporated in the Catawba Nuclear Station Technical Specifications. As outlined in NRC Generic Letter 86-10, the Catawba Nuclear Station fire protection features were relocated from the Technical Specifications to the following references:

- 4.1.1.2.2
- 4.1.1.2.3
- 4.1.1.2.4
- 4.1.1.2.5
- 4.1.1.2.6
- 4.1.1.2.7
- 4.1.1.2.8

3. DESIGN BASES

The design bases of the fire protection program at the Catawba Nuclear Station is to achieve an adequate balance in the following:

a. Prevent fires from starting.

b. Promptly detect, control and extinguish those fires that do occur.

c. Provide protection for structures, systems and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.

The Catawba Nuclear Station Fire Protection Program has been developed based on the regulatory positions and guidance contained in the documents identified in 2.

Catawba Nuclear Station has the latitude to revise the fire protection program as documented in references:

- 4.1.1.1.1
- 4.1.1.1.2

Fire protection program changes which would adversely affect the ability to achieve and maintain safe shutdown in the event of a fire shall receive prior approval by the NRC. Fire protection program changes which do not degrade the approved fire protection program may be made without prior NRC approval.

Fire protection program changes shall be available for NRC review upon request and reported annually to the Director of the Office of Nuclear Reactor Regulation. Changes to the fire protection program are also documented within the appropriate appendices of this specification.

Design Criteria utilized for complying with regulatory requirements related to assuring safe shutdown following loss of equipment due to a fire is documented in reference 4.1.2.1.7.

The equipment, systems or components provided for the fire protection program are generally designed for compliance with an applicable National Fire Protection Association (NFPA) Standard. To determine the specific NFPA standard and edition that applies to a fire detection/protection equipment, system, or component, a review of the applicable drawings, calculations, and System Design Basis Document is required.

Whenever station conditions are in violation of Duke Power's commitments to the NRC as outlined in Appendix A.1 through A.5, the Problem Investigation Process (PIP) shall be invoked.

3.1 DEFINITIONS

Terms are defined when used in the appendices.

3.2 APPLICATION

This specification addresses the fire protection features included in the QA Condition 3 Program. The QA Condition 3 Program boundaries are detailed in reference 4.1.2.1.1.

3.3 EXEMPTIONS

As described in Section 2 of this Specification, the NRC prepared the fire protection portion of the Safety Evaluation Report using the guidance of reference 4.1.1.6.1 as the basis for their review. In many cases the NRC accepted fire protection commitments made by Duke Power Company which deviated from certain requirements of reference 4.1.1.6.1. These deviations are noted in references:

- 4.1.1.3.1
- 4.1.1.3.2
- 4.1.1.3.3
- 4.1.1.3.4
- 4.1.1.3.5

4. REFERENCES

4.1.1 LICENSING

4.1.1.1 License

4.1.1.1.1 Unit 1 Full Power License Condition Number 8, Fire Protection Program

4.1.1.1.2 Unit 2 Full Power License condition Number 6, Fire Protection Program

4.1.1.2 FSAR

4.1.1.2.1 FSAR Section 9.5.1, Fire Protection System

4.1.1.2.2 FSAR Section 16.9-1 (SLC), Fire Suppression Water Systems

4.1.1.2.3 FSAR Section 16.9-2 (SLC), Sprinkler Systems

4.1.1.2.4 FSAR Section 16.9-3 (SLC), CO2 System

4.1.1.2.5 FSAR Section 16.9-4 (SLC), Fire Hose Stations

4.1.1.2.6 FSAR Section 16.9-5 (SLC), Fire Barrier Penetrations

4.1.1.2.7 FSAR Section 16.9-6 (SLC), Fire Detection Instrumentation

4.1.1.2.8 FSAR Section 16.9-23 (SLC), Fire Hydrants

4.1.1.2.9 FSAR Section 16.13-1 (SLC), Fire Brigade

4.1.1.2.10 FSAR Section 16.13-2 (SLC), Technical Review and Control

4.1.1.3 SER

4.1.1.3.1 SER Section 9.5.1, Fire Protection Program

4.1.1.3.2 SER Supplement No. 2 Section 9.5.1, Fire Protection Program

4.1.1.3.3 SER Supplement No. 3 Section 9.5.1, Fire Protection Program

4.1.1.3.4 SER Supplement No. 4 Section 9.5.1, Fire Protection Program

4.1.1.3.5 SER Supplement No. 5 Section 9.5.1, Fire Protection Program

4.1.1.4 10CFR

4.1.1.4.1 10CFR50.48 Appendix A, General Design Criteria 3, Fire Protection

4.1.1.4.2 10CFR50 Appendix R, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979

4.1.1.5 NUREGS

4.1.1.5.1 U.S. Nuclear Regulatory Commission NUREG-1449, Shutdown and Low Power Operation at Commercial Nuclear Power Plants in the United States

4.1.1.6 Standard Review Plan

4.1.1.6.1 Standard Review Plan Section 9.5.1, Fire Protection Program which incorporates Branch Technical Position CMEB 9.5.1 Fire Protection for Nuclear Power Plants

4.1.1.7 Codes and Standards

Specific codes and editions are discussed as applicable in Appendices A and B.

4.1.1.8 Correspondence

A detailed summary of the following correspondence is provided in Appendix D of this specification.

4.1.1.8.1 W.O. Parker October 23, 1981 letter to H.R. Denton, Subject: Catawba Nuclear Station Response to Appendix A to Branch Technical Position APCSB 9.5-1

4.1.1.8.2 W.O. Parker January 14, 1982 letter to H.R. Denton, Subject: Catawba Nuclear Station Response to Appendix R to 10CFR50

4.1.1.8.3 W.O. Parker July 29, 1982 letter to H.R. Denton, Subject: Commitment to Comply with Various Sections of Branch Technical Position CMEB 9.5-1

4.1.1.8.4 H.B. Tucker September 14, 1982 letter to H.R. Denton, Subject: Fire Detectors in Safety Related Areas

4.1.1.8.5 H.B. Tucker December 15, 1982 letter to H.R. Denton, Subject: Interim Barrier and Unlabeled Fire Doors

4.1.1.8.6 H.B. Tucker April 14, 1983 letter to H.R. Denton, Subject: SER Clarifications

4.1.1.8.7 H.B. Tucker May 31, 1983 letter to H.R. Denton, Subject: Masonry Wall Embedded Steel Fire Test

4.1.1.8.8 H.B. Tucker July 5, 1983 letter to H.R. Denton, Subject: Post Fire Safe Shutdown

4.1.1.8.9 H.B. Tucker July 25,1983 letter to H.R. Denton, Subject: Post Fire Safe Shutdown

4.1.1.8.10 H.B. Tucker November 4, 1983 letter to H.R. Denton, Subject: Revision to Catawba Nuclear Station Response to Appendix A to Branch Technical Position APCSB 9.5-1

4.1.1.8.11 H.B. Tucker January 17, 1984 letter to H.R. Denton, Subject: Reactor Building Annulus Proposed Manual Sprinkler System

4.1.1.8.12 H.B. Tucker February 10, 1984 letter to H.R. Denton, Subject: Response to NRC Concerns Raised During November 1-4, 1983 Site Audit

4.1.1.8.13 **H.B. Tucker February 20, 1984 letter to H.R. Denton, Subject: Reactor Coolant Pump Motor Oil Collection System**

4.1.1.8.14 **H.B. Tucker February 29, 1984 letter to H.R. Denton, Subject: Fire Protection Valve Supervision**

4.1.1.8.15 **H.B. Tucker March 14, 1984 letter to H.R. Denton, Subject: Fire Brigade Composition**

4.1.1.8.16 **H.B. Tucker April 9, 1984 letter to H.R. Denton, Subject: Revision to Catawba Nuclear Station Response to Appendix A to Branch Technical Position APCSB 9.5-1**

4.1.1.8.17 **H.B. Tucker April 11,1984 letter to H.R. Denton, Subject: Associated Circuit Reviews for Post Fire Safe Shutdown**

4.1.1.8.18 **H.B. Tucker April 25, 1984 letter to H.R. Denton, Subject: Reactor Coolant Pump Drain Tanks Hydrogen Blanket and Automatic Sprinkler Protection for Reactor Building Annulus**

4.1.1.8.19 **H.B. Tucker May 8, 1984 letter to H.R. Denton, Subject: Supplement to April 11, 1984 letter concerning Associated Circuit Reviews**

4.1.1.8.20 **H.B. Tucker May 11, 1984 letter to H.R. Denton, Subject: CAPT Hatch Cover Structural Steel/Rubatex Flame Spread/CA Pump Room Cable Enclosure**

4.1.1.8.21 **H.B. Tucker June 29, 1984 letter to H.R. Denton, Subject: Unit 1 Fire Protection Program Establishment Versus Unit 1 Fuel Load**

4.1.1.8.22 **H.B. Tucker July 6, 1984 letter to H.R. Denton, Subject: Request Exemption For Compliance to Various Items Until Initial Criticality**

4.1.1.8.23 **H.B. Tucker August 2, 1984 letter to H.R. Denton, Subject: False Actuation to Main Steam Isolation Valves or Steam Generator PORV's Due to Fire Induced Shorts**

4.1.1.8.24 **H.B. Tucker August 3, 1984 letter to H.R. Denton, Subject: Post Fire Safe Shutdown Minimum Shift Crew**

4.1.1.8.25 **H.B. Tucker September 18, 1984 letter to H.R. Denton, Subject: SER and Supplements Clarifications**

4.1.1.8.26 **H.B. Tucker November 13, 1984 letter to H.R. Denton, Subject: Completion of Items Identified in June 29, 1984 Letter**

4.1.1.8.27 **H.B. Tucker November 30, 1984 letter to H.R. Denton, Subject: Confirmation that Cold Shutdown Can Be Achieved Within 72 Hours Following a Fire Event**

4.1.1.8.28 **H.B. Tucker March 21, 1985 letter to Dr. J. Nelson-Grace, Subject: Submittal of Information In Preparation For Unit 1 Post Fire Safe Shutdown Inspection**

4.1.1.8.29 **H.B. Tucker April 1, 1985 letter to Dr. J. Nelson-Grace, Subject: Submittal of Information In Preparation For Unit 1 Post Fire Safe Shutdown Inspection**

4.1.1.8.30 **H.B. Tucker May 31, 1985 letter to Dr. J. Nelson-Grace, Subject: CA Pump Unprotected Cable Tray Supports**

4.1.1.8.31 **H.B. Tucker November 27, 1985 letter to R.D. Walker, Subject: Submittal of Information In Preparation For Unit 2 Post Fire Safe Shutdown Inspection**

4.1.1.8.32 **H.B. Tucker March 19, 1986 letter to Dr. J. Nelson-Grace, Subject: Doghouse Fire Hazard Analysis**

4.1.1.9 Branch Technical Positions

4.1.1.9.1 **Appendix A to Branch Technical Position APCSB 9.5-1, Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976**

4.1.1.9.2 **Branch Technical Position CMEB 9.5-1, Fire Protection Guidelines for Nuclear Power Plants**

4.1.1.10 Generic Letters

4.1.1.10.1 **NRC Generic Letter 86-10, Implementation of Fire Protection Requirements**

4.1.1.10.2 **NRC Generic Letter 88-20, Supplement 4, Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities, including Sandia Fire Risk Scoping Studies**

4.1.2 ENGINEERING DOCUMENTS

4.1.2.1 Specifications

4.1.2.1.1 **CNS-1435.00-00-0001, Fire Protection Acceptance Specification**

4.1.2.1.2 **CNS-1599.RF-00-0001, Design Basis Specification for the RF/RY System**

4.1.2.1.3 **CNS-376.00-EFA-0001, Design Basis Specification for the EFA System**

4.1.2.1.4 **CNS-1139.00-00-0001, Design Basis Specification for the Auxiliary Building Structures**

4.1.2.1.5 **CNS-1144.00-00-0010, Design Basis Specification for the Reactor Building Structures**

4.1.2.1.6 **CNS-1465.00-00-0003, Design Basis Specification for Mechanical & Electrical Penetration Seals**

4.1.2.1.7 **CNS-1435.00-00-0002, Design Basis Specification for Post Fire Safe Shutdown**

4.1.2.2 Drawings

Reference 4.1.2.1.1 contains a listing of drawings which define the QA Condition 3 boundaries at Catawba Nuclear Station.

4.1.2.2.1 Drawing Series CN-1105, Architectural Fire Boundary Walls

4.1.2.2.2 Drawing CN-1206-18, AB Arch Door Schedule

4.1.2.2.3 Drawing CN-1206-18.01, AB Arch Door Schedule

4.1.2.2.4 Drawing CN-1206-18.02, AB Arch Door Schedule

4.1.2.2.5 Drawing CN-1206-18.03, AB Arch Door Schedule

4.1.2.2.6 Drawing CN-1206-18.03-01, AB Arch Door Schedule

4.1.2.2.7 Drawing CN-1206-18.04, AB Arch Door Schedule

4.1.2.2.8 Drawing Series CN-1209-10, Fire Protection Equipment Layout and Boundaries

4.1.3 OTHER

4.1.3.1 Nuclear Policy Manual (NSD's)

4.1.3.1.1 NSD 112, Fire Brigade Organization, Training and Responsibilities

4.1.3.1.2 NSD 313, Control of Combustible and Flammable Material

4.1.3.1.3 NSD 316, Fire Protection Impairment and Surveillance

4.1.3.1.4 NSD 314, Hot Work Authorization

4.1.3.1.5 NSD-403, Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) per 10CFR50.65(a)(4)

4.1.3.2 Site Directives

Deleted per Revision 21.

4.1.3.3 Design Basis Calculations

4.1.3.3.1 CNC-1435.00-00-0037, Fire Protection Program Licensing Basis

4.1.3.3.2 CNC-1435.00-00-0036, Evaluation of Changes/Deviations to the Fire Protection Program

4.1.3.3.3 CNC-1435.00-00-0035, CNS Penetration Seal Database and 86-10 Evaluations

4.1.3.3.4 CNC-1435.00-00-0031, Technical Basis of Fire Barrier Penetration Seals

APPENDIX A. FIRE PROTECTION REVIEW

The contents of this review form the basis of the Fire Protection Program required per license agreements between the NRC and Duke Power Company for the Catawba Nuclear Station. The review includes the following:

- DPC's response to reference 4.1.1.9.1.
- Fire hazards analysis.
- DPC's response to reference 4.1.1.4.2.
- Fire protection portion of the Safety Evaluation Report and subsequent supplements.

The fire hazard analysis will be reviewed as necessary and revised as changes are made in areas affecting the analysis. Details of the hazards analysis are in A-2 of this Appendix.

Duke Power Company has installed a Standby Shutdown System (SSS) at Catawba Nuclear Station to provide an additional means of achieving and maintaining the unit in a hot standby condition. Damage control measures would then be utilized as necessary to bring the unit from a hot standby to a cold shutdown condition.

A.1 PART A - RESPONSE TO APPENDIX A TO BRANCH TECHNICAL POSITION APCSB 9.5-1

The following report regarding the fire protection program at the Catawba Nuclear Station is in response to positions presented in reference 4.1.1.9.1. Responses follow paragraph headings as shown in the Position.

NRC: 1. OVERALL REQUIREMENTS OF NUCLEAR PLANT FIRE PROTECTION PROGRAM

a. PERSONNEL

RESPONSIBILITY FOR THE OVERALL FIRE PROTECTION PROGRAM SHOULD BE ASSIGNED TO A DESIGNATED PERSON IN THE UPPER LEVEL OF MANAGEMENT. THIS PERSON SHOULD RETAIN ULTIMATE RESPONSIBILITY EVEN THOUGH FORMULATION AND ASSURANCE OF PROGRAM IMPLEMENTATION IS DELEGATED. SUCH DELEGATION OF AUTHORITY SHOULD BE TO STAFF PERSONNEL PREPARED BY TRAINING AND EXPERIENCE IN FIRE PROTECTION AND NUCLEAR PLANT SAFETY TO PROVIDE A BALANCED APPROACH IN DIRECTING THE FIRE PROTECTION PROGRAMS FOR NUCLEAR POWER PLANTS. THE QUALIFICATION REQUIREMENTS FOR THE FIRE PROTECTION ENGINEER OR CONSULTANT WHO WILL ASSIST IN THE DESIGN AND SELECTION OF EQUIPMENT, INSPECTION AND TEST THE COMPLETED PHYSICAL ASPECTS OF THE SYSTEM, DEVELOP THE FIRE PROTECTION PROGRAM, AND ASSIST IN THE FIREFIGHTING TRAINING FOR THE OPERATING PLANT SHOULD BE STATED.

THE FIRE PROTECTION STAFF SHOULD BE RESPONSIBLE FOR:

1) COORDINATION OF BUILDING LAYOUT AND SYSTEMS DESIGN WITH FIRE AREA REQUIREMENTS, INCLUDING CONSIDERATION OF POTENTIAL HAZARDS ASSOCIATED WITH POSTULATED DESIGN BASIS FIRES,

2) DESIGN AND MAINTENANCE OF FIRE DETECTION, SUPPRESSION, AND EXTINGUISHING SYSTEMS.

3) FIRE PREVENTION ACTIVITIES,

4) TRAINING AND MANUAL FIRE-FIGHTING ACTIVITIES OF PLANT PERSONNEL AND THE FIRE BRIGADE.

DUKE: The Vice President of Catawba Nuclear Site has the responsibility for Maintaining the Catawba Fire Protection Program (FFP). The formulation and assurance of this program has been delegated to the Program and Components Engineering Section. The responsibility for fire protection has been placed with the Programs Group. An Engineer, with the title Fire Protection Engineer, has been assigned full time to assist in the design and selection of equipment and development of the Fire Protection Program. The Fire Protection Engineer reviews all designs for new facilities and existing facilities modifications; reviews the design, layout, and installation of fire detection and suppression systems; and provides support to the station to resolve fire protection concerns.

A Fire Protection Consistency team which includes the Fire Protection Engineers from the three Nuclear Station Engineering Sections reviews fire protection issues to ensure consistency among the sites in implementation of the program.

An individual within the Emergency Planning Group, within the Safety Assurance Section, is responsible for administrative control of the site Fire Brigade.

NRC: b. DESIGN BASES

THE OVERALL FIRE PROTECTION PROGRAM SHOULD BE BASED UPON EVALUATION OF POTENTIAL FIRE HAZARDS THROUGHOUT THE PLANT AND THE EFFECT OF POSTULATED DESIGN BASIS FIRES RELATIVE TO MAINTAINING ABILITY TO PERFORM SAFETY SHUTDOWN FUNCTIONS AND MINIMIZE RADIOACTIVE RELEASES TO THE ENVIRONMENT.

DUKE: The fire protection program at Catawba is based upon an evaluation of potential fire hazards throughout the Auxiliary, Diesel Generator and Reactor Buildings and the Nuclear Service Water Pump Structure and those portions of the Turbine and Service Buildings adjacent to these facilities.

Each area was inspected and the combustible material considered over the affected area.

Considering the combustible loading, equipment orientation, and areas immediately adjacent to the area under review, an appropriate level of fire protection was developed.

NRC: c. BACKUP

TOTAL RELIANCE SHOULD NOT BE PLACED ON A SINGLE AUTOMATIC FIRE SUPPRESSION SYSTEM. APPROPRIATE BACKUP FIRE SUPPRESSION CAPABILITY SHOULD BE PROVIDED.

DUKE: Total reliance is not placed on a single fixed suppression system. In areas protected by fixed sprinklers or automatic CO2 systems, backup hose stations and portable extinguishers are provided.

NRC: d. SINGLE FAILURE CRITERION

A SINGLE FAILURE IN THE FIRE SUPPRESSION SYSTEM SHOULD NOT IMPAIR BOTH THE PRIMARY AND BACKUP FIRE SUPPRESSION CAPABILITY. FOR EXAMPLE, REDUNDANT FIRE WATER PUMPS WITH INDEPENDENT POWER SUPPLIES AND CONTROLS SHOULD BE PROVIDED. POSTULATED FIRE OR FIRE PROTECTION SYSTEM FAILURES NEED NOT BE CONSIDERED CONCURRENT WITH OTHER PLANT ACCIDENTS OR THE MOST SEVERE NATURAL PHENOMENA. THE EFFECTS OF LIGHTNING STRIKES SHOULD BE INCLUDED IN THE OVERALL PLANT FIRE PROTECTION PROGRAM.

DUKE: A single failure in the fire suppression system will not impair both the primary and backup fire suppression capability. Catastrophic failure of either valve lRY-19 or lRY-23 resulting in total system impairment is not considered to be a credible event.

Separate feeders from the fire protection header to fixed sprinkler systems and backup hose stations will assure available fire protection. Portable fire extinguishers are also provided. Three fire pumps, each capable of supporting the fire protection system, are provided with separate sources of power. Backup power from the diesel generators is also available during a blackout condition for two of the three fire pumps.

Fire pump discharge piping is arranged to minimize potential of a single failure impairing redundant fire pumps. The primary jockey pumps provide constant pressure and YD makeup water to the system. As a backup the secondary Jockey Pumps and pressure tank arrangement taking suction from the Filtered Water (YF) system would be adequate for 2 1/2" hose streams.

There are three fire protection headers supplying the fire protection systems located within each Reactor Building.

One header supplies water to the extinguishing systems protecting the Pipe Corridor, Reactor Coolant Pumps, and Lower Containment Carbon Filters.

A second header supplies all manual hose stations located within the Reactor Building.

Each of these headers is equipped with a normally closed electric motor operated control valve.

The remaining header, equipped with a normally open electric motor operated control valve, supplies the sprinklers located within the Annulus.

All of the electric motor operated valves are manually operable or may be remotely operated from the control room. When the area is available for personnel access, an administrative procedure will require manual extinguishers be available as backup protection.

NRC: e. FIRE SUPPRESSION SYSTEMS

FAILURE OR INADVERTENT OPERATION OF THE FIRE SUPPRESSION SYSTEM SHOULD NOT INCAPACITATE SAFETY RELATED SYSTEMS OR COMPONENTS. FIRE SUPPRESSION SYSTEMS THAT ARE PRESSURIZED DURING NORMAL PLANT OPERATION SHOULD MEET THE GUIDELINES SPECIFIED IN APCSB BRANCH TECHNICAL POSITION 3-1, "PROTECTION AGAINST POSTULATED PIPING FAILURES IN FLUID SYSTEMS OUTSIDE CONTAINMENT."

DUKE: Orifice plates will be installed in the two yard fire protection headers which supply water to fire protection systems within safety related areas. Hydraulic calculations verify that the available water supply is adequate based on fire protection design criteria and the maximum potential quantity is within the limit of guidelines specified in APCSB Branch Technical Position 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment".

In areas protected with fixed sprinkler systems, shields will prevent direct impingement of water on safe shutdown equipment which might be incapacitated by water contact. In addition, shields are provided in some areas (i.e., switchgear rooms) for protection in the event of fire hose piping failure.

NRC: f. FUEL STORAGE AREAS

SCHEDULE FOR IMPLEMENTATION OF MODIFICATIONS, IF ANY, WILL BE ESTABLISHED ON A CASE-BY-CASE BASIS.

THE FIRE PROTECTION PROGRAM (PLANS, PERSONNEL AND EQUIPMENT) FOR BUILDING, STORING NEW REACTOR FUEL AND FOR ADJACENT FIRE ZONES WHICH COULD AFFECT THE FUEL STORAGE ZONE SHOULD BE FULLY OPERATIONAL BEFORE FUEL IS RECEIVED AT THE SITE.

DUKE: The fire protection program, including plans, personnel and equipment, for the new fuel storage area and for adjacent fire zones which could affect the fuel storage zone was operational before fuel was received at the site and continues to provide protection for shipments.

NRC: g. FUEL LOADING

SCHEDULE FOR IMPLEMENTATION OF MODIFICATIONS, IF ANY, WILL BE ESTABLISHED ON A CASE-BY-CASE BASIS.

THE FIRE PROTECTION PROGRAM FOR AN ENTIRE REACTOR UNIT SHOULD BE FULLY OPERATIONAL PRIOR TO INITIAL FUEL LOADING IN THAT REACTOR UNIT.

DUKE: The Fire Protection Program was operational prior to initial fuel loading for both units.

NRC: h. SIMULTANEOUS FIRES

SIMULTANEOUS FIRES IN MORE THAN ONE REACTOR NEED NOT BE POSTULATED, WHERE SEPARATION REQUIREMENTS ARE MET. A FIRE INVOLVING MORE THAN ONE REACTOR UNIT NEED NOT BE POSTULATED EXCEPT FOR FACILITIES SHARED BETWEEN UNITS.

DUKE: The fire hazard analysis postulated a single fire which would affect both units only in those facilities shared between units.

CONCLUSION

Based on this evaluation, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section 1, Overall Requirements of Nuclear Plant Fire Protection Program.

NRC: 2. ADMINISTRATIVE PROCEDURES, CONTROLS AND FIRE BRIGADE

a. ADMINISTRATIVE PROCEDURES CONSISTENT WITH THE NEED FOR MAINTAINING THE PERFORMANCE OF THE FIRE PROTECTION SYSTEM AND PERSONNEL IN NUCLEAR POWER PLANTS SHOULD BE PROVIDED.

GUIDANCE IS CONTAINED IN THE FOLLOWING PUBLICATIONS:

NFPA 4 - ORGANIZATION FOR FIRE SERVICES

NFPA 4A - ORGANIZATION FOR FIRE DEPARTMENT

NFPA 6 - INDUSTRIAL FIRE LOSS PREVENTION

NFPA 7 - MANAGEMENT OF FIRE EMERGENCIES

NFPA 8 - MANAGEMENT RESPONSIBILITY FOR EFFECTS OF FIRE ON OPERATIONS

NFPA 27 - PRIVATE FIRE BRIGADES

DUKE: A Nuclear System Directive (NSD 112) covers the organization of the fire brigade and training requirements for the station.

Guidance for the Directive will be obtained from the National Fire Protection Association Codes.

NRC: b. EFFECTIVE ADMINISTRATIVE MEASURES SHOULD BE IMPLEMENTED TO PROHIBIT BULK STORAGE OF COMBUSTIBLE MATERIALS INSIDE OR ADJACENT TO SAFETY RELATED BUILDINGS OR SYSTEMS DURING OPERATION OR MAINTENANCE PERIODS. REGULATORY GUIDE 1.39, "HOUSEKEEPING REQUIREMENTS FOR WATER-COOLED NUCLEAR POWER PLANTS," PROVIDES GUIDANCE ON HOUSEKEEPING, INCLUDING THE DISPOSAL OF COMBUSTIBLE MATERIALS.

DUKE: A Nuclear System Directive (NSD 313) prohibits bulk storage of combustible materials inside or adjacent to safety related buildings or systems. Periodic inspections by station personnel assures adherence to the Directive.

NRC: c. NORMAL AND ABNORMAL CONDITIONS OR OTHER ANTICIPATED OPERATIONS SUCH AS MODIFICATIONS (e.g., BREAKING FIRE STOPS, IMPAIRMENT OF FIRE DETECTION AND SUPPRESSION SYSTEMS) AND REFUELING ACTIVITIES SHOULD BE REVIEWED BY APPROPRIATE LEVELS OF MANAGEMENT AND APPROPRIATE SPECIAL ACTIONS AND PROCEDURES SUCH AS FIRE WATCHES OR TEMPORARY FIRE BARRIERS IMPLEMENTED TO ASSURE ADEQUATE FIRE PROTECTION AND REACTOR SAFETY IN PARTICULAR:

1) WORK INVOLVING IGNITION SOURCES SUCH AS WELDING AND FLAME CUTTING SHOULD BE DONE UNDER CLOSELY CONTROLLED CONDITIONS. PROCEDURES GOVERNING SUCH WORK SHOULD BE REVIEWED AND APPROVED BY PERSONS TRAINED AND EXPERIENCED IN FIRE PROTECTION. PERSONS PERFORMING AND DIRECTLY ASSISTING IN SUCH WORK SHOULD BE TRAINED AND EQUIPPED TO PREVENT AND COMBAT FIRES. IF THIS IS NOT POSSIBLE, A PERSON QUALIFIED IN FIRE PROTECTION SHOULD DIRECTLY MONITOR THE WORK AND FUNCTION AS A FIRE WATCH.

DUKE: The Catawba Planning Section reviews work requests to determine the effects of these activities on station fire barriers and alerts maintenance supervisors to special precautions which must be taken. A Nuclear System Directive (NSD 314) provides guidance for precautions taken during welding and cutting operations.

NRC: 2) LEAK TESTING AND SIMILAR PROCEDURES, SUCH AS AIR FLOW DETERMINATION, SHOULD USE ONE OF THE COMMERCIALLY AVAILABLE AEROSOL TECHNIQUES. OPEN FLAMES OR COMBUSTION GENERATED SMOKE SHOULD NOT BE PERMITTED.

DUKE: Leak testing, and similar procedures such as air flow determinations, are accomplished with available aerosol techniques. Open flame or combustion generated smoke are not used for leak testing.

Periodic test procedures, written by experienced personnel, cover steps in testing for each situation. Supervisors and maintenance personnel are experienced in their areas of responsibility.

NRC: 3) USE OF COMBUSTIBLE MATERIAL, e.g., HEPA AND CHARCOAL FILTERS, DRY ION EXCHANGE RESINS OR OTHER COMBUSTIBLE SUPPLIES IN SAFETY RELATED AREAS SHOULD BE CONTROLLED. USE OF WOOD INSIDE BUILDINGS CONTAINING SAFETY RELATED SYSTEMS OR EQUIPMENT SHOULD BE PERMITTED ONLY WHEN SUITABLE NON-COMBUSTIBLE SUBSTITUTES ARE NOT AVAILABLE. IF WOOD MUST BE USED, ONLY FIRE RETARDANT TREATED WOOD (SCAFFOLDING, LAY DOWN BLOCKS) SHOULD BE PERMITTED. SUCH MATERIALS SHOULD BE ALLOWED INTO SAFETY RELATED AREAS ONLY WHEN THEY ARE TO BE USED IMMEDIATELY. THEIR POSSIBLE AND PROBABLE USE SHOULD BE CONSIDERED IN THE FIRE HAZARD ANALYSIS TO DETERMINE THE ADEQUACY OF THE INSTALLED FIRE PROTECTION SYSTEMS.

DUKE: A Nuclear System Directive (NSD 313) and procedures require control of combustible material required for operation of the plant.

A Nuclear System Directive permits use of fire retardant treated wood in the station only when suitable non-combustible substitutes are not available.

The periodic inspections by task force personnel and station personnel assure compliance with the Directive.

NRC: d. NUCLEAR POWER PLANTS ARE FREQUENTLY LOCATED IN REMOTE AREAS, AT SOME DISTANCE FROM PUBLIC FIRE DEPARTMENTS. ALSO, FIRST RESPONSE FIRE DEPARTMENTS ARE OFTEN VOLUNTEER. PUBLIC FIRE DEPARTMENT RESPONSE SHOULD BE CONSIDERED IN THE OVERALL FIRE PROTECTION PROGRAM. HOWEVER, THE PLANT SHOULD BE DESIGNED TO BE SELF-SUFFICIENT WITH RESPECT TO FIRE FIGHTING ACTIVITIES AND RELY ON THE PUBLIC RESPONSE ONLY FOR SUPPLEMENTAL OR BACKUP CAPABILITY.

DUKE: The Catawba Nuclear Station fire brigade is self-sufficient with respect to fire fighting activities. Since the publication of Supplement 3 to the Safety Evaluation Report, Operations has assumed fire brigade responsibilities from Security. The fire brigade may be supplemented by other station groups as needed. This is the normally accepted fire brigade organization. Training and drills are conducted on a regular basis. Sufficient fire protection equipment is provided in appropriate locations.

The nearest fire department is the Bethel Volunteer Fire Department located approximately six miles from the station. Request for assistance from the local fire department would be considered only by the Station Manager or his designated representative.

NRC: e. THE NEED FOR GOOD ORGANIZATION, TRAINING AND EQUIPPING OF FIRE BRIGADES AT NUCLEAR POWER PLANT SITES REQUIRES EFFECTIVE MEASURES BE IMPLEMENTED TO ASSURE PROPER DISCHARGE OF THESE FUNCTIONS. THE GUIDANCE IN REGULATORY GUIDE 1.101, "EMERGENCY PLANNING FOR NUCLEAR POWER PLANTS," SHOULD BE FOLLOWED AS APPLICABLE.

1) SUCCESSFUL FIRE FIGHTING REQUIRES TESTING AND MAINTENANCE OF THE FIRE PROTECTION EQUIPMENT, EMERGENCY LIGHTING AND COMMUNICATION, AS WELL AS PRACTICE AS BRIGADES FOR THE PEOPLE WHO MUST UTILIZE THE EQUIPMENT. A TEST PLAN THAT LISTS THE INDIVIDUALS AND THEIR RESPONSIBILITIES IN CONNECTION WITH ROUTINE TEST AND INSPECTIONS OF THE FIRE DETECTION AND PROTECTION SYSTEMS SHOULD BE DEVELOPED. THE TEST PLAN SHOULD CONTAIN THE TYPES, FREQUENCY AND DETAILED PROCEDURES FOR TESTING. PROCEDURES SHOULD ALSO CONTAIN INSTRUCTION ON MAINTAINING FIRE PROTECTION DURING THOSE PERIODS WHEN THE FIRE PROTECTION SYSTEM IS IMPAIRED OR DURING PERIODS OF PLANT MAINTENANCE, e.g., FIRE WATCHES OR TEMPORARY HOSE CONNECTIONS TO WATER SYSTEMS.

DUKE: Periodic tests are conducted to assure the reliability of the fire protection system at Catawba.

The Catawba Nuclear Station Procedure Index defines periodic tests to be conducted, personnel to conduct tests and the frequency of test.

A Nuclear System Directive (NSD 316) covers requirements for fire watches during periods of fire protection system impairments.

NRC: 2) BASIC TRAINING IS A NECESSARY ELEMENT IN EFFECTIVE FIRE FIGHTING OPERATION. IN ORDER FOR A FIRE BRIGADE TO OPERATE EFFECTIVELY, IT MUST OPERATE AS A TEAM. ALL MEMBERS MUST KNOW WHAT THEIR INDIVIDUAL DUTIES ARE. THEY MUST BE FAMILIAR WITH THE LAYOUT OF THE PLANT AND EQUIPMENT LOCATION AND OPERATION IN ORDER TO PERMIT EFFECTIVE FIRE-FIGHTING OPERATIONS DURING TIMES WHEN A PARTICULAR AREA IS FILLED WITH SMOKE OR IS INSUFFICIENTLY LIGHTED. SUCH TRAINING CAN ONLY BE ACCOMPLISHED BY CONDUCTING DRILLS SEVERAL TIMES A YEAR (AT LEAST QUARTERLY) SO THAT ALL MEMBERS OF THE FIRE BRIGADE HAVE HAD THE OPPORTUNITY TO TRAIN AS A TEAM, TESTING ITSELF IN THE MAJOR AREAS OF THE PLANT. THE DRILLS SHOULD INCLUDE THE SIMULATED USE OF EQUIPMENT IN EACH AREA AND SHOULD BE PREPLANNED AND POSTCRITIQUED TO ESTABLISH THE TRAINING OBJECTIVE OF THE DRILLS AND DETERMINE HOW WELL THESE OBJECTIVES HAVE BEEN MET. THESE DRILLS SHOULD PERIODICALLY (AT LEAST ANNUALLY) INCLUDE LOCAL FIRE DEPARTMENT PARTICIPATION WHERE POSSIBLE. SUCH DRILLS ALSO PERMIT SUPERVISING PERSONNEL TO EVALUATE THE EFFECTIVENESS OF COMMUNICATIONS WITHIN THE FIRE BRIGADE AND WITH THE ON-SCENE FIRE TEAM LEADER, THE REACTOR OPERATOR IN THE CONTROL ROOM, AND THE OFFSITE COMMAND POST.

DUKE: The fire brigade training and refresher training will be conducted using guidelines from the National Fire Protection Association.

NRC: 3) TO HAVE PROPER COVERAGE DURING ALL PHASES OF OPERATION, MEMBERS OF EACH SHIFT CREW SHOULD BE TRAINED IN FIRE PROTECTION. TRAINING OF THE PLANT FIRE BRIGADE SHOULD BE COORDINATED WITH THE LOCAL FIRE DEPARTMENTS SO THAT RESPONSIBILITIES AND DUTIES ARE DELINEATED IN ADVANCE. THIS COORDINATION SHOULD BE PART OF THE TRAINING COURSE AND IMPLEMENTED INTO THE TRAINING OF THE LOCAL FIRE DEPARTMENT STAFF. LOCAL FIRE DEPARTMENTS SHOULD BE EDUCATED IN THE OPERATIONAL PRECAUTIONS WHEN FIGHTING FIRES ON NUCLEAR POWER PLANT SITES. LOCAL FIRE DEPARTMENTS SHOULD BE MADE AWARE OF THE NEED FOR RADIOACTIVE PROTECTION OF PERSONNEL AND THE SPECIAL HAZARDS ASSOCIATED WITH A NUCLEAR POWER PLANT SITE.

DUKE: Each operating shift provides individuals to the fire brigade.

Local fire departments are provided orientation training.

NRC: 4) NFPA 27, "PRIVATE FIRE BRIGADE" SHOULD BE FOLLOWED IN ORGANIZATION, TRAINING, AND FIRE DRILLS. THIS STANDARD ALSO IS APPLICABLE FOR THE INSPECTION AND MAINTENANCE OF FIRE FIGHTING EQUIPMENT. AMONG THE STANDARDS REFERENCED IN THIS DOCUMENT, THE FOLLOWING SHOULD BE UTILIZED: NFPA 194, "STANDARD FOR SCREW THREADS AND GASKETS FOR FIRE HOSE COUPLINGS," NFPA 196, "STANDARD FOR FIRE HOSE," NFPA 197, "TRAINING STANDARD ON INITIAL FIRE ATTACKS," NFPA 601, "RECOMMENDED MANUAL OF INSTRUCTIONS AND DUTIES FOR THE PLANT WATCHMAN OR GUARD." NFPA BOOKLETS AND PAMPHLETS LISTED ON PAGE 27-11 OF VOLUME 8, 1971-72, ARE ALSO APPLICABLE FOR GOOD TRAINING REFERENCES. IN ADDITION, COURSES IN FIRE PREVENTION AND FIRE SUPPRESSION WHICH ARE RECOGNIZED AND/OR SPONSORED BY THE FIRE PROTECTION INDUSTRY SHOULD BE UTILIZED.

DUKE: The fire brigade organization and training is established and supervised by qualified fire training instructors. NFPA Standards are used for guidance in establishing requirements for watchpersons.

CONCLUSION

With the use of Nuclear System Directives, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section 2, Administrative Procedures, Controls and Fire Brigade.

NRC: 3. QUALITY ASSURANCE PROGRAM

QUALITY ASSURANCE (QA) PROGRAMS OF APPLICANTS AND CONTRACTORS SHOULD BE DEVELOPED AND IMPLEMENTED TO ASSURE THAT THE REQUIREMENTS FOR DESIGN, PROCUREMENT, INSTALLATION, AND TESTING AND ADMINISTRATIVE CONTROLS FOR THE FIRE PROTECTION PROGRAM FOR SAFETY RELATED AREAS AS DEFINED IN THIS BRANCH POSITION ARE SATISFIED. THE PROGRAM SHOULD BE UNDER THE MANAGEMENT CONTROL OF THE QA ORGANIZATION. THE QA PROGRAM CRITERIA THAT APPLY TO THE FIRE PROTECTION PROGRAM SHOULD INCLUDE THE FOLLOWING:

a. DESIGN CONTROL AND PROCUREMENT DOCUMENT CONTROL

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT ALL DESIGN-RELATED GUIDELINES OF THE BRANCH TECHNICAL POSITION ARE INCLUDED IN DESIGN AND PROCUREMENT DOCUMENTS AND THAT DEVIATIONS THEREFROM ARE CONTROLLED.

DUKE: Only those revisions to the fire protection program negotiated after January l, 1978, are under the Duke Power Quality Assurance Program to assure they conform to guidelines of the Branch Technical Position or are controlled deviations.

References to the Quality Assurance Program mentioned hereafter were effective May 1, 1978.

NRC: b. INSTRUCTIONS, PROCEDURES AND DRAWINGS

INSPECTIONS, TESTS, ADMINISTRATIVE CONTROLS, FIRE DRILLS AND TRAINING THAT GOVERN THE FIRE PROTECTION PROGRAM SHOULD BE PRESCRIBED BY DOCUMENTED INSTRUCTIONS, PROCEDURES OR DRAWINGS AND SHOULD BE ACCOMPLISHED IN ACCORDANCE WITH THESE DOCUMENTS.

DUKE: Inspections, tests, administrative controls, fire drills and training governing the fire protection program are prescribed in Nuclear System Directives to include instructions, procedures or drawings and frequencies.

NRC: c. CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT PURCHASED MATERIAL, EQUIPMENT AND SERVICES CONFORM TO THE PROCUREMENT DOCUMENTS.

DUKE: The Duke Power Quality Assurance Program assures that purchased material, equipment and services conform to the procurement documents.

NRC: d. INSPECTION

A PROGRAM FOR INDEPENDENT INSPECTION OF ACTIVITIES AFFECTING FIRE PROTECTION SHOULD BE ESTABLISHED AND EXECUTED BY, OR FOR, THE ORGANIZATION PERFORMING THE ACTIVITY TO VERIFY CONFORMANCE WITH DOCUMENTED INSTALLATION DRAWINGS AND TEST PROCEDURES FOR ACCOMPLISHING THE ACTIVITIES.

DUKE: The Quality Assurance program verifies the organization performing the activity conforms with documented installation drawings and test procedures for accomplishing the activities.

NRC: e. TEST AND TEST CONTROL

A TEST PROGRAM SHOULD BE ESTABLISHED AND IMPLEMENTED TO ASSURE THAT TESTING IS PERFORMED AND VERIFIED BY INSPECTION AND AUDIT TO DEMONSTRATE CONFORMANCE WITH DESIGN AND SYSTEM READINESS REQUIREMENTS. THE TESTS SHOULD BE PERFORMED IN ACCORDANCE WITH WRITTEN TEST PROCEDURES. TEST RESULTS SHOULD BE PROPERLY EVALUATED AND ACTED ON.

DUKE: Nuclear System Directives, Engineering, and manufacturer's recommendations establish the required test programs and procedures for the station. The QA program will audit these inspections.

NRC: f. INSPECTION, TEST AND OPERATING STATUS

MEASURES SHOULD BE ESTABLISHED TO PROVIDE FOR THE IDENTIFICATION OF ITEMS THAT HAVE SATISFACTORILY PASSED REQUIRED TESTS AND INSPECTIONS.

DUKE: Documentation of audits and inspections conducted under the QA program identify items that have satisfactorily passed required tests and inspections.

Station procedures control tags or other methods used to physically identify those items needing additional recognition.

NRC: g. NON-CONFORMING ITEMS

MEASURES SHOULD BE ESTABLISHED TO CONTROL ITEMS THAT DO NOT CONFORM TO SPECIFIED REQUIREMENTS TO PREVENT INADVERTENT USE OR INSTALLATION.

DUKE: Procedures under the QA program are used to control those items that do not conform to specified requirements to prevent inadvertent use or installation.

NRC: h. CORRECTIVE ACTION

MEASURES SHOULD BE ESTABLISHED TO ASSURE THAT CONDITIONS ADVERSE TO FIRE PROTECTION, SUCH AS FAILURES, MALFUNCTIONS, DEFICIENCIES, DEVIATIONS, DEFECTIVE COMPONENTS, UNCONTROLLED COMBUSTIBLE MATERIAL AND NON-CONFORMANCES ARE PROMPTLY IDENTIFIED, REPORTED AND CORRECTED.

DUKE: Regularly scheduled inspections and testing is conducted in accordance with Nuclear System Directives to assure that conditions adverse to fire protection are promptly identified, reported and corrected.

These actions are audited under the provisions of the QA program.

NRC: i. RECORDS

RECORDS SHOULD BE PREPARED AND MAINTAINED TO FURNISH EVIDENCE THAT THE CRITERIA ENUMERATED ABOVE ARE BEING MET FOR ACTIVITIES AFFECTING THE FIRE PROTECTION PROGRAM.

DUKE: Records kept in the Station Master File will furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.

NRC: j. AUDITS

AUDITS SHOULD BE CONDUCTED AND DOCUMENTED TO VERIFY COMPLIANCE WITH THE FIRE PROTECTION PROGRAM INCLUDING DESIGN AND PROCUREMENT DOCUMENTS; INSTRUCTIONS; PROCEDURES AND DRAWINGS; AND INSPECTION AND TEST ACTIVITIES.

DUKE: The QA Department conducts and documents audits to verify compliance with the fire protection program including design and procurement documents; instructions; procedures and drawings; and inspection and test activities.

In addition to the QA Department audits, internal audits are conducted for each unit on a regular basis to review the fire protection program to include, but not limited to the following:

1) Initial and periodic testing of all fire protection systems and equipment
2) Adequate separation of hazardous materials
3) Controlled use of combustible building materials
4) Compliance with Directives

CONCLUSION

With the initiation of the Quality Assurance Program and periodic internal inspections, the Catawba Nuclear Station is in compliance with the intent of Appendix A to Branch Technical Position 9.5-1 under Section 3, Quality Assurance Program.

NRC: 4. GENERAL GUIDELINES FOR PLANT PROTECTION

a. BUILDING DESIGN

1) PLANT LAYOUTS SHOULD BE ARRANGED TO:

a) ISOLATE SAFETY RELATED SYSTEMS FROM UNACCEPTABLE FIRE HAZARDS, AND

b) ALTERNATIVES:

i) REDUNDANT SAFETY RELATED SYSTEMS THAT ARE SUBJECT TO DAMAGE FROM A SINGLE FIRE HAZARD SHOULD BE PROTECTED BY A COMBINATION OF FIRE RETARDANT COATINGS AND FIRE DETECTION AND SUPPRESSION SYSTEMS, OR

ii) A SEPARATE SYSTEM TO PERFORM THE SAFETY FUNCTION SHOULD BE PROVIDED.

DUKE: The Catawba Nuclear Station plant layout is arranged to isolate safety related systems from unacceptable fire hazards as demonstrated by the hazards analysis.

Areas where redundant safety related systems are subject to damage from a single fire hazard are protected by a combination of fire barriers, fire detection and suppression capability.

NRC: 2) IN ORDER TO ACCOMPLISH a.(1) ABOVE, SAFETY RELATED SYSTEMS AND FIRE HAZARDS SHOULD BE IDENTIFIED THROUGHOUT THE PLANT. THEREFORE, A DETAILED FIRE HAZARD ANALYSIS SHOULD BE MADE. THE FIRE HAZARDS ANALYSIS SHOULD BE REVIEWED AND UPDATED AS NECESSARY.

DUKE: The hazard analysis is presented in A.2

NRC: 3) FOR MULTIPLE REACTOR SITES, CABLE SPREADING ROOMS SHOULD NOT BE SHARED BETWEEN REACTORS. EACH CABLE SPREADING ROOM SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY BARRIERS (WALLS AND FLOORS) HAVING A MINIMUM FIRE RESISTANCE OF THREE HOURS. CABLING FOR REDUNDANT SAFETY DIVISIONS SHOULD BE SEPARATED BY WALLS HAVING THREE-HOUR FIRE BARRIERS.

DUKE: The Cable Spreading Rooms are addressed in Section 6.c, Guideline for Specific Plant Areas Cable Spreading Room.

NRC: 4) INTERIOR WALL AND STRUCTURAL COMPONENTS, THERMAL INSULATION MATERIALS AND RADIATION SHIELDING MATERIALS AND SOUND-PROOFING SHOULD BE NON-COMBUSTIBLE. INTERIOR FINISHES SHOULD BE NON-COMBUSTIBLE OR LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY, SUCH AS FACTORY MUTUAL OR UNDERWRITERS LABORATORY, INC. FOR FLAME SPREAD, SMOKE AND FUEL CONTRIBUTION OF 25 OR LESS IN ITS USE CONFIGURATION (ASTM E-84 TEST, "SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS").

DUKE: Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound proofing are non-combustible.

Interior finishes have a flame spread rating of 25 or less and a smoke and fuel contribution of 50 or less in its use configuration.

NRC: 5) METAL DECK ROOF CONSTRUCTION SHOULD BE NON-COMBUSTIBLE (SEE THE BUILDING MATERIALS DIRECTORY OF THE UNDER-WRITERS LABORATORY, INC.) OR LISTED AS CLASS I BY FACTORY MUTUAL SYSTEM APPROVAL GUIDE.

DUKE: The Reactor Buildings, Auxiliary Building, Diesel Generator Buildings, and Nuclear Service Water Pump Structure all have reinforced concrete roofs.

NRC: 6) SUSPENDED CEILINGS AND THEIR SUPPORTS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION. CONCEALED SPACES SHOULD BE DEVOID OF COMBUSTIBLES.

DUKE: Suspended ceilings and their supports are of non-combustible construction. Concealed spaces contain only necessary electrical wiring.

NRC: 7) HIGH-VOLTAGE - HIGH AMPERAGE TRANSFORMERS INSTALLED INSIDE BUILDINGS CONTAINING SAFETY RELATED SYSTEMS SHOULD BE OF THE DRY TYPE OR INSULATED AND COOLED WITH NON-COMBUSTIBLE LIQUID.

DUKE: High voltage - high amperage load-center transformers located in the Auxiliary Building are gas filled. All other transformers located in safety related buildings are dry type, air cooled.

8. BUILDINGS CONTAINING SAFETY RELATED SYSTEMS, HAVING OPENINGS IN EXTERIOR WALLS CLOSER THAN 50 FEET TO FLAMMABLE OIL FILLED TRANSFORMERS SHOULD BE PROTECTED FROM THE EFFECTS OF A FIRE BY:

   a) CLOSING OF THE OPENING TO HAVE FIRE RESISTANCE EQUAL TO THREE HOURS.

   b) CONSTRUCTING A THREE-HOUR FIRE BARRIER BETWEEN THE TRANSFORMERS AND THE WALL OPENINGS; OR

   c) CLOSING THE OPENING AND PROVIDING THE CAPABILITY TO MAINTAIN A WATER CURTAIN IN CASE OF A FIRE.

DUKE: There are no oil-filled transformers located within fifty (50) feet of buildings containing safety related equipment necessary for shutdown.

Openings in exterior walls of buildings containing safety related systems which are exposed to fire hazards will be closed with penetration seals with fire resistance equal to rating of the barrier. However, presently there is no existing fire hazard exposure to safety related buildings.

NRC: 9) FLOOR DRAINS, SIZED TO REMOVE EXPECTED FIRE FIGHTING WATER FLOW SHOULD BE PROVIDED IN THOSE AREAS WHERE FIXED WATER FIRE SUPPRESSION SYSTEMS ARE INSTALLED. DRAINS SHOULD BE PROVIDED IN OTHER AREAS WHERE HAND HOSE LINES MAY BE USED IF SUCH FIRE FIGHTING WATER COULD CAUSE UNACCEPTABLE DAMAGE TO EQUIPMENT IN THE AREA. EQUIPMENT SHOULD BE INSTALLED ON PEDESTALS, OR CURBS SHOULD BE PROVIDED AS REQUIRED TO CONTAIN WATER AND DIRECT IT TO FLOOR DRAINS. (SEE NFPA 92M, "WATERPROOFING AND DRAINING OF FLOORS.") DRAINS IN AREAS CONTAINING COMBUSTIBLE LIQUIDS SHOULD HAVE PROVISIONS FOR PREVENTING THE SPREAD OF THE FIRE THROUGHOUT THE DRAIN SYSTEM. WATER DRAINAGE FROM AREAS WHICH MAY CONTAIN RADIOACTIVITY SHOULD BE SAMPLED AND ANALYZED BEFORE DISCHARGE TO THE ENVIRONMENT.

IN OPERATING PLANTS OR PLANTS UNDER CONSTRUCTION, IF ACCUMULATION OF WATER FROM THE OPERATION OF NEW FIRE SUPPRESSION SYSTEMS DOES NOT CREATE UNACCEPTABLE CONSEQUENCES, DRAINS NEED NOT BE INSTALLED.

DUKE: Floor drains are provided in areas protected by fixed water suppression systems. These floor drains are adequate for the expected water flow from the fire suppression system in these areas.

Floor drains in areas of potential radiation are connected to the Liquid Waste System and are monitored for acceptable limits prior to discharge to the environment.

In the event additional areas are equipped with fixed water suppression systems, a study will be performed to determine the effect of water accumulation.

NRC: 10) FLOORS, WALLS AND CEILINGS ENCLOSING SEPARATE FIRE AREAS SHOULD HAVE MINIMUM FIRE RATING OF THREE HOURS. PENETRATIONS IN THESE FIRE BARRIERS, INCLUDING CONDUITS AND PIPING, SHOULD BE SEALED OR CLOSED TO PROVIDE A FIRE RESISTANCE RATING AT LEAST EQUAL TO THAT OF THE FIRE BARRIER ITSELF. DOOR OPENINGS SHOULD BE PROTECTED WITH EQUIVALENT RATED DOORS, FRAMES AND HARDWARE THAT HAVE BEEN TESTED AND APPROVED BY A NATIONALLY RECOGNIZED LABORATORY. SUCH DOORS SHOULD BE NORMALLY CLOSED AND LOCKED OR ALARMED WITH ALARM AND ANNUNCIATION IN THE CONTROL ROOM. PENETRATIONS FOR VENTILATION SYSTEM SHOULD BE PROTECTED BY A STANDARD "FIRE DOOR DAMPER" WHERE REQUIRED. (REFER TO NFPA 80, "FIRE DOORS AND WINDOWS.")

THE FIRE HAZARD IN EACH AREA SHOULD BE EVALUATED TO DETERMINE BARRIER REQUIREMENTS. IF BARRIER FIRE RESISTANCE CANNOT BE MADE ADEQUATE, FIRE DETECTION AND SUPPRESSION SHOULD BE PROVIDED, SUCH AS:

a) WATER CURTAIN IN CASE OF FIRE,

b) FLAME RETARDANT COATINGS,

c) ADDITIONAL FIRE BARRIERS.

DUKE: Floors, walls and ceilings enclosing separate fire areas have minimum fire ratings of three hours. Penetrations through rated walls that are sealed provide fire resistance equivalent to the barrier itself. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning exceptions.)

Doors and hardware installed in fire boundaries have fire rating equal to the boundary rating. Doors and hardware are listed by or constructed to standards of a nationally recognized testing laboratory. Variances are discussed in A-2. (Ref. Correspondence - W. O. Parker's letter of July 29, 1982 and H. B. Tucker's letter of December 15, 1982 to Harold R. Denton (NRR) concerning exceptions.)

Ventilation penetrations through barriers are protected by rated fire dampers where required. These dampers are installed in accordance with manufacturer's recommendations. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning exception.)

The fire hazard analysis was used to evaluate the need for fire barriers.

NRC: b. CONTROL OF COMBUSTIBLES

1) SAFETY RELATED SYSTEMS SHOULD BE ISOLATED OR SEPARATED FROM COMBUSTIBLE MATERIALS. WHEN THIS IS NOT POSSIBLE BECAUSE OF THE NATURE OF THE SAFETY SYSTEM OR THE COMBUSTIBLE MATERIAL, SPECIAL PROTECTION SHOULD BE PROVIDED TO PREVENT A FIRE FROM DEFEATING THE SAFETY SYSTEM FUNCTION. SUCH PROTECTION MAY INVOLVE A COMBINATION OF AUTOMATIC FIRE SUPPRESSION, AND CONSTRUCTION CAPABLE OF WITHSTANDING AND CONTAINING A FIRE THAT CONSUMES ALL COMBUSTIBLES PRESENT. EXAMPLES OF SUCH COMBUSTIBLE MATERIALS THAT MAY NOT BE SEPARABLE FROM THE REMAINDER OF ITS SYSTEM ARE:

a) EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS

b) TURBINE-GENERATOR OIL AND HYDRAULIC CONTROL FLUID SYSTEMS

c) REACTOR COOLANT PUMP LUBE OIL SYSTEM

DUKE: Safety related systems are separated from combustible materials except when required for system operation. (Ref. Correspondence April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning flammable gases.)

a) EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS

Emergency diesel generator fuel oil day tanks and related equipment are located inside the Diesel Generator Building's three-hour barriers. Automatic detection is provided to alarm and annunciate in the Control Room and activate the automatic carbon dioxide system protecting the area. Hose stations and portable extinguishers are provided as backup to the automatic suppression system. A dike around the day tank will contain the entire contents of the tank in the event of a spill. Tanks are vented to the exterior of the Diesel Generator Room. The day tank can be isolated from the Main Fuel Oil Tanks by means of a valve located exterior to the Diesel Generator Room.

b) TURBINE-GENERATOR OIL AND HYDRAULIC CONTROL FLUID SYSTEMS

Turbine-generator oil and hydraulic control fluid systems are not exposed to safety related equipment required for shutdown.

c) REACTOR COOLANT PUMP MOTOR LUBE OIL SYSTEM

The Primary means of fire protection for the Reactor Coolant Pump Motors is the oil collection systems designed to contain oil leakage and direct it to piping which goes to drain tanks. In addition to the pump motor design features for containing oil, each Reactor Coolant Pump is protected with a fixed water extinguishing system.

Heat sensing cable detectors around the pumps and motors alarm and annunciate in the Control Room. The operator then activates a remote manual valve from the Control Room to pressurize the fire protection header in the Reactor Building. Individual heads will then fuse as necessary to provide suppression.

NRC: 2) BULK GAS STORAGE (EITHER COMPRESSED OR CRYOGENIC), SHOULD NOT BE PERMITTED INSIDE STRUCTURES HOUSING SAFETY RELATED EQUIPMENT. STORAGE OF FLAMMABLE GAS SUCH AS HYDROGEN, SHOULD BE LOCATED OUTDOORS OR IN SEPARATE DETACHED BUILDINGS SO THAT A FIRE OR EXPLOSION WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT.

(REFER TO NFPA 50A, "GASEOUS HYDROGEN SYSTEMS.")

CARE SHOULD BE TAKEN TO LOCATE HIGH PRESSURE GAS STORAGE CONTAINERS WITH THE LONG AXIS PARALLEL TO BUILDING WALLS. THIS WILL MINIMIZE THE POSSIBILITY OF WALL PENETRATION IN THE EVENT OF A CONTAINER FAILURE. USE OF COMPRESSED GASES (ESPECIALLY FLAMMABLE AND FUEL GASES) INSIDE BUILDINGS SHOULD BE CONTROLLED. (REFER TO NFPA 6, "INDUSTRIAL FIRE LOSS PREVENTION.")

DUKE: Bulk gas storage is located in a separate detached building with each tank restrained to prevent potential damage in the event of tank failure. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning flammable gases.)

NRC: 3) THE USE OF PLASTIC MATERIALS SHOULD BE MINIMIZED. IN PARTICULAR, HALOGINATED PLASTICS SUCH AS POLYVINYL CHLORIDE (PVC) AND NEOPRENE SHOULD BE USED ONLY WHEN SUBSTITUTE NON-COMBUSTIBLE MATERIALS ARE NOT AVAILABLE. ALL PLASTIC MATERIALS, INCLUDING FLAME AND FIRE RETARDANT MATERIALS, WILL BURN WITH AN INTENSITY AND BTU PRODUCTION IN A RANGE SIMILAR TO THAT OF ORDINARY HYDROCARBONS. WHEN BURNING, THEY PRODUCE HEAVY SMOKE THAT OBSCURES VISIBILITY AND CAN PLUG AIR FILTERS, ESPECIALLY CHARCOAL AND HEPA. THE HALOGINATED PLASTICS ALSO RELEASE FREE CHLORINE AND HYDROGEN CHLORIDE WHEN BURNING WHICH ARE TOXIC TO HUMANS AND CORROSIVE TO EQUIPMENT.

DUKE: Power/Control/Instrumentation cable used in the Auxiliary, Reactor Buildings, Diesel Generator Buildings, and Nuclear Service Water Pump Structure is bare armored construction with exception of a few computer interface cables which are routed through enclosed cable tray(s). Refer to Section 4.c(6) for a discussion of the construction and use of cable at Catawba. The use of other plastic materials is controlled by Administrative Procedures. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) for additional information concerning jacketed cables.)

NRC: 4) STORAGE OF FLAMMABLE LIQUIDS SHOULD, AS A MINIMUM, COMPLY WITH THE REQUIREMENTS OF NFPA 30, "FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE."

DUKE: A Nuclear System Directive (NSD 313) requires storage of flammable liquids to, as a minimum, comply with intent of NFPA 30, "Flammable and Combustible Liquids Code."

NRC: c. ELECTRIC CABLE CONSTRUCTION, CABLE TRAYS AND CABLE PENETRATIONS

1) ONLY NON-COMBUSTIBLE MATERIALS SHOULD BE USED FOR CABLE TRAY CONSTRUCTION.

DUKE: All cable trays are constructed of galvanized steel.

NRC: 2) SEE SECTION 6.c FOR FIRE PROTECTION GUIDELINES FOR CABLE SPREADING ROOMS.

DUKE: Fire protection for the Cable Spreading Room is discussed in Section 6.c.

NRC: 3) AUTOMATIC WATER SPRINKLER SYSTEMS SHOULD BE PROVIDED FOR CABLE TRAYS OUTSIDE THE CABLE SPREADING ROOM. CABLES SHOULD BE DESIGNED TO ALLOW WETTING DOWN WITH DELUGE WATER WITHOUT ELECTRICAL FAULTING. MANUAL HOSE STATIONS AND PORTABLE HAND EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP. SAFETY RELATED EQUIPMENT IN THE VICINITY OF SUCH CABLE TRAYS, THAT DOES NOT ITSELF REQUIRE WATER FIRE PROTECTION, BUT IS SUBJECT TO UNACCEPTABLE DAMAGE FROM SPRINKLER WATER DISCHARGE, SHOULD BE PROTECTED FROM SPRINKLER SYSTEM OPERATION OR MALFUNCTION.

WHEN SAFETY RELATED CABLES DO NOT SATISFY THE PROVISIONS OF REGULATORY GUIDE 1.75, ALL EXPOSED CABLES SHOULD BE COVERED WITH AN APPROVED FIRE RETARDANT COATING AND A FIXED AUTOMATIC WATER FIRE SUPPRESSION SYSTEM SHOULD BE PROVIDED.

DUKE: The results of the fire hazard analysis were used to determine the methods and extent of fire protection required in each area of the plant.

In areas with fixed sprinkler systems and/or hose stations, shields will be provided as necessary to protect safety related equipment from water damage.

Cable routing at Catawba satisfies the following criteria:

The separation of redundant safety related cables is provided by routing in separate cable trays, conduits, ducts, or other suitable wireways over different routes with adequate separation. Routing of redundant safety related cables located above each other is intended to be avoided. Where this is not possible and they are located vertically above each other, the minimum vertical spacing is 60 inches in the general plant area and 36 inches in the Control Complex Area without additional protection or 12 inches with a barrier over the lower cables and a barrier under the upper cables. Where redundant safety related cables are located along side each other horizontally, 36 inches minimum separation is maintained in the general plant area and 12 inches in the Control Complex Area without additional protection. Cable tray covers, cable tray sides, conduits, armored cables, metal barriers and other barriers may provide this additional protection. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) detailing Appendix R cable separation information.)

NRC: 4) CABLE AND CABLE TRAY PENETRATION OF FIRE BARRIERS (VERTICAL AND HORIZONTAL) SHOULD BE SEALED TO GIVE PROTECTION AT LEAST EQUIVALENT TO THAT FIRE BARRIER. THE DESIGN OF FIRE BARRIERS FOR HORIZONTAL AND VERTICAL CABLE TRAYS SHOULD, AS A MINIMUM, MEET THE REQUIREMENTS OF ASTM E-119, "FIRE TEST OF BUILDING CONSTRUCTION AND MATERIALS," INCLUDING THE HOSE STREAM TEST.

WHERE INSTALLED PENETRATION SEALS ARE DEFICIENT WITH RESPECT TO FIRE RESISTANCE, THESE SEALS MAY BE PROTECTED BY COVERING BOTH SIDES WITH AN APPROVED FIRE RETARDANT MATERIAL. THE ADEQUACY OF USING SUCH MATERIAL SHOULD BE DEMONSTRATED BY SUITABLE TESTING.

DUKE: Cable and cable tray penetrations of fire barriers will be sealed to provide protection equivalent to the rating of the original barrier.

The design of the penetration seals meet the requirements of IEEE 634-1978 Standard on electrical cable penetration firestops including the hose stream test. The cable penetration firestops will meet the station differential pressure requirements. Test reports demonstrating compliance to IEEE 634-1978 have been submitted for review. Reference 4.1.3.3.3 and 4.1.3.3.4.

NRC: 5) FIRE BREAKS SHOULD BE PROVIDED AS DEEMED NECESSARY BY THE FIRE HAZARDS ANALYSIS. FLAME OR FLAME RETARDANT COATINGS MAY BE USED AS A FIRE BREAK FOR GROUPED ELECTRICAL CABLES TO LIMIT SPREAD OF FIRE IN CABLE VENTINGS. (POSSIBLE CABLE DERATING OWING TO USE OF SUCH COATING MATERIALS MUST BE CONSIDERED DURING DESIGN.)

DUKE: Requirements for fire barriers are determined from results of the fire hazard analysis. In addition, the armored cable design used for Catawba Nuclear Station has demonstrated high resistance to propagation as evidenced by testing of this design in a fully loaded, randomly filled, 400,000 BTU/hr exposure fire at the Underwriters Laboratories. The fully loaded trays showed no tendency for self-propagation; therefore, fire breaks are not required.

NRC: 6) ELECTRICAL CABLE CONSTRUCTIONS SHOULD AS A MINIMUM PASS THE CURRENT IEEE NO. 383 FLAME TEST. (THIS DOES NOT IMPLY THAT CABLES PASSING THIS TEST WILL NOT REQUIRE ADDITIONAL FIRE PROTECTION.)

FOR CABLE INSTALLATION IN OPERATING PLANTS AND PLANTS UNDER CONSTRUCTION THAT DO NOT MEET THE IEEE NO. 383 FLAME TEST REQUIREMENTS, ALL CABLES MUST BE COVERED WITH AN APPROVED FLAME RETARDANT COATING AND PROPERLY DERATED.

DUKE: The cable used at Catawba, classified as either power, control or instrumentation, passed the IEEE 383-1974 Flame Test.

The five, eight and fifteen KV cables are three conductor power cables with exception of the single conductor 15KV cables for the Nuclear Service Water Pump Motors which are routed through conduit. The tinned copper conductors are covered with a semi-conductive extruded strand shield, insulated with ethylene propylene rubber (EPR) and wrapped with a tinned copper shield tape. The three conductors are then twisted with a non-hydroscopic filler, bound together with asbestos binder tape, encased in a 25 mil galvanized steel interlocked armor jacket.

The three conductor 2KV power cable, which is used for 600 V systems, is constructed using a unipass flame retardant ethylene propylene rubber insulation over the tinned copper conductor. This is encased in 25 mil galvanized steel interlocked armor.

Control cables are multi-conductor cables. The tinned copper conductor has unipass ethylene propylene rubber or flame retardant cross-linked polyethylene (XLPE) insulation over the singles; the singles have been cabled with the non-hydroscopic fillers and covered with glass reinforced asbestos tape or fiberglass scrim tape. This is encased in 25 mil galvanized steel interlocked armor.

Instrumentation cable is single or multipaired cable consisting of No. 16 AWG copper conductor with unipass EPR or XLPE insulation. The singles are paired and twisted with an aluminum mylar shield and cabled with glass reinforced asbestos tape or fiberglass scrim tape. This is encased in a 25 mil galvanized steel interlocked armor.

In addition to passing the IEEE 383 Flame Test, extensive flame testing of this particular interlocked armor design in typical plant configurations has been conducted. This test program culminated in a test series at the Underwriters Laboratories, Northbrook, Illinois, where a fully loaded tray consisting of seven conductor, number twelve, inter-locked armor control cable, placed in a random lay, was exposed to a 400,000 BTU/hr heat flux. This is known as the UL corner test which consists of a sixteen foot cable run placed one foot from each corner and exposed to the heat flux of two ribbon burners.

This particular cable passed the 400,000 BTU/hr fully loaded test with no tendency for propagation on its own. Salient observations of the test series were as follows:

a) A time delay of five to six minutes was observed before the cable began to smoke or burn.

b) Burning of the cable took place in the immediate area of the source fire. Controlled propagation was evident from emission of gases through the armor during the burn time.

c) Flame height and smoke emissions can be controlled by changing tapes under the armor.

d) Maximum burn time of this cable was five to eight minutes; whereafter the source flame receded to its original height for the test duration.

e) As a result of the above, this design provides a low smoking cable with a minimum amount of combustibles. There is a time delay before burning is initiated during which a source fire is self-consuming with no contribution from the cable. Cable burning is controlled with a demonstrated burn time of five to eight minutes.

f) Additionally, Steiner Tunnel Tests demonstrated this cable design to have an extremely low flame spread and smoke factor, further demonstrating its resistance to fire.

The use of armor on cables ensures they are more resistant to mechanical damage and electrostatic and electromagnetic interferences. The armor has also been demonstrated to provide protection from short circuits and overloads.

Short circuit tests performed at the Westinghouse High Power Laboratories, East Pittsburgh, Pennsylvania, have demonstrated the cable performance under short circuit. When deliberately faulted cables were exposed to short circuit currents of 50,000 amperes at 4160 and 6900 volts, adjacent power cables and control cables in trays directly above and beneath the faulted cables were not damaged.

In many overload test series, it was demonstrated that overloaded cables would not self-ignite and cause fire propagation within the overloaded tray or adjacent trays.

Thermo Fisher Scientific provided the Source Range and Intermediate Range Excore Detector (N31/N35 and N32/N36) in-containment cabling (from the junction boxes to the penetrations) with heat shrink applied over the outer fiber glass covering. These cables are routed in two inch flex conduit with a maximum of twelve feet exposed (2 sections of 6 ft. each) at each of the penetration ends for each cable assembly, and a maximum of four feet exposed at each of the junction box ends (for each cable). Also, each detector assembly was provided with a pigtail with an outer fiber glass covering with a maximum of 6 feet (for each cable) exposed at the junction box connection. This limited amount of exposed cable (not within the flex conduit) does not constitute a significant fire hazard and is therefore acceptable. Reference EC76152 (CN-11436/02) and EC75788 (CN-21436/02).

NRC: 7) TO THE EXTENT PRACTICAL, CABLE CONSTRUCTION THAT DOES NOT GIVE OFF CORROSIVE GASES WHILE BURNING SHOULD BE USED IN NEW CABLE INSTALLATIONS.

DUKE: Interlocked armor cable within the Auxiliary Building, Reactor Buildings, Diesel Generator Buildings, and Nuclear Service Water Pump Structure at Catawba have no outer jacket over the armor. The combustible loadings in these cables consist of the insulation over the single conductors underneath the armor and the small quantity of fillers.

This is a low smoking cable design with no significant amount of halogenic materials such as PVC□S. This cable design has a minimum amount of combustible material.

NRC: 8) CABLE TRAYS, RACEWAYS, CONDUIT, TRENCHES, OR CULVERTS SHOULD BE USED ONLY FOR CABLES. MISCELLANEOUS STORAGE SHOULD NOT BE PERMITTED, NOR SHOULD PIPING FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS OR GASES BE INSTALLED IN THESE AREAS.

DUKE: Cable trays are used only to route cable. Cable located in pipe trenches is to service equipment located in that trench.

Miscellaneous storage in cable tray is administratively prohibited by Nuclear System Directives and Station Procedures.

NRC: 9) THE DESIGN OF CABLE TUNNELS, CULVERTS AND SPREADING ROOMS SHOULD PROVIDE FOR AUTOMATIC OR MANUAL SMOKE VENTING AS REQUIRED TO FACILITATE MANUAL FIRE FIGHTING CAPABILITY.

DUKE: Smoke venting to facilitate manual fire fighting capability in areas will be accomplished with portable fans.

NRC: 10) CABLES IN THE CONTROL ROOM SHOULD BE KEPT TO THE MINIMUM NECESSARY FOR OPERATION OF THE CONTROL ROOM. ALL CABLES ENTERING THE CONTROL ROOM SHOULD TERMINATE THERE. CABLES SHOULD NOT BE INSTALLED IN FLOOR TRENCHES OR CULVERTS IN THE CONTROL ROOM.

DUKE: Only those cables required for operation are routed to the Control Room. Cable entering the Control Room terminates there.

There are no floor trenches or culverts in the Control Room. NOTE: A sub floor electrical raceway was added between the SRO desk and the OATC/BOP desks per Engineering Change 91534 (CD500965). This is a completely enclosed raceway less than one sq ft in cross sectional area and has been evaluated for acceptability.

Cable run in the ceiling is for power and control of HVAC and lighting equipment located in the ceiling space. Additionally, plenum rated fiber optic cables for use by digital systems are run in the ceiling. These cables terminate in the Control Room.

NRC: d. VENTILATION

1) THE PRODUCTS OF COMBUSTION THAT NEED TO BE REMOVED FROM A SPECIFIC FIRE AREA SHOULD BE EVALUATED TO DETERMINE HOW THEY WILL BE CONTROLLED. SMOKE AND CORROSIVE GASES SHOULD GENERALLY BE AUTOMATICALLY DISCHARGED DIRECTLY OUTSIDE TO A SAFE LOCATION.

SMOKE AND GASES CONTAINING RADIOACTIVE MATERIALS SHOULD BE MONITORED IN THE FIRE AREA TO DETERMINE IF RELEASE TO THE ENVIRONMENT IS WITHIN THE PERMISSIBLE LIMITS OF THE PLANT TECHNICAL SPECIFICATIONS.

DUKE: Continuous monitoring is provided in appropriate areas throughout the Auxiliary Building to assure safe conditions of radioactivity and to alert operating personnel of any abnormality.

Specific areas with designated HVAC subsystems are addressed in the following paragraphs.

ELEVATION 594+0

FUEL HANDLING AREA - Outside air is provided for each fuel handling area by a separate supply subsystem consisting of a 100 percent capacity fan with heating and cooling coils and a medium efficiency (30 percent) air filter.

The fuel handling ventilation exhaust subsystem consists of four 50 percent capacity fans and filters (preheater prefilter, demister, absolute, carbon and absolute) and associated ductwork. Exhaust air is directed either through the filters or the filter train bypass, as determined by a duct mounted radiation monitor, to the unit vent.

This operation affords a minimum of ten air changes per hour in the fuel pool area.

CONTROL AREA - The Control Area Ventilation and Air Conditioning Systems are designed to maintain the environment in the Control, Cable and Equipment Rooms within acceptable limits for the operation of the units.

Because of the uninterrupted safe occupancy during post-accident shutdown criteria, this system is designed as an Engineered Safety Feature System with absolute and carbon filtration in the outside air intakes and equipment redundancies for use as conditions require.

Two 100 percent capacity redundant air handling systems are provided for the Control Room.

Essential electrical apparatus involved with the cooling, heating and pressurizing of the Control Room during accident conditions is connected to emergency standby power.

A 2000 CFM purge fan is provided to purge smoke through the station vent. (**NOTE**: The Control Room purge fans were abandoned by modification NSM CN-50442/00. The Control Room still has the capability of being purged of smoke by opening doors and using the Auxiliary Building Filtered Exhaust Fans.) In addition, the Control Room Area pressurizing fans provide a continuous 2000 CFM of outside air to the Control Room.

Smoke from other areas on the 594+0 Elevation will be handled by the Auxiliary Building exhaust system assisted by portable fans.

ELEVATION 577+0 and 574+0

The Cable, MCC, and Switchgear Rooms for Unit 1 and Unit 2 are served by the Control Room Area Ventilation System.

The Control Room Area pressurizing fans which serve all areas of the Control Complex, except for the Switchgear Rooms, supply 2000 CFM of outside air to these areas.

The ventilation units for these areas (not including the Switchgear Rooms) supply 73,510 CFM each. The ventilation units for the Switchgear Rooms supply 10,400 CFM to each room.

The remainder of Elevation 577+0 is served by the Auxiliary Building ventilation system. Portable fans would be used to remove smoke from affected areas to the exhaust system as required.

ELEVATION 560+0 and 554+0

The Battery, MCC and Switchgear Rooms are served by the Control Area Ventilation System.

The Control Room Area pressurizing fans serve all areas of the Control Complex except for the Switchgear Rooms. Refer also to Elevation 577+0 for pressurizing fan and ventilation unit capacities.

DIESEL BUILDING

The Diesel Building Ventilation System is designed to provide a suitable environment for the operation of equipment and personnel access as required for inspection, operation and maintenance.

The system is composed of the following components:

- A set of filters for normal ventilation supply air to the system.
- One ventilating fan and one heating coil for maintenance of building temperature.
- Two 50 percent capacity ventilation fans, ducts, diffusers, automatic return air and outside air dampers are arranged to maintain ventilation requirements during diesel operation.

Upon actuation of the carbon dioxide fire suppression system, the Diesel Building Ventilation System is automatically de-energized and the outside air and exhaust dampers are closed.

ELEVATION 543+0 AND 522+0

These areas are served by the Auxiliary Building Ventilation System with portable fans utilized as required.

CONTAINMENT

The Containment Ventilation System is designed to maintain temperature in the various portions of the Containment within acceptable limits for operation of equipment and for personnel access for inspection, maintenance and testing as required. In addition, the Containment Purge System is provided for purging the Containment atmosphere to the environment via the unit vent. These systems are not Engineered Safety Features.

The Containment Purge and Containment Ventilation Systems consist of the independent subsystems described below:

Containment Purge Supply and Exhaust

Purge air is supplied to the Containment through two 50 percent capacity fans and their associated filters and heating coils. Purged air is exhausted through two 50 percent capacity fans and filter networks to the unit vent where it is monitored during release to the atmosphere. The purge air supply and exhaust fans and filters are located in the Auxiliary Building.

There are four purge air supply penetrations and three purge air exhaust penetrations in the Containment. These penetrations are in the upper compartment and lower compartment. Two normally closed isolation valves in each penetration provide Containment isolation.

The system has the capacity to assure approximately 1.5 complete air changes per hour. Purge capacity is controlled by throttling dampers.

The upper compartment purge exhaust ductwork is so arranged to draw exhaust air into a plenum around the periphery of the refueling canal, effecting a ventilation sweep of the canal, during the refueling process. The lower compartment purge exhaust ductwork is arranged so as to sweep the reactor well during the refueling process.

Containment Upper Compartment Ventilation

The Containment upper compartment ventilation subsystem consists of four freestanding, recirculating ventilation units (three for normal operation, one standby) and their associated cooling coils, and ductwork.

Containment Lower Compartment Ventilation

The Lower Containment compartment ventilation subsystem consists of four recirculating ventilation units (three in normal operation, one standby) and their associated cooling coils, and ductwork. This equipment is located in the annular concrete chambers around the periphery of the lower Containment compartment.

Control Rod Drive Ventilation System

The control rod drive ventilation subsystem consists of four recirculating fans (three in normal operation, one standby) and associated ductwork. The fans are located in the lower compartment outside the primary shield and the supply ducts are arranged to maintain the required flow of cooling air through the control rod drive mechanism shroud.

Air is drawn from the lower compartment and is returned to the lower compartment after passing through the mechanism shroud.

In-core Instrument Room Ventilation

The In-core Instrumentation Room is a dead-ended part of the lower Containment compartment. The In-core Instrumentation Room ventilation subsystem consists of two freestanding ventilation units (one in normal operation, one standby) and associated cooling coils, and ductwork.

In-core Instrument Room Purge

Purge air is supplied to the In-core Instrumentation Room through one 100 percent capacity fan and its associated filters, heating coil, and ductwork. Purged air is exhausted through one 100 percent capacity fan and filter train to the unit vent where it is monitored during release to the atmosphere. Two normally closed isolation valves in each of the two penetrations (one supply and one exhaust) provide In-core Instrumentation Room isolation.

Containment Auxiliary Carbon Filter

This system consists of two fan-filter units located in the lower Containment compartment, arranged to assure uniform mixing of the lower compartment atmosphere with either or both units operating. Prefilters, absolute and carbon filters are provided in each unit for reduction of fission product activity which may be airborne in the lower compartment as the result of fuel cladding defects and reactor coolant leakage.

The lower compartment atmosphere is continuously monitored for radioactivity during reactor power operation for display in the Control Room. The number of auxiliary carbon filter units in operation (one or two) depends on the airborne activity levels observed. Sufficient redundancy is included to assure proper operation of the system with one active component out of service.

NRC: 2) ANY VENTILATION SYSTEM DESIGNED TO EXHAUST SMOKE OR CORROSIVE GASES SHOULD BE EVALUATED TO ENSURE THAT INADVERTENT OPERATION OR SINGLE FAILURES WILL NOT VIOLATE THE CONTROLLED AREAS OF THE PLANT DESIGN.

THIS REQUIREMENT INCLUDES CONTAINMENT FUNCTIONS FOR PROTECTION OF THE PUBLIC AND MAINTAINING HABITABILITY FOR OPERATIONS PERSONNEL.

DUKE: The air exhausted to the environment from potentially contaminated areas is monitored and filtered, as required, such that limits of 10CFR20 and Technical Specifications are not exceeded.

NRC: 3) THE POWER SUPPLY AND CONTROLS FOR MECHANICAL VENTILATION SYSTEMS SHOULD BE RUN OUTSIDE THE FIRE AREA SERVED BY THE SYSTEM.

DUKE: The power supply and controls for redundant mechanical ventilation systems are located at separate motor control centers and will not be affected by a single fire.

NRC: 4) FIRE SUPPRESSION SYSTEMS SHOULD BE INSTALLED TO PROTECT CHARCOAL FILTERS IN ACCORDANCE WITH REGULATORY GUIDE 1.52, "DESIGN TESTING AND MAINTENANCE CRITERIA FOR ATMOSPHERIC CLEANUP AIR FILTRATION."

DUKE: Carbon filters defined by Regulatory Guide 1.52 are protected by built-in water spray systems. Upon receipt of an alarm, the valves to the carbon filter involved will be manually opened at the discretion of the responding operator.

NRC: 5) THE FRESH AIR SUPPLY INTAKES TO AREAS CONTAINING SAFETY RELATED EQUIPMENT OR SYSTEMS SHOULD BE LOCATED REMOTE FROM THE EXHAUST AIR OUTLETS AND SMOKE VENTS OF OTHER FIRE AREAS TO MINIMIZE THE POSSIBILITY OF CONTAMINATING THE INTAKE AIR WITH THE PRODUCTS OF COMBUSTION.

DUKE: Outside air for the Control Area is taken from two locations such that a source of uncontaminated air is available regardless of wind direction following an event which releases radioactivity to the atmosphere. Each intake is provided with radiation, chlorine, and smoke detection. Radiation and smoke detectors alarm to the control room. This arrangement differs from that described in the SER. This modification was implemented as a resolution to PIR: 0-C91-0072 under NSM CN-50422. The fresh air intakes are at elevation 594+0 located such that each is placed on the side of the Reactor Building diametrically opposed to that unit's vent. Normally air is taken from both intakes.

NRC: 6) STAIRWELLS SHOULD BE DESIGNED TO MINIMIZE SMOKE INFILTRATION DURING A FIRE. STAIRCASES SHOULD SERVE AS ESCAPE ROUTES AND ACCESS ROUTES FOR FIRE FIGHTING. FIRE EXIT ROUTES SHOULD BE CLEARLY MARKED. STAIRWELLS, ELEVATORS AND CHUTES SHOULD BE ENCLOSED IN MASONRY TOWERS WITH MINIMUM FIRE RATING OF THREE HOURS AND AUTOMATIC FIRE DOORS AT LEAST EQUAL TO THE ENCLOSURES CONSTRUCTION, AT EACH OPENING INTO THE BUILDING. ELEVATORS SHOULD NOT BE USED DURING FIRE EMERGENCIES.

DUKE: Stairwells, duct shafts and elevator shafts are enclosed with three-hour rated walls. Three hour rated doors are provided for duct shafts and stairwells. Elevator doors are 1-hour fire rated. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning unprotected spiral stairs.)

Stairwells are centrally located and marked as emergency exits.

Station procedures prevent the use of elevators as fire exits.

NRC: 7) SMOKE AND HEAT VENTS MAY BE USEFUL IN SPECIFIC AREAS SUCH AS CABLE SPREADING ROOMS AND DIESEL FUEL OIL STORAGE AREAS AND SWITCHGEAR ROOMS. WHEN NATURAL-CONVECTION VENTILATION IS USED, A MINIMUM RATIO OF 1 SQ FOOT OF VENTING AREA PER 200 SQ FEET OF FLOOR AREA SHOULD BE PROVIDED. IF FORCED CONVECTION VENTILATION IS USED, 300 CFM SHOULD BE PROVIDED FOR EVERY 200 SQ FEET OF FLOOR AREA. SEE NFPA 204 FOR ADDITIONAL GUIDANCE ON SMOKE CONTROL.

DUKE: The Control Room is equipped with a 2000 CFM fan to purge smoke to the station vent. (**NOTE**: The Control Room purge fans were abandoned by modification NSM CN-50442/00. The Control Room still has the capability of being purged of smoke by opening doors and using the Auxiliary Building Filtered Exhaust Fans.)

Portable fans will be used to remove smoke from affected areas to the exhaust systems as required.

NRC: 8) SELF-CONTAINED BREATHING APPARATUS, USING FULL FACE POSITIVE PRESSURE MASKS, APPROVED BY NIOSH (NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH - APPROVAL FORMERLY GIVEN BY THE U S BUREAU OF MINES) SHOULD BE PROVIDED FOR FIRE BRIGADE, DAMAGE CONTROL AND CONTROL ROOM PERSONNEL. CONTROL ROOM PERSONNEL MAY BE FURNISHED BREATHING AIR BY A MANIFOLD SYSTEM PIPED FROM A STORAGE RESERVOIR IF PRACTICAL. SERVICE OR OPERATING LIFE SHOULD BE A MINIMUM OF ONE HALF HOUR FOR THE SELF-CONTAINED UNITS.

AT LEAST TWO EXTRA AIR BOTTLES SHOULD BE LOCATED ONSITE FOR EACH SELF-CONTAINED BREATHING UNIT. IN ADDITION, AN ONSITE 6-HOUR SUPPLY OF RESERVE AIR SHOULD BE PROVIDED AND ARRANGED TO PERMIT QUICK AND COMPLETE REPLENISHMENT OF EXHAUSTED SUPPLY AIR BOTTLES AS THEY ARE RETURNED. IF COMPRESSORS ARE USED AS A SOURCE OF BREATHING AIR, ONLY UNITS APPROVED FOR BREATHING AIR SHOULD BE USED. SPECIAL CARE MUST BE TAKEN TO LOCATE THE COMPRESSOR IN AREAS FREE OF DUST AND CONTAMINANTS.

DUKE: Self-contained breathing apparatus, approved by NIOSH, are provided for the fire brigade and damage control personnel.

A breathing air compressor provides for refilling expended self-contained breathing apparatus.

Self-contained breathing apparatus (SCBA) are provided for Control Room personnel.

NRC: 9) WHERE TOTAL FLOODING GAS EXTINGUISHING SYSTEMS ARE USED, AREA INTAKE AND EXHAUST VENTILATION DAMPERS SHOULD CLOSE UPON INITIATION OF GAS FLOW TO MAINTAIN NECESSARY GAS CONCENTRATION. (SEE NFPA 12, "CARBON DIOXIDE SYSTEMS," AND 12A, "HALON 1301 SYSTEMS.")

DUKE: A carbon dioxide system is used in the Diesel Generator Buildings and Auxiliary Feedwater Pump pits. The dampers in intake and exhaust ducts will close upon initiation of the protection system.

NRC: e. LIGHTING AND COMMUNICATION

LIGHTING AND TWO-WAY VOICE COMMUNICATIONS ARE VITAL TO SAFE SHUTDOWN AND EMERGENCY RESPONSE IN THE EVENT OF FIRE. SUITABLE FIXED AND PORTABLE EMERGENCY LIGHTING AND COMMUNICATION DEVICES SHOULD BE PROVIDED TO SATISFY THE FOLLOWING REQUIREMENTS:

1) FIXED EMERGENCY LIGHTING SHOULD CONSIST OF SEALED BEAM UNITS WITH INDIVIDUAL 8-HOUR MINIMUM BATTERY POWER SUPPLIES.

DUKE: Emergency lights with individual 8-hour battery powered supplies are provided in the Control Room, Auxiliary Shutdown Panel (ASP) area, in areas containing motor control centers and valves which are required to be manned when bringing the unit to a hot shutdown condition and along the access way from the Control Room to the ASP area and the Standby Shutdown Facility (SSF). An exception is the yard area between the Unit 1 Turbine Building and the SSF. Appendix R emergency lighting requirements are addressed in Part C.

Emergency Lighting System

For each of the units, there is a separate emergency 250 volt DC lighting system and a separate emergency 208Y/120 volt AC lighting system.

Emergency 250 Volt DC Lighting System

The 250 volt DC lighting system, which is normally de-energized, provides operating level lighting in the Control Room and lighting at selected stairs and corridors in the Containment, Auxiliary, and Turbine Buildings. The emergency lighting circuits are energized automatically as needed by undervoltage sensing relays mounted on the normal AC lighting panelboards. A test button is provided at each panelboard to test the operability of the system without affecting normal lighting.

Emergency AC Lighting System

The emergency AC lighting system, which is normally de-energized, provides lighting in the following parts of the Auxiliary Building: Control Room, Cable Room and Equipment Room, stairs, exits, corridors, Switchgear Rooms, Hot Machine Shop, Fuel Pool, Fuel Unloading Area, Decontamination Rooms, Pump and Tank Room areas, Fan and Ventilation Rooms, Penetration Rooms, Purge Rooms and Diesel Rooms. The stairs and platforms in the Containment are also provided lighting to enable personnel to leave or enter the structure. Power is provided from two essential 600 volt AC motor control centers through two panelboards located in the Auxiliary Building. The emergency AC lighting is energized automatically by undervoltage sensing relays monitoring the normal 600 volt AC feeder voltage. Should a blackout occur, the emergency AC lighting system will be energized by the diesel generator sequencer. Should a blackout occur simultaneously with a LOCA, the operator may energize this lighting system as soon as the diesel generator LOCA loading sequence has been completed.

NRC: 2) SUITABLE SEALED BEAM BATTERY POWERED PORTABLE HAND LIGHTS SHOULD BE PROVIDED FOR EMERGENCY USE.

DUKE: Portable hand lights will be provided for emergency use.

NRC: 3) FIXED EMERGENCY COMMUNICATION SHOULD USE VOICE POWERED HEAD SETS AT PRESELECTED STATIONS.

DUKE: There are two communication systems at the Catawba Station: (a) the Station Telephone System and (b) the Public Address System. These systems are designed in such a manner as to satisfy the single failure requirement. In addition, there are a limited number of telephones on a direct line from the commercial telephone system and a limited number of telephones on a direct line from the Duke Power microwave system.

Direct voice communications within the station is handled by the Station Telephone System by use of extension telephones with direct dialing between extensions. Station personnel may be paged by use of the station telephones and a special interface between the telephone switch (i.e., PAX) equipment and the PA amplifiers. In the event of a failure of the telephone switch, voice paging and direct conversation can be accomplished by the use of PA handsets.

Commercial telephone lines or Duke microwave lines may be accessed for outside calls by any extension telephone of the switch. These calls may be placed either by direct dialing or through the station console operator, depending upon which extension telephone is being used to place the call. Incoming outside calls may be received from the commercial telephone lines or the Duke microwave lines by the station console operator, who can then transfer the calls to any extension telephone of the switch. In addition to these interfaced lines, a commercial line and a Duke microwave line are extended directly to specific telephones in several vital locations in the station.

The Station Telephone System provides the primary means of communication for both direct conversation and for voice paging. For paging from telephones, a special interface is provided between the telephone switch and the PA system amplifiers. The telephone equipment is comparable to that of the local telephone company in operation and in equipment quality. Telephones are located so as to be accessible from any occupied area of the plant. Therefore, the telephone system should be considered adequate for communication purposes should the PA system be destroyed or disabled. 120V AC power is supplied by an AC-DC-AC battery-inverter system to the telephone switch. In the event of failure of the AC power source, the battery-inverter system can maintain the telephone switch for a minimum of one hour.

In the event of a failure of the telephone switch, the PA system remains with an adequate number of PA handsets for general coverage of the station site. The necessary power for speaker amplifiers and handset preamplifiers is from a supply which is separate from the supply feeding the Station Telephone System.

In addition to the previously described systems, a fixed repeater will be installed to provide an additional communications net for the containment. The repeater will be connected only during unit outages and when the fire brigade must enter containment. Also Electro Sound Power jacks complete with head sets are provided throughout the containment for additional voice communication.

NRC: 5. FIRE DETECTION AND SUPPRESSION

b. FIRE DETECTION

1) FIRE DETECTION SYSTEMS SHOULD AS A MINIMUM COMPLY WITH THE NFPA 72D, "STANDARD FOR THE INSTALLATION, MAINTENANCE AND USE OF PROPRIETARY PROTECTIVE SIGNALING SYSTEMS."

DUKE: The Fire Detection System complies with the intent of NFPA 72D, 1975. It is a "Type I" supervised system which provides alarm and trouble indication to the Control Room from all detectors and tested by operating personnel to insure system integrity. Back-up batteries are provided for emergency operation with alarm indication in the Control Room if normal power is lost.

NOTE: As discovered in PIP C-05-04320, the UV flame detectors in the fuel pool buildings (EFA zones 89 and 90) are not supervised on the power circuit. This is an exception to Duke's response to BTP APCSB 9.5-1, and has been evaluated per PIP C-05-04320 and minor design change CD500716.

While the Fire Detection System design complies with the intent of NFPA 72D-1975, or 72E-1974, specific features of the Catawba Nuclear Station design may differ in certain areas. Clarification of these areas is provided below:

Paragraph 1223 -

The Control Room operator will acknowledge "Fire Alarm" or "Trouble Alarm" from the Fire Detection System and take appropriate action.

Paragraphs 1231 and 1232 -

The Fire Detection System is continually supervised. System operability including individual detection instruments is verified in accordance with Catawba Selected Licensee Commitments.

Paragraph 2110 -

Installation of wiring and equipment is in accordance with Duke Power Company Standards which meet the requirements for Nuclear Power Plant Design.

Paragraph 2213 -

Conductors are protected in accordance with their current-carrying capacities. They meet Duke Power Company Standard Design for Nuclear Power Plants.

Paragraph 2224 -

Power to the Fire Detection System Processing Control Center is supplied from the Station Auxiliary Control Power System. This power system is backed by both batteries and the station diesel generators. Loss of power to the Processing Control Center is annunciated in the Control Room.

Paragraph 2471-

Trouble alarms on the containment area local alarms (Public Address System) are not provided. Any Public Address System failure will be readily apparent due to its frequent use when the containment area is accessible. Since failure of the tone generator equipment would not be readily apparent, the Reactor Building evacuation alarm will be manually activated upon verification of a fire inside containment when personnel may be in the area.

Paragraph 2551-C-

The distinct local fire alarm broadcast over the Public Address System in the Reactor Building could have a lower priority than the reactor building radiation alarm, evacuating alarm, or the site assembly alarm, all of which are broadcast in the same manner. The response of personnel will be the same for all four of the above alarms inside the Reactor Building.

Paragraph 3330 -

The Fire Detection System has been designed and installed by persons trained in Fire Protection System engineering to meet the intent of NFPA 72E-1974.

Paragraph 3520 -

Smoke detection equipment is installed in accordance with the intent of NFPA 72E-1974 as recommended by persons trained in Fire Protection System engineering.

EC104021 replaces control room Data Gathering Panel (DGP) 37 and 38 panels with EST (Edwards System Technology) Fire Alarm Control Panels (FACP 37 and 38). These panels monitor all RF suppression, deluge and CO2 alarm/trouble inputs and interface with the Honeywell Command PC.

The FACPs will be configured in a ring topology communication network in which the alarm interface for the control room will be two independent servers. One server is connected to FACP37 and the 2nd computer is connected to FACP38. Both machines allow full interface of the EFA system independent of each other. Installed on each computer is the Fireworks software which allows for easy operator interface for communication and response (alarm, supervisory, and trouble conditions) to the system. The computers being utilized are UL listed with the Edwards EST platform.

Fireworks computer 1 is connected to the U1 Keyboard, Video, Mouse (KVM) system which allows for a remote interface from the control room to computer 1. Computer 2 is connected to the U2 KVM system which allows for a remote interface from the control room to computer 2. The KVM interfaces allow for easy convenience for control room operators to respond to conditions on both Computer 1 and Computer 2.

The alarm/supervisory/trouble notification will display to the operators by annunciator windows 2AD13 A/5 (EFA System Alarm) and 2AD13 B/5 (EFA Trouble Alarm). The fire alarms and RF supervisory alarms will actuate 2AD13 A/5 and B/5 annunciators, respectively. The EST system trouble alarms will only actuate 2AD13 B/5 annunciator. The annunciators can be actuated by both FACP37 and FACP38. The annunciators are the notification for the control room operators to investigate the alarm on the Fireworks computers either by utilizing the KVM interface or by walking to the physical machines (i.e. Computer 1 and/or Computer 2 which are located in control room but out of the horseshoe complex)

The above UL listed aspects of the Edwards EST system meets or exceeds the site code of record requirements of NFPA 72D-1975 (Proprietary Signaling Systems), NFPA72E-1974 (Automatic Fire Detectors), NFPA 12-1980 (Carbon Dioxide Extinguishing Systems), NFPA 13-1976 (Sprinkler Systems), and NFPA 15-1977 (Water Spray Fixed Systems). Since the UL listed aspects of the Edwards EST system meets or exceeds the Site code of records as listed above, all other regulatory requirements are bounded and licensing commitments are satisfied. The aspects (annunciator alarms) that are not UL listed utilize redundancy (dual independent computers and means of annunciation via the flashing annunciator and the horn) and frequent testing as described above which yields an acceptable deviation or exceeds the design of current UL designs with the Edwards EST platform. Thereby the deviations are acceptable to meet the regulatory requirements and satisfy the fire protection licensing basis.

The deviations to UL Listing for Annunciator windows (2AD13 A/5 and B/5) are documented in EC104021. The detailed description of this deviation is also provided in Reference 4.1.2.1.3.

NRC: 2) FIRE DETECTION SYSTEM SHOULD GIVE AUDIBLE AND VISUAL ALARM AND ANNUNCIATION IN THE CONTROL ROOM. LOCAL AUDIBLE ALARMS SHOULD ALSO SOUND AT THE LOCATION OF THE FIRE.

DUKE: The activation of any detector provides a local alarm in the area of the activation as well as an audible and visual alarm in the Control Room.

NRC: 3) FIRE ALARMS SHOULD BE DISTINCTIVE AND UNIQUE. THEY SHOULD NOT BE CAPABLE OF BEING CONFUSED WITH ANY OTHER PLANT SYSTEM ALARMS.

DUKE: In addition to the local alarm, the PA System is used to alert fire brigade personnel. The fire alarm is sufficiently different from other plant system alarms to preclude confusion.

NRC: 4) FIRE DETECTION AND ACTUATION SYSTEMS SHOULD BE CONNECTED TO THE PLANT EMERGENCY POWER SUPPLY.

DUKE: The Fire Detection System Processing Control Center is powered from the battery-backed Auxiliary Control Power System. In the event of a blackout, the Auxiliary Control Power System is powered from the emergency diesel generators. Each data gathering panel of the detection system is equipped with back-up batteries.

NRC: b. FIRE PROTECTION WATER SUPPLY SYSTEMS

1) AN UNDERGROUND YARD FIRE MAIN LOOP SHOULD BE INSTALLED TO FURNISH ANTICIPATED FIRE WATER REQUIREMENTS. NFPA 24 - STANDARD FOR OUTSIDE PROTECTION - GIVES NECESSARY GUIDANCE FOR SUCH INSTALLATION. IT REFERENCES OTHER DESIGN CODES AND STANDARDS DEVELOPED BY SUCH ORGANIZATIONS AS THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) AND THE AMERICAN WATER WORKS ASSOCIATION (AWWA). LINED STEEL OR CAST IRON PIPE SHOULD BE USED TO REDUCE INTERNAL TUBERCULATION. SUCH TUBERCULATION DEPOSITS IN AN UNLINED PIPE OVER A PERIOD OF YEARS CAN SIGNIFICANTLY REDUCE WATER FLOW THROUGH THE COMBINATION OF INCREASED FRICTION AND REDUCED PIPE DIAMETER. MEANS FOR TREATING AND FLUSHING THE SYSTEMS SHOULD BE PROVIDED. APPROVED VISUALLY INDICATING SECTIONAL CONTROL VALVES, SUCH AS POST INDICATOR VALVES, SHOULD BE PROVIDED TO ISOLATE PORTIONS OF THE MAIN FOR MAINTENANCE OR REPAIR WITHOUT SHUTTING OFF THE ENTIRE SYSTEM. VISIBLE LOCATION MARKING SIGNS FOR UNDERGROUND VALVES IS ACCEPTABLE. ALTERNATIVE VALVE POSITION INDICATORS SHOULD ALSO BE PROVIDED.

DUKE: An underground fire loop (12 cement-lined ductile iron) is provided around the perimeter of the plant site.

Normally open control valves on the exterior fire protection yard main, which are not electrically supervised, are locked open and are inspected in accordance with the Selected Licensee Commitments (SLCs). Regularly scheduled, recorded inspections and key control procedures assure availability of fire protection water.

The exterior fire protection is arranged in accordance with the intent of NFPA 24-1978 Outside Protection. Isolation valves are not provided for individual fire hydrants, which is at variance with the aforementioned code. Fire hydrants are isolated by operation of divisional valves on the fire protection yard loop. An impairment due to a broken fire hydrant will not impair or affect delivering an adequate water supply to Fire Protection systems in the Auxiliary Building, Diesel Generator Buildings, Reactor Buildings, or Nuclear Service Water Pump Structure due to piping configuration of the fire protection yard loop.

A portion of the underground fire protection yard loop is routed beneath the Administration Building. A spread footing foundation reduces the possibility of a foundation settlement breaking the underground piping.

NRC: 2) A COMMON YARD FIRE MAIN LOOP MAY SERVE MULTI-UNIT NUCLEAR POWER PLANT SITES, IF CROSS-CONNECTED BETWEEN UNITS. SECTIONAL CONTROL VALVES SHOULD PERMIT MAINTAINING INDEPENDENCE OF THE INDIVIDUAL LOOP AROUND EACH UNIT. FOR SUCH INSTALLATIONS, COMMON WATER SUPPLIES MAY ALSO BE UTILIZED. THE WATER SUPPLY SHOULD BE SIZED FOR THE LARGEST SINGLE EXPECTED FLOW. FOR MULTIPLE REACTOR SITES WITH WIDELY SEPARATED PLANTS (APPROACHING 1 MILE OR MORE), SEPARATE YARD FIRE MAIN LOOPS SHOULD BE USED.

DUKE: One fire main loop serves both Unit 1 and Unit 2 with multiple connections to interior Fire Protection Systems.

Redundant yard mains supply the Auxiliary Building fire protection header.

The water flow is adequate to meet the demand from the largest Automatic Sprinkler System in the safety related portion of the station with an allowance of 500 gpm minimum for hose stations. (Ref. Correspondence April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning water demand information.) Note that in most cases, 1000 gpm hose stream was used in the design.

NRC: 3) IF PUMPS ARE REQUIRED TO MEET SYSTEM PRESSURE OR FLOW REQUIREMENTS, A SUFFICIENT NUMBER OF PUMPS SHOULD BE AVAILABLE WITH ONE PUMP INACTIVE (e.g., THREE 50 PERCENT PUMPS OR TWO 100 PERCENT PUMPS). THE CONNECTION TO THE YARD FIRE MAIN LOOP FROM EACH FIRE PUMP SHOULD BE WIDELY SEPARATED, PREFERABLY LOCATED ON OPPOSITE SIDES OF THE PLANT. EACH PUMP SHOULD HAVE ITS OWN DRIVER WITH INDEPENDENT POWER SUPPLIES AND CONTROL. AT LEAST ONE PUMP (IF NOT POWERED FROM THE EMERGENCY DIESELS) SHOULD BE DRIVEN BY NON-ELECTRICAL MEANS, PREFERABLY DIESEL ENGINE. PUMPS AND DRIVERS SHOULD BE LOCATED IN ROOMS SEPARATED FROM THE REMAINING PUMPS AND EQUIPMENT BY A MINIMUM THREE-HOUR FIRE WALL. ALARMS INDICATING PUMP RUNNING, DRIVER AVAILABILITY, OR FAILURE TO START SHOULD BE PROVIDED IN THE CONTROL ROOM.

DETAILS OF THE FIRE PUMP INSTALLATION SHOULD AS A MINIMUM CONFORM TO NFPA 20, " STANDARD FOR THE INSTALLATION OF CENTRIFUGAL FIRE PUMPS."

DUKE: The water supply is provided by three full capacity electric motor driven fire pumps supplied with water from Lake Wylie. Each pump is designed for 2500 gpm at 144 psig. Each pump can meet the maximum water demand of a sprinkler or deluge system, plus 500 gpm minimum for hose streams. The set pressures at which the pumps are activated are staggered. Once the fire pumps are started, they can only be shut off manually. The three fire pumps have independent power supplies and controls. Two fire pumps are supplied by station diesel generators during blackout conditions.

The original jockey pump arrangement was modified by EC92877 resulting in a treated water supply and two sets of jockey pumps, a primary set and use of the existing arrangement as a secondary set.

In addition to the fire pumps, one 300 gpm and two 90 gpm primary jockey pumps are provided to prevent frequent starting of the fire pumps by maintaining pressure in the yard mains at 125 psig. These pumps maintain the system pressure above the set point pressures of the fire pumps by replenishing any water lost by leakage in fire mains.

The Fire Protection System is designed to meet the intent of standards developed by the National Fire Protection Association (NFPA) where practicable. In addition, the design of the system will be in accordance with the Nuclear Regulatory Commission's 10CFR50 Appendix A, Criterion 3.

One 200 gpm and two 25 gpm secondary jockey pumps will operate in the event the primary jockey pumps fail to operate.

A 5000 gallon pressurizer tank is provided in the system to act as an accumulator or surge tank for the secondary jockey pumps. The tank has a nitrogen volume in the top of the tank which expands or contracts with pressure fluctuations in the Fire Protection System.

Each fire pump is driven by a 300 HP motor. One 25 HP and two 5 HP secondary jockey pumps are driven by 600V motors.

The Primary jockey pumps are driven by two 25 HP and one 50 HP 480 volt motors. A large 3500 gpm recirculation pump is driven by one 400 HP 4160 V motor.

A 10,000 gallon storage tank holds the YD potable water make-up for the primary jockey pumps.

Power to Fire Pump A is from Unit 1, 6.9KV Switchgear 1TC; Fire Pump B is from Unit 1, 4.16KV Switchgear 1FTB; Fire Pump C is from Unit 2, 4.16KV Switchgear 2FTA.

A redundant starting scheme based on system pressure drop is utilized for the three main fire pumps. If a fire occurs, the drop in line pressure caused by sprinkler, deluge system or hose operation actuates a set of pressure switches. The set points are staggered so that if the first pump set to start fails, the second pump automatically starts. If the second pump also fails, the third pump operates.

A manual start pushbutton for each pump is provided in the Control Room for further redundancy.

Annunciator alarms are provided for each pump to indicate control power failure or failure to start. Computer alarms are also provided for each pump to indicate that a pump is running or that a pump has failed to start.

Two of the three fire pumps located in the same bay of the intake structure are separated by a three hour fire rated wall. The other fire pump is located in an adjacent bay of the intake structure. (Ref. Correspondence- July 29, 1982. W. O. Parker's letter to Harold R. Denton concerning fire pump arrangement detail and supply information.)

Fire pumps and fire pump power supplies are arranged in accordance with the intent of NFPA 20-1978 "Centrifugal Fire Pumps" except as follows:

Section 6-3.2 All fire pump motor power supply cables are armored cable; in addition, one power supply cable is routed in metal conduit.

Section 6-3.3.2 Paragraph 2, Fire pump power supplies are routed through the Power House. The arrangement is acceptable due to redundancy, fire barriers and spatial separation.

Section 6-3.3.3 Fire Pump Motors are designed to start at 80% voltage and operate at 90% voltage.

Section 6-3.3.4 Voltage drop during start in excess of 15% is acceptable because fire pump motors are designed to start at 80% voltage.

Section 6-4.2 Isolation. Nuclear safety precludes shedding all loads except fire pumps "when necessary."

Section 7-1.1.1 Switchgear which is not "specifically" listed for electric motor driven fire pump service is used as pump controller.

Section 7-1.1.2 The controllers are 4.16KV and 6.9KV metal-clad switchgear breakers which are part of the 4.16KV blackout and 6.9KV Normal Auxiliary Power Systems, respectively.

Section 7-1.1.3 Each switchgear cubicle, housing a breaker feeding the fire pump motors, is labeled with an engraved nameplate: "Main Fire Pump Motor _____."

Section 7-2 The 4.16KV blackout and 6.9KV switchgear lineups are located in the Service and Turbine Buildings, respectively.

Section 7-2.1 Controllers are located for adequate redundancy and environmental control.

Section 7-3.5 Overcurrent protection is acceptable on fire pump controller circuits due to redundancy. (Fuses are installed in control power circuits.)

Section 7-3.7.1 and Section 7-3.7.9 Documents are retained in the Station Master Files.

Section 7-4.1 A switchgear circuit breaker serves as both fire pump controller and isolation means.

Section 7-4.1.1 In the test or disconnect position, the breaker is physically and electrically removed from the circuit.

Section 7-4.1.3 A safety shutter automatically covers all high voltage bus/connectors when the breaker is racked out from the operate position.

Section 7-4.1.4 The breaker is mechanically interlocked such that it cannot be racked out from the operate position unless the breaker is tripped.

Section 7-4.2 Protective relaying and metering are accomplished through the use of potential and current transformers serving their respective busses. These transformers are wired through test switches which allow easy accessibility for testing and calibrating the relays and metering devices. Motor protection is accomplished by solid state instantaneous/time delay overcurrent and ground fault relays. Relay settings are coordinated with the motors' damage curves to offer both motor availability and protection.

Section 7-4.2.7 Circuit trip time is 2 - 3 seconds.

Section 7-4.2.11 Circuit breakers are tripped from the Control Room (rather than at the controller).

Section 7-4.3 Motors are started across the line.

Section 7-4.4 Red and green panel lights, which are an integral part of the breaker control switches, indicate if a breaker is closed (red) or open (green). (See Section 7-6.6)

Section 7-4.5 Local and Control Room indicating lights, digital computer points and an annunciator alarm are activated when any fire pump controller is operated into a motor running condition and are powered by 125VDC control power. Loss of switchgear bus voltage is indicated by annunciator and computer alarms and video graphics display with their input derived from a single phase undervoltage relay on each switchgear bus.

Section 7-5.2.3 and 7-5.2.5. The intent of paragraph 7-5.2.3 is to ensure a remote manual start/stop switch independent of the automatic pressure switch cannot cause stopping of the motor. The intent of paragraph 7-5.2.5 is to ensure a fire (or other means) resulting in breakage, disconnecting or shortage of the wires or loss of power cannot prevent the starting of the motor. Catawba has three full capacity motor driven fire pumps that each have automatic start pressure switches and also have a remote start/stop button located in the Control room. The concern is a single fire in a location where all three control circuits exist (Main Control Room (MCR) or Cable Spreading Room (CSR)) could cause the exact three shorts that would result in stopping of all three main fire pumps. This could impact automatic suppression systems dependent on the auto start feature of the pumps. The areas of vulnerability (MCR & CSR) do not have automatic suppression systems. These areas would still have hose stations available for manual suppression capability which could still be supplied by the larger of the jockey pumps (Jockey Pump C with a capacity of 200 gpm). Therefore, for the scenario to occur (no suppression available in the MCR or CSR), there would have to be a failure (due to fire, operator action, or other means) of all three main fire pump circuits as well as a failure of the C Jockey Pump. In addition, in the unlikely occurrence of this scenario, Main Fire Pump A could be started locally at the switchgear.

Section 7-6.1 The components comprising a Catawba fire pump controller are as follows:

- 4.16KV and 6.9KV switchgear breakers and associated protective relaying and metering devices,
- Remote control switch,
- Loss of control voltage alarm relay,
- Pressure switch or initiating automatic start, and
- Local control devices

Of these components, the control switches, alarm relay and pressure switches are all UL listed.

If the automatic start components fail, manual start capability is provided by the local or remote control devices. No automatic method of de-activating a fire pump is provided. Manual stop capability for each pump is provided by the local control device located at the switchgear breaker and by the remote control switch in the Control Room. Upon receipt of fire pump start or trouble alarms in the Control Room, the appropriate personnel will be dispatched as provided for in Administrative Procedures.

The UL listing is not applicable to the switchgear assembly. This equipment is designed in conformance to the following standards and requirements:

ANSI C37.03 - 1969	- Definitions for AC High Voltage Circuit Breakers
C37.04 - 1964	- Rating Structure for AC High Voltage Circuit Breakers
C37.04a	- Supplement to C37.04-1964
C37.04b	- Supplement to C37.04-1964
C37.06 - 1971	- AC High Voltage Circuit Breakers Rated on Symmetrical Current Basis
USAS C37.07-1969	- Interrupting Capability Factor for Reclosing Service for AC High Voltage Circuit Breakers
ANSI N45.2.2 -1972	- Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants
C37.20c - 1974	- Switchgear Assemblies (IEEE Std. 27-1974)
C37.100-1972	- Power Switchgear, Definitions of
IEEE 344-1971	- Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating Stations, Rev. 4, 4/30/75 - (Where It interfaces with Duke's seismic requirements)

The switchgear equipment is of a proven design and is similar to that being utilized in nuclear safety-related applications.

Section 7-6.2 Provisions are made for reading secondary CT current on the test switch of each phase of the overcurrent relays. In addition, a single phase current transducer is provided in the Y phase of each motor's current transformer secondary with output to a meter in the Control Room. A single phase bus voltmeter is connected to the secondary side of the switchgear bus potential transformers of each 4.16KV blackout and 6.9KV switchgear and is calibrated to indicate bus voltage. These voltmeters are also located in the Control Room.

Section 7-6.5 The low voltage control circuits are powered from separate 125VDC sources.

Section 7-6.6 Breaker position lamps, connected in the l25VDC control circuit, are provided on each switchgear cubicle. Alarms from the switchgear controller include: (1) bus undervoltage and (2) loss of fire pump motor breaker DC control power.

Section 7-6.7 A safety shutter automatically covers all high voltage bus/connectors when the breaker is racked out from the operate position.

Two of the three fire pumps can be powered from the emergency diesels in the event of a blackout condition.

NRC: 4) TWO SEPARATE RELIABLE WATER SUPPLIES SHOULD BE PROVIDED. IF TANKS ARE USED, TWO 100 PERCENT (MINIMUM OF 300,000 GALLONS EACH) SYSTEM CAPACITY TANKS SHOULD BE INSTALLED. THEY SHOULD BE SO INTERCONNECTED THAT PUMPS CAN TAKE SUCTION FROM EITHER OR BOTH. HOWEVER, A LEAK IN ONE TANK OR ITS PIPING SHOULD NOT CAUSE BOTH TANKS TO DRAIN. THE MAIN PLANT FIRE WATER SUPPLY CAPACITY SHOULD BE CAPABLE OF REFILLING EITHER TANK IN A MINIMUM OF EIGHT HOURS.

COMMON TANKS ARE PERMITTED FOR FIRE AND SANITARY OR SERVICE WATER STORAGE. WHEN THIS IS DONE, HOWEVER, MINIMUM FIRE WATER STORAGE REQUIREMENTS SHOULD BE DEDICATED BY MEANS OF A VERTICAL STANDPIPE FOR OTHER WATER SERVICES.

DUKE: The water supply for the fire protection system is Lake Wylie.

NRC: 5) THE FIRE WATER SUPPLY (TOTAL CAPACITY AND FLOW RATE) SHOULD BE CALCULATED ON THE BASIS OF THE LARGEST EXPECTED FLOW RATE FOR A PERIOD OF TWO HOURS, BUT NOT LESS THAN 300,000 GALLONS. THIS FLOW RATE SHOULD BE BASED CONSERVATIVELY ON 1000 GPM FOR MANUAL HOSE STREAMS PLUS THE GREATER OF:

a ALL SPRINKLER HEADS OPENED AND FLOWING IN THE LARGEST DESIGNED FIRE AREA; OR

b THE LARGEST OPEN HEAD DELUGE SYSTEM(S) OPERATING.

DUKE: Each fire pump has the capacity to meet the maximum water demand for sprinklers in any safety related area with an allowance of 1000 gpm for hose streams. (Ref. Correspondence - April 14, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning water demand information.) Note that the Standard Review Plan, Branch Technical Position CMEB 9.5-1 only requires an allowance of 500 gpm for hose streams.

NRC: 6) LAKES OR FRESH WATER PONDS OF SUFFICIENT SIZE MAY QUALIFY AS SOLE SOURCE OF WATER FOR FIRE PROTECTION, BUT REQUIRE AT LEAST TWO INTAKES TO THE PUMP SUPPLY. WHEN A COMMON WATER SUPPLY IS PERMITTED FOR FIRE PROTECTION AND THE ULTIMATE HEAT SINK, THE FOLLOWING CONDITIONS SHOULD ALSO BE SATISFIED:

a THE ADDITIONAL FIRE PROTECTION WATER REQUIREMENTS ARE

DESIGNED INTO THE TOTAL STORAGE CAPACITY; AND

b FAILURE OF THE FIRE PROTECTION SYSTEM SHOULD NOT DEGRADE THE FUNCTION OF THE ULTIMATE HEAT SINK.

DUKE: Fire pumps have separate suction piping. One pump is located in a separate bay of the intake structure. (Ref. Correspondence July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning fire pump arrangement detail and water demand information.)

The Ultimate Heat Sink for Catawba is the Standby Nuclear Service Water (SNSW) Pond.

NRC: 7) OUTSIDE MANUAL HOSE INSTALLATION SHOULD BE SUFFICIENT TO REACH ANY LOCATION WITH AN EFFECTIVE HOSE STREAM. TO ACCOMPLISH THIS HYDRANTS SHOULD BE INSTALLED APPROXIMATELY EVERY 250 FEET ON THE YARD MAIN SYSTEM. THE LATERAL TO EACH HYDRANT FROM THE YARD MAIN SHOULD BE CONTROLLED BY A VISUALLY INDICATING OR KEY OPERATED (CURB) VALVE. A HOSE HOUSE, EQUIPPED WITH HOSE AND COMBINATION NOZZLE, AND OTHER AUXILIARY EQUIPMENT RECOMMENDED IN NFPA 24, "OUTSIDE PROTECTION," SHOULD BE PROVIDED AS NEEDED BUT AT LEAST EVERY 1000 FEET.

THREADS COMPATIBLE WITH THOSE USED BY LOCAL FIRE DEPARTMENTS SHOULD BE PROVIDED ON ALL HYDRANTS, HOSE COUPLINGS AND STANDPIPE RISERS.

DUKE: Hydrants are located about 250 feet apart with hose houses at alternate hydrants. Any location within the protected area can be reached with an effective hose stream.

Post indicator or key operated valves are provided to isolate sections of the fire loop for maintenance or repairs.

Hydrant hose houses are equipped with hose nozzles and other auxiliary equipment useful for manual fire fighting.

Threads compatible with those used by local fire departments are provided either on hydrants, hose couplings and standpipe risers by adapters.

NRC: c. WATER SPRINKLERS AND HOSE STANDPIPE SYSTEM

1) EACH AUTOMATIC SPRINKLER SYSTEM AND MANUAL HOSE STATION STANDPIPE SHOULD HAVE AN INDEPENDENT CONNECTION TO THE PLANT UNDERGROUND WATER MAIN. HEADERS FED FROM EACH END ARE PERMITTED INSIDE BUILDINGS TO SUPPLY MULTIPLE SPRINKLER AND STANDPIPE SYSTEMS. WHEN PROVIDED, SUCH HEADERS ARE CONSIDERED AN EXTENSION OF THE YARD MAIN SYSTEM. THE HEADER ARRANGEMENT SHOULD BE SUCH THAT NO SINGLE FAILURE CAN IMPAIR BOTH THE PRIMARY AND BACKUP FIRE PROTECTION SYSTEMS.

EACH SPRINKLER AND STANDPIPE SYSTEM SHOULD BE EQUIPPED WITH OS&Y (OUTSIDE SCREW AND YOKE) GATE VALVE, OR OTHER APPROVED SHUTOFF VALVE, AND WATER FLOW ALARM. SAFETY RELATED EQUIPMENT THAT DOES NOT ITSELF REQUIRE SPRINKLER WATER FIRE PROTECTION, BUT IS SUBJECT TO UNACCEPTABLE DAMAGE IF WETTED

BY SPRINKLER WATER DISCHARGE SHOULD BE PROTECTED BY WATER SHIELDS OR BAFFLES.

DUKE: Each sprinkler system and manual hose station standpipe has an independent connection to the fire protection header; therefore, a single failure cannot impair both the primary and backup Fire Protection Systems outside containment.

Four butterfly control valves, arranged for operation by use of a chain wheel assembly, are installed in the Fire Protection System in the Auxiliary Building.

Shields are provided to direct water spray away from equipment which might be impaired by water impingement.

NRC: 2) ALL VALVES IN THE FIRE WATER SYSTEMS SHOULD BE ELECTRICALLY SUPERVISED. THE ELECTRICAL SUPERVISION SIGNAL SHOULD INDICATE IN THE CONTROL ROOM AND OTHER APPROPRIATE COMMAND LOCATIONS IN THE PLANT (SEE NFPA 26, "SUPERVISION OF VALVES.")

WHEN ELECTRICAL SUPERVISION OF FIRE PROTECTION VALVES IS NOT PRACTICABLE, AN ADEQUATE MANAGEMENT SUPERVISION PROGRAM SHOULD BE PROVIDED. SUCH A PROGRAM SHOULD INCLUDE LOCKING VALVES OPEN WITH STRICT KEY CONTROL; TAMPER PROOF SEALS; AND PERIODIC, VISUAL CHECK OF ALL VALVES.

DUKE: Valves in the Fire Protection System which are not electrically supervised, with indication to the Control Room, are locked or sealed in normal operating position and checked periodically to assure fire protection is available.

NRC: 3) AUTOMATIC SPRINKLER SYSTEMS SHOULD AS A MINIMUM CONFORM TO REQUIREMENTS OF APPROPRIATE STANDARDS SUCH AS NFPA 13, "STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS," AND NFPA 15, "STANDARD FOR WATER SPRAY FIXED SYSTEMS."

DUKE: Automatic Sprinkler Systems are designed in accordance with the intent of NFPA 13-1980 "Installation of Sprinkler Systems." A variance to the code is the use of seismically qualified control valves in safety related areas. UL Listed, or FM Approved seismically qualified control valves were not available when these valves were procured. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R Denton (NRR) detailing valve exceptions.)

NRC: 4) INTERIOR MANUAL HOSE INSTALLATION SHOULD BE ABLE TO REACH ANY LOCATION WITH AT LEAST ONE EFFECTIVE HOSE STREAM. TO ACCOMPLISH THIS, STANDPIPES WITH HOSE CONNECTIONS EQUIPPED WITH A MAXIMUM OF 75 FEET OF 1 1/2 INCH WOVEN JACKET LINED FIRE HOSE AND SUITABLE NOZZLES SHOULD BE PROVIDED IN ALL BUILDINGS, INCLUDING CONTAINMENT, ON ALL FLOORS AND SHOULD BE SPACED AT NOT MORE THAN 100-FOOT INTERVALS. INDIVIDUAL STANDPIPES SHOULD BE OF AT LEAST 4-INCH DIAMETER FOR MULTIPLE HOSE CONNECTIONS AND 2 1/2 INCH DIAMETER FOR SINGLE HOSE CONNECTIONS. THESE SYSTEMS SHOULD FOLLOW THE REQUIREMENTS OF NFPA 14 FOR SIZING, SPACING AND PIPE SUPPORT

REQUIREMENTS (NELPIA).

HOSE STATIONS SHOULD BE LOCATED OUTSIDE ENTRANCES TO NORMALLY UNOCCUPIED AREAS AND INSIDE NORMALLY OCCUPIED AREAS. STANDPIPES SERVING HOSE STATIONS IN AREAS HOUSING SAFETY RELATED EQUIPMENT SHOULD HAVE SHUTOFF VALVES AND PRESSURE REDUCING DEVICES (IF APPLICABLE) OUTSIDE THE AREA.

DUKE: Interior manual hose installations are provided and equipped to reach any location with at least one effective hose stream.

Hose stations are equipped with 1 1/2-inch fiber reinforced synthetic hose in appropriate lengths with spray nozzle to provide adequate coverage.

The Fire Protection Piping System for hose stations conforms to the intent of NFPA 14-1978 "Standpipe and Hose Stations" and is located for the most efficient and practical coverage. Fire Department pumper connections are not provided on hose standpipes. This variance from the NFPA code is appropriate based on the use of high pressure fire pumps as primary and secondary water supply.

5) THE PROPER TYPE OF HOSE NOZZLES TO BE SUPPLIED TO EACH AREA SHOULD BE BASED ON THE FIRE HAZARD ANALYSIS. THE USUAL COMBINATION SPRAY/ STRAIGHT-STREAM NOZZLE MAY CAUSE UNACCEPTABLE MECHANICAL DAMAGE (FOR EXAMPLE, THE DELICATE ELECTRONIC EQUIPMENT IN THE CONTROL ROOM) AND BE UNSUITABLE. ELECTRICALLY SAFE NOZZLES SHOULD BE PROVIDED AT LOCATIONS WHERE ELECTRICAL EQUIPMENT OR CABLING IS LOCATED.

DUKE: Hoses are provided with spray nozzles for fighting fires in the geographical area. In addition, fire brigade training emphasizes the proper techniques for fighting the different type fires.

NRC: 6) CERTAIN FIRES SUCH AS THOSE INVOLVING FLAMMABLE LIQUIDS RESPOND WELL TO FOAM SUPPRESSION. CONSIDERATION SHOULD BE GIVEN TO USE OF ANY OF THE AVAILABLE FOAMS FOR SUCH SPECIALIZED PROTECTION APPLICATION. THESE INCLUDE THE MORE COMMON CHEMICAL AND MECHANICAL LOW EXPANSION FOAMS, HIGH EXPANSION FOAM AND THE RELATIVELY NEW AQUEOUS FILM FORMING FOAM (AFFF).

DUKE: Fire protection capabilities consist of primary and secondary systems including fixed extinguishing systems, fire hose stations and portable extinguishers. In addition, portable foam units are available for use when appropriate.

NRC: d. <u>HALON SUPPRESSION SYSTEMS</u>

1) THE USE OF HALON FIRE EXTINGUISHING AGENTS SHOULD AS A MINIMUM COMPLY WITH THE REQUIREMENTS OF NFPA 12A AND 12B, "HALOGENATED FIRE EXTINGUISHING AGENT SYSTEMS - HALON 1301 AND HAL0N 1211." ONLY UL OR FM APPROVED AGENTS SHOULD BE USED.

IN ADDITION TO THE GUIDELINES OF NFPA 12A AND 12B, PREVENTATIVE MAINTENANCE AND TESTING OF THE SYSTEMS, INCLUDING CHECK WEIGHTING OF THE HALON CYLINDERS SHOULD BE

DONE AT LEAST QUARTERLY.

PARTICULAR CONSIDERATION SHOULD ALSO BE GIVEN TO:

a MINIMUM REQUIRED HALON CONCENTRATION AND SOAK TIME.

b TOXICITY OF HALON.

c TOXICITY AND CORROSIVE CHARACTERISTICS OF THERMAL DECOMPOSITION PRODUCTS OF HALON.

DUKE: Halon Suppression Systems are not utilized for fire protection of safety related equipment/areas.

NRC: e. CARBON DIOXIDE SUPPRESSION SYSTEMS

1) THE USE OF CARBON DIOXIDE EXTINGUISHING SYSTEMS SHOULD AS A MINIMUM COMPLY WITH THE REQUIREMENTS OF NFPA 12, "CARBON DIOXIDE EXTINGUISHING SYSTEMS."

PARTICULAR CONSIDERATION SHOULD ALSO BE GIVEN TO:

a. MINIMUM REQUIRED CO2 CONCENTRATION AND SOAK TIME;

b. TOXICITY OF CO2;

c. POSSIBILITY OF SECONDARY THERMAL SHOCK (COOLING) DAMAGE;

d. OFFSETTING REQUIREMENTS FOR VENTING DURING CO2 SYSTEMS BEING OUT-OF-SERVICE BECAUSE OF PERSONNEL SAFETY CONSIDERATION. CO2 SYSTEMS ARE DISARMED WHENEVER PEOPLE ARE PRESENT IN AN AREA SO PROTECTED. AREAS ENTERED FREQUENTLY (EVEN THOUGH DURATION TIME FOR ANY VISIT IS SHORT) HAVE OFTEN BEEN FOUND WITH CO2 SYSTEMS SHUT OFF.

DUKE: The concentration of the CO2 System is designed for the particular fire hazard in the diesel generator rooms and auxiliary feedwater pump pits. Provisions are made to isolate each area during the soak time. Electric motor driven auxiliary feedwater pump pits do not have covers. The volume of C02 gas in the system has been calculated to allow for "boilover" during discharge.

System sight and sound warning alarms, including a pneumatic predischarge timer and siren, activate before agent discharge. Equipment is designed to accommodate the rapid cooling by CO2.

Administrative procedures will assure CO2 Systems are returned to service following maintenance in the protected areas. Indication is provided locally and in the Control Room when the system is disarmed.

All carbon dioxide systems are designed and installed to meet the intent of NFPA 12-1980.

NRC: f. PORTABLE EXTINGUISHERS

1) FIRE EXTINGUISHERS SHOULD BE PROVIDED IN ACCORDANCE WITH GUIDELINES OF NFPA 10 AND 10A, "PORTABLE FIRE EXTINGUISHERS, MAINTENANCE AND USE." DRY CHEMICAL EXTINGUISHERS SHOULD BE INSTALLED WITH DUE CONSIDERATION GIVEN TO CLEANUP PROBLEMS AFTER USE AND POSSIBLE ADVERSE EFFECTS ON EQUIPMENT INSTALLED IN THE AREA.

DUKE: An adequate number of portable extinguishers, are provided in accordance with intent of NFPA 10-1978 "Portable Fire Extinguishers." A 100 lb wheeled carbon dioxide extinguisher and portable extinguishers are provided in equipment rooms (ELEV 560) of each unit, located near entrances of the protected area. Maximum travel distance may be at variances to NFPA 10 in some instances.

Portable extinguishers will not be permanently located within containment. Station procedures assure extinguishers are available when personnel are in the area.

NRC: 6. GUIDELINES FOR SPECIFIC PLANT AREAS

a. PRIMARY AND SECONDARY CONTAINMENT

1) NORMAL OPERATION

FIRE PROTECTION REQUIREMENTS FOR THE PRIMARY AND SECONDARY CONTAINMENT AREAS SHOULD BE PROVIDED ON THE BASIS OF SPECIFIC IDENTIFIED HAZARDS. FOR EXAMPLE:

LUBRICATING OIL OR HYDRAULIC FLUID SYSTEM FOR THE PRIMARY COOLANT PUMPS.

DUKE: As previously stated, in Section 4.b(1)(c), the Reactor Coolant Pumps are designed to prevent oil fires, a fire detection system is provided and for additional protection, a manual sprinkler system is provided.

CABLE TRAY ARRANGEMENTS AND CABLE PENETRATIONS

Automatic detection with alarm and annunciation in the Control Room is provided for safety related cable trays and penetrations. Protection is provided by hose stations located in the Reactor Building. Portable extinguishers for use by fire brigade personnel provide secondary fire suppression capabilities. Appendix R requirements for fire detection within the Reactor Buildings are addressed in Part C.

CHARCOAL FILTERS

Carbon filters are protected with fixed manual water spray systems.

NRC: BECAUSE OF THE GENERAL INACCESSIBILITY OF THESE AREAS DURING NORMAL PLANT OPERATIONS, PROTECTION SHOULD BE PROVIDED BY AUTOMATIC FIXED SYSTEMS. AUTOMATIC SPRINKLERS SHOULD BE INSTALLED FOR THOSE HAZARDS IDENTIFIED AS REQUIRING FIXED SUPPRESSION.

DUKE: Automatic detection and manual sprinklers are provided where necessary in the primary and secondary Containment.

NRC: FIRE DETECTION SYSTEMS SHOULD ALARM AND ANNUNCIATE IN THE

CONTROL ROOM. THE TYPE OF DETECTION USED AND THE LOCATION OF THE DETECTORS SHOULD BE MOST SUITABLE TO THE PARTICULAR TYPE OF FIRE THAT COULD BE EXPECTED FROM THE IDENTIFIED HAZARD. A PRIMARY CONTAINMENT GENERAL AREA FIRE DETECTION CAPABILITY SHOULD BE PROVIDED AS BACKUP FOR THE ABOVE DESCRIBED HAZARD DETECTION. TO ACCOMPLISH THIS, SUITABLE SMOKE DETECTION (e.g., VISUAL OBSCURATION, LIGHT SCATTERING AND PARTICLE COUNTING) SHOULD BE INSTALLED IN THE AIR RECIRCULATION SYSTEM AHEAD OF ANY FILTERS.

DUKE: The fire detection system alarms and annunciates in the Control Room. In addition to detection over safety related cables and penetrations, smoke detectors and rate-of-rise heat detectors are provided over the lower containment carbon filters.

NRC: 2) REFUELING AND MAINTENANCE

REFUELING AND MAINTENANCE OPERATIONS IN CONTAINMENT MAY INTRODUCE ADDITIONAL HAZARDS SUCH AS CONTAMINATION CONTROL MATERIALS, DECONTAMINATION SUPPLIES, WOOD PLANKING, TEMPORARY WIRING, WELDING AND FLAME CUTTING (WITH PORTABLE COMPRESSED FUEL GAS SUPPLY). POSSIBLE FIRES WOULD NOT NECESSARILY BE IN THE VICINITY OF FIXED DETECTION AND SUPPRESSION SYSTEMS.

DUKE: Station procedures direct additional fire protection measures to be Implemented during refueling and maintenance operations and include:

a. Fire watches during welding and cutting operations.

b. Additional fire suppression equipment, i.e., portable extinguishers, be present during maintenance activities.

c. Security personnel present on a twenty-four hour basis to control entry.

NRC: IN ADDITION, MANUAL FIRE FIGHTING CAPABILITY SHOULD BE PERMANENTLY INSTALLED IN CONTAINMENT. STANDPIPES WITH HOSE STATIONS, AND PORTABLE FIRE EXTINGUISHERS, SHOULD BE INSTALLED AT STRATEGIC LOCATIONS THROUGHOUT CONTAINMENT FOR ANY REQUIRED MANUAL FIRE FIGHTING OPERATIONS.

DUKE: Hose stations are present in the Containment. As stated above, Station procedures assure portable extinguishers are available in Containment when the area is occupied.

NRC: ADEQUATE SELF-CONTAINED BREATHING APPARATUS SHOULD BE PROVIDED NEAR THE CONTAINMENT ENTRANCES FOR FIRE FIGHTING AND DAMAGE CONTROL PERSONNEL. THESE UNITS SHOULD BE INDEPENDENT OF ANY BREATHING APPARATUS OR AIR SUPPLY SYSTEMS PROVIDED FOR GENERAL PLANT ACTIVITIES.

DUKE: Self-contained breathing apparatus will be provided for fire brigade personnel as discussed in Section 4.d.(8).

NRC: b. CONTROL ROOM

THE CONTROL ROOM IS ESSENTIAL TO SAFE REACTOR OPERATION. IT MUST BE PROTECTED AGAINST DISABLING FIRE DAMAGE AND SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY FLOORS, WALLS

AND ROOFS HAVING MINIMUM FIRE RESISTANCE RATINGS OF THREE HOURS.

DUKE: The Control Room is separated from the remainder of the plant by three-hour barriers. Exception: The boundary between the Control Room (floor) and the Unit 1 and 2 Cable Spreading Rooms (ceiling) is not required to be a committed three hour fire barrier (reference Modification CNCE-9584). The Control Room floor is maintained as a pressure and smoke barrier.

NRC: CONTROL ROOM CABINETS AND CONSOLES ARE SUBJECT TO DAMAGE FROM TWO DISTINCT FIRE HAZARDS:

1) FIRE ORIGINATING WITHIN A CABINET OR CONSOLE; AND

2) EXPOSURE FIRE INVOLVING COMBUSTIBLES IN THE GENERAL ROOM AREA.

HOSE STATIONS ADJACENT TO THE CONTROL ROOM WITH PORTABLE EXTINGUISHERS IN THE CONTROL ROOM ARE ACCEPTABLE.

DUKE: The Control Room is provided with smoke and rate-of-rise/fixed temperature detectors and portable extinguishers. Hose stations are located adjacent to the room. Operation and fire brigade personnel will be briefed on the use of water on Control Room fires.

Nozzles on hose stations adjacent to the Control Room will not deliver a straight stream.

NRC: FIRE DETECTION IN THE CONTROL ROOM CABINETS AND CONSOLES SHOULD BE PROVIDED BY SMOKE AND HEAT DETECTORS IN EACH FIRE AREA. ALARM AND ANNUNCIATION SHOULD BE PROVIDED IN THE CONTROL ROOM. FIRE ALARMS IN OTHER PARTS OF THE PLANT SHOULD ALSO BE ALARMED AND ANNUNCIATED IN THE CONTROL ROOM.

DUKE: Cabinets in the Control Room are monitored by ceiling-mounted smoke and rate-of-rise/fixed temperature detectors. Smoke detectors are provided inside the main control board consoles. Fire alarms in other parts of the plant are alarmed and annunciated in the Control Room.

NRC: BREATHING APPARATUS FOR CONTROL ROOM OPERATORS SHOULD BE READILY AVAILABLE. CONTROL ROOM FLOORS, CEILING, SUPPORTING STRUCTURES, AND WALLS, INCLUDING PENETRATIONS AND DOORS, SHOULD BE DESIGNED TO A MINIMUM FIRE RATING OF THREE HOURS. ALL PENETRATION SEALS SHOULD BE AIRTIGHT.

DUKE: Self-contained breathing apparatus (SCBA) are provided and all penetration seals are protected and sealed to maintain a positive pressure in the Control Room.

NRC: THE CONTROL ROOM VENTILATION INTAKE SHOULD BE PROVIDED WITH SMOKE DETECTION CAPABILITY TO AUTOMATICALLY ALARM LOCALLY AND ISOLATE THE CONTROL ROOM VENTILATION SYSTEM TO PROTECT OPERATORS BY PREVENTING SMOKE FROM ENTERING THE CONTROL ROOM. MANUALLY OPERATED VENTING OF THE CONTROL ROOM SHOULD BE AVAILABLE SO THAT OPERATORS HAVE THE OPTION OF VENTING FOR VISIBILITY.

DUKE: The Control Area Ventilation intakes are described previously. The intake smoke detectors

alarm in the Control Room. The Control Room can be manually purged.

NRC: CABLES SHOULD NOT BE LOCATED IN CONCEALED FLOOR AND CEILING SPACES. ALL CABLES THAT ENTER THE CONTROL ROOM SHOULD TERMINATE IN THE CONTROL ROOM. THAT IS, NO CABLING SHOULD BE SIMPLY ROUTED THROUGH THE CONTROL ROOM FROM ONE AREA TO ANOTHER.

DUKE: Only power and control cables essential for operation of lighting and HVAC equipment are located in the concealed ceiling space. Additionally, plenum rated fiber optic cables for use by digital systems are run in the ceiling. Cable entering the Control Room terminates there.

NRC: c. CABLE SPREADING ROOMS

1) THE PREFERRED ACCEPTABLE METHODS ARE:

NRC: a. AUTOMATIC WATER SYSTEM SUCH AS CLOSED HEAD SPRINKLERS, OPEN HEAD DELUGE, OR OPEN DIRECTIONAL SPRAY NOZZLES. DELUGE AND OPEN SPRAY SYSTEMS SHOULD HAVE PROVISIONS FOR MANUAL OPERATION AT A REMOTE STATION; HOWEVER, THERE SHOULD ALSO BE PROVISIONS TO PRECLUDE INADVERTENT OPERATION. LOCATION OF SPRINKLER HEADS OR SPRAY NOZZLES SHOULD CONSIDER CABLE TRAY SIZING AND ARRANGEMENTS TO ASSURE ADEQUATE WATER COVERAGE. CABLES SHOULD BE DESIGNED TO ALLOW WETTING DOWN WITH DELUGE WATER WITHOUT ELECTRICAL FAULTING. OPEN HEAD DELUGE AND OPEN DIRECTIONAL SPRAY SYSTEMS SHOULD BE ZONED SO THAT A SINGLE FAILURE WILL NOT DEPRIVE THE ENTIRE AREA OF AUTOMATIC FIRE SUPPRESSION CAPABILITY. THE USE OF FOAM IS ACCEPTABLE, PROVIDED IT IS OF A TYPE CAPABLE OF BEING DELIVERED BY A SPRINKLER OR DELUGE SYSTEM, SUCH AS AN AQUEOUS FILM FORMING FOAM (AFFF).

DUKE: The cables in the Cable Spreading Rooms are non-flame propagating and are described in Section 4.c.

Automatic detection with alarm and annunciation in the Control Room is provided in addition to Nuclear System Directives regarding the control of combustible/flammable materials in the Cable Spreading Rooms and the use of fire watches at any time welding or cutting operations are being conducted.

NRC: b. MANUAL HOSES AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP.

DUKE: Portable extinguishers provide primary protection for Cable Spreading Rooms. Fire hose stations are provided for secondary protection.

NRC: c. EACH CABLE SPREADING ROOM OF EACH UNIT SHOULD HAVE DIVISIONAL CABLE SEPARATION AND BE SEPARATED FROM THE OTHER AND THE REST OF THE PLANT BY A MINIMUM THREE-HOUR RATED FIRE WALL (REFER TO NFPA 251 OR ASTM E-119 FOR FIRE TEST RESISTANCE RATING).

DUKE: Each Cable Spreading Room is separated from other areas of the plant by three-hour fire barriers with separation of divisions as outlined in Section 4.c.(3). Exception: The

boundary between the Control Room (floor) and the Unit 1 and 2 Cable Spreading Rooms (ceiling) is not required to be a committed three hour fire barrier (reference Modification CNCE-9584). The Control Room floor is maintained as a pressure and smoke barrier.

Penetrations and openings are sealed with appropriate barriers which have been tested and approved by a recognized testing facility.

NRC: d. AT LEAST TWO REMOTE AND SEPARATE ENTRANCES PROVIDED TO THE ROOM FOR ACCESS BY FIRE BRIGADE PERSONNEL.

DUKE: Each Unit's Cable Spreading Room has three remote and separate entrances to the room for access by fire brigade personnel.

NRC: e. AISLE SEPARATION PROVIDED BETWEEN TRAY STACKS SHOULD BE AT LEAST THREE FEET WIDE AND EIGHT FEET HIGH.

DUKE: Aisle separation and overhead clearance is provided to permit access by personnel.

NRC: 2) FOR CABLE SPREADING ROOMS THAT DO NOT PROVIDE DIVISIONAL CABLE SEPARATION OF (1)(c), IN ADDITION TO MEETING (1)(a), (b), (d), AND (e) ABOVE, THE FOLLOWING SHOULD ALSO BE PROVIDED:

a. DIVISIONAL CABLE SEPARATION SHOULD MEET THE GUIDELINES OF REGULATORY GUIDE 1.75 "PHYSICAL INDEPENDENCE OF ELECTRICAL SYSTEMS".

DUKE: As stated in (1)(c), separation criteria is outlined in Section 4.c.(3).

NRC: b. ALL CABLING SHOULD BE COVERED WITH SUITABLE FIRE RETARDANT COATING.

c. AS AN ALTERNATE TO (1)(a) ABOVE, AUTOMATICALLY INITIATED GAS SYSTEMS (HALON OR CO2) MAY BE USED FOR PRIMARY FIRE SUPPRESSION, PROVIDE A FIXED WATER SYSTEM IS USED AS A BACKUP.

DUKE: Response to (1) (a) is applicable. Non-fire propagating electrical cables (refer to Section 4.c.6) and Nuclear System Directives which control transient combustibles, minimize fire potential in Cable Spreading Rooms. Provision of portable extinguishers as primary protection and fire hose stations as secondary protection is appropriate.

NRC: d. PLANTS THAT CANNOT MEET THE GUIDELINES OF REGULATORY GUIDE 1.75, IN ADDITION TO MEETING (1)(a), (b), (d), AND (e) ABOVE, AN AUXILIARY SHUTDOWN SYSTEM WITH ALL CABLING INDEPENDENT OF THE CABLE SPREADING ROOM SHOULD BE PROVIDED.

DUKE: Catawba Nuclear Station has a standby shutdown system with cabling independent of Cable Spreading Room to bring the plant to a hot standby condition.

NRC: d. <u>PLANT COMPUTER ROOM</u>

SAFETY RELATED COMPUTERS SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY BARRIERS HAVING A MINIMUM THREE-HOUR FIRE RESISTANT RATING. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. MANUAL HOSE STATIONS AND PORTABLE WATER

AND HALON FIRE EXTINGUISHERS SHOULD BE PROVIDED.

DUKE: There are no safety related computers at the Catawba Nuclear Station.

NRC: e. SWITCHGEAR ROOMS

SWITCHGEAR ROOMS SHOULD BE SEPARATED FROM THE REMAINDER OF THE PLANT BY MINIMUM THREE-HOUR RATED FIRE BARRIERS TO THE EXTENT PRACTICABLE. AUTOMATIC FIRE DETECTION SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. FIRE HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD BE READILY AVAILABLE.

DUKE: Each unit and divisional Switchgear Room is separated from the remainder of the plant by three-hour barriers. Exception: The boundary between the Switchgear Rooms and associated Electrical Penetration Rooms is not required to be a committed three-hour fire barrier (Reference Modification CNCE-10095).

Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.

Hose stations equipped with nozzles which will not deliver a straight stream and portable extinguishers are provided in and adjacent to each Switchgear Room.

NRC: ACCEPTABLE PROTECTION FOR CABLES THAT PASS THROUGH THE SWITCHGEAR ROOM IS AUTOMATIC WATER OR GAS AGENT SUPPRESSION. SUCH AUTOMATIC SUPPRESSION MUST CONSIDER PREVENTING UNACCEPTABLE DAMAGE TO ELECTRICAL EQUIPMENT AND POSSIBLE NECESSARY CONTAINMENT OF AGENT FOLLOWING DISCHARGE.

DUKE: Power and control cable passing through this area is limited to one power train in the Switchgear Room.

NRC: f. REMOTE SAFETY RELATED PANELS

THE GENERAL AREA HOUSING REMOTE SAFETY RELATED PANELS SHOULD BE PROVIDED WITH AUTOMATIC FIRE DETECTORS THAT ALARM LOCALLY AND ALARM AND ANNUNCIATE IN THE CONTROL ROOM. COMBUSTIBLE MATERIALS SHOULD BE CONTROLLED AND LIMITED TO THOSE REQUIRED FOR OPERATION. PORTABLE EXTINGUISHERS AND MANUAL HOSE STATIONS SHOULD BE PROVIDED.

DUKE: The auxiliary shutdown panels for Train A and Train B are located in separate three-hour rated rooms in the vicinity of Auxiliary Feedwater Pump Room Area. Each room is provided with automatic detection with local alarm and alarm and annunciation in the Control Room as are the Auxiliary Feedwater Pump Rooms.

In addition to these auxiliary shutdown panels another shutdown panel is provided in the Standby Shutdown Facility. This provides a separate means of bringing the plant to a hot standby condition.

NRC: g. STATION BATTERY ROOMS

BATTERY ROOMS SHOULD BE PROTECTED AGAINST FIRE EXPLOSIONS. BATTERY ROOMS SHOULD BE SEPARATED FROM EACH OTHER AND OTHER AREAS OF THE PLANT BY BARRIERS HAVING A MINIMUM FIRE

RATING OF THREE HOURS INCLUSIVE OF ALL PENETRATIONS AND OPENINGS. (SEE NFPA 69, "STANDARD ON EXPLOSION PREVENTION SYSTEMS"). VENTILATION SYSTEM IN THE BATTERY ROOMS SHOULD BE CAPABLE OF MAINTAINING THE HYDROGEN CONCENTRATION WELL BELOW 2 VOL PERCENT HYDROGEN CONCENTRATION. STANDPIPE AND HOSE AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED.

ALTERNATIVES:

1) PROVIDE A TOTAL FIRE RATED BARRIER ENCLOSURE OF THE BATTERY ROOM COMPLEX THAT EXCEEDS THE FIRE LOAD CONTAINED IN THE ROOM,

2) REDUCE THE FIRE LOAD TO BE WITHIN THE FIRE BARRIER CAPABILITY OF 1 1/2 HOURS, OR

3) PROVIDE A REMOTE MANUAL ACTUATED SPRINKLER SYSTEM IN EACH ROOM AND PROVIDE THE 1 1/2 HOUR FIRE BARRIER SEPARATION.

DUKE: An Equipment Room is provided for each Unit and is separated from the remainder of the plant by three-hour barriers. Individual Battery Rooms are located in the Equipment Room and are separated from each other and surrounding areas by non-combustible construction. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning construction of battery rooms and equipment separation.)

Each individual Battery Room is equipped with redundant exhaust ventilation to prevent the buildup of hydrogen. Loss of exhaust ventilation is annunciated in the Control Room.

NRC: h. <u>TURBINE LUBRICATION AND CONTROL OIL STORAGE AND USE AREAS</u>

A BLANK FIRE WALL HAVING A MINIMUM RESISTANCE RATING OF THREE HOURS SHOULD SEPARATE ALL AREAS CONTAINING SAFETY RELATED SYSTEMS AND EQUIPMENT FROM THE TURBINE OIL SYSTEM.

DUKE: The Turbine and Auxiliary Buildings are separated by a three-hour barrier and approximately 50 feet of spatial separation. Therefore, the turbine oil system is separated from all equipment required for safe shutdown.

NRC: i. <u>DIESEL GENERATOR AREAS</u>

DIESEL GENERATORS SHOULD BE SEPARATED FROM EACH OTHER AND OTHER AREAS OF THE PLANT BY FIRE BARRIERS HAVING A MINIMUM FIRE RESISTANCE RATING OF THREE HOURS.

AUTOMATIC FIRE SUPPRESSION SUCH AS AFFF FOAM, OR SPRINKLERS SHOULD BE INSTALLED TO COMBAT ANY DIESEL GENERATOR OR LUBRICATING OIL FIRES. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. DRAINAGE FOR FIRE FIGHTING WATER AND MEANS FOR LOCAL MANUAL VENTING OF SMOKE SHOULD BE PROVIDED.

DUKE: The Diesel Generator Buildings are separate from the Auxiliary Building and Reactor Building.

Each redundant diesel generator is separated from other areas of the plant by three-hour fire barriers.

Diesel Generator Rooms are protected by an automatic carbon dioxide system. The system is activated by fixed temperature detectors which alarm and annunciate in the Control Room.

Automatic alarm of carbon dioxide activation is provided in the Control Room.

The carbon dioxide system may also be activated manually if required. Hose stations, in the switchgear rooms adjoining the diesel room halls, and portable extinguishers are provided as backup suppression.

NRC: WHEN DAY TANKS CANNOT BE SEPARATED FROM THE DIESEL GENERATOR, ONE OF THE FOLLOWING SHOULD BE PROVIDED FOR THE DIESEL GENERATOR AREA:

1) AUTOMATIC OPEN HEAD DELUGE OR OPEN HEAD SPRAY NOZZLE SYSTEM(S)
2) AUTOMATIC CLOSED HEAD SPRINKLERS
3) AUTOMATIC AFFF THAT IS DELIVERED BY A SPRINKLER DELUGE OR SPRAY SYSTEM
4) AUTOMATIC GAS SYSTEM (HALON OR CO2) MAY BE USED IN LIEU OF FOAM OR SPRINKLERS TO COMBAT DIESEL GENERATOR AND/OR LUBRICATING OIL FIRES.

DUKE: As noted in i. above, the automatic carbon dioxide system is provided.

NRC: j. <u>DIESEL FUEL OIL STORAGE AREAS</u>

DIESEL FUEL OIL TANKS WITH A CAPACITY GREATER THAN 1100 GALLONS SHOULD NOT BE LOCATED INSIDE THE BUILDING CONTAINING SAFETY RELATED EQUIPMENT. THEY SHOULD BE LOCATED AT LEAST 50 FEET FROM ANY BUILDING CONTAINING SAFETY RELATED EQUIPMENT, OR IF LOCATED WITHIN 50 FEET, THEY SHOULD BE HOUSED IN A SEPARATE BUILDING WITH CONSTRUCTION HAVING A MINIMUM FIRE RESISTANCE RATING OF THREE HOURS. BURIED TANKS ARE CONSIDERED AS MEETING THE THREE-HOUR FIRE RESISTANCE REQUIREMENTS. SEE NFPA 30, "FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE", FOR ADDITIONAL GUIDANCE.

WHEN LOCATED IN A SEPARATE BUILDING, THE TANK SHOULD BE PROTECTED BY AN AUTOMATIC FIRE SUPPRESSION SYSTEM SUCH AS AFFF OR SPRINKLERS.

TANKS, UNLESS BURIED, SHOULD NOT BE LOCATED DIRECTLY ABOVE OR BELOW SAFETY RELATED SYSTEMS OR EQUIPMENT REGARDLESS OF THE FIRE RATING OF SEPARATING FLOORS OR CEILINGS.

DUKE: The Diesel Fuel Oil Storage Tanks are buried and therefore meet the three-hour fire barrier criteria.

NRC: k. <u>SAFETY RELATED PUMPS</u>

PUMP HOUSES AND ROOMS HOUSING SAFETY RELATED PUMPS SHOULD BE PROTECTED BY AUTOMATIC SPRINKLER PROTECTION UNLESS A FIRE HAZARDS ANALYSIS CAN DEMONSTRATE THAT A FIRE WILL NOT

ENDANGER OTHER SAFETY RELATED EQUIPMENT REQUIRED FOR SAFE PLANT SHUTDOWN. EARLY WARNING FIRE DETECTION SHOULD BE INSTALLED WITH ALARM AND ANNUNCIATION LOCALLY AND IN THE CONTROL ROOM. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD ALSO BE PROVIDED.

DUKE: The Motor Driven Auxiliary Feedwater Pumps for each unit are separated from the Turbine Driven Auxiliary Feedwater Pump by three-hour rated fire boundaries.

Automatic detection with local alarm and alarm and annunication in the Control Room is provided. Where the Hazard Analysis and Criteria for Fire Protection indicated the need, a sprinkler system is provided. Auxiliary feedwater pumps are separated from other safety related pumps by three-hour fire boundaries.

Local hose stations or portable extinguishers are provided as secondary protection as appropriate.

NRC: l. NEW FUEL AREA

HAND PORTABLE EXTINGUISHERS SHOULD BE LOCATED WITHIN THIS AREA. ALSO, LOCAL HOSE STATIONS SHOULD BE LOCATED OUTSIDE BUT WITHIN HOSE REACH OF THIS AREA. AUTOMATIC DETECTION SHOULD ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND ALARM LOCALLY. COMBUSTIBLES SHOULD BE LIMITED TO A MINIMUM IN THE NEW FUEL AREA. THE STORAGE AREA SHOULD BE PROVIDED WITH A DRAINAGE SYSTEM TO PRECLUDE ACCUMULATION OF WATER.

THE STORAGE CONFIGURATION OF NEW FUEL SHOULD ALWAYS BE SO MAINTAINED AS TO PRECLUDE CRITICALITY FOR ANY WATER DENSITY THAT MIGHT OCCUR DURING FIRE WATER APPLICATION.

DUKE: Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.

Administrative policy has been established to preclude the use of hydrogenous fire fighting material in the vault. Extinguishers are of dry chemical or CO2 type.

Combustible material storage in the New Fuel Area is administratively controlled.

Floor drains are provided in the New Fuel Area to preclude accumulation of water.

NRC: m. SPENT FUEL POOL AREA

PROTECTION FOR THE SPENT FUEL POOL AREA SHOULD BE PROVIDED BY LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM AND TO ALARM LOCALLY.

DUKE: The Spent Fuel Pool Area is provided with automatic detection with local alarm and annunciation in the Control Room. Hose stations and portable extinguishers are provided as primary protection.

NRC: n. RADWASTE BUILDING

THE RADWASTE BUILDING SHOULD BE SEPARATED FROM OTHER AREAS OF THE PLANT BY FIRE BARRIERS HAVING AT LEAST THREE-HOUR RATINGS. AUTOMATIC SPRINKLERS SHOULD BE USED IN ALL AREAS

WHERE COMBUSTIBLE MATERIALS ARE LOCATED. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ANNUNCIATE AND ALARM LOCALLY. DURING A FIRE, THE VENTILATION SYSTEMS IN THESE AREAS SHOULD BE CAPABLE OF BEING ISOLATED. WATER SHOULD DRAIN TO LIQUID RADWASTE BUILDING SUMPS.

ACCEPTABLE ALTERNATIVE FIRE PROTECTION IS AUTOMATIC FIRE DETECTION TO ALARM AND ANNUNCIATE IN THE CONTROL ROOM, IN ADDITION TO MANUAL HOSE STATIONS AND PORTABLE EXTINGUISHERS CONSISTING OF HAND HELD AND LARGE WHEELED UNITS.

DUKE: The Radwaste Area is provided with automatic detection with alarm and annunciation in the Control Room. Primary protection is hose stations and portable extinguishers.

NRC: o. DECONTAMINATION AREAS

THE DECONTAMINATION AREAS SHOULD BE PROTECTED BY AUTOMATIC SPRINKLERS IF FLAMMABLE LIQUIDS ARE STORED. AUTOMATIC FIRE DETECTION SHOULD BE PROVIDED TO ANNUNCIATE AND ALARM IN THE CONTROL ROOM AND ALARM LOCALLY. THE VENTILATION SYSTEM SHOULD BE CAPABLE OF BEING ISOLATED. LOCAL HOSE STATIONS AND HAND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED AS BACKUP TO THE SPRINKLER SYSTEM.

DUKE: Decontamination Areas are provided with hose stations and portable extinguishers as primary fire protection. The fire hazard analysis indicated this protection is appropriate.

NRC: p. SAFETY RELATED WATER TANKS

STORAGE TANKS THAT SUPPLY WATER FOR SAFE SHUTDOWN SHOULD BE PROTECTED FROM THE EFFECTS OF FIRE. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD BE PROVIDED. PORTABLE EXTINGUISHERS SHOULD BE LOCATED IN NEARBY HOSE HOUSES. COMBUSTIBLE MATERIALS SHOULD NOT BE STORED NEXT TO OUTDOOR TANKS. A MINIMUM OF 50 FEET OF SEPARATION SHOULD BE PROVIDED BETWEEN OUTDOOR TANKS AND COMBUSTIBLE MATERIALS WHERE FEASIBLE.

DUKE: Safety related water tanks are separated from combustible materials.

Local hose stations and portable extinguishers are provided.

NRC: q. COOLING TOWERS

COOLING TOWERS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION OR SO LOCATED THAT A FIRE WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT. COOLING TOWERS SHOULD BE OF NON-COMBUSTIBLE CONSTRUCTION WHEN THE BASINS ARE USED FOR THE ULTIMATE HEAT SINK OR FOR THE FIRE PROTECTION WATER SUPPLY.

DUKE: Cooling towers are not used as fire protection water supply or the ultimate heat sink. Cooling towers are of non-combustible construction and located such that a fire would not adversely affect any safety related systems or equipment.

NRC: r. MISCELLANEOUS AREAS

MISCELLANEOUS AREAS SUCH AS RECORDS STORAGE AREAS, SHOPS, WAREHOUSES, AND AUXILIARY BOILER ROOMS SHOULD BE SO LOCATED THAT A FIRE OR EFFECTS OF A FIRE, INCLUDING SMOKE, WILL NOT ADVERSELY AFFECT ANY SAFETY RELATED SYSTEMS OR EQUIPMENT. FUEL OIL TANKS FOR AUXILIARY BOILERS SHOULD BE BURIED OR PROVIDED WITH DIKES TO CONTAIN THE ENTIRE TANK CONTENTS.

DUKE: The fire hazard analysis was a primary medium for determining that safe shutdown equipment was isolated from unacceptable fire hazards, including those listed as Miscellaneous Areas. A three hour rated barrier and/or spatial separation are credited for protection of areas that contain safe shutdown equipment.

NRC: 7) SPECIAL PROTECTION GUIDELINES

a. WELDING AND CUTTING, ACETYLENE - OXYGEN FUEL GAS SYSTEMS

THIS EQUIPMENT IS USED IN VARIOUS AREAS THROUGHOUT THE PLANT. STORAGE LOCATIONS SHOULD BE CHOSEN TO PERMIT FIRE PROTECTION BY AUTOMATIC SPRINKLER SYSTEMS. LOCAL HOSE STATIONS AND PORTABLE EQUIPMENT SHOULD BE PROVIDED AS BACKUP. THE REQUIREMENTS OF NFPA 51 and 51B ARE APPLICABLE TO THESE HAZARDS. A PERMIT SYSTEM SHOULD BE REQUIRED TO UTILIZE THIS EQUIPMENT. (ALSO REFER TO b6 HEREIN).

DUKE: Equipment is stored in an area protected by sprinklers or isolated from combustibles. Local hose stations or portable extinguishers are provided as backup.

Nuclear System Directives require permits for all uses of this equipment.

NRC: b. STORAGE AREAS FOR DRY ION EXCHANGE RESINS

DRY ION EXCHANGE RESINS SHOULD NOT BE STORED NEAR ESSENTIAL SAFETY RELATED SYSTEMS. DRY UNUSED RESINS SHOULD BE PROTECTED BY AUTOMATIC WET PIPE SPRINKLER INSTALLATIONS. DETECTION BY SMOKE AND HEAT DETECTORS SHOULD ALARM AND ANNUNICATE IN THE CONTROL ROOM AND ALARM LOCALLY. LOCAL HOSE STATIONS AND PORTABLE EXTINGUISHERS SHOULD PROVIDE BACKUP FOR THESE AREAS. STORAGE AREAS OF DRY RESINS SHOULD HAVE CURBS AND DRAINS. (REFER TO NFPA 92M, "WATERPROOFING AND DRAINING OF FLOORS").

DUKE: Dry ion exchange resins are stored in accordance with the manufacturer's recommendations and protected from fire hazards.

Storage areas are not located adjacent to safe shutdown equipment.

NRC: c. HAZARDOUS CHEMICALS

HAZARDOUS CHEMICALS SHOULD BE STORED AND PROTECTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF NFPA 49, "HAZARDOUS CHEMICALS DATA". CHEMICALS STORAGE AREAS SHOULD BE WELL VENTILATED AND PROTECTED AGAINST FLOODING CONDITIONS SINCE

SOME CHEMICALS MAY REACT WITH WATER TO PRODUCE IGNITION.

DUKE: Hazardous chemicals will be stored and protected in accordance with "Good Practice" and manufacturer's recommendations.

NRC: d. MATERIALS CONTAINING RADIOACTIVITY

MATERIALS THAT COLLECT AND CONTAIN RADIOACTIVITY SUCH AS SPENT ION EXCHANGE RESINS, CHARCOAL FILTERS, AND HEPA FILTERS SHOULD BE STORED IN CLOSED METAL TANKS OR CONTAINERS THAT ARE LOCATED IN AREAS FREE FROM IGNITION SOURCES OR COMBUSTIBLES. THESE MATERIALS SHOULD BE PROTECTED FROM EXPOSURE TO FIRES IN ADJACENT AREAS AS WELL. CONSIDERATION SHOULD BE GIVEN TO REQUIREMENTS FOR REMOVAL OF ISOTOPIC DECAY HEAT FROM ENTRAINED RADIOACTIVE MATERIALS.

DUKE: Materials that collect and contain radioactivity are stored in closed metal containers. Temporary storage at RCZ step off pads may be in containers with open tops. These tops are automatically actuated by heat actuated elements.

Handling of materials is in accordance with applicable standards and Station Directives.

A.2 PART B - FIRE HAZARDS ANALYSIS

A hazards analysis was conducted by a team consisting of an engineer assigned full time duties in the area of fire protection and a fire protection consultant.

Combustible materials were considered to be:

1. Flammable liquids including lubricants used in motors, pumps and other equipment.
2. Combustible portions of power and control cable used in the plant.
3. Other material which was observed during the inventory that would contribute to the combustible loading.

The following hazard analysis was conducted for each fire area. A fire area is considered that portion of the plant which is separated from the remainder of the plant by three hour rated barriers, i.e. walls, floors or ceilings. Fire Areas 4, 11, 18, 22, 38, and 47 have been separated within the Hazards Analysis to delineate information. These areas could be combined into a single fire area without degradation of shutdown capability.

The analysis was conducted in the Auxiliary, Diesel, Reactor Buildings and Nuclear Service Water Pump Structure.

The analysis defined each fire area, identified the equipment located in the area, noting the equipment necessary for shutdown of the units, and demonstrated the capabilities for bringing the unit to a hot standby condition with and without the suppression system functioning as designed.

Auxiliary Building

FIRE AREA 1 (Reference Drawings CN-1209-10-10, CN-1200-1.1 and 1.2)

1. Description of Fire Area

   Drawing CN-1209-10-10 shows the boundaries of Fire Area 1 and CN-1200-1.1 and 1.2 show the location of the following major equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
RHR Pumps (ND)	X	X
Containment Spray Pumps (NS)	X	
RHR and Cont Spray Rooms		
Sump Pumps (WL)		

Combustible materials, are listed in Table 1.

2. Construction

   Boundaries of Fire Area 1 are walls, floors and ceilings of reinforced concrete which provide three hour fire barriers. The boundary adjoining the pipe corridor has a louvered metal door which permits air flow into the pipe corridor. The pipe corridor is a Radiation Control Zone. Significant pressure differential assures air flow into the Radiation Control Zone. Radiological shield wall, the labyrinth arrangement and lack of continuity of combustibles on each side of the wall reduce the possibility of

fire spread. (Ref. Correspondence - W. O. Parker's July 29, 1982 letter and H. B. Tucker's December 15, 1982 letter to Harold R. Denton (NRR) concerning louvered fire doors.)

Spiral stairs provide access into Fire Area 1 from the elevation above (543+0). The entrances to these stairs from elevation 543 + 0 are enclosed with three hour fire rated walls and ceilings.

The access wall opening of each enclosure is equipped with a three hour fire rated door and frame approved by Underwriter's Laboratory or of equivalent construction.

Three-hour rated reinforced concrete walls separate redundant Residual Heat Removal Pumps.

Floor drains are provided and will handle the sprinkler water flow.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved, 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each room is provided with automatic detection which alarms and annunciates in the Control Room.

   Fixed water sprinklers are provided in each RHR Pump Room and connecting corridor.

   Manual hose stations and portable extinguishers are provided in the corridors leading to each pump room.

4. Consequences of a Fire

   a. With Suppression system functioning:

      The fixed water sprinklers in the RHR Pump Rooms are designed to extinguish fires in the area should they occur and prevent their spread to redundant equipment. Rated barriers forming area boundaries ensure the fire would be contained.

      Rated barriers between redundant pumps assure availability of at least one pump.

   b. With no suppression functioning:

      A fire in any room could possibly cause loss of that piece of equipment if no suppression system functioned.

      With barriers between redundant pumps, normal shutdown capability would not be affected.

      The area boundary would ensure that the fire would be contained in Fire Area 1.

      Hot standby is assured through the Standby Shutdown System (SSS).

Table 1. BUILDING: AUXILIARY ELEVATION: 522 + 0 (Ref. Dwg. CN-1209-10-10)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
100	Comp. Cooling Sump Pump 1A, 1B, 2A, 2B; Refueling Water Recir Pumps 1A, 1B, 2A, 2B; RHR & Cont Spray Rooms Sump Pumps 1A, 2A, 1B, 2B	Cable Ins	-	I-R/R	AE	HS
101	Corridor	Cable Ins	-	I-R/R	AE	HS
102	Cont Spray Pump 1A	Lube Oil, Cable Ins	3 Gal.	I-R/R	HS	PE
103	Cont Spray Pump 1B	Lube Oil, Cable Ins	3 Gal.	I-R/R	HS	PE
104	RHR Pump 1B	Lube Oil, Cable Ins	8 Gal.	I-R/R	AE	HS
105	RHR Pump 1A	Lube Oil, Cable Ins	8 Gal.	I-R/R	AE	HS
106	Corridor	Cable Ins		I-R/R	AE	HS
107	Cont Spray Pump 2A	Lube Oil, Cable Ins	3 Gal.	I-R/R	HS	PE
108	Cont Spray Pump 2B	Lube Oil, Cable Ins	3 Gal.	I-R/R	HS	PE
109	RHR Pump 2B	Lube Oil, Cable Ins	8 Gal.	I-R/R	AE	HS
110	RHR Pump 2A	Lube Oil, Cable Ins	8 Gal.	I-R/R	AE	HS
111	Corridor	Cable Ins		I-R/R	AE	HS
112	Corridor	Cable Ins	-	I-R/R	AE	HS

NOTES FOR TABLES 1 THRU 11

Symbols for Primary and Backup Protection

AE - Fixed Suppression System

HS - Hose Station

HY Fire Hydrant

PE - Portable Extinguishers

DETECTION		
a.	I - Ionization	May be used in combination
b.	R/R - Rate of Rise	or separately as suggested
c.	FT - Fixed Temperature	by the manufacturer
d.	UV - Ultraviolet	
e.	P - Photo Electric	

SUMMARY OF FIRE PROTECTION FOR ELEVATION 522 + 0

1) Automatic detection with local alarm and alarm and annunciation in the control room for rooms 100 through 112.
2) Fixed water sprinklers in RHR Pump rooms 104, 105, 109, and 110.
3) Penetrations through rated barriers are sealed with a 3-hour rated fire barrier.
4) Hose stations and portable extinguishers are provided for backup protection.
5) Sprinklers in the RHR Pump rooms are extended to provide protection for the corridor connecting the two pump room entrances.
6) Spatial separation is adequate to prevent a single fire affecting both Train A and Train B cables for equipment required for shutdown.

FIRE AREAS 2 and 3 (Reference Drawings CN-1209-10-11, CN-1200-5.4)

1. Description of Fire Area

   Drawing CN-1209-10-11 shows the boundaries of Fire Areas 2 and 3 and drawing CN-1200-5.4 shows the location of the following major equipment:

EQUIPMENT (SYSTEM)	**SAFETY RELATED**	**SAFE SHUTDOWN**
Auxiliary Shutdown Panels Air Conditioning Units (VA)	X	
Motor Driven Auxiliary Feedwater Pumps (CA)	X	X
Containment Ventilation Unit Condensate Drain Tank (WL)		
Air Handling Units		
Air Handling Unit Control Panel		

Combustible materials are listed in Table 2.

2. Construction

   The boundaries for Fire Areas 2 and 3 are walls, floors and ceilings constructed using concrete block and reinforced concrete providing 3-hour barriers for each area.

   Access to Fire Area 2 and 3 is by stairwells enclosed by 3-hour rated block walls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

   Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each area is provided with automatic detection which alarms and annunciates in the Control Room.

   Fixed water sprinklers are provided for rooms 250 and 260.

   A fixed Carbon Dioxide System is provided to protect the Motor Driven Auxiliary Feedwater Pumps.

   Manual hose stations and portable extinguishers are provided as backup to the fixed Fire Protection Systems.

4. Consequences of a Fire

   a. With suppression system functioning:

      The suppression systems are designed to extinguish a fire should it occur in the area and prevent its spread to other areas.

      Unit shutdown capability would be available from the SSS using the Turbine Driven Auxiliary Feedwater Pump.

   b. With no suppression system functioning:

      A fire could possibly cause loss of the area; however, the rated barriers would contain the fire in the area. Shutdown would be available from the SSS using the Turbine Driven Auxiliary Feedwater Pump.

FIRE AREAS 31, 32, 33 and 34 (Reference Drawings CN-1209-10-11 and CN-1200-5.4)

1. Description of Fire Area

   Drawing CN-1209-10-11 shows the boundaries of Fire Areas 31, 32, 33 and 34 and drawing CN-1200-5.4 shows the location of the following major equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Auxiliary Shutdown Panel	X	

   Combustible materials, are listed in Table 2.

2. Construction

   The boundaries of Fire Areas 31, 32, 33 and 34 reinforced concrete and block walls providing a 3-hour rated barrier.

Access to Fire Areas 31, 32, 33 and 34 is by a 3-hour rated door and frame approved by Underwriter's Laboratory or of equivalent construction.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each area is provided with automatic detection which alarms and annunciates in the Control Room.

   Portable extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With suppression system functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

   b. With no suppression system functioning:

      1) A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room, utilizing the redundant train.

FIRE AREAS 36 and 37 (Reference Drawings CN-1209-10-11 and CN-1200-5.4)

1. Description of Fire Area

   Drawing CN-1209-10-11 shows the boundaries of Fire Areas 36 and 37 and drawing CN-1200-5.4 shows the location of the following major equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Aux. Feedwater Pump Turbine Pnl.	X	X

   Combustible materials, are listed in Table 2.

2. Construction

   The boundaries for Fire Areas 36 and 37 are floors and ceilings constructed using reinforced concrete and walls constructed using reinforced concrete and concrete block providing a 3-hour rated barrier.

   Access to Fire Area 36 and 37 is by 3-hour rated door and frame approved by Underwriter's Laboratory, or of equivalent construction.

   Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   The area is provided with automatic detection which alarms and annunciates in the Control Room.

   Portable extinguishers are provided for suppression.

4. Consequences of a Fire

a. With suppression system functioning:

Portable extinguishers and manual hose stations would be used to extinguish a fire should it occur and normal shutdown capability would be available from the Motor Driven Auxiliary Feedwater Pumps.

b. With no suppression system functioning:

A fire could possibly cause loss of Auxiliary Feedwater Pump Turbine Panel if no suppression system functioned; however, the fire would be contained in this area and normal shutdown capability would be available from the Control Room.

FIRE AREAS 39 and 40 (Reference Drawings CN-1209-10-11 and CN-1200-5.4)

1. Description of Fire Area

Drawing CN-1209-10-11 shows the boundaries of Fire Areas 39 and 40 and drawing CN-1200-5.4 shows the location of the following major equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Turbine Driven Auxiliary Feedwater Pump (CA)	X	X

Combustible materials, are listed in Table 2.

2. Construction

The boundaries for Fire Areas 39 and 40 are walls, floors and ceilings constructed using reinforced concrete providing 3-hour barriers for each area.

Access to Fire Area 39 and 40 is by a rated hatch constructed to UL 3-hour specifications, located in the ceiling.

Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

Each area is provided with automatic detection which alarms and annunciates in the Control Room.

A fixed Carbon Dioxide System is provided to protect the Turbine Driven Auxiliary Feedwater Pump.

Portable extinguishers are provided as backup to the fixed Carbon Dioxide System.

4. Consequences of a Fire

a. With suppression system functioning:

The suppression systems are designed to extinguish a fire should it occur in the area and prevent its spread to other areas.

Unit shutdown capability would be available from Control Room or ASP's using one of the Motor Driven Auxiliary Feedwater Pumps.

b. With no suppression system functioning:

A fire could possibly cause loss of the area; however, the rated barriers would contain the fire in the area. Shutdown would be available from the Control Room.

FIRE AREA 4 (Drawings CN-1209-10-11, 10-12, 10-13, CN-1200-5.1, 5.2 and 5.3, 8.2, 8.3, 9.2 and 9.3)

1. Description of Fire Area

Drawings CN-1209-10-11, 10-12, and 10-13 show the boundaries of Fire Area 4 and Drawings CN-1200-5.1, -5.2,-5.3, -8.2, -8.3 -9.2 and -9.3, show locations of the following major pieces of safety related equipment.

EQUIPMENT (SYSTEM) (ROOM NO)	SAFETY RELATED	SAFE SHUTDOWN
Evaporator Feed Pumps (NB) (210)	X	
Safety Injection Pumps (NI) (234, 235, 245, 242)	X	
Waste Gas Comp Pkg (WG) (206B, 207)	X	
Centrifugal Charging Pumps (NV) (231, 230, 241, 240)	X	X
Reciprocating Charging Pump (NV) (233, 243) (Note: Reciprocating Charging Pump No. 2 (243) has been abandoned in place per NSM CN-21392/00.) (NOTE: Reciprocating Charging Pump No. 1 (233) has been abandoned in place per NSM CN-11392/00.)	X	
Waste Drain Tank Pump (WL) (215A)	X	
Waste Drain Tank (WL) (215C)	X	

Combustible materials, are listed in Table 2.

2. Construction

The boundaries for Fire Area 4 are walls, floors and ceilings constructed using reinforced concrete and concrete block which provides 3-hour barriers for the area.

A three-hour fire rated reinforced concrete wall separates redundant Centrifugal Charging Pumps.

Access to Fire Area 4 is by any of four stairwells enclosed by 3-hour rated block walls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

Floor drains provided in areas protected by fixed water sprinklers will handle sprinkler flow.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

Cable tray runs, safety related pump rooms and areas containing combustibles are provided with automatic detection which alarms and annunciates in the Control Room. Individual rooms are listed in Table A-2.

Fixed water sprinklers are provided with alarm to the Control Room for the Centrifugal Charging Pumps.

Manual hose stations and portable extinguishers are provided throughout the elevation.

4. Consequences of a Fire

   a. With suppression system functioning:

      The fixed water sprinklers are designed to extinguish fires should they occur in those protected areas and either normal, ASP or SSS shutdown capability would be available.

   b. With no suppression functioning:

      A fire could possibly cause loss of equipment in an area if no suppression systems functioned; however, the fire rated boundaries would contain the fire within Area 4 and the SSS provides the alternate means to shutdown the unit separate from the Control Room.

Table 2. Building: Auxiliary Elevation: 543 + 0 (Ref. Dwg. CN-1209-10-11)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
200, 204, 204A, 212B	Equipment Area	Cable Ins	-	I-R/R	HS	PE
200A	Stairway	-	-	-	HS	PE
200B	Aisle	-	-	-	HS	PE
200C	Groundwater Drainage Sump Pumps	-	-	-	HS	PE
200D	Stairway	-	-	-	HS	PE
201	Aisle	-	-	-	HS	PE
202	Valve Gallery	-	-	-	HS	PE
203	Waste Gas Decay Tanks, Shutdown Waste Gas Tanks				HS	PE
204	Hydrogen Recombiner Control Panel Area	(See 200)		I-R/R	HS	PE
204A	Exhaust Fan Concrete Pad	(See 200)		-	HS	PE
204B	Waste Gas Analysis Rack A	-	-	-	HS	PE
205	Waste Gas Hydrogen Recombiner A	-	-	-	HS	PE
205A	Gas Analysis Rack	-	-	-	HS	PE
206A	Waste Gas Hydrogen Recombiner B	-	-	-	HS	PE
206B	Waste Gas Compressor Package B	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
207	Waste Gas Compressor Package □A□	-	-	-	HS	PE
208	Corridor	-	-	I-R/R	HS	PE
209	Corridor	Cable Ins	-	I-R/R	HS	PE
209A	Stairway	-	-	-	HS	PE
210	Corridor	-	-	-	HS	PE
210A	Recycle Evap. Feed Pump □A□ □B□	-	-	-	HS	PE
210B	Valve Gallery	-	-	-	HS	PE
211	Recycle Evap. Cond Return Unit, Recycle Evap. Package, Air Handling Unit	-	-	-	HS	PE
212	Corridor	Cable Ins	-	I-R/R	HS	PE
212A	Stairway	-	-	-	HS	PE
212B	Exhaust Fan Concrete Pad	(See 200)		-	HS	PE
213	Gas Decay Tank Drain Pump	-	-	-	HS	PE
214	Chemical Drain Tank & Pump, Floor Drain Sump Pump, Waste Evap. Feed Tank Pump	-	-	-	HS	PE
215	Corridor	-	-	-	HS	PE
215A	Waste Drain Tank Pumps	-	-	-	HS	PE
215B	Waste Evap. Feed Pumps	-	-	-	HS	PE
215C	Waste Drain Tank	-	-	-	HS	PE
215D	Waste Evap. Feed Tank	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
216	Waste Evap. Package	-	-	-	HS	PE
217,333	Mechanical	Cable Ins	-	I-R/R	HS	PE
333A, 333B	Penetration Room - Unit 1					
220	Mixing & Settling Tank Pump, Mixing & Settling Tank Sluge Pump	-	-	-	HS	PE
221	Mixing & Settling Tank	-	-	-	HS	PE
222	Spent Resin Valve Body Room	-	-	-	HS	PE
222A	Spent Resin Storage Tank B	-	-	-	HS	PE
222B	Spent Resin Storage Tank A	-	-	-	HS	PE
223	Spent Resin Sluicing Pump	-	-	-	HS	PE
224	Laundry & Hot Water Tank Pump	-	-	-	HS	PE
225	Floor Drain Tank, Laundry& Hot Shower Tank	-	-	-	HS	PE
226	Floor Drain Tank Pump	-	-	-	HS	PE
227,323	Mechanical Penetration	Cable Ins	-	I-R/R	HS	PE
323A, 323B	Room - Unit 2					
230	Centrifugal Charging Pump 1A	Lube Oil	56 Gal.	I-R/R	AE	HS
231	Centrifugal Charging Pump 1B	Lube Oil	56 Gal.	I-R/R	AE	HS
232	Corridor	-	-	I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
233	Reciprocal Charging Pump- Unit 1	Lube Oil*	96.25 Gal.*	I-R/R	HS	PE
		* Reciprocal Charging Pump No. 1 has been abandoned in place per NSM CN-11392/00 and oil has been drained.				
234	High Pressure Safety Safety Injection Pump 1B	Lube Oil	3.5 Gal.	I-R/R	HS	PE
235	High Pressure Safety Injection Pump 1A	Lube Oil	3.5 Gal.	I-R/R	HS	PE
236	Floor Drain Sump Pump Vent Condensate Drain Tank, Train A & B Air Handling Units	-	-	I-R/R	HS	PE
237	Restricted Instrument Shop	-	-	I-R/R	HS	PE
238	Sample Panel- Unit 1	-	-	I-R/R	HS	PE
239	Cable Shaft	Cable Ins	-	I-R/R	HS	PE
240	Centrifugal Charging Pump 2A	Lube Oil	56 Gal.	I-R/R	AE	HS
241	Centrifugal Charging Pump 2B	Lube Oil	56 Gal.	I-R/R	AE	HS
242	Corridor	-	-	I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
243	Reciprocal Charging Pump- Unit 2	Lube Oil*	96.25 Gal.*	I-R/R	HS	PE
		*Reciprocal Charging Pump No. 2 has been abandoned in place per NSM CN-21392/00 and oil has been drained.				
244	High Pressure Safety Injection Pump 2B	Lube Oil	3.5 Gal.	I-R/R	HS	PE
245	High Pressure Safety Injection Pump 2A	Lube Oil	3.5 Gal.	I-R/R	HS	PE
246	Floor Drain Sump Pump, Vent Condensate Drain Tank, Train A & B Air Handling Units	-	-	I-R/R	HS	PE
247	Restricted Instrument Shop	-	-	I-R/R	HS	PE
248	Sample Panel-Unit 2	-	-	I-R/R	HS	PE
250, 255	Auxiliary Feedwater Pump	Lube Oil	3 Gal.	I-R/R	AE	HS
256	Room- Unit 1	Cable Ins				
250A	Stairway	-	-	-	HS	PE
251	Auxiliary Feedwater Pump Turbine Panel	Cable Ins	-	I-R/R	PE	HS
252	Train A Shutdown Panel	Cable Ins	-	I-R/R	PE	HS
253	Train B Shutdown Panel	Cable Ins	-	I-R/R	PE	HS

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
254	Turbine Driven Auxiliary Feedwater Pump (1A)	Lube Oil	8.5 Gal.	P	AE	PE
255	Motor Driven Auxiliary Feedwater Pump (1B)	(See 250)		I-R/R	AE	HS
256	Motor Driven Auxiliary Feedwater Pump (1A)	(See 250)		I-R/R	AE	HS
260,265	Auxiliary Feedwater Pump	Lube Oil	3 Gal.	I-R/R	AE	HS
266	Room-Unit 2	Cable Ins				
260A	Stairway	-	-	-	HS	PE
261	Auxiliary Feedwater Pump Turbine Panel	Cable Ins	-	I-R/R	PE	HS
262	Train A Shutdown Panel	Cable Ins	-	I-R/R	PE	HS
263	Train B Shutdown Panel	Cable Ins	-	I-R/R	PE	HS
264	Turbine Driven Auxiliary Feedwater Pump (2A)	Lube Oil	8.5 Gal.	P	AE	PE
265	Motor Driven Auxiliary Feedwater Pump (2B)	(See 260)		I-R/R	AE	HS
266	Motor Driven Auxiliary Feedwater Pump (2A)	(See 260)		I-R/R	AE	HS
314	Recycle Holdup Tank (A)	-	-	-	HS	PE
316	Recycle Holdup Tank (B)	-	-	-	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 543+0

AUXILIARY FEEDWATER PUMP (AFP) ROOMS

1. Automatic detection with local alarm and alarm and annunciation in the control room.
2. Automatic sprinklers and fixed carbon dioxide systems provide primary protection.
3. Photo-electric detectors are provided in the turbine-driven AFP rooms.
4. Hose stations and portable extinguishers are provided as backup protection for Sprinkler and Carbon Dioxide Systems.
5. Penetrations in fire barriers and stairwells are sealed with a 3-hour rated fire barrier.

REMAINDER OF ELEVATION 543+0

1. Fixed water sprinklers are provided for the Centrifugal Charging Pump rooms 231, 230, 241 and 240.
2. Penetrations in fire barriers and stairwells are sealed with a 3-hour fire rated fire barrier.
3. Curbs are provided as necessary to control sprinkler discharge.
4. Hose stations and portable extinguishers are provided as backup to sprinkler systems.
5. Automatic detection with local alarm and alarm and annunciation in the control room is provided for cable trays.

FIRE AREAS 5 and 6 (Reference Drawings CN-1209-10-12 and CN-1200-8.5)

1. Description of Fire Area

   Drawing CN-1209-10-12 shows the boundaries of Fire Areas 5 and 6 and Drawing CN-1200-8.5 shows the location of the following major pieces of equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
RCP D Switchgear		
RCP B Switchgear		
Pressurizer Htr Panel B		X
Pressurizer Htr Panel D		X
600V MCC MXN		
600V MCC MXZ		
ATC 16		
ATC 17		

   Combustible materials, are listed in Table 3.

2. Construction

   Floors and ceilings forming the fire boundaries of Fire Areas 5 and 6 are reinforced concrete construction providing 3-hour barriers.

Boundary walls separating Fire Areas 5 and 6 from other fire areas are reinforced concrete and concrete block providing 3-hour barriers.

Exception: The boundary walls between the Switchgear Rooms (Fire Area 7 & 8) and associated Electrical Penetration Rooms (Fire Area 5 & 6) are not required to be committed three-hour fire rated barriers (Reference Modification CNCE-10095).

Access to each of these fire areas is by a stairwell enclosed by 3-hour rated blockwalls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetrations in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each Fire Area is provided with automatic detection which alarms and annunciates in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With suppression system functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

   b. With no suppression system functioning:

      A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room.

FIRE AREAS 7 and 8 (Reference Drawings CN-1209-10-12 and CN-1200-8.5)

1. Description of Fire Area

   Drawing CN-1209-10-12 shows the boundaries of Fire Area 7 and 8. Drawing CN-1200-8.5 shows the location of the following major pieces of equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Transf ELXB (EPC)	X	X
600V LC ELXB (EPE)	X	X
Transf ETXF (EPC)	X	
600V LC ELXD (EPE)	X	X
Transf ELXD (EPC)	X	X
600V MCC EMXL (EPE)	X	X
600V MCC EMXD (EPE)	X	X
4 KV SWGR ETB (EPC)	X	X
EATC 2	X	X
Switchgear Air Handling Units (VC)	X	

Combustible materials, are listed in Table 3.

2. Construction

   Boundary walls separating Fire Areas 7 and 8 from other fire areas are 3-hour rated concrete block or concrete.

   Exception: The boundary walls between the Switchgear Rooms (Fire Area 7 & 8) and associated Electrical Penetration Rooms (Fire Area 5 & 6) are not required to be committed three-hour fire rated barriers (Reference Modification CNCE-10095).

   Access to these fire areas is by 3-hour rated fire doors and frames approved by Underwriter's Laboratory or equivalent construction.

   Mechanical and electrical penetrations are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each Fire Area is provided with automatic detectors which alarm and annunciate in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With suppression system functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

   b. With no suppression system functioning:

      A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room.

FIRE AREAS 9 and 10 (Reference Drawings CN-1209-10-12, CN-1209-10-13, CN-1200-8.4, and CN-1200-9.4)

1. Description of Fire Area

   Drawings CN-1209-10-12 and 10-13 show the boundaries of Fire Areas 9 and 10 and drawing CN-1200-8.4 shows the location of the following major pieces of equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Vital Batteries EBA, EBB, EBC, EBD	X	X
Aux Control Batteries CBA, CBB		
Vital Battery Chargers	X	X
Reg Pwr Dist Centers		
Vital DC Dist Center & Panelboards	X	X
Volt Regulators		

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Vital Inverters & AC Panelboards	X	X
Auxiliary Control Battery Chargers		
Auxiliary Control DC Dist Centers		
Auxiliary Control Inverters & AC Panelboards		
Battery Room Exhaust Fans (VC)	X	

Combustible materials, are listed in Table 3.

2. Construction

   Floor and ceiling fire area boundaries are reinforced concrete construction providing 3-hour barriers. Boundary walls are 3-hour rated concrete block.

   Access to either area 9 or 10 is through any of the four (4) entrances which are equipped with 3-hour UL approved doors or of equivalent construction.

   Floor drains are provided in the pipe trenches along column lines 54 and 60 and will handle water from hose stations located in the area.

   Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are sealed with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Each Fire Area is provided with automatic detectors which alarm and annunciate in the Control Room. Manual hose stations and portable extinguishers are provided for suppression. Automatic sprinklers are provided in the cable shafts.

4. Consequences of a Fire

   a. With suppression systems functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur. If redundant trains in this area were involved in the fire, shutdown capability would be available from the ASP's or the SSS.

   b. With no suppression systems functioning:

      A fire could possibly cause loss of redundant trains if no suppression systems functioned; however, the fire barriers would contain the fire within the area and shutdown capability would be available from the SSS.

FIRE AREA 11 (Reference Drawings CN-1209-10-11 and 10-12, CN-1200-8.1, 8.2, 8.3 and 5.2)

1. Description of Fire Area

   Drawings CN-1209-10-11 and 10-12 show the boundaries of Fire Area 11 and drawings CN-1200-8.1 8.2, 8.3 and 5.2 show locations of the following major pieces of safety related equipment:

EQUIPMENT (SYSTEM) (ROOM NO)	SAFETY RELATED	SAFE SHUTDOWN
Seal Water HX (NV) (331, 321)	X	X
Unit 1 - Component Cooling Pumps (KC) (300)	X	X
Volume Control Tank (NV) (319, 309)	X	
RC Filters (NV) (456, 455)	X	
Boric Acid Tanks (NV) (305, 307)	X	X
Seal Water Injection Filter (NV) (471, 470, 463, 462)	X	X
Boron Recycling Hold Up Tanks (316, 314)	X	

Combustible materials are listed in Table 3.

2. Construction

Walls, floors and ceilings are reinforced concrete construction providing 3-hour boundaries for the Fire Area.

A 3-hour fire rated concrete block wall separates Train A and Train B Component Cooling Pumps.

Three hour fire rated concrete block and concrete walls provide protection for safety related 600V motor control centers.

Access to Fire Area 11 is through any of six (6) entrances which are equipped with 3-hour rated doors except in radiation control areas where louvered metal doors permit air flow into radiation control zones. Significant pressure differential assures air flow into radiation control zones. Shield walls, inside the radiation control zones, in a labyrinth arrangement and lack of continuity of combustibles on each side of the boundary reduce the possibility of fire spread. (Ref. Correspondence - W. 0. Parker's letter of July 29, 1982 and H. B. Tucker's letter of December 15, 1982 concerning louvered fire doors.)

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

Cable tray runs, safety related pumps and areas containing combustibles are provided with automatic detectors, which alarm and annunciate in the Control Room.

Fixed water sprinklers, with alarm to the Control Room, are provided for the Component Cooling Pumps.

Manual hose stations and portable extinguishers are provided throughout the elevation as backup to the sprinklers.

4. Consequences of a Fire

a. With suppression system functioning:

The fixed water sprinklers are designed to extinguish fires should they occur in those protected areas and either the normal, ASP or SSS shutdown capability would be available.

b. With no suppression functioning:

A fire could possibly cause loss of equipment in an area if no suppression systems functioned; however, rated boundaries would contain the fire within the area. The SSS provides a means to shutdown the unit separate from the normal unit functions.

Table 3. Building: Auxiliary Elevation: 560 + 0 (Ref. Dwg. CN-1209-10-12)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
300	Component Cooling Pumps (4)	Lube Oil, Cable Ins	1 Gal Ea.	I-R/R	AE	PE
300A	Stairway	-	-	-	HS	PE
300B	Aisle	-	-	-	HS	PE
300C	Duct Shaft	-	-	-	HS	PE
300D	Duct Shaft	-	-	-	HS	PE
301	Boric Acid Transfer Pumps- Unit 2	-	-	-	HS	PE
302	Boric Acid Transfer Pumps- Unit 1	-	-	-	HS	PE
303, 306	Corridor	Cable Ins	-	I-R/R	HS	PE
303A	Stairway	-	-	-	HS	PE
303B	Duct Shaft	-	-	-	HS	PE
304	Valve Gallery	-	-	I-R/R	HS	PE
305	Boric Acid Tank "A"	-	-	-	HS	PE
306	Valve Gallery			I-R/R	HS	PE
307	Boric Acid Tank "B"	-	-	-	HS	PE
308	Corridor	Cable Ins	-	I-R/R	HS	PE
308A	Boron Injection Tank & Pumps- Unit 2	-	-	I-R/R	HS	PE
309	Volume Control Tank Unit 2	-	-	-	HS	PE
310, 315	Corridor	Cable Ins	-	I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
310A	Stairway	-	-	-	HS	PE
310B	Duct Shaft	-	-	-	HS	PE
311	Pipe Trench	-	-	-	HS	PE
312	Pipe Trench	-	-	-	HS	PE
313	Valve Gallery	-	-	I-R/R	HS	PE
314	Boron Recycle Holdup Tank A	(see Table 2)				
315	Valve Gallery	(see 310)		I-R/R	HS	PE
316	Boron Recycle Holdup Tank B	(see Table 2)				
317	Valve Gallery	-	-	-	HS	PE
318	Corridor	Cable Ins	-	I-R/R	HS	PE
318A	Boron Injection Tank & Pumps- Unit 1	-	-	I-R/R	HS	PE
319	Volume Control Tank- Unit 1	-	-	-	HS	PE
320	MCC 2EMXB, Terminal Cabinets MCC 2EMXJ	Cable Ins	-	I-R/R	HS	PE
321	Seal Water Heat Exchanger- Unit 2	-	-	-	HS	PE
322	Cable Tray Access- Unit 2	Cable Ins	-	I-R/R	HS	PE
322A	Stairway	-	-	-	HS	PE
323	Pipe Chase	(see Table 2, 227)		I-R/R	HS	PE
323A	Pipe Chase	(see Table 2, 227)		-	HS	PE
323B	Pipe Chase	(see Table 2, 227)		I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
324	Boronometer- Unit 2	-	-	-	HS	PE
330	MCC 1EXMB, Terminal Cabinets MCC1EMXJ	Cable Ins	-	I-R/R	HS	PE
331	Seal Water Heat Exchanger- Unit 1	-	-	-	HS	PE
332	Boronmeter- Unit 1	-	-	-	HS	PE
333	Pipe Chase	(See Table 2, 217)		I-R/R	HS	PE
333A	Pipe Chase	(See Table 2, 217)		-	HS	PE
333B	Pipe Chase	(See Table 2, 217)		I-R/R	HS	PE
334	Cable Tray Access- Unit 1	Cable Ins	-	I-R/R	HS	PE
340	Battery Room- Unit 2	Cable Ins	-	I	HS	PE
340A	Cable Shaft	(see Table 4, 483)		-	HS	PE
340B	Duct Shaft	-	-	-	HS	PE
341	Vital Battery 2EBA	Battery Casing	-	I-R/R	HS	PE
342	Vital Battery 2EBB	Battery Casing	-	I-R/R	HS	PE
342A	Battery Charger 2ECB	(see 340)		I	HS	PE
343	Vital Battery 2EBC	Battery Casing	-	I-R/R	HS	PE
344	Vital Battery 2EBD	Battery Casing	-	I-R/R	HS	PE
345	Auxiliary Control Power Battery 2CBB	Battery Casing	-	I-R/R	HS	PE
346	Auxiliary Control Power Battery 2CBA	Battery Casing	-	I-R/R	HS	PE
350	Battery Room Unit 1	Cable Ins	-	I	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
350A	Cable Shaft	(See Table 4, 493)		-	HS	PE
350B	Duct Shaft	-	-	-	HS	PE
351	Vital Battery 1EBA	Battery Casing	-	I-R/R	HS	PE
352	Vital Battery 1EBB	Battery Casing	-	I-R/R	HS	PE
352A	Battery Charger 1ECB	(see 350)		I	HS	PE
353	Vital Battery 1EBC	Battery Casing	-	I-R/R	HS	PE
354	Vital Battery 1EBD	Battery Casing	-	I-R/R	HS	PE
355	Auxiliary Control Power Battery 1CBB	Battery Casing	-	I-R/R	HS	PE
356	Auxiliary Control Power Battery 1CBA	Battery Casing	-	I-R/R	HS	PE
360	Electrical Penetration Room- Unit 2	Cable Ins	-	I	HS	PE
360A	Stairway	-	-	-	HS	PE
362	Loadcenters 2ELXB, 2ELXD Switchgear 2ETB MCC-2EMXP MCC-2EMXL MCC-2EMXR	Cable Ins	-	I	HS	PE
363	Switchgear HVAC Equipment Room	(See 362)		I	HS	PE
370	Electrical Penetration Room- Unit 1	Cable Ins	-	I	HS	PE
370A	Stairway	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
372	Load Centers 1ELXB, 1ELXD, Switchgear 1ETB MCC-1EMXP MCC-1EMXL MCC-1EMXR	Cable Ins	-	I	HS	PE
373	Switchgear HVAC Equipment Room	(See 372)		I	HS	PE
410	Recycle Evaporator Feed Demin (Hatch)	-	-	-	HS	PE
411	Recycle Evaporator Condensate Demin (Hatch)	-	-	-	HS	PE
412	Recycle Evaporator Condensate Filter (Hatch)	-	-	-	HS	PE
413	Boric Acid Filters (2 Hatches)	-	-	-	HS	PE
414	Recycle Evaporator Feed Demin (Hatch)	-	-	-	HS	PE
415	Recycle Evaporator Concentrate Filter (Hatch)	-	-	-	HS	PE
416A	Recycle Evaporator Feed Filter (Double Hatch)	-	-	-	HS	PE
416B	Recycle Evaporator Feed Filter (Double Hatch)	-	-	-	HS	PE
420	Fuel Pool Cooling Pre- Filters, Fuel Pool Cooling Post Filters (6 Hatches)	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
421	Thermal Regenerative Demineralizer 2B (Hatch)	-	-	-	HS	PE
422	Thermal Regenerative Demineralizer 2C (Hatch)	-	-	-	HS	PE
423	Cation Bed Demineralizer 2A (Hatch)	-	-	-	HS	PE
424	Waste Monitor Tank Demineralizer (Hatch)	-	-	-	HS	PE
428	Laundry/Hot Shower Carbon Filter (Hatch)	-	-	-	HS	PE
430	Waste Evap. Cond. Filter, Fuel Pool Skimmer Filter (3 Hatches)	-	-	-	HS	PE
431	Thermal Regenerative Demineralizer 1E (Hatch)	-	-	-	HS	PE
432	Thermal Regenerative Demineralizer 1C (Hatch)	-	-	-	HS	PE
433	Cation Bed Demineralizer 1A (Hatch)	-	-	-	HS	PE
441	Floor Drain Tank Filter (Hatch)	-	-	-	HS	PE
442	Laundry & Hot Shower Tank Primary & Secondary Filters (Hatch)	-	-	-	HS	PE
443	Thermal Regenerative Demineralizer 2A (Hatch)	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
444	Thermal Regenerative Demineralizer "2D" (Hatch)	-	-	-	HS	PE
445	Mixed Bed Demineralizer (Hatch)	-	-	-	HS	PE
446	Reactor Coolant Filter "2B" (Hatch)	-	-	-	HS	PE
447	Seal Water Return Filter (Hatch)	-	-	-	HS	PE
448	Thermal Regenerative Demineralizer "2E" (Hatch)	-	-	-	HS	PE
449	Mixed Bed Demineralizer "2A" (Hatch)	-	-	-	HS	PE
450	Fuel Pool Cooling Post Filters- Unit 1 (5 Hatches)	-	-	-	HS	PE
451	Seal Water Return Filter- Unit 1 (2 Hatches)	-	-	-	HS	PE
452	Thermal Regenerative Demineralizer "1D" (Hatch)	-	-	-	HS	PE
453	Thermal Regenerative Demineralizer "1B" (Hatch)	-	-	-	HS	PE
454	Mixed Bed Demineralizer "1B" (Hatch)	-	-	-	HS	PE
455	Reactor Coolant Filter "1B" (2 Hatches)	-	-	-	HS	PE
456	Reactor Coolant Filter "1A" (2 Hatches)	-	-	-	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
457	Waste Evaporator Condensate Demineralizer (1 Hatch)	-	-	-	HS	PE
458	Thermal Regenerative Demineralizer 1A (Hatch)	-	-	-	HS	PE
459	Mixed Bed Demineralizer 1A (Hatch)	-	-	-	HS	PE
460	Reactor Coolant Filter 2A (Hatch)	-	-	-	HS	PE
461	Waste Monitor Tank Filter (Hatch)	-	-	-	HS	PE
462	Seal Water Injection Filter 2B (Hatch)	-	-	-	HS	PE
463	Seal Water Injection Filter 2A (Hatch)	-	-	-	HS	PE
464	Spent Resin Sluice Filter (Hatch)	-	-	-	HS	PE
470	Seal Water Injection Filter 1A (Hatch)	-	-	-	HS	PE
471	Seal Water Injection Filter 1B (Hatch)	-	-	-	HS	PE
472	Waste Evaporator Feed Filter B (Hatch)	-	-	-	HS	PE
473	Waste Evaporator Feed Filter A (Hatch)	-	-	-	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 554+0 and 560+0

BATTERY ROOM (350, 340)

1. Hose stations are provided as primary protection.
2. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
3. Penetrations through rated barriers are sealed with a 3-hour rated fire barrier.
4. Dampers in HVAC ducts are UL rated 3-hours.

SWITCHGEAR ROOMS (372 and 362)

1. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
2. Hose stations provide primary protection.
3. Penetrations through rated barriers are sealed with 3-hour rated fire barrier.

ELECTRICAL PENETRATION ROOMS (370 and 360)

1. Automatic detection is provided with local alarm and alarm and annunciation in the control room.
2. Hose stations and portable fire extinguisher's provide primary protection.
3. Penetrations through rated barriers and stairwells are sealed with a 3-hour rated fire barrier.

REMAINDER OF ELEVATION 560+0

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are provided to protect the Component Cooling Pumps.
3. A 3-hour rated fire barrier is constructed between the Train A and Train B component cooling water pumps.
4. Curbs are provided as necessary to control sprinkler discharge.
5. Hose stations and portable extinguishers are provided as backup for sprinklers.
6. Penetrations through rated barriers and stairwells are sealed with a 3-hour rated fire barrier.

FIRE AREAS 12 and 13 (Reference Drawings CN-1209-10-13 and CN-1200-9.5)

1. Description of Fire Area

   Drawing CN-1209-10-13 shows the boundaries of Fire Areas 12 and 13 and Drawing CN-1200-8.5 shows the location of the following major pieces of equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
RCP D Switchgear		
RCP B Switchgear		
Pressurizer Htr Panel B		X
Pressurizer Htr Panel D		X
600V MCC MXN		

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
600V MCC MXZ		
ATC 16		
ATC 17		

Combustible materials, are listed in Table 3.

2. Construction

   Floors and ceilings forming the fire boundaries of Fire Areas 12 and 13 are reinforced concrete construction providing 3-hour barriers.

   Boundary walls separating Fire Areas 12 and 13 from other fire areas are reinforced concrete and concrete block providing 3-hour barriers.

   Exception: The boundary walls between the Switchgear Rooms (Fire Area 14 & 15) and associated Electrical Penetration Rooms (Fire Area 12 & 13) are not required to be committed three-hour fire rated barriers (Reference Modification CNCE-10095).

   Access to each of these fire areas is by a stairwell enclosed by 3-hour rated blockwalls with 3-hour rated fire doors and frames approved by Underwriter's Laboratory or of equivalent construction.

   Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetrations in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   Each Fire Area is provided with automatic detection which alarms and annunciates in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With fire suppression systems functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

   b. With no fire suppression system functioning:

      A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room.

FIRE AREAS 14 and 15 (Reference Drawings CN-1209-10-13 and CN-1200-9.5)

1. Description of Fire Area

   Drawing CN-1209-10-13 shows the boundaries of Fire Area 14 and 15. Drawing CN-1200-9.5 shows the location of the following major pieces of equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Transf ELXA (EPC)	X	X
600V LC ELXA (EPE)	X	X
Transf ETXE (EPC)	X	
600V LC ELXC (EPE)	X	X
Transf ELXC (EPC)	X	X
600V MCC EMXC (EPE)	X	X
600V MCC EMXK (EPE)	X	X
4 KV SWGR ETA (EPC)	X	X
Switchgear Air Handling Units (VC)	X	

Combustible materials, are listed in Table 4.

2. Construction

Boundary walls separating Fire Areas 14 and 15 from other fire areas are 3-hour rated concrete block or concrete.

Access to these fire areas is by 3-hour rated fire doors and frames approved by Underwriter's Laboratory or equivalent construction.

Exception: The boundary walls between the Switchgear Rooms (Fire Area 14 & 15) and associated Electrical Penetration Rooms (Fire Area 12 & 13) are not required to be committed three-hour fire rated barriers (Reference Modification CNCE-10095).

Mechanical and electrical penetrations are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

Each Fire Area is provided with automatic detectors which alarm and annunciate in the Control Room. Manual hose stations and portable extinguishers are provided for suppression.

4. Consequences of Fire

a. With fire suppression systems functioning:

Manual hose stations and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

b. With no fire suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the fire would be contained in this area. Shutdown capability would be available from the Control Room.

FIRE AREAS 16 and 17 (Reference Drawings CN-1209-10-13 and CN-1200-9.4)

1. Description of Fire Area

Drawing CFP-4 shows the boundaries of Fire Areas 16 and 17 and Drawing CN-1200-9.4 shows the location of major pieces of equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Transducer Cabinets		
Event Recorder		
Auxiliary Relay Racks	X	
Cable Shaft		

Combustible materials and quantities are listed in Table 4.

2. Construction

   The boundaries for Fire Areas 16 and 17 are floors and ceilings constructed using reinforced concrete providing a 3-hour barrier.

   Exception: The boundary between the Control Room floor (Fire Area 21) and the Unit 1 and 2 Cable Rooms (Fire Areas 16 & 17) is not required to be a committed three-hour fire barrier (reference Modification CNCE-9584). The Control Room floor is maintained as a pressure and smoke barrier.

   The wall separating the Cable Rooms from the Service Building (A-A Line) is of reinforced concrete construction providing a 3-hour barrier.

   Remaining boundary walls are concrete block which provide 3-hour barriers.

   Access to Areas 16 and 17 is through any of five (5) entrances which are protected with UL Approved, or of equivalent construction, 3-hour rated fire doors and frames.

   Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated dampers.

3. Fire Detection and Suppression

   The Cable Rooms are provided with automatic detectors which alarm and annunciate in the Control Room.

   Portable extinguishers and fire hose stations are provided for fire suppression.

4. Consequences of a Fire

   a. With fire suppression systems functioning:

      Manual hose stations and portable extinguishers would be used to extinguish a fire and normal unit shutdown would be available. Safe shutdown capability would be available from the SSS.

   b. With no suppression system functioning:

      A fire could possibly cause loss of redundant trains of equipment if no suppression systems functioned; however, boundary walls would contain the fire within the area. Shutdown capability would be available from the SSS.

FIRE AREA 45 and 46 (Reference Drawings CN-1209-10-12 and CN-1209-10-13, CN-1200-8.4, and 9.4)

1. Description of Fire Area

   Drawings CN-1209-10-12 and CN-1209-10-13 show the boundaries of Fire Area 45 and 46 and drawings CN-1200-8.4 and 9.4 show locations of the following major equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Corridor		
Cable Shaft		

   Combustible materials and individual room inventories of equipment are listed in Table 4.

2. Construction

   The boundaries for Fire Area 45 and 46 are walls, floors and ceilings constructed using reinforced concrete and concrete block which provides 3-hour barriers.

   Access to areas 45 and 46 is through any of eight (8) entrances which are equippped with 3-hour UL approved doors or are equivalent construction label, as shown on the attached drawings.

   Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Each area is provided with automatic detectors which alarm and annunciate in the Control Room. Portable extinguishers are provided for fire protection. Automatic sprinklers are provided in corridors 480 and 490.

4. Consequences of a Fire

   a. With suppression system functioning:

      Portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available.

   b. With no suppression system functioning:

      A fire could possibly cause loss of equipment in an area if no suppression system functioned; however, the rated boundaries would contain the fire within the fire area.

      For area 45, the SSS provides means to shutdown the unit. For area 46, the Control Room using the redundant train provides shutdown means.

FIRE AREA 18 (Reference Drawings CN-1209-10-12, 10-13, and 10-14, CN-1200-9.1, 9.2, 9.3, 8.2, 8.3, 10.2 and 10.3)

1. Description of Fire Area

   Drawings CN-1209-10-12, 10-13, and 10-14 show the boundaries of Fire Area 18 and drawings CN-1200-9.1, 9.2 and 9.3, 8.2, 8.3, 10.2 and 10.3 show locations of the following major pieces of equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Demister Heat Sections (VA)	X	
Unit 2-Component Cooling Pumps (KC) (400)	X	X
KC HX (KC) (400)	X	X
600V MCC 1EMXA, 1EMXI (EPE) (478)	X	X
Letdown HX (NV) (476, 467)		
Letdown Reheat, Letdown Chiller and Moderating HX's (NR) (477, 474, 475, 466, 465, 468)	X	
Fuel Pool Cooling Pumps (KF) (418, 409)	X	
KF HX's (KF) 418, 409)	X	
600V MCC 2EMXI, 2EMXA (EPE) (469)	X	X
RHR HX (ND) (435, 434, 425, 426)	X	X

Combustible materials, and individual room inventories of equipment, are listed in Table 4.

2. Construction

   The boundaries for Fire Area 18 are walls, floors, ceilings constructed using reinforced concrete providing a 3-hour barrier. Spiral stairs provide access from the elevation above (594 + 0). Spatial separation and lack of continuity of combustibles reduce the possibility of fire spread. (Ref. Correspondence - July 29, 1982. W. 0. Parker's letter to Harold R. Denton concerning spiral stairs.)

   Access to the area is by any of five (5) separate entrances protected by UL Approved, or equivalent construction, 3-hour rated fire doors and frames as shown on the attached drawings.

   Mechanical and electrical penetrations in rated barriers, stairwells and exterior walls of room 403 are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers, stairwells and exterior walls of room 403 are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Cable tray runs, safe shutdown pumps and areas containing combustible materials are provided with automatic detectors which alarm and annunciate in the Control Room. Individual rooms are listed in Table A-4.

   Fixed water sprinklers are provided, with alarm to the Control Room, for the Component Cooling Pumps and extend twenty feet to GG line to protect cable concentration.

   Manual hose stations and portable extinguishers are provided throughout the elevation.

4. Consequences of a Fire

   a. With suppression system functioning:

The fixed water sprinkler systems are designed to extinguish fires should they occur. A 3-hour rated concrete block wall separates redundant Component Cooling Pumps and both the normal, ASP, and SSS shutdown capability would be available.

b. With no suppression system functioning:

A fire could possibly cause loss of equipment in an area if no suppression system functioned; however, the rated boundaries would contain the fire within the fire area. The SSS provides a means to shutdown the unit separate from the normal unit functions.

Table 4. Building: Auxiliary Elevation: 577 + 0 (Ref. Dwg. CN-1209-10-13)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
400, 400C	Component Cooling Pumps	Lube Oil	1 Gal. Ea.	I-R/R	AE	HS
400D, 400F	(4), Component Cooling	Cable Ins				
400G, 407	Heat Exchangers					
400A	Stairway	-	-	-	HS	PE
400B	Stairway	-	-	-	HS	PE
400C	Duct Shaft	(see 400)		-	HS	PE
400D	Duct Shaft	(see 400)		-	HS	PE
400E	Stairway	-	-	-	HS	PE
400F	Duct Shaft	(see 400)		-	HS	PE
400G	Duct Shaft	(see 400)		-	HS	PE
401	Ice Cond Glycol Mixing & Storage Tank	-	-	I-R/R	HS	PE
401A	Stairway	-	-	-	HS	PE
402	Corridor	-	-	I-R/R	HS	PE
403	Container & Drum Storage	-	-	I-R/R	HS	PE
404	Access Corridor	-	-	-	HS	PE
404A	Dewatering Pump Skid	-	-	I-R/R	HS	PE
404B	Radwaste Feed Skid	-	-	I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
404C	Evaporator Concentrate Holdup Tank	-	-	I-R/R	HS	PE
405	Filter Bunkers	-	-	I-R/R	HS	PE
407	Corridor	(see 400)		I-R/R	HS	PE
408	Fuel Pool Cooling Demineralizer	-	-	I-R/R	HS	PE
409	Fuel Pool Cooling Pumps, Fuel Pool Skimmer Pump, Fuel Pool Cooling Heat Exchanger	Cable Ins	_	I-R/R	HS	PE
417	Fuel Pool Cooling Demineralizer	-	-	I-R/R	HS	PE
418	Fuel Pool Cooling Pumps, Fuel Pool Cooling Heat Exchanger, Fuel Pool Skimmer Pump	Cable Ins	-	I-R/R	HS	PE
419	Mechanical Penetration Room	Cable Ins	_	I-R/R	HS	PE
425	Containment Spray & Residual Heat Removal Heat Exchangers □2A□	-	-	I-R/R	HS	PE
	NOTE: NS HX□s have titanium tubes which would present special fire hazards only when exposed.					

426	Containment Spray & Residual Heat Removal Heat Exchangers 2B	-	-	I-R/R	HS	PE
	NOTE: NS HX s have titanium tubes which would present special fire hazards only when exposed.					
427	Mechanical Penetration	Cable Ins	-	I-R/R	HS	PE
434	Containment Spray & Residual Heat Removal Heat Exchangers 1A	-	-	I-R/R	HS	PE
	NOTE: NS HX s have titanium tubes which would present special fire hazards only when exposed.					
435	Containment Spray & Residual Heat Removal Heat Exchangers 1B	-	-	I-R/R	HS	PE
	NOTE: NS HX s have titanium tubes which would present special fire hazards only when exposed.					
465	Letdown Reheat Heat Exchanger- Unit 2	-	-	I-R/R	HS	PE
466	Letdown Chiller Heat Exchanger- Unit 2	-	_	I-R/R	HS	PE
467	Letdown Heat Exchanger- Unit 2	-	-	I-R/R	HS	PE
468	Moderating Heat Exchanger- Unit 2	-	-	I-R/R	HS	PE
469	MCC 2DMXA MCC 2 EMXI	Cable Ins	_	I-R/R	HS	PE
474	Letdown Reheat Heat Exchanger- Unit 1	_	_	I-R/R	HS	PE
475	Letdown Chiller Heat Exchanger- Unit 1	-	-	I-R/R	HS	PE

476	Letdown Heat Exchanger- Unit 1	_	_	I-R/R	HS	PE
477	Moderating Heat Exchanger- Unit 1	-	-	I-R/R	HS	PE
478	MCC 1EMXA MCC 1EMXI	Cable Ins	-	I-R/R	HS	PE
480	Corridor	(see 483)		I-R/R	PE	HS
480A	Cable Shaft	(see Table 3, 340)		I-R/R	PE	HS
481, 481A	Cable Room Unit 2	Cable Ins	_	I-R/R	PE	HS
481A	Electrical Boards- Unit 2	(see 480A)		I-R/R	PE	HS
482	Duct Shaft	-	-	-	PE	HS
483	Corridor	Cable Ins	-	I-R/R	PE	HS
484	MCC-2MXY, 2MXO, 2MXM, RCP Switchgear, Pressurizer Heater Control, Terminal Cabinets	Cable Ins	-	I	HS	PE
484A	Stairway	-	-	-	HS	PE
485	Switchgear & HVAC Equipment	(see Room 486)		I	HS	PE
486, 485	Load Centers 2ELXA, 2ELXC, Switchgear 2ETA, MCC 2EMXC, 2EMXK, 2EMXQ	Cable Ins	-	I	HS	PE
490	Corridor	(see 493)		I-R/R	PE	HS
490A	Cable Shaft	(see Table 3, 350)		I-R/R	PE	HS

491, 491A	Cable Room- Unit 1	Cable Ins	-	I-R/R	PE	HS
491A	Electric Boards- Unit 1	(see 491)		I-R/R	PE	HS
492	Duct Shaft	-	-	-	HS	PE
493	Corridor	Cable Ins	-	I-R/R	PE	HS
494	MCC-1MXY, 1MXO, 1MXM RCP Switchgear Pressurizer Heater Control Terminal Cabinets	Cable Ins	-	I	HS	PE
494A	Stairs	-	-	-	HS	PE
495	Switchgear & HVAC Equipment	(see Room 496)		I	HS	PE
496, 495	Load Centers 1ELXA, 1ELXC Switchgear 1ETA MCC-1EMXC, 1EMXK, 1EMXQ	Cable Ins	-	I	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 574 + 0 and 577 + O

CABLE ROOM 481, 491

1. Automatic detection with local alarm and alarm and annunciation in the Control Room.
2. Portable extinguishers are provided as primary protection.
3. Penetrations through fire walls are sealed with a 3-hour fire barrier.

SWITCHGEAR AND PENETRATION ROOMS

Same as Elevation 560+0

REMAINDER OF ELEVATION 577+0

1. Automatic detection with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are installed to protect Component Cooling water pumps, the cable corridors, and the cable shafts.
3. A 3-hour, concrete block, barrier is constructed between Train A and Train B Component Cooling Pumps.
4. Penetrations through fire barriers, stairwells and exterior walls of room 403 are sealed with a 3-hour fire barrier.
5. Hose stations and portable extinguishers are provided throughout the elevation.
6. A 3-hour, reinforced concrete barrier is constructed between Train A and Train B Residual Heat Removal Heat Exchangers and Containment Spray Heat Exchangers.

FIRE AREAS 19 and 20 (Reference Drawings CN-1209-10-14 and CN-1200-10.5)

1. Description of Fire Area

   Drawing CN-1209-10-14 shows the boundaries of Fire Areas 19 and 20 and CN-1200-10.5 shows locations of the following major pieces of equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
MG Sets		
Rod Power Gen		
Reactor Trip SWGR (IRE)	X	X

   Combustible materials, are listed in Table 5.

2. Construction

   Boundaries for Fire Areas 19 and 20 are walls, floors and ceilings of reinforced concrete and concrete block construction providing 3-hour barriers.

   Access to these Areas is through UL Approved doors, or doors of equivalent construction, 3-hour rated fire doors and frames.

Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour rated fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with UL Listed, 3-hour rated fire dampers.

3. Fire Detection and Suppression

   Each Area is provided with automatic detectors with alarm and annunciation in the Control Room.

   Manual hose stations and portable extinguishers are provided for fire protection.

4. Consequences of a Fire

   a. With suppression system functioning:

      Manual hose stations and portable extinguishers would be used to extinguish fires should they occur. The normal unit, ASP or SSS shutdown capability would be available.

   b. With no suppression system functioning:

      A fire could possibly cause loss of functions in this area if no suppression system functioned. For Area 19, the Control Room using the redundant train provides shutdown means. For Area 20, the SSS provides the means to shutdown the unit.

FIRE AREA 21(Reference Drawings CN-1209-10-14 and CN-1200-10.4)

1. Description of Fire Area

   Drawing CN-1209-10-14 shows the boundaries of Fire Area 21 and Drawing CN-1200-10.4 shows the arrangement of the Control Room.

2. Construction

   Boundaries for Fire Area 21 are walls, floors, and the ceiling of reinforced concrete and concrete block construction providing 3-hour barriers.

   Exception: The boundary between the Control Room floor (Fire Area 21) and the Unit 1 and 2 Cable Rooms (Fire Areas 16 & 17) is not required to be a committed three-hour fire barrier (reference Modification CNCE-9584). The Control Room floor is maintained as a pressure and smoke barrier.

   Access to the Control Room is through UL Approved, or of equivalent construction labeled, 3-hour rated fire doors (and frames) located in all four walls.

   Mechanical and electrical penetrations in rated barriers are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   The Control Room is provided with automatic detectors located throughout the room and in the control board which alarm and annunciate in the Control Room.

   Portable extinguishers are provided in the Control Room. Manual hose stations are located in each Electrical Penetration Room located adjacent to the Control Room.

4. Consequences of a Fire

   The Control Room is manned twenty four (24) hours per day and if a fire should start, fire suppression is available as stated in paragraph 3.

In the unlikely event that the Control Room shutdown capability is lost, the SSS would be available for shutdown.

FIRE AREA 35 (Reference Drawings CN-1209-10-14 and CN-1200-10.4)

1. Description of Fire Area

   Drawing CN-1209-10-14 shows the boundaries of Fire Areas 35 and Drawing CN-1200-10.4 shows the arrangement of the Storage Room and the Operations Shift Manager's (OSM) Office.

2. Construction

   Walls forming the boundaries of Fire Areas 35 are concrete block construction and reinforced concrete construction each providing a 3-hour barrier.

   Note that Fire Area 35 is not maintained separate from the balance of the Control Room and therefore, can be considered a part of Fire Area 21.

   The floor and ceiling of these rooms is reinforced concrete construction providing 3-hour barrier. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning non-rated doors.)

   Access to each of these rooms is from the Control Room. Doors (to these office areas) will not be normally locked or alarmed. These areas will be normally attended by personnel.

   Mechanical and Electrical penetrations in rated barriers are sealed with an approved 3-hour rated fire barrier. Ventilation ducts penetrating rated barriers are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Each room is provided with automatic detectors which alarm and annunciate in the Control Room.

   Portable extinguishers are provided in the adjacent Control Room. Manual hose stations are located in each Electrical Penetration Room adjacent to the Control Room.

4. Consequences of a Fire

   The Control Room is manned twenty-four (24) hours per day and if a fire should occur, fire suppression is available as stated in Paragraph 3.

   In the unlikely event that the Control Room shutdown capability is lost, the SSS would be available for shutdown.

FIRE AREA 22 (Reference Drawings CN-1209-10-14, CN-1200-10.1, 10.2 and 10.3)

1. Description of Fire Area

   Drawing CN-1209-10-14 shows the boundaries of Fire Area 22 and Drawings CN-1200-10.1, 10.2 and 10.3 show locations of the following major pieces of equipment:

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Control Room Area Fans (VC)	X	
Control Room Area Air Handling Units (VC)	X	
Fuel Handling Area Exhaust Filter Units (VF)	X	
Auxiliary Building Filtered Exhaust Filter Units (VA)	X	

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Annulus Ventilation Filter Units (VE)	X	
Control Area Vent System (VC)	X	X
Comp Cooling Surge Tanks (KC)	X	
Ice Machines (NF)		
Boron Chiller Surge Tanks (NR)		
Aux Bldg AHU (VA)		
Fuel Pool AHU (VF)		
RB Purge Filter Units (VP)		
Control Room Air Handling Units (VC)	X	
Control Room Area Pressurizing Filter Units (VC)	X	
Control Room Area Chillers (YC)	X	

Combustible materials and quantities are listed in Table 5.

2. Construction

   Walls, floors and ceilings are reinforced concrete or concrete block constructed providing 3-hour fire boundaries for Fire Area 22. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning unprotected spiral stairways.)

   Access to the area is through UL Approved, or of equivalent construction, 3-hour rated fire doors and frames as shown on attached drawings.

   Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire barrier. Mechanical penetration seals in the Reactor Building boundary walls have been qualified through testing and/or analysis. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Cable tray runs and areas containing combustibles are provided with automatic detectors which alarm and annunciate in the Control Room.

   Fixed manual water spray systems are installed in carbon filters.

   Manual hose stations and portable extinguishers are provided throughout the area to protect equipment.

4. Consequences of a Fire

   a. With suppression system functioning:

      The fixed manual water sprays are designed to extinguish fires should they occur in the carbon filters.

Manual hose stations and portable extinguishers would extinguish fires and normal unit, ASP or SSS capability, would be available.

b. With no suppression system functioning:

Fire area boundaries would contain the fire. The SSS would be available even if no suppression systems functioned in Fire Area 22.

SUMMARY OF FIRE PROTECTION FOR ELEVATION 594 + 0

CONTROL ROOM (573, 575, 574)

1. Automatic detection with local alarm is provided.
2. Portable extinguishers are provided for primary protection.

ELECTRICAL PENETRATION ROOMS (563, 516)

1. Automatic detection with local alarm and alarm and annunciation is provided.
2. Hose stations and portable extinguishers are provided for fire protection.

Table 5. BUILDING: AUXILIARY ELEVATION: 594 + 0 (Ref. Dwg. CN-1209-10-14)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
500	HVAC Filters Ice Machine Tank, MCC	Cable Ins	-	I-R/R	AE	HS
500A	Stairway	-	-	-	HS	PE
500B	Stairway	-	-	-	HS	PE
500C	Stairway	-	-	-	HS	PE
500D	Stairway	-	-	-	HS	PE
510	Counting Room	-	-	-	HS	PE
511	Environment Lab	-	-	I-R/R	HS	PE
512	Health Physics	-	-	I-R/R	HS	PE
530	New Fuel Storage- Unit 1	-	-	Ultraviolet	PE	HS
531	New Fuel Receiving Area - Unit 1	-	-	Ultraviolet	PE	HS
540	New Fuel Storage- Unit 2	-	-	Ultraviolet	PE	HS
541	New Fuel Receiving Area - Unit 2	-	-	Ultraviolet	PE	HS
550	Manway To Spent Resin Batching Tank	-	-	I-R/R	HS	PE
551	Inst. Calibration	-	-	-	HS	PE
551A	Corridor	-	-	-	HS	PE
560	Equipment Area (Vent)	-	-	I	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
561	Corridor	-	-	-	HS	PE
561A	Stairway	-	-	-	HS	PE
561B	Stairway	-	-	-	HS	PE
563	Reactor Trip Swgr.	Cable Ins, Hyd Fluid	60 Gal.	I	HS	PE
564	RMC Room	-	-	I	HS	PE
570	HVAC, MCC	Cable Ins	-	I	HS	PE
571	Corridor	-	-	-	HS	PE
571A	Stairway	-	-	-	HS	PE
573	Control Room	-	-	I (throughout room and inside main control boards) R/R (Partially covered)	PE	HS
574	Operators Office	-	-	I	PE	HS
575	Interface Office	-	-	I	PE	HS
576	Reactor Trip Swgr.	Cable Ins	-	I	PE	HS

REMAINDER OF ELEVATION 594 + 0

1. Built-in manual water spray systems are provided for carbon filters.
2. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
3. Hose stations and portable extinguishers are provided for fire protection.

FIRE AREAS 23 and 24 (Reference Drawings CN-1209-10-14, CN-1209-10-15, CN-1200-11.2, 11.3, 12.2 and 12.3)

1. Description of Fire Area

   Drawings CN-1209-10-14 and CN-1209-10-15 show the boundaries of Fire Areas 23 and 24 and Drawings CN-1200-11.2, 11.3, 12.2 and 12.3 show details of the Fuel Buildings.

   Combustible materials are listed in Tables 5 and 6.

2. Construction

   Walls, floor and ceiling fire boundaries are reinforced concrete construction providing a 3-hour barrier between the Fuel Pool and the Auxiliary Building.

   Access to the area is via 3-hour rated stairways equipped with UL Approved, or of equivalent construction, 3-hour fire rated doors and frames.

   Mechanical and electrical penetrations in rated barriers and stairwells are sealed with an approved 3-hour fire rated barrier. Ventilation ducts penetrating rated barriers and stairwells are protected with 3-hour UL rated fire dampers.

3. Fire Detection and Suppression

   Each area is provided with automatic detectors which alarm and annunciate in the Control Room.

   Manual hose stations and portable extinguishers are provided for fire suppression.

4. Consequences of a Fire

   a. With suppression system functioning:

      Normal unit shutdown would not be affected if a fire occurred in the Fuel Pool Area.

   b. With no suppression system functioning:

      Normal unit shutdown would not be affected if a fire occurred in the Fuel Pool Area. However, the SSS is the credited method of shutdown for these areas.

FIRE AREAS 38 and 47 (Reference Drawings CN-1209-10-15, CN-1200-11.4 and 12.4)

1. Description of Fire Area

   Drawing CN-1209-10-15 shows the boundaries of Fire Area 38 and 47 and drawings CN-1200-11.4 and 12.4 shows the location of the following major equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Fuel Handling Area		

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Exhaust Filter		

2. Construction

   The boundaries of Fire Areas 38 and 47 are walls, floors, and ceilings constructed using reinforced concrete which provides 3-hour barriers.

   Spiral stairs provide access into the fire areas from the elevation below (605+10). Spatial separation and lack of continuity of combustibles reduce the possibility of fire spread. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton concerning additional spiral stair information.)

3. Fire Detection and Suppression

   Automatic detection is provided which alarms and annunciates in the Control Room.

   Manual hose stations and portable fire extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With suppression system functioning:

      Normal unit shutdown would not be affected if a fire occured in these Fire Areas. However, the SSS is the credited method of shutdown for these areas.

   b. With no suppression system functioning:

      Normal unit shutdown would not be affected if a fire occured in the Fire Areas.

SUMMARY OF FIRE PROTECTION FOR ELEVATION 605 + 10

1. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
2. Hose stations and portable extinguishers are provided for fire protection.

Table 6. BUILDING: AUXILIARY ELEVATION: 605 + 10 and 631 + 6 (Ref. Dwg. CN-1209-10-15)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
530	New Fuel Storage- Unit 1	(See Table 5, 530)	-	-	-	-
531	New Fuel Receiving Area- Unit 1	(See Table 5, 531)	-	-	-	-
540	New Fuel Storage- Unit 2	(See Table 5, 540)	-	-	-	-
541	New Fuel Receiving Area- Unit 2	(See Table 5, 541)	-	-	-	-
600	Fuel Pool Operating Floor, Unit 1	Cable Ins	-	I-R/R	HS	PE
600A	Duct Room	-	-	-	HS	PE
601	Reactor Personnel #1 Lock Area (Aisle)	-	-	-	HS	PE
601A	Reactor Personnel #1 Lock Area (Aisle)	-	-	I-R/R	HS	PE
602	Contaminated Decon-tamination Tool Storage	-	-	I-R/R	HS	PE
614	Fuel Pool Operating Floor, Unit 2	Cable Ins	-	I-R/R	HS	PE
614A	Duct Room	-	-	-	HS	PE
615	Reactor Personnel #2 Lock Area (Aisle)	-	-	-	HS	PE
615A	Reactor Personnel #2 Lock Area (Aisle)	-	-	I-R/R	HS	PE

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
616	Contaminated Decon-tamination Tool Storage	-	-	I-R/R	HS	PE
801	Fuel Handling Area Exhaust Filter (Fuel Pool Purge) #1	-	-	-	HS	PE
802	Fuel Handling Area Exhaust Filter (Fuel Pool Purge Unit) #2	-	-	-	HS	PE

SUMMARY OF FIRE PROTECTION FOR ELEVATION 605 + 10

CONTROL ROOM (573, 575, 574)

1. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
2. Hose stations and portable extinguishers are provided for fire protection.

SUMMARY OF FIRE PROTECTION FOR ELEVATION 631 + 6

1. Automatic detection with local alarm and alarm and annunciation in the Control Room is provided.
2. Hose stations are provided for primary fire protection.

Diesel Generator Building

FIRE AREAS 25, 26, 27 and 28 (Reference Drawings CN-1209-10-16, CN-1200-14.1 and 14.4)

1. Description of Fire Area

   Drawing CN-1209-10-16 shows the boundaries of Fire Areas 25, 26, 27 and 28 and drawings CN-1200-14.1 and 14.4 show the location of the following major pieces of safety related equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Emergency Diesel Generator and associated equipment, instrumentation and controls	X	X

   Combustible materials, are listed in Table 7.

2. Construction

   The Diesel Generator Buildings are physically separated from the Auxiliary Building by 44 feet.

   Redundant diesels are separated from each other by a three hour barrier.

   Access to these Fire Areas is by outside stairwells and corridors from the Auxiliary Building, Elev. 560 + 0, Essential Switchgear Rooms.

   Floor drains provided in each area will handle water from hose stations.

   Mechanical and electrical penetrations are sealed with an approved 3-hour rated fire barrier.

3. Fire Detection and Suppression

   Each Fire Area (25, 26, 27 and 28) is provided with automatic detection which alarms and annunciates in the Control Room.

   An automatic Carbon Dioxide system is provided for protection of the diesels. The system is actuated by fixed temperature detectors which also alarm and annunciate in the Control Room.

   The CO2 system may also be activated manually if required. Manual hose stations are provided as backup for the CO2 protection.

4. Consequences of a Fire

   a. With suppression system functioning:

The CO2 system is designed to extinguish fires should they occur in one of these areas and normal shutdown capacity would be available from offsite power or the redundant diesel generator as conditions warrant.

b. With no suppression system functioning:

A fire could possibly cause loss of one train if no suppression system functioned; however, the rated barriers separating redundant trains would contain the fire and normal shutdown capability would be available from the Control Room. The SSS is the assured means.

FIRE AREAS 41, 42, 43, 44 (Reference Drawings CN-1209-10-16, and CN-1200-14.4)

1. Description of Fire Area

Drawing CN-1209-10-16 shows the boundaries of Fire Areas 41, 42, 43, 44 and Drawings 1200-14.4 show locations of the following equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Diesel Generator Sequencer Panels	X	

Combustible materials, quantities and fire loads are listed in Table 7.

2. Construction

Walls, floor and ceiling fire boundaries are reinforced concrete construction providing a 3-hour barrier between Diesel Generators and the Auxiliary Building.

3. Fire Detection and Suppression

Each area is provided with automatic detectors which alarm and annunciate in the Control Room.

Portable extinguishers are provided in adjacent rooms for fire suppression.

4. Consequences of a Fire

a. With suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in Fire Areas 41, 42, 43, 44.

b. With no suppression system functioning:

Normal unit shutdown would not be affected if a fire occurred in Fire Areas 41, 42, 43, 44. However, the SSS is the credited method of shutdown for these areas.

Table 7. BUILDING: AUXILIARY ELEVATION: 556 + 0 (Ref. Dwg. CN-1209-10-16)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
302	Diesel Control Panel Diesel 1A Diesel-Generator Lube Oil Cooler, Lube Oil Filter, Fuel Oil Day Tk, Fuel Oil Booster Pump, Battery Racks, Lube Oil Sump Tk	Cable Ins, Lube & Fuel Oil	880 Gal.	FT	AE	HS
302C	Diesel Gen. Sequencer Panels	Cable Insulation		I-R/R	PE	HS
304	(See Room 302)					
304C	Diesel Generator Sequencer Panels	Cable Insulation		I-R/R	PE	HS
306	(See Room 302)					
306C	Diesel Generator Sequencer Panels	Cable Insulation		I-R/R	PE	HS
308	(See Room 302)					
308C	Diesel Generator Sequencer Panels	Cable Insulation	-	I-R/R	PE	HS

SUMMARY OF FIRE PROTECTION FOR ELEVATION 556 + 0

DIESEL GENERATOR ROOMS (302, 304, 306 and 308)

1. A Carbon Dioxide system provides primary protection.
2. Hose stations provide backup for the CO2 system.
3. Penetrations through fire barriers are sealed with a three hour rated fire barrier.
4. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.

Nuclear Service Water Pump Structure

FIRE AREA 29 and 30 (Reference Drawings CN-1209-10-17 and CN-1040-11)

1. Description of Fire Area

   Drawing CN-1209-10-17 shows the boundaries of Fire Areas 29 and 30 and drawing CN-1040-11 shows the location of the following major equipment.

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Nuclear Service Water Pump	X	X
Nuclear Service Water Strainer	X	X
Nuclear Service Water Pump Structure		
Vent Fans	X	

   Combustible materials, are listed in Table 8.

2. Construction

   Boundaries of Fire Areas 29 and 30 are walls, floors and ceiling of reinforced concrete which provide a three hour fire barrier.

   Access to the area is by doors opening to the yard.

3. Fire Detection and Suppression

   Each room is provided with automatic detection with local alarm and alarm and annunciation in the Control Room.

   External fire hydrants and portable extinguishers are provided for suppression.

4. Consequences of a Fire

   a. With suppression systems functioning:

      External fire hydrants and portable extinguishers would be used to extinguish a fire should it occur and normal shutdown capability would be available from the redundant train.

   b. With no suppression system functioning:

      A fire could possibly cause loss of one train if no suppression system functioned; however, shutdown capability from the SSS would be available.

SUMMARY OF FIRE PROTECTION FOR NUCLEAR SERVICE WATER PUMP STRUCTURE

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room for each room.
2. Penetrations through fire barriers are sealed with a 3-hour rated fire barrier.
3. External fire hydrants and portable extinguishers are provided for fire suppression.

Reactor Building

The Reactor Building is considered separately from the Auxiliary Building. Each Reactor Building, although considered to be a single fire area, has been divided into three areas to delineate information.

Area RB-1 (Reference Drawing CN-1209-10-19)

1. Description of Area RB-1

   Drawing CN-1209-10-19 shows the boundaries of Area RB-1, Annulus.

   Combustible materials are listed in Table 9.

2. Construction

   The outer wall of the Annulus is 3'-0" thick reinforced concrete construction. The inner wall is the containment liner plate.

   Access to the area is from the Electrical Penetration Room on Elevation 560 + 0.

   Floor drains are provided to handle sprinkler discharge water.

   Mechanical and electrical penetrations are sealed to preserve the pressure boundaries. Penetration seals for the Reactor Building boundary walls have been qualified through testing and/or analysis. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning HVAC duct penetrations).

3. Fire Detection and Suppression

   The annulus is provided with automatic detectors which alarm and annunciate in the Control Room.

   Fixed water sprinklers are provided to extinguish fires should they occur in the Annulus.

   Manual hose stations and portable extinguishers are provided in the Auxiliary Building Electrical Penetration Room. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) for details of fire protection based on Appendix R cable separation.)

4. Consequences of a Fire

   a. With suppression system functioning:

      The fixed water sprinklers are designed to extinguish fires should they occur and unit shutdown would be by normal equipment.

   b. With no suppression system functioning:

      The automatic detection would alert station personnel of the fire condition and manual suppression with hose stations and portable extinguishers would be used.

      Unit shutdown would be by the redundant train.

      Areas RB-2 and RB-3 are inside the containment liner plate and not accessible during operation.

If a fire should occur, the unit would be shutdown and the fire brigade would enter when conditions permitted.

Safe shutdown would be maintained by the redundant train.

AREA RB-2 (Reference Drawing CN-1041-2)

1. Description of Fire Area

   Drawing CN-1041-2 shows the boundaries of Area RB-2, Pipe Corridor.

   Combustible materials are listed in Table 9.

2. Construction

   The floor, interior wall and ceiling are reinforced concrete construction. The exterior wall is the containment liner plate.

   Access to this area is from Elevation 565 + 3 through a hatch in the Emergency Personnel Lock area.

   Floor drains are provided to handle sprinkler discharge water.

3. Fire Detection and Suppression

   Automatic detection is provided with alarm and annunciation in the Control Room.

   Fixed manual water sprinklers are provided to extinguish fires should they occur.

   Manual hose stations are provided to backup the fixed manual water sprinklers.

AREA RB-3 (Reference Drawing CN-1041-2)

1. Description of Area RB-3

   Drawing CN-1041-2 shows the boundaries of Area RB-3 and the location of the following equipment:

EQUIPMENT	SAFETY RELATED	SAFE SHUTDOWN
Reactor Coolant Pumps		
Pressurizer Relief Tank		
Steam Generators		
Lower Containment Filters		

   Combustible materials are listed in Table 9.

2. Construction

   The floor, ceiling and walls are reinforced concrete construction.

   Access to the area is from Elevation 565 + 3 through the pressure door at the Emergency Personnel Lock.

3. Fire Detection and Suppression

   Automatic detection which alarms and annunciates in the Control Room is provided over safety related cable tray runs, the Reactor Coolant Pumps and other areas containing combustibles. (Ref.

Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning Appendix R requirements for detection within the Reactor Building.)

Fixed manual water sprinklers are provided to protect the RCP's and the motors have been designed to prevent oil spills as described in Section D., Paragraph 2.(a)(3).

Fixed manual preaction water spray systems are provided to protect the Lower Containment Filters.

SUMMARY OF FIRE PROTECTION FOR THE REACTOR BUILDINGS

1. Automatic detection is provided with local alarm and alarm and annunciation in the Control Room.
2. Fixed water sprinklers are provided for the pipe corridor, annulus reactor coolant pumps and carbon filters.
3. Hose stations are provided as backup for sprinklers.
4. Fixed repeaters are provided for communication within containment.

Table 8. BUILDING: NUCLEAR SERVICE WATER PUMP STRUCTURE (Ref. CN-1209-10-17, CN-1040-11)

EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
RN Pump Room Train A	Cable Ins	--	I-R/R	HY	PE
RN Pump Room Train B	Cable Ins	--	I-R/R	HY	PE
RN Pump 1A, 1B, 2A, 2B	Lube Oil	8.75 Gal (ea)	I-R/R	HY	PE

Table 9. BUILDING: REACTOR BUILDING (Ref. CN-1209-10.19, CN-1209-10.21)

EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
Annulus Unit 1	Cable Ins	-	I	AE (Partial)	HS
Annulus Unit 2	Cable Ins	-	I	AE (Partial)	HS
Pipe Corridor Unit 1	Cable Ins	-	P	AE	HS
Pipe Corridor Unit 2	Cable Ins	-	P	AE	HS
Safety Related Cable Trays Unit 1	Cable Ins	-	P	PE	HS
Safety Related Cable Trays Unit 2	Cable Ins	-	I	PE	HS
Reactor Coolant Pumps 1A, 1B, 1C, 1D	Lube Oil, Cable Ins	220 Gal. (ea.)	Heat Sens. Cable	Oil Collection System	AE/HS
Reactor Coolant Pumps 2A,2B,2C,2D	Lube Oil, Cable Ins	220 Gal. (ea.)	Heat Sens. Cable	Oil Collection System	AE/HS
Lower Containment Filters 1A, 1B	Carbon	-	P-R/R	AE	HS
Lower Containment Filters 2A, 2B	Carbon	-	P-R/R	AE	HS

Doghouses

FIRE AREAS 48 AND 49 (Reference drawings CN-1209-10.13, -10.14, -10.15 and CN-1200-16.2, -16.3, -16.4, -16.6, -16.7, -16.9)

1. Description of Fire Area

   Drawings CN-1209-10.13, -10.14, -10.15 show the boundaries of Fire Areas 48 and 49. Drawings CN-1200-16.2, -16.3, -16.4, -16.6, -16.7, -16.9 show the physical arrangement and location of major equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Main Steam Isolation Valves (SV)	X	X
Main Steam Isolation Bypass Valves (SV)	X	X
Main Steam Power Operated Relief Valves (SV)	X	X
Feedwater Isolation Valves (CF)	X	

   Combustible materials in each area consist of armor interlock non-jacketed cable, short lengths of PVC jacketed flexible conduit, Fyrequel EHC hydraulic fluid +(feedwater isolation valves), and small quantities of grease. See Table 10 for summary of combustibles.

2. Construction

   Floor, wall and ceiling construction forming the boundaries of Fire Areas 48 and 49 are reinforced concrete construction providing 3-hour barriers. Penetrations and other openings in these barriers are sealed with an approved 3-hour rated fire barrier when they communciate with adjacent Fire Areas. Mechanical penetrations in the Reactor Building boundary wall have been qualified through testing and/or analysis.

   Access to these areas is from grade elevation (El. 594 + 0) by means of the El. 594 Electrical Penetration Rooms. Emergency access is obtained through the large vent openings located in the exterior walls at El. 634 + 0.

   Flooring consists of a concrete floor at El. 577 + 0 (1200 sq. ft.) and four mezzanine levels formed of steel grating at Elevations 594 + 0 (525 sq. ft.), 619 + 6 (775 sq. ft.), 622 + 6 (325 sq. ft.), and 634 + 0 (750 sq. ft.).

3. Fire Detection and Suppression

   Due to the extremely low insitu combustible load, low potential for transient combustibles at times other than outages, controlled and limited personnel access, and physical arrangement, fire detection and suppression systems are not provided in these areas. Portable fire extinguishers are readily available in the adjacent fire areas and fire brigade locker. The hose stations located in the El. 594 Electrical Penetration Rooms may be utilized for fire fighting within The Doghouse areas if additional hose is connected. Additional hose is stored in the fire brigade locker. The fire plan for each Doghouse fire area provides information concerning equipment needed for response to a fire in the area.

4. Consequences of a Fire

   a. With suppression equipment utilized: Portable fire extinguishers backed by a 1 1/2 inch hose connection would be used to extinguish a fire should it occur. Shutdown capability from at least one train of equipment would likely be available.

   b. With no suppression equipment utilized: Loss of one train of shutdown equipment could occur, but the fire would be contained within the Fire Area. Shutdown capability is assured through the use of Exterior Doghouse equipment utilizing Train B.

FIRE AREAS 50 and 51 (Reference drawings CN-1209-10.13, -10.14, -10.15 and CN-1200-16.1, -16.3, -16.4, -16.5, -16.7, -16.9)

1. Description of Fire Area

   Drawings CN-1209-10.13, -10.14, -10.15 show the boundaries of Fire Areas 50 and 51. Drawings CN-1200-16.1, -16.3, -16.4, -16.5, -16.7, -16.9 show the physical arrangement and location of major equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
Main Steam Isolation Valves (SV)	X	X
Main Steam Isolation Bypass Valves (SV)	X	X
Main Steam Power Operated Relief Valves (SV)	X	X
Feedwater Isolation Valves (CF)	X	

   Combustible materials in each area consist of armor interlock non-jacketed cable, short lengths of PVC jacketed flexible conduit, Fyrequel EHC hydraulic fluid (feedwater isolation valves), and small quantities of grease. See Table 10 for summary of combustibles.

2. Construction

   Floor, wall and ceiling construction forming the boundaries of Fire Areas 50 and 51 are reinforced concrete construction providing 3-hour barriers. Penetrations and other openings in these barriers are sealed with an approved 3-hour rated fire barrier when they communicate with adjacent Fire Areas. Mechanical penetrations in the Reactor Building boundary wall have been qualified through testing and/or analysis.

   Access to these areas is from grade elevation (El. 594 + 0) through an exterior door. Emergency access is obtained through the large vent openings located in the exterior walls at El. 634 + 0.

   Flooring consists of a concrete floor at El. 577 + 0 (1175 sq. ft.) and four mezzanine levels formed of steel grating at Elevations 594 + 0 (550 sq. ft.), 619 + 6 (725 sq. ft.), 622 + 6 (325 sq. ft.), and 634 + 0 (755 sq. ft.).

3. Fire Detection and Suppression

   Due to the extremely low insitu combustible load, low potential for transient combustibles at times other than outages, controlled and limited personnel access, and physical arrangement, fire detection and suppression systems are not provided in these areas. Portable fire extinguishers are stored in the fire brigade locker for use in these areas. Yard fire hydrants and related equipment may be utilized

for fire fighting within the Doghouse areas. The fire plan for each Doghouse fire area provides information concerning equipment needed for response to a fire in the area.

4. Consequences of a Fire

   a. With suppression equipment utilized: Portable fire extinguishers backed by a 1 1/2 inch hose connection would be used to extinguish a fire should it occur. Shutdown capability from at least one train of equipment would likely be available.

   b. With no suppression equipment utilized: Loss of redundant trains of equipment could occur but the fire would be contained within the Fire Area. Shutdown capability is assured through the use of the SSS. (Refer to the Associated Circuit Review for additional information.)

Table 10. BUILDING: Doghouses ELEVATION: 577 + 0 (Ref. Dwgs. CN-1209-10.13, -10.14, -10.15)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
562	Unit 2 Interior Doghouse	Cable Ins., Hyd. Fluid, Grease	10 gal.	-	PE	HS
572	Unit 1 Interior Doghouse	Cable Ins., Hyd. Fluid, Grease	10 gal.	-	PE	HS
581	Unit 2 Exterior Doghouse	Cable Ins., Hyd. Fluid, Grease	10 gal.	-	PE	HS
591	Unit 1 Exterior Doghouse	Cable Ins., Hyd. Fluid, Grease	10 gal.	-	PE	HS

SUMMARY OF FIRE PROTECTION FOR THE DOGHOUSES

1. Portable fire extinguishers and fire hoses are provided for fire suppression.
2. Penetrations through fire barriers are sealed with a 3-hour rated fire barrier.

Standby Shutdown Facility (SSF)

FIRE AREA SSF (Reference drawings CN-1209-10.18 and CN-1040-18)

1. Description of Fire Area

   Drawing CN-1209-10.18 shows the boundaries of the SSF. Drawing CN-1040-18 shows the physical arrangement and location of major equipment.

EQUIPMENT (SYSTEM)	SAFETY RELATED	SAFE SHUTDOWN
SSF Diesel Generator		X
SSF Control Panel		X
SSF Load Center Transformers (1STXG, 1SLXG)		X
SSF Motor Control Center (SMXG)		X
SSF Batteries (SDSB1,SDSB2, SDSBS)		X
SSF Air Handling Equipment		

   See Table 11 for summary of combustibles.

2. Construction

   The floor of the SSF is reinforced concrete construction, the walls are of concrete block construction, and the roof is concrete slab on metal decking with a built up insulated roof system. Individual rooms at elevation 594 such as the Control Room, Battery Room, Electrical Equipment Room, and the Diesel Room are separated by walls of concrete block construction. In addition, the walls separating the Diesel Room from the remainder of the SSF are three-hour rated fire walls and are sealed with three-hour fire rated penetration seals and Listed/Approved fire doors for property conservation purposes.

   Floor drains are provided and will handle fire fighting water flow.

   Access to the SSF is from grade elevation (El. 594 + 0) through exterior doors.

3. Fire Detection and Suppression

   Automatic detection is provided in each room which alarms and annunciates in the Control Room.

   Fixed automatic sprinklers are provided in the SSF Diesel Room.

   Manual hose stations and portable fire extinguishers are provided throughout for suppression..

4. Consequences of a Fire

   Fixed and manual suppression equipment is available. Loss of equipment could occur but the damage would be limited to the equipment in the SSF structure itself due to spatial separation from redundant train shutdown equipment. Shutdown capability is assured through the Main Control Room using redundant train equipment (A or B).

Table 11. BUILDING: Standby Shutdown Facility (SSF) ELEVATION: 594 + 0 (Ref. Dwg. CN-1209-10.18)

ROOM NO.	EQUIPMENT/USE	COMBUSTIBLE MATERIAL	OIL QUANTITY	TYPE DETECTION	PRIMARY PROTECTION	BACK-UP PROTECTION
SS-101, SS-103, SS-104, SS-201, SS-202	Control Room, Battery Room, Electrical Equip Room, HVAC Room, Cable Shaft	Cable Ins., Batteries	-	1-R/R	PE	HS
SS-102	Diesel Room	Cable Ins., Lube & Fuel Oil	~120 Gal.	R/R	AE	HS

A.3 PART C - RESPONSE TO APPENDIX R TO 10CFR PART 50

NRC: 1. INTRODUCTION AND SCOPE

Not applicable.

NRC: 2. GENERAL REQUIREMENTS

a. FIRE PROTECTION PROGRAM

A FIRE PROTECTION PROGRAM SHALL BE ESTABLISHED AT EACH NUCLEAR POWER PLANT. THE PROGRAM SHALL ESTABLISH THE FIRE PROTECTION POLICY FOR THE PROTECTION OF STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY AT EACH PLANT AND THE PROCEDURES, EQUIPMENT, AND PERSONNEL REQUIRED TO IMPLEMENT THE PROGRAM AT THE PLANT SITE.

THE FIRE PROTECTION PROGRAM SHALL BE UNDER THE DIRECTION OF AN INDIVIDUAL WHO HAS BEEN DELEGATED AUTHORITY COMMENSURATE WITH THE RESPONSIBILITIES OF THE POSITION AND WHO HAS AVAILABLE STAFF PERSONNEL KNOWLEDGEABLE IN BOTH FIRE PROTECTION AND NUCLEAR SAFETY.

THE FIRE PROTECTION PROGRAM SHALL EXTEND THE CONCEPT OF DEFENSE-IN-DEPTH TO FIRE PROTECTION IN FIRE AREAS IMPORTANT TO SAFETY, WITH THE FOLLOWING OBJECTIVES:

- TO PREVENT FIRES FROM STARTING;
- TO DETECT RAPIDLY, CONTROL, AND EXTINGUISH PROMPTLY THOSE FIRES THAT DO OCCUR;
- TO PROVIDE PROTECTION FOR STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY SO THAT A FIRE THAT IS NOT PROMPTLY EXTINGUISHED BY THE FIRE SUPPRESSION ACTIVITIES WILL NOT PREVENT THE SAFE SHUTDOWN OF THE PLANT.

DUKE: The fire protection program of Catawba Nuclear Station is as stated in this Design Basis Document (CNS-1465.00-00-0006). Fire Protection responsibilities have been assigned to the Site Vice President who has delegated responsibility for fire protection to the Fire Protection Engineer in the Progam and Component Engineering Group.

Nuclear System Directives and administrative controls provide emphasis to fire prevention. Fire detection systems located as stated in the Fire Hazards Analysis provide rapid fire detection capabilities. Automatic and manual fixed fire suppression systems and manual fire fighting equipment provide capabilities for rapid fire control. Safe shutdown capabilities are assured as stated in the Fire Hazards Analysis.

NRC: b. FIRE HAZARDS ANALYSIS

A FIRE HAZARDS ANALYSIS SHALL BE PERFORMED BY QUALIFIED FIRE PROTECTION AND REACTOR SYSTEMS ENGINEERS TO (1) CONSIDER POTENTIAL IN SITU AND TRANSIENT FIRE HAZARDS; (2) DETERMINE THE CONSEQUENCES OF FIRE IN ANY LOCATION IN THE PLANT ON THE ABILITY TO SAFELY SHUTDOWN THE REACTOR OR ON THE ABILITY TO MINIMIZE AND CONTROL THE RELEASE OF RADIOACTIVITY TO THE ENVIRONMENT; AND (3) SPECIFY MEASURES FOR FIRE PREVENTION, FIRE DETECTION, FIRE SUPPRESSION, AND FIRE CONTAINMENT AND ALTERNATIVE SHUTDOWN CAPABILITY AS REQUIRED FOR EACH FIRE AREA CONTAINING STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY IN ACCORDANCE WITH NRC GUIDELINES AND REGULATIONS.

DUKE: The Fire Hazards Analysis is presented in Part B.

NRC: c. FIRE PREVENTION FEATURES

FIRE PROTECTION FEATURES SHALL MEET THE FOLLOWING GENERAL REQUIREMENTS FOR ALL FIRE AREAS THAT CONTAIN OR PRESENT A FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY.

1) IN SITU FIRE HAZARDS SHALL BE IDENTIFIED AND SUITABLE PROTECTION PROVIDED.
2) TRANSIENT FIRE HAZARDS ASSOCIATED WITH NORMAL OPERATION, MAINTENANCE, REPAIR, OR MODIFICATION ACTIVITIES SHALL BE IDENTIFIED AND ELIMINATED WHERE POSSIBLE. THOSE TRANSIENT FIRE HAZARDS THAT CAN NOT BE ELIMINATED SHALL BE CONTROLLED AND SUITABLE PROTECTION PROVIDED.
3) FIRE DETECTION SYSTEMS, PORTABLE EXTINGUISHERS, AND STANDPIPE AND HOSE STATIONS SHALL BE INSTALLED.
4) FIRE BARRIERS OR AUTOMATIC SUPPRESSION SYSTEMS OR BOTH.
5) A SITE FIRE BRIGADE SHALL BE ESTABLISHED, TRAINED, AND EQUIPPED AND SHALL BE ON SITE AT ALL TIMES.
6) FIRE DETECTION AND SUPPRESSION SYSTEMS SHALL BE DESIGNED, INSTALLED, MAINTAINED AND TESTED BY PERSONNEL PROPERLY QUALIFIED BY EXPERIENCE AND TRAINING IN FIRE PROTECTION SYSTEMS.
7) SURVEILLANCE PROCEDURES SHALL BE ESTABLISHED TO ENSURE THAT FIRE BARRIERS ARE IN PLACE AND THAT FIRE SUPPRESSION SYSTEMS AND COMPONENTS ARE OPERABLE.

DUKE: In situ fire hazards are recognized in the Fire Hazard Analysis. Transient combustibles are controlled by Nuclear System Directives. Appropriate fire detection systems, portable extinguishers and standpipes/hose stations are provided. Fire barriers and automatic suppression systems are provided as stated in Part B. A site fire brigade will be established for all shifts. Fire detection and suppression systems are designed and installed by qualified individuals. Maintenance and testing personnel are properly trained. Station maintenance, surveillance and periodic test procedures provide guidance to assure that fire protection equipment is operable.

NRC: d. ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY

IN AREAS WHERE THE FIRE PROTECTION FEATURES CANNOT ENSURE SAFE SHUTDOWN CAPABILITY IN THE EVENT OF A FIRE IN THAT AREA, ALTERNATIVE OR DEDICATED SAFE SHUTDOWN CAPABILITY SHALL BE PROVIDED.

DUKE: A dedicated Standby Shutdown System (SSS) is provided. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) for details of SSS and cable separation.)

NRC: 3. SPECIFIC REQUIREMENTS

a. WATER SUPPLIES FOR FIRE SUPPRESSION SYSTEMS

TWO SEPARATE WATER SUPPLIES SHALL BE PROVIDED TO FURNISH NECESSARY WATER VOLUME AND PRESSURE TO THE FIRE MAIN LOOP.

EACH SUPPLY SHALL CONSIST OF A STORAGE TANK, PUMP, PIPING, AND APPROPRIATE ISOLATION AND CONTROL VALVES. TWO SEPARATE REDUNDANT SUCTIONS IN ONE OR MORE INTAKE STRUCTURES FROM A LARGE BODY OF WATER (RIVER, LAKE, ETC.) WILL SATISFY THE REQUIREMENT FOR TWO SEPARATED WATER STORAGE TANKS. THESE SUPPLIES SHALL BE SEPARATED SO THAT A FAILURE OF ONE SUPPLY WILL NOT RESULT IN A FAILURE OF THE OTHER SUPPLY.

EACH SUPPLY OF THE FIRE WATER DISTRIBUTION SYSTEM SHALL BE CAPABLE OF PROVIDING FOR A PERIOD OF 2 HOURS THE MAXIMUM EXPECTED WATER DEMANDS AS DETERMINED BY THE FIRE HAZARDS ANALYSIS FOR SAFETY-RELATED AREAS OR OTHER AREAS THAT PRESENT A FIRE EXPOSURE HAZARD TO SAFETY-RELATED AREAS.

WHEN STORAGE TANKS ARE USED FOR COMBINED SERVICE-WATER/ FIRE-WATER USES, THE MINIMUM VOLUME FOR FIRE USES SHALL BE ENSURED BY MEANS OF DEDICATED TANKS OR BY SOME PHYSICAL MEANS SUCH AS A VERTICAL STANDPIPE FOR OTHER WATER SERVICE. ADMINISTRATIVE CONTROLS, INCLUDING LOCKS FOR TANK OUTLET VALVES, ARE UNACCEPTABLE AS THE ONLY MEANS TO ENSURE MINIMUM WATER VOLUME.

OTHER WATER SYSTEMS USED AS ONE OF THE TWO FIRE WATER SUPPLIES SHALL BE PERMANENTLY CONNECTED TO THE FIRE MAIN

SYSTEM AND SHALL BE CAPABLE OF AUTOMATIC ALIGNMENT TO THE FIRE MAIN SYSTEM. PUMPS, CONTROLS, AND POWER SUPPLIES IN THESE SYSTEMS SHALL SATISFY THE REQUIREMENTS FOR THE MAIN FIRE PUMPS. THE USE OF OTHER WATER SYSTEMS FOR FIRE PROTECTION SHALL NOT BE INCOMPATIBLE WITH THEIR FUNCTIONS REQUIRED FOR SAFE PLANT SHUTDOWN. FAILURE OF THE OTHER SYSTEM SHALL NOT DEGRADE THE FIRE MAIN SYSTEM.

DUKE: Primary and secondary water sources are provided by redundant fire pumps, each of which is adequate for the largest anticipated water demand. Two of the three fire pumps are located in the same bay of the intake structure. These two pumps are separated by a three hour rated wall. The other fire pump is located in an adjacent bay of the intake structure. Discharge piping is arranged to maintain maximum practical separation to reduce the possibility of a single failure resulting in impairment to redundant piping. The water supply available from Lake Wylie is adequate to provide the largest anticipated fire protection water demand for more than two hours. (Ref. Correspondence -July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning fire pump arrangement detail.)

NRC: b. SECTIONAL ISOLATION VALVES

SECTIONAL ISOLATION VALVES SUCH AS POST INDICATOR VALVES OR KEY OPERATED VALVES SHALL BE INSTALLED IN THE FIRE MAIN LOOP TO PERMIT ISOLATION OF PORTIONS OF THE FIRE MAIN LOOP FOR MAINTENANCE OR REPAIR WITHOUT INTERRUPTING THE ENTIRE WATER SUPPLY.

DUKE: Post indicator or key operated valves are installed to provide sectional isolation for each portion of the underground fire main yard loop without affecting water supply for interior sprinkler systems and hose stations.

NRC: c. HYDRANT ISOLATION VALVES

VALVES SHALL BE INSTALLED TO PERMIT ISOLATION OF OUTSIDE HYDRANTS FROM THE FIRE MAIN FOR MAINTENANCE OR REPAIR WITHOUT INTERRUPTING THE WATER SUPPLY TO AUTOMATIC OR MANUAL FIRE SUPPRESSION SYSTEMS IN ANY AREA CONTAINING OR PRESENTING A FIRE HAZARD TO SAFETY-RELATED OR SAFE SHUTDOWN EQUIPMENT.

DUKE: The fire main system redundant connections allow isolation of any fire hydrant on the main yard loop without resulting in impairment to interior fire protection equipment located in the Auxiliary Building, Reactor Buildings, Diesel Generator Buildings, or Nuclear Service Water Pump Structure. This arrangement is in compliance with the intent of the requirement for individual fire hydrant isolation valves.

NRC: d. MANUAL FIRE SUPPRESSION

STANDPIPE AND HOSE SYSTEMS SHALL BE INSTALLED SO THAT AT LEAST ONE EFFECTIVE HOSE STREAM WILL BE ABLE TO REACH ANY LOCATION THAT CONTAINS OR PRESENTS AN EXPOSURE FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY. ACCESS TO PERMIT EFFECTIVE FUNCTIONING OF THE FIRE BRIGADE SHALL BE PROVIDED TO ALL AREAS THAT CONTAIN OR PRESENT AN EXPOSURE FIRE HAZARD TO STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY.

STANDPIPE AND HOSE STATIONS SHALL BE INSIDE PWR CONTAINMENTS AND BWR CONTAINMENTS THAT ARE NOT INERTED. STANDPIPE AND HOSE STATIONS INSIDE CONTAINMENT MAY BE CONNECTED TO A HIGH QUALITY WATER SUPPLY OF SUFFICIENT QUANTITY AND PRESSURE OTHER THAN THE FIRE MAIN LOOP IF PLANT-SPECIFIC FEATURES PREVENT EXTENDING THE FIRE MAIN SUPPLY INSIDE CONTAINMENT. FOR BWR DRYWELLS, STANDPIPE AND HOSE STATIONS SHALL BE PLACED OUTSIDE THE DRY WELL WITH ADEQUATE LENGTHS OF HOSE TO REACH ANY LOCATION INSIDE THE DRY WELL WITH AN EFFECTIVE HOSE STREAM.

DUKE: Standpipes and hose systems are provided so that an effective hose stream will reach any location which is recognized in the Fire Hazard Analysis as having potential for fire which may involve or expose structures, systems and/or components important to safety. Hose stations in subject areas are accessible. Standpipes and hose stations, supplied from the fire protection system, are provided inside containment.

NRC: e. HYDROSTATIC HOSE TESTS

FIRE HOSE SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF 300 PSI OR 50 PSI ABOVE MAXIMUM FIRE MAIN OPERATING PRESSURE, WHICHEVER IS GREATER. HOSE STORED IN OUTSIDE HOSE HOUSES SHALL BE TESTED ANNUALLY. INTERIOR STANDPIPE HOSE SHALL BE TESTED EVERY THREE YEARS.

DUKE: New fire hose is tested by the manufacturer in accordance with the applicable edition of NFPA 1961, Chapter 4, Acceptance Hydrostatic Tests. Regularly scheduled hydrostatic tests are conducted as specified in Catawba Selected Licensee Commitments.

Exterior fire hose is tested annually. Interior fire hose is tested every three years.

Fire hose care and testing is in accordance with the intent of the applicable edition of NFPA 1962.

NRC: f. AUTOMATIC FIRE DETECTION

AUTOMATIC FIRE DETECTION SYSTEMS SHALL BE INSTALLED IN ALL AREAS OF THE PLANT THAT CONTAIN OR PRESENT AN EXPOSURE FIRE HAZARD TO SAFE SHUTDOWN OR SAFETY-RELATED SYSTEMS OR COMPONENTS. THESE FIRE DETECTION SYSTEMS SHALL BE CAPABLE OF OPERATING WITH OR WITHOUT OFFSITE POWER.

DUKE: Fire detection systems capable of operating without offsite power are provided as outlined in Part A.

NRC: g. FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY

1) FIRE PROTECTION FEATURES SHALL BE PROVIDED FOR STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFE SHUTDOWN. THESE FEATURES SHALL BE CAPABLE OF LIMITING FIRE DAMAGE SO THAT:

a) ONE TRAIN OF SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN HOT SHUTDOWN CONDITIONS FROM EITHER THE CONTROL ROOM OR EMERGENCY CONTROL STATION(S) IS FREE OF FIRE DAMAGE, AND

b) SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN COLD SHUTDOWN FROM EITHER THE CONTROL ROOM OR EMERGENCY CONTROL STATION(S) CAN BE REPAIRED WITHIN 72 HOURS.

2) EXCEPT AS PROVIDED FOR PARAGRAPH G.3 OF THIS SECTION, WHERE CABLES OR EQUIPMENT, INCLUDING ASSOCIATED NONSAFETY CIRCUITS THAT COULD PREVENT OPERATION OR CAUSE MALOPERATION DUE TO HOT SHORTS, OPEN CIRCUITS, OR SHORTS TO GROUND, OR REDUNDANT TRAINS OF SYSTEMS NECESSARY TO ACHIEVE AND MAINTAIN HOT SHUTDOWN CONDITIONS ARE LOCATED WITHIN THE SAME FIRE AREA OUTSIDE OF PRIMARY CONTAINMENT, ONE OF THE FOLLOWING MEANS OF ENSURING THAT ONE OF THE REDUNDANT TRAINS IS FREE OF FIRE DAMAGE SHALL BE PROVIDED:

a) SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A FIRE BARRIER HAVING A 3-HOUR RATING. STRUCTURAL STEEL FORMING A PART OF OR SUPPORTING SUCH FIRE BARRIERS SHALL BE PROTECTED TO PROVIDE FIRE RESISTANCE EQUIVALENT TO THAT REQUIRED OF THE BARRIER;

b) SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A HORIZONTAL DISTANCE OF MORE THAN 20 FEET WITH NO INTERVENING COMBUSTIBLE OR FIRE HAZARDS. IN ADDITION, FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE FIRE AREA: OR

c) ENCLOSURE OF CABLE AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF ONE REDUNDANT TRAIN IN A FIRE BARRIER HAVING A 1-HOUR RATING. IN ADDITION, FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE FIRE AREA;

INSIDE NONINERTED CONTAINMENTS ONE OF THE FIRE PROTECTION MEANS SPECIFIED ABOVE OR ONE OF THE FOLLOWING FIRE PROTECTION MEANS SHALL BE PROVIDED:

d) SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A HORIZONTAL DISTANCE OF MORE THAN 20 FEET WITH NO INTERVENING COMBUSTIBLES OR FIRE HAZARDS;

e) INSTALLATION OF FIRE DETECTORS AND AN AUTOMATIC FIRE SUPPRESSION SYSTEM IN THE FIRE AREA; OR

f) SEPARATION OF CABLES AND EQUIPMENT AND ASSOCIATED NONSAFETY CIRCUITS OF REDUNDANT TRAINS BY A NONCOMBUSTIBLE RADIANT ENERGY SHIELD.

3) ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY AND ITS ASSOCIATED CIRCUITS, INDEPENDENT OF CABLES, SYSTEMS OR COMPONENTS IN THE AREA, ROOM OR ZONE UNDER CONSIDERATION, SHALL BE PROVIDED:

ALTERNATIVE SHUTDOWN CAPABILITY IS PROVIDED BY REROUTING, RELOCATING OR MODIFICATING OF EXISTING SYSTEMS; DEDICATED SHUTDOWN CAPABILITY IS PROVIDED BY INSTALLING NEW STRUCTURES AND SYSTEMS FOR THE FUNCTION OF POSTFIRE SHUTDOWN.

a) WHERE THE PROTECTION OF SYSTEMS WHOSE FUNCTION IS REQUIRED FOR HOT SHUTDOWN DOES NOT SATISFY THE REQUIREMENT OF PARAGRAPH G.2 OF THIS SECTION; OR

b) WHERE REDUNDANT TRAINS OF SYSTEMS REQUIRED FOR HOT SHUTDOWN LOCATED IN THE SAME FIRE AREA MAY BE SUBJECT TO DAMAGE FROM FIRE SUPPRESSION ACTIVITIES OR FROM THE RUPTURE OR INADVERTENT OPERATION OF FIRE SUPPRESSION SYSTEMS.

IN ADDITION, FIRE DETECTION AND A FIXED FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED IN THE AREA, ROOM, OR ZONE UNDER CONSIDERATION.

DUKE: Dedicated Standby Shutdown System (SSS) assures that one train of systems necessary to achieve and maintain hot shutdown condition is available.

Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours following a design basis fire. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning cable separation, discussion of associated circuits, and SSS information.)

NRC: h. FIRE BRIGADE

A SITE FIRE BRIGADE TRAINED AND EQUIPPED FOR FIRE FIGHTING SHALL BE ESTABLISHED TO ENSURE ADEQUATE MANUAL FIRE FIGHTING CAPABILITY FOR ALL AREAS OF THE PLANT CONTAINING STRUCTURES, SYSTEMS, OR COMPONENTS IMPORTANT TO SAFETY. THE FIRE BRIGADE SHALL BE AT LEAST FIVE MEMBERS ON EACH SHIFT. THE BRIGADE LEADER AND AT LEAST TWO BRIGADE MEMBERS SHALL HAVE SUFFICIENT TRAINING IN OR KNOWLEDGE OF PLANT SAFETY-RELATED SYSTEMS TO UNDERSTAND THE EFFECTS OF FIRE AND FIRE SUPPRESSANTS ON SAFE SHUTDOWN CAPABILITY. THE QUALIFICATION OF FIRE BRIGADE MEMBERS SHALL INCLUDE AN ANNUAL PHYSICAL EXAMINATION TO DETERMINE THEIR ABILITY TO PERFORM STRENUOUS FIRE FIGHTING ACTIVITIES. THE SHIFT SUPERVISOR SHALL NOT BE A MEMBER OF THE FIRE BRIGADE. THE BRIGADE LEADER SHALL BE COMPETENT TO ASSESS THE POTENTIAL SAFETY CONSEQUENCES OF A FIRE AND ADVISE CONTROL ROOM PERSONNEL. SUCH COMPETENCE BY THE BRIGADE LEADER MAY BE EVIDENCED BY POSSESSION OF AN OPERATOR'S LICENSE OR EQUIVALENT KNOWLEDGE OF PLANT SAFETY-RELATED SYSTEMS.

THE MINIMUM EQUIPMENT PROVIDED FOR THE BRIGADE SHALL CONSIST OF PERSONAL PROTECTIVE EQUIPMENT SUCH AS TURNOUT COATS, BOOTS, GLOVES, HARD HATS, EMERGENCY COMMUNICATIONS EQUIPMENT, PORTABLE LIGHTS, PORTABLE VENTILATION EQUIPMENT, AND PORTABLE EXTINGUISHERS. SELF-CONTAINED BREATHING APPARATUS USING FULL-FACE POSITIVE - PRESSURE MASKS APPROVED BY NIOSH (NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH - APPROVAL FORMERLY GIVEN BY THE U.S. BUREAU OF MINES) SHALL BE PROVIDED FOR FIRE BRIGADE, DAMAGE CONTROL, AND CONTROL ROOM PERSONNEL. AT LEAST 10 MASKS SHALL BE AVAILABLE FOR FIRE BRIGADE PERSONNEL. CONTROL ROOM PERSONNEL MAY BE FURNISHED BREATHING AIR BY A MANIFOLD SYSTEM PIPED FROM A STORAGE RESERVOIR IF PRACTICAL. SERVICE OR RATED OPERATING LIFE SHALL BE A MINIMUM OF ONE-HALF HOUR FOR THE SELF-CONTAINED UNITS.

AT LEAST TWO EXTRA AIR BOTTLES SHALL BE LOCATED ON SITE FOR EACH SELF-CONTAINED BREATHING UNIT. IN ADDITION, AN ONSITE 6-HOUR SUPPLY OF RESERVE AIR SHALL BE PROVIDED AND ARRANGED TO PERMIT QUICK AND COMPLETE REPLENISHMENT OF EXHAUSTED SUPPLY AIR BOTTLES AS THEY ARE RETURNED. IF COMPRESSORS ARE USED AS A SOURCE OF BREATHING AIR, ONLY UNITS APPROVED FOR BREATHING AIR SHALL BE USED; COMPRESSORS SHALL BE OPERABLE ASSUMING A LOSS OF OFFSITE POWER. SPECIAL CARE MUST BE TAKEN TO LOCATE THE COMPRESSOR IN AREAS FREE OF DUST AND CONTAINMENTS.

DUKE: A site fire brigade has been established to provide manual fire fighting capability. Personnel protective equipment, emergency communication equipment, portable lights and portable ventilation equipment are provided. Breathing air for Control Room personnel is furnished by self contained breathing apparatus (SCBA) air pack units. Reserve air bottles and a breathing air compressor for cylinder replenishment is provided.

NRC: i. FIRE BRIGADE TRAINING

THE FIRE BRIGADE TRAINING PROGRAM SHALL ENSURE THAT THE CAPABILITY TO FIGHT POTENTIAL FIRES IS ESTABLISHED AND MAINTAINED. THE PROGRAM SHALL CONSIST OF AN INITIAL CLASSROOM INSTRUCTION PROGRAM FOLLOWED BY PERIODIC CLASSROOM INSTRUCTION, FIRE FIGHTING PRACTICE, AND FIRE DRILLS:

1) INSTRUCTION

a) THE INITIAL CLASSROOM INSTRUCTION SHALL INCLUDE:

i) INDOCTRINATION OF THE PLANT FIRE FIGHTING PLAN WITH SPECIFIC IDENTIFICATION OF EACH INDIVIDUAL'S RESPONSIBILITIES.

ii) IDENTIFICATION OF THE TYPE AND LOCATION OF FIRE HAZARDS AND ASSOCIATED TYPES OF FIRES THAT COULD OCCUR IN THE PLANT.

iii) THE TOXIC AND CORROSIVE CHARACTERISTICS OF EXPECTED PRODUCTS OF COMBUSTION.

iv) IDENTIFICATION OF THE LOCATION OF FIRE FIGHTING EQUIPMENT FOR EACH FIRE AREA AND FAMILIARIZATION WITH THE LAYOUT OF THE PLANT, INCLUDING ACCESS AND EGRESS ROUTES TO EACH AREA.

v) THE PROPER USE OF AVAILABLE FIRE FIGHTING EQUIPMENT AND THE CORRECT METHOD OF FIGHTING EACH TYPE OF FIRE. THE TYPES OF FIRES COVERED SHOULD INCLUDE FIRES IN ENERGIZED ELECTRICAL EQUIPMENT, FIRES IN CABLES AND CABLE TRAYS, HYDROGEN FIRES, FIRES INVOLVING FLAMMABLE AND COMBUSTIBLE LIQUIDS OR HAZARDOUS PROCESS CHEMICALS, FIRES RESULTING FROM CONSTRUCTION OR MODIFICATIONS (WELDING), AND RECORD FILE FIRES.

vi) THE PROPER USE OF COMMUNICATION, LIGHTING, VENTILATION, AND EMERGENCY BREATHING EQUIPMENT.

vii) THE PROPER METHOD FOR FIGHTING FIRES INSIDE BUILDINGS AND CONFINED SPACES.

viii) THE DIRECTION AND COORDINATION OF THE FIRE FIGHTING ACTIVITIES (FIRE BRIGADE LEADERS ONLY).

ix) DETAILED REVIEW OF FIRE FIGHTING STRATEGIES AND

PROCEDURES.

x) REVIEW OF THE LATEST PLANT MODIFICATIONS AND CORRESPONDING CHANGES IN FIRE FIGHTING PLANS.

NOTE: ITEMS (ix) AND (x) MAY BE DELETED FROM THE TRAINING OF NO MORE THAN TWO OF THE NON-OPERATIONS PERSONNEL WHO MAY BE ASSIGNED TO THE FIRE BRIGADE.

b) THE INSTRUCTION SHALL BE PROVIDED BY QUALIFIED INDIVIDUALS WHO ARE KNOWLEDGEABLE, EXPERIENCED, AND SUITABLY TRAINED IN FIGHTING THE TYPES OF FIRES THAT COULD OCCUR IN THE PLANT AND IN USING THE TYPES OF EQUIPMENT AVAILABLE IN THE NUCLEAR POWER PLANT.

c) INSTRUCTION SHALL BE PROVIDED TO ALL FIRE BRIGADE MEMBERS AND FIRE BRIGADE LEADERS

d) REGULAR PLANNED MEETINGS SHALL BE HELD AT LEAST EVERY 3 MONTHS FOR ALL BRIGADE MEMBERS TO REVIEW CHANGES IN THE FIRE PROTECTION PROGRAM AND OTHER SUBJECTS AS NECESSARY.

e) PERIODIC REFRESHER TRAINING SESSIONS SHALL BE HELD TO REPEAT THE CLASSROOM INSTRUCTION PROGRAM FOR ALL BRIGADE MEMBERS OVER A TWO-YEAR PERIOD. THESE SESSIONS MAY BE CONCURRENT WITH THE REGULAR PLANNED MEETINGS.

2) <u>PRACTICE</u>

PRACTICE SESSIONS SHALL BE HELD FOR EACH SHIFT FIRE BRIGADE ON THE PROPER METHOD OF FIGHTING THE VARIOUS TYPES OF FIRES THAT COULD OCCUR IN A NUCLEAR POWER PLANT. THESE SESSIONS SHALL PROVIDE BRIGADE MEMBERS WITH EXPERIENCE IN ACTUAL FIRE EXTINGUISHMENT AND THE USE OF EMERGENCY BREATHING APPARATUS UNDER STRENUOUS CONDITIONS ENCOUNTERED IN FIRE FIGHTING. THESE PRACTICE SESSIONS SHALL BE PROVIDED AT LEAST ONCE PER YEAR FOR EACH FIRE BRIGADE MEMBER.

DUKE: Initial and subsequent classroom instruction is provided for brigade members. Specific responsibilities are designated by the fire brigade leader. The Station Fire Plan identifies potential fire hazards and strategy of fire control in areas containing safety related systems, equipment and components. Instruction includes proper use of emergency equipment. Fire Brigade meetings are held once a quarter including periodic refresher sessions of classroom instruction. Fire Brigade training includes experience in fire extinguishment and use of emergency equipment.

NRC: 3) DRILLS

a) FIRE BRIGADE DRILLS SHALL BE PERFORMED IN THE PLANT SO THAT THE FIRE BRIGADE CAN PRACTICE AS A TEAM.

b) DRILLS SHALL BE PERFORMED AT REGULAR INTERVALS NOT TO EXCEED 3 MONTHS FOR EACH SHIFT FIRE BRIGADE. EACH FIRE BRIGADE MEMBER SHOULD PARTICIPATE IN EACH DRILL, BUT MUST PARTICIPATE IN AT LEAST TWO DRILLS PER YEAR.

A SUFFICIENT NUMBER OF THESE DRILLS, BUT NOT LESS THAN ONE FOR EACH SHIFT FIRE BRIGADE PER YEAR, SHALL BE UNANNOUNCED TO DETERMINE THE FIRE FIGHTING READINESS OF THE PLANT FIRE BRIGADE, BRIGADE LEADER, AND FIRE PROTECTION SYSTEMS AND EQUIPMENT. PERSONS PLANNING AND AUTHORIZING AN UNANNOUNCED DRILL SHALL ENSURE THAT THE RESPONDING SHIFT FIRE BRIGADE MEMBERS ARE NOT AWARE THAT A DRILL IS BEING PLANNED UNTIL IT IS BEGUN. UNANNOUNCED DRILLS SHALL NOT BE SCHEDULED CLOSER THAN FOUR WEEKS.

AT LEAST ONE DRILL PER YEAR SHALL BE PERFORMED ON A "BACK SHIFT" FOR EACH SHIFT FIRE BRIGADE.

c) THE DRILLS SHALL BE PREPLANNED TO ESTABLISH THE TRAINING OBJECTIVES OF THE DRILL AND SHALL BE CRITIQUED TO DETERMINE HOW WELL THE TRAINING OBJECTIVES HAVE BEEN MET. UNANNOUNCED DRILLS SHALL BE PLANNED AND CRITIQUED BY MEMBERS OF THE MANAGEMENT STAFF RESPONSIBLE FOR PLANT SAFETY AND FIRE PROTECTION. PERFORMANCE DEFICIENCIES OF A FIRE BRIGADE OR OF INDIVIDUAL FIRE BRIGADE MEMBERS SHALL BE REMEDIED BY SCHEDULING ADDITIONAL TRAINING FOR THE BRIGADE OR MEMBERS. UNSATISFACTORY DRILL PERFORMANCE SHALL BE FOLLOWED BY A REPEAT DRILL WITHIN 30 DAYS.

d) AT 3-YEAR INTERVALS, A RANDOMLY SELECTED UNANNOUNCED DRILL SHALL BE CRITIQUED BY QUALIFIED INDIVIDUALS INDEPENDENT OF THE LICENSEE'S STAFF. A COPY OF THE WRITTEN REPORT FROM SUCH INDIVIDUALS SHALL BE AVAILABLE FOR NRC REVIEW.

e) DRILLS SHALL AS A MINIMUM INCLUDE THE FOLLOWING:

i) ASSESSMENT OF FIRE ALARM EFFECTIVENESS, TIME REQUIRED TO NOTIFY AND ASSEMBLE FIRE BRIGADE, AND SELECTION, PLACEMENT AND USE OF EQUIPMENT, AND FIRE FIGHTING STRATEGIES.

ii) ASSESSMENT OF EACH BRIGADE MEMBER'S KNOWLEDGE OF HIS OR HER ROLE IN THE FIRE FIGHTING STRATEGY FOR THE AREA ASSUMED TO CONTAIN THE FIRE. ASSESSMENT OF THE BRIGADE MEMBER'S CONFORMANCE WITH ESTABLISHED PLANT FIRE FIGHTING PROCEDURES AND USE OF FIRE FIGHTING EQUIPMENT, INCLUDING SELF-CONTAINED EMERGENCY BREATHING APPARATUS, COMMUNICATION EQUIPMENT, AND VENTILATION EQUIPMENT, TO THE EXTENT PRACTICABLE.

iii) THE SIMULATED USE OF FIRE FIGHTING EQUIPMENT REQUIRED TO COPE WITH THE SITUATION AND TYPE OF FIRE SELECTED FOR THE DRILL. THE AREA AND TYPE OF FIRE CHOSEN FOR THE DRILL SHOULD DIFFER FROM THOSE USED IN THE PREVIOUS DRILL SO THAT BRIGADE MEMBERS ARE TRAINED IN FIGHTING FIRES IN VARIOUS PLANT AREAS. THE SITUATION SELECTED SHOULD SIMULATE THE SIZE AND ARRANGEMENT OF A FIRE THAT COULD REASONABLY OCCUR IN THE AREA SELECTED, ALLOWING FOR FIRE DEVELOPMENT DUE TO THE TIME REQUIRED TO RESPOND, TO OBTAIN EQUIPMENT, AND ORGANIZE FOR THE FIRE, ASSUMING LOSS OF AUTOMATIC SUPPRESSION CAPABILITY.

iv) ASSESSMENT OF BRIGADE LEADER'S DIRECTION OF THE FIRE FIGHTING EFFORT AS TO THOROUGHNESS, ACCURACY, AND EFFECTIVENESS.

DUKE: Fire drills are scheduled to be conducted on a regular interval not to exceed three months plus a 25% grace period. However, plant operational considerations may dictate that drills be delayed. As a minimum a fire drill is conducted for each shift each calendar quarter, with unannounced drills conducted annually for operations shifts. Documentation of fire drill response and critique is maintained on file.

NRC: 4) RECORDS

INDIVIDUAL RECORDS OF TRAINING PROVIDED TO EACH FIRE BRIGADE MEMBER, INCLUDING DRILL CRITIQUES, SHALL BE MAINTAINED FOR AT LEAST 3 YEARS TO ENSURE THAT EACH MEMBER RECEIVES TRAINING IN ALL PARTS OF THE TRAINING PROGRAM. THESE RECORDS OF TRAINING SHALL BE AVAILABLE FOR NCR REVIEW. RETRAINING OR BROADENED TRAINING FOR FIRE FIGHTING WITHIN BUILDINGS SHALL BE SCHEDULED FOR ALL THOSE BRIGADE MEMBERS WHOSE PERFORMANCE RECORDS SHOW DEFICIENCIES.

DUKE: Fire brigade training records are maintained and available for subsequent review.

NRC: j. EMERGENCY LIGHTING

EMERGENCY LIGHTING UNITS WITH AT LEAST AN 8-HOUR BATTERY POWER SUPPLY SHALL BE PROVIDED IN ALL AREAS NEEDED FOR OPERATION OF SAFE SHUTDOWN EQUIPMENT AND IN ACCESS AND EGRESS ROUTES THERETO.

DUKE: Emergency lighting units with 8-hour battery power are provided as necessary to illuminate the path to and immediate area of equipment required to be manned to achieve a hot standby condition.

NRC: k. ADMINISTRATIVE CONTROLS

ADMINISTRATIVE CONTROLS SHALL BE ESTABLISHED TO MINIMIZE FIRE HAZARDS IN AREAS CONTAINING STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY. THESE CONTROLS SHALL ESTABLISH PROCEDURES TO:

1) GOVERN THE HANDLING AND LIMITATION OF THE USE OF ORDINARY COMBUSTIBLE MATERIALS, COMBUSTIBLE AND FLAMMABLE GASES AND LIQUIDS, HIGH EFFICIENCY PARTICULATE AIR AND CHARCOAL FILTERS, DRY ION EXCHANGE RESINS, OR OTHER COMBUSTIBLE SUPPLIES IN SAFETY-RELATED AREAS.

2) PROHIBIT THE STORAGE OF COMBUSTIBLES IN SAFETY-RELATED AREAS OR ESTABLISH DESIGNATED STORAGE AREAS WITH APPROPRIATE FIRE PROTECTION.

3) GOVERN THE HANDLING OF AND LIMIT TRANSIENT FIRE LOADS SUCH AS COMBUSTIBLE AND FLAMMABLE LIQUIDS, WOOD AND PLASTIC PRODUCTS, OR OTHER COMBUSTIBLE MATERIALS IN BUILDINGS CONTAINING SAFETY-RELATED SYSTEMS OR EQUIPMENT DURING ALL PHASES OF OPERATING, AND ESPECIALLY DURING MAINTENANCE, MODIFICATION, OR REFUELING OPERATIONS.

4) DESIGNATE THE ONSITE STAFF MEMBER RESPONSIBLE FOR THE INPLANT FIRE PROTECTION REVIEW OF PROPOSED WORK ACTIVITIES TO IDENTIFY POTENTIAL TRANSIENT FIRE HAZARDS AND SPECIFY REQUIRED ADDITIONAL FIRE PROTECTION IN THE WORK ACTIVITY PROCEDURE.

5) GOVERN THE USE OF IGNITION SOURCES BY USE OF A FLAME PERMIT SYSTEM TO CONTROL WELDING, FLAME CUTTING, BRAZING, OR SOLDERING OPERATIONS. A SEPARATE PERMIT SHALL BE ISSUED FOR EACH AREA WHERE WORK IS TO BE DONE. IF WORK CONTINUES OVER MORE THAN ONE SHIFT, THE PERMIT SHALL BE VALID FOR NOT MORE THAN 24 HOURS WHEN THE PLANT IS OPERATING OR FOR THE DURATION OF A PARTICULAR JOB DURING PLANT SHUTDOWN.

6) CONTROL THE REMOVAL FROM THE AREA OF ALL WASTE, DEBRIS, SCRAP, OIL SPILLS, OR OTHER COMBUSTIBLES RESULTING FROM THE WORK ACTIVITY IMMEDIATELY FOLLOWING COMPLETION OF THE ACTIVITY, OR AT THE END OF EACH WORK SHIFT, WHICHEVER COMES FIRST.

7) MAINTAIN THE PERIODIC HOUSEKEEPING INSPECTIONS TO ENSURE CONTINUED COMPLIANCE WITH THESE ADMINISTRATIVE CONTROLS.

8) CONTROL THE USE OF SPECIFIC COMBUSTIBLES IN SAFETY-RELATED AREAS. ALL WOOD USED IN SAFETY-RELATED AREAS DURING MAINTENANCE, MODIFICATION, OR REFUELING OPERATIONS (SUCH AS LAY-DOWN BLOCKS OR SCAFFOLDING) SHALL BE TREATED WITH A FLAME RETARDANT. EQUIPMENT OR SUPPLIES (SUCH AS NEW FUEL) SHIPPED IN UNTREATED COMBUSTIBLE PACKING CONTAINERS MAY BE UNPACKED IN SAFETY-RELATED AREAS IF REQUIRED FOR VALID OPERATING REASONS. HOWEVER, ALL COMBUSTIBLE MATERIALS SHALL BE REMOVED FROM THE AREA IMMEDIATELY FOLLOWING THE UNPACKING. SUCH TRANSIENT COMBUSTIBLE MATERIAL, UNLESS STORED IN APPROVED CONTAINERS, SHALL NOT BE LEFT UNATTENDED DURING LUNCH BREAKS, SHIFT CHANGES, OR OTHER SIMILAR PERIODS. LOOSE COMBUSTIBLE PACKING MATERIAL SUCH AS WOOD OR PAPER EXCELSIOR, OR POLYETHYLENE SHEETING SHALL BE PLACED IN METAL CONTAINERS WITH TIGHT-FITTING SELF-CLOSING METAL COVERS.

DUKE: Administrative controls outline proper use, handling, and storage of combustible materials, combustible and flammable gases and liquids, combustible supplies or miscellaneous transient combustibles in safety related areas.

Storage of combustibles in safety-related areas will be restricted to controlled, designated areas.

The Fire Protection Engineer reviews proposed and in-progress work activities in safety-related areas to identify potential transient fire hazards and specify appropriate fire prevention/protection measures.

A hot work permit system will be established to control ignition sources.

NRC:

9) CONTROL ACTIONS TO BE TAKEN BY AN INDIVIDUAL DISCOVERING A FIRE, FOR EXAMPLE, NOTIFICATION OF CONTROL ROOM, ATTEMPT TO EXTINGUISH FIRE, AND ACTUATION OF LOCAL FIRE SUPPRESSION SYSTEMS.

10) CONTROL ACTIONS TO BE TAKEN BY THE CONTROL ROOM OPERATOR TO DETERMINE THE NEED FOR BRIGADE ASSISTANCE UPON REPORT OF A FIRE OR RECEIPT OF ALARM ON CONTROL ROOM ANNUNCIATOR PANEL, FOR EXAMPLE, ANNOUNCING LOCATION OF FIRE OVER PA SYSTEM, SOUNDING FIRE ALARMS, AND NOTIFYING THE SHIFT SUPERVISOR AND THE FIRE BRIGADE LEADER OF THE TYPE, SIZE, AND LOCATION OF THE FIRE.

11) CONTROL ACTIONS TO BE TAKEN BY THE FIRE BRIGADE AFTER NOTIFICATION BY THE CONTROL ROOM OPERATOR OF A FIRE, FOR EXAMPLE, ASSEMBLING IN A DESIGNATED LOCATION, RECEIVING DIRECTIONS FROM THE FIRE BRIGADE LEADER, AND DISCHARGING SPECIFIC FIRE FIGHTING RESPONSIBILITIES INCLUDING SELECTION AND TRANSPORTATION OF FIRE FIGHTING EQUIPMENT TO FIRE LOCATION, SELECTION OF PROTECTIVE EQUIPMENT, OPERATING INSTRUCTIONS FOR USE OF FIRE SUPPRESSION SYSTEMS, AND USE OF PREPLANNED STRATEGIES FOR FIGHTING FIRES IN SPECIFIC AREAS.

12) DEFINE IN THE STRATEGIES FOR FIGHTING FIRES IN ALL SAFETY-RELATED AREAS AND AREAS PRESENTING A HAZARD TO SAFETY-RELATED EQUIPMENT. THESE STRATEGIES SHALL DESIGNATE:

    a) FIRE HAZARDS IN EACH AREA COVERED BY THE SPECIFIC PREFIRE PLANS.

    b) FIRE EXTINGUISHANTS BEST SUITED FOR CONTROLLING THE FIRES ASSOCIATED WITH THE FIRE HAZARDS IN THAT AREA AND THE NEAREST LOCATION OF THESE EXTINGUISHANTS.

    c) MOST FAVORABLE DIRECTION FROM WHICH TO ATTACK A FIRE IN EACH AREA IN VIEW OF THE VENTILATION DIRECTION, ACCESS HALLWAYS, STAIRS, AND DOORS THAT ARE MOST LIKELY TO BE FREE OF FIRE, AND THE BEST STATION OR ELEVATION FOR FIGHTING THE FIRE. ALL ACCESS AND EGRESS ROUTES THAT INVOLVE LOCKED DOORS SHOULD BE SPECIFICALLY IDENTIFIED IN THE PROCEDURE WITH THE APPROPRIATE PRECAUTIONS AND METHODS FOR ACCESS SPECIFIED.

d) PLANT SYSTEMS THAT SHOULD BE MANAGED TO REDUCE THE DAMAGE POTENTIAL DURING A LOCAL FIRE AND THE LOCATION OF LOCAL AND REMOTE CONTROLS FOR SUCH MANAGEMENT (E.G., ANY HYDRAULIC OR ELECTRICAL SYSTEMS IN THE ZONE COVERED BY THE SPECIFIC FIRE FIGHTING PROCEDURE THAT COULD INCREASE THE HAZARDS IN THE AREA BECAUSE OF OVERPRESSURIZATION OR ELECTRICAL HAZARDS).

e) VITAL HEAT-SENSITIVE SYSTEM COMPONENTS THAT NEED TO BE KEPT COOL WHILE FIGHTING A LOCAL FIRE. PARTICULARLY HAZARDOUS COMBUSTIBLES THAT NEED COOLING SHOULD BE DESIGNATED.

f) ORGANIZATION OF FIRE FIGHTING BRIGADES AND THE ASSIGNMENT OF SPECIAL DUTIES ACCORDING TO JOB TITLE SO THAT ALL FIRE FIGHTING FUNCTIONS ARE COVERED BY ANY COMPLETE SHIFT PERSONNEL COMPLEMENT. THESE DUTIES INCLUDE COMMAND CONTROL OF THE BRIGADE, TRANSPORTING FIRE SUPPRESSION AND SUPPORT EQUIPMENT TO THE FIRE SCENES, APPLYING THE EXTINGUISHANT TO THE FIRE, COMMUNICATION WITH THE CONTROL ROOM, AND COORDINATION WITH OUTSIDE FIRE DEPARTMENTS.

g) POTENTIAL RADIOLOGICAL AND TOXIC HAZARDS IN FIRE ZONES.

h) VENTILATION SYSTEM OPERATION THAT ENSURES DESIRED PLANT AIR DISTRIBUTION WHEN THE VENTILATION FLOW IS MODIFIED FOR FIRE CONTAINMENT OR SMOKE CLEARING OPERATIONS.

i) OPERATIONS REQUIRING CONTROL ROOM AND SHIFT ENGINEER COORDINATION OR AUTHORIZATION.

j) INSTRUCTIONS FOR PLANT OPERATORS AND GENERAL PLANT PERSONNEL DURING FIRE.

DUKE: As previously stated, the Catawba Fire Plan and Fire Brigade Organization and Training assures proper response to a fire event.

NRC: l. <u>ALTERNATIVE AND DEDICATED SHUTDOWN CAPABILITY</u>

1) ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY PROVIDED FOR A SPECIFIC FIRE AREA SHALL BE ABLE TO ACHIEVE AND MAINTAIN SUBCRITICAL REACTIVITY CONDITIONS IN THE REACTOR, MAINTAIN REACTOR COOLANT INVENTORY, ACHIEVE AND MAINTAIN HOT STANDBY CONDITIONS FOR A PWR (HOT SHUTDOWN FOR A BWR) AND ACHIEVE COLD SHUTDOWN CONDITIONS WITHIN 72 HOURS AND MAINTAIN COLD SHUTDOWN CONDITIONS THEREAFTER. DURING THE POSTFIRE SHUTDOWN, THE REACTOR COOLANT SYSTEM PROCESS VARIABLES SHALL BE MAINTAINED WITHIN THOSE PREDICTED FOR A LOSS OF NORMAL

A.C. POWER, AND THE FISSION PRODUCT BOUNDARY INTEGRITY SHALL NOT BE AFFECTED, I. E., THERE SHALL BE NO FUEL CLAD DAMAGE, RUPTURE OF ANY PRIMARY COOLANT BOUNDARY, OR RUPTURE OF THE CONTAINMENT BOUNDARY.

2) THE PERFORMANCE GOALS FOR THE SHUTDOWN FUNCTIONS SHALL BE:

   a) THE REACTIVITY CONTROL FUNCTION SHALL BE CAPABLE OF ACHIEVING AND MAINTAINING COLD SHUTDOWN REACTIVITY CONDITIONS.

   b) THE REACTOR COOLANT MAKEUP FUNCTION SHALL BE CAPABLE OF MAINTAINING THE REACTOR COOLANT LEVEL ABOVE THE TOP OF THE CORE FOR BWRS AND BE WITHIN THE LEVEL INDICATION IN THE PRESSURIZER FOR PWRS.

   c) THE REACTOR HEAT REMOVAL FUNCTION SHALL BE CAPABLE OF ACHIEVING AND MAINTAINING DECAY HEAT REMOVAL.

   d) THE PROCESS MONITORING FUNCTION SHALL BE CAPABLE OF PROVIDING DIRECT READINGS OF THE PROCESS VARIABLES NECESSARY TO PERFORM AND CONTROL THE ABOVE FUNCTIONS.

   e) THE SUPPORTING FUNCTIONS SHALL BE CAPABLE OF PROVIDING THE PROCESS COOLING, LUBRICATION, ETC., NECESSARY TO PERMIT THE OPERATION OF THE EQUIPMENT USED FOR SAFE SHUTDOWN FUNCTIONS.

3) THE SHUTDOWN CAPABILITY FOR SPECIFIC FIRE AREAS MAY BE UNIQUE FOR EACH SUCH AREA, OR IT MAY BE ONE UNIQUE COMBINATION OF SYSTEMS FOR ALL SUCH AREAS. IN EITHER CASE, THE ALTERNATIVE SHUTDOWN CAPABILITY SHALL BE INDEPENDENT OF THE SPECIFIC FIRE AREA(S) AND SHALL ACCOMMODATE POSTFIRE CONDITIONS WHERE OFFSITE POWER IS AVAILABLE AND WHERE OFFSITE POWER IS NOT AVAILABLE FOR 72 HOURS. PROCEDURES SHALL BE IN EFFECT TO IMPLEMENT THIS CAPABILITY.

4) IF THE CAPABILITY TO ACHIEVE AND MAINTAIN COLD SHUTDOWN WILL NOT BE AVAILABLE BECAUSE OF FIRE DAMAGE, THE EQUIPMENT AND SYSTEMS COMPRISING THE MEANS TO ACHIEVE AND MAINTAIN THE HOT STANDBY OR HOT SHUTDOWN CONDITION SHALL BE CAPABLE OF MAINTAINING SUCH CONDITIONS UNTIL COLD SHUTDOWN CAN BE ACHIEVED. IF SUCH EQUIPMENT AND SYSTEMS WILL NOT BE CAPABLE OF BEING POWERED BY BOTH ONSITE AND OFFSITE ELECTRIC POWER SYSTEMS BECAUSE OF FIRE DAMAGE, AN INDEPENDENT ONSITE POWER SYSTEM SHALL BE PROVIDED. THE NUMBER OF OPERATING SHIFT PERSONNEL, EXCLUSIVE OF FIRE BRIGADE MEMBERS, REQUIRED TO OPERATE SUCH EQUIPMENT AND SYSTEMS SHALL BE ONSITE AT ALL TIMES.

5) EQUIPMENT AND SYSTEMS COMPRISING THE MEANS TO ACHIEVE AND MAINTAIN COLD SHUTDOWN CONDITIONS SHALL NOT BE DAMAGED BY FIRE; OR THE FIRE DAMAGE TO SUCH EQUIPMENT AND SYSTEMS SHALL BE LIMITED SO THAT THE SYSTEMS CAN BE MADE OPERABLE AND COLD SHUTDOWN ACHIEVED WITHIN 72 HOURS. MATERIALS FOR SUCH REPAIRS SHALL BE READILY AVAILABLE ONSITE AND PROCEDURES SHALL BE IN EFFECT TO IMPLEMENT SUCH REPAIRS. IF SUCH EQUIPMENT AND SYSTEMS USED PRIOR TO 72 HOURS AFTER THE FIRE WILL NOT BE CAPABLE OF BEING POWERED BY BOTH ONSITE AND OFFSITE ELECTRIC POWER SYSTEMS BECAUSE OF FIRE DAMAGE, AN INDEPENDENT ONSITE POWER SYSTEM SHALL BE PROVIDED. EQUIPMENT AND SYSTEMS USED AFTER 72 HOURS MAY BE POWERED BY OFFSITE POWER ONLY.

6) SHUTDOWN SYSTEMS INSTALLED TO ENSURE POSTFIRE SHUTDOWN CAPABILITY NEED NOT BE DESIGNED TO MEET SEISMIC CATEGORY I CRITERIA, SINGLE FAILURE CRITERIA, OR OTHER DESIGN BASIS ACCIDENT CRITERIA, EXCEPT WHERE REQUIRED FOR OTHER REASONS, E.G., BECAUSE OF INTERFACE WITH OR IMPACT ON EXISTING SAFETY SYSTEMS, OR BECAUSE OF ADVERSE VALVE ACTIONS DUE TO FIRE DAMAGE.

7) THE SAFE SHUTDOWN EQUIPMENT AND SYSTEMS FOR EACH FIRE AREA SHALL BE KNOWN TO BE ISOLATED FROM ASSOCIATED NONSAFETY CIRCUITS IN THE FIRE AREA SO THAT HOT SHORTS, OPEN CIRCUITS, OR SHORTS TO GROUND IN THE ASSOCIATED CIRCUITS WILL NOT PREVENT OPERATION OF THE SAFE SHUTDOWN EQUIPMENT. THE SEPARATION AND BARRIERS BETWEEN TRAYS AND CONDUITS CONTAINING ASSOCIATED CIRCUITS OF SAFE SHUTDOWN DIVISION AND TRAYS AND CONDUITS CONTAINING ASSOCIATED CIRCUITS OR SAFE SHUTDOWN CABLES FROM THE REDUNDANT DIVISION, OR THE ISOLATION OF THESE ASSOCIATED CIRCUITS FROM THE SAFE SHUTDOWN EQUIPMENT, SHALL BE SUCH THAT A POSTULATED FIRE INVOLVING ASSOCIATED CIRCUITS WILL NOT PREVENT SAFE SHUTDOWN.

DUKE: The Standby Shutdown System (SSS) provides dedicated shutdown capabilities. (Ref. Correspondence - July 5, 1983. H. B. Tucker's letter to Harold R. Denton (NRR) concerning cable separation, discussion of associated circuits, and SSS information.)

NRC: m. FIRE BARRIER CABLE PENETRATION SEAL QUALIFICATION

PENETRATION SEAL DESIGNS SHALL UTILIZE ONLY NONCOMBUSTIBLE MATERIALS AND SHALL BE QUALIFIED BY TESTS THAT ARE COMPARABLE TO TESTS USED TO RATE FIRE BARRIERS. THE ACCEPTANCE CRITERIA FOR THE TEST SHALL INCLUDE:

1) THE CABLE FIRE BARRIER PENETRATION SEAL HAS WITHSTOOD THE FIRE ENDURANCE TEST WITHOUT PASSAGE OF FLAME OR IGNITION OF CABLES ON THE UNEXPOSED SIDE FOR A PERIOD OF TIME EQUIVALENT TO THE FIRE RESISTANCE RATING REQUIRED OF THE BARRIER;

2) THE TEMPERATURE LEVELS RECORDED FOR THE UNEXPOSED SIDE ARE ANALYZED AND DEMONSTRATE THAT THE MAXIMUM TEMPERATURE IS SUFFICIENTLY BELOW THE CABLE INSULATION IGNITION TEMPERATURE; AND

3) THE FIRE BARRIER PENETRATION SEAL REMAINS INTACT AND DOES NOT ALLOW PROJECTION OF WATER BEYOND THE UNEXPOSED SURFACE DURING THE HOSE STREAM TEST.

DUKE: Fire barrier cable penetration seals are qualified by appropriate fire test methods and/or analysis.

NRC: n. FIRE DOORS

FIRE DOORS SHALL BE SELF-CLOSING OR PROVIDED WITH CLOSING MECHANISMS AND SHALL BE INSPECTED SEMIANNUALLY TO VERIFY THAT AUTOMATIC HOLDOPEN, RELEASE, AND CLOSING MECHANISMS AND LATCHES ARE OPERABLE.

ONE OF THE FOLLOWING MEASURES SHALL BE PROVIDED TO ENSURE THEY WILL PROTECT THE OPENING AS REQUIRED IN CASE OF FIRE:

1) FIRE DOORS SHALL BE KEPT CLOSED AND ELECTRICALLY SUPERVISED AT A CONTINUOUSLY MANNED LOCATION;

2) FIRE DOORS SHALL BE LOCKED CLOSED AND INSPECTED WEEKLY TO VERIFY THAT THE DOORS ARE IN THE CLOSED POSITION;

3) FIRE DOORS SHALL BE PROVIDED WITH AUTOMATIC HOLD-OPEN AND RELEASE MECHANISMS AND INSPECTED DAILY TO VERIFY THAT DOORWAYS ARE FREE OF OBSTRUCTIONS; OR

4) FIRE DOORS SHALL BE KEPT CLOSED AND INSPECTED DAILY TO VERIFY THAT THEY ARE IN THE CLOSED POSITION.

THE FIRE BRIGADE LEADER SHALL HAVE READY ACCESS TO KEYS FOR ANY LOCKED FIRE DOORS.

AREAS PROTECTED BY AUTOMATIC TOTAL FLOODING GAS SUPPRESSION SYSTEMS SHALL HAVE ELECTRICALLY SUPERVISED SELF-CLOSING FIRE DOORS OR SHALL SATISFY OPTION 1 ABOVE.

DUKE: Automatic closure devices are provided for fire rated doors installed in Fire Boundaries as shown on design drawings. These doors will be normally locked, alarmed, or inspected daily. (Ref. Correspondence - July 29, 1982. W. O. Parker's letter to Harold R. Denton (NRR) concerning exceptions to fire door monitoring.)

NRC: o. OIL COLLECTION SYSTEM FOR REACTOR COOLANT PUMP

THE REACTOR COOLANT PUMP SHALL BE EQUIPPED WITH AN OIL COLLECTION SYSTEM IF THE CONTAINMENT IS NOT INERTED DURING NORMAL OPERATION. THE OIL COLLECTION SYSTEM SHALL BE SO DESIGNED, ENGINEERED, AND INSTALLED THAT FAILURE WILL NOT LEAD TO FIRE DURING NORMAL OR DESIGN BASIS ACCIDENT CONDITIONS AND THAT THERE IS REASONABLE ASSURANCE THAT THE SYSTEM WILL WITHSTAND THE SAFE SHUTDOWN EARTHQUAKE.

SUCH COLLECTION SYSTEMS SHALL BE CAPABLE OF COLLECTING LUBE OIL FROM ALL POTENTIAL PRESSURIZED AND UNPRESSURIZED LEAKAGE SITES IN THE REACTOR COOLANT PUMP LUBE OIL SYSTEMS. LEAKAGE SHALL BE COLLECTED AND DRAINED TO A VENTED CLOSED CONTAINER THAT CAN HOLD THE ENTIRE LUBE OIL SYSTEM INVENTORY. A FLAME ARRESTER IS REQUIRED IN THE VENT IF THE FLASH POINT CHARACTERISTICS OF THE OIL PRESENT THE HAZARD OF FIRE FLASHBACK. LEAKAGE POINTS TO BE PROTECTED SHALL INCLUDE LIFT PUMP AND PIPING, OVERFLOW LINES, LUBE OIL COOLER, OIL FILL AND DRAIN LINES AND PLUGS, FLANGED

CONNECTIONS ON OIL LINES, AND LUBE OIL RESERVOIRS WHERE SUCH FEATURES EXISTS ON THE REACTOR COOLANT PUMPS. THE DRAIN LINE SHALL BE LARGE ENOUGH TO ACCOMMODATE THE LARGEST POTENTIAL OIL LEAK.

DUKE: Oil collection system for Reactor Coolant pumps are designed to withstand the design basis seismic event. Leakage is drained to a vented tank. The drain line is properly sized.

A.4 PART D - SAFETY EVALUATION REPORT

See SER, Section 9.5.1., including Supplements 2, 3, 4, and 5.

A.5 PART E - CORRESPONDENCE

SUMMARY OF FIRE PROTECTION DOCUMENTS SUBMITTED TO THE NRC

1. Letter of October 23, 1981, William O. Parker, Jr. (DPC) to Harold R. Denton (ONRR) submitting the August 1981 revision (Rev. 2) of the Catawba Nuclear Station Response to Appendix A to BTP APCSB 9.5-1. This document superceded the previous submittals and additionally provided an evaluation against the technical requirements of Appendix R to 10 CFR50. (Reference SER, Page 9-34.)
2. Letter of January 14, 1982, William O. Parker, Jr., to Harold R. Denton responding to NRC request to provide a comparison of the Catawba fire protection program to Appendix R to 10 CFR50. This letter indicates that the revised DPC response to BTP APCSB 9.5-1, submitted with the letter of October 23, 1981, contains a comparison of the fire protection program to Appendix R to 10 CFR50.
3. Letter of July 29, 1982, William O. Parker, Jr. to Harold R. Denton. The following information is included in this letter (Note 1):
   a. Commitment to comply with guidelines contained in BTP CMEB 9.5-1, Item C.1.a in development of Station Fire Plan (Program). (Reference SER, Page 9-35.)
   b. Commitment to have administrative controls and station directives in place for each unit prior to fuel loading of the unit.
   c. Commitment to develop administrative controls which comply with guidelines in BTP CMEB 9.5-1, Item C.2. (Reference SER, Page 9-35.)
   d. Commitment to establish and train a fire brigade which complies with guidelines in BTP CMEB 9.5-1, Item C.3. (Reference SER, Page 9-36.)
   e. Discussion of spiral staircases between fire areas within the Auxiliary Building. (Reference SER, Page 9-36.)
   f. Commitment to install fire barrier penetration seals which have been tested and approved in accordance with IEEE 634-1978 and ASTM E119-1976. (Reference SER, Page 9-36.)
   g. Discussion of labeled and unlabeled fire doors in committed fire barriers. (Reference SER, Pages 9-36 and 9-37)
   h. Commitment to provide a safe shutdown analysis in accordance with the guidelines of BTP CMEB 9.5-1, Item C.5.b, at a future date. (Reference SER, Page 9-37.)
   i. Commitment to comply with NFPA 30-1977, "Flammable and Combustible Liquids". (Reference SER, Page 9-38.)
   j. Commitment to provide fixed emergency lighting in accordance with BTP CMEB 9.5-1, Item C.5.g.(1). (Reference SER, Page 9-39.)
   k. Commitment to provide a multifrequency radio system with a dedicated frequency for fire brigade use. (Reference SER, Page 9-39.)
   l. Discussion of compliance with NFPA 13-1980 and use of unlisted valves.- (Reference SER, Pages 9-41 and 9-42.)

m. Commitment to comply with NFPA 12-1980, "Carbon Dioxide Extinguishing Systems". (Reference SER, Page 9-42.)

n. Discussion of fire separation between vital battery rooms and related equipment. (Reference SER, Page 9-45.)

o. Complete listing of rooms within the safety related buildings including room description, and the type of detection utilized when provided. (Reference SER, Pages 9-39 and 9-40.)

p. Manufacturer's data concerning the critical radiant heat flux of the control room carpet.

q. Details of interlocked armor cable usage and use of PVC jacketed flexible conduit. (Reference SER, Page 9-38.)

r. Drawing providing details of the physical arrangement of the three fire pumps. (Reference SER, Page 9-40.)

s. Date of 90% cable pull completion.

t. Discussion of cable separation outside of containment and schedule for completion of the separation study within containment. (Reference SER, Page 9-39.)

This letter also includes 13 items of clarification, 4 of which were generated following review of the draft SER and 9 which were generated following initial review of Revision 3 of NUREG 0800, Standard Review Plan.

4. Letter of September 14, 1982, Hal B. Tucker to Harold R. Denton. This letter submitted a revised list of fire detectors located within the safety related buildings. This submittal was made as the original list submitted with the letter of July 29, 1982 was found to contain numerous typographical errors. (Reference SER, Pages 9-39 and 9-40.)

5. Letter of December 15, 1982, Hal B. Tucker to Harold R. Denton. The following information is included in this letter:

   a. Clarification concerning use of an interim barrier between units and fire protection features to be in place on the Unit 1 side of the barrier prior to Unit 1 fuel load. This clarification was made based on review of the draft SER. (Reference SER, Page 9-35.)

   b. Details of unlabeled hollow metal doors and composite steel doors including location and use. Also provided were examples of manufacturer's certification letters addressing compliance with listed construction methods. (Reference SER, Pages 9-36 and 9-37.)

6. Letter of April 14, 1983, Hal B. Tucker to Harold R. Denton. This letter provides a number of clarifications generated following review of the SER (issued 2/22/83). The following information is included in this letter:

   a. Bulk hydrogen system submittal consisting of marked drawings indicating pipe routing in the Auxiliary and Reactor Buildings. (Reference SER, Page 9-38 and SSER No. 2, Pages 9-2 and 9-3.)

   b. Commitment to provide a safe shutdown analysis and supporting information for Unit 1 by July 1983. (Reference SER, Page 9-37.)

   c. Use of photoelectric smoke detectors and ultraviolet flame detectors. Also included in the submittal was a list of rooms within the safety related buildings which are not provided with fire detection and a sketch detailing power supplies to the fire detection system. (Reference SSR No. 2, Page 9-3.)

d. Water supply capability including greatest water demand for a fire suppression system and graphs of fire pump test results. (Reference SSER No. 2, Page 9-3.)

e. Use of manual sprinkler systems for the reactor coolant pumps and pipe corridor areas within each Reactor Building and proposed sprinkler protection arrangement within each annulus area. (Reference SER, Page 9-42.)

f. Details of Reactor Building HVAC system penetrations being equipped with dampers which are not fire rated.

g. Clarification that Control Room pressure doors are not listed fire doors. (Reference SER, Pages 9-36 and 9-37.)

h. Confirmation that the standby shutdown system is available following a fire in the safety related battery room area for each unit. (Reference SER, Page 9-45 and SSER No. 2, Page 9-3.)

7. Letter of May 31, 1983, Hal B. Tucker to Harold R. Denton. This submittal included the fire testing summary report for embedded steel concrete block firewalls and supporting information. (Reference SSR No. 3, Page 9-10.)

8. Letter of July 5, 1983, Hal B. Tucker to Harold R. Denton submitting information concerning cable separation within the Unit 1 Reactor Building, associated circuits methodology, and standby shutdown system design.

9. Letter of July 25, 1983, Hal B. Tucker to Harold R. Denton submitting tables and figures inadvertently omitted from the July 5, 1983, submittal concerning the standby shutdown system.

10. Letter of November 4, 1983, Hal B. Tucker to Harold R. Denton submitting the July 1983 revision (Rev. 3) of the Catawba Nuclear Station Response to Appendix to BTP APCSB 9.5-1.

11. Letter of January 17, 1984, Hal B. Tucker to Harold R. Denton submitting a description of the proposed manual sprinkler system for each Reactor Building annulus area and supporting drawings. (Reference SSER No. 3, Page 9-14.)

12. Letter of February 10, 1984, Hal B. Tucker to Harold R. Denton providing responses to concerns raised during the site audit conducted November 1-4, 1983. The following information was provided in this letter.

    a. Commitments to complete the following features noted as outstanding:

        1) Replacement of cork expansion joint material between fire areas. (Reference SSER No. 3, Pages 9-8 and 9-9.)

        2) Installation of cable wrap systems in Fire Areas 2 and 3. (Reference SSER No. 3, Pages 9-16.)

        3) Installation/replacement of fire doors and hardware. (Reference SSER No. 3, Pages 9-9 and 9-10).

        4) Installation of emergency lighting units. (Reference SSER No. 3, Pages 9-12.)

        5) Installation of fire barrier penetration seals. (Reference SSER No. 3, Pages 9-8 and 9-9.)

        6) Installation of smoke detectors. (Reference SSER No. 3, Pages 9-12 through 9-14.)

        7) Installation of sprinkler systems. (Reference SSER No. 3, Page 9-15.)

        8) Installation of HVAC duct access panels for fire dampers. (Reference SSER No. 3, Page 9-11.)

9) Protection of embedded steel members in stairway enclosures of the control complex. (Reference SSER No. 3, Page 9-10.)

10) Installation of fire hose stations in Fire Areas 9 and 10. (Reference SSER No. 3, Page 9-15.)

11) Supervision of control valves for fire protection water supply piping. (Reference SSER No. 3, Pages 9-13 and 9-l4.)

12) Provision of equipment for fire hose houses. (Reference SSER No. 3, Page 9-15.)

13) Installation of a radio communication repeater. (Reference SSER No. 3, Page 9-12.)

b. Protection of embedded steel members will be carried out in accordance with criteria established in the fire test (Bletzaker) report. (Reference SSER No. 3, Page 9-10.)

c. Cable trays will be supported at (above) the floor slabs and within two feet of either side of fire barrier walls. Automatic sprinklers will be provided where seismic cable tray supports penetrate the fire barrier walls of the cable shafts and adjacent corridors on Elevations 547+0 and 554+0. (Reference SSER No. 3, Page 9-9.)

d. Mechanical penetration seals in masonry block fire walls have sealant material which extends beyond the surface of the wall. (Reference SSER No. 3, Page 9-8.)

e. Fire barrier electrical penetration seals were tested to IEEE 383 acceptance criteria rather than ASTM E119 acceptance criteria. Tests conducted meet ASTM E119 criteria (temperature) except for a small zone extending from the penetrating member. There are no ordinary combustible materials or sensitive electronic equipment in these zones which would be affected by heat transfer. (Reference SSER No. 3, Page 9-8.)

f. Two and one half gallon water filled portable fire extinguishers will be provided in the Control Room and the Essential Switchgear Rooms. (Reference SSER No. 3, Page 9-15.)

g. Cables will be rerouted as appropriate in the annulus to maintain at least 20 feet of separation. Cables do not have exposed plastic insulation and there are no other in-situ combustibles. (Reference SSER No. 3, Page 9-16).

h. Due to difficult access for manual fire fighting, a fixed fire suppression (sprinkler) system will be installed in the annulus. (Reference SSER No. 3, Pages 9-14 through 9-16.)

i. Additional 1 1/2 inch fire hose will be stored in the fire brigade locker for use in fighting fires in the pipe tunnel area adjacent to Fire Area 1. (Reference SSER No. 3, Page 9-14.)

j. Station fire fighting plans will address available options for manual fire fighting using fire hoses in the event that a diesel generator room fire prevents use of the room fire hose stations. (Reference SSER No. 3, Pages 9-14 and 9-15.)

k. One hour fire rated "wrap" will be installed on the conduit containing fire pump "B" cables beneath the intake structure. The fire wall separating fire pump "A" from fire pump "B" will be extended. (Reference SSER No. 3, Page 9-14.)

l. Conduit ends of conduits (passing through fire barriers) which do not terminate at boxes, devices or cable seal connectors will be sealed. (Reference SSER No. 3, Page 9-9.)

m. A number of HVAC ducts (12 gauge stainless steel welded pipes) ranging in diameter from 2 1/2 inches to 8 inches are not provided with fire dampers where penetrating fire rated barriers. These unprotected openings do not occur in barriers which separate equipment necessary for safe shutdown. (Reference SSER No. 3, Page 9-11.)

n. Connections to the diesel generator day tanks which exist above the dike walls are either under low pressure or are above the normal operating level of the tank and do not constitute a spray hazard. Failure of the supply solenoid would result in increased pressure and possible flange leak. This is considered remote due to fail closed valve design and redundant level control switches and high level alarm. (Reference SSER No. 3, Page 9-10.)

o. Continuous flow hose reels will be provided in Fire Areas 2 and 3. (Reference SSER No. 3, Page 9-14.)

p. Fire detection zone circuits and interconnection circuits are "Class A" supervised. Back-up battery supplies are provided. (Reference SSER No. 3, Page 9-13.)

q. Sprinkler system waterflow signalling and valve position signalling circuits are not electrically supervised. Supervised fire detection zones are provided in all sprinklered areas. The position of fire protection related valves will be verified on a monthly basis (where accessible). (Reference SSER No. 3, Page 9-13.)

r. Fire detectors will be provided for Rooms 300 (hatch area), 510, 561, 571, 580, 590, 801, 802 and the hatch area outside of Room 331. Duct type detectors will be provided to monitor Rooms 204, 206A, 206B, 207, 301, 302, and 331. (Reference SSER No. 3, Pages 9-12 and 9-13.)

13. Letter of February 20, 1984, Hal B. Tucker to Harold R. Denton providing information concerning the reactor coolant pump motor oil collection system.

14. Letter of February 29, 1984, Hal B. Tucker to Harold R. Denton providing clarification that fire protection valves which were equipped with tamper switches will be locked with the exception of motor operated valves. (Reference SSER No. 3, Pages 9-13 and 9-14.)

15. Letter of March 14, 1984, Hal B. Tucker to Harold R. Denton providing information concerning composition of the station fire brigade. (Reference SSER No. 3, Page 9-6.)

16. Letter of April 9, 1984, Hal B. Tucker to Harold R. Denton providing a summary of substantive changes in the Response to Appendix A to BTP APCSB 9.5-1, submitted on November 4, 1983. This letter also provides additional information in response to concerns raised during the fire protection site audit (11/1-4/83) as follows:

    a. Detailed description of Reactor Building mechanical penetration sealing methods. (Reference SSER No. 3, Page 9-7.)

    b. Detailed description of Reactor Building electrical penetration sealing methods. (Reference SSER No. 3, Page 9-7.)

    c. Details of the Reactor Building bypass leakage enclosures for the personnel access portals. (Reference SSER No. 3, Pages 9-6 and 9-7.)

    d. Within the Reactor Buildings, automatic sprinkler protection and detection is provided in the vicinity of certain cables which are not separated by 20 feet (Annulus). Automatic sprinkler protection and detection is not provided throughout the Reactor Building. (Reference SSER No. 3, Page 9-16.)

    e. Protection of embedded steel in walls of stair towers and duct shafts between Fire Areas 4, 11, 18, 22, 38 and 47 will not be provided. These areas could be combined into a single Fire Area without degradation of shutdown capability. (Reference SSER No. 3, Page 9-10.)

    f. Cork expansion joint material will be replaced in wall, floor and roof interfaces between Fire Areas 2, 3, 5, 6, 12, 13, 19 and 20. Voids will be filled with a minimum 11 1/2 inch depth of

foam. Cork will not be removed from any other interfaces as shutdown capability will not be degraded in the event of fire penetrating these interfaces. (Reference SSER No. 3, Pages 9-8 and 9-9.)

g. The fuel systems supplying the emergency diesel generators deviate from the requirements of NFPA 30-1981, Section 2-4.4.3, in that automatic cutoff valves or similar devices are not provided. These devices would be of limited benefit considering the design of the system and may degrade reliability.

h. Penetrations occurring in exterior walls and roofs are generally not sealed for protection purposes. (Reference SSER No. 3, Page 9-8.)

i. Emergency lighting units will be provided in areas required to be attended for operation of the standby shutdown system including access and egress routes with the exception of the yard. Normal exterior lighting units would be available in the yard area in the event that operation of the standby shutdown system is required.

j. Curb box type fire protection valves are not to be locked. These valves require a "T" wrench for operation.

k. Fire doors located in fire barrier walls will be inspected per "Appendix R" requirements.

l. HVAC dampers may be supported or divided by steel plate which has been protected by a thickness of Pyrocrete. (Reference SSER No. 3, Page 9-11.)

m. Reactor Building fire protection piping for the manual sprinkler spray systems protecting the pipe corridor, reactor coolant pumps, and lower containment filters is not supervised.

n. Mineral insulated cable is used for encore thermocoupling cabling + inside the Reactor Building. The construction of this cable consists of a substantial metal jacket which is considered to be a radiant energy heat shield. (Reference SSER No. 3, Page 9-16.)

o. In the same manner as HVAC dampers, large wall/floor penetration openings may be subdivided using steel plate which has been protected by a thickness of Pyrocrete. (Reference SSER No. 3, Page 9-11.)

17. Letter of April 11, 1984, Hal B. Tucker to Harold R. Denton discussing the methodology and bases for conducting associated circuit reviews. (Reference SSER No. 4, Page 9-2.)

18. Letter of April 25, 1984, Hal B. Tucker to Harold R. Denton providing the following clarifications:

    a. The two 150 lb. hydrogen cylinders associated with the gas blanket for the reactor coolant pump drain tanks have been relocated from the Reactor Building to the hydrogen shed in the yard. Excess flow valves are to be installed on the supply piping to each unit prior to fuel load. (Reference SSER No. 3, Page 9-10.)

    b. The annulus area of the Reactor Building is considered to be inside containment. The sprinkler system is arranged for automatic actuation to comply with requirements of Appendix R, Section III.G.2.e. (Reference SSER No. 3, Page 9-16.)

19. Letter of May 8, 1984, Hal B. Tucker to Harold R. Denton providing supplemental information regarding the associated circuit review submittal of April 11, 1984. (Reference SSER No. 4, Page 9-2.)

20. Letter of May 11, 1984, Hal B. Tucker to Harold R. Denton providing the following additional information:

a. The hatch covers over the turbine-driven auxiliary feedwater pump pits are supported by W16x64 structural steel members. No fire resistive coating has been applied to this steel based on the minimal insitu and potential transient combustible loading. - A C02 fire suppression system as well as early warning smoke detection system are provided. (Reference SSER No. 3, Pages 9-16 and 9-17.)

b. Rubatex R1800 FS or FR/Armaflex cellular foam insulation is used on a limited basis for insulation of HVAC ducts and cold water pipes. These materials have a flame spread index of 25; smoke development index of 150 or less; and fuel contribution index of 30 or less. These materials do not significantly increase the combustible loading in any fire area. Additionally, fire detectors are generally provided in areas where this material is used. (Reference SSER No. 3, Page 9-11.)

c. Automatic sprinklers protection is provided in each auxiliary feedwater pump room area (Fire Areas 2 and 3) with the exception of the area above each auxiliary feedwater pump pit. A one hour cable wrap is used in each auxiliary feedwater pump room area, including the unsprinkled portions. This arrangement is considered satisfactory since combustible loading is minimal and a carbon dioxide suppression system has been provided throughout the area with the exception of the bay directly above each turbine-driven auxiliary feedwater pump pit hatch cover. (Reference SSER No. 3, Page 9-16.)

d. Wall of floor penetrations which exceed the 6' x 9' tested assembly dimensions are subdivided by steel plate which has been coated with a thickness of Pyrocrete.

21. Letter of June 29, 1984, Hal B. Tucker to Harold R. Denton indicating that the fire protection program would be in place inside the Unit 1 protected area prior to Unit 1 fuel load with the following exceptions:

a. The features listed below will be complete prior to initial criticality:

1) SSF diesel fuel line modification.

2) Standby makeup pump capacity modification.

3) Train "A" disconnect enclosure cover modification.

4) Standby makeup pump SSF flow gage modification.

5) SSS related emergency lighting modifications.

6) SSS related equipment access platforms.

b. Damage control measures and cold shutdown procedures which will be in place prior to initial criticality.

c. Floor drains near component cooling pumps 1A1 and 1A2 are to remain capped until the interim barrier is removed.

d. The sprinkler systems for the Unit 2 component cooling pumps 2B1 and 2B2 (located on the Unit 1 side of the interim barrier) will not be in service until the interim barrier is removed.

e. The CO2 system for diesel generator 1A will not be completed until overhaul of the diesel generator is complete. The system will be in service prior to initial criticality.

f. A fire detector will be installed in the bay above the turbine-driven auxiliary feedwater pump hatch cover. This detector will be in service prior to initial criticality. (Reference SSER No. 3, Page 9-16.)

g. Cork expansion joint material in the Reactor Building/Auxiliary Building interfaces east of Column Line EE will be replaced with RTV silicone foam such that Fire Areas 4, 11, and 18 will be completely separated. (Reference SSER No. 3, Page 9-16.)

22. Letter of July 6, 1984, Hal B. Tucker to Harold R. Denton requesting partial exemption from GDC3 of 10 CFR50, Appendix A for the following items (to be completed by initial criticality):

    a. CO2 system for diesel generator 1A.

    b. Fire detector over the turbine-driven auxiliary feedwater pump hatch cover.

    c. Cork expansion joint removal between Fire Areas 4, 11, and 18.

    d. Six features related operation of the SSS.

    e. Damage control measures and cold shutdown procedures.

23. Letter of August 2, 1984, Hal B. Tucker to Harold R. Denton addressing concerns raised involving false actuation of main steam isolation valves or steam generator power operated relief valves due to fire induced shorts. A modification will be implemented for Unit 1 prior to entry into Mode 3 which provides disconnects for the cables providing power to the actuation solenoids. (Reference SSER No. 4, Page 9-4.)

24. Letter of August 3, 1984, Hal B. Tucker to Harold R. Denton addressing compliance with minimum shift crew requirements of Technical Specification 6.2.2. Sufficient manpower is available on-site to perform the required manual operations in a timely manner to achieve hot standby conditions without reliance on fire brigade members. (Reference SSER No. 4, Page 9-4.).

25. Letter of September 18, 1984, Hal B. Tucker to Harold R. Denton indicating that review of the Catawba SER and supplements identified a number of incorrect descriptions of features of the Catawba fire protection program. The following items were identified:

    a. The two 150 lb. cylinders associated with the reactor coolant pump drain tank were identified as being located in the Reactor Building. These tanks have been relocated to the hydrogen shed in the yard and excess flow valves installed on the supply piping. (Reference SSER No. 2, Page 9-2.)

    b. Diesel generator room fire detectors are identified as not being seismically qualified. These detectors meet Catawba seismic qualifications. (Reference SSER No. 2, Page 9-4.)

    c. Steel sleeves for mechanical penetrations through masonry fire walls are identified as extending beyond the wall surface. These sleeves do not protrude beyond the surface of the wall. (Reference SSER No. 3, Page 9-8.)

    d. Hydrogen piping associated with the reactor coolant pump drain tanks is identified as being located within the Reactor Building. This piping is also routed within the Auxiliary Building. (Reference SSER No. 3, Page 9-10.)

    e. Valve tamper switches are identified as being functional on fire protection valves which are to be locked open. There are no plans to test valve tamper switch circuits for these valves as they are inspected (where accessible) on a monthly basis. (Reference SSER No. 3, Page 9-13.)

    f. Both the conduit and related Supports for the "B" fire pump power cable located below the intake structure, are identified as being wrapped. Due to the low probability of a fire and negligible combustible load beneath the intake structure, the commitment made was to wrap the conduit only.

g. The turbine-driven auxiliary feedwater pump is identified as being separated from the water-driven pumps by a 3-hour fire barrier. The pumps identified as water-driven are motor-driven. (Reference SSER No. 3, Page 9-16.)

26. Letter of November 13, 1984, Hal B. Tucker to Harold R. Denton advising that the items identified in the correspondence of June 29, 1984, to be completed prior to initial criticality had been completed.

27. Letter of November 30, 1984, Hal B. Tucker to Harold R. Denton confirming that cold shutdown can be achieved within 72 hours following a fire event per Standard Review Plan Section 9.5-1, Section 1.C.5.C. This letter also includes a discussion concerning T-Hot determination within the SSF.

28. Letter of March 21, 1985, Hal B. Tucker to Dr. J. Nelson-Grace (NRC-Region II) submitting fire protection layout and boundary drawings as well as marked standby shutdown system flow paths and pressure boundary drawings for use during the upcoming (April 15-19) Appendix A inspection.

29. Letter of April 1, 1985, Hal B. Tucker to Dr. J. Nelson Grace submitting marked cable routing drawings, associated circuit analysis study, and various shutdown and damage control procedures for use in the upcoming Appendix 4 inspection of Unit 1.

30. Letter of May 31, 1985, Hal B. Tucker to Dr. J. Nelson Grace submitting calculations addressing the acceptability of unprotected cable tray supports within the auxiliary feedwater pump room. (Reference SSER No. 5, Pages 9-1 and 9-2.)

31. Letter of November 27, 1985, Hal B. Tucker to Roger D. Walker (NRC-Region II), submitting marked flow diagrams, fire boundary and layout drawings, electrical cable routing and power distribution drawings, and associated circuit analysis study for use in the upcoming Appendix A inspection of Unit 2.

32. Letter of March 19, 1986, Hal B. Tucker to Dr. J. Nelson Grace, submitting a fire hazards analysis summary for each doghouse fire area. (Subsequently, forwarded to ONRR. Resolution pending.)

NOTE 1: The original SER for Catawba identifies three letters of correspondence, dated 7/22/82, 7/9/82 and 7/9/81. In each case the date identified was determined to be a typographical error. The correct date in each case is 7/29/82.)

APPENDIX B. (DELETED PER PIP C-10-01294) COMMITMENT INDEX

APPENDIX C. FIRE BRIGADE RESPONSE STRATEGIES BASES DOCUMENTS

Standard Review Plan Position C.2.o (1 thru 10)	Disposition	Documents/Programs
1) Fire hazards in each area covered by the specific prefire plans	The fire brigade response strategies include a listing of special fire hazards. Fire brigade training covers the types of combustibles and flammables found in typical plant areas and equipment (e.g., pump lube oils, diesel engine fuel oils, transformer oils, cable insulation, fixed and transient ordinary combustibles, etc.)	Fire Brigade Strategies & Fire Brigade Training
2) Fire extinguishants best suited for controlling the fires associated with the fire hazards in that area and the nearest location of these extinguishants	The fire brigade strategy plan views show the type and location of the extinguishants available for use. Fire brigade training covers the proper type of extinguishant to use on the various types of expected fires.	Fire Brigade Strategies & Fire Brigade Training
3) Most favorable direction from which to attack a fire in each area in view of the ventilation direction, access hallways, stairs and doors that are most likely to be free of fire, and the best station or elevation for fighting the fire. All access and egress routes that involve locked doors should be specifically identified in the procedure with the appropriate precautions and methods for access specified.	The most favorable direction from which to attack the fire is a decision made by the incident commander (fire brigade leader/captain) during the initial assessment upon arrival at the scene. The decision is aided by the fire brigade leader's plant knowledge (SRO or equivalent) as well as access information shown on the strategy plan views. Fire fighting equipment and travel paths are well marked using the plant labeling process. Access control doors (CAD) and locked doors are accessible via the security and radiation protection personnel that are part of the normal fire brigade response procedures.	Fire Brigade Strategies, Fire Brigade Training, Incident Command Training, SRO Training, plant labeling
4) Plant systems that should be managed to reduce the damage potential during a local fire and the location of local and remote controls for such management (e.g., any	The fire brigade strategies indicate any special hazards with respect to components susceptible to overpressurization concerns. Fire brigade training covers the potential increase in hazards associated with electrical	Fire Brigade Strategies & Fire Brigade Training

Standard Review Plan Position C.2.o (1 thru 10)	Disposition	Documents/Programs
hydraulic or electrical systems in the zone covered by the specific fire fighting procedure that could increase the hazards in the area because of overpressurization or electrical hazards).	equipment.	
5) Vital heat-sensitive system components that need to be kept cool while fighting a local fire. Particularly hazardous combustibles that need cooling should be designated.	The fire brigade strategies indicate any special hazards with respect to hazardous combustibles that could become involved as a secondary ignition. Fire brigade training covers the proper cooling techniques to prevent secondary ignition. Information with respect to heat sensitive equipment that needs to be protected is available via the control room operators knowledge, plant drawings, and control room operating procedures and will be coordinated between the control room and the incident commander.	Fire Brigade Strategies & Fire Brigade Training
6) Organization of fire fighting brigades and the assignment of special duties according to job title so that all fire fighting functions are covered by any complete shift personnel complement. These duties should include command control of the brigade, transporting fire suppression and support equipment to the fire scenes, applying the extinguishant to the fire, communication with the control room, and coordination with outside fire departments.	Fire brigade training covers the roles and responsibilities of the responders, including the fire brigade leader, the designated fire brigade members, the safety officer, any non-designated fire brigade qualified responders, security personnel, and radiation protection personnel. The designated fire brigade leader and designated fire brigade members are assigned and noted at the beginning of each shift. A Nuclear System Directive (NSD) covers fire brigade requirements.	Fire Brigade Training, Operations Management Procedure (OMP) 2-22, "Shift Turnover", NSD-112, "Fire Brigade Organization, Training, and Responsibilities"

Standard Review Plan Position C.2.o (1 thru 10)	Disposition	Documents/Programs
7) Potential radiological and toxic hazards in fire zones.	The fire brigade strategies indicate the radiological hazards in each area. Radiation Protection personnel respond to fire events and provide radiological information and support. Fire brigade training covers the expected toxic hazards for typical plant areas.	Fire Brigade Strategies & Fire Brigade Training
8) Ventilation system operation that ensures desired plant air distribution when ventilation flow is modified for fire containment or smoke clearing operation.	Operation of ventilation systems during a fire response is coordinated between the incident commander and the control room operator. Information with respect to desired ventilation system operation is available via the control room operator's knowledge; and plant drawings (P&ID's) and operating procedures which are available in the control room.	Fire Brigade Training, Incident Command Training, SRO Training, P&ID's, Operating Procedures
9) Operations requiring control room and shift engineer coordination or authorization.	Operation of plant equipment and systems is coordinated between the incident commander and the control room operator. Fire brigade leader training as well as training for other operation shift positions clearly designates responsibilities and proper levels of authorization for decisions.	Fire Brigade Training, Incident Command Training, SRO Training, Operations Management Procedure (OMP) 1-8, " Authority and Responsibilities of On-Shift Operations Personnel"
10) Instructions for plant operators and general plant personnel during fire.	Plant fire response procedures and fire brigade response procedures give instruction for plant operators during a fire event. General employee training (GET) provides instructions for general plant personnel during fire events. This includes the proper actions to take upon discovery of a fire.	RP/0/A/5000/29 " Fire Brigade Response Procedure" AP/0/A/5500/45 " Plant Fire Procedure" , GET