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April 3, 1981

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket Nos. 50-387
50-388

SUSQUEHANNA STEAM ELECTRIC STATION
FIRE PROTECTION REVIEW REPORT REVISION 1
ER 100450 FILE 841-2
PLA-668

Dear Mr. Youngblood:

Attached are forty (40) copies of Revision 1 to the Fire Protection Review Report for Susquehanna SES. Appendix A to this report is considered confidential in nature and in accordance with Title 10 CFR Part 2 Section 2.790 should be withheld from public inspection.

If you have any questions, please call.

Very truly yours,

NW Curtis

N. W. Curtis
Vice President-Engineering and Construction-Nuclear

WWW/mks

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Forwards Rev. 7 to "Fire Protection Review Rept"

Sharon Hunt
M/S-016

Distribution Services Branch

35

To:

From: W. E. Barberich
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, PA 18101

Subject: Appendix A to Susquehanna SES Fire Protection Review Report

The enclosed material is considered confidential in nature and in accordance with Title 10CFR Part 2 Section 2.790 should be withheld from public inspection.

Please sign this receipt form and return, within 30 days, to me at the above location.

W. E. Barberich

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I hereby certify that I have received the material indicated above except as noted.

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APPENDIX A

Fire Zone: 0-24D

Essential Raceway:

E1KR 23
27

Fire Zone: 0-24G

Essential Raceway:

E2KQ 21

22

23

Fire Zone: 0-26B

Essential Raceway:

F1K. 294

295

Fire Zone: 0-26G

Essential Raceway:

F1KR 02

Fire Zone: 0-26I

Essential Raceway:

F2KR 03
04

Fire Zone: 0-28H

Essential Raceway:

A1P 071

075

105

C1P 107

Fire Zone: 0-41A

Essential Raceway:

B1K	043
	044
B1M	033
	034
D1K	043
	044
D1M	031
	032
F1P	463

Fire Zone: 0-41C

Essential Raceway:

F1P 463

Fire Zone: 1-1C

Essential Raceway:

E1P 473

Fire Zone: 1-2B

Essential Raceway:

E1K 758

833

Fire Zone: 1-3A

Essential Raceway:

F1KL 6

7

8

9

10

11

F1KR 24

26

27

F1KY 5

6

F1KH 6

7

8

9

10

11

F1KX 5

6

Fire Zone: 1-3B

Essential Raceway:

C1F 033

034

C1KH 021

027

E1K 833

E1PJ 063

E1PH 021

022

E1KH 021

027

Fire Zone: 1-4A

Essential Raceway:

C1K	23	F1K	041
	27		043
D1P	008		115
D1K	159		184
	160		199
E1K	553		217
	617		218
	833		297
E1KJ	016		298
	017		488
	018		510
	019		583
	020		584
	021		623
	023	F1KP	014
	024		015
E1P	030		016
E1PJ	016	F1KQ	017
	017	F1KR	006
	018		007
	019		009
	061		

F1KY 006
007
008
009
010
F1P 080
096

Two Bus Ducts from Fire Zone 1-4C to Fire Zone 1-5F.

Fire Zone: 1-5A

Essential Raceway:

F1K	488
F1P	030
D1K	010
	017
D1P	008
	025
E1K	758
	833
	041
E1KK	21

Fire Zone: 1-6A

Essential Raceway:

A1P	105
	075
C1P	107
E1P	005
	006
	428

Fire Zone: 2-3B

Essential Raceway:

A2M 023

E1K 715

E2M 275

E2KH 26

27

28

29

30

Fire Zone: 2-4A

Essential Raceway:

C2P 006

C2K 006

E2KJ 020

029

030

E2PJ 064

065

F2P 023

F2K 423

424

425

426

427

Two Bus Ducts from Fire Zone 2-4C to Fire Zone 2-5F.

Fire Zone: 2-4B

Essential Raceway:

C2K 006

E2P 117

119

E2M 025

Fire Zone: 2-5A

Essential Raceway:

A1K	010	E1K	669
A2P	008	E2P	082
	009	E2KJ	03
	016		10
	020		11
	030		64
C1KD	071		86
	145	E2KQ	12
C1K	017	E2KK	043
C2P	006		044
	011	E2PK	043
	022		044

CONFIDENTIAL

Fire Zone: 2-6A

Essential Raceway:

A2P 016

SUSQUEHANNA STEAM ELECTRIC STATION

UNITS 1 & 2

FIRE PROTECTION REVIEW REPORT

BY

PENNSYLVANIA POWER & LIGHT COMPANY

AND

BECHTEL POWER CORPORATION

JANUARY, 1978

REVISED MARCH, 1981

Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, Pennsylvania 18101

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
FIRE PROTECTION REVIEW REPORT

CONTENTS

1.0 - FIRE PROTECTION REVIEW REPORT INTRODUCTION

On September 30, 1976, the Director of the Division of Project Management, of the Office of Nuclear Reactor Regulation, requested a re-evaluation on the fire protection program for the Susquehanna Steam Electric Station. Attached to the document was Appendix A to the Branch Technical Position APCSB 9.5-1 "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976". The following report was prepared in response to that request and discusses the fire protection program as it relates to nuclear safety and our compliance with Appendix A to Branch Technical Position APCSB 9.5-1.

It is Pennsylvania Power & Light's (PP&L) philosophy that fire protection be provided for all Company facilities to minimize the effects of a fire, therefore proper fire protection was an original design objective for Susquehanna Steam Electric Station. In addition to the fire protection items which would insure a reliable and safe facility, the fire protection program includes the necessary items to prevent damage to safety related equipment which are vital to safe operation and safe shutdown of the plant. It is the portion of the fire protection program at Susquehanna Steam Electric Station, to which this report is primarily addressed.

The fire protection program has the support of the management of PP&L. Responsibility for the fire protection program is vested in PP&L managerial personnel in the same manner as other operating and design responsibilities.

To support these responsibilities, PP&L employs qualified fire protection personnel to ensure an adequate fire protection program is provided.

Bechtel Power Corporation provided the fire protection engineers and consultants to develop the design concept, preparation of specifications, and selection of experienced fire protection contractors. Bechtel has designed the fire protection system for several operating nuclear plants and has a specialized staff that constantly monitors the latest in fire protection methods.

This report addresses the overall fire protection program at SSES, and specifically, that portion of the program formulated to insure that safe shutdown can be accomplished. Section 2 provides a general description of the fire protection features of SSES. Section 3 contains a point-by-point comparison of the SSES design with the requirements set forth in Appendix A to the Branch Technical Position APSCB 9.5-1. Section 4 evaluates the effects of fires in areas containing safety related equipment.

A listing of proposed modifications has not been provided. This is not to imply that modifications in the Fire Protection Program have not been made, as a result of Appendix A to the Branch Technical Position APSCB 9.5-1, but rather, design modifications are being made and implemented in the normal course of the design and construction program.

2.0 FIRE PROTECTION SYSTEM DESCRIPTION

This section provides an integrated description of the fire protection suppression and fire detection systems which can be used in conjunction with specific discussions in other sections. The specific guidelines contained in Appendix A of the Branch Technical Position APCSB 9.5-1 are addressed in Sections 3.

Figures 5-1 through 5-3 are legend sheets needed for interpretation of the remaining figures. Piping and instrumentation diagrams for the fire protection systems are schematically shown on Figures 5-4, 5-5, 5-6, and 5-7. Fire suppression and detection coverage for specific plant areas is shown on the fire protection drawings, Figures 5-8 through 5-20 and is summarized in Table 6.1. Figure 5-21 is the schematic diagram of the plant fire detection system.

Components for the fire suppression and detection systems contained within safety related areas, which would cause damage to the safety related equipment, are supported in accordance with Seismic Category I requirements.

2.1 FIRE PROTECTION WATER SUPPLY SYSTEMS

The fire protection water supply systems are shown schematically on Figures 5-4, 5-5, and 5-6. The plant's two automatic fire pumps have three suction sources: the two cooling tower basins each containing six million gallons of water and the clarified water storage tank from which 300,000 gallons of the 500,000 gallon capacity are available. The clarified water storage tank is provided with an alarm at the 300,000 gallon level and administrative controls assure that this level is maintained.

The 300,000 gallons of water in the clarified water storage tank and the contents of one of the cooling tower basins is available for fire protection use. The other cooling tower basin is provided with a normally closed valve on the fire pump suction supply.

The fire protection water supply system has two horizontal centrifugal type fire pumps, each rated for 2500 gpm at 125 psig (net head). Both pumps are located in the circulating water pump house. One pump is motor driven and one is diesel engine driven with a day tank containing enough diesel oil (550 gal) for 8 hr of operation in accordance with NFPA 20.

A jockey pump maintains a system pressure of 105 to 125 psig to prevent frequent operation of the main fire pumps. Should the fire main pressure fall to 95 psig, the motor driven pump would start automatically. Should the fire main pressure fall to 85 psig, the diesel driven pump would start automatically. Both pumps continue running until shut off manually.

The largest single demand can be satisfied by one fire pump. With a loss of both offsite power supplies, the electric fire pump cannot operate. The diesel fire pump can be started either from the diesel pump controller or in the control room using the diesel fire pump batteries as a power source; no a.c. power is required for the diesel pump starting.

The sectional and control valves of both fire pumps and the manual valve in the fuel supply line for the diesel fire pump will be electrically supervised with alarm annunciation in the control room or be locked open and administratively controlled.

Either one or both pumps can be started manually from the fire control panel in the main control room or locally at the circulating water pump house, in which both pumps are located.

The electric power for the electric motor driven fire pump is taken from a load center that is supplied by two power sources. If the primary power source fails, the power will automatically be transferred to the secondary power source.

Alarms including "pump running", "power failure", and "failure to start" are provided and arranged to annunciate in the control room and at the local fire pump panels for monitoring the pumps. For test purposes, a flowmeter has been installed on a test manifold in the pump discharge piping, which indicates flow locally.

A 12-in. diameter cement-lined, ductile-iron yard loop encircling the plant is buried in the ground below the frost level, and is made of piping which conforms to the requirements of NFPA 24.

A secondary loop surrounds the construction buildings. Post indicator valves, which are electrically supervised, have been provided for Sectional Control. A total of 29 yard hydrants are provided along the yard main at intervals not exceeding 250 ft. Each 6 in. lateral connecting to the hydrant is controlled by a post indicator valve. Fire fighting equipment such as fire hose, nozzels, adaptors, wrenches, etc. are being provided for each fire hydrant in accordance with the requirements of NFPA 24.

The diesel driven fire pump is enclosed within a 3 hr. fire rated enclosure.

2.2 AUTOMATIC WET PIPE SPRINKLER SYSTEMS

Wet pipe sprinkler systems are selected to provide primary suppression capability for various areas shown on Figures 5-8 through 5-20 and listed in Table 6-1.

Wet pipe sprinkler systems are designed in accordance with NFPA 13. Each sprinkler system consists of an alarm valve assembly, an alarm device, piping, and fusible element sprinkler heads.

Wet pipe sprinkler systems operate when ambient temperature rises to the melting point of fusible links on sealed sprinkler heads, thus permitting the heads to open. Flow of water through alarm check valves actuate a pressure switch and registers an alarm condition on an audible-visual annunciator on the fire protection control panel in the control room. Once initiated, wet pipe sprinkler operation is terminated manually by shutting the outside screw and yoke (OS&Y) gate valves. The systems are restored to a "ready" condition by replacing the sprinkler heads that operated and reopening the OS&Y valves.

2.3 DRY PIPE SPRINKLER SYSTEMS

Dry pipe sprinkler systems are selected to provide primary suppression capability for various areas shown on Figures 5-8 through 5-20 and listed in Table 6-1. Dry pipe sprinkler systems are designed in accordance with NFPA 13. The dry pipe sprinkler systems are selected for areas where low temperatures may occur, thus avoiding freezing of sprinkler piping.

Dry pipe sprinkler systems use automatic sprinkler heads attached to a piping system that contains air under pressure. The system operation is initiated by the melting of fusible links, which allows a sprinkler head to open and release the air. Loss of air pressure permits the water pressure to open the dry pipe valve. Activation of the system operates a pressure switch and registers in alarm condition on an audible-visual annunciator on the fire protection control panel in the control room. After operation, the dry pipe sprinkler system is reset by manually closing the OS&Y gate valve, draining the system, replacing all sprinkler heads that operated, resetting dry pipe valve, and repressurizing the pipe with air, before reopening the OS&Y valve.

2.4 AUTOMATIC PREACTION SPRINKLER SYSTEMS

Automatic preaction sprinkler systems are selected to provide primary fire suppression capability for various plant areas shown on Figures 5-8 through 5-20 and listed in Table 6-1.

Dry pipe preaction sprinkler systems are provided in all safety related mechanical equipment rooms in order to reduce the risk of possibly flooding the area in the event of a pipe failure.

Preaction sprinkler system operation is initiated by sensors which detect a rapid temparature rise or a fixed temperature. The sensor in turn releases a tripping device to open the deluge valve, permitting water to flow into the sprinkler piping system. When the fusible links holding the sprinkler heads close melts, water will discharge from the sprinkler head. A pressure switch will sense water flow and register an alarm condition on an audible-visual annunciator on the fire protection control panel in the control room. After operation, the pre-action sprinkler system is reset by closing the OS&Y gate valve, draining the system, replacing all sprinkler heads that operated, resetting the preaction valve, and repressurizing the pipe with air, before reopening the OS&Y valve.

2.5 DELUGE SYSTEMS

Deluge systems provide fire suppression capability for various areas shown on Figure 5-8 through 5-20 and listed in Table 6-1.

Deluge systems are automatic open-head water spray systems using heat detectors to open the deluge valve. The individual systems may be manually activated either locally or from the control room.

The heat detectors, which control the deluge valves, will open when temperatures in the protected area rise at an abnormally high rate or reach a fixed temperature. Heat detector actuation is indicated on a local panel and annunciated on the control room panel. Deluge systems are reset by closing the OS&Y gate valve, draining the system, resetting the deluge valve and reopening the OS&Y valve.

2.6 WET STANDPIPES AND HOSE STATIONS

Hose stations are strategically located throughout the plant in accordance with NFPA 14. Each hose station contains 100 ft. of 1-1/2 in. woven jacket-lined fire hose. The minimum residual pressure at the highest hose rack in the plant is 65 psig with 100 gpm flowing. Fog nozzles of the type listed by UL for electrical fires are provided at locations where there is electrical equipment or cabling.

With the exception of fire nozzles zone 0-8A, where straight stream nozzles are used, adjustable spray nozzles are provided.

2.7 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers are selected to provide either primary or backup fire suppression capability depending on the particular area. They are located throughout the plant and provide coverage as indicated in Table 6-1.

The exact number, type, and location of each extinguisher will be determined in accordance with the guidelines of NFPA 10.

Portable water type fire extinguishers will be located adjacent to the control room for use by the plant fire brigade. The location of these extinguishers outside the control room decreases the probability that a non-electrically safe extinguishing agent will be used on electrical equipment by untrained personnel.

Provision is made for portable fire extinguishers to be carried into the containment during refueling and major maintenance operations. The fire extinguishers are to be removed from the containment and stored in a controlled area after each maintenance entry.

2.8 CARBON DIOXIDE SYSTEMS

Low pressure carbon dioxide (CO_2) systems provide primary fire suppression capability in the electrical equipment rooms as shown on Figures 5-8 through 5-20 and listed in Table 6-1.

The low pressure carbon dioxide systems are designed in accordance with NFPA 12, "Carbon Dioxide Extinguishing Systems". The design quantity of the agent is based on 50 percent concentration in the hazard area. The storage tank can supply double shot fire protection to the largest hazard plus four shots for generator purging.

The two types of CO_2 systems in use are automatic total flooding and manual spurt.

The automatic total flooding systems is actuated by heat detectors. A predischarge alarm sounds locally and in the control room. HVAC system penetrations into the area are sealed off by CO_2 operated fire dampers. Automatic CO_2 operated doors close off the hazard area. An independent smoke detection system is provided using ionization detectors that provide an early warning alarm in the control room.

Manual spurt systems are provided to protect cables in concealed spaces on the control room level.

Ionization detectors in the hazard areas actuate the audible and visual alarm on the main fire protection control panel.

Since it is desirable for the operators to remain in the control room, the manual spurt system allows the operators to control the release of CO_2 in the vicinity of the control room. Once the operator activates the manual spurt system, a discharge alarm is sounded in the control room.

2.9 HALON EXTINGUISHING SYSTEMS

Power Generation Control Complex (PGCC) modules are provided with self-contained Halon 1301 fire extinguishing systems. Each system includes a pressurized cylinder containing liquefied Halon 1301 at ambient temperature, product-of-combustion detectors (ionization), thermal detectors, spray nozzles, control panel, and manual pull station. Each PGCC module cable way is sealed at point of connection. Product-of-combustion or thermal detectors activate automatic discharge of Halon to the panel and floor section to produce a 20% concentration by volume for a 20 minute duration. Each system alarms locally and in the control room upon activation. The Halon 1301 system is designed in accordance with NFPA 12A.

General room flooding Halon 1301 fire extinguishing systems are provided in areas as shown on Figures 5-8 through 5-20 and listed in Table 6-1. The systems are designed in accordance with NFPA 12A. Products-of-combustion or thermal detectors activate the automatic discharge of Halon to produce a 5% concentration (by volume). Each system alarms locally and in the control room upon activation.

2.10 FIRE DETECTION SYSTEM

The fire and smoke detection system is in compliance with NFPA 72A, with the additional provision of uninterruptible power supply.

The system complies with the requirements of NFPA 72D for a Class B system, except that operation and supervision of the system is not the primary function of the operators.

There are provisions for recording the date and time of a fire alarm. The recording will define the area by unit (Unit 1, Unit 2 or common). The operator on duty will then be responsible for entering further information into the log book.

Fire and smoke monitoring, detection, and alarm are accomplished by installing product-of-combustion (ionization) detectors (CD), smoke detectors (photoelectric) (SD), flame detectors (FD), and thermal or heat-responsive detectors (TD) in areas where fire potential exists. Fire and smoke detection systems for alarm are separate from fire and smoke detection systems for actuation of fire extinguishing systems.

There are several types of fire and smoke detectors to detect different stages of fire. The CDs annunciate at the presence of product of combustion during the incipient stage of fire. CDs are not installed in areas where the radiation level is in excess of 7.5 mrem/hr. Smoke detectors respond directly to visible smoke concentration of not less than 0.6 percent/ft of light obscuration caused by smoke for at least 5 sec. Flame detectors respond directly to the infrared radiation emanating from a flickering flame sustained for at least 3 sec. Thermal detectors react to the presence of a high fixed temperature or a rapid rise in ambient temperature (in excess of 15°F/min).

The fire and smoke detection system is electrically supervised to detect circuit breaks, ground faults, and power failure. All fire or trouble alarms register on the audible-visual annunciator on the fire control panel in the control room. (See table 6-1 for additional information on areas provided with detection)

2.11 MINORITY DIVISION ESSENTIAL CABLE PROTECTION

Minority division raceway is obtained from a list of systems required for safe plant shutdown (refer to Section 4.2). The essential raceway is identified by division for each fire zone. Then the following fire protection criteria is applied:

Whenever redundant, essential safe shutdown raceways are located in separate fire zones, no further fire protection is required. When such raceways are located within the same fire zone, one or more of the following criteria is applied:

(a) Fire/smoke detection is provided in all fire zones containing redundant safe shutdown raceways.

(b) If redundant essential safe shutdown raceways are separated by a horizontal distance of at least 50 feet, no further protection is provided.

(c) If redundant essential safe shutdown raceways are separated by a horizontal distance of less than 50 feet, fixed automatic fire suppression shall be provided to protect an area at least 50 feet horizontally on either side of the essential minority raceway.

(d) If redundant essential safe shutdown raceways are separated by less than 50 feet and not protected by fixed automatic fire suppression, the raceways of one division will be enclosed in a fire barrier having a 1-hour fire rating for a projected horizontal distance of 50 feet. (Either side of the essential minority raceway).

(e) If redundant essential safe shutdown raceways are separated by less than 20 feet and protected by fixed automatic fire suppression, the raceways of one division will be enclosed in a fire barrier having a 1-hour fire rating for a projected horizontal distance of 20 feet. (Either side of the essential minority raceway).

(f) Specific technical justification may be developed for special cases not covered.

3.0 INTRODUCTION

The purpose of this section is to compare the fire protection provisions of Susquehanna Steam Electric Station (SSES) Units 1 and 2 with the guidelines in Appendix A of the NRC's Branch Technical Position APCSB 9.5-1.

To identify areas of impact and to facilitate comparison, a matrix addressed to Appendix A and relating to the plant systems, equipment and components, is included. The matrix compares the plant to Appendix A and is keyed in the following manner:

C - indicates compliance to Appendix A. Substantiating statements may or may not be referenced in either the matrix or Section 3.2

AC - indicates compliance to Appendix A by alternative means of methods or compliance to its intent. The manner of compliance is discussed in Section 3.2

NC - indicates that the plant is not in compliance. The bases for noncompliance to Appendix A are discussed in Section 3.2.

NA - indicates that Appendix A is not applicable to SSES Units 1 and 2. Substantiating statements may or may not be included in either the matrix or Section 3.2.

The matrix has extracted all suggested guidelines from Appendix A and given each an item number 1 through 261. Each item has condensed a particular intent and references it to Appendix A by page and paragraph. The item is given a status (C, AC, NC or NA) to indicate the plants response according to the definitions described above.

Under the remarks column, reference to other sections may be given to explain or expand the intent or method. The majority of these sections are referenced to 3.2, but references to Sections 2.0, 4.0, 5.0 and 6.0 may also be included. In most cases no explanation is given when the plant is in compliance.

SECTION 3.1

SUSQUEHANNA STEAM ELECTRIC STATION FIRE PROTECTION SYSTEM

As Compared for Compliance to
Branch Technical Position APCSB 9.5.1, Appendix A

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Overall Requirements of Nuclear Plant Fire Protection Program				
1.	Designated person assigned management responsibility	1	A.I.	C	See Section 3.2
2.	Personnel qualification requirements	1	A.1.	C	See Section 3.2, Item 1
3.	Personnel Training - FSAR	1	A.1.	C	See Section 3.2, Item 1
4.	Task Responsibility - Staff	1	A.1.	C	See Section 3.2, Item 1

Comparison Key

C = Items of compliance
AC = Items of compliance by an alternate method or partial compliance
NC = Items of non-compliance
NA = Not applicable

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
5.	Fire protect. program based on eval. of potential fire hazards and effect of design basis fires on safety related system (SRS).	2	A.2.	C	See Section 4.0
6.	Backup fire suppression capability provided	2	A.3.	C	See Section 3.2
7.	Primary and backup fire sup pression capability satisfies single failure criterion	2	A.4.	C	See Section 3.2
8.	FPS - lightning strike effects considered	3	A.4.	C	
9.	FPS failure or inadvertent operation does not incapacitate SRS	3	A.5.	C	
10.	Pressurized fire suppres. systems (normal plant operation) conform to APCSB BTP 3-1	3	A.5.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
11.	Fire protection program for new fuel area operable before fuel received at site	3	A.6	C	See Section 3.2
12.	Fire protection program operable prior to initial fuel loading	4	A.7	C	See Section 3.2
13.	Multiple reactor unit sites fire protection program	4	A.8	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Administrative Procedures, Controls, and Fire Brigade				
14.	Provision of administrative procedures	4	B.1.	C	See Section 3.2
15.	Admin. measures for combustible material storage	5	B.2.	C	See Section 3.2
16.	Management control of normal, abnormal, modification work to assure adequate fire protection	5	B.3.	C	See Section 3.2
17.	Ignition sources - procedure review and approval, training and equipping, fire watch	5	B.3.a.	C	See Section 3.2
18.	Leak testing - aerosol techniques, no open flames or combustion generated smoke	6	B.3.b.	C	See Section 3.2
19.	Combustible material usage controlled and usage minimized in safety related areas	6	B.3.c.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
20.	Fire fighting - plant self sufficient, reliance on public fire dept. only for backup	6	B.4.	C	See Section 3.2
21.	Fire brigades - organization, training, and equipping	7	B.5.	C	See Section 3.2
22.	Testing and maintenance of fire protection program	7	B.5.a.	C	See Section 3.2, Item 21
23.	Training of fire brigade; drills quarterly and with local fire dept. at least annually	8	B.5.b.	C	See Section 3.2, Item 21
24.	Training of all shift members; coordin. with and training of local fire department personnel	8	B.6.c.	C	See Section 3.2, Item 21
25.	Standards for guidance NFPA 27, 194, 196, 197, 601, and other	9	B.5.d.	C	See Section 3.2, Item 21
	Quality Assurance Program				
26.	QA programs of applicants and contractors to assure proper control for the fire protection program for safety related areas; program under management control of the QA organization.	10	C.	AC	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	General Guidelines for Plant Protection				
	Building Design				
27.	Plant layout - isolation of SRS from unaccept. fire hazards	12	D.l.a.l.	C	See Sections 4.0 and 5.0
28.	Plant layout - separate redundant SRS on single fire hazard basis	12	D.l.a.2.	C	See Sections 4.0 and 5.0
29.	SRS and fire hazard identification	13	D.l.b.	C	See Sections 4.0 and 5.0
30.	Cable spreading rooms - not common to multiple reactor units	13	D.l.c.	C	See Sections 3.2 and 5.0
31.	CSR separated from other areas by 3 hour fire barriers	13	D.l.c.	C	See Section 3.2
32.	Redundant cabling in CSR should be separated by 3 hour barriers	13	D.l.c.	AC	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
33.	Interior wall and structural sound proofing, and radiation shielding materials - non-combustible	13	D.1.d.	C	
34.	Interior finishes - noncombustible or listed by testing laboratory for flame spread, smoke, and fuel contrib. of 25 or less in its use configuration (ASTM E-84 Test)	13	D.1.d.	C	See Section 3.2 item 34
35.	Metal deck roof construc. noncombustible or listed as Class I by Factory Mutual System Guide	13	D.1.e	C	Built-up roofing conforms to F.M. Class I
36.	Suspended ceilings and sup ports - noncombustible	14	D.1.f.	C	
37.	Concealed spaces - devoid of combustibles	14	D.1.f.	AC	See Section 3.2 Item 74
38.	High voltage - amperage transformers in buildings containing safety related systems should be dry type or insul. and cooled with noncombustible liquid	14	D.1.g.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Bldgs. contain, SRS protected from oil filled X-forms by:		D.l.h.		
39.	Locating transformers at least 50 ft away, or building walls within 50 ft. are without openings and have 3-hour fire ratings as minimum.	14	D.l.h.	AC	See Section 3.2
40.	Building walls within 50 ft are without openings and have 3 hr. fire rating as minimum.	14	D.l.h.	AC	See Section 3.2, Item 39
41.	Building containing safety related systems having openings in exterior walls closer than 50 ft to flammable oil filled transformer should be protected from the effects of a fire by closing of the opening to have fire resistance equal to 3 hours.	14	D.i.h.i.	AC	See Section 3.2, Item 39
42.	Constructing a three-hour fire barrier between the transformers and the wall opening	14	D.i.h.ii.	AC	See Section 3.2, Item 39
43.	Closing the opening and providing the capability to maintain a water curtain in case of a fire	15	D.i.h.iii.	AC	See Section 3.2, Item 39

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
44.	Floor drains - sized for expected fire fighting water flow, provided for fixed suppress. system	15	D.l.i.	C	
45.	Floor drains - also pro vided where needed to prevent SRS equip. from fire hose water damage	15	D.l.i.	C	
46.	SRS equip. mounted on pedestals where appro-priate, or curbs pro-vided to contain and direct water to floor drains (NFPA 92)	15	D.l.i.	C	
47.	Water drainage for potential radioactive areas - sampled and analyzed before dis-charge to environ.	15	D.l.i.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
48.	Floors, walls, ceilings, & penetrations in these barriers should have a minimum 3 hour rating for separating fire area isolation	15	D.1.j.	C	See Section 3.2
49.	Doors in barriers separating fire areas should be 3-hour rated.	15	D.1.j.	C	See Section 3.2
50:	Doors separating fire areas should be: normally closed and locked, or alarmed with alarm and annunc. in control room.	15	D.1.j.	C	See Section 3.2
51.	Ventilation system penet. in barrier's separating fire areas should be protected by a standard "fire door damper" (NFPA 80)	16	D.1.j.	C	
	Control of Combustibles				
52.	SRS separated from combustible materials where possible and when not, fire protection required to ensure operability of SRS equipment in event of fire	16	D.2.a.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
53.	Bulk gas storage (compressed or cryogenic) prohibited inside buildings housing SRS equipment	16	D.2.b.	C	
54.	Flammable gas storage - locate outdoors or in separate detached buildings to remove danger to SRS from fire or explosion (NFPA 50A-H)	16	D.2.b.	C	
55.	Orientation of high pressure gas storage containers - long axis parallel to building wall	17	D.2.b.	C	
56.	Compressed gas usage inside buildings - control necessary (NFPA 6)	17	D.2.b.	C	
57.	Plastic material usage should be minimized	17	D.2.c.	C	See Section 3.2
58.	PVC and neoprene usage acceptable only when substitute noncombustible materials are not available	17	D.2.c.	AC	See Section 3.2, Item 57 and Tables 6-2 and 6-3
59.	Flammable liquid storage comply with NFPA 30	17	D.2.d.	C	
	Electrical Cable Construction, Cable Trays and Penetrations				
60.	Noncombustible cable tray construction	18	D.3.a.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
61.	Cable spreading rooms	18	D.3.b.	C	See Secton 3.2 item 31
62.	Automatic water sprinkler systems for cable trays outside CSR	18	D.3.c.	NC	See Section 3.2.
63.	Cables designed for wetting without electrical faulting	18	D.3.c.	C	
64.	Cable trays should have manual hose and portable extinguisher.	18	D.3.c.	C	
65.	Safety related equipment (SRE) in vicinity of cable trays must not be degraded operationally by wetting; protection from wetting to be provided as needed	18	D.3.c.	C	
66.	Cable and cable tray penetra tion of vertical and horizontal fire barriers sealed to equivalent of barrier rating	18	D.3.d.	C	See Section 3.2
67.	Cable tray penetration fire barriers designed to at least satisfy ASTM E-119	18	D.3.d.	C	See Section 3.2 item 66
68.	Fire breaks should be provided as deemed necessary by the fire hazzard analysis. Flame or fire retardant coatings allowed for grouped elect. cables as fire breaks	18	D.3.e.	C	See Section 3.2 item 66

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
69.	Cable construction - pass IEEE 383 flame test	19	D.3.f.	AC	See Section 3.2, Item 57
70.	Cable - to extent practical, use cable that does not emit corrosive gases when burning	19	D.3.g.	AC	See Section 3.2, Item 57
71.	Cable trays, raceways, trenches, used only for cables; no miscellaneous storage; piping for flammable or combustible liquids or gases not allowed in cable routing area.	19	D.3.h.	C	
72.	Areas with significant concentration of plastic insulated cables, (e.g., cable tunnels, culverts, spreading rooms) - provide manual smoke venting as required to facilitate manual fire fighting	19	D.3.i.	C	
73.	Cables in control room minimum necessary number; all cables entering should terminate in CR	19	D.3.j.	C	
74.	Cables installed in concealed floor and ceiling spaces should be protected with an automatic total flooding halon system	19	D.3.j.	AC	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Ventilation	20	D.4.		
75.	Smoke and corrosive gases should be automatically discharged 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.	20	D.4.a.	AC	See Section 3.2
76.	Ventilation systems exhausting smoke or corrosive gases - evaluated to assure single failure or inadvertent operation does not violate controlled areas of the plant design.	20	D.4.b.	C	See Section 3.2
77.	Power supply and controls for ventilation systems should be run outside the fire area served by the system	20	D.4.c.	NC	See Section 3.2
78.	Charcoal filters - fixed auto sprinkler protection	20	D.4.d	C	Designed in accordance with the recommendations of Regulatory Guide 1.52
79.	Air intakes for ventil. systems serving SRS should be remote from exhaust and smoke outlets of other fire areas	20	D.4.e	C	See Section 3.2
80.	Stairwells - designed to minimize smoke infiltration	21	D.4.f.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
81.	Staircases - serve as escape and access routes for fire fighting; fire exit routes marked	21	D.4.f	C	
82.	Where stairwells and elevators not enclosed in three-hour barriers, escape and access routes should be established.	21	D.4.f.	C	Exit stairways enclosed in 2-hour shafts
83.	Elevators should not be used during fire emergencies.	21	D.4.f.	C	
84.	Smoke and heat vents - when used, install at a minimum ratio of 1 sq ft of venting area per 200 sq ft of flow area (for power venting 300 cfm equals 1 sq ft of gravity venting area). Refer to NFPA 204 for additional guidance on smoke control	21	D.4.g.	C	See Section 3.2
85.	Self-contain breathing apparatus, using full face positive press. masks provided for fire brigade, damage control and control room personnel.	21	D.4.h.	C	
86.	Service or operat. life of self-contain. units should be minimum of 1/2 hr.	22	D.4.h.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
87.	Two extra air bottles located onsite for each self-contain. breathing unit.	22	D.4.h.	C	
88.	Reserve 6-hour supply provided for quick, full replenishment of exhausted supply air bottles	22	D.4.h	C	
89.	Only approved compressors for supply of breathing quality air to be used and located in dust and contaminant free areas	22	D.4.h	C	
90.	Total flooding gas exting. systems - area intake and exhaust ventilation dampers to close upon initiation of gas flow (See NFPA 12, Carbon Dioxide Systems, and 12A, "Halon 1301 Systems."	22	D.4.i	C	See Section 3.2
	Lighting and Communication				
91.	Fixed emergency lighting sealed beam with individual 8-hour minimum battery power supply	22	D.5.a	C	See Section 3.2
92.	Portable hand lights for emergency use - sealed beam battery powered	23	D.5.b	C	
93.	Fixed emergency communication - voice powered head sets at stations	23	D.5.c	NC	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
94.	Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage	23	D.5.d	C	See Section 3.2
	Fire Detection and Suppression				
	Fire Detection				
95.	Fire detection compliance with NFPA 72D	23	E.1.a.	AC	See Section 3.2
96.	Fire detection system - audible and visual alarm and annunciation in the control room	25	E.1.b	C	See Section 3.2, Item 95
97.	Local audible alarms at fire location	23	E.1.b.	NC	See Section 3.2, Item 95
98.	Fire alarms - distinctive and unique	23	E.1.c.	C	See Section 3.2, Item 95
99.	Fire detection and actuation systems to be connected to plant emergency power supply	23	E.1.d	AC	See Section 3.2, Item 95
	Fire Protection Water Supply Systems				
100.	Underground yard fire main loop - NFPA 24	23	E.2.a.	C	
101.	Lined steel or cast iron pipe used to reduce tuberculation	24	E.2.a.	C	
102.	Treating and flushing of fire main possible	24	E.2.a	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
103.	Approved visually indicating sectional control valves provided for isolation of fire main portions during maintenance or repair without shutting off the entire system	24	E.2.a.	C	Post indicator valves provide sectionalized control and isolation to portions of the fire main loop. See Figures 5-4, 5-5 & 5-6.
104.	Fire main system piping separate from service or domestic water system piping	24	E.2.a.	C	
105.	Multi-unit nuclear power plant fire water supply system	24	E.2.b.	C	See Section 3.2
106.	Redundant 100% capacity fire pumps	25	E.2.c.	C	Two 2500 GPM, 125 PSI fire pumps are provided.
107.	Independent water supply for each fire pump	25	E.2.c.	C	See Section 3.2
108.	Fire pump connections to the yard fire main should be widely separated	25	E.2.c.	AC	See Section 3.2
109.	Independent driver, power, and control for each fire pump	25	E.2.c.	C	
110.	One fire pump should be driven by non-elect. means, preferably diesel	25	E.2.c.	C	
111.	Fire pumps and drivers - 3 hour fire barrier separation	25	E.2.c.	C	See Section 3.2

No.	Branch Technical Position Guidelines	Branch Technical Position		Comparison	Remarks
112.	Fire pump alarms in control room - pump running, driver availability, failure to start	25	E.2.c.	C	
113.	Fire pump installation - should conform to NFPA 20 as minimum	25	E.2.c.	C	See Section 3.2
114.	Two separate water supplies	25	E.2.d.	C	
115.	If tanks used, two 100% capacity tanks required - interconnection required	25	E.2.d.	C	
116.	Fire water supply - based on largest expected flow rate during 2 hr. period (300,000 gallon minimum)	26	E.2.e.	C	
117.	Single source of fire water lakes, fresh water ponds of sufficient size; two intakes to the fire pumps required	26	E.2.f.	NA	
118.	If common water supply for fire protection and ultimate heat sink, then fire water require. are included in total capacity, and failure of FPS does not impact ultimate heat sink.	27	E.2.f.	NA	
119.	Outside manual hose stations able to reach any location (approx. every 250 ft. on yard main)	27	E.2.g	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
120.	Yard main laterals to hydrants should be controlled by a visually indicating or key operated (curb) valve	27	E.2.g.	C	
121.	Hose houses - equipped as recom mended in NFPA 24, should be provided as needed, but at least every 1000 ft.	27	E.2.g.	C	
122.	Threads on hydrants, hose couplings and standpipe risers compatible with local fire department	27	E.2.g.	C	See Section 3.2
	<u>Water Sprinkler and Hose Standpipe Systems</u>				
123.	Each automatic sprinkler and manual hose station standpipe should have independent connection to yard main	27	E.3.a.	AC	See Section 3.2
124.	Headers fed from each end are permitted inside buildings to supply multiple sprinkler and standpipe systems. The header arrangement should be such that no single failure can impair both the primary and backup fire protection systems.	27	E.3.a.	NA	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
125.	Each sprinkler and standpipe system - equipped with OS&Y (outside screw and yoke) gate valve, or other approved shutoff valve, and water flow alarm	28	E.3.a.	C	
126.	Safety related equipment (SRE) should be protected from sprinkler discharge if such could damage - water shields or baffles may be used.	28	E.3.a.	AC	See Section 3.2
127.	Fire protection water system valves - all should be electrically supervised with signal in control room and other locations as appropriate. 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	28	E.3.b.	C	All major fire protection control valves, with the exception of the post indicator valves controlling fire hydrants, are provided with electrical supervision.
128.	Auto sprinkler systems - conform to appropriate NFPA standards as minimum	28	E.3.c	C	
129.	Interior manual hose stations able to reach any location effectively	28	E.3.d.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
130.	Standpipes with hose connections shall be equipped with a maximum of 75 ft of 1-1/2 inch hose	29	E.3.d.	AC	See Section 3.2
131.	Suitable nozzles shall be provided for all hoses	29	E.3.d.	C	
132.	Standpipes with hose connection should be located on all floors of all buildings, including containment	29	E.3.d.	NC	See Section 3.2
133.	Standpipes with hose connections should be spaced at not more than 100 ft. intervals	29	E.3.d.	NC	See Section 3.2
134.	Multiple hose connections individual standpipe at least 4 inch diameter	29	E.3.d.	C	
135.	Single hose connections standpipe diameter of 2-1/2 inches	29	E.3.d.	C	
136.	Standpipe and hose systems should follow requirements of NFPA 14	29	E.3.d.	C	
137.	Normally unoccupied areas hose stations outside entrance	29	E.3.d.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
138.	Normally occupied areas - hose stations inside	29	E.3.d.	C	See Section 3.2
139.	Standpipes serving hose stations in SRE areas should have shutoff valves and pressure reducing devices (if applicable) outside the area	29	E.3.d.	C	
140.	Hose nozzle selection determined by fire hazard analysis, electr. safe nozzle in vicinity of elect. hazards.	30	E.3.e.	C	
141.	Foam fire suppression	30	E.3.f.	NA	
	Halon Suppression Systems				
142.	Use of halogenated fire extinguishing agents should as a minimum, comply with NFPA 12A or 12B	31	E.4.	C	
143.	Quarterly preventive maintenance and testing of the system	31	E.4.	C	
144.	Particular attention to: minimum required Halon concentration; soak time; toxicity; and the toxic and corrosive effects of decomposition products of Halon	31	E.4.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Carbon Dioxide Suppression Systems	31	E.5.	C	
145.	Use of carbon dioxide extinguishing systems should as a minimum comply with NFPA 12.	31	E.5.	C	
146.	Particular consideration of minimum concentration and soak time; toxicity; secondary thermal shock; of-setting requirements for venting and over pressurization versus sealing; design for over pressurization and CO_2 system being out-of-service.	31	E.5.	C	
	Portable Extinguishers				
147.	Fire extinguisher provided in accordance with NFPA 10	32	E.6.	C	See Section 3.2
148.	Dry chemical extinguisher installed with due consideration of cleanup and possible adverse effects on equipment in area	32	E.6.	C	See Section 3.2, Item 147
	Guidelines for Specific Plant Areas				
	Primary and Secondary Containment				
	Normal Operation				
149.	Identify fire hazards	32	F.1.a.	C	See Sections 5.0 and 6.0

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
150.	Automatic sprinklers recommended for identified hazards; for example, lubricating oil for primary coolant pumps, cable trays and penetrations, and charcoal filters; auto fire suppression not needed if atmosphere is normally inerted	32	F.1.a.	C	See Sections 4.0, 5.0 and 6.0
151.	FPS operation should not compromise other criteria or systems	33	F.1.a.	C	
152.	Fire detection systems should alarm and annunciate in the control room	33	F.1.a.	C	
153.	Backup fire detection system provided as smoke detection in ventilation recirculation system ahead of filters in primary containment general area	33	F.1.a.	NA	
	Refueling and Maintenance				
154.	Management controls over transient combustibles and ignition sources required	34	F.1.b.	C	
155.	Manual fire suppression required throughout containment - standpipes with hose stations, or equivalent protection from portable extinguishers, if it is impractical to install standpipes with hose stations.	34	F.1.b.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
156.	Independent self-contained breathing apparatus required near containment entrances	34	F.1.b.	C	
	Control Room				
157.	3 hour fire barrier separa - tion from other plant areas	35	F.2.	C	See Section 3.2
158.	Manual fire suppression capability provided for CR cabinet and console fires	35	F.2.	C	See Section 3.2, item 138
159.	Hose stations and portable extinguisher, to be located in CR providing CO2 portable extinguisher	35	F.2.	C	See Section 3.2
160.	Hose piping shutoff and pres- sure reducing valves located outside CR	35	F.2.	C	Pressure Reducing devices are provided where needed
161.	Nozzles for hoses shall be appropriate for hazards and equipment	35	F.2.	C	See Section 3.2 item 140
162.	Fire detection by smoke and heat detectors for each fire area in CR	36	F.2.	C	
163.	Fire detection alarm and annunc. to be in CR	36	F.2.	C	
164.	Breathing apparatus readily available for CR personnel	36	F.2.	C	
165.	Penetration seals - airtight	36	F.2.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
166.	CR ventilation - intake to have smoke detection to automatically alarm locally and isolate CR ventilation system to prevent smoke infiltration	36	F.2.	C	See Section 3.2
167.	CR ventilation - manual venting capability	36	F.2.	C	See Section 3.2, item 166
168.	Cables should not be located in concealed floor and ceiling spaces. If such concealed spaces are used, however, they should have fixed automatic total flooding halon protection.	36	F.2.	AC	See Section 3.2
169.	Cables that enter CR shall terminate in CR	36	F.2.	C	
	<u>Cable Spreading Room</u>				
170.	Primary fire suppression to be automatic water system: closed head sprinkler; open head deluge, or open direct, spray	37	F.3.a.1.	C	See Section 5.0
171.	If deluge or open spray systems used, provision for remote manual operation required as well as provision to preclude inadvertent operation	37	F.3.a.1.	NA	
172.	Sprinkler head or spray nozzle locations should assure adequate water coverage	37	F.3.a.1.	C	

No.	Branch Technical Position Guideline	Branch Technical Position		Comparison	Remarks
173.	Cables designed to allow wetting without faulting	37	F.3.a.1.	C	
174.	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.	37	F.3.a.1.	NA	
175.	Foam suppression acceptable if delivered by a sprinkler or deluge system	37	F.3.2.1	NA	
176.	Manual hoses and portable extinguishers should be provided as backup.	37	F.3.a.2	C	
177.	Each cable spreading room of each unit should have divisional cable separation and be separated from the rest of the plant by a minimum three-hour rated fire wall.	38	F.3.1.3.	AC	See Section 4.5.10, 4.5.13, 4.5.19, 4.5.23, 4.5.44 4.5.45, 4.5.46, and 4.5.48
178.	At least two remote and separate entrances are provided to the room for access by fire brigade personnel.	38	F.3.a.4	C	
179.	Aisle separation provided between tray stacks should be at least 3 ft. wide and 8 ft. high.	38	F.3.a.5	NC	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
180.	For CSR that do not provide divisional cable separation of 3 hr. fire wall, separation should met guidelines of Reg. Guide 1.75	38	F.3.6.1	C	
181.	All cabling should be covered with suitable fire retardant coating	38	F.3.b.2	NA	
182.	As an alternate, automatically initiated gas systems (Halon or CO2) may be used for primary suppression, provided a fixed water system is used as a backup	38	F.3.b.3	NA	
183.	Auxiliary shutdown system with all cabling independent of the cable spreading room should be provided if the above could not be met.	39	F.3.b.4	C	See Section 3.2
184.	Cables - pass IEEE 383 as a minimum	38	F.3.a.1	AC	See Section 3.2 item 57
185.	Drains - provided with adequate seal if gas exting. systems used	38	F.3.a.1	N/A	
186.	Redundant safety related cable divisions separated by 3 hour fire rated walls	38	F.3.	C	See Section 3.2 item 32
187.	Multiple reactor units CSR not shared	38	F.3.2.1	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
188.	CSR - 3 hr fire barrier separation (NFPA 251 and ASTM E-119)	39	F.3.a.1	C	See Section 3.2 item 32
189.	For gas exting. systems ventil. system must isolate CSR	39	F.3.a.1	NA	
190.	Smoke venting - automatic control by fire detect. and/ or suppress. systems as appropriate	39	F.3.a.1	AC	See Section 3.2
191.	Smoke venting - remote manual control also should be provided	39	F.3.a.1	C	
	Plant Computer Room				
192.	Safety related computer room separation - 3 hour barrier minimum	39	F.4	C	The computers are not safety related, but a 3-hr barrier separates the computer room from the relay rooms.
193.	Fire detection - should be automatic with alarm and annunciation in control room, and local alarm	39	F.4.	C	See Section 3.2
194.	Standpipe and hose stations, and Halon 1301 portable exting. provided as suppress. capability.	40	F.4.	C	Either portable CO_2 or portable halon 1211 extinguishers are provided.
	Switchgear Rooms				
195.	Switchgear room separation minimum 3 hour barrier to the extent practicable.	40	F.5.	C	See Section 3.2

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
196.	Automatic fire detection should alarm and annunciate in the control room and alarm locally.	40	F.5.	C	See Section 3.2 item 193. The detection systems are identical
197.	Fire hose and portable extinguishers should be readily available.	40	F.5.	C	
198.	Acceptable protection for cables that pass through the switchgear room is automatic water or gas agent suppression	40	F.5.	NA	All cables entering the switchgear room terminate here.
	Remote Safety Related Panels				
199.	Fire detection - automatic that alarms locally and alarms and annun. in control room	40	F.6	C	See Section 3.2 item 193. The detection systems are identical.
200.	Portable exting. and manual hose stations provided	40	F.6.	C	
201.	Combustible material control.	40	F.6.	C	
	Station Battery Rooms				
202.	Fire explosion protection (NFPA 69)	41	F.7.	C	
203.	Separation of battery rooms from each other and other plant areas by min. 3 hour barrier	41	F.7.	C	Except for unrated steel beams supporting reinforced concrete floors and ceilings.

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
204.	Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 vol. % hydrogen concentration.	41	F.7.	C	
205.	Standpipe and hose and portable extinguishers should be provided.	41	D.7.	C	
	Turbine Lubrication and Control Oil Storage and Use Areas				
206.	Blank fire wall (min. 3 hr. rating) should separate all SR system and equip. from turbine oil systems	41	F.8.	C	See Section 3.2
207.	When a blank wall is not present, open head deluge protection should be provided	41	F.8	C	
208.	Separation - diesel gen. from each other and other plant areas by min. 3 hour barriers	42	F.9.	C	See Section 3.2
209.	Automatic fire suppression AFFF (foam) or sprinklers required	42	F.9.	C	
210.	Fire detection - automatic to alarm locally and to alarm and annunc. in control room.	42	F.9.	C	See Section 3.2 item 193. The detection systems are identical.
211.	Drainage capability for fire water	42	F.9.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
212.	Ventilation - local manual smoke venting	42	F.9.	AC	See Section 3.2
213.	Day tanks (max. total capacity of 1100 gallons) permitted in diesel generator area if:	42	F.9.	C	See Section 3.2
213A.	Day tank located in separate 3 hr. rated enclosure capable of contain. entire tank capacity with ventilation provided.	42	F.9.a.	AC	See Section 3.2
213B.	Day tank enclosure protect. by automatic fire suppress. (foam or sprinklers)	42	F.9.b.	AC	See Section 3.2
214	When day tanks cannot be separated from the diesel-generator, automatic closed head sprinklers should be provided	42	F.9	C	
	<u>Diesel Fuel Oil Storage Areas</u>				
215.	Diesel fuel oil tanks greater than 1100 gallons capacity not permitted in buildings contain. SRE	42	F.10.	C	
216.	Diesel fuel oil tank location at least 50 ft. from any bldg. housing SRE/ or if within 50 ft. tanks housed in separate 3 hr. rated bldg. (Note: buried tanks meet 3 hr. separat. requirement see NFPA 30 for addit. guidance)	43	F.10.	C	

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No.	Branch Technical Position Guidance	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
217.	Diesel fuel oil tanks in separate bldg. should be provided with auto fire suppress.	43	F.10.	NA	
218.	Diesel fuel oil tanks should not be located directly above or below safety related systems or equip. regardless of fire rating separation	43	F.10.	C	
	Safety Related Pumps				
219.	Auto sprinklers required unless fire hazards analysis can demonstrate that a fire will not endanger other safety related equipment required for safe plant shutdown	44	F.11.	C	See Section 3.2
220.	Fire detection - early warning with alarm and annunc. locally and in the CR	44	F.11.	C	
221.	Local hose stations and portable exting. provided	44	F.11.	C	
222.	SRE - equip. pedestals, or curbs and drains provided	44	F.11.	C	
223.	Ventilation - manual smoke venting capability	44	F.11.	AC	See Section 3.2

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No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	New Fuel Area				
224.	Portable exting. within area	44	F.12.	C	
224A.	Hose stations outside area but within effective range	44	F.12.	C	
225.	Fire detection - automatic with alarm and annunc. in CR and local alarm	44	F.12.	AC	See Section 3.2
226.	Combustible material control	45	F.12.	C	
227.	Storage area drainage capability	45	F.12.	C	
228.	Storage configuration of new fuel - such that critically precluded for any water density that might occur during fire fighting	45	F.12	C	
	Spent Fuel Pool				
229.	Fire protect. - local hose stations and port. exting.	45	F.13.	C	
230.	Fire detect. - auto with alarm and annunc. in CR and local alarm	45	F.13.	C	See Section 3.2 item 193. The detection systems are identical

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Radwaste Building				
231.	Separation from other plant areas by min. 3 hr. barriers	45	F.14.	C	
232.	Auto sprinklers - required wherever combust. materials located	45	F.14.	AC	See Section 3.2
233.	Fire detection - auto with alarm and annunc. in CR and local alarm	45	F.14.	AC	See Section 3.2
234.	Ventilation - systems capable of being isolated during a fire	45	F.14.	C	
235.	Drainage - water should drain to liquid radwaste sumps	45	F.14.	C	
	Decontamination Areas				
236.	Automatic sprinklers required	46	F.15.	C	See Section 3.2
237.	Fire detection - automatic with alarm and annunc. in CR and local alarm	46	F.15.	AC	See Section 3.2, item 236
238.	Ventilation - isolation possible	46	F.15.	AC	See Section 3.2, item 236

No.	Branch Technical Positiion Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
239.	Hose stations and port. exting. provided locally	46	F.15.	C	
	Safety Related Water Tanks				
240.	Local hose stations and port. exting. provided	46	F.16.	NA	
241.	Portable exting. - located in hose houses	46	F.16.	NA	
242.	Control of combustibles - 50 ft. min. separation between outdoor tanks and combustibles where feasible	46	F.16.	NA	
	Cooling Towers				
243.	Non-combustible construct., or located so that a fire will not affect SRS	46	F.17.	C	
244.	If cooling tower basins used for fire water supply or ultimate heat sink, noncombust. construct. required	46	F.17.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Miscellaneous Areas				
245.	Misc. 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.	47	F.18.	C	
246.	Fuel oil tanks for auxiliary boilers should be buried, or provided with dikes to contain entire capacity.	47	F.18	NA	
	Special Protection Guidelines				
	Welding and Cutting Acetylene Oxygen Fuel Gas Systems				
247.	Storage locations - automatic sprinkler system provided	47	G.1.	C	
248.	Local hose stations and portable exting. provided as backup	47	G.1.	C	
249.	Requirements of NFPA 51 & 51B	47	G.1.	C	
250.	Permit system for usage	47	G.1.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Storage Areas for Dry Ion Exchange				
251.	Storage remote from essential SRS	47	G.2.	C	
252.	Automatic wet pipe sprinkler system for dry unused resins	47	G.2.	C	See Section 3.2
253.	Fire detection smoke and heat should alarm and annunc. in CR and alarm locally	47	G.2.	C	See Section 3.2 item 252
254.	Local hose stations and portable exting. provided	47	G.2.	C	
255.	Storage areas of dry resins should have curbs and drains (NFPA 92M)	47	G.2.	C	See Section 3.2 item 252
	Hazardous Chemicals				
256.	Hazardous chem. stored and protected as per NFPA 49	48	G.3.	C	
257.	Chemical storage areas ventilation required	48	G.3.	C	
258.	Chemical storage areas protection against flooding	48	G.3.	C	

No.	Branch Technical Position Guideline	Branch Technical Position Page	Branch Technical Position Item	Comparison	Remarks
	Materials Containing Radioactivity				
259.	Storage in closed metal tanks or containers located in areas devoid of ignition sources or combustibles (e.g. spent ion exchange resins, charcoal filters, HEPA filters)	48	G.4.	C	
260.	Protection from exposure to fires in adjacent areas	48	G.4	C	See Section 3.2
261.	Provisions for accommodating decay heat from entrained radioactive materials	48	G.4	C	See Section 3.2

3.2 EXPLANATORY NOTES

Item numbers in this section correspond to the item numbers in Section 3.1

ITEM 1 POSITION A.1 (P-1) (C)

Designated person assigned management responsibility.

SSES Policy

The fire protection program is the responsibility of the Senior Vice President-Nuclear. Responsibilities for design are delegated to the Manager-Nuclear Plant Engineering. The responsibilities for the operational phase of the fire protection program are delegated to the Superintendent of Plant-Susquehanna.

Within the organization, reporting to the Manager-Nuclear Plant Engineering is a qualified fire protection engineer who is involved with the design effort and will provide fire protection support for the operational phase.

Bechtel Power Corporation provided the qualified fire protection engineers and consultants to develop in the design concept, preparation of specifications, and selection of experienced fire protection contractors. Bechtel has designed the fire protection systems for several operating nuclear plants and has a specialized staff that constantly monitors the latest in fire protection methods.

ITEM 6 POSITION A.3 (P-2) (C)

Backup fire suppression capability provided.

SSES Design:

All automatic fire suppression systems have manual backup systems of either standpipe and hose reels and portable extinguishers.

ITEM 7 POSITION A.4 (P-2) (C)

Primary and backup fire suppression capability satisfies single failure criterion.

SSES Design:

The Fire Protection System has redundancy built into the system in that two separate pumps and power supply systems are provided, each capable of supplying the design flow rate at design pressure. By use of sectional control valves and cross connecting, damaged fire yard mains can be isolated. Separate supplies are provided for sprinkler and standpipe/hose reel stations.

ITEM 10 POSITION A.5 (P-3) (C)

Pressurized fire suppression systems (normal plant operation) conform to BTP APCSB 3-1.

SSES Design:

The wet standpipe systems and headers supplying automatic extinguishing systems are normally pressurized. Additionally, wet pipe sprinkler systems are pressurized in their entirety.

Safety related areas determined to require automatic fire suppression systems are provided with pre-action sprinkler or deluge systems. No unacceptable adverse effects result in the event of a pipe break since the system is dry. In the event normally pressurized fire suppression piping passes through safety related areas, piping and supports will be designed to comply with APCSB 3-1.

ITEM 11 POSITION A.6 (P-3) (C)

Fire protection program for new fuel area operable before fuel received at site.

SSES Policy:

The fire protection program for the new fuel area will be operable before fuel may be received at the site.

ITEM 12 POSITION A.7 (P-4) (C)

Fire protection program operable prior to initial fuel loading.

SSES-Policy:

The fire protection program will be operable prior to initial fuel loading.

ITEM 13 - POSITION A.8 (P-4) (C)

Multiple reactor unit sites fire protection program.

SSES-Policy:

The responsibility for Unit #1 and common fire protection services will be transferred to the Superintendent of Plant-Susquehanna at a date no later than fuel loading of Unit #1. At that time, the associated fire protection administrative procedures will be in effect for Unit #1. Responsibility for Unit #2 will remain with Bechtel until fuel loading of Unit #2.

ITEM 14 - POSITION B.1 (P-4) (C)

Provision of administrative procedures.

SSES-Policy:

The administrative and technical procedures concernig the Fire Protection Program will be written and included in the Susquehanna Plant Procedures. Suitable codes and standards of the National Fire Protection Association will be used as guidance.

ITEM 15 - POSITION B.2 (P-5) (C)

Administrative measures for combustible material storage.

SSES-Policy:

Procedures will be written to control the storage of combustible materials including prohibiting bulk storage of combustible materials in areas where they might endanger safety related equipment.

ITEM 16 - POSITION B.3 (P-5) (C)

Management control of normal, abnormal, modification work to assure adequate fire protection.

SSES Policy:

Procedures will be written to provide management with proper control over normal, abnormal and modification of fire protection items.

ITEM 17 - POSITION B.3.a (P-5) (C)

Ignition sources - procedure review and approval, training and equipping, fire watch.

SSES Policy:

Procedures will be written to provide proper control and precautions for work involving ignition sources such as welding, open flame, etc.

ITEM 18 - POSITION B.3.b (P-6) (C)

Leak testing - aerosol techniques, no open flames or combustion generated smoke.

SSES Policy:

Procedures will be written to prohibit the use of open flame or combustion smoke for leak testing. Work orders for leak testing shall require the concurrence of the shift engineer to verify that the leak test method is acceptable and will not present a potential ignition source.

ITEM 19 POSITION B.3.c (P-6) (C)

Combustible material usage controlled and usage minimized in safety related areas.

SSES Policy:

Procedures will be written to control and minimize combustible material usage in all areas of the facility including safety related areas.

ITEM 20 - POSITION B.4 (P-6) (C)

Fire fighting - plant self-sufficient, reliance on public fire department only for backup.

SSES Policy:

The public Fire Department will be considered in the prefire planning and will be involved in the training program. However, the fire protection plan will be designed for the plant to be self-sufficient. The public Fire Department will be relied upon for major equipment and additional manpower.

ITEM 21 - POSITION B.5 (P-7) (C)

Fire brigades - organization, training, and equipping.

SSES Policy:

Plant Procedures will detail the organization and procedures necessary to accomplish the self-sufficient fire fighting response. The training intervals and persons to be trained will all be set forth in the fire fighting section of the Fire Protection Manual. The organization and training will be provided to meet the goal of providing a self-sufficient emergency team.

The fire fighting program will utilize the appropriate National Fire Protection Association codes and standards as guidance.

ITEM 26 - POSITION C (P-10) (C)

QA programs of applicants and contractors to assure proper control for the fire protection program for safety related areas; program under management control of the QA organization.

Response:

A program was provided for the design and construction phases of the fire protection installation. The program was not under the control of the QA organization. The following is a description of that program.

1. Design Control and Procurement Document Control - Procedures were followed by both PP&L and Bechtel,

whereby appropriate existing NRC Safety guides and other regulatory documents including new revisions were included in design documents in accordance with Bechtel Division Engineering Standards. Plant procurement specifications are reviewed and controlled in accordance with the current procedures, design criteria, regulatory documents, codes and standards referenced in the specific design criteria.

2. Instructions, Procurements, and Drawings - Appropriate procurement and drawing procedures currently exist in Bechtel for the control of inspections, tests and instructions for the fire protection equipment and systems during the procurement and construction phases. Specific care will be taken to formulate adequate tests, equipment procurement and fire drill procedures to ensure maximum fire protection capability following Plant construction.

3. Control of Purchased Material, Equipment, and Services - Materials, services and equipment purchased are supplied and subcontracted by individuals who have demonstrated their ability to the industry to provide quality material, equipment and services. Bid evaluations were performed in accordance with Bechtel procedures. Surveillance inspections were performed on suppliers work (other than that performed by recognized national laboratories) in accordance with the inspection requirements of the particular equipment or material specification. Receiving inspections were performed in accordance with the Quality Control Instructions and normal warehouse procedures.

4. Inspection - Bechtel field personnel witness the protection installation and verify conformance with design drawings.

5. Test and Test Control - Not applicable to the design and construction phase.

6. Inspection, Test and Operation Status - Not applicable to the design and construction phase.

7. Nonconforming Items - Materials received by either Bechtel personnel or PP&L personnel, which do not comply with the purchase specifications and equipment found not operating satisfactorily during testing, will be segregated or identified as nonconforming items in acordance with Bechtel Quality Control Instructions, PP&L Warehouse procedures, or PP&L Testing Program Procedures.

8. Corrective Action - Conditions or equipment which would be adverse to fire protection are identified and a corrective course of action recommended to PP&L by Bechtel.

9. Records - Records in the form of design drawings, letters, comment, etc., are prepared and stored to furnish evidence that fire protection criteria have been met.

10. Audit - None

Following the turnover of the fire protection systems to PP&L, the PP&L QA program, under the control and supervision of the QA organization, will be in effect.

The Operation Quality Assurance Program concerning fire protection is discussed in FSAR Section 17.2.2.

ITEM 31 - POSITION D.1.c (P-13) (C)

CSR separated from other areas by 3 hour fire barriers.

SSES Design:

Cable spreading rooms are separated by 3-hour barriers with the exception of the upper cable spreading room floors. Beams supporting the upper cable spreading room floor slabs are not fire proofed. Due to the relatively low combustible loading in the control room, the temperature resulting from a fire would be below the deformation temperature (1,200°F).

ITEM 32 - POSITION D.1.c (P-13) (AC)

Redundant cabling in CSR should be separated by 3-hour barriers.

SSES Design:

Cable for redundant safety divisions are separated by locating one division in the Upper Cable Spreading Room and the other division in the Lower Cable Spreading Room. The "GE" furnished cables for the Reactor Protection System are installed in J.I.C. type wireway gutters and are installed in the raised floor at El. 729'-0" routed from the cable spreading and relay rooms.

ITEM 38 - POSITION D.1.g (P-14) (C)

High voltage-amperage transformers in buildings containing Safety Related Systems should be dry type or insulated and cooled with noncombustible liquid.

SSES Design:

Only dry type transformers are installed inside buildings containing safety related equipment. The largest indoor transformer located in any safety related area is rated 4, 160-480V, 750/1000KVA AA/FA. While for the rest of the plant, the largest indoor transformer is rated 13,200-480V, 1500/2000KVA AA/FA.

There are no oil filled transformers inside any building in the plant.

ITEM 39 - POSITION D.1.h (P-14) (AC)

Locating transformers at least 50 ft. away, or building walls within 50 ft. are without openeings and have 3-hour fire ratings as minimum.

SSES Design:

Engineered safeguard auxiliary transformers (non-safety related) OX-201 and OX-203 are located 30 feet from the wall on column line U of the Reactor Building. The wall is 36 inches thick poured concrete which has a fire resistance rating of more than three hours but there are two openings for the steam vents for the RHR pump rooms. The openings are protected by 12 inch thick, 15 feet high, poured concrete walls. The 12 inch thick walls have more than 3 hours fire resistance rating.

The transformers are protected with deluge systems.

ITEM 48 - POSITION D.1.j (P-15) (C)

Floors, walls, ceilings, and penetrations in these barriers should have a minimum 3-hour rating for separating fire area isolation.

Floor, walls and ceilings enclosing separate fire areas should have minimum three-hour fire rating. Penetrations in these fire barriers, including conduits and piping, should

be sealed or closed to provide fire resistance at least equal to that of the 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 noramlly closed and locked or alarmed with alarm and annunciation in the control room.

SSES Design:

The carpeting installed in areas containing safety-related equipment has been tested for fire safety with the following results:

ASTM-84 (Per Manufacturer's Data)	
Flame spread rating	20
Fuel contributed	20
Smoke density	10
UL 992 (Per Southwest Research Institute Project No. 03-04085-445b)	
Flame propagation index	1.09

These results indicate that the carpeting installed exceeds the requirements of BTP-ASB 9.5-1 Appendix A for flame spread ratings and also exceeds the NEDO 10466A commitment for a maximum flame propagation index of 2.00.

Procurement of additional or replacement carpeting for installation in areas housing safety-related equipment will be subject to quality assurance control to assure that the procured carpeting satisfies or exceeds the requirements of BTP-ASB 9.5-1 Appendix A and NEDO 10466A.

ITEM 49 - POSITION D.1.j (P-15) (C)

Doors in barriers separating fire areas should be 3-hour rated.

SSES Design:

Doors in 3-hour barriers as shown on the Fire Protection Drawings are 3-hour, U.L. labeled doors for Class A openings. Doors in 2-hour barriers providing vertical access separation of fire areas are 1-1/2 hour, U.L. labeled for Class B openings.

ITEM 50 - POSITION D.1.j (P-15) (C)

Doors separating fire areas should be locked, or alarmed with alarm and annunciation in the control room.

SSES Design

One of the following measures will be employed prior to fuel load to ensure fire doors will protect openings as required in case of fire:

1) Fire doors will be kept closed and electrically supervised at a continuously manned location; or

2) Fire doors will be locked closed; or

3) Fire doors will be provided with automatic hold-open and release mechanisms and inspected weekly to verify that doorways are free of obstructions; or

4) Fire doors will be kept closed and inspected weekly to verify that they are in the closed position.

ITEM 57 - POSITION D.2.c (P-17) (C)

Plastic material usage should be minimized.

SSES Design:

Plastic architectural materials are used only where no suitable substitute material is available. These materials include plastic laminate flooring on some access floor areas, vinyl asbestos tile and seamless vinyl flooring, vinyl wall base, laminated plastic countertops, vinyl edge trim on access floor panels and vinyl coated acoustic ceiling panels. Acrylic lenses are used in fluorescent lighting fixtures.

Local panel 1C040 for cleanup filter/demineralizer localed in Fire Zone 1-6A contains PVC insulated wiring which is not in compliance.

PVC insulation and jacketing of cables for Unit 1 computer is not in compliance.

All cable types used have been qualified in accordance with IEEE 383 except the PVC-insulated and jacketed cables.

Three-hour rated fire barriers separate the control complex and the reactor buildings from one another as well as other portions of the plant. The control complex and the reactor buildings are further divided into fire zones. The fire rating of the floor, ceiling and walls of each fire zone, including those listed in the question, are based on combustible loadings and are designed to contain a fire within the zone. Zone boundaries are generally defined by reinforced concrete walls, ceiling and floor. Cable and cable tray penetrations through boundary walls are provided with fire rated seals. Fire rated walls, ceilings and floors are provided with rated fire doors, ventilation duct fire dampers and pipe penetration seals. Floors, ceilings and walls which are not rated as fire barriers may not have rated firedoors, fire proofing on structural steel, penetration seals on pipe and ventilation duct penetrations, or fire dampers in ventilation ducts; however, these non-ratedwalls, floors and ceilings would resist a fire for at least 45 minutes.

With the exception of gypsum walls, walls, floors, and ceilings designated as having a fire rating are designed in acordance with the Uniform Building Code requirements. In the case of gypsum wall construction, where the Uniform Building Code did not have a recommended design, the U. S. Gypsum cavity shaft system was utilized. The fire rating for this design is a symmetrical 3 hours, howver, since the design was originally intended for use in elevator shafts, materials are not symmetrical. The gypsum boards system has been given a certificate of approval by the Commonwealth of Pennsylvania for three-hour and two-hour ratings.

Various tests to verify the fire resistance rating of the fire barrier penetration seals were conducted by Brand Industrial Services Company in accordance with ASTM E-119. These tests have been accepted by the American Nuclear Insurers and Mutual Atomic Energy Reinsurance Pool.

Where required to accommodate the design, metal curbs were installed around floor penetrations in the control complex for flood prevention. Where this occurred, it was not possible to install ventilation duct fire dampers in proper positions and still gain access for resetting the dampers. Therefore, these dampers were installed above the floor. The metal between the floor and damper is provided with fireproofing to maintain the proper protection for the floor penetration. Other fire rated dampers are installed in accordance with the manufacturer's recommendations.

See Tables 6-2 and 6-3.

ITEM 60 - POSITION D.3.a (P-18) (C)

Noncombustible cable tray construction.

SSES Design:

All cable trays are made of non-combustible materials.

ITEM 62 - POSITION D.3.c (P-18) (NC)

Automatic water sprinkler systems for cable trays outside CSR.

SSES Design:

Automatic water sprinkler systems are provided for cable trays outside the cable spreading room in accordance with the criteria established in Section 2.11.

The tray configuration outside the cable spreading rooms complies with the separation criteria of Regulatory Guide 1.75. Manual hose stations and portable hand extinguishers are provided for fire protection. Refer to Sections 4.3 through 4.10 for fire hazard analysis of specific areas.

ITEM 66 - POSITION D.3.d (P-18) (C)

Cable and cable tray penetration of vertical and horizontal fire barriers sealed to equivalent of barrier rating.

SSES Design:

Vertical and horizontal cable and cable tray penetrations are sealed. The design of fire barriers for horizontal and vertical cable trays meets the requirements of ASTM E 119, "Fire Test of Building Construction and Materials" including the hose stream test.

Fire breaks will be installed in vertical trays every 15 ft., at solid floor and ceiling penetrations, and at tops of cabinets. Fire breaks are provided on horizontal runs of cable trays where they penetrate walls, and at 20 ft. intrvals if the trays are covered.

ITEM 74 - POSITION D.3.i (P-19) (AC)

Cables installed in concealed floor and ceiling spaces should be protected with an automatic total flooding halon system.

SSES Design:

Cabling installed in concealed floor and ceiling spaces are either protected by manual spurt or automatic total-flooding CO_2 systems except the PGCC floor which is protected by unitized Halon system.

The following areas are protected with manual spurt total flooding CO_2 systems:

1. The control room raised floor space.
2. The enclosure containing the vertical cable trays from the upper cable spreading room to the top of control cabinets in the control room.
3. Soffit and cable chases in the cold instrument repair shop.
4. Soffit and cable chases in the spare room at El. 741'-1".
5. All three cable chases from El. 729'-0" to El. 754'-0".

The following areas ar protected with automatic total flooding CO_2 systems:

1. U.P.S. room - Unit 1 under raised floor.
2. U.P.S. room - Unit 2 under raised floor.
3. Computer room and ceiling.
4. Above ceiling of corridor, computer maintenance room, and office of the computer rooms.
5. Below raised floor of corridor, computer maintenance room and office of the computer rooms.
6. All levels of the three electrical cable chases except the one on the control room level.
7. Under the floor of the upper cable spreading rooms of Unit 1 and Unit 2.

All PGCC modules are protected with self-contained automatic Halon 1301 Systems.

Manual spurt total flooding CO_2 systems are provided in the above listed areas for the purpose of allowing the operator to remain in the effected area and perform necessary functions.

ITEM 75 - POSITION D.4.a (P-20) (AC)

Smoke and corrosive gases in specific fire areas-evaluation and control; nonradioactive automatically discharged outside; radioactive monitored to determine if release accepted.

SSES Design:

The SSES ventilation exhaust system is described in Item 76. Not all rooms and areas have fixed exhaust systems to remove combustion product. The rooms and areas that do have exhaust systems capable of removing smoke do not automatically discharge directly outside as specified in the guideline. This specified discharge is contrary to effective fire fighting guidelines, which refer to automatic room isolation in the event of fire, and guidelines and regulations that govern the release of radioactivity. In all cases the operator will have the option of controlling the various systems manually.

The exhaust systems contain fire dampers and doors where penetrations are made in fire-rated walls, floors or ceilings.

Products of combustion emanating from areas that could contain radioactive materials are continuously monitored prior to discharge. These monitors do not monitor a given single fire area.

The following described the method used in controlling smoke from various areas:

Control Structure: In case of fire in any room in the control structure between elevations 697'-0" through 771'-0", the fire dampers of the supply and return air ducts will close automatically and isolate the room. After the fire has been extinguished, the smoke removal fan will be started manually and the required dampers necessary for smoke removal from the affected room will be opened by remote manual operation. The exhausted smoke is monitored for radiation in the exhaust stack. If plant limits are

exceeded, the operator is alarmed and has the option of stopping the smoke removal fans and isolating the affected area.

Turbine Building: The turbine lube oil reservoir room, hydro-control power room, lube oil centrifuge and conditioner room, upper and lower switchgear rooms in the turbine building are provided with fire dampers in their supply and return air ducts. The above listed rooms will be isolated in case of fire.

There is no separate mechanical smoke removal system in the turbine building. Smoke and heat vents on a ratio of 1 sq. ft. of effective vent area to each 100 sq. ft. of floor area are provided on the roof of the turbine building. The smoke and heat vents are operated either by fusible link or by remote electrically operated release.

Reactor Building: The reactor building has no separate smoke removal system. Only the emergency load center and emergency switch gear rooms are provided with fire dampers at the ventilation system penetrations for isolation in case of fire. Portable smoke ejectors are provided if required. Once control of the fire is established, the ventilation system serving the affected area can be activated.

Radwaste Building: The heating and ventilating system of the radwaste building is a 100 percent outside air operation. In case of fire the supply and exhaust fans will be stopped manually by the operator. Smoke could be removed after a fire by using a portable smoke ejector. There is no separate mechanical smoke removal system in the radwaste building.

Diesel Generator, ESSW Pumphouse and Circulating Water Pumphouse: None of these buildings are provided with a fixed mechanical smoke removal system. Upon receiving an alarm in the control room, the operator can remotely stop the ventilation systems in either the diesel generator building or the ESSW pumphouse. The circulating water pumphouse requires local tripping of each fan system in order to isolate the building. All systems for the subject buildings are capable of exhausting and supplying fresh air by manually activating the ventilation systems.

ITEM 76 - POSITION D.4.b (P-20) (C)

Ventilation systems exhausting smoke or corrosive gases-evaluated to assure single failure or inadvertent operation does not violate controlled areas of the plant design.

SSES-Design:

Other than the smoke vents in the turbine building roof and the smoke exhaust system for the control structure, there are no portions of the ventilation system specifically dedicated to smoke removal. The basic design of the overall plant ventilation system considers the effects of inadvertent operation and single failure. The fire dampers provided within the ventilation system affect only those portions isolated by the dampers with no adverse effects on the balance of the systems.

ITEM 77 - POSITION D.4.c (P-20) (NC)

Power supply and controls for ventilation systems should be run outside the fire area served by the system.

SSES-Design:

The controls for all fans are in the same room, except for hand switches located in the control room. Combustible loadings in HVAC areas are less than 1 psf except where charcoal filtration systems are located. Each charcoal adsorber has its own total-flooding or deluge system and is contained within a steel enclosure, constructed of 3/16 in. minimum plate thickness. The reactor building, control structure and safety related systems all have redundant supply and exhaust equipment, which are physically separated by a missile barrier. Electrical separation is provided for safety related redundant systems. The redundant systems are capable of providing design flow rates under design conditions.

ITEM 79 - POSITION D.4.e (P-20) (C)

Air intakes for ventilation systems serving safety related systems should be remote from exhaust and smoke outlets of other fire areas.

SSES-Design:

No basis for determining the acceptability of intake and exhaust separation is given in the guideline. Because the requirements of the Uniform Building Code and standard practice are met, existing plant design is considered in compliance with the guideline. The minimum distance between an exhaust system and fresh air intake is approximately 90 ft.

ITEM 84 - POSITION D.4.g (P-21) (C)

Smoke and heat vents-when used, install at a minimum ratio of 1 sq. ft. of venting area per 200 sq. ft. of floor area (for power venting 300 cfm equals 1 sq. ft. of gravity venting area). Refer to NFPA 204 for additional guidance on smoke control.

SSES Design:

Smoke and heat vents are provided in the Turbine Building at a ratio of 1 sq. ft. of venting area to each 100 sq. ft. of floor area. The upper and lower switch gear room fire doors would need to be opened manually and exhausted with a portable smoke ejector.

The cable spreading rooms are provided with a separate smoke removal system as described in Section 3.2 Item 75.

ITEM 90 - POSITION D.4.i (P-22) (C)

Total-flooding gas extinguishing system - area intake and exhaust ventilation dampers to close upon initiation of gas flow (NFPA 12A-Halon). SSES Design:

Initiation of a carbon dioxide total flooding system automatically closes the inlet and exhaust dampers in ventilation ducts serving the areas protected by the system.

The Halon 1301 systems are totally enclosed within the PGCC units and do not require dampers to isolate the area.

ITEM 91 - POSITION D.5.a (P-22) (C)

Fixed emergency lighting sealed beam with individual 8 hour minimum battery power supply.

SSES Design:

The in-plant emergency lighting system is normally supplied by the normal 208/120V ac lighting panels. Upon loss of the normal ac supply, the emergency lighting system will be automatically transferred to the station 125V dc systems. Emergency lighting system is discussed in FSAR Subsection 9.5.3.2.3. Location or emergency light units with 8 hour rated batteries are listed in FSAR Table 9.5-3.

ITEM 93 - POSITION D.5.c (P-23) (NC)

Fixed emergency communication - voice powered head sets at stations.

SSES Design:

The communication system consists of three separate and independent networks:

1. Radio system - 2 channel UHF (1 prime, 1 backup)

2. Public address - 6 channels, 1 page and 5 tank.

3. Plant maintenance jacks - 2 channels.

4. Private auto branch exchange telephone system.

Radio System:

Portable radios are available for fire brigade and operations personnel during a fire emergency. Fixed repeaters are located in a non-hazardous low combustile loaded area of the turbine building. Initial and periodic testing is conducted to demonstrate that the frequencies used for portable radio communication do not affect the actuation of protective relays.

Public Address (PA):

The intra-plant public address system is five channel independent page-party communication system, consisting of telephone handsets, amplifiers and loudspearkers located at various selected areas throughout the plant.

The loudspeakers are powered from individual amplifiers contained in each handset station. The system provides two-way communication facilities for speech at all handset stations. Each station is capable of originating and receiving information by switching to either a page channel or to one of five non-interfering party-line channels. A desk type "Merge-Isolate," selector switch panel is located in the control room at the plant operating monitor console, and functions as the central control point for the system. During normal plant operation the Unit 1 communication system is completely independent and isolated from Unit 2. To inter-tie both units, the caller pages the control room and the operator merges the systems by switching the selected channels of both units. In addition, a switch/relaying function is provided to mute the outdoor

speakers during night time operation. Power for the PA system is supplied from the vital ac bus.

Plant Maintenance/Test Jack System:

This system provides a redundant and independent two channel station to station communication system for use during startup and normal maintenance, and consists of telephone jack stations located at various selected areas throughout the plant. The paging channel is connected directly to the control room and interfaced with the PA system page line tied to designated speakers. The party lines are connected to the "Jack Station" selector switch panel, which enables the operator to connect any combination of 100 separate stations. All Jack stations have a low level intensity red light to monitor the power supply. This system utilizes portable headsets which are provided with thirty foot long cables and plugtype connectors. Each headset consists of an amplifier and headset microphone unit for use in conjunction with separate portable headset stations. In addition the system has the capability, by interconnecting one group of jacks, to provide uninterrupted conversation between the control room and the following areas; control rod drive equipment area, refueling platform, and the turbine generator operating deck. Power for the system is applied from the ac instrument panels.

Private Automatic Branch Exchange Telephone System:

The private, automatic branch exchange telephone system (PABX) is furnished and maintained by the Commonwealth Telephone Company. This system consists of approximately 100 lines with four central office trunks and four tie lines for dispatching purposes. The telephones are located throughout the plant. The power supply for this system consists of an independent charger and battery with the capability of operating the entire plant telephone system for approximately eight hours after a loss of the normal ac supply. In high radiation areas, such as the refueling platform, telephone jacks are utilized to accommodate portable dial-type telephones to meet the communication requirements during fuel loading and refueling conditions.

System Evaluation:

System design considerations include diversity and operational reliability. The in-plant communication systems are provided with reliable and redundant power supplies for uninterrupted communications between all areas of the plant.

Physical and electrical separation is provided between primary and backup systems to minimize the possibility of a single occurrence affecting more than one system.

Communication Systems have adequate flexibility to keep the plant personnel informed of plant operational status at all times. If one handset station of the PA system would be damaged or inacessible or extreme background noise would prevent its use, multiple handset locations at each plant elevation provide easy access to an alternate handset of the PA system.

ITEM 94 - POSITION D.5.d (P-23) (NC)

Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage.

SSES Design:

Fixed repeaters to permit the use of portable radio communication are not utilized in the present design.

The use of fixed repeaters to facilitate the use of portable radios is not advised because radio signals have been known to energize or deenergize electrical equipment and components. There will be adequate back-up communications to preclude need for fixed repeaters.

ITEM 95 - POSITION E.1.a (P-23) (AC)

Fire detection systems should as a minimum comply with NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems."

SSES Design:

The control room C650panel provides fire and trouble indication for the CO_2, smoke detection, sprinkler, deluge, preaction and Halon systems. Individual local panels are provided for each of these systems. In addition to displaying fire and trouble alarms, the local panels provide supervision of detector and release mechanism wiring, and where applicable, provide system activation. Power to panels, except the Halon panels, is provided by separate connections to the uninterruptable power supply, which is described in Subsection 8.3.1.8 of the FSAR. The Halon panels in the power generation control complex are powered

by normal ac power and are provided with battery packs for backup power.

A one-line diagram of the fire alarm system is provided as Figure 5-21.

The fire and smoke detection system has been designed in accordance with NFPA 72A as "Local Signaling Systems," with additional provision of uninterruptable power supply.

The system also complies with the requirements of NFPA No. 72D, Proprietary Protective Signaling Systems, for a Class B system except operation and supervision of the system is not the primary function of the operators and the following clarifications:

Power Supplies:

Par. 2221 - Requires 2 sources of power supply within Central Supervising Station Primary (Main) & Secondary (Standby).

SSES - Uses Vital ac, Station Standby ac Supply with battery as backup.

Par. 2224 - Separate power supply for the operation of trouble signals.

SSES - Uses the main power supply plus 125VDC for annunciators.

Par. 2231 - Shall comprise a Primary (Main), Secondary (Standby) and Trouble power supply for Local Panels.

SSES - Uses just 1 Vital ac circuit for all functions on each Local Panel.

Circuit Arrangement:

Par. 1311 - Circuits shall be so arranged so that single break or a single ground fault of the installation wiring shall not cause a false alarm signal.

SSES - A break in the local panel supervised circuits will cause a trouble alarm.

Par. 1312a - A break in the wiring between the loal panel and the Control Room panel may result in an alarm. Carrier channels shall be designed to transmit a tone of a frequency which shall

shift to a second frequency for transmission of signals.

SSES - - - - - N/A.

Par. 1312b - Two carrier channels shall be provided for each circuits with all signals transmitted simultaneously over both channels.

SSES - - There is only one pair of wire (channel) used in each circuit detection & signaling loops. No standby channel is provided.

Electrical Supervision:

Par. 3442 - A control valve shall be supervised to obtain two separate and distinctive signals, one indicating movement of the valve from its normal position and the other indicating restoration of the valve to its normal position.

SSES - - Monitor indicates when gate valves move from their normal position only.

Par. 3443 - Pressure sources shall be supervised to obtain two separate and distinctive signals, on indicating that the required pressure has been decreased or increased and the other indicating restoration of the pressure to its normal value.

SSES - - 1) Water - HI/LO pressure not annunicated.

2) CO_2 - HI/LO annunciated in the Off-Normal value only.

3) Air - Included in the supervisory for pre-action system-annunicated in the Off-Normal value only.

Par. 3444 - Water storage containers shall be supervised to obtain HI/LO and restoration to normal level.

SSES - A low level alarm is provided for the clarified water storage tank to indicate at the 300,000 gallon level.

Par. 3445 - Water storage containers shall be supervised to obtain two separate and distinctive signals, one indicating that the temperature

of the water has been lowered to 40°F, and the other indicating restoration to proper temperature.

SSES-- No annunication provided.

Audible Signals:

Par. 2551 - Audible signal appliances of a fire alarm system shall produce signals which are distinctive from other similar appliances used for other purposes in the same area. The distinction among signals shall be as follows:

a) Fire alarm

b) Supervisory signals - N/A in SSES

c) Trouble signal

SSES--

1) Deluge & pre-action systems - no local audible alarm.

2) CO_2 - 1 common local audible alarm.

3) Ionization, combustion & fire detectors 1 local audible alarm (Sonalert) at the local panel.

ITEM 102 - POSITION E.2.a (P-24) (C)

Treating and flushing of fire main possible.

SSES Design:

Water used for fire service meets requirements of NFPA No. 22 and does not require treatment. The first 300,000 gallons of water are taken from the clarified water system. Flushing of the fire main is possibloe by sectionalized control of the main fire loop.

The clarified water also provides non-conductive properties, which prevents flashover on transformers when the deluge systems are activated.

ITEM 105 - POSITION E.2.b (P-24) (C)

Multi-unit nuclear power plant fire water supply system.

SSES Design:

SSES is a two unit plant site. A common underground fire loop serves both units of the plant. Since both units are in a single plant structure, it is not possible to run an individual loop around each unit. The fire main includes post indicator valves for sectionalizing control of the fire water distribution system. A common water supply is used and sized for the maximum expected flow of 2500 gpm of a single plant fire since fires in both units simultaneously are not a design consideration.

ITEM 107 POSITION E.2.c (P-25) (C)

Independent water supply for each fire pump.

SSES Design:

SSES is provided with three separate sources of water to be used for fire protection as described in Section 2.1. The three sources (clarified water storage tank, Unit 1 and Unit 2 cooling tower basins) are interconnected, allowing the pumps to draw water from any or all sources.

ITEM 108 POSITION E.2.c (P-25) (C)

Fire pump connections to the yard fire main should be widely separated.

SSES Design:

Individual fire pump connections to the yard fire main loop are separated with sectionalzing valves between connections.

ITEM 111 POSITION E.2.c (P-25) (C)

Fire pumps and drivers - three-hour fire barrier separation.

SSES Design:

The diesel engine driven fire pump is located in a room enclosed by three-hour fire rated walls, doors and duct penetrations. The motor driven fire pump is located in the main pump room with the service water pumps and circulating water pumps. This area has less than 2-1/2 lbs. of equivalent wood combustibles per sq. ft. and is protected by

hose reels and portable fire extinguishers. The diesel engine driven fire pump is protected by a wet pipe sprinkler system.

ITEM 113 - POSITION E.2.c (P-25) (C)

Fire pump installation - should conform to NFPA 20 as a minimum.

SSES Design:

The fire pump installation conforms to NFPA 20 with the exception that the electric fire pump feeder circuit conductors, which are physically routed inside of the turbine building, are not protected with two inches of concrete. However, all fire pump feeder circuit conductors are routed in non-hazardous areas of the building and separated from fire zones containing safety related safe shutdown equipment by a three-hour rated fire wall.

ITEM 122 - POSITION E.2.g (P-27) (C)

Threads on hydrants, hose couplings and standpipe risers compatible with local fire department.

SSES Design:

PP&L has standardized on American National Fire Hose connection screw thread (NST) as set forth in the National Fire Protection Association Standard #194. This has the obvious advantage of allowing interchangeability between all PP&L facilities and allowing extra equipment to be stockpiled in a central storeroom. Although adequate equipment and material will be provided to support the plant's need to be self-reliant, adapters from American National Fire Hose connection screw threads (NST) to the thread type of the local Fire Department will be provided for fire department use.

ITEM 123 - POSITION E.3.a (P-27) (AC)

Each automatic sprinkler and manual hose station standpipe should have independent connection to yard main.

SSES Design:

Sprinkler systems and manual hose station standpipes are connected to the plant underground water main separately so that no single active failure or crack in a moderate-energy line can impair both the primary and backup fire suppression systems. Hose, stanpipe and automatic water suppression systems serving a single fire area have independent connections to the yard main system.

ITEM 124 - POSITION E.3.a (P-27) (NA)

Headers fed from each end are permitted inside buildings to supply multiple sprinkler and standpipe systems.

SSES Design:

This was not used SSES.

ITEM 126 - POSITION E.3.a (P-28) (AC)

Safety related equipment (SRE) should be protected from sprinkler discharge if such could damage - water shields or baffles may be used.

SSES Design:

The following safety related areas are provided with sprinkler protection:

HPCI Pump Room
RCIC Pump Room
Diesel Generator Building
Lower Cable Spreading Room
Upper Cable Spreading Room

Equipment in the first three listed areas are not protected from sprinkler discharge, since the purpose of the sprinkler system is to extinguish or suppress a fire condition involving a piece of equipment. No safety related system required to achieve and maintain cold shutdown other than the affected system itself can be damaged, since the above areas only contain one safety related system. The cable spreading rooms contain only cable and this is not liable to damage from water spray.

ITEM 130 - POSITION E.3.d (P-29) (AC)

Standpipes with hose connections shall be equipped with a maximum of 75 ft. of 1-1/2 in. hose.

SSES Design:

Standpipes with hose connections are supplied in 100 ft. lengths in accordance with NFPA 14. The hoses were purchased prior to the issue date of Section 9.5.1.

ITEM 132 - POSITION E.3.d (P-29) (NC)

Standpipes with hose connection should be located on all floors of all buildings, including containment.

SSES Design:

There are no standpipes or hose connections inside the containment.

Provision is made for portable fire extinguishers to be carried into the containment during refueling and major maintenance operations. The fire extinguishers are to be removed from the containment and stored in a controlled area after each maintenance entry so they do not constitute a potential missile hazard.

See Section 2.7, Portable Fire Extinguishers.

ITEM 133 - POSITION E.3.d (P-29) (NC)

Standpipes with hose connections should be spaced at not more than 100 ft. intervals.

SSES Design:

Hose reel locations were determined by running a 120 ft. line to cover every room in the vicinity from that one location only, resulting in most of the hose reels being spaced at greater than 100 ft. intervals.

In many cases, these locations can be reached by more than one hose. Each hose station has 100 ft. of 1-1/2 inch woven-jacket lined fire hose with a suitable nozzle. Both the ESSW structure and the diesel generator building are in close proximity to outside yard fire hydrants. These fire

hydrants are provided with hose houses which will be outfitted with 2-1/2 inch and 1-1/2 inch hoses and nozzles. Interior hose stations for the diesel generator building, and the ESSW intake structure would not provide any additional operation advantages. Fire hose stations have been provided which reach cable chases and soffits.

ITEM 138 - POSITION E.3.d (P-29) (C)

Normally occupied areas - hose stations inside.

SSES Design:

All normally occupied areas have hose stations provided inside, with the exception of the control room, where they are located adjacent to the control room as described under Par. F.2, Page 35 of Branch Technical Position APCSB 9.5-1.

ITEM 147 - POSITION E.6 (P-32) (C)

Fire extinguisher provided in accordance with NFPA 10.

SSES Design:

A full complement of fire extinguishers will be provided prior to initial fuel load. Until such time, extinguishers provided during construction will be available. PP&L has always preferred to determine fire extinguisher locations when construction was nearly finished, so that distances, equipment relationships, etc., can be determined in the field. Fire extinguishers will be placed according to the guidelines of the National Fire Protection Association Standard #10. Due consideration for the effectiveness, nature, and clean-up associated with each fire extinguishing agent is considered in placement of the fire extinguishers.

ITEM 155 - POSITION F.1.b (P-34) (C)

Manual fire suppression required throughout containment - standpipes with hose stations, or equivalent protection from portable extinguishers, if it is impractical to install standpipes with hose stations.

SSES Design:

The atmosphere inside the primary containment area is inerted with nitrogen during operation. There are no standpipes with hose stations installed within the primary containment. During maintenance and refueling, a hose from the standpipe/hose rell located inside the shielding wall of the equiment and personnel access door will be brought into the containment.

Portable water and chemical fire extinguishers will also be provided inside the containment whenever the inert atmosphere is removed. See Section 27, Portable Fire Extinguishers.

ITEM 157 - POSITION F.2 (P-35) (C)

Three-hour fire barrier separation from other plant areas.

SSES Design:

The control room envelope; floor, walls and overhead concrete slab provide the required 3-hour separation. The steel framing supporting the control room floor is fireproofed as is the framing over the upper cable spreading room (above the control room). The architectural ceiling in the control room is noncombustible but is not fire rated. Three-hour labeled fire shutters are provided at the control room observation gallery windows.

ITEM 159 - POSITION F.2 (P-35) (C)

Hose stations and portable extinguisher, to be located in CR providing CO_2 portable extinguisher.

SSES Design:

A standpipe and hose reel are located in each of the two stairwells of the control room. Portable water and either CO_2 or Halon extinguishers are also provided. The spaces under the raised floor in the control room are provided with manual spurt CO_2 systems.

ITEM 166 - POSITION F.2 (P-36) (C)

CR ventilation - intake to have smoke detection to automatically alarm locally and isolate CR ventilation system to prevent smoke infiltration.

SSES Design:

A duct ionization smoke detector is insalled in the outside air intake plenum, which alarms the operator if smoke is about the enter the control room. The operator can manually isolate the control room ventilation system.

Automatically isolating the control room ventilation system would be degrading to the safety related ventilation system, since the fire detection system is nonsafety related.

ITEM 168 - POSITION F.2 (P-36) (AC)

Cables should not be located in concealed floor and ceiling spaces. If such concealed spaces are used, however, they should have fixed automatic total flooding halon protection.

SSES Design:

Cables located in concealed floor and ceiling spaces are provided with fixed automatic total flooding or manual spurt CO_2 protection. See Item 74.

ITEM 179 - POSITION F.3.a.5 (P-38) (NC)

Aisle separation provided between tray stacks should be at least 3 ft. wide and 3 ft. high.

SSES Design:

The aisle separation between tray stacks in the upper cable spreading room, for the most part, satisfy the width and the height recommendations of Appendix A. However, due to space limitations in some areas, the aisle height clearance is between 7 ft. and 3 ft. 6 inches.

ITEM 183 - POSITION F.3.b.4 (P-39) (C)

Auxiliary shutdown system with all cabling independent of the cable spreading room should be provided if the above could not be met.

SSES Design:

A remote shutdown panel with cabling independent of the cable spreading room is provided for SSES.

ITEM 190 - POSITION F.3.a.1 (P-39) (AC)

Smoke venting - automatic control by fire detection and/or suppression systems as appropriate.

SSES Design:

A manually initiated smoke removal system is provided for the control structure as described in Item 75 of this section. Upon detection of a fire, all ventilation and exhaust dampers within the area close. The operator can then remotely open the smoke exhaust dampers which are normally closed and start the system to exhaust the smoke.

ITEM 193 - POSITION F.4 (P-39) (C)

Fire detection - should be automatic with alarm and annunication in control room, and local alarm.

SSES Design:

The computer room fire detection system is automatic and is annunicated and alarmed in the control room. There is no local annunication provided.

ITEM 195 - POSITION F.5 (P-40) (C)

Switchgear room separation minimum 3-hour barrier to the extent practicable.

SSES Design:

Switchgear rooms are enclosed by concrete or concrete block walls of sufficient thickness and density to qualify as 3-

hour barriers. Floor slabs and overhead slabs are of sufficient thickness to qualify as 3-hour barriers. Exposed steel framing is not fireproofed. All switchgear room doors are 3-hour rated.

ITEM 206 - POSITION F.8 (P-41) (C)

Blank fire wall (min. 3-hour rating) should separate all SR systems and equipment from turbine oil systems.

SSES Design:

All safety related equipment necessary for a safe shutdown is separated from turbine lube oil systems by three hour rated fire walls.

ITEM 212 - POSITION F.9 (P-42) (AC)

Ventilation - local manual smoke venting.

SSES Design:

There are not separate smoke removal systems in the diesel generator areas. The diesel generator building ventilation system starts automatically with the diesel engine or under the control of a wall mounted temperature switch. The fan can also be started manually from the control room. The recirculating air damper, the exhaust air damper, and the outside air damper are modulated by a thermostatic controller to increase outside air flow on room temperature rise. In case of fire the wall mounted temperature switch will start the fan on temperature rise. The thermostatic controller will open the outside air and exhaust air damper. This will remove the smoke generated inside the room. This is not a positive smoke removal system, because as soon as the atmosphere has been cooled by the pre-action sprinkler system, the outside air and exhaust air dampers will close.

The ventilating fan should be stopped in the event of fire. The fan is safety related and cannot be controlled by signals from the smoke and flame detectors or the pre-action sprinkler system because these systems are not safety related. Therefore it will be part of the emergency operating procedures and the control room operator's instructions that the diesel generator room ventilation fan be turned off in case of fire.

- The outside air intake and exhaust dampers are fail open and smoke will be removed by natural convection.

ITEM 213, 213A&B - POSITION F.9, F.9.a & F.9.b (P-42) (AC)

Day tanks (maximum total capacity of 1,100 gallons) permitted in diesel generator areas if:

Day tank located in separate 3-hour rated enclosure capable of containing entire tank capacity with ventilation provided.

Day tank enclosure protected by automatic fire suppression (foam or sprinklers).

SSES Design:

A 550 gallon capacity day tank is mounted on the skid of each diesel engine. The whole area is protected by a pre-action sprinkler system.

NFPA 37, Par. 524 requires a fire rated enclosure for the day tank only if the tank capacity is in excess of 550 gallons.This is the criteria used in mounting the 550 gallonq day tank on the diesel engine skid without any enclosure.

Because the whole diesel generator area is protected by a pre-action sprinkler system, SSES is considered to conform to the requirement.

ITEM 219 - POSITION F.11 (P-44) (C)

Automatic sprinklers required unless fire hazards analysis can demonstrate that a fire will not endanger other safety related equipment required for safe plant shutdown.

SSES Design:

The core spray pump rooms, RHR pump rooms RCIC pump rooms and HPCI pump rooms are all enclosed within 3-ft. thick concrete walls that have a minimum three-hour fire rating, but do not have fire rated doors. The HPCI and RCIC pump rooms are providewd with deluge systems. All other safety related pump areas have been analyzed, and show that the loadings are such that a fire in the area will not endanger other safety related equipment. See Section 6.0 for fire

loadings and Section 4.0 for further analysis of the safety related pump areas.

ITEM 223 - POSITION F.11 (P-44) (AC)

Ventilation - manual smoke venting capability.

SSES Design:

The supply and exhaust fans serving the safety related pumps within the Reactor Building are electrically controlled so that both fans must run, simultaneously. No separate smoke removal system is provided other than portable smoke ejectors.

The ESSW Pumphouse ventilation system can be manually controlled from the control room. This system provides ventilation by supplying outside air and returning or exhausting interior air.

ITEM 225 - POSITION F.12 (P-44) (AC)

Fire detection - automatic with alarm and annunciator in CR and local alarm.

SSES Design:

The new fuel area is a vault with top access covered with water tight cover plate over a removable aluminum grating. A portable extinguisher will be located about eleven feet from the top access. The whole new fuel area is within the range of hose reel 1HR-201 or 2HR-201. There are no automatic fire detectors within the vault, but on the ceiling above the vault we have located smoke detectors.

ITEM 232 - POSITION F.14 (P-45) (AC)

Auto sprinklers - required wherever combustible materials located.

SSES Design:

The controlled zone shops and the access control and laundry area are provided with automatic wet pipe sprinklers. The tank exhaust unit charcoal filter is provided with a deluge system. Products of combustion detectors are provided on

the elevator foyers, the radwaste control center and the electrical equipment room. All areas in the Radwaste Building are within reach of at least one water stream from a hose reel. The cable trays in the corridors and pipeway are not provided with automatic sprinklers or smoke or fire detectors, since they are not controlling or supplying power to safety related equipment. A fire in the cable tray will be endanger safety related equipment.

Portable fire extinguishers are located in all areas containing combustible materials.

ITEM 233 - POSITION F.14 (P-45) (AC)

Fire detection - auto with alarm and annunciator in CR and local alarm.

SSES Design:

Smoke detectors are located in the elevator foyers, the radwaste control center and the electrical equipment room. Fire detection is only alarmed in the control room and not locally. Each smoke detector has an individual alarm light.

ITEM 236 - POSITION F.15 (P-46) (C)

Automatic sprinklers required in all areas where combustible materials are located.

SSES Design:

Decontamination areas in the central access control area are provided with wet pipe sprinklers as part of the sprinkler system protecting the locker room, first aid room, protective clothing area, laundry room, laundry storage room and chemistry laboratory.

The decontamination areas at El. 676'-0" and El. 691'-6" of the Radwaste Building are provided with wet pipe sprinklers as part of the sprinkler system protecting the Laundry Rooms and Controlled Zone Shop.

The two isolated decontamination rooms in El. 646'-0" of the Radwaste Building are protected with hose stations and portable extinguishers.

The emergency decontamination rooms in El. 719'-1" and El. 818'-1" of the Reactor Buildings are protected with hose stations and portable extinguishers.

ITEM 252 - POSITION G.2 (P-47) (C)

Automatic wet pipe sprinkler system for dry unused resins.

The storage of dry ion exchange resins should be kept away from essential safety related systems. Dry unused resins should be protected by automatic wet pipe sprinkler installations. Detection by smoke and fire detectors should alarm and annunciate in the control room and alarm locally. Local hose stations and portable extinguishers should provide backup for these areas. Storage areas of dry resin should have curbs and drains.

SSES Design:

Unused resins will be stored in a warehouse. Sprinklers and drains with traps are provided.

ITEM 260 - POSITION G.4 (P-48) (C)

Protection from exposure to fires in adjacent areas.

SSES Design:

Closed metal tanks or containers will be used to store materials which collect radioactivity. Administrative procedures will include handling, storage and protection of radioactive materials to be commonly used at SSES.

ITEM 261 - POSITION G.4 (P-48) (C)

Provisions for accommodating decay heat from entrained radioactive materials.

SSES Design:

The Containers for waste, requiring special considerations for removal of isotopic decay heat, are designed for sufficient heat removal, heat generation and radiation protection.

4.0 EVALUATION OF POTENTIAL FIRE HAZARDS FOR SAFETY-RELATED AREAS AREAS

4.1 INTRODUCTION

4.1.1 SCOPE OF EVALUATION

This Section provides an evaluation of the effects of postulated fires in accordance with the Standard Review Plan 9.5.1 guidelines and supporting Branch Technical Position APCSB 9.5-1 as amended by Appendix A thereto.

"Evaluation of potential fire hazards for safety-related areas throughout the plant and the effect of postulated fires relative to maintaining radioactive releases to the environment."

A review of the SSES Fire Protection Program has been made to evaluate the potential fire hazards that could affect safety-related areas throughout the plant, to quantify the hazards in terms of combustible loading, and to relate the potential hazards to the capability of the existing Fire Protection Program. This information is presented in Table 6-1 which lists the combustible material present in each fire zone, the quantity, and combustible loading in the fire zones, and availability of detection and suppression equipment. Figures 5-7 through 5-20 show fire zones, fire barriers, fire suppression coverage, and the location of the safety-related areas.

This evaluation has been performed for all the buildings that: (1) contain safety-related equipment, or (2) could affect safety-related buildings by virtue of the fire hazards present, or (3) contain significant quantities of radioactive material.

This evaluation considers the potential effects of transient and/or in-situ exposure fires on the capability of achieving safe shutdown.

4.1.2 ASSUMPTIONS

This evaluation was based on the following assumptions:

(1) Unless otherwise indicated in the analysis of individual fire zones, it is assumed that all combustible materials in the fire zone will be consumed in a postulated fire. The extent of a fire zone is based on the distribution of combustible and plant features such as walls, floors, ceilings, doors, and dikes which tend to isolate one fire zone from another. A fire is assumed to propagate from one fire zone to adjacent zones unless the fire hazards analysis can show that such propagation would not occur.

(2) The analysis takes no credit for fire suppression capability in the fire zone.

(3) The rate of heat release, the conditions of occupancy, the temperatures and fire duration to be expected were considered, as illustrated in Table 6-8C and Figure 6-8E of the "Fire Protection Handbook", Fourteenth Edition. For purposes of this analysis, the combustible materials were categorized, giving consideration to the nature of the material and configuration using five categories, from A-slight through E-severe. All combustible liquids were placed in the E-severe category. Cable insulation containing inhibitors for a slow rate of heat release, generally, was placed in the A-slight category. Congested cable tray areas, with both horizontal and verticle trays, were placed in the C-moderately severe category. Judgement was used to downgrade any category, where necessary, due to conditions of occupancy and combustible material configuration. In order to determine the adequacy of building components to resist the fire, the time-temperature curve for each category was compared with the National Bureau of Standards Time-Temperature.

(4) Postulated fires or fire protection system failures are not considered as occurring concurrently with other plant accidents or the most severe natural phenomena.

(5) Rate of heat release has been considered in the evaluation of specific postulated fires. A conservative burning rate of 4 mm/min is used for combustible liquid fires. A conservative burning rate of .092 psf/min is used for cable insulation and jacketing.

(6) In the absence of significant external fire hazards, electrical cable tray fire propagation is expected to be limited by existing horizontal and vertical fire breaks. Due to the type of cable used, a cable tray fire is assumed not to propagate to an adjacent tray if the horizontal and vertical separation distances per Regulatory Guide 1.75 are present. This assumption is contingent upon the absence of external fire hazards and combustible pathways between trays.

(7) In no case is a fire in one division <u>essential</u> raceway assumed to progagate to another division essential raceway.

(8) When it is shown that a fire involving a safety train or system will not propagate to its redundant counterpart, the availability of the second train is assumed without application of the single failure criterion.

(9) All components affected by a postulated fire are assumed inoperable, except where a transient exposure fire could cause hot shorts which might activate a component.

(10) Wherever it could be shown that combustible loading in an area could breach a pressure boundary, the fire hazard was assumed unacceptable if the breach could approach 10 CFR 100 release limits.

(11) The fire zone boundaries are generally defined by reinforced concrete walls, ceilings and floors. Cable and cable tray penetrations through all internal walls in the Unit 1 and Unit 2 reactor buildings and the control structure, which do not have a nominal fire rating, are normally treated in the same manner as the electrical penetrations for a fire rated wall. In addition, the piping and ventilation ductwork penetrations through these internal walls are usually arranged in such a manner so as to prevent the spread of fire by a radiant heat transfer mechanism. The doors in these walls are generally of such a construction that they would resist a fire of at least 45 minutes of equivalent fire severity. Therefore, in fire zones with combustible loadings postulated to result in fires of slight severity, i.e., 5 psf or less, it is assumed that there is an absence of combustible pathways and that the fire boundaries are sufficient obstacles to prevent the propagation of a fire from that particular zone.

(12) The impact of inadvertent operation or rupture of the Fire Protection System is addressed in the responses to the associated Appendix A guideline statement in Subsections 3.1 and 3.2 of this report.

(13) The control of combustion products resulting from a postulated fire is discussed in Subsections 3.1 and 3.2 in response to the specific Appendix A guideline statement.

(14) In evaluating the effects of postulated transient and/or in-situ exposure fires on safe shutdown equipment and raceways, the following set of assumptions is assumed.

(a) There is a loss of offsite power

(b) All systems of concern (for safe shutdown) are safety related, or 'Q' systems.

(c) There will be no random single failures (other than a single fire and its effects).

(d) Alternate methods of shutdown such as manual operation and control post-fire are acceptable.

4.1.3 METHODOLOGY

To analyze the SSES Fire Protection Program the systematic approach described below was established.

(1) The first step involved the selection of an appropriate area (i.e., fire zone) for evaluation.

(2) A detailed review was made of the plant on the basis of fire zones to determine the following parameters:

(a) Fire zone boundary features including accessways to adjacent zones.

(b) Location and orientation of safety-related features including:

(1) Cable trays and conduit

(2) Panels and motor control centers

(3) Mechanical components such as pumps, valves, and piping

(4) Instrumentation racks and controls

(c) Location and orientation of specific fire hazards

(d) Classification and distribution of combustible materials present. Classification of combustibles is as defined in NFPA 10, Section 1-3. Basic types of fires are:

(1) Class A - Fires in ordinary combustible materials such as wood, cloth, paper, rubber and many plastics

(2) Class B - Fires in flamible liquid, gases, and greases

(3) Class C - Fires involving energized electrical equipment

(4) Class D - Fires in combustible metals

(e) Total amount of combustible material

(f) Fire loading expressed in pounds of equivalent wood per sq. ft.

(g) Combustible pathways to adjacent areas

(h) Fire detection and suppression systems available.

The detailed information accumulated in the preceding steps were derived from plant design drawings. This information forms the basis for completing the fire hazard evaluation described in the following paragraphs. This evaluation is summarized in Table 6-1.

(3) The next step was to determine the adequacy of the building components in limiting the propagation of an uncontrolled postulated fire. For this analysis the combustibles in an area were categorized from A-slight through E-severe in accordance with National Fire Protection Handbook, Fourteenth Edition, Table 6-8C. Low density electrical cabling in well separated tray configurations was placed in the A-slight category. More congested tray areas with stacked trays were placed in the C-moderately severe category. All combustible liquids were placed in the E-severe category. In analyzing fire zones that contained combustible liquids, it was assumed that the entire contents of the liquid reservoir in the particular zone was distributed uniformly over the flow area of the zone unless limited by curbs or other architectural features. It was then assumed that the oil was ignited and burned at a rate of 4 mm/min. This method of analysis presents a conservative approach since it will generate the maximum heat release rate and thus minimize the effectiveness of the plant fire brigade in reducing fire damage. In general, if the distribution of the combustible material in the area being considered was nonuniform, a more severe category was selected than would have been warranted by homogeneous material distribution.

National Fire protection Handbook, Figure 6-8E was then utilized to determine the expected duration of the fully developed period of the fire. In certain cases where significant quantities of combustibles in different occupancy categories were present, interpolation between time-temperature curves was used to yield a realistic expected duration.

To establish the adequacy of fire zone boundaries, an equivalent fire severity was then determined. The area under the time-temperature curve for each occupancy category was compared to the National Bureau of Standards Standard Time-Temperature Curve. This normalization process yields and equivalent fire severity in minutes. For example, a fire loading of 4 psf in an A-slight area will have an expected duration of 96 minutes but an equivalent severity of 50 minutes. The same loading in a C-moderately severe

area will have an expected duration of 34 minutes and equivalent severity of 22 minutes.

As a result of the particular construction and design features of certain fire zones, the standard method of determining the equivalent fire severity, as described above, yields unrealistic results. This comment is particularly applicable to fire zones with relatively small cross-sectional or floor areas. Examples of this situation exist with the cable chases in the control structure. These chases are typically vertical shafts with barriers and seals at every floor elevation for the purpose of limiting fire spread and controlling the concentration of carbon dioxide if the fire protection system is activated. These cable chases are essentially "gas-tight" between different floor elevations. In fire zones of this category, oxygen depletion is considered in determining the expected duration of the fully developed period of the fire. During the period of the fully developed fire, approximately 80 percent of the combustible material involved in the fire event is presumed consumed. Since 80% of the total energy of the fire is released during this period, the time calculated for the duration of the zone boundaries to determine their sufficiency.

The following general methodology and assumptions were employed in the analysis for the type of zones described above. It was assumed that open burning conditions of organic combustibles, plastics, and electrical cable insulating systems would produce 113 BTU per cubic foot of available air regardless of the heat of complete combustion of the material. For purposes of this analysis, the total volume of air available for combustion was assumed to be the entire volume of the particular fire zone. This assumption will produce conservative results since it disregards the space occupied by equipment, piping, cables, etc. The burning rates listed in Subsection 4.1.2(5) were used to calculate the expected duration for the fully developed period of the postulated fire.

In cable chases where the oxygen depletion analysis was justified, an estimate was made to determine the quantity of cable insulation material expected to be consumed. Since this estimate revealed that the quantities of oxygen available would only allow for the consumption of relatively small quantities of insulation material, it was assumed that only one cable tray was ignited. Specifically it was assumed tht the exposed area of a single cable tray was ignited and burned at a rate of .092 psf/minute. This particular methodology should provide conservative estimates of the time duration for the fully developed period of the fire within a "gas-tight" cable chases.

(4) The resulting equivalent fire severity, as determined above, was then compared to the fire rating of the fire zone boundaries to determine the adequacy of the boundaries in limiting fire propagation.

In many fire zones, the fire loading is less than 5 psf. In these cases, a postulated fire would be expected to remain localized within the boundaries of the area considered as long as a combustible pathway out of the area does not exist.

(5) The next step was to determine the effect of postulated uncontrolled fires within the area of safe plant shutdown. This analysis took into account the quantity and distribution of combustible materials in the fire zone. Consideration was also given to the potential effect of fires in adjacent fire zones.

(6) For the evaluation of the effects of transient exposure fires on the capability of achieving safe shutdown, each fire zone is reviewed individually. First, a raceway layout drawing is marked to show the divisionalization of the safety-related raceway. The minority division is identified as its raceway is listed. The term "minority division" refers to the electrical division which has fewer of its raceways routed through the fire zone in question. Actually, either division could be chosen for further examination, but the minority division represents the least effort in most cases. However in certain of the larger fire zones in the Reactor Buildings, consideration was given to horizontal separation of divisionalized safe shutdown raceway within the fire zone. The cables in all the listed minority raceways are checked, and any not connected to a safe shutdown system (as given in Table 6-4) or component are deleted. All cable left is reviewed for its support of the system's safe shutdown function(s) and for the effects of failure caused by fire. This step leaves safe shutdown cabling that violates fire zone separation.

(7) Each cable or component is then reviewed for applicable fire protection measures. The cable is then either rerouted or separation barriers and/or suppression and detection systems, as necessary, are privided. (See Section 2.11)

4.2 DESCRIPTION OF REACTOR SHUTDOWN METHODS

The purpose of this subsection is to provide a general discussion of the various methods that exist for effecting a safe shutdown of the reactor plant. This discussion will be referenced in the subsequent subsections that provide the detailed fire hazards analysis. A more detailed discussion of the reactor shutdown methods and the systems required for shutdown is contained in Subsections 7.4 and 15.0 of the Final Safety Analysis Report.

In this section, reference will be made to two conditions of reactor shutdown which are defined here for purposes of clarity:

<u>Hot Shutdown</u>: The reactor is in the shutdown mode and the reactor coolant temperature is greater than 212°F.

<u>Cold Shutdown</u>: The reactor is in the shutdown mode, the reactor coolant temperature is less than 212°F, and the reactor vessel is vented to atmospheric pressure.

A more rigorous definition is given in Section 16.0 of the Final Safety Analysis Report, Technical Specifications.

Manual scram of the reactor is accomplished by de-energizing at least 2 of the 4 scram solenoids on each hydraulic control units. Alternately, the operator can interrupt power to the reactor protection system. A more detailed description is provided in Section 7.2 of the FSAR.

4.2.1 Reactor Shutdown with Offsite Power

A normal plant cooldown is accomplished by heat rejection to the main turbine condensers with makeup water supplied by the condensate and feedwater system. The RHR system is used to remove the residual heat from the core after the reactor coolant has been reduced to approximately 90 psig. Once the reactor system has been placed in the cold, safe shutdown condition, it is maintained in this condition by the RHR system.

The following systems would also be required to reach the cold shutdown condition in the manner described above:

1) Division I or II RHR service water system to supply cooling water to the RHR heat exchangers.

2) Division I or II emergency service water system to supply cooling water to the RHR pump motor lube oil

coolers, the pump seal coolers, and RHR pump room unit coolers.

3) Circulating water system

4) Offgas system

5) Service water system

6) Instrument air system

7) All other systems required for the operation of the steam plant and condenser but not those systems or components required only for electrical power generation.

4.2.2 Reactor Cooldown without Offsite Power

In case of loss of offsite power and/or a single fire in any one fire zone, reactor cooldown can be effected without reliance on any nonsafety-related systems.

The cooldown to 90 psig would be accomplished, assuming a loss of offsite power, by discharging steam to the suppression pool via any of the main steam safety relief valves and providing makeup to the reactor from the RCIC system. The main steam isolation valves would be closed to avoid depending on the non-safety turbine stop valve and main steam by-pass valves. The RHR system would be operated in the suppression pool cooling mode to reject heat to the ultimate heat sink spray pond. Alternatively, the RHR heat exchangers could be used in the steam condensing mode to transfer heat directly to the ultimate heat sink. After cooldown to approximately 90 psig, the RHR system would be used in the shutdown cooling mode to cool the reactor directly and to achieve and maintain the reactor in a cold shutdown condition.

The following systems would also be required to achieve cold shutdown in the manner described above:

1) Division I or II RHR service water

2) Division I or II emergency service water

3) Division I (A&C) or II (B&D) emergency diesel generators.

Miscellaneous divisionalized support systems are listed in Table 6-4.

Except for the RCIC system and the RHR shutdown cooling suction line, each of the systems required for cold shutdown have redundant loops, one associated with Division I, and one associated with Division II.

The HPCI system (Division II) provides a redundant backup to the RCIC system (Division I). Additionally, the following system combinations are capable of safely making the transient to 90 psig where the RHR shutdown cooling mode would be effective:

1) ADS plus LPCI (Division I or II),

or

2) ADS plus core spray (Division I or II)

These backup methods are justified in Chapter 15.0 of the FSAR.

The RHR shutdown cooling suction line is provided with one motor operated isolation valve inside containment (Division I) and one outside containment (Division II). A failure in either Division I or II would require that that valve be opened manually using the handwheel to place the RHR system in the shutdown cooling mode. However, several hours would be available for this operation before the shutdown cooling mode would be needed. Should the fire prevent venting and purging of the inerted containment and hence prevent personnel entry for manual operation of the Division I valve, coolant flow from the reactor through open main steam safety relief valve(s) to the suppression pool would be established. The RHR pump(s) would then draw from the suppression pool, pump through the RHR heat exchanger(s) and back to the reactor vessel. See FSAR Section 15.2.9 for further details.

The plant design is such that a postulated fire affecting only Division I or II would not prevent safe plant shutdown. The analysis by fire zone in the following subsections will show that there is no postulated fire that would affect both division of safety related systems required to provide safe shutdown. Where both divisions of essential raceway are routed within a fire zone, the local minority is fire protected per Section 2.11.

4.2.3 Reactor Cooldown from Outside the Control Room (Remote Shutdown)

The plant is designed with a main control room that is common to Units 1 and 2. A Remote Shutdown Panel (RSP) is provided for each unit in the unlikely event the control room becomes uninhabitable. The design is such that the reactors can be placed and maintained in a safe cold shutdown condition from outside the main control room.

Transfer switches on the remote shutdown panel allow the operator to isolate and transfer control from the control room to the RSP instrumentation and controls for the following system functions:

1) RCIC
2) Nuclear boiler safety and relief valves
3) Containment instrument gas to supply air to relief valves
4) RHR (suppression pool cooling mode)
5) RHR (shutdown cooling mode)
6) RHR service water
7) Emergency service water
8) RPV and containment monitoring

4.3 FIRE HAZARDS ANALYSIS - UNIT 1 REACTOR BUILDING

4.3.1 FIRE ZONE 1-1A CORE SPRAY PUMP ROOM (645'-0" to 670'-0")

a) Major safety-related components in fire zone:

Two Division I core spray pumps (A&C)

Two Division I core spray area unit coolers (A&C)

One 16 in. motor-operated valve (MOV), HV-E21-1F-001A, suction isolation valve for Division I core spray pumps

Two 6 in. MOVs, HV-15766 and HV-15768, containment isolation valves for the suppression pool cleanup and drain

Division I cable trays and Divisions I and II safety-related conduit. The Division II conduit supplies control and motive power to suppression pool filter isolation valves.

Division I core spray panel and instrumentation for core spray train and suppression pool level.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-8

		Construction	Rating
Walls:	South & West	36 in. reinforced concrete	3 hr
	North	72 in. reinforced concrete	Not rated
	East	36 in. reinforced concrete	Not rated
Floor:		60 in. reinforced concrete	Not rated
Ceiling:		24 in. reinforced concrete	Not rated
Doors:		Watertight steel door connects to fire Zone 1-1B and steel door connects to fire Zone 1-1G.	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket within safety-related cable trays

2) Leakage of the total inventory of lube oil from one (1) core spray pump motor spread uniformly over the floor of the fire zone and then ignition of this oil. This represents the postulated fire in the area anticipated to generate the maximum heat release during a single fire event.

f) Consequences of fire without active fire protection:

1) Loss of Division I core spray loop

2) Loss of other Division I components

3) Loss of control of isolation valves for the suppression pool filter system

4) The amount of lube oil in any one (1) core spray pump motor is not anticipated to sustain a fire in excess of one minute. The cable insulation and jacketing, as described in Table 6-2, will not propagate combustion once the source of ignition is removed. The fire would not spread into adjacent fire zones because of the absence of combustible pathways through an area of low fire loading.

g) Consequences of fire with active fire protection:

The smoke from the fire would activate the ionization detectors which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the

ability of Division I safety-related equipment or components to function could not be assumed.

The loss of control and power cable for the isolation valves for the suppression pool filter system would not have any adverse effect on the shutdown of the reactor plant. These valves are normally shut and the slight severity of the fire would not result in a breach of the pressure boundary of this system.

4.3.2 FIRE ZONE 1-1B CORE SPRAY PUMP ROOM (645'-0" to 670'-0")

a) Major safety-related components in fire zone:

Two Division II core spray pumps (B&D)

Two Division II core spray pump room unit coolers (B&D)

One 10 in. MOV HV-E41-1F011, HPCI test return line isolation valve

One 16 in. MOV HV-E21-1F001B, suction isolation valve for Division II core spray pumps

Instrumentation panels for Division II core spray loop and HPCI system

Division II cable trays and Divisions I and II safety-related conduit. Division I conduit is for HV-E51-1F022, isolation valve for RCIC test return line

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-8

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	Not rated
	East	24" reinforced concrete	Not rated
	West (Part)	36" reinforced concrete	3hr
	West (part) & North (part)	12" reinforced concrete	2hr
	South	72" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated

Ceiling: 36" reinforced concrete Not rated

Doors: Watertight steel doors connect to fire Zones 1-1A and 1-1C, 1-1/2 hr rated steel door connects to fire Zone 1-1I.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustible: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket within safety-related cable trays

2) Ignition of lube oil for core spray pump motors.

f) Consequences of fire without active fire protection:

1) Loss of Division II core spray loop

2) Loss of HPCI system

The amount of combustibles would not sustain a fire in excess of a severity of 5 minutes. The fire would not spread into adjacent fire zones because of the absence of combustible pathways through an area of low fire loading.

g) The smoke from a fire would activate the ionization detectors which would provide visual and audible alarms both locally and in the main control room. The fire brigade would be dispatached to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

The loss of control power for the RCIC test return line isolation valve would not affect shutdown, since the operation of this valve is not required for the shutdown of the reactor. This valve is normally closed.

4.3.3 FIRE ZONE 1-1C HPCI PUMP ROOM (645'-0" to 683'-0")

a) Major safety-related components in fire zone:

HPCI pump and turbine

Two HPCI pump room unit coolers (A&B)

One 16 in. MOV HV-E41-1F042, HPCI pump suction isolation valve from suppression pool

One 16 in. MOV HV-E41-1F004, HPCI pump suction isolation valve from condensate storage tank

One 10 in. MOV HV-E41-1F001, HPCI turbine steam supply isolation valve

One 20 in. MOV HV-E41-1F066, HPCI turbine exhaust line isolation valve

HPCI instrumentation and panel

Division II cable trays and Divisions I and II conduit. Division I conduit is for HV-E51-1F022, isolation valve for RCIC test return line.

Essential Div. II raceway as listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	3 Hr
	North (part)	36" reinforced concrete	Not rated
	East & West	36" reinforced concrete	Not rated
	South	72" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		36" reinforced concrete	Not rated
Doors:		Watertight steel doors connect to fire Zones 1-1B, 1-1D	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket within safety-related cable trays

2) Ignition of wiring in HPCI panels

3) Ignition of lube oil for HPCI turbine

f) Consequences of fire without active fire protection:

1) Loss of HPCI system

2) Loss of Division II cable tray and Divisions I and II conduit except those Div. II raceways listed in Appendix A and fire protected in accordance with Section 2.11.

3) If it is assumed that all of the lube oil leaked from the HPCI turbine and spread uniformly over the floor of this fire zone, it would sustain an oil fire for approximately one minute. The fire would not spread into adjacent fire zones because of the absence of combustible pathways through an area of low fire loading.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. When the thermal detectors sense a rapid rate of temperature rise or an ambient temperature of 190°F, the water spray system operation would be initiated and would control and/or extinguish the fire. The alarm would also cause the fire brigade to be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the

ability of Division II safety-related equipment or components to function could not be assumed.

The loss of control power for the RCIC test return line isolation valve would not affect shutdown since the operation of this valve is not required for shutdown of the reactor. This valve is normally closed.

4.3.4 FIRE ZONE 1-1D RCIC PUMP ROOM (645'-0" to 683'-0")

a) Major safety-related components in fire zone:

RCIC pump and turbine

Two RCIC pump room unit coolers (A&B)

MOV HV-E51-1F031, RCIC pump suction isolation valve from suppresson pool

MOV HV-E51-1F010, RCIC pump suction isolation valve from condensate storage tank

MOV HV-E51-1F045, RCIC turbine steam supply isolation valve

MOV HV-E51-1F059, RCIC turbine exhaust line isolation valve

RCIC instrumentation and panel

Division I conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	East	36" reinforced concrete	2 hr
	West	36" reinforced concrete	Not rated
	South	72" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		36" reinforced concrete	Not rated
Doors:		Watertight steel door connected to	Not rated

fire Zone 1-1C

Watertight steel door 1-1/2 hr. connects to Zone 1-1J

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of lube oil from RCIC turbine.

f) Consequences of fire without active fire protection:

Although the fire would burn for less than one minute, the potential loss of RCIC system exists. The fire would not spread into adjacent fire zones because of the absence of combustible pathways through an area of low fire loading.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarm both locally and in the main control room. If thermal detectors sense a rapid rate of temperature rise or an ambient temperature of 190°F, the water spray system operation would be initiated and would control and/or extinguish the fire. In any event, the plant fire brigade would be dispatched as a backup to the deluge system to ensure that the fire is extinguished.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of the RCIC equipment or components to function could not be assumed.

4.3.5 FIRE ZONE 1-1E RHR PUMP ROOM (645'-0" to 681'-0")

a) Major safety-related components in fire zone:

Two Division II RHR pumps (B&D) and RHR heat exchanger B.

Two RHR pump room unit coolers (B&D), RHR heat exchanger valves (HV-E11-1F004B&D) and containment penetration valve (HV-E11-1F007B).

RHR system instrumentation

Division II cable trays and Division II and channels A, B, and D conduit

Leak detection temperature elements TE-E11-1N029C&D, TE-E11-1N030C&D

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

		Construction	Rating
Walls:	East	36" reinforced concrete	Not rated
	West	72" reinforced concrete	Not rated
	Northwest	36" reinforced concrete	Not rated
	North	36" reinforced concrete	2 hr
	South	36" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling		36" reinforced concrete	Not rated
Doors:	1 watertight door connects to Zone 1-1J.		1-1/2 hr.
	1 watertight door connects to Zone 1-1F.		Not rated

d) Combustible material in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e). Postulated fire in zone:

1) Ignition of cable insulation and jacket within safety-related cable trays

2) Leakage of total inventory of lube oil from one (1) RHR pump motor spreads uniformly over the floor of this fire zone and then the ignition of this oil. This represents the postulated fire in this area anticipated to generate the maximum heat release during a single fire event.

f) Consequences of fire without active fire protection:

1) Loss of Division II RHR loop

2) Loss of other Division II components

3) Loss of control of isolation valves for the RHR system and containment isolation valves

4) The amount of lube oil in any one (1) RHR pump motor is not anticipated to sustain a fire in excess of one minute. The cable insulation and jacket, as described in Table 6-2, will not propagate combustion once the source of ignition is removed. The fire would not spread into adjacent fire zones because of the absence of combustible pathways. An 8 in. curb prevents spread of oil to adjacent fire zones.

g) Consequences of fire with active fire protection:

In addition to the consequences in f) above, the smoke from the fire would activate the photo-electric detectors which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

Failure of leakage detection temperature elements TE-E11-1N029C and TE-11-1N030C (Division I) in addition to loss of Division II elements would cause isolation of the shutdown supply valves (HV-E11-1F009 and HV-E11-1F008); however, these isolation signals can be bypassed from the control room.

4.3.6 FIRE ZONE 1-1F RHR PUMP ROOM (645'-0" to 681'-0")

a) Major safety-related components in fire zone:

Two Division I RHR pumps (A&C) and RHR heat exchanger A.

Two RHR pump room unit coolers (A&C), RHR heat exchanger valves (HV-E11-1F004A&C) and containment penetration valve (HV-E11-1F007A).

RHR system instrumentation.

Division I cable trays and Division I and Channels A, B & C conduit.

Leak, detection temperature elements TE-E11-1N029A & B, TE-E11-1N030A & B.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9.

	Construction	Rating
Walls: East	36" reinforced concrete	Not rated
North	36" reinforced concrete	Not rated
South	36" reinforced concrete	Not rated
West	72" reinforced concrete	Not rated
Floor:	60" reinforced concrete	Not rated
Ceiling:	36" reinforced concrete	Not rated
Doors:	1 watertight door connects to Zone 1-1E	Not rated
	1 watertight door connects to Zone 1-1G	Not rated

d) Combustible material in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 12 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Leakage of total inventory of lube oil from one (1) RHR pump motor spreads uniformly over the floor of this fire zone and then ignition of this oil. This represents the postulated fire in the area anticipated to generate the maximum heat release during a single fire event.

f) Consequences of fire without active fire protection:

1) Loss of Division I RHR loop

2) Loss of other Division I components

3) Loss of control of isolation valves for the RHR system and containment isolation

4) The amount of lube oil in any one (1) RHR pump motor is not anticipated to sustain a fire in excess of one minute. The cable insulation and jacketing, as described in Table 6-2, will not propagate combustion once the source of ignition is removed. The fire would not spread into adjacent fire zones because of the absence of combustible pathways. An 8 in. curb prevents spread of oil to adjacent fire zones.

g) Consequences of fire with active fire protection:

The smoke from the fire would activate the photo-electric detectors which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

Failure of leakage detection temperature elements TE-E11-1N029B and TE-E11-1N030B (Div II) in addition to loss of

Division I elements would cause isolation of the shutdown supply valves (HV-E11-1F008 and HV-E11-1F009); however, these isolation signals can be bypassed from the main control room.

4.3.7 FIRE ZONE 1-1G SUMP PUMP ROOM (EL 645'-0" to 668'-0")

a) Major safety-related components in fire zone:

Two Division I RHR instrument racks

Division I cable tray

Division I conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-8.

	Construction	Rating
Walls: South	36" reinforced concrete	3 hr rating
East	36" reinforced concrete	Not rated
West	36" reinforced concrete	Not rated
North	36" reinforced concrete	Not rated
Floor:	60" reinforced concrete	Not rated
Ceiling:	24" reinforced concrete	Not rated
Doors:	1 watertight door connects to Zone 1-1F	Not rated
	1 steel door connects to Zone 1-1A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 25 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Ignition of oil on sump liquid surface

f) Consequences of fire without active fire protection:

Loss of Division I cable, loss of Division I RHR instruments. Oil fire contained within and would be limited to the covered sump. Cable does not propagate fire to adjacent rooms. The fire will not propagate to adjacent fire zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

Since there is no automatically actuated fire suppression equipment in this zone, the consequences would be the same as those postulated in Section 4.3.7.f.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

4.3.8 FIRE ZONE 1-1H SUPPRESSION CHAMBER (648'-0" to 700'-0")

a) Major safety-related components in fire zone:

Post-LOCA hydrogen recombiners

Suppression pool water temperature monitors

Primary containment vacuum relief valves

Divisions I and II power cables, in conduit, to post-LOCA recombiners.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figures 5-8, 5-9, and 5-10.

	Construction	Rating
Walls: Circular	72" reinforced concrete	Not rated
Floor:	96" reinforced concrete	Not rated
Ceiling	42" reinforced concrete	Not rated
Access:	Steel hatch	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Failure of recombiner enclosure. This is only possible during periods of recombiner activity which is not expected during normal operation.

f) Consequences of fire without active fire protection:

Loss of hydrogen recombiner and loss of pool temperture monitoring.

Containment penetrations positively prevent propagation of fire to adjacent zones.

Cable in the conduit is not normally energized and thermal overload protection is provided. Therefore no fire source is predicted in the conduit.

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not disable any of the equipment required to place and maintain the reactor in a cold safe shutdown condition.

4.3.9 FIRE ZONE 1-1I STAIRWELL (El 645'-0" to 827'-2")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

Reinforced concrete envelope 2 hr rating.

All doors 1-1/2 hr. rating.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

None

f) Consequences of fire without active fire protection:

N/A

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safe shutdown:

A fire was not postulated in this stairwell since combustible material will not be located in this zone. In the unlikely event that a fire were initiated in some nonmechanistic fashion, the fire would be confined to this stairwell by the fire barrier represented by the walls and doors. Therefore, a fire in this zone would not have an adverse affect on any system required for safe shutdown of the reactor plant. Furthermore, a fire in this zone would not prevent access to or egress from the reactor building since the stairwell in fire Zone 1-1J would be available.

4.3.10 FIRE ZONE 1-1J STAIRWELL (El 645'-0" to 827'-2")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

Reinforced concrete envelope 2 hr rating.

All doors 1-1/2 hr rating.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

None

f) Consequences of fire without active fire protection:

N/A

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safe shutdown:

A fire was not postulated in this stairwell since combustible material will not be located in this zone. In the unlikely event that a fire is initiated nonmechanistically, the fire would be confined to this stairwell by the fire barrier represented by the walls and doors. Therefore, a fire in this zone would not have an adverse affect on any system required for safe shutdown on the reactor plant. Furthermore, a fire in this zone would not prevent access to or egress from the reactor building since the stairwell in fire Zone 1-1I would be available.

4.3.11 FIRE ZONE 1-2A ACCESS AREA (El. 670'-0" to 683'-0")

a) Major safety-related components in fire zone:

Division I motor control centers for RHR, RCIC systems valves and unit coolers, and HPCI vacuum breaker isolation valve.

Division I cable trays and conduit

Division I motor/generator set for LPCI swing bus

Auto transfer switch for LPCI swing bus

Containment isolation valve HV-E21-1F031A

Suppression pool level indication and interlock with core spray

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-9.

	Construction	Rating
Walls: South	36" reinforced concrete	3hr
West	36" reinforced concrete	3 hr
East	36" reinforced concrete	Not rated
North (Part)	72" reinforced concrete	Not rated
North (Part)	24" reinforced concrete	Not rated
Floor:	24" reinforced concrete	Not rated
Ceiling:	24" reinforced concrete	Not rated
Doors:	1 metal door connects to Zone 1-2E	Not rated
	1 metal door connects to Zone 1-2C	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within safety related cable trays.

f) Consequences of fire without active fire protection:

Loss of Division I MCCs (AC and DC)

Loss of containment isolation ability for core spray minimum recirculation line

Loss of Division I swing bus equipment

Loss of Division I suppression pool level indication

The fire will not propagate to adjacent fire zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

Since this zone is not provided with suppression equipment, a fire would result in the consequences described above in Section 4.3.11.f.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

A fire in this zone would probably cause the loss of Division I RHR and core spray systems, and the RCIC system. The HPCI vacuum breaker valve is not in the zone and may be opened manually. The loss of the LPCI swing bus equipment would only affect Division I LPCI system which is postulated to be unavailable because of the loss of the Division I RHR motor control centers.

Containment isolation valve HV-E21-1F031A is the isolation valve for the Division I core spray train minimum recirculation line. The loss of this valve would not affect safe shutdown since the core spray system is not required.

The loss of the suppression pool level instrumentation would likewise only affect the availability of Division I core spray train.

<u>4.3.12 FIRE ZONE 1-2E ACCESS AREA (El. 670'-0" to 683'-0")</u>

a) Major safety-related components in fire zone:

Division II motor control centers for RHR valves

RCIC system control panel B (assigned to Division II - pressure instruments only)

Division II cable trays

Channel A, B, C and Divisions I and II conduit

Containment isolation valves HV-E21-1F031B and SV-15736, SV-15737, SV-15734A

Channel A conduit serves HPCI leak detection thermocouple TE-E41-N029A

Division I conduit serves the RCIC pump discharge valve HV-E51-1F012

Essential raceway as listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-9

		Construction	Rating
Walls:	North (part)	concrete unit masonry and steel	Not rated
	North (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	
	North (part)	16" reinforced concrete	2 hr
	West (part)	16" reinforced concrete	
	East	30" reinforced concrete	2 hr
	South (part)	72" reinforced concrete	
	South (part)	30" reinforced concrete	
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		2 metal doors to zones 1-1J and 1-1I	1-1/2 hr
		3 metal doors to zones 1-1D, 1-1C & 1-2A	Not rated
		1 bullet resistant door to 1-2D	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within cable trays.

f) Consequences of fire without active fire protection:

The major portion of cabling in this fire zone are low energy control cables associated with the remote shutdown panel (located in Fire Zone 1-2D), and a nonsafety-related lighting panel. A motor control center for Division II RHR valves contains some 480 V cables. An overload condition in the cables in these panels and/or in the safety-related cable trays would be interrupted by overcurrent protection associated with the cabling. If a fire were initiated in the cabling insulation as a result of an overcurrent condition, it would extinguish itself once the power was interrupted. As a result of this self-extinguishment characteristic, the fire would not propagate beyond the immediate location of the initiation of the fire.

Those essential raceways listed in Appendix A are fire protected in accordance with Section 2.11 and are not assumed to be lost.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the low potential for a fire in this zone, any fire within a panel or cable tray would be confined to the immediate point where the fire was initiated. For purposes of this analysis, it was assumed that any fire in the Division II safety-related cable tray rendered inoperative all Division II safety-related systems and/or components that could be used to shut down the reactor plant. With respect to panel fires, it was assumed that the ability of all equipment associated with this panel to function would be lost unless there was some internal fire barrier to physically prevent propagation throughout the entire panel.

4.3.13 FIRE ZONE 1-2C RAILROAD AIRLOCK AND HOISTWAY (El. 670'-0" to 818'-0")

a) Major safety-related components in fire zone:

Spent fuel and new fuel casks

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-9

		Construction	Rating
Walls:	North	30" reinforced concrete	Not rated
	West	30" reinforced concrete	Not rated
	East	30" reinforced concrete	Not rated
	South	36" reinforced concrete	3 hr
Ceiling:		30" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Doors:	1 steel door to Zone 1-2A		Not rated
	1 steel door to yard		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Tabel 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of railroad car axle grease.

f) Consequences of fire without active fire protection:

While in this fire zone, the spent reactor fuel elements are contained within shipping casks that are qualified for an external fire in accordance with 10 CFR 71.

g) Consequences of fire with active fire protection:

If a fire were to occur in this zone, the sprinkler system would be actuated when the fusible links on the sprinkler

heads melted at 212°F. The actuation of this system would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

Since the shipping casks are rated for any plausible fire in this zone, there would not be any abnormal release of radioactive material.

The postulated fire would not affect any safety-related systems required for safe shutdown. Therefore, the reactor plants could be placed and maintained in a cold, safe shutdown condition by the methods described in Section 4.2.1 or 4.2.2.

4.3.14 FIRE ZONE 1-2D REMOTE SHUTDOWN PANEL El 670'-0" to 683'-0"

a) Major safety related components in fire zone:

Remote Shutdown Panel

b) Fire protection and detection system in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-9.

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	West (part)	16" reinforced concrete	2 hr
	West (part)	concrete unit masonry & steel	Not rated
	South	concrete unit masonry & steel	Not rated
	East	concrete unit masonry & steel	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Bullet resistant door to Zone 1-2B	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire within zone:

Ignition of cables within the cable trays.

f) Consequences of fire without active fire protection:

Cabling in this fire zone is all associated with the remote shutdown panel. If a fire were initiated in the cabling insulation as a result of an overcurrent condition, it would extinguish itself once the power was interrupted. As a result of this self-extinguishment characteristic, the fire would not propagate beyond the immediate location of the initiation of the fire.

All systems with control circuits other than indication in the remote shutdown panel are assumed to fail. Therefore assume:

Loss of RCIC

Loss of RHR Division II

Loss of RHR Service Water Division II

Loss of ESW Division II

Loss of main steam isolation valves, inboard, Division I

g) Consequences of fire with active fire protection:

The ionization smoke detectors would alarm in the main control room and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the low potential for a fire in this zone, any fire within a panel or raceway would be confined to the immediate point where the fire was initiated. With respect to panel fires, it was assumed that the ability of all equipment associated with this panel to function would be lost unless there was some internal fire barrier to physically prevent propagation throughout the entire panel.

A fire in the remote shutdown panel would result in loss of either the Division I or Division II safety-related equipment or components controlled from this panel, since the divisions are physically separated by a steel plate barrier and all switches and instrumentation devices are located in accordance with NRC Regulatory Guide 1.75.

If either division were lost as result of the remote shutdown panel fire or the Division II safety-related systems were lost as a result of a fire in the Division II cable trays, the reactor plant could by placed and maintained in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

4.3.15 FIRE ZONE 1-3A ACCESS AREA (El. 683'-0" to 719'-0")

a) Major safety-related components in fire zone:

Motor control center for HPCI, RHR core spray unit coolers

Transformer for Division I instrument panel

Divisions I and II cable trays

ESW valves HV11024, A1, A2, E1, B2

Neutron monitoring instrumentation preamplifier panels.

1) SRM A, IRM A/E preamp panel

2) SRM B, IBM B/F preamp panel

Recombiner power supply panel A

Divisions I and II and RPS channels A1, B1, A2, B2 safety-related conduit. Division II conduit serves ESW valves HV11024, E1, E2, B3.

Essential Div. II raceway is listed in Appendix A.

b) Fire ptoection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

		Construction	Rating
Walls:	East (part)	72" reinforced concrete	Not rated
	East (part)	30" reinforced concrete	Not rated
	East (part)	18" concrete block	Not rated
	West	36" reinforced concrete	3 hr
	South	36" reinforced concrete	3 hr
	North	30" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Floor:	24" reinforced concrete	Not rated
Doors:	Steel doors to Zones 1-3B and 1-3C	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 25 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within safety-related cable trays

f) Consequences of fire without fire protection:

Loss of SRM channels A&B and IRM channels A/E and E/F

Loss of reactor building cooling water and associated ESW valves

Loss of Division I HPCI, RHR, and core spray unit coolers

Loss of recirculation pump A

Loss of 'A' recombiner

Loss of Division I instrumentation

Loss of Division I safety-related cable trays and conduit.

The low radiation energy of a postulated cable fire precludes horizontal propagation to Division II cables. Essential Div. II raceway listed in Appendix A will be fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of

offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

The minimum separation distance between the safety-related division cable trays is 25 feet. The minimum distance between any non-safety related cable tray and the nearest safety-related cable tray (Division I) is 10 feet. In order for a fire in any cable tray to approach these minimum separation distances and possibly affect either safety-related division of cable trays, the fire would have to propagate horizontally. There are horizontal fire stops in these cable trays at intervals of approximately 20 feet to prevent horizontal propagation. In addition, the cable insulation has chemical properties which preclude the propagation of the fire beyond a relatively short distance once the source of ignition is removed.

The loss of the neutron monitoring IRM channels A/E and B/F would not cause a reactor scram unless the reactor plant were in a startup or subcritical condition. The loss of the neutron monitoring SRM channels A&B has no effect on the RPS. Manual Scram from the main control/room would not be precluded.

The emergency service water (ESW) valves listed in Section 4.3.15a isolate ESW from the reactor building closed cooling water system (RBCCWS) heat exchangers. These valves are normally closed and, since the RBCCWS is not required for reactor shutdown, the loss of these valves will not have an adverse impact on the ability to place the plant in a cold shutdown condition. Should these valves run open due to a hot short, operators could manually close them.

4.3.16 FIRE ZONE 1-3E ACCESS AREA (El. 683'-0" to 719'-1")

a) Major safety-related components in fire zone:

250 V Division II motor control centers 1D264, 1D274

480 V ac Division II control center 1B226

Division II control panels for RHR, HPCI leak detection, recirculation pumps, recombiners and neutron monitoring panels SRM/IRM D/H and C/G

Containment pressure 'B' instruments

Instrument power distribution panel

Transformer for instrument power

Division I and II cable trays and channels A, B, C, D, E, F and Division II conduit

Essential Div. I raceway listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	3 hr
	North (part)	16" reinforced concrete	2 hr
	West (part)	16" reinforced concrete	2 hr
	East (part)	30" reinforced concrete	2 hr
	East (part)	36" reinforced concrete	Not rated
	South (part)	30" concrete block	Not rated
	South (part)	30" reinforced concrete	Not rated
	South wall common to Zone 1-3C	30" reinforced concrete	Not rated
	West wall common to Zone 1-3C	30" reinforced concrete	Not rated
Ceiling		24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Doors:	Door to Zones I-1I and 1-1J		1-1/2 hr
	Steel door to Zone 1-3A		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Tabel 6-1

2) Equivalent fire severity: 15 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within one division of safety-related cable trays

f) Consequences of fire without active fire protection:

Loss of listed MCCs and control panels

Loss of 'E' containment pressure instruments

Loss of instrument power distribution panel and transformer

Loss of Division I or II cable trays. The low radiant energy of a cable fire precludes horizontal propagation between Division I and II cable trays.

Essential raceway will be protected in accordance with Section 2.11 and is assumed not to fail.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

The loss of both divisions of safety-related cable trays is not postulated for a fire in this zone since the redundant trays are separated by a minimum distance of 24 ft. and there are no fixed combustible materials between these trays at this point of minimum separation to serve as combustible pathways. The loss of both divisions of safety-related conduit is not postulated because of the fire barrier represented by the conduit and the separation distances which, as a minimum, are in accordance with NRC Regulatory Guide 1.75. Essential raceway is fire protected in accordance with Section 2.11.

The loss of the 250 V dc motor control center 1D264 would result in the loss of the remote operation of most of the dc motor operated valves associated with the HPCI system. For purposes of this analysis, it was assumed that the HPCI system was unavailable either as a result of the loss of MCC 1D264, the Division II cable trays, or the control panel for HPCI leak detection.

The loss of the 250 V dc MCC 1D274 would result in the loss of three HPCI valves, the RHR outboard suction isolation

valve HV-E11-1F008, and RHR head spray outboard isolation valve HV-E11-1F023. The RHR system could be placed in the shutdown cooling mode by dispatching an operator to open the outboard suction valve, HV-E11-1F008, by the handwheel attached to the valve operator. The same action could be taken for HV-E11-1F023, if RHR head spray was desired.

The loss of the 480 V ac MCC 1B226, would cause the loss of some Division II RHR and core spray valves and the Division II RHR and core spray room unit coolers. For purposes of this analysis, Division II RHR and core spray systems were assumed lost; thus, the loss of this MCC would not adversely affect the ability to safely shut down the reactor plant.

4.3.17 FIRE ZONE 1-3C ACCESS AREA (El. 683' - 719'-1")

a) Major safety-related components in fire zone:

The following Division I and II motor-operated valves

E41-1F003	Outboard isolation valve for steam supply to HPCI turbine (normally open)
E11-1F010B	Division II RHR cross-tie isolation valve (normally open)
E11-1F017B	Division II LPCI injection isolation valve (normally open)
E11-1F015B	Division II LPCI injection outboard isolation valve (normally closed)
E11-1F048B	Division II RHR heat exchanger bypass valve (normally open)
E11-1F008	RHR suction outboard isolation valve (normally closed)
E51-1F008	Outboard isolation valve for steam supply to RCIC turbine (normally open)
E11-1F010A	Division I RHR cross-tie isolation valve (normally open)
E11-1F017A	Division I LPCI injection isolation valve (normally open)
E11-1F015A	Division I LPCI injection outboard isolation valve (normally closed)
E11-1F048A	Division I RHR heat exchanger bypass valve (normally open)

E11-11F023	RHR head spray outboard isolation valve (normally closed)
HV-15112	RHR head spray isolation valve (normally open)

Drywell floor and equipment drain sumps discharge containment isolation valves

Reactor building closed cooling water containment isolation valve

RHR system instrumentation

Divisions I and II cable trays

Divisions I and II and channels A and B safety-related conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

			Construction	Rating
Walls:	North South East West	Common with Zones 1-3A 1-3B and 1-2C	30" reinforced concrete	Not rated
	North South East West	Common to Zone 1-3D	72" reinforced concrete	Not rated
Floor:			24" reinforced concrete	Not rated
Ceiling			24" reinforced concrete	Not rated
Doors:	3 steel doors to Zones 1-3A, 1-3B, and 1-2C			Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable within safety related cable trays.

f) Consequences of fire without active fire protection:

Loss of either Division I or II LPCI system

Loss of either RCIC or HPCI system

Temporary loss of RHR shutdown cooling

The low radiant energy of a postulated cable fire precludes horizontal propagation or "flash-over" from Division I cable to Division II cable and vice versa.

g) Consequences of fire with active fire protection:

Same as f) above

h) Effects of fire on safe shutdown:

The absence of combustibles in this zone would preclude the occurrence of a fire external to cable trays or conduit. An electrical fire would not propagate beyond the point of initiation, since the cables are protected from thermal overload by overcurrent protection. Once the power source is removed the cable insulation would self-extinguish.

The loss of both divisions of safety-related trays is not postulated for a fire in this zone since the redundant division trays are separated by a minimum distance of 24 feet and there are no fixed combustible materials between these trays at this point of minimum separation to serve as combustible pathways.

If a fire initiated in the area of the Division I equipment or cable trays and the remote control of RHR suction valve were lost, the RHR system could be placed in the shutdown cooling mode by dispatching plant personnel to manually open the valve by a handwheel attached to the valve operator. The loss of the RCIC system would probably not occur because the steam supply isolation valve, HV-E51-F008, is normally in the open position.

If a fire started in the area of the Division II equipment or cable trays, the Division II RHR/LPCI system might be rendered unavailable. If only the remote control of the isolation valves were lost, the Division II RHR system would only be lost temporarily. The loss of the HPCI system would probably not occur because the steam supply isolation valve, HV-E41-F003, is normally in the open position.

4.3.18 FIRE ZONE 1-4A, CONTAINMENT ACCESS AREA (El. 719'-1" to 747')

a) Major safety-related components in fire zone:

1) Main steam flow 'C&D' panel, Division II

2) Jet pumps 1-10 panel, Division II

3) Main steam flow A&B panel, Division II

4) RCIC leak detection panel, Division II

5) RWCU leak detection EDSH-G33-1N044A

6) SRM-IRM drive control relay panel

7) RCIC leak detection 'A' panel, Division I

8) Jet pumps 11-20 panel, Division I

9) Main steam flow 'A&B' panel, Division I

10) Main steam flow 'C&D' panel, Division I

11) Containment atmos. analysis panels and pumps Division I and II

12) Hydrogen recombiner control panel, Division II and I

13) MSIV leak control system panel, Division II

14) MSIV leak control system transmitter, Division II

15) MCC 1B229, Division II, LPCI Swing Bus (480 V) for RHR, inject. iso. vlv and recirc disch. byps.

16) Transformers: 1X23G, Div. I (480-208/120V) for 1Y-236

1X24G, Div. II (480-208/120 V)) for 1Y-246

17) Tray raceway Div. I & II and conduit raceway Div. I & II (A1, B1, A2, B2)

18) Division II LPCI swing bus MG SET-1G-203

19) 120 V instrument ac distribution panels Ch. ABC&D 1Y216, 1Y226, 1Y236 & 1Y246

20) HV18781 A1&A2 & B1&B2 Ch. wtr. drywell unit coolers valves

HV18791 A1&A3 & B1&B2 Ch. wtr. drywell unit coolers valves

21) Emergency switchgear and load center unit coolers A&B Division I and II and instruments

22) Control rod drive hydraulic units, flow & pressure modulus

23) Main steam isolation valves control system blowers

24) CRD removal hatch

25) Essential raceway as listed in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	West (part)	36" reinforced concrete	3 hr
	West (part	12" reinforced concrete	2 hr
	North (part)	12" reinforced concrete	2 hr
	South (part)	36" reinforced concrete	3 hr
	East (part)	12" reinforced concrete	3 hr
	East (part)	12" reinforced concrete	2 hr
	North (part)	36" reinforced concrete	2 hr
	North (part)	36" reinforced concrete	Not rated
	South&East (part)	12" concrete block	Not rated
	North, South, East, West common to zone 1-4F	72" reinforced concrete	Not rated
Ceiling		24" reinforced concrete	Not rated

Floor:	24" reinforced concrete	Not rated
Doors:	5 steel doors to zones 1-4C, 1-4D & 1-4E	3 hr
	2 steel doors to zones 1-1J & 1-1I	1-1/2 hr
	1 steel doors to zones 1-4G	Not rated
	1 steel door to zone 1-4E alarmed	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 15 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of Division I or Division II cable insulation and jacket material in cable trays

2) Ignition of instrument air compressors lube oil

3) Ignition of TIP drive lubricant

f) Consequences of fire without active fire protection:

1) Loss of main steam flow monitoring and interlock

2) Loss of jet pump instrumentation

3) Loss of leak detection system for the RCIC & RWCU

4) Loss of core monitoring instrumentation

5) Loss of leak detection function

6) Loss of main steam flow instrumentation

7) Loss of main steam flow signals

8) Loss of containment atmospheric analysis instrumentation

9) Loss of hydrogen recombiner C&D.

10) Loss of MSIV leak control system controls

11) Loss of input information to panel 1C074 an 1C073 (MSIV leakage control Division I and II)

12) Loss of reactor recirculation pump motor cooler

13) Loss of drywell unit coolers loop 'A'

14) Loss of emergency switchgear rooms unit cooler A

(Note: Cooler B raceways are fire protected in accordance with Section 2.11 and the air intake is routed from Fire Zone 1-5A)

15) Loss of the CRD hydraulic control units

16) Loss of main steam isolation valves opertors' blowers (causing restrictions to number of MSIV operations)

17) Loss of containment isolation capability

The fire is not propagated to adjacent zones because of the absence of combustible pathways.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

Within the fire zone, there are no combustible materials that represent a potential ignition source for the initiation of a fire. The only plausible mechanism for a fire in the cables, MCC's or motors in this zone would be due to current overload. Since all cables and motors are provided with overload protection, power to an overloaded cable or motor would be interrupted prior to the cables or motor reaching the ignition point for the insulation. Even if the overload protection did not prevent the initiation of a fire, once the power was removed from the cables the fire would not continue since the cable insulation will not propagate flame.

The minimum separation distance between the opposite division safety-related cable trays is 48 feet. There are non-safety related trays between these safety-related trays, however, a fire in the non-safety related trays or a fire in one of the divisions of safety-related trays would have to

propagate 70 feet horizontally in order to affect both divisions. There are horizontal fire stops in these cable trays at intervals of approximately 20 feet to prevent horizontal propagation of a fire. In addition, the cable insulation has chemical properties which preclude the propagation of a fire beyond a relatively short distance once the source of ignition is removed.

Any fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire. Thermal detectors would actuate the sprinkler system.

A fire in this zone would not disable the emergency switchgear in zones 1-4C, 1-4D, 1-5F or 1-5G since all the switchgear is separated from this fire zone by 3 hour fire rated reinforced concrete walls, ceiling and floors. Although both emergency switchgear unit coolers are located in this fire zone, they are separated by a minimum distance of 6 feet. A motor fire in either unit would not propagate because the motor is provided with thermal overload protection and once the power to motor was interrupted the insulation would not propagate flame. Furthermore, each fan assembly is contained in a steel plate enclosure and the enclosure contains no combustible material. If one switchgear unit cooler were lost, due to fire, the other unit could cool all four emergency switchgear rooms. The air intake for Cooler B is located in Fire Zone 1-5A above this zone to prevent smoke and superheated air from a local fire from being drawn into the switchgear rooms.

The loss of the RCIC leak detection panel would cause the turbine steam supply isolation valves HV-E51-1F007 and HV-E51-1F008 to close. This isolation signal can be bypassed from the main control room and the valves can be reopened.

The loss of the SRM-IRM drive control relay panel would affect the ability of the operator to move reactor control rods, but would not affect either the capability for automatic or manual scram.

The loss of the reactor water clean-up system (RWCU) leak detection differential pressure switch and main steam isolation valve (MSIV) leak detection panel would cause the isolation of the RWCU and MSIV's. The isolation of the MSIV's would cause the reactor to scram and the reactor could be shutdown in the manner described in Section 4.2.2. The loss of motor control center 1B229 or the LPCI swing bus motor-generator set 1G-203 would cause the loss of power to the motor operation for the following valves: HV-E31-1F031B, recirculation pump discharge isolation valve, HV-

B31-1F032B, recirculation pump discharge bypass valve, HV-E11-1F007B, outboard isolation valve for minimum flow line for RHR pumps 1P202B and 1P202D, and HV-E11-1F015B, outboard LPCI injection isolation valve. The recirculation valves are not required for reactor shutdown. If it is assumed that the Division II cable trays and/or conduit are also lost, then the RHR pumps 1P202B&D would be unavailable and thus the losing of these RHR valves would not cause a more degraded condition. If it were assumed that Division I cable trays and/or conduit were also lost, then these RHR valves could be manually opened by use of the attached handwheels.

If a fire occurred in the area of the control rod drive (CRD) hydrualic control units, the associated solenoid valves might be deenergized and the reactor control rods would scram. Subsequent to the reactor scram, the plant would be shutdown by a method described in either Section 4.2.1 or 4.2.2.

4.3.19 FIRE ZONE 1-4E, PIPE PENETRATION ROOM (El. 719'-1" to 733')

a) Major safety-related components in fire zone:

1) Division II cable tray raceway and Division I & II conduit raceways.

2) Division I conduit serves the instrument gas compression 1K 205 A & B

b) Fire protection and detection systems in fire zone:

See Table 6.1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North (Part)	24" reinforced concrete	2 hr
	North (Part)	24" reinforced concrete	Not rated
	West	36" reinforced concrete	3 hrs
	South	48" reinforced concrete	Not rated
	East	36" & 72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

<u>Doors:</u> Non rated, alarmed, steel door connecting to fire zone 1-4A

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 11 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material with Division II safety related cable trays and Division I and II conduit raceways

2) Ingnition of lubricant in TIP drives running through this zone.

f) Consequences of fire without active fire protection:

Loss of Division II cables. Division I & II conduits are physical separated from each other in accordance with NRC Regulatory Guide 1.75 precluding propagation from one division to the other.

g) Consequences of fire with active fire protection:

A fire hose station provides capability to extinguish any postulated fire in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2, except that the ability of the Division II safety-related equipment or components to function could not be assumed.

<u>4.3.20 FIRE ZONE 1-4C, SWITCHGEAR ROOM (El. 719'-1" to 739')</u>

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 1A204 CH.'D', distributed power from the off site power and standby onsite power to load Group "D".

2) 480 V load center 1B240 CH.'D.', distributes 480 V and lower voltage to load Group "D".

3) 480 V MCC 1B246 Division II provides power to 480 V equipment listed in paragraph 4.3.19.h.

4) Division II cable tray raceway and Division II-D conduit raceway.

5) 1X240 Load center transformer for 1B240.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Structure	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs.
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hr 1 side
Ceiling:		8" reinforced concrete	3 hr
Doors:	Steel door connecting to Fire Area 1-4A		3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 45 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable trays and conduit raceways.

f) Consequences of fire without active fire protection:

1) Loss of switchgear 1A-204 Channel "D"

2) Loss of load center 1B-240 Channel "D"

3) Loss of MCC 1B-246 and associated Division II power supply to drywell coolers, RHR valves etc.

4) Loss of Division II cable tray and Division II-C conduit.

5) Loss of transformer IX-240 Channel "D"

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 719'-1" elevation. The floor is 24" and the ceiling is 8" reinforced concrete and the penetrations are sealed to a three hour rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel "D" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 1P202D

2) Emergency Service Water Pump OP504D

3) Core Spray Pump 1P206D

4) RHR Service Water Pump 1P506B

5) Control Structure Chiller OK211B

Nonetheless three safety-related electrical channels, i.e., A, B, and C, and the systems and components served by these channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of MCC 1B-246 would result in the loss of a power supply to the following equipment and components:

1) Hydrogen recombiner "D" - 1E440D

2) 480V/277V reactor building essential lighting panel - 1EP04

3) Valve HV-B21-1F002, reactor head vent isolation valve

4) Valve HV-B21-1F005, reactor head vent isolation valve to steam line "A" (normally open)

5) Valve HV-B21-1F032B, outboard feedwater isolation check valve

6) Valve HV-B31-1F023B, recirculation pump "B" suction isolation valve (normally open)

7) Valve HV-B31-1F031B, recirculation pump "B" discharge isolation valve (normally open)

8) Valve HV-E11-1F027B, RHR suppression pool spray outboard isolation valve (normally closed)

9) Valve HV-E11-1F048B, Division II RHR heat exchanger bypass valve (normally open)

10) Valve HV-E51-1F007, inboard isolation valve for steam supply to RCIC turbine (normally open)

11) Loop "B" drywell area unit coolers

The loss of power to the outboard feedwater isolation valve, HV-B21-1F032B, would only cause the loss of the testing function of this check valve and would not affect its ability to shut on reverse flow.

The loss of power to the recirculation pump "B" suction and discharge isolation valves, HV-B31-1F023B and HV-B31-1F031B, would not cause the loss of the recirculation flow in this loop since these valves are normally open during power operations and if power were lost to the motor operators the valves would remain in the open position.

The loss of power to the RHR suppression pool spray outboard isolation, valve HV-E11-1F027B, would cause loss of the ability of the Division II RHR train to provide sprays to the suppression pool. However, the Division I isolation valve, HV-E11-1F027A, would be operable from the main control room and thus sprays would be provided to the suppression pool if needed. The suppression pool spray function is not normally required for the reactor shutdown operations.

The loss of power to the Division II RHR heat exchanger bypass valve, HV-E11-1F048B, would not cause the loss of the

LPCI function since this valve is normally open. However, it would cause the temporary loss of the shutdown cooling mode for the Division II RHR train. The shutdown cooling capability for this train could be restored by dispatching plant personnel to shut this valve by use of the handwheel attached to the valve operator. However, this would not be necessary since the redundant Division I RHR shutdown cooling mode would be available.

The loss of power to the inboard isolation valve for the steam supply to the RCIC turbine, HV-E51-1F007, would not cause the loss of the RCIC system since this valve is normally open and if power were lost to the motor operator, the valve would remain in the open position.

Loss of power to all the other valves and components listed above as being powered from MCC 1B-246 would not have any appreciable affect on the ability to affect a safe shutdown of the reactor since none of these valves or components is required for the shutdown operation.

4.3.21 FIRE ZONE 1-4D, SWITCHGEAR ROOM (El. 719'-1" TO 739')

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 1A203, distribution power from the offsite and standby power to load Group "C" (Channel C)

2) 480 V load center 1B230 load center distribute 480 V/low voltage to load Group "C" (Channel C)

3) MCC 1B236-480 V supply to equipment listed in paragraph 4.3.20.h.

4) Transformer IX230-4.16 kV/480 V load center transformer for 1B230 (Channel C)

5) Division I cable trays and Division I conduit raceway

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North, South	8" reinforced concrete	3 hrs

& West		
East	36" reinforced concrete	Not rated
Floor:	24" reinforced concrete	3 hr 1 side
Ceiling:	8" reinforced concrete	3 hr
Doors:	Steel door connecting to Fire Area 1-4A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 40 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable trays and conduit.

f) Consequences of fire without active fire protection:

1) Loss of switchgear 1A203 Channel "C"

2) Loss of load center 1B230 Channel "C"

3) Loss of MCC 1B-236 and associated Division I Power supply

4) Loss of transformer 1X230, Channel "C"

5) Loss of Division I tray raceway and Division I, Channel "C" conduit raceway.

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 719'-1" elevation. The floor is 24 inch and the ceiling is 8 inch reinforced concrete and the penetrations are sealed to a three hour rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel "C" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 1P202C

2) Emergency Service Water Pump OP504C

3) Core Spray Pump 1P206C

4) RHR Service Water Pump 1P506A

5) Control Structure Chiller CK211A

Nonetheless, three safety-related electrical channels, i.e., A, B, and D, and the systems and components served by these channels would remain available to place and maintain the reactor in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of MCC 1B-236 would result in the loss of a power supply to the following equipment and components:

1) 250 Volt DC battery charger "A" - 1D653B

2) Standby liquid control storage tank heater - 1E220

3) Hydrogen recombiner "C" - 1E440C

4) Standby liquid control pump "A" - 1P208A

5) Valve HV-11313, reactor building closed cooling water system containment isolation valve (normally open) - return

6) Valve HV-11314, reactor building closed cooling water system containment isolation valve (normally open) - supply

7) Valve HV-12603, inboard isolation valve for suction to containment instrument gas compressors (normally open)

8) Valve HV-B21-1F001, reactor head vent valve

9) Valve HV-C41-1F006, SLCS outboard isolation valve (stop check - normally open)

10) Valve HV-E11-1F009, RHR suction inboard isolation valve (normally closed)

11) Valve HV-E11-1F027A, RHR suppression pool spray outboard isolation valve (normally closed)

12) Valve HV-E11-1F040, RHR drain valve to liquid radwaste system (normally closed)

13) Valve HV-G33-1F001, RWCU inboard suction isolation valve (normally open)

14) Loop "A" drywell area unit coolers

The loss of power to the standby liquid control pump, 1P208A, would not affect reactor safety or the ability to effect a reactor shutdown since the CRD system and the other SLCS pump 1P208B would still be available to place the reactor in a subcritical condition.

The loss of power to the RHR inboard suction isolation valve, HV-E11-1F009, would cause a temporary loss of control of the shutdown cooling mode of the RHR system from the main control room. However, once the reactor was in subcritical condition, operators could be dispatched to open this valve by use of the handwheel attached to the operator and thus restore the shutdown cooling mode capability. Since the reactor plant can be held in a hot shutdown condition without the use of the shutdown cooling mode of the RHR system, this does not represent a significant degradation of the plant's ability to place and maintain the reactor in a cold, shutdown condition.

Loss of power to all the other valves and components listed above would not have any effect on the ability to effect a safe shutdown of the reactor since none of these valves or components is required for the shutdown operation.

4.3.22 FIRE ZONE 1-4E, CRD REPAIR AREA, (El. 719'-1" TO 747'-1")

a) Major safety-related components in fire zone:

Radiation Elements RE-IN010A3 & B3

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	8" reinforced concrete	3 hrs
	West	8" reinforced concrete	3 hrs
	South	36" reinforced concrete	3 hrs
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		8" reinforced concrete	Not rated
Doors:		Steel door to Zone 1-4A	3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: None

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

The fire loading is less than 1 psf and a postulated fire would be expected to remain localized in the area of ignition. Cable routed in conduit is not considered a pathway out of this zone.

f) Consequences of fire without active fire protection:

Loss of Radiation Elements

g) Consequences of fire with active fire protection:

Portable extinguishers and a hose reel are available for plant fire brigade to extinguish a fire in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2 since the ability to function of both Division I and II safety-related equipment or components would not be adversely affected by a fire in this zone.

4.3.23 FIRE ZONE 1-4F, DRYWELL (EL. 703'-11", 719'-1", 738'-11 1/2", 752'-2 1/2", 767'-1" & 779'-1" TO 807'-0")

a) Major safety-related components in fire zone:

1) El. 703'-11" and 719'-1"

1) Division I & II cable trays, and Division I & II (A1, A2, B1, B2) conduit raceway

2) Hydrogen recombiners "C" and "D"

3) Reactor recirculation pumps "A" & "B"

4) HV-B21-1F016 Main steam drain shutoff I valve
HV-B21-1F020 Steam line equalizer valve
HV-E11-1F009 RHR pump suction shutoff valve
HV-E11-F022 Reactor head spray shutoff IB valve

2) El. 738'-11 1/2"

1) Division II cable trays, and Division I and II, A (A1, A2, B1 & B2) conduit raceway

2) MSIV leakage control system heaters A, B, C & D

3) HV-G33-1F001 RWCU IB ISO valve

3) El. 752'-2 1/2"

1) Conduit raceway Division I & II

2) HV-B21-1F032A Feedwater inlet valve
HV-B21-1F032B Feedwater inlet valve
HV-E11-1F016B RHR shutdown Clg Pp suc valve
HV-E21-1F005A CS inbd eject shutoff valve
HV-21-1F005B CS inbd eject shutoff valve

4) El. 767'-1"

Division I & II conduit raceway

5) Penetrations as determined in adjoining fire zones.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-11 through 5-13

		Construction	Rating
Walls:	All around	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete/ steel plate	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Equipment & personnel air locks to 1-4A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 20 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) There is no postulated fire considered in this zone because of the nitrogen inerted atmosphere.

2) Separation of redundant cable trays & conduit are in accordance with the NRC Regulatory Guide 1.75.

f) Consequences of fire without active fire protection:

The inerted nitrogen atmosphere will prevent combustion at any time that a safe shut down may be required.

g) Consequences of fire with active fire protection:

Same as 'f' above.

h) Effects of fire on safe shutdown:

Since no fire is postulated in this zone, all of the system and/or components required to place and/or maintain the reactor plant in a cold, safe shutdown condition would be available. The methods described in section 4.2.1 or 4.2.2 could be used to effect a shutdown of the reactor plants.

4.3.24 FIRE ZONE 1-4G, MAIN STEAM PIPEWAY RECIRCULATION FAN ROOM (El. 719'-1" TO 816'-1")

a) Major safety-related components in fire zone:

Division I and II conduit raceway

Containment isolation valves B21-1F028 A, B, C, D outboard main steam isolation valves

HV 4107 A, B feedwater check valves (outboard isolation)

B21-1F032 A, B feedwater isolation valves

E51-1F0013 RCIC to feedwater isolation valve (normally closed)

E41-1F006 HPCI return to feedwater isolation valve (normally closed)

b) Fire protection and detection systems in the fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-11 through 5-14

		Construction	Rating
Walls:	North, South & West	48" reinforced concrete (717' to 786")	3 hrs
	North & South (part)	48" reinforced concrete	Not rated
	East (part)	36" reinforced concrete (761' to 818')	Not rated
	East (part)	72" reinforced concrete (717' to 818') Steel plate to zone 1-4C	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Steel doors to zones 1-4A, 1-5A, 1-7A, blow-out panel to outside	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of Division II (A2, B2) ESF conduit

2) Ignition of non-safety related cable to reactor building pipe tunnel unit coolers

f) Consequences of fire without active fire protection:

1) Loss of reactor building pipe tunnel unit cooler recirculation fans.

Loss of power to the above listed outboard containment isolation valves except that assisted check valves will still close on reverse flow.

Cable in conduit is not considered a combustible path to adjacent areas.

Fire does not spread to adjacent fire zones because of absence of combustible paths.

g) Consequences of fire with active fire protection:

Same as above.

h) Effects of fire on safe shutdown:

Since the cable routed in conduit is separated in accordance with NRC Regulatory Guide 1.75 the conduit material would act as a fire barrier with respect to external cable fires, the loss of both Division I and II cables is not postulated.

If both the AC and DC power supply to valves B21-1F028, A, B, C & D were lost, these valves would shut and reactor protection system would cause the reactor to scram. If only the AC or DC power were lost, the valves would remain open. If the AC and DC power were lost to one MSIV, then the total steam flow would decrease and the three element feedwater control system would reduce feedwater flow. If power were lost to two MSIV's, then one of two results would occur depending on which combination of valves were lost:

1) The steam flow would decrease, or

2) The RPS system would scram the reactor

If power were lost to three MSIVs, the RPS system would scram the reactor.

The loss of power to the feedwater check valves would only cause loss of the testing capability of the valves. The valves would still close on reverse flow.

The Division I conduit for RCIC injection isolation valve HV-E51-1F0013 and the Division II conduit for HPCI injection isolation valve HV-E41-1F006 are routed on opposite sides of this fire zone and the minimum distance between these conduits is 10 feet. As a result of this separation, the loss of both these valves due to an electrical fire is improbable. Even if the power to both valves were lost, the plant could still be shutdown by use of the combination of LPCI or core spray and ADS. Once the fire was extinguished in this zone, the HPCI and RCIC system could be restored by dispatching operators to open both of the valves by use of the handwheel attached to the valve operators.

4.2.25 FIRE ZONE 1-5A, FUEL POOL PUMPS AND HEAT EXCHANGERS (El. 749'-0" TO 771'-7")

a) Major safety-related components in fire zone:

Reactor vessel level and pressure panels 1C-004, 1C-005

Standby liquid control system panel

Standby liquid control pumps 1P208A&B

Standby liquid control storage tank

Standby liquid control Nitrogen accumulators A&B

Standby liquid control panel 1C011

HV-E11-1F016A RHR containment spray isolation MOV

HV-G33-1F042 RWCU return isolation MOV (normally open)

HV-G33-1F104 RWCU bypass MOV (normally closed)

Air intake for Emergency Switchgear Unit Cooler B located in Fire Zone 1-4A

Division I & II trays and Channels A1, A2, B1, B2 conduit raceways

Core spray loop 'A' pressure switch PSH-E21-1N007A

RWCU system panel 1C002

Reactor protection system motor-generator sets 1G201A&B

Essential raceway listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	3 hr
	South (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	3 hr
	West (part)	12" reinforced concrete	2 hr
	North (part)	12" reinforced concrete	2 hr
	East (part)	12" reinforced concrete	2 hr
	East (part)	12" reinforced concrete	3 hr
	North (part)	36" reinforced concrete	Not rated
	South (part)	12" concrete block	Not rated
	South (part)	48" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors:

1. 3 hr rated steel doors connecting to fire areas 1-5F, 1-5G & 1-5H
2. 1 1/2 hrs steel door connecting to fire area 1-1J 7 1-1I
3. Non-rated pressure resistant alarmed steel door connecting to fire area 1-5D
4. Non-rated alarmed steel door connecting to fire area 1-5E

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety related cable trays.

f) Consequences of fire without active fire protection:

1) Loss of standby liquid control system

2) Loss of Division I cables and conduits

3) Loss of Division II conduits serving post-accident monitoring instruments and MSIV leakage instrumentation. Loss of channels A1, B1, A2 & B2 serving RPS instrumentation.

4) Loss of Division I or II reactor vessel pressure and level instrumentation

5) Loss of core spray isolation valve

6) Loss of drywell containment spray isolation valve

7) Closure of Emergency Switchgear Unit Cooler B air intake by fire dampers and actuation of Cooler A.

Division I & II cable trays are separated by 77 ft. The area is elongated and spread of fire is inhibited by the type of cable insulation used.

Essential raceway listed in Appendix A is fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The loss of both divisions of safety related cable trays is not postulated for a fire in this zone since the redundant trays are separated by a minimum distance of 77 feet. There are non-safety related cable trays between the two divisions of safety-related trays, however, a fire in any cable tray would have to propage 77 feet horizontally in order to affect both divisions. There are horizontal fire stops in these cable trays at intervals of approximately 20 feet to prevent the horizontal propagation of a fire. In addition,

the cable insulation has chemical properties which preclude the propagation of a fire beyond a relatively short distance once the source of ignition is removed.

The loss of both reactor vessel pressure and level instrumentation panels, 1C-004 and 1C-005 is not postulated since cables associated with these panels are low energy control and instrumentation cables, these cables are protected from thermal overload condition and the cable insulation would self-extinguish once the power was interrupted. Furthermore, the panels are separated by a distance of 18 feet, no Division II cable trays or conduit are routed in the vicinity of panel 1C004 and the Division I cable tray is separated from panel 1C005 by 3 feet horizontally and 6 feet vertically.

The loss of the standby liquid control system (SLCS) pumps, valves, and/or control panel would not affect the safe shutdown of the plant since this system is only employed if a malfunction in the CRD system prevents a reactor shutdown. Since the major components of the CRD system are located on elevation 719'-1" and are separated from the SLCS components by 24" of reinforced concrete and at least 10 feet of horizontal separation, the simultaneous loss of both systems is not postulated as being credible.

If all three of the fuel pool cooling system pumps were lost as the result of a fire, the spent fuel elements could be cooled by use of the RHR system.

The loss of the reactor protection system (RPS) motor-generator sets would deenergize the RPS which would result in the reactor being scrammed. Subsequent to the reactor scram, the plant could be brought to a safe shutdown condition by the methods described in Sections 4.2.1 or 4.2.2.

The loss of power to RCWU valves HV-G33-1F042 and HV-G33-1F104 would not affect the operation of the RWCU system since it would not be necessary to change the position of either valve from its normal position.

THe loss of power to RHR containment spray isolation valve HV-E11-1F016A would only result in the temporary loss of the containment spray function of the RHR system. Since the function of the spray system is to reduce the containment pressure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

Smoke intake into the Switchgear Unit Cooler B intake would close the fire damper and transfer operation to Cooler A, located in and drawing air from Fire Zone 1-4A.

4.3.26 FIRE ZONE 1-5B, VALVE ACCESS AREA (El.761'-10" TO 777'-1")

a) Major safety-related components in fire zone:

1) HV-E11-1F021B RHR to drywell spray containment isolation valve

2) HV-E21-1F004A&B core spray isolation valves

3) HV-E21-1F005A&B core spray containment isolation valves

4) HV-E11-1F016B RHR to drywell spray isolation valve

5) Divisions I & II conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South	48" reinforced concrete	Not rated
	East	72" reinforced concrete	Not rated
	West	36" reinforced concrete	not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non-rated steel door connecting to fire area 1-5C

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: None

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material. There is negligible combustible material located in this fire zone.

f) Consequences of fire without active fire protection:

Loss of either core spray loop 'A' or 'B'

Loss of drywell spray header 'B'

g) Consequences of fire with active fire protection:

Same as above.

h) Effects of fire on safe shutdown:

The loss of power to the core spray isolation valves HV-E21-1F004A and B would not cause the loss of the core spray system since these valves are normally in the open position and no valve movement would be required for the operation of the system. The power cables for valves HV-E21-1F005A and B are in steel conduit that are spearated by a minimum distance of 5 feet. In addition, the combustible loading for this zone is negligible and thus the potential for an external fire hazard is highly improbable. An internal fire in a conduit would be self-extinguished once the power supply was interrupted by thermal overload or overcurrent protection.

The loss of power to RHR containment spray isolation valves HV-E11-1F021B and HV-E11-1F-16A would only result in the temporary loss of the containment spray function of the RHR system. Since this function is not required to effect a safe reactor shutdown, the loss of this capability would not prevent placing and maintaining the plant in a cold shutdown condition.

4.3.27 FIRE ZONE 1-5C, REACTOR CLEANUP BACKWASH TANK (El. 761'-10" TO 777'-1")

a) Major safety-related components in fire zone:

Core spray pressure switch PSH-E21-1N007B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North (part)	24" reinforced concrete	2 hrs
	North (part)	24" reinforced concrete	Not rated
	South & East	36" reinforced concrete	Not rated
	West	36" reinforced concrete	3 hrs
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non-rated steel door connecting to fire zone 1-4B

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related cable trays.

f) Consequences of fire without active fire protection:

Loss of core spray loop 'B' pressure indication.

No other impact on safety-related equipment. Fire does not propagate to adjacent fire zones because of absence of combustible paths.

g) Consequences of fire with active fire protection:

A hose reel is provided to control and/or minimize the fire in the cable trays.

h) Effects of fire on safe shutdown:

Since none of the systems required for shutdown would be incapacitated by a fire, the postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.28 FIRE ZONE 1-5D, RWCU PUMPS AND HEAT EXCHANGERS (El. 749'-1" TO 766'-1")

a) Major safety-related components in fire zone:

1) Containment atmosphere control isolation valves HV-15713 & 15714 and controlling solenoid valves

2) Reactor water cleanup containment isolation valves HV-1F104, HV-1F042 & HV-1F004

3) Containment atmosphere control system isolation valves control panel 1C601

4) RWCU control panel 1C651

5) Reactor water cleanup recirculation pumps 1P221A and B

6) Division I & II conduit raceway

7) HVAC supply and exhaust isolation dampers to fire zone 1-5A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	48" reinforced concrete	Not rated
	East, South (part), & West	36" reinforced concrete	Not rated
	South (part)	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non-rated pressure resistant alarmed steel doors to fire zone 1-5A

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: < 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable in Division I or II conduits.

f) Consequences of fire without active fire protection:

1) Loss of containment purge and use of SGTS for containment atmosphere control.

2) Smoke from fire may be drawn into equipment compartment air exhaust system.

3) The low intensity of a cable fire precludes flames from being spread by the air exhaust.

4) The fire does not spread to adjacent fire zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

A hose reel and a portable extinguisher is provided to control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

The Division I and II conduit in this area only serves the containment purge isolation valves HV-15713 and HV-15714. The loss of this particular purge function would not affect the safe shutdown of the reactor plant.

The loss of the RWCU system would not affect the capability to place and maintain the plant in a cold, shutdown condition.

4.3.29 FIRE ZONE 1-5E, PENETRATION ROOM (El. 749'-1" TO 777'-1")

a) Major safety-related components in fire zone:

1) RHR system drywell spray header containment isolation valves, Division I, HV-E11-1F021A and HV-E11-1F016A

2) CRD return water containment isolation valve HV-1F082

3) Standby liquid control containment isolation valve HV-C41-1F006

4) Instrument gas containment isolation valve SV-12654A

5) Division I cable tray and Divisions I conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & East	36" reinforced concrete	Not rated
	West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	Non rated, alarmed steel door connecting to fire zone 1-5A		

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: < 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays Division I or conduit raceway Division I.

The fire concentration is located in the south end of this zone.

f) Consequences of fire without active fire protection:

1) Loss of drywell spray header 'A'

2) Loss of Division I cables in tray & conduit

3) Loss of Division I conduit serving standby liquid control valve or SLCS valve HV-E41-1F006 in same zone

g) Consequences of fire with active fire protection:

The protection provided by the hose reel and portable extinguisher would control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety related equipment or components to function could not be assumed.

The loss of power to the RHR containment spray isolation valves HV-E11-1F021A and HV-E11-1F016A would only result in the temporary loss of the containment spray function of one division of the RHR system. Since the function of the spray system is to reduce the containment pressure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

The loss of power to the standby liquid control system (SLCS) isolation valve, HV-C41-1F006 would not result in the loss of the system since the valve is a stop check valve that is normally open and the motor operator function would not be required to place the SLCS in operation.

The CRD valve HV-C12-1F082, the return line outboard isolation valve, is normally in the open position and the loss of power to the motor would not cause a change in position. Even if the valve were to close, this would not affect the capability of scramming the reactor with the CRD system.

4.3.30 FIRE ZONE 1-5F, LOAD CENTER (749'-1" TO 764'-1")

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 1A202, distributes power from the offsite and standby power to load group 'B'

2) 480 V load center 1B220 Division II, distributes 480 V and lower power to load group 'B'

3) MCC's 1B227 Division II, 480 V power to equipment listed in paragraph 4.3.29.h

4) Transformer 1X220 Division II, 4.16 kV - 480 V transformer for load center 1B220

5) Cable tray raceway Division II, Channel 'B' and Division II conduit

6) Breakers 1A20601 and 1A20602, Divisions I & II for recirculation pump 1P410B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs
	East	24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hr 1 side
Ceiling:		8" reinforced concrete	3 hrs
Doors:	Steel door connecting to fire zone 1-5A		3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 30 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety related Division II cable trays, Division II and channel 'B' conduit

2) The combustible loading in this zone is 3.9 and is expected to generate a high heat release

3) An 8 in. block wall has been provided to separate 1A20601 (Division I) from 1A20602 (Division II)

f) Consequences of fire without active fire protection:

1) Loss of switchgear 1A-202 Channel B

2) Loss of load center 1B-220 Channel B

3) Loss of MCC 1B-227 and associated Division II power supply

4) Loss of Division II cable tray and Division II-B conduit

5) Loss of transformer 1X-220 Channel B

6) Loss of Division I & II recirculation pump trip breakers 1A20601 and 1A20602

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 479'-1" elevation. The floor is 24" reinforced concrete, the ceiling is 8" reinforced ceiling, and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel B emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 1P202B

2) Emergency Service Water Pump OP504B

2) Core Spray Pump 1P206B

4) Main Condenser Mechanical Vacuum Pump 1P105

5) Reactor Building Chiller 1K206B

6) Turbine Building Chiller 1K102B

Nonetheless, three safety related electrical channels, i.e., A, C, and D, and the systems and components served by these

channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of the MCC 1B227 would cause the loss of a power supply to the following equipment and components:

1) Reactor Building Recirculation Fan B - OV201B

2) 250 Volt DC Battery Charger B - 1D663

3) 480/277V Reactor Building Essential Lighting Panel - 1EP08

4) Emergency Switchgear Load Center Room Unit Cooler Fan - 1V222B

5) Valve HV-C12-1F082, CRD system outboard isolation for return line to RPV (normally open)

6) Valve HV-E11-1F021B, RHR containment spray isolation valve

7) Valve HV-E21-1F004B, Division II core spray injection isolation valve

8) Valve HV-E21-1F005B, Division II core spray outboard containment isolation valve

9) Valve HV-E32-1F001B, suction isolation valve for MSIV leakage control system for steam line "A"

10) Valve HV-E32-1F001F, suction isolation valve for MSIV leakage control system for steam line "B"

11) Valve HV-E32-1F002B, backup suction isolation valve for MSIV leakage control system for steam line "A"

12) Valve HV-E32-1F002F, backup suction isolation valve for MSIV leakage control system for steam line "B"

13) Valve HV-E32-1F003B, heater discharge isolation valve for MSIV leakage control system for steam line "A"

14) Valve HV-E32-1F003F, heater discharge isolation valve for MSIV leakage control system for steam line "B"

The loss of power to CRD valve HV-C12-1F082 would have no effect on the operation of the CRD system since this valve is normally open and is not required to scram the reactor control rods.

The loss of power to emergency switchgear load center room unit cooler fan, 1V-222B would not cause the loss of the equipment in the other emergency switchgear rooms, fire zones 1-4C, 1-4D and 1-5G since there is a redundant cooler fan 1V-222A.

The MSIV leakage control system is not required for shutdown operations, thus the loss of power for the valves associated with this system would not affect the ability to place the reactor in a cold shutdown conditon. Furthermore, the loss of power for these valves would not result in any radioactive release since all of these valves are normally closed.

The loss of power to the RHR containment spray isolation valve HV-E11-1F021B would only result in the temporary loss of the containment spray function of one division of the RHR system. Since the function of the spray system is to reduce the containment pressure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

All of the other components supplied by MCC 1B227 are not required for reactor shutdown.

4.3.31 FIRE ZONE 1-5G, LOAD CENTER ROOM (El. 749'-1" TO 764'-1")

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 1A201 Division I, distributes power from the offsite and standby power to load group 'A'

2) 480 V load center 1B210 Division I, distributes 480 V and lower power to load group 'A'

3) MCC 1B217 Division I, distributes 480 V power to equipment listed in paragraph 4.3.30.h

4) Transformer 1X210 Division I, 4.16 kV - 480 load center transformer for load center 1B210

5) Cable tray raceway Division I, conduit raceway Channel A, and Division I

6) Bkrs 1A20501, 1A20502 4 kV Division I & II recirc. pump 1P410A trip

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hr 1 side
Ceiling:		8" reinforced concrete	3 hrs
Doors:	Steel docr connecting tc fire zone 1-5A		3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 30 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety related Division I cable trays, Division I and channel A conduit

2) The combustible loading in this zone is 3.19 and is expected to generate a high heat release in this zone

3) An 8 in. block wall has been provided to separate 1A20501 (Division I) from 1A20502 (Division II)

f) Consequences of fire without active fire protection:

1) Loss of switchgear 1A-201 Channel A

2) Loss of load center 1B-210 Channel A

3) Loss of MCC 1B-217 and associated Division I power supply

4) Loss of Division I cable tray and Division I-A conduit

5) Loss of transformer 1X-210 Channel A

6) Loss of Division I & II recirculation pump trip breakers 1A20501 and 1A20502

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 749'-1" elevation. The floor is 24" reinforced concrete, the ceiling is 8" reinforced ceiling, and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

This fire zone is protected by products of combustion detectors and portable fire extinguishers to control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel "A" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 1P202A

2) Emergency Service Water Pump CP504A

3) Core Spray Pump 1P206A

4) Reactor Building Chiller 1K206A

5) Turbine Building Chiller 1K102A

6) CRD Water Pump 1P132A

Nonetheless, three safety related electrical channels, i.e., B, C, and D, and the systems and components served by these channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of the MCC 1B217 would cause the loss of a power supply to the following equipment and components:

1) Reactor Building Recirculation Fan - CV201A

2) 250 Volt DC Battery Charger - 1D653

3) 480/277V Reactor Building Essential Lighting Panel - 1LP07

4) Instrument Gas Compressors - 1K205A&B

5) Standby Liquid Control Pump - 1P208B

6) Reactor Protection System MG Set - 1S237A

7) Valve HV-15112, RPV head spray outboard isolation valve (normally open)

8) Valve HV-B21-1F032A, outboard feedwater isolation testable check valve

9) Valve HV-E11-1F016A, Division I RHR drywell spray isolation valve

10) Valve HV-E11-1F021A, Division I RHR drywell spray isolation valve

11) Valve HV-E21-1F004A, Division I core spray injection isolation valve

12) Valve HV-E21-1F005A, Division I core spray injection isolation valve

13) Valve HV-E32-1F006, MSIV leakage control system (MISV-LCS) isolation valve

14) Valve HV-E32-1F007, MSIV-LCS isolation valve

15) Valve HV-E32-1F008, MSIV-LCS isolation valve

16) Valve HV-E32-1F009, MSIV-LCS isolation valve

17) Valve HV-G33-1F042, RWCU return isolation valve

18) Valve HV-G33-1F104, RWCU heat exchanger bypass valve

The loss of power to RPS MG set "A", 1S237A only, would not cause the reactor control rods to scram. However, a trip signal in either channel B1 or B2 would result in a reactor scram and then the loss of this MG set would not result in a degraded condition in reactor protection.

The loss of power to the SLCS pump, 1P208B, would not affect reactor safety or the ability to affect a reactor shutdown, since the CRD system and the other SLCS pump, 1P208A, would still be available to place the reactor in a subcritical condition.

The loss of power to the RPV head spray isolation valve HV-15112 would not result in the loss of the ability to initiate head spray since this valve is normally open during

power operations. Furthermore, the head spray function is not required in order to reach a safe shutdown condition.

If power were lost to the outboard feedwater isolation valve HV-E21-1F032A, only the testing function would be lost since this is a check valve and would shut on reverse flow.

The loss of power to the Division I RHR drywell spray isolation valves HV-E11-1F016A & 1F021A would only result in the temporary loss of the containment spray function of one division. Since the spray system is designed to mitigate the consequences of a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

The loss of power to Division I core spray injection valves HV-E21-1F004A and 1F005A would not affect the shutdown of the reactor since a redundant Division II core spray train, three RHR pumps, the HPCI system and the RCIC system would be available.

Since neither the MSIV-LCS nor the RWCU system is required for shutdown operations, the loss of the power source for the valves associated with these systems would not affect the ability to place the reactor in a cold, shutdown condition.

4.3.32 FIRE ZONE 1-5H, INSTRUMENT REPAIR ROOM (El. 749'-1" to 764')

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	8" reinforced concrete	3 hrs
	West	8" reinforced concrete	Not rated
	South	36" reinforced concrete	3 hrs
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated

Ceiling:	8" reinforced concrete	Not rated
Doors:	Steel door connecting to fire area 1-5A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: < 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within non-safety relatd cable trays

2) A postulated fire would be expected to remain localized within the boundaries of this zone. Cable routed in conduit is not considered a potential propagation pathway out of this zone.

f) Consequences of fire without active fire protection:

1) Loss of non-safety related equipment

g) Consequences of fire with active fire protection:

The existing fire protection would ensure control and/or minimize damage to the equipment in this fire zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.33 FIRE ZONE 1-6A, ACCESS AREA (779'-1" to 797'-1" & 816'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Pressure differential dampers PDDM-07554A&B

Controls associated with containment purge to SGTS and reactor buildup recirculation system dampers

Motor operated dampers HD 07543A&B, HD 17508A&B, HD 17534A&F

Ducts associated with containment purge and reactor building recirculation system

Essential raceway listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	8" reinforced concrete	2 hr
	South (part)	24" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	Not rated
	West (part)	8" reinforced concrete	2 hr
	East (part)	72" reinforced concrete	Not rated
	East (part)	16" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	Steel door connects to zone 2-6A		3hr
	Steel door connects to zone 1-1I		1 1/2 hr
	Steel door connects to zone 1-6B		Not rated
	Steel door connects to zone 0-6G		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays, and Division I or II conduit raceway.

2) The sample cooler chiller oil is contained within an hermetic enclosure and cannot contribute combustibles to a fire in this zone.

f) Consequences of fire without active fire protection:

Loss of containment purge to SGTS

Loss of reactor building recirculation

Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75. Essential raceway is fire protected in accordance with Section 2.11.

g) consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photoelectric detectors which would provide visual and auidble alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

The loss of the power to the dampers for the containment purge and the reactor building recirculation systems would only result in a temporary loss of these function since plant personnel could be dispatched to open these dampers manually. Neither the containment purge nor the reactor building recirculation systems are required to affect a safe shutdown.

4.3.34 FIRE ZONE 1-6E, LOAD CENTER ROOM
(El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	36" reinforced concrete	Not rated
	East & West	72" reinforced concrete	Not rated
	South	54" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	Non rated steel doors to fire zones 1-6A & 1-6C		

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related cable trays.

f) Consequences of fire without active fire protection:

Loss of load center panels

Fire would not propagate to adjacent fire zones because of absence of combustible paths.

g) Consequences of fire with active fire protection:

The detection and suppression capability installed in this zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of

offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.35 FIRE ZONE 1-6C, ELECTRICAL EQUIPMENT ROOM (El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hrs partial)
	South	36" reinforced concrete	Not rated
	East	12" concrete blocks	2 hrs
	West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors:
1. Nonrated steel doors connecting fire zones 1-6B & 1-6D
2. 1 1/2 hr rated, airtight, steel door connecting to zone 1-1J

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 9 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related panels.

f) Consequences of fire without active fire protection:

There are no safety related instrumentation and controls located in this fire zone.

g) Consequences of fire with active fire protection:

The detection and suppression capability in this fire zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The posutlated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.36 FIRE ZONE 1-6D, H&V EQUIPMENT ROOM (El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

Division I & II cable in conduit

Division I & II air recirculation system dampers HD-17586A&B, HD-17524A&B, HD-17576A&B, and associated solenoid valves

Division I & II zone I equipment compartment exhaust isolation dampers

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North&South	24" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	West	18"&72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non rated steel doors connecting to fire zones 1-6B, 1-6C, and 1-6E

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of nonsafety related cable trays or motors

2) Ignition of cable insulation or jacket material in Division I or Division II conduit

f) Consequences of fire without active fire protection:

Loss of air recirculation system isolation damper A or B

Loss of one of two redundant isolation dampers

g) Consequences of fire with active fire protection:

The suppression capability in this fire zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability to function of the Division I or II damper for the reactor building zone I recirculation system or the reactor building zone I exhaust system could not be assumed. If power were lost to the dampers listed above, the zone I ventilation system would be lost, but the rooms where safety related pumps and other components are located are cooled by unit coolers. Therefore, the loss of these dampers would not result in a significant degradation of the ability to place and maintain the plant in a cold, shutdown condition.

4.3.37 FIRE ZONE 1-6E, RECIRCULATION FANS AREA (El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Division I & II reactor building zone I exhaust system dampers HDM-07545A&B and ED-07545A&B

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	30" reinforced concrete	Not rated
	South	36" reinforced concrete	3 hrs
	West	12" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Non-rated steel door to fire zone 1-6D	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: < 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of Division I or II cable insulation and jacket material in conduit

f) Consequences of fire without active fire protection:

Loss of air recirculation system dampers Division I or II

Cable routed in conduit is not considered a potential propagation pathway out of this zone

Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75

g) Consequences of fire with active fire protection:

Same as in 'f' above.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2. The loss of power for the above listed dampers for the reactor building zone I exhaust system will cause the dampers to fail closed and the zone I ventilation system would be lost. Since the rooms that contain safety related system and components that require heat dissipation are cooled by unit coolers, the loss of this system will not prevent the safe shutdown of the reactor plant.

4.3.38 FIRE ZONE 1-6F, SPENT FUEL POOL (El. 779'-4" to 818'-1")

a) Major safety-related components in fire zone:

None when empty - no fire hazard when filled with water

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	60" reinforced concrete	Not rated
	South, East & West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	None (removable platform)		

d) Combustible materials in zone:

1) Combustible loading: None

2) Equivalent fire severity: None

3) Quantities of combustibles: None

e) Postulated fire in zone:

No flammable material is located in this fire zone, therefore a fire cannot start or propagate in this area.

4) Consequences of fire without active fire protection:

None

q) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.39 FIRE ZONE 0-6G, SURGE TANK VAULT (El. 779'-4" to 816'-1")

a) Major safety-related components in fire zone:

One skimmer surge tank including pressure boundary component of level indicators for fuel pool cooling system.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North, West	72" reinforced concrete	Not rated
	South	72" reinforced concrete	3 hrs
	East	24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Door: Non rated steel door connecting to fire zone 1-6A

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: None

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of non-safety related cable in conduit

f) Consequences of fire without active fire protection:

Loss of non-safety related cable only.

Fire does not propagate because of absence of combustible paths.

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

The loss of the fuel pool cooling system or water from the surge tank as a result of a fire in this zone is not considered to be credible.

4.3.40 FIRE ZONE 0-6H, CASK STORAGE PIT (El. 775'-5" to 816'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

		Construction	Rating
Walls:	North, East (part)	72" reinforced concrete	Not rated

	South, East (part)	72" reinforced concrete	3 hrs
	West	24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: None

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: None

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustible materials present in this fire zone.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.3.41 FIRE ZONE 1-7A, H&V FAN AND FILTER ROOMS ACCESS AREA (El. 799'1 to 816'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Zone III exhaust isolation dampers

Zone III filtered exhaust isolation dampers

Recirculation system balance damper

Zone III supply air isolation damper

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hrs (partial)
	South	24" reinforced concrete	Not rated
	West	72" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	East	8" reinforced concrete	2 hr
Floor:		12" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: A 1 1/2 hr fire door connecting to fire zone 1-1J.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 28 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of charcoal filters

2) Ignition of cables within non-safety related cables trays and Division I & II conduit.

f) Consequences of fire without active fire protection:

1) The radioactive products of combustion from the charcoal filter could possible be released to the environment if the filter housing or dampers collapse.

2) Loss of recirculation system due to inability to isolate conjunctive systems.

3) Loss of non-safety related HVAC systems.

4) Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75.

g) Consequences of fire with active fire protection:

1) The automatic deluge sprinkler would extinguish a charcoal filter fire. An alarm system will indicate the fire condition to the operator.

2) A hose reel is provided to control and/or minimize the postulated fire damage in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2.

Since the reactor building zone III ventilation system is not required for shutdown operations, the loss of this system will not have a significant effect on the ability to shutdown the reactor.

The potential for a radioactive release from the filters is diminished significantly by the use of the water deluge system that is provided in the area where the filters are located. If the products of combustion were not contained by the filter assembly or isolation dampers, the radioactive release to the environment would be very small fraction of 10CFR100 limits.

4.3.42 FIRE ZONE 1-7E, RECIRCULATION FAN ROOM (El. 799'-1" to 816'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Air recirculation system fans CV201A&B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13.

		Construction	Rating
Walls:	North	24" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	West	12" reinforced concrete	Not rated
	South	36" reinforced concrete	3 hrs
Floor:		12" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: One non-rated steel door connecting to fire zone 1-7A

d) Combustible materials in zone:

1) Combustible loading: See Tably 6-1

2) Equivalent fire severity: < 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of Division I or II conduit raceway

2) A postulated fire would be expected to remain localized in this zone. Cable routed in conduit is not considered a potential propagation pathway out of this zone.

f) Consequences of fire without active fire protection:

1) Loss of recirculation fans (from Zone III, Unit 1&2, Zone II, Unit 2, and Zone I, Unit 1)

2) There are no safety related instrumentation and controls located in this fire zone

3) Fire does not spread to adjacent zones because of the absence of combustible paths

4) Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75

g) Consequences of fire with active fire protection:

Same as above.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2. The loss of power to or a fire in the above listed causes loss of recirculation capability only. Since the rooms that contain safety related systems and components that require heat dissipation are cooled by unit coolers, the loss of this system will not prevent the safe shutdown of the reactor plant.

4.3.43 FIRE ZONE C-8A, REFUELIN FLOOR (El. 818-1" to 872'-6")

a) Major safety-related components in fire zone:

1) One refueling platform bridge drive

2) One 125 ton crane 1H213 at El. 850'-8"

3) One refueling platform auxiliary hoist 1H-203

4) One auxiliary hoist monorail 1H-214

5) One containment temperature indicator

6) Air recirculation and conjunctive systems isolation dampers

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-14

		Construction	Rating
Walls:	General	Metal siding	Not rated
	North (part)	Metal siding	3 hr
	Common with Zones 1-1J, 1-1I, 2-1J, 2-1I	8" reinforced concrete	2 hr
Floor:		24" reinforced concrete	Not rated
Ceiling:		Metal deck	Not rated

Doors: 1 1/2 hr fire resistant steel doors connects to fire zones 1-1I, 1-1J, 2-1I & 2-1J

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: < 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of Division I cable in conduit

Ignition of filter/demineralizer resin

f) Consequences of fire without active fire protection:

1) Loss of containment temperature indication from elements TE-15791A&B at El. 798'-10 1/4"

2) Loss of refueling platform bridge drive, 125 ton crane, refueling platform fuel hoist, refueling auxiliary hoist & auxiliary monorail

g) Consequences of fire with active fire protection:

The fire protection provided is sufficient to control and/or minimize the damage of the fire in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

None of the equipment in this zone is rquired for shutdown operations.

4.4 FIRE HAZARDS ANALYSIS - UNIT 2 REACTOR BUILDING

4.4.1 FIRE ZONE 2-1A, CORE SPRAY PUMP ROOM (El. 645'-0" to 670'-0")

a) Major safety-related components in fire zone:

Two Division II core spray pumps (B&D)

Two Division II core spray area unit coolers (B&D)

10 in. MOV HV-E41-2F011 RCIC and HPCI common return to condensate tank isolation valve

16 in. MOV HV-E21-2F001B core spray suction Division II isolation valve

Instrumentation panels for Division II core spray loop and HPCI system

Division II suppression pool level instruments

Division II cable trays and Divisions I and II safety-related conduit

Division I conduit is for HV-E51-2F022j

Division I conduit is for HV-E41-2F011

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and Architectural design features of zone:

See Figure 5-8

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	3 hr.
	West (part)	36" reinforced concrete	Not rated
	South	72" reinforced concrete	Not rated
	East	24" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Watertight steel door connects to fire zones 2-1B and 2-1C	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety-related cable trays

2) Ignition of lube oil for core spray pump motors

f) Consequences of fire without fire protection:

Loss of Division II core spray loop

Loss of other Division II components

Loss of HPCI system

Loss of Division II suppression pool level indication

The amount of lube oil present would not sustain a fire in excess of 1 minute. The cable insulation and jacketing will not propagate fire to adjacent fire zones.

g) Consequences of fire with active fire protection:

The smoke from a fire would activate the ionization detectors which would provide visual and audible alarms both locally and in the main control room. Plant fire brigade would be dispatched to extinguish the fire.

h) Effect of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

The loss of control power for the RCIC test return line isolation valve would not affect shutdown, since the operation of this valve is not required for the shutdown of the reactor. These valves are normally closed.

4.4.2 FIRE ZONE 2-1B, CORE SPRAY PUMP ROOM (El. 645'-0" to 670'-0")

a) Major safety-related components in fire zone:

Two Division I core spray pumps (A&C)

Two Division I core spray area unit coolers (A&C)

One 16 in. motor operated valve (MOV), HV-E21-2F001A suction valve for Division I core spray pump

Division II conduit supplies control and motive power to two 6 in. MOVs HV-25766 and HV-25768, containment isolation valves for the suppression pool cleanup and drain

Division I cable trays and Divisions I and II safety-related conduit

Division I core spray panel and instrumentation for core spray train and suppression pool level

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-8

		Construction	Rating
Walls:	North (part)	72" reinforced concrete	Not rated
	West (part)	30" reinforced concrete	Not rated
	South	36" reinforced concrete	3 hr.
	East	36" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Watertight steel door connects to fire zones 2-1A.	Not rated
		Steel door connects to fire Zone 2-1G.	Not rated
		1-1/2 hr resistant steel door connect to fire Zone 2-1I.	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety-related cable trays

2) Leakage of lube oil from both core spray pump motors spread uniformly over the floor of the fire zone and then ignition of this oil. This represents the postulated fire in this area, anticipated to generate the maximum heat release during a single fire event.

f) Consequences of fire without fire protection:

1) Loss of Division I core spray loop

2) Loss of other Division I components

3) Loss of control of isolation valves for the suppression pool filter system

4) The amount of lube oil in any one core spray pump motor is not anticipated to sustain a fire in excess of one minute. The cable insulation and jacketing, as described in Table 6-2, will not propagate a fire once the fire source is extinguished. The fire would not spread into adjacent fire zones because of the absence of combustible pathways.

g) Consequences of fire with active fire protection:

The smoke from the fire would activate the ionization detectors, which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or components could not be assumed.

4.4.3 FIRE ZONE 2-1C, HPCI PUMP ROOM (El. 645'-0" to 683'-0"

a) Major safety-related components in fire zone:

HPCI pump and turbine

HPCI pump room unit coolers (A&B)

16 in. MOV HV-E41-2F042, HPCI pump suction containment isolation valve

16 in. MOV HV-E41-2F004, HPCI pump suction isolation valve from condensate storage tank

10 in. MOV HV-E41-2F001, HPCI turbine steam supply isolation valve

20 in. MOV HV-E41-2F066, HPCI turbine exhaust line isolation valve

HPCI instrumentation and panel

Divisions II cable trays and Division I and II conduit

Division I conduit is for HV-E51-2F022; the isolation valve is for RCIC test return line

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr.
	East & West	36" reinforced concrete	Not rated
	South	72" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		36" reinforced concrete	Not rated
Doors:		Watertight steel doors connect to fire Zones 2-1D, 2-1A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within safety-related cable tray

Ignition of wiring in HPCI panels

Ignition of lube oil for HPCI turbine

f) Consequences of fire without fire protection:

Loss of HPCI system

Loss of Division II cable trays and Divisions I and II conduit

The lube oil is assumed to spread uniformly over the floor of this fire zone and would burn for less than one minute. The fire would not spread to adjacent fire zones because of the absence of combustible pathways.

g) Consequences of fire with active fire protection:

The smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. When the room temperature rises to 190°F, the deluge sprinkler system would be initiated and would extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

The loss of control power for the RCIC test return line isolation valve would not affect shutdown since the operation of this valve is not required for shutdown of the reactor. This valve is normally closed.

4.4.4 FIRE ZONE 2-1D, RCIC PUMP ROOM (El. 645'-0" to 683'-0")

a) Major safety-related components in fire zone:

RCIC pump and turbine

Two RCIC pump room unit coolers (A&B)

MOV HV-E51-2F031, RCIC pump suction isolation valve from suppression pool

MOV HV-E51-2F010, RCIC pump suction isolation valve from condensate storage tank

MOV HV-E51-2F045, RCIC turbine steam supply isolation valve

MOV HV-E51-2F059, RCIC turbine exhaust line isolation

RCIC instrumentation and panel

Division I and channels A, C and D conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr.
	East	36" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	2 hr.
	South	72" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		36" reinforced concrete	Not rated
Doors:		Watertight steel door connects to Zone 2-1J.	1-1/2 hr.
		Water tight steel door connects to Zone 2-1C.	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 1 minute

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of lube oil from RCIC turbine

f) Consequences of fire without active fire protection:

Loss of RCIC system

A lube oil fire would last less than 1 minute. The fire would not spread to adjacent fire zones because of the absence of combustible pathways.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above the smoke from a fire would activate the photoelectric detectors which would provide visual and audible alarm both locally and in the main control room. If thermal detectors sense a rapid rate of temperature rise or an ambient temperature of 190°F, the water spray system would be initiated and would extinguish the fire. In any event, the plant fire brigade would be dispatched as a backup to the deluge system to ensure that the fire is extinguished.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of the RCIC equipment or components to function could not be assumed.

4.4.5 FIRE ZONE 2-1E, RHR PUMP ROOM (El. 645'-0" to 681'-0")

a) Major safety-related components in fire zone:

Two Division II RHR pumps (B&D) and RHR heat exchanger 'B'.

Two RHR pump room unit coolers (B&D) RHR heat exchanger valves and containment penetration valves HV-E11-2F004B&D and HV-E11-2F007B

RHR system instrumentation

Division II cable tray and Division I conduit to TE-E11-2N029C

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

	Construction	Rating
Walls: East	36" reinforced concrete	Not rated
West	72" reinforced concrete	Not rated
North West	36" reinforced concrete	Not rated
North	36" reinforced concrete	Not rated
South	36" reinforced concrete	Not rated
Floor:	60" reinforced concrete	Not rated
Ceiling:	36" reinforced concrete	Not rated
Doors:	1 watertight door 1-1/2 hr connects to Zone 2-1J 1 watertight door connects to Zone 2-1F	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Leakage of total inventory of lube oil from one RHR pump motor spread uniformly over the floor of the fire zone and then ignition of this oil. This represents the postulated fire in the area, anticipated to generate the maximum heat release during a single fire event.

f) Consequences of fire without fire protection:

1) Loss of Division II RHR loop

2) Loss of other Division II components

3) Loss of control of isolation valves for the RHR system and containment isolation

4) The amount of lube oil would not sustain a fire in excess of one minute. The cable insulation and jacketing, as described in Table 6-2, will not propagate a fire once the fire source is extinguished. The fire would not spread into adjacent fire zones because of the absence of combustible pathways. An 8 in. curb prevents spread of oil to adjacent fire zones.

g) Consequences of fire with active fire protection:

In addition to the consequences of f) above the smoke from the fire would activate the photo-electric detectors which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, and announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

Failure of leakage detection temperature elements TE-E11-1N029C and TE-E11-1N030C (Division I) in addition to loss of Division II elements would cause isolation of the shutdown supply valves (HV-E11-1F009 and HV-E11-1F008); however, these isolation signals can be bypassed from the control room.

4.4.6 FIRE ZONE 2-1F, RHR PUMP ROOM (El. 645'-0" to 681'-0"

a) Major safety-related components in fire zone:

Two Division I RHR pumps (A&C) and RHR heat exchanger 'A'

Two RHR pump room unit coolers (A&C), RHR heat exchanger valves and containment penetration valves HV-E11-2F004 A&C and HV-E11-2F007A

RHR system instrumentation

Division I cable trays and Division I and channels A, B and C conduit

Division II conduit is for TE-E11-2N029C

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8 and 5-9

	Construction	Rating
Walls: South	36" reinforced concrete	Not rated
North	36" reinforced concrete	Not rated
East	36" reinforced concrete	Not rated
West	72" reinforced concrete	Not rated
Floor:	60" reinforced concrete	Not rated
Ceiling:	36" reinforced concrete	Not rated
Doors:	1 Zone 2-1E watertight door connects to	Not rated
	1 Zone 2-1B watertight door onnects to	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 12 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Leakage of total inventory of lube oil from one RHR pump motor spread uniformly over the floor of the fire zone and then ignition of this oil. This ignition should represent the most conservative oil fire in the

area, thus it will generate the maximum heat release rate for this type of fire.

f) Consequences of fire without active fire protection:

1) Loss of Division I RHR loop

2) Loss of other Division I components

3) Loss of control of isolation valves for the RHR system and containment isolation

4) The amount of lube oil in any one RHR pump motor is not anticipated to sustain a fire in excess of one minute. The cable insulation and jacketing, as described in Table 6-2, will not propagate combustion once the source of ignition is removed. The fire would not spread into adjacent fire zones because of the absence of combustible pathways. An 8 in. curb prevents spread of oil to adjacent fire zones.

g) Consequences if fire with active fire protection:

The smoke from the fire would activate the photo-electric detectors which would provide a visual signal in both the main control room and at the local panel. In addition, an audible alarm would be sounded in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

Failure of leakage detection temperature elements TE-E11-2N029B and TE-E11-2N030B (Division II) in addition to loss of Division I elements would cause isolation of the shutdown supply valves (HV-E11-2F008 and HV-E11-2F009); however, these isolation signals can be bypassed from the main control room.

4.4.7 FIRE ZONE 2-1G, SUMP PUMP ROOM (El. 645'-0" to 668'-0")

a) Major safety-related components in fire zone:

Division I RHR instrument rack and panel 213A

Division I cable tray

Division I conduit

A nonsafety-related cable associated with chanel 'C' feeds the RHR motor space heater

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-8.

		Construction	Rating
Walls:	South	36" reinforced concrete	3 hr.
	East	36" reinforced concrete	Not rated
	West	36" reinforced concrete	Not rated
	North	36" reinforced concrete	Not rated
Floor:		60" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		1 watertight door to Zone 1-1F	Not rated
		1 steel door to Zone 1-1A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 20 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Ignition of oil on sump liquid surface

f) Consequences of fire without active fire protection:

Loss of Division I cable, loss of Division I RHR instruments. Oil fire is contained within and would be limited to the covered sump. Cable does not propagate fire to adjacent rooms. The fire will not propagate to adjacent zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

Since there is no fire detection or automatically actuated fire suppression equipment in this zone, the consequences would be the same as those postulated above in Section 4.3.7.f.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

4.4.8 FIRE ZONE 2-1H, SUPPRESSION CHAMBER (El. 648'-0" to 700'-0")

a) Major safety-related components in fire zone:

Post LOCA hydrogen recombiners

Suppression pool water temperature monitors

Primary containment vacuum relief valves

Division I and II power cables, in conduit, to recombiners

Suppression pool access hatches

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-8, 5-9, and 5-10

		Construction	Rating
Walls:	Circular	72" reinforced concrete	Not rated
Floor:		96" reinforced concrete	Not rated

Ceiling: 42" reinforced concrete Not rated

Access: Steel hatch Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Failure of recombiner enclosure. This is only possible during periods of recombiner activity which is not expected during normal operation.

f) Consequences of fire without active fire protection:

Loss of hydrogen recombiner and loss of pool temperature monitoring.

Containment penetrations positively prevent propagation of fire to adjacent zones.

Cable in the conduit is not normally energized and thermal overload protection is provided. Therefore no fire source is predicted in the conduit.

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not disable any of the equipment required to place and maintain the reactor in a cold safety shutdown condition.

4.4.9 FIRE ZONE 2-1I, STAIRWELL (El. 645'-0" to 827'-0")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

Reinforced concrete envelope 2 hr. rating

All doors 1-1/2 hr. rating

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

None

f) Consequences of fire without active fire protection:

N/A

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safe shutdown:

A fire was not postulated in this stairwell, since combustible material will not be located in this zone. In the unlikely event that a fire were initiated in some nonmechanistic fashion, it would be confined to this stairwell by the fire barrier represented by the walls and doors. Therefore, a fire in this zone would not have an adverse affect on any system required for safety shutdown of the reactor plant. Furthermore, a fire in this zone would not prevent access to or egress from the reactor building, since the stairwell in fire Zone 2-1J would be available.

4.4.10 FIRE ZONE 2-1J, STAIRWELL (El. 645'-0" to 827'-2")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

Reinforced concrete envelope 2 hr. rating

All doors 1-1/2 hr. rating

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

None

f) Consequences of fire without active fire protection:

N/A

g) Consequences of fire with active fire protection:

N/A

h) Effects of fire on safety shutdown:

A fire was not postulated in this stairwell, since combustible material will not be located in this zone. In the unlikely event that a fire were initiated in some nonmechanistic fashion, it would be confined to this stairwell by the fire barrier represented by the walls and doors. Therefore, a fire in this zone would not have an adverse affect on any system required for safe shutdown of the reactor plant. Furthermore, a fire in this zone would not prevent access to or egress from the reactor building, since the stairwell in fire Zone 2-1J would be availalbe.

4.4.11 FIRE ZONE 2-2A, CORE SPRAY PUMP ROOM (El. 670'-0" to 683'-0")

a) Major safety-related components in fire zone:

Division I motor control centers for RHR, HPCI, and RCIC systems, valves, and unit coolers, and HPCI vacuum breaker isolation valve

Division I cable trays and Division I and II conduit

Division I motor/generator set for swing bus

Auto transfer switch for swing bus

Containment isolation valve HV-E21-2F031A

Suppression pool level indication and interlock with core spray

Remote shutdown panel

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-9

		Construction	Rating
Walls:	North (part)	72" reinforced concrete	Not rated
	North (part)	24" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	3 hr.
	West (part)	8" reinforced concrete	2hr.
	South (part)	36" reinforced concrete	Not rated
	South (part)	8" reinforced concrete	2 hr.
Ceiling:		24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Doors:	1 metal door connects to Zone 2-2B		Not rated
	1 metal door connects to Zone 2-2C		Not rated
	1 metal door to Zone 2-1I		1-1/2 hr.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1.

e) Postulated fire in zone:

Ignition of cables within safety-related cable trays.

f) Consequences of fire without active fire protection:

Loss of Division I MCCs (AC and DC).

Loss of containment isolation ability for core spray minimum recirculation line.

Loss of Division I swing bus equipment.

Loss of Division I suppression pool level indication.

The fire will not propagate to adjacent fire zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

Since this zone is not provided with either fire detection or suppression equipment, a fire would result in the consequences described in Section 4.4.11.f.

h) Effects of fire on safe shutdown:

A fire in this zone would probably cause the loss of Division I RHR and core spray systems, and the RCIC system. The HPCI vacuum breaker valve is not in this zone and may be opened manually. The loss of the LPCI swing bus equipment would only affect the Division I LPCI system which is postulated to be unavailable because of the loss of the Division I RHR motor control centers.

Containment isolation valve HV-E21-2F031A is the isolation valve for the Division I core spray train minimum recirculation line. The loss of this valve would not affect safe shutdown, since the core spray system is not required.

The loss of the suppression pool level instrumentation would likewise only affect the availability of Division I core spray train.

A fire in the remote shutdown panel would result in the loss of either the Division I or Division II safety-related equipment or components controlled from this panel since the divisions are physically separated by a steel barrier plate and all switches and instrumentation devices are located in accordance with NRC Regulatory Guide 1.75.

If either division were lost as the result of a fire in the remote shutdown panel or the Division I safety-related systems were lost as a result of a fire in the Division I cable trays, the reactor plant could be placed and maintained in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

4.4.12 FIRE ZONE 2-2E, CORE SPRAY PUMP ROOM (El. 670'-0" to 683'-0")

a) Major safety-related components in fire zone:

Division II motor control centers for RHR valves

RCIC system control panel 'B' (assigned to Division II pressure instruments only)

Division II cable trays

Channel A, B, and Division II conduit

Containment isolation valves HV-E21-2F031B and SV-25736, SV-25737, SV-25734A

Channel 'A' conduit that serves HPCI leak detection thermocouple TE-E41-N029A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-9

		Construction	Rating
Walls:	North (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	Not rated
	North (part)	16" reinforced concrete	2 hr
	West (part)	16" reinforced concrete	Not rated
	East	30" reinforced concrete	2 hr
	South (part)	72" reinforced concrete	Not rated
	South (part)	30" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		1 metal door to Zone 2-1J	1-½ hr
		1 metal door connects to Zone 2-2A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within cable trays.

f) Consequences of fire without active fire protection:

The major portion of cabling in this fire zone are low energy control cables associated with a nonsafety-related lighting panel. A motor control center of Division II RHR valves contains some 480 V cables. An overload condition in the cables in these panels and/or in the safety-related cable trays would be interrupted by overcurrent protection associated with the cabling. If a fire were initiated in the cabling insulation as a result of an overcurrent condition, it would extinguish itself once the power was interrupted. As a result of this self-extinguishment characteristic, the fire would not propagate beyond the immediate location of the initiation of the fire.

g) Consequences of fire with active fire protection:

The ionization smoke detectors would alarm in the main control room and plant personnel would be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the low potential for a fire in this zone, any fire within a panel or cable tray would be confined to the immediate point where the fire was initiated. For purposes of this analysis, it was assumed that any fire in the Division II safety-related cable tray rendered inopeative all Division II safety-related systems and/or components that could be used to shut down the reactor plant. With respect to panel fires, it was assumed that the ability of all equipment associated with this panel to function was lost.

If the Division II safety-related systems were lost as a result of a fire in the Division II cable trays, the reactor plant could be placed and maintained in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

4.4.13 FIRE ZONE 2-2C, TRUCK AIRLOCK (El. 670' to 717')

a) Major safety-related components in fire zone:

None.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	36" reinforced concrete	Not rated
Ceiling:	24" reinforced concrete	Not rated
Floor:	24" reinforced concrete	Not rated
Doors:	1 metal door connect to Zone 2-2A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1 (transient combustibles are not analyzed for this zone

e) Postulated fire in zone:

No fire postulated in this zone.

f) Consequences of fire without fire protection:

Not applicable

h) Effects of fire on safe shutdown:

None.

4.4.14 FIRE ZONE 2-3A, ACCESS AREA (El. 683'-0" to 719'-1")

a) Major safety-related components in fire zone:

Motor control center for HPCI, RHR, core spray unit coolers

Transformer for Division I instrument panel

Division I cable trays

ESW valves HV21024, A1, A2, B1, B2

Neutron monitoring instrumentation pre-amplifier panels:

1) SRM A, IRM A/E preamp panel

2) SRM B, IRM B/F preamp panel

Recombiner power supply panel A

Division I & II and RPS channels A1, B1, A2, B2 safety-related conduit. Division II conduit serves ESW valves HV21024, E1, E2, B3.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-10.

		Construction	Rating
Walls:	North (part)	72" reinforced concrete	Not rated
	North (part)	30" reinforced concrete	Not rated
	East	30" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	3 hr.
	West (part)	8" reinforced concrete	2 hr.
	South (part)	36" reinforced concrete	Not rated
	South (part)	8" reinforced concrete	2 hr.
	South with Zone 2-1J		Not rated
Ceiling:		24" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Doors:	1 steel door connects to Zone 2-2B		Not rated
	1 steel door connects to Zone 2-2C		Not rated
	1 steel door to Zone 2-1I		1-1/2 hr.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 32 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within safety-related cable trays.

f) Consequences of fire without active fire protection:

Loss of SRM channesl A&B and IRM channesl A/E and B/F.

Loss of reactor building cooling water and associated ESW valves.

Loss of Division I HPCI, RHR, and core spray unit coolers.

Loss of recirculation pump A.

Loss of 'A' recombiner.

Loss of Division I instrumentation.

Loss of Division I safety related cable trays and conduit.

The low radiation energy of a postulated cable fire precludes horizontal propagation to Division II conduit.

g) Consequences of fire with active fire protection:

The plant fire brigade could extinguish the fire with hose reel units.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or components could not be assumed.

The loss of the neutron monitoring SRM channels A&B and IRM channesl A/E and B/F would not cause a reactor scram unless the reactor plant were in a startup or sub-critical condition. The loss of the neutron monitoring SRM channels A&B has no effect on the BPS.

The emergency service water (ESW) valves listed in Section 4.3.14.a isolate ESW from the reactor building closed cooling water system (RBCCWS) heat exchangers. These valves are normally closed and since the RBCCWS is not required for reactor shutdown, the loss of these valves will not have an adverse impact on the ability to place the plant in a cold, shutdown condition.

4.4.15 FIRE ZONE 2-3B, ACCESS AREA (El. 683' to 719'-1")

a) Major safety-relatedcomponents in fire zone:

250 V dc Division II motor control centers 2D264, 2D274

480 V ac Division II motor control center 2B226

CRD rod position indicators

Recirculation pump 'A' panel

Division II control panels for RHR, HPCI leak detection, recirculation pumps, recombiners and neutron monitoring panels SRM/IRM D/H and C/G

Containment pressure 'B' instruments

Instrument power distribution panel

Transformer for instrument power

RHR water flow instruments

Division I and II cable trays and Channels A, B and Division I and II conduits

Essential raceway as listed in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr.
	West	36" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	South (part)	30" reinforced concrete	Not rated
	South (part)	30" concrete block	Not rated
	East common with zone 2-3D		
		72" reinforced concrete	Not rated
	East, South & West common with zone 2-3C		
		30" reinforced concrete	Not rated
	North & East common with zone 2-1J		
		16" reinforced concrete	2 hr.
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: 1 1/2 hr fire rated to zone 2-1J
Steel doors to zoned 2-3A and 2-3C

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 20 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cables within safety-related cable trays.

f) Consequences of fire without active fire protection:

Loss of listed MCCs and control panels

Loss of 'B' containment pressure instruments

Loss of instrument power distribution panel and transformer

Loss of Division I or II cable trays and conduits. The low radiant energy of a cable fire precludes horizontal propagation between Division I and II cable trays.

Essential raceway is fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite powre, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division II safety-related equipment or components to function could not be assumed.

The loss of both divisions of safety-related cable trays is not postulated for a fire in this zone since the redundant trays are separated by a minimum distance of 24 feet and

there are no fixed combustible materials between these trays at this point of minimum separation tc serve as combustible pathways. The loss of both divisions of safety-related conduit is not postulated because of the fire barrier represented by the conduit and the separation distances which, as a minimu, are in accordance with NRC Regulatory Guide 1.75. Essential raceway is not assumed to fail.

The loss of the 250 V dc motor control center 2D264 would result in the loss of most of the remote operation of the dc motor operated valves associated with the HPCI system. For purposes of this analysis, it was assumed that the HPCI system was unavailable either as a result of the loss of MCC 2D264, the Division II cable trays, or the control panel for HPCI leak detection.

The loss of the 250 V dc MCC 2D274 would result in the loss of three HPCI valves, the RHR outboard suction isolation valve HV-E11-2F008, and RHR head spray outboard isolation valve HV-E11-2F023. The RHR system could be placed in the shutdown cooling mode by dispatching an operator to open the outboard suction valve, HV-E11-2F008, by the handwheel attached to the valve operator. The same action could be taken for HV-E11-2F023, if RHR head spray was desired.

The loss of the 480 V AC MCC 2B226, would cause the loss of some Division II RHR and core spray valves and the Division II RHR and core spray room unit coolers. For purposes of this analysis, Division II RHR and core spray system were assumed lost, thus the loss of this MCC would not adversely affect the ability to safely shutdown the reactor plant.

4.4.16 FIRE ZONE 2-3C, ACCESS AREA (El. 683' to 719'-1")

a) Major safety-related components in fire zone:

The following Division I and II motor-operated valves

E41-2F003	Outboard isolation valve for steam supply to HPCI turbine (normally open)
E11-2F010B	Division II RHR cross-tie isolation valve (normally open)
E11-2F017B	Division II LPCI injection isolation valve (normally open)
E11-2F015B	Division II LPCI injection outboard isolation valve (normally closed)

E11-2F048B	Division II RHR heat exchanger bypass valve (normally open)
E11-2F008	RHR suction outboard isolation valve (normally closed)
E51-2F008	Outboard isolation valve for steam supply to RCIC turbine (normally open)
E11-2F010A	Division I RHR cross-tie isolation valve (normally open)
E11-2F017A	Division I LPCI injection isolation valve (normally open)
E11-2F015A	Division I LPCI injection outboard isolation valve (normally closed)
E11-2F048A	Division I RHR heat exchanger bypass valve (normally closed)
E11-2F023	RHR head spray outboard isoltion valve (normally open)
HV-25112	RHR head spray isolation valve (normally open)

Drywell floor and equipment drain pumps discharge containment isolation valves

Reactor building closed cooling water containment isolation valves

RHR system instrumentation

Divisions I and II cable trays

Division I and II and channel A and B safety-related conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

		Construction	Rating
Walls:	North Common with South Zones 2-3A, East 2-3B, 2-2C West	30" reinforced concrete	Not rated
	North Common with South zone 2-3D East West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: 3 steel doors to zones 1-3A, 1-3B and 1-2C

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable within safety-related cable trays.

f) Consequences of fire without active fire protection:

Loss of either Division I or II LPCI system

Loss of either RCIC or HPCI system

Temporary loss of RHR shutdown cooling.

The low radiant energy of a postulated cable fire precludes horizontal propagation or "flash-over" from Division I cable to Division II cable and vice versa.

g) Consequences of fire with active fire protection:

Same as above.

h) Effects of fire on safe shutdown:

The absence of combustible materials other than cable insulation in this zone would preclude the occurrence of a

fire external to cable trays or conduit. An electrical fire would not propagate beyond the point of initiation, since the cables are protected from thermal overload by overcurrent protection. Once the power source is removed the cable insulation would self-extinguish.

For purposes of this analysis, it was assumed that an electrical fire would cause the loss of the equipment and cable trays in the immediate area. The loss of both divisions of safety-related trays is not postulated for a fire in this zone since the redundant division trays are separated by a minimum distance of 24 feet and there are no fixed combustibles between these trays at this point of minimum separation to serve as a combustible pathway.

If a fire initiated in the area of the Division I equipment or cable trays and the remote control of RHR suction valve were lost, the RHR system could be placed in the shutdown cooling mode by dispatching plant personnel to manually open the valve by use of a handwheel attached to the valve operator. The loss of the RCIC system would probably not occur because the steam supply isolation valve, HV-E51-2F008, is normally in the open position.

If a fire started in the area of the Division II equipment or cable trays, the division II RHR/LPCI system might be rendered unavailable. If only the remote control of the isolation valve were lost, the Division II RHR system would only be lost temporarily. The loss of the HPCI system would probably not occur because the steam supply isolation valve HV-E41-2F003, is normally in the open position.

4.4.17 FIRE ZONE 2-4A, CONTAINMENT ACCESS AREA (El. 719'-1" to 747')

a) Major safety-related components in fire zone:

1) Main steam flow 'A & B' panel Division I

2) Main steam flow 'A & B' panel Division II

3) Main steam flow 'C & D' panel Division I

4) Main steam flow 'C & D' panel Division II

5) Jet pumps 1-10 panel Division II

6) Jet pumps 11-20 panel Division I

7) RCIC leak detection panel Division I

8) RCIC leak detection panel Division II

9) RWCU leak detection pressure switch PDSH-G33-2N044A

10) SRM-IRM drive panel 2C008 Division I

11) Containment atmosphere analysis panels and pumps Division I & II

12) Hydrogen recombiner control panels C&D

13) MSIV leak control instruments and panel Division I & II

14) MCC 2B229 Division II LPCI swing bus for RHR minimum flow and isolation valves

15) 120 V instrument AC distribution panels channels A,B,C&D 2Y226, 2Y236 & 2Y246

16) Transformers 1X236 (Division I and 1X246 (Division II)

17) Division II LPCI swing bus M/G set 2G-203

18) Division I & II cable trays

19) Division I & II and channels A1,B1,A2&B2 cable in conduit

20) Drywell unit coolers chilled water isolation valves HV-18781 A1, A2, B1 & B2 and HV-18791 A1, A2, B1 & B2

21) Emergency switchgear & load center unit coolers A&B and instruments, Divisions I and II

22) Control rod drive hydraulic units, flow and pressure modules

23) Main steam isolation valves control system blowers

24) CRD removal hatch

25) Containment instrument gas bottles

26) Essential raceway as listed in Appendix A

b) Fire protection and detection systems in fire zone: See Table 6-1

c) Structural and architectural design features of zone: See Figure 5-11

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr.
	East (part)	12" reinforced concrete	3 hr.
	East (part)	12" reinforced concrete	2 hr.
	South (part)	36" reinforced concrete	Not rated
	South (part)	12" reinforced concrete	2 hr.
	West (part)	36" reinforced concrete	3 hr.
	West (part)	12" reinforced concrete	2 hr.
	Common to Zone 2-4F	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	5 steel doors to zones 2-4C, 2-4D, 2-4E		3 hr.
	2 steel doors to zones 2-1J, 2-1I		1-1/2 hr.
	1 steel door to zone 2-4G		Not rated
	1 steel door to zone 2-4B, alarmed		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of Division I or Division II cable insulation and jacket material in cable trays.

2) Ignition of instrument air compressors lube oil

3) Ignition of TIP drive lubricant

f) Consequences of fire without active fire protection:

1) Loss of main steam flow monitoring and interlock

2) Loss of jet pump instrumentation

3) Loss of leak detection system for the RCIC & RWCU

4) Loss of core monitoring instrumentation

5) Loss of leak detection function

6) Loss of main steam flow instrumentation

7) Loss of main steam flow signals

8) Loss of containment atmospheric analysis instrumentation

9) Loss of hydrogen recombiner C&D

10) Loss of MSIV leak control system controls

11) Loss of input information to panel, MSIV leakage control Division I and II

12) Loss of reactor recirculation pump motor cooler

13) Loss of drywell unit coolers loop 'A'

14) Loss of emergency switchgear rooms unit cooler A

15) Loss of the CRD hydraulic control units

16) Loss of main steam isolation valves operators' blowers (causing restrictions to number of MSIV operations)

17) Loss of containment isolation capability

The fire is not propagated to adjacent zones because of the absence of combustible pathways.

Essential raceway is protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection: In addition to consequences in f) above, the smoke from a fire would activate the photoelectric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then taken place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

Within the fire zone, there are no combustible materials that represent a potential ignition source for the initiation of a fire. The only plausible mechanism for a fire in the cables, MCC's or motors in this zone would be due to current overload. Since all cables and motors are provided with overload protection, power to an overloaded cable or motor would be interrupted prior to the cables or

motor reaching the ignition point for the insulation. Even if the overload protection did not prevent the initiation of a fire, once the power was removed from the cables the fire would not continue since the cable insulation will not propagate flame. Since most of the Division I and II cable trays are separated by a minimum distance of 4 feet, a fire in one division cable tray would not adversely effect the cables in the other division raceway. However, one Division I cable tray passes directly over a Division II cable tray at two poins near column line intersection 30 and P. The minimum separation distance between these trays is 12 inches (vertical) and these trays have solid bottoms and steel covers that extend one (1) foot beyond the outer boundary of the tray intersections. In addition, the cables in the Division I tray in this fire zone are covered with flame retardant material.

Any fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire. Automatic sprinklers would actuate on high temperature to control and/or extinguish the fire.

A fire in this zone would not disable the emergency switchgear in zones 2-4C, 2-4D, 2-5F or 2-5G since all the switchgear is separated from this fire zone by 3 hour fire rated reinforced concrete walls, ceiling and floors. Although both emergency switchgear unit coolers are located in this fire zone, they are separated by a minimum distance of 6 feet. Cooler B cabling is included in the essential raceway list. A motor fire in either unit would not propagate because the motor is provided with thermal overload protection and once the power to motor was interrupted the insulation would not propagate flame. Furthermore, each fan assembly is contained in a steel plate enclosure and the enclosure contains no combustible material. If one switchgear unit cooler were lost, due to fire, the other unit could cool all four emergency switchgear rooms. Cooler B air intake is ducted from zone 1-5A above. Both coolers include fire dampers.

The loss of the RCIC leak detection panel would cause the turbine steam supply isolation valves HV-E51-2F007 and HV-E51-2F008 to close. This isolation signal can be bypassed from the main control room and the valves can be reopened.

The loss of the SRM-IRM drive control relay panel would affect the ability of the operator to move reactor control rods, but would not affect either the capability for automatic or manual scram.

The loss of the reactor water clean-up system (RWCU) leak detection differential pressure switch and main steam isolation valve (MSIV) leak detection panel would cause the isolation of the RWCU and MSIV's. The isolation of the MSIV's would cause the reactor to scram and the reactor could be shutdown in the manner described in Section 4.2.2. The loss of motor control center 2B229 or the LPCI swing bus motor-generator set 2G-203 would cause the loss of power to the motor operation for the following valves: HV-B31-2F031B, recirculation pump discharge isolation valve, and HV-B31-2F032B, recirculation pump discharge bypass valve, HV-E11-2F007B, outboard isolation valve for minimum flow line for RHR pumps 2P202B and 2P202D, and HV-E11-2F015B, outboard LPCI injection isolation valve. the recirculation valves are not required for reactor shutdown. If it is assumed that the Division II cable trays and/or conduit are also lost, then the RHR pumps 2P202B&D would be unavailable and thus the losing of these RHR valves would not cause a more degraded condition. If it were assumed that Division I cable trays and/or conduit were also lost, then these RHR valves could be manually opened by use of the attached handwheels.

If a fire occurred in the area of the control rod drive (CRD) hydraulic control units, the associated solenoid valves might be deenergized and the reactor control rods would scram. Subsequent to the reactor scram, the plant would be shutdown by a method described in either Section 4.2.1 or 4.2.2.

4.4.18 FIRE ZONE 2-4E, PIPE PENETRATION ROOM (El. 719'-1" 733')

a) Major safety-related components in fire zone:

   1) Division I & II cable tray and conduit raceways

   2) Essential raceway listed in Appendix A

b) Fire protection and detection systems in fire zone:

   See Table 6-1

c) Structural and architectural design features of zone:

   See Figure 5-11

		Construction	Rating
Walls:	North	24" reinforced concrete	Not rated
	West	36" reinforced concrete	3 hr

	South	48" reinforced concrete	Not rated
	East (part)	36" reinforced concrete	Not rated
	East (part)	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	Alarmed, steel door connecting to fire zone 2-4A		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 11 minutes

3) Quantitites of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable trays Division I or II and conduit raceways Division I or II

2) Ignition of lubricant in TIP drives running through this zone.

f) Consequences of fire without active fire protection:

Loss of Division I or Division II cable in trays

Loss of Division II cable in conduit, Division I conduit is buried in the 3 hr rated concrete wall on the west side. Essential raceway is fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of

offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I or II safety-relatd equipment or components to function could not be assumed.

The Division I and II cable trays are separated by 4 feet in the horizontal direction. This separation distance satisfies the requirements of NRC Regulatory Guide 1.75, thus precluding any "flash-over" from one division tray to the other. In addition, the cables in the Division I tray in this fire zone are covered with a flame retardant material and the closest Division II and non-safety trays are provided with steel covers. Essential raceway is not assumed to fail.

4.4.19 FIRE ZONE 2-4C, SWITCHGEAR ROOM (719'-1" to 739'-1")

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 2A204 CH.'D', distributed power from the off site power & standby onsite power to load Group "D"

2) 480 V load center 2B240 CH.'D.", distributed 480V and lowe voltage to load Group "D".

3) 480 V MCC 2B246 Division II provides power to 480 V equipment listed in paragraph 4.4.19.h.

4) Division II cable tray raceway and Division II-D conduit raceway.

5) 2X240 Load center transformer for 2B240.

b) Fire protection and detection systems in fire zone:

See TAble 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Structure	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs.
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hrs. 1 side

Ceiling: 12" reinforced concrete 3 hrs.

Doors: Steel door connecting to fire area 2-4A 3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 25 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable trays and conduit raceways.

f) Consequences of fire without active fire protection:

1) Loss of switchgear 2A-204 Channel "D"

2) Loss of load center 2B-240 Channel "D"

3) Loss of MCC 2B-246 and associated Division II Power supply to drywell coolers, RHR valves etc.

4) Loss of Division II cable tray and Division II-D conduit.

5) Loss of transformer 2X-240 Channel "D"

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 719'-1" elevation. The floor is 24" and the celing is 12" reinforced concrete and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel "D" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 2P202D

2) CRD Water Pump 2P132B

3) Core Spray Pump 2P206D

4) RHR Service Water Pump 1P506B

Nonetheless, three safety-related electrical channels, i.e., A, B, and C, and the systems and components served by these channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of MCC 2B-246 would result in the loss of a power supply to the following equipment and components:

1) Hydrogen recombiner "D" - 2E440D

2) 480V/277V reactor building essential lighting panel - 2EP04

3) Valve HV-B21-2F002, reactor head vent isolation valve

4) Valve HV-B21-2F005, reactor head vent isolation valve to steam line "A" (normally open)

5) Valve HV-B21-2F032B, outboard feedwater isolation check valve

6) Valve HV-B31-2F023B, recirculation pump "B" suction isolation valve (normally open)

7) Valve HV-B31-2F031B, recirculation pump "B" discharge isolation valve (normally open)

8) Valve HV-E11-2F027B, RHR suppression pool spray outboard isolation valve (normally closed)

9) Valve HV-E11-2F048B, Division II RHR heat exchanger bypass valve (normally open)

10) Valve HV-E51-2F007, inboard isolation valve for steam supply to RCIC turbine (normally open)

11) Loop "B" drywell area unit coolers

The loss of power to the outboard feedwater isolation valve, HV-B21-2F032B, would only cause the loss of the testing function of this check valve and would not affect its ability to shut on reverse flow.

The loss of power to the recirculation pump "B" suction and discharge isolation valves, HV-B31-2F023B and HV-B31-2F031B, would not cause the loss of the recirculation flow in this loop once these valves are normally open during power operations and if power were lost to the motor operators the valves would remain in the open position.

The loss of power to the RHR suppression pool spray outboard isolation, HV-E11-2F027B, valve would cause loss of the ability of the Division II RHR train to provide sprays to the suppression pool. However, the Division I isolation valve, HV-E11-2F027A, would be operable from the main control room and thus sprays would be provided to the suppression pool if needed. The suppression pool spray function is not normally required for the reactor shutdown operations.

The loss of power to the Division II RHR heat exchanger bypass valve, HV-E11-2F048B, would not cause the loss of the LPCI function since this valve is normally open. However, it would cause the temporary loss of the shutdown cooling mode for the Division II RHR train. The shutdown cooling capability for this train could be restored by dispatching plant personnel to shut this valve by use of the handwheel attached to the valve operator. However, this would not be necessary since the redundant Division I RHR shutdown cooling mode would be available.

The loss of power to the inboard isolation valve for the steam supply to the RCIC turbine, HV-E51-2F007, would not cause the loss of the RCIC system since this valve is normally open and if power were lost to motor operator, the valve would remain in the open position.

Loss of power to all the other valves and components listed above as being powered from MCC 2B-246 would not have any appreciable affect on the ability to affect a safe shutdown of the reactor since none of these valves or components is required for the shutdown operation.

4.4.20 FIRE ZONE 2-4D, SWITCHGEAR ROOM (El. 719'-1" to 739')

a) Major safety-related components in fire zone:

1) 4.16 kV, switchgear 2A203 distribution power from the offsite and standby power to load Group "C" (Channel C)

2) 480 V load center 2B230 load center distribute 480 V/low voltage to load Group "C" (Channel C)

3) MCC 2B236-480 V supply to equipment listed in paragraph 4.4.20.h

4) Transformer 2X230-4.16 kV/480 V load center transformer for 2E-230 (Channel C)

5) Division I cable trays and Division I conduit raceway

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North, South, & West	8" reinforced concrete	3 hrs.
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hr. 1 side
Ceiling:		8" reinforced concrete	3 hrs.
Doors:		Steel door connecting to fire Area 2-4A	3 hrs.

d) Combustible materials in zone: See Table 6-1

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 21 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable trays and conduit

f) Consequences of fire without active fire protection:

1) Loss of switchgear 2A203 Channel "C"

2) Loss of load center 2B230 Channel C"

3) Loss of MCC 2B-236 and associated Division I power supply

4) Loss of transformer 2X230, Channel "C"

5) Loss of Division I tray raceway and Division I, Channel "C" conduit raceway

The fusible link fire dampers would close, thus isolating this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 719'-1" elevation. The floor is 24 inch and the ceiling is 8 inch reinforced concrete and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to control and extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of postulated loss of the Channel "C" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 2P202C

2) Core Spray Pump 2P206C

3) Main condenser mechanical vacuum pump

Nonetheless, three safety-related electrical channels, i.e., A, B, and D, and the systems and components served by these channels would remain available to place and maintain the reactor in a cold shutdown condition by the methods described in either section 4.2.1 or 4.2.2.

The loss of MCC 2B-236 would result in a loss of a power supply to the following equipment and components:

1) 250 Volt DC batter charger "A" - 2D653B

2) Standby liquid control storage tank heater - 2E220

3) Hydrogen recombiner "C" - 2E440C

4) Standby liquid control pump "A" - 2P208A

5) Valve HV-21313, reactor building closed cooling water system containment isolation valve (normally open) - return

6) Valve HV-21314, reactor building closed cooling water system containment isolation valve (normally open) - supply

7) Valve HV-22603, inboard isolation valve for suction to containment instrument gas compressors (normally open)

8) Valve HV-B21-2F001, reactor head vent valve

9) Valve HV-C41-2F006, SLCS outboard isolation valve (stop check - normally open)

10) Valve HV-E11-2F009, RHR suction inboard isolation valve (normally closed)

11) Valve HV-E11-2F027A, RHR suppression pool spray outboard isolation valve (normally closed)

12) Valve HV-E11-2F040, RHR drain valve to liquid radwaste system (normally closed)

13) Valve HV-G33-2F001, RWCU inboard suction isolation valve (normally open)

14) Loop "A" drywell area unit coolers

The loss of power to the standby liquid control pump, 2P208A, would not affect reactor safety or the ability to effect a reactor shutdown since the CRD system and the other SLCS pump 2P208B would still be available to place the reactor in a sub-critical condition.

The loss of power to the RHR inboard suction isolation valve, HV-E11-2F009, would cause a temporary loss of control of the shutdown cooling mode of the RHR system from the main control room. However, once the reactor was in subcritical condition, operators could be dispatched to open this valve by use of the handwheel attached to the operator and thus restore the shutdown cooling mode capability. Since the reactor plant can be held in a hot shutdown condition without the use of the shutdown cooling mode of the RHR system, this does not represent a significant degradation of the plant's ability to place and maintain the reactor in a cold, shutdown condition.

The loss of power to all the other valves and components listed above would not have any effect on the ability to effect a safe shutdown of the reactor since none of these valves or components is required for the shutdown operation.

4.4.21 FIRE ZONE 2-4E, CONTROL ROD DRIVE REPAIR AND SHIELD STORAGE (El. 719'-1" to 747"- 1")

a) Major safety-related components in fire zone:

Radiation elements RE-IN010A3 & B3

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	8" reinforced concrete	3 hrs.
	West	8" reinforced concrete	Not rated
	South	36" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		8" reinforced concrete	Not rated
Doors:		Fire rated steel door	3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: None

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

The fire loading is less than 1 psf and a postulated fire would be expected to remain localized in the area of ignition. Cable routed in conduit is not considered a pathway out of this zone.

f) Consequences of fire without active fire protection:

Loss of Radiation Elements.

g) Consequences of fire with active fire protection:

Portable extinguishers and a hose reel are available for the plant fire brigade to extinguish a fire in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2 since the ability of both Division I and II safety-related equipment or components to function would not be adversely effected by a fire in this zone.

4.4.22 FIRE ZONE 2-4F, DRYWELL (El. 703'-11", 719'-1", 738'-11 1/2", 752'-2 1/2", 767'-1", 779'-1" to 807'-0")

a) Major safety-related components in fire zone:

1) Recir. pump motor 'A' Division I instruments TE-2N009A, TE-2N001A & PS6-2N008A

2) Residual heat removal instruments ZS-25150A, ZS-25160A, PDIS 2N0019B & ZS-25109

3) Containment atmosphere control TE-2579BA

4) PCIC system instruments PSL-2N019A, B, C & D, PDSH 2N017, PDSH 2N018 & ES-25122

5) Reactor water cleanup BS instruments TE-2N042, TE-2N043, ZE-24402 & ZE-24401B

6) Reactor recirc. sys (REVAB instruments PS-2N018A & B

7) Recir. pump motor 'B' Division II instruments TE-2N001E, TE-2N009B, PSL 2N008B

8) Containment atmosphere control TE-25799B

9) Division I, II tray raceways @ El. 719'-1" & Division II trays @ 738'-11"

10) Division I, II (A1, A2, B1, B2) conduit raceway @ 719'-1" & 738' - Division I, II conduit @ 752' & 761' El.

11) @ Elevation 719'-1"

HV-B21-2F016 main steam drain shutoff valves

HV-B21-2F020 steam line equalizer valves

HV-E11-2F009 RHR pump suction shutoff valve

HV-E11-2F022 reactor head spray shutoff IB valve

@ Elevation 738'-11 1/2"

HV-G33-2F001 RWCU IB isolation valve

@ Elevation 752'-2 1/2"

HV-B21-2F032A & B feedwater inlet valves

HV-E11-2F016B RHR shutdown clg. pp. suct valve

HV-E21-2F005A & B CS inbd eject shutoff valves

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-11 through 5-13

		Construction	Rating
Walls:	All around	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete & steel plate	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Equipment & personnel air locks w/steel doors connecting to fire zone 2-4A	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 20 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) There is no postulated fire considered in ths zone because of the nitrogen inerted atmosphere.

2) Redundant cable trays separated 49 feet at El. 719'-1". All other redundant cable trays and conduit in this zone are in accordance with the NRC Regulatory Guide 1.75

f) Consequences of fire without active fire protection:

The inerted nitrogen atmosphere will prevent combustion at any time that a safe shutdown may be required.

g) Consequences of fire with active fire protection:

Same as in f) above.

h) Effects of fire on safe shutdown:

Since no fire is postulated in this zone, all of the system and/or components required to place and/or maintain the reactor plant in a cold, safe shutdown condition would be available. The methods described in Section 4.2.1 or 4.2.2 could be used to effect a shutdown of the reactor plants.

4.4.23 FIRE ZONE 2-4G, MAIN STEAM PIPEWAY RECIRCULATION ROOM (El. 719'-1" to 816'-1")

a) Major safety-related components in fire zone:

Division I & II cable in conduit

Containment isolation valves

B21-2F028A, B, C, D outboard main steam isolation valves

HV-24107A, B feedwater check valve

B21-2F032A, B feedwater isolation valve

E51-2F0013 RCIC to feedwater isolation valve

E41-2F006 HPCI return to feedwater isolation valve

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-11 through 5-14

		Construction	Rating
Walls:	North, South & West	48" reinforced concrete (717' to 786')	3 hrs.
	North & South (part)	48" reinforced concrete	Not rated
	East (part)	36" reinforced concrete (761' to 818')	Not rated
	East (part)	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Steel doors to zones 2-4A, 2-5A, 2-7A, Blow out panel to outside	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire zone:

1) Ignition of Division II (A2, B2) ESF conduit

2) Ignition of nonsafety related cable to reactor building pipe tunnel unit coolers

f) Consequences of fire without active fire protection:

Loss of reactor building pipe tunnel unit cooler recirculation fans.

Loss of power to the above listed outboard containment isolation valves except that assisted check valves will still close on reverse flow.

Cable in conduit is not considered a combustible path to adjacent areas.

Fire does not spread to adjacent fire zones because of absence of combustible paths.

g) Consequences of fire with active fire protection:

Same as above

h) Effects of fire on safe shutdown:

Since the cable routed in conduit is separated in accordance with NRC Regulatory Guide 1.75 the conduit material would act as a fire barrier with respect to external cable fires, the loss of both Division I and II cables is not postulated.

If both the AC and DC power supply to valves B21-2F028, A, B, C & D were lost, these valves would shut and reactor protection system would cause the reactor to scram. If only the AC or DC power were lost, the valves would remain open. If the AC and DC pcwer were lost ot one MSIV, then the total steam flow should decrease and the three element feedwater control system would reduce feedwater flow. If power were lost to two MSIV's then one of two results would occur depending on which combination of valves were lost:

1) The steam flow would decrease, or

2) The RPS system would scram the reactor.

If the power were lost to three MSIV's the RPS system would scram the reactor.

The loss of power to the feedwater check valves would only cause loss of the testing capability of the valves. The valves would still close on reverse flow.

The Division I conduit for RCIC injection isolation valve HV-E51-2F0013 and the Division II conduit for HPCI injection isolation valve HV-E41-2F006 are routed on opposite sides of this fire zone and the minimum distance between these conduits is 10 feet. As a result of this separation, the loss of both these valves due to an electrical fire is improbable. Even if the power to both valves were lost, the plant could still be shutdown by use of the combination of LPCI or core spray and ADS. Once the fire was extinguished in this zone, the HPCI and RCIC system could be restored by dispatching operators to open both of the valves by use of the handwheel attached to the valve operators.

4.4.24 FIRE ZONE 2-5A, FUEL POOL PUMPS AND HEAT EXCHANGERS (El. 749'-1" to 771'-1")

a) Major safety-related components in fire zone:

Reactor vessel level and pressure panels 2C-004, 2C-005

Standby liquid control system panel

Standby liquid control pumps 2P208A & B

Standby liquid control storage tank

Standby liquid control nitrogen accumulators A & B

Standby liquid control panel 2C011

HV-E11-2F016A RHR containment spray isolation MOV

HG-G33-2F042 RWCU return isolation MOV (normally open)

HV-G33-2F104 RWCU bypass MOV (normally closed)

Division I trays & Channels A1, B1, A2 and B2 conduit raceways

Core spray loop 'A' pressure swithc PSH-E21-2N007A

RWCU systme panel 2C002

Reactor protection system motor-generator sets 2G-201A & B

Air intake for Emergency Swithgear Unit Cooler B from Fire Zone 1-4A.

RWCU system panel 2C002.

Essential raceway listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr.
	West (part)	36" reinforced concrete	3 hr.
	East (part)	12" reinforced concrete	3 hr.
	East (part)	12" reinforced concrete	2 hr.
	South (part)	12" reinforced concrete	2 hr.
	South (part)	36" reinforced concrete	Not rated
	South (part)	48" reinforced concrete	Not rated
	South (part)	72" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	Not rated

Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	1.	3 hr. rated steel doors connecting to fire areas 2-5F, 2-5G, & 2-5H	
	2.	1-1/2 hrs. steel door connecting to fire area 2-1J & 2-1I	
	3.	Non-rated pressure resistant alarmed steel door connecting to fire area 2-5D	
	4.	Non-rated alarmed steel door connecting to fire area 2-5E	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety related cable trays

f) Consequences of fire without active fire protection:

1) Loss of standby liquid control system

2) Loss of Division I cables and conduits

3) Loss of Division II conduits serving post-accident monitoring instruments and MSIV leakage instrumentation. Loss of channels A1, B1, A2 & B2 serving RPS instrumentation.

4) Loss of Division I or II reactor vessel pressure and level instrumentation

5) Loss of core spray isolation valve

6) Loss of drywell containment spray isolation valve

7) Loss of reactor water cleanup system panel

8) Loss of fuel pool cooling system panel

9) Switchgear Unit Cooler B fire damper will close causing transfer to Unit Cooler A.

The area is elongated and spread of fire is inhibited by the type of cable insulation used.

Essential raceway is fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The loss of all or both divisions of safety related conduit is not postulated because of the absence of Class A or B combustible materials, the fact that conduit material represents a fire barrier for electrical fires and the separation distances, as a minimum, are in accordance with the NRC Regulatory Guide 1.75.

The loss of both reactor vessel pressure and level instrumentation panels, 2C-004 and 2C-005 is not postulated since cables associated with these panels are low energy control and instrumentation cables, these cables are protected from thermal overload condition and the cable insulation would self-extinguish once the power was interrupted. Furthermore, the panels are separated by a distance of 18 feet, no Division II cable trays or conduit are routed in the vicinity of panel 2C004 and the Division I cable tray is separated from panel 2C005 by 14 feet vertically.

The loss of the standby liquid control system (SLCS) pumps, valves, and/or control panel would not affect the safe shutdown of the plant since this system is only employed if a malfunction in the CRD system prevents a reactor shutdown. Since the major components of the CRD system are located on elevation 719'1" and are separated from the SLCS components by 24" of reinforced concrete and at least 10 feet of horizontal separation, the simultaneous loss of both systems is not postulated as being credible.

If all three of the fuel pool cooling system pumps were lost as the result of a fire, the spent fuel elements could be cooled by use of the RHR system

The loss of the reactor protection system (RPS) motor-generator sets would denergize the RPS which would result in

the reactor being scrammed. Subsequent to the reactor scram, the plant could be brought to safe shutdown condition by the methods described in Sections 4.2.1 or 4.2.2.

The loss of power to RCWU valves HV-G33-2F042 and HV-G33-2F104 would not affect the operation of the RWCU system since it would not be necessary to change the position of either valve from its normal position.

The loss of power to RHR containment spray isolation valve HV-E11-2F016A would only result in the temporary loss of the containment spray function of the RHR system. Since the function of spray system is to reduce the containment pressure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

Loss of Switchgear Cooler B air intake causes transfer to Unit Cooler A which draws air from Fire zone 1-4A.

4.4.25 FIRE ZONE 2-5B, VALVE ACCESS AREA (761' to 771'-1")

a) Major safety-related components in fire zone:

1) HV-E11-2F021B RHR to drywell spray containment isolation valve

2) HV-E21-2F004A & B core spray isolation valves

3) HV-E21-2F005A & B core spray containment isolation valves

4) HV-E11-2F016B RHR to drywell spray isolation valve

5) Division I cable tray raceway and Division I & II conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South	48" reinforced concrete	Not rated
	East	72" reinforced concrete	Not rated
	West	36" reinforced concrete	Not rated

Floor:	24" reinforced concrete	Not rated
Ceiling:	24" reinforced concrete	Not rated
Doors:	Non rated steel door connecting to fire area 2-5C	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Less than 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material in Division I cable trays

f) Consequences of fire without active fire protection:

Loss of either core spray loop 'A' or 'B'

Loss of drywell spray headder 'B'

g) Consequences of fire with active fire protection:

Same as above

h) Effects of fire on safe shutdown:

The loss of power to the core spray isolation valves HV-E21-2F004A and B would not cause the loss of the core spray system since these valves are normally in the open position and no valve movement would be required for the operation of the system. The power cables for valves HV-E21-2F005A and B are in steel conduit that are separated by a minimum distance of 5 feet. In addition, the combustible loading for this zone is negligible and thus the potential for an external fire hazard is highly improbable. An internal fire in a conduit would be self-extinguised once the power supply was interrupted by thermal overload or overcurrent protection.

The loss of power to RHR containment spray isolation valves HV-E11-2F021B and HV-E11-2F016A would only result in the temporary loss of the containment spray function of the RHR system. Since this function is not required to effect a safe reactor shutdown the loss of this capability would not

prevent placing and maintaining the plant in a cold shutdown condition.

4.4.26 FIRE ZONE 2-5C, REACTOR CLEANUP BACKWASH TANK (El. 761'-10" to 777'-1")

a) Major safety-related components in fire zone:

1) Core spray system Division I instrument PSH-E21-2N007A

2) Reactor water cleanup instruments FE-2N011 & FT-2N012

3) Solenoid valves SV-24107A1 and A2, isolation valves for air supply to testing piston for outboard feedwater check valve HV-24107A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North & East	36" reinforced concrete	Not rated
	South (part)	24" reinforced concrete	Not rated
	South (part)	24" reinforced concrete	2 hrs.
	West	36" reinforced concrete	3 hrs.
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Nonrated steel door connecting to fire Zone 2-5B	

d) Combustible material in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays & Division I conduit raceway.

f) Consequences of fire without active fire protection:

1) Loss of pressure switch for the core spray system

2) Loss of flow indication for the reactor water cleanup system discharge to main condenser or liquid radwaste collection tanks.

The combustible loading is less than 1 psf and a fire would be expected to remain localized in the area of ignition.

g) Consequences of fire with active fire protection:

A hose reel is provided to control and/or minimize the fire in the cable trays.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2.

The loss of pressure switch PSH-2N007A would only result in the loss of a high pressure alarm in the main control room and would only cause the unavailability of the "A" train of the core spray system.

The flow element, FE-2N011, and transmitter, FT-2N012, are only needed when the RWCU system is discharging either to the main condenser or the radwaste collection system. This is not a normal operation and is not required for reactor shutdown.

The solenoid valves SV-24107A1 and A2 are isolation valves for the air supply to the testing piston of the outboard feedwater check valve. Thus the loss of these solenoids would only result in the loss of the testing function for these valves and would not prevent closure of this valve on reverse flow.

4.4.27 FIRE ZONE 2-5D, RWCU PUMPS AND HEAT EXCHANGERS (El. 749'-1" to 766'-1")

a) Major safety-related components in fire zone:

1) Containment atmosphere control isolation valves HV-25713 & 25714 and controlling sclenoid valves

2) Reactor water cleanup containment isolation valves HV-2F104, HV-2F042 & HV-2F004

3) RWCU control panel 2C651

4) Reactor water cleanup recirculation pumps 2P221A and B

5) Division I and II in conduit raceway

6) HVAC supply and exhaust isolation dampers to fire zone 2-5A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	South	48" reinforced concrete	
	East, North (part), & West	36" reinforced concrete	Not rated
	North (part)	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Non rated pressure resistant alarmed steel doors to fire zone 2-5A	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 1 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable in Division I or II conduits

f) Consequences of fire without active fire protection:

1) Loss of containment purge and use of SGTS for containment atmosphere control

2) Smoke from fire may be drawn into equipment compartment air exhaust system

3) The low intensity of a cable fire precludes flames from being spread by the air exhaust

4) The fire does not spread to adjacent fire zones because of the absence of combustible paths.

g) Consequences of fire with active fire protection:

A hose reel and a portable extinguisher is provided to control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

The Division I and II conduit in this area only serves the containment purge isolation valves HV-25713 and HV-25714. The loss of this particular purge function would not affect the safe shutdown of the reactor plant.

The loss of the RWCU system would not affect the capability to place and maintain the plant in a cold, shutdown condition.

4.4.28 FIRE ZONE 2-5E, PENETRATION ROOM (749'-1" to 777'-1")

a) Major safety-related components in fire zone:

1) RHR system drywell spray header containment isolation valves, Division I HV-E11-2F021A and HV-E11-2F016A

2) CRD return water containment isolation valve HV-2F082

3) Standby liquid control containment isolation valve HV-C41-2F006

4) Instrument gas containment isolation valve SV-22654A

5) Division I cable tray and Divisions I conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & East	36" reinforced concrete	Not rated
	West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Non rated, alarmed steel door connecting to fire zone 2-5A	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays Division I or conduit raceway Division I.

The fire concentration is located in the south end of this zone.

f) Consequences of fire without active fire protection:

1) Loss of drywell spray header 'A'

2) Loss of Division I cables in tray & conduit

3) Loss of Division I conduit serving standby liquid control valve or SLCS valve HV-E41-1F006 in same zone

g) Consequences of fire with active fire protection:

The protection privided by the hose reel and portable extinguisher would control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety related equipment or components to function could not be assumed.

The loss of power to the RHR containment spray isolation valve HV-E11-2F021A and HV-E11-2F016A would only result in the temporary loss of the containment spray function of one division of the RHR system. Since the function of the spray system is to reduce the containment prssure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

The loss of power to the standby liquid control system (SLCS) isolation valve, HV-c41-2F006 would not result in the loss of the system since the valve is a stop check valve that is normally open and the motor operator function would not be required to place the SLCS in operation.

The CRD valve HV-C12-2F082, the return line outboard isolation valve, is normally in the open position and the loss of power to the motor would not cause a change in position. Even if the valve were to close, this would not affect the capability of scramming the reactor with the CRD system.

4.4.29 FIRE ZONE 2-5F, LOAD CENTER (749'-1" to 764'-1")

a) Major safety-related components in fire zone:

1) 4.16 kV switchgear 2A202, distributed power from the offsite and standby power to load group 'B'

2) 480 V load center 2B220 Division II, distributes 480V and lower power to load group 'B'

3) MCC's 2B227 Division II, 480V - power to equipment listed in paragraph 4.4.29.h

4) Transformer 2X220 Division II, 4.16 kV - 480V transformer for load center 2B220

5) Cable tray raceway Division II, Channel 'B' and Division II conduit

6) Breakers 2A20601 and 2A20602, Division I and II for recirculation pump 2P410B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs.
	East	24" reinforced concrete	Not rated.
Floor:		24" reinforced concrete	3 hr. 1 side
Ceiling:		8" reinforced concrete	3 hrs.
Doors:		Steel door connecting to fire zone 2-5A	3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 30 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety related Division II cable trays, Division II and channel 'B' conduit

2) The combustible loading in this zone is 3.9 psf and is expected to generate a high heat release.

3) An 8 in. block wall has been provided to separate 2A20601 (Division I) from 2A20602 (Division II)

f) Consequences of fire without active fire protection:

1) Loss of switchgear 2A-202 Channel B

2) Loss of load center 2B-220 Channel B

3) Loss of MCC 2B-227 and associated Division II power supply

4) Loss of Division II cable tray and Division II-B conduit

5) Loss of transformer 2X-220 Channel B

6) Loss of Division I and II recirculaticn pump trip breakers 2A20601 and 2A20602

The fusible link fire dampers would close, thus isolationg this zone. This fire zone is enclosed by three hour fire barriers cn all sides that communicate with other fire zones on the 749'-1" elevation. The floor is 24" reinforced concrete, the ceiling is 8" reinforced ceiling, and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

A fire within this zone would be alarmed in the main control room by the ionization smoke detectors and the plant fire brigade would be dispatched to contrcl and extinguish the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel B emergency switchgear, the following major ccmponents and systems would be rendered unavailable:

1) RHR Pump 2P202B.

2) RHR Service Water Pump 2P506B

3) Core Spray Pump 2P206B

4) Reactor Building Chiller 2K206B

Nonetheless, three safety related electrical channels, ie, A, C, and D, and the systems and components served by these channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Secticn 4.2.1 or 4.2.2.

The loss of the MCC 2B227 would cause the loss of a power supply to the following equipment and components:

1) 250 Volt DC Battey Charger B - 2D663

2) 480/277V Reactor Building Essential Lighting Panel - 2EP08

3) Emergency Switchgear Load Center Room Unit Cooler Fan - 2V222B

4) Valve HV-C12-2F082, CRD system outboard isolation for return line to RPV (normally open)

5) Valve HV-E11-2F021B, RHR containment spray isolation valve

6) Valve HV-E21-2F004B, Division II core spray injection isolation valve

7) Valve HV-E21-2F005B, Division II core spray outboard containment isolation valve

8) Valve HV-E32-2F001B, suction isolation valve for MSIV leakage control system for steam line"A"

9) Valve HV-E32-2F001F, suction isolation valve for MSIV leakage control system for steam line"B"

10) Valve HV-E32-2F002B, backup suction isolation valve for MVIV leakage control system for steam line "A"

11) Valve HV-E32-2F002F, backup suction isolation valve for MSIV leakage control system for steam line "B"

12) Valve HV-E32-2F003B, heater discharge isolation valve for MSIV leakage control system for steam line "A"

13) Valve HV-E32-2F003F, heater discharge isolation valve for MSIV leakage control system for steam line "B"

The loss of power to CRD valve HV-C12-2F082 would have no affect on the operation of the CRD system since this valve is normally open and is not required to scram the reactor control rods.

The loss of power to emergency switchgear load center room unit cooler fan, 2V-222B would not cause the loss of the equipment in the other emergency switchgear rooms, fire zones 2-4C, 2-4D and 2-5G since there is a redundant cooler fan 2V-222A.

The MSIV leakage control system is not required for shutdown operations, thus the loss of power for the valves associated with this system would not affect the ability to place the reactor in a cold shutdown condition. Furthermore, the loss of power for these valves would not result in any radioactive release since all of these valves are normally closed.

The loss of power to the RHR containment spray isolation valve HV-E11-2F021B would only result in the temporary loss of the containment spray function of one division of the RHR system. Since the function of the spray system is to reduce the containment pressure after a LOCA, the loss of this function would not prevent the reactor plant from being placed and maintained in a cold, shutdown condition.

All of the other components supplied by MCC 2B227 are not required for reactor shutdown.

4.4.30 FIRE ZONE 2-5G, LOAD CENTER ROOM (749'-1" to 764'-1")

a) Major safety related components in fire zone:

1) 4.16 kV - switchgear 2A201 Division I, distributed power from the offsite and standby power to load group 'A'

2) 480 V load center 2B210 Division I, distributes 480 V and lower power to load group 'A'

3) MCC 2B217 Division I, distributes 480 V power to equipment listed in paragraph 4.4.30.h

4) Transformer 2X210 Division I, 4.16 kV - 480 load center transformer for load center 2B210

5) Cable tray raceway Division I, conduit raceway Channel A, and Division I

6) Bkrs 2A20501, 2A20502 4 kV Division I & II recirc. pump 2P410A trip

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South & West	8" reinforced concrete	3 hrs.
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	3 hr. 1 side

Ceiling:	8" reinforced concrete	3 hrs.
Doors:	Steel door connecting to fire zone 2-5A	3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 30 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within safety-related Division I cable trays, Division I and channel A conduit

2) The combustible loading in this zone is 3.19 and is expected to generate a high heat release in this zone

3) An 8 in. block wall has been provided to separate 2A20501 (Division I) from 2A20502 (Division II)

f) Consequences of fire without active fire protection:

1) Loss of switchgear 2A-201 Channel A

2) Loss of load center 2B-210 Channel A

3) Loss of MCC 2B-217 and associated Division I power supply

4) Loss of Division I cable tray and Division I-A conduit

5) Loss of transformer 2X-210 Channel A

6) Loss of Division I & II recirculation pump trip breaker 2A20501 and 2B20502

The fusible link fire dampers would close, thus isolationg this zone. This fire zone is enclosed by three hour fire barriers on all sides that communicate with other fire zones on the 749'-1" elevation. The floor is 24" reinforced concrete, the ceiling is 8" reinforced concrete, and the penetrations are sealed to a three hour fire rating. These design features will prevent the propagation of a fire outside of this zone.

g) Consequences of fire with active fire protection:

This fire zone is protected by products of combustion detectors and portable fire extinguishers to control and/or minimize the effects of the fire.

h) Effects of fire on safe shutdown:

As a result of the postulated loss of the Channel "A" emergency switchgear, the following major components and systems would be rendered unavailable:

1) RHR Pump 2P202A

2) Core Spray Pump 2P206A

3) Turbine Building Chiller 2K102A

4) CRD Water Pump 2P132A

Nonetheless, three safety related electrical channesl, ie, B, C, and D, and the systems and components served by these channels would remain available to place and maintain the reactor plant in a cold shutdown condition by the methods described in either Section 4.2.1 or 4.2.2.

The loss of the MCC 2B217 would cause the loss of a power supply to the following equipment and components:

1) 250 Volt DC Battery Charger - 1D653A

2) 480V/277V Reactor Building Essential Lighting Panel - 2EP07

3) Instrument Gas Compressors - 2K205A&B

4) Standby Liquid Control Pump - 2P208B

5) Reactor Protection System MG Set - 2S237A

6) Valve HV-25112, RPV head spray outboard isolation valve (normally open)

7) Valve HV-B21-2F032A, outboard feedwater isolation testable check valve

8) Valve HV-E11-2F016A, Division I RHR drywell spray isolation valve

9) Valve HV-E11-2F021A, Division I RHR drywell spray isolation valve

10) Valve HV-E21-2F004A, Division I core spray injection isolation valve

11) Valve HV-E21-2F005A, Division I core spray injection isolation valve

12) Valve HV-E32-2F006, MSIV leakage control system (MISV-LCS) isolation valve

13) Valve HV-E32-2F007, MSIV-LCS isolation valve

14) Valve HV-E32-2F008, MSIV-LCS isolation valve

15) Valve HV-E32-2F009, MSIV-LCS isolation valve

16) Valve HV-G33-2F042, RWCU return isolation valve

17) Valve HV-G33-2F104, RWCU heat exchanger bypass valve

The loss of power to RPS MG set "A", 2S237A only, would not cause the reactor control rods to scram. However, a trip signal in either channel B1 or B2 would result in a reactor scram and then the loss of this MG set would not result in a degraded condition in reactor protection.

The loss of power to the SLCS pump, 2P208B, would not affect reactor safety or the ability to affect a reactor shutdown, since the CRD system and the other SLCS pump 2P208A would still be available to place the reactor in a sub-critical condition.

The loss of power to the RPV head spray isolation valve HV-25112 would not result in the loss of the ability to initiate head spray since this valve is normally open during power operations. Furthermore, the head spray function is not required in order to reach a safe shutdown condition.

If power were lost to the outboard feedwater isolation valve HV-B21-2F032A, only the testing function would be lost since this is a check valve and would shut on reverse flow.

The loss of power to the Division I RHR drywell spray isolation valves HV-E11-2F016A & 2F021A would only result in the temporary loss of the containment spray function of one division. Since the spray system is designed to mitigate the consequences of a LOCA, the loss of this function would not prevent the reactor plant form bieng placed and maintained in a cold, shutdown condition.

The loss of power to Division I core spray injection valves HV-E21-2F004A and 2F005A would not affect the shutdown of the reactor since a redundant Division II core spray train, three RHR pumps, the HPCI system and the RCIC system would be available.

Since neither the MSIV-LCS nor the RWCU system is required for shutdown opeations, the loss of the power source for the valves associated with these systems would not affect the ability to place the reactor in a cold, shutdown condition.

4.4.31 FIRE ZONE 2-5H, INSTRUMENT REPAIR ROOM (El. 749'-1" to 764')

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	8" reinforced concrete	3 hrs.
	West	8" reinforced concrete	3 hrs.
	South	36" reinforced concrete	3 hrs.
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		8" reinforced concrete	Not rated
Doors:		Steel door connecting to fire area 2-5A	3 hrs.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 1 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables with non-safety related cable trays

2) A postulated fire would be expected to remain localized within the boundaries of this zone. Cable routed in conduit is not considered a potential propagation pathway out of this zone.

f) Consequences of fire without active fire protection:

1) Loss of non-safety related equipment

g) Consequences of fire with active fire protection:

The existing fire protection would ensure control and/or minimize damage to the equipment in this fire zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.4.32 FIRE ZONE 2-6A, ACCESS AREA (779'-1" to 797'-1" & 816'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Controls associated with containment purge to SGTS and reactor buildup recirculation system dampers

Motor operated dampers HD 27508A&B, HD 27534A&F

Ducts associated with containment purge and reactor building recirculation system

Essential raceway listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	24" reinforced concrete	3 hr
	South	8" reinforced concrete	2 hr
	East (part)	72" reinforced concrete	Not rated
	East (part)	16" reinforced concrete	Not rated
	West (part)	36" reinforced concrete	3 hr
	West (part)	36" reinforced concrete	Not rated

	West (part)	8" reinforced concrete	2 hr
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	Steel door to zone 1-6A		3 hr
	Steel door to zone 2-1I		1-1/2 hr
	Steel door connects to zone 2-6B		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays, and Division I or II conduit raceway.

2) The sample cooler chiller oil is contained within an hermetic enclosure and cannot contribute combustibles to a fire in this zone.

f) Consequences of fire without active fire protection:

Loss of containment purge to SGTS

Loss of reactor building recirculation

Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75. Essential raceway is fire protected in accordance with Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photoelectric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of

offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2.

The loss of the power to the dampers for the containment purge and the reactor building recirculation systems would only result in a temporary loss of these functions since these plant personnel could be dispatched to open these dampers manually. Neither the containment purge nor the reactor building recirculation systems are requied to affect a safe shutdown.

4.4.33 FIRE ZONE 2-6E, LOAD CENTER ROOM (779'-1" to 797'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	South	36" reinforced concrete	Not rated
	East & West	72" reinforced concrete	Not rated
	North	54" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:		Non rated steel doors to fire zones 2-6A & 2-6D	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 5 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related cable trays.

f) Consequences of fire without active fire protection:

Loss of load center panels

Fire would not propagate to adjacent fire zones because of absence of combustible paths.

g) Consequences of fire with active fire protection:

The detection and suppression capability installed in this zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.4.34 FIRE ZONE 2-6C, ELECTRICAL EQUIPMENT ROOM (779'-1" to 797'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hrs (partial)
	South	36" reinforced concrete	Not rated
	East	12" concrete blocks	2 hrs.
	West	48" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated
Doors:	1.	Steel door connecting to fire zone 2-6D	Not rated

2. Airtight, steel door connecting to zone 2-1J — 1-1/2 hr.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 9 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related panels.

f) Consequences of fire without active fire protection:

1) There are no safety related instrumentation and controls located in this fire zone.

g) Consequences of fire with active fire protection:

The detection and suppression capability in this fire zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.4.35 FIRE ZONE 2-6D, H&V EQUIPMENT ROOM (El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

Division I & II cable in conduit

Division I & II air recirculation system dampers HD-27586A&B, HD-27524A&B, HD-27576A&B, and associated solenoid valves

Division I & II zone I equipment compartment exhaust isolation dampers

Containment pressure instrument rack 2C058

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North&South	24" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
	West	18"&72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non rated steel doors connecting to fire zones 2-6B, 2-6C, and 2-6E

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 9 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition in nonsafety related cable trays or motors

2) Ignition of cable insulation or jacket material in Division I or Division II conduit

f) Consequences of fire without active fire protection:

Loss of air recirculation system isolation damper A or B

Loss of one of two redundant isolation dampers

g) Consequences of fire with active fire protection:

The suppression capability in this fire zone is sufficient to control and/or minimize the fire damage.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of

offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability to function of the Division I or II damper for the reactor building zone I recirculation system or the reactor building zone I exhaust system could not be assumed. If power were lost to the dampers listed above, the zone I ventilation system would be lost, but the rooms where safety-related pumps and other components are located are cooled by unit coolers. Therefore, the loss of these dampers would not result in a degradation of the ability to place and maintain the plant in a cold, shutdown condition.

4.4.36 FIRE ZONE 2-6E, HATCH AND LAYDOWN AREA (El. 779'-1" to 797'-1")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	30" reinforced concrete	Not rated
	South	36" reinforced concrete	Not rated
	West	72" reinforced concrete	Not rated
	East	36" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: Non-rated steel door to fire zone 2-6D

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of non-safety related cable insulation and jacket material

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

Same as above:

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.4.37 FIRE ZONE 2-6F, SPENT FUEL POOL (El. 779'-4" to 818-1")

a) Major safety-related components in fire zone:

None when empty - no fire hazard when filled with water

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North	60" reinforced concrete	Not rated
	South, East & West	72" reinforced concrete	Not rated
Floor:		24" reinforced concrete	Not rated
Ceiling:		24" reinforced concrete	Not rated

Doors: None (removable platform)

d) Combustible materials in zone:

1) Combustible loading: None

2) Equivalent fire severity: None

3) Quantities of combustibles: None

e) Postulated fire in zone:

1) No flammable material located in this fire zone, therefore a fire cannot start or propagate in this area.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None required

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2.

4.4.38 FIRE ZONE 2-7A, H&V FAN AND FILTER ROOMS CIRCULATION AND EQUIPMENT OFFICE (El. 799'-1"to 816'-1")

a) Major safety-related components in fire zone:

Division I & II conduit raceway

Zone III exhaust isolation dampers

Zone III filtered exhaust isolation dampers

Recirculation system balance damper

Zone III supply air isolation damper

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North (part)	12" Concrete Block	2 hrs.
	North (part)	36" reinforced concrete	3 hrs.
	South	12" concrete block	Not rated

	West	72" reinforced concrete	Not rated
	East (part)	36" reinforced concrete	Not rated
	East (part)	12" concrete block	2 hrs.
Floor:		12" reinforced concrete	Not rated
Ceiling:		Metal deck	Not rated

Doors: A 1-1/2 hr fire door connecting to fire zone 2-1J, and a non-rated steel door connecting to fire zone 2-6E

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 28 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of charcoal filters

2) Ignition of cables within non-safety related cables trays and Division I & II conduit.

f) Consequences of fire without active fire protection:

1) The radioactive products of combustion from the charcoal filter could possibly be released to the environment if the filter housing or dampers collapse.

2) Loss of recirculation system due to inability to isolate conjunctive systems.

3) Loss of non-safety related HVAC systems.

4) Separation of redundant conduit is in accordance with the NRC Regulatory Guide 1.75.

g) Consequences of fire with active fire protection:

1) The automatic deluge sprinkler would extinguish a charcoal filter fire. An alarm system will indicate the fire condition to the operator.

2) A hose reel is provided to control and/or minimize the postulated fire damage in this zone.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintaind in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2.

Since the reactor building zone III ventilation system is not required for shutdown operations, the loss of this system will not have a significant effect on the ability to shutdown the reactor.

The potential for a radioactive release from the filters is diminished significantly by the use of the water deluge system that is provided in the area where the filters are located. If the products of combustion were not contained by the filter assembly or isolation dampers, the radioactive release to the environment would be a very small fraction of 10CFR100 limits.

4.5 FIRE HAZARDS ANALYSIS - CONTROL STRUCTURE

4.5.1 FIRE ZONE 0-21A, COMMON EQUIPMENT ROOM (El. 656'-0" to 674'-0")

a) Major safety-related components in fire zone:

Four 4" air operated isolation valves on ESWS lines from TB CCW heat exchangers 1E123 A & B and 2E123 A & B respectively. All valves operated from the control room by hand switches.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-8

		Construction	Rated
Walls:	North & South	12" & 36" reinforced concrete	3 hrs
	East & West	36" reinforced concrete	3 hrs
Floor:		Concrete floor on grade	Not rated
Ceiling:		Metal deck with 24" of reinforced concrete	Not rated
Doors:		Steel door to zones 1-31G&F, 0-31-H & 2-31G&F	3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 7 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays, conduits or MCCs

2) Ignition of any combustible components of electrical motors

f) Consequences of fire without active fire protection:

None to safety related components, since the only safety related components located in this area are the isolation valves on the ESWS lines to a non-essential system. These valves are normally closed and are designed to fail closed. The cable insulation and jacketing will not propagate a fire once the ignition ceases to exist. The fire will not spread to adjacent zones because of the absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except for room C-10 where the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

None

4.5.2 FIRE ZONE 0-21B, STAIR & FREIGHT ELEVATOR (El. 656'-0" thru 836'-0")

a) Major safety-related components in fire zone:

None.

b) Fire protection and detection systems in fire zone:

None

c) Structural and architectural design features of zone:

See Figures 5-8 through 5-13

		Construction	Rating
Walls:	South & West	36" reinforced concrete	3 hr
	North & East	4" to 12" reinforced concrete	2 hr
Ceiling:		36" reinforced concrete	Not rated
Doors:	1 steel door at each floor		1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of elevator traveling cable insulation or electrical equipment and cables within the elevator machine room.

f) Consequences of fire without active fire protection:

Same as in f) above, except the duration of the fire will be shortened by early detection by ionization detectors located in the elevator foyer at each elevation served. Plant fire brigade will be dispatched to extinguish the fire. Regardless of the fire location, any activation of an elevator foyer ionization detector will cause the elevator to descent to the lowest level.

g) Consequences of fire with active fire protection:

Same as in f) above.

h) Effects of fire on safe shutdown:

None

4.5.3 FIRE ZONE 0-22A, CENTRAL ACCESS CONTROL (El. 676'-0" to 695'-11")

a) Major safety-related components in fire zone:

Division II and channel B conduits

Reactor protection system channels A2 and B2 conduits for both Units 1 and 2.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figures 5-9 and 5-18

	Construction	Rating
Walls:	External envelope, 36" reinforced concrete, internal separation walls, 8" to 18" reinforced concrete, 8" gypsum board, and metal studs	3 hr 2 hr
Floor:	Metal deck with 24" of reinforced concrete	Not rated
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Doors:	5 steel to zone 0-22C	1 1/2 hr
	1 steel to zone 0-22B	1 1/2 hr
	1 steel to zone 1-32I	3 hr
	5 steel to zone 0-32A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 30 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays.

2) Ignition of cables within one safety related enclosed conduit.

3) Ignition of charcoal in any of four (4) charcoal filter units.

f) Consequences of fire without active fire protection:

1) Loss of Division II conduits

2) Loss of channel B conduits

3) Loss of RPS channels A 2 and B2 conduits

g) Consequences of fire with active fire protection:

Same as in (f) above, except for charcoal fire inside the filter housings. The charcoal filter housings are provided with thermal detectors with two separate settings, one of which will alarm in the control room on above normal charcoal temperatures and the other on charcoal ignition. Upon ignition, the charcoal is completely flooded by activation of a deluge valve.

The activation of the deluge valve will be alarmed in the main control room and the plant fire brigade will be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2, except that Division II safety-related equipment or components could not be assumed to function.

4.5.4 FIRE ZONE 0-22B, STAIR & PASS ELEVATOR (El. 656'-0" through 803'-0")

a) Major safety-related components in fire zone:

None.

b) Fire protection and detection system in fire zone:

None

c) Structural and architectural design features of zone:

See Figures 8-5 through 8-12

		Construction	Rating
Walls:	North & West	36" reinforced concrete	3 hr
	South & East	4" through 12" reinforced concrete	2 hr
Floor:		Concrete slab on grade	Not rated
Ceiling:		36" reinforced concrete	Not rated
Doors:	1 steel door at each floor		1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of elevator traveling cable insulation or electrical equipment combustibles or cables within the elevator machine room.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as above, except the duration of the fire will be shortened by early detection by ionization detectors located in the elevator foyer at each elevation served. The plant fire brigade will be dispatched to extinguish the fire. Regardless of the fire location, any activation of an elevator foyer ionization detector will cause the elevator to descent to the lowest level.

h) Effects of fire on safe shutdown:

None.

4.5.5 FIRE ZONE 0-22C, LOBBY (El. 676'-0" to 685'-0")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection system in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-9

	Construction	Rating
Walls:	East, 36" reinforced concrete	3 hr rated
	Remaining walls, 8" reinforced concrete block and 4" gyboard/metal studs,	both 2 hr rated
Floor:	Metal deck with 24" of reinforced concrete	Not rated
Ceiling:	Noncombustible acoustical tile (suspended) and metal deck with 12" reinforced concrete above the suspended ceiling	
Doors:	1 Metal door to zone 0-23B	1 1/2 hr
	5 Metal doors to zone 0-22A	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1.

2) Equivalent fire severity: less than 3 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within non-safety related electrical wiring.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the ignition source

ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in f) above.

h) Effects of fire on safe shutdown:

None

4.5.6 FIRE ZONE 0-23, SUSPENDED CORRIDOR (El. 676'-0" to 695'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figures 5-9 and 5-18

	Construction	Rating
Walls:	East, 36" reinforced concrete	3 hr
	Remaining 8" block wall, and 4" gyp. board with metal studs	2 hr
Floor:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Doors:	1 metal door to zone 0-22C	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: N/A

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles in this zone, therefore no fire is postulated.

f) Consequences of fire without active fire protection:

None, see Item e) above.

g) Consequences of fire with active fire protection:

None, see Item e) above.

h) Effects of fire on safe shutdown:

None

4.5.7 FIRE ZONE 0-24A, UPS PANEL ROOM (C-209) (El. 698'-0" to 712'-11")

a) Major safety-related components in fire zone:

None.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	East, 36" reinforced concrete	3 hr
	Remaining, 8" reinforced concrete or block	2 hr
Floor:	Metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete, on 3 hr rated fire proofed steel beams	3 hr
Doors:	1 steel door to zone 0-24B	1 1/2 hr

d) Combustible material in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 150 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of non-safety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection, by ionization detectors, will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.8 FIRE ZONE 0-24B, CORRIDOR (El. 698'-0" to 714'-0")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	North & South, 8" block wall	2 hr
	West, 8" block or concrete wall	2 hr
	East, gyp. board/metal studs	
Floor:	Plastic lamination of steel access flooring over metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	3 hr
Doors:	Steel doors to zones 0-24A, B, C, C&H	1 1/2 hr
	Steel doors to Zones 0-24D&G	3 hr
	Steel doors to Zone 0-24F	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 60 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of non-safety related cable insulation and jacket material.

2) Ignition of plastic floor lamination.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing or plastic floor lamination will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system under floor and above ceiling.

h) Effects of fire on Safe shutdown:

None

4.5.9. FIRE ZONE 0-24C, UPS PANEL ROOM (C-208) (El. 698'-0" to 712'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	North, 18" reinforced concrete	2 hr
	South & South, block wall	2 hr
Floor:	Plastic lamination on steel access flooring over metal deck with 13 1/2 of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete, on 3 hr rated fire proofed steel beams	3 hr
Doors:	1 steel door to zone 0-28B	

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 150 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of non-safety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.10 FIRE ZONE 0-24D, LOWER RELAY ROOM PGCC FLOOR AREA (El. 698'-1" to 712'-11")

a) Major safety-related components in fire zone:

1) Division II cable trays for Unit 1

2) Division II control panels, relay bounds or instrument racks for Unit 1:

1C675 - Hydrogen recombiner control

1C612 - Feedwater and recirculation water instrument rack

1C618 - RHR relay cabinet

1C620 - HPCI relay board

1C627 - Core spray relay board

1C611 - Reactor protection system, relay board, trip system B

1C631 - Auto depression system relay board

1C633 - Radiation monitoring Cab. 3

1C608 - Power range neutron monitoring cabinet

1C623 - Outboard (main steam) valve relay board

1C661 - ESWS, RHR, HVAC, and other Division II logic relays

Termination cabinets for the above panels, relay boards, and instrument rack.

3) Division I cable trays, with cables serving the following function for Unit 1:

NSSS isolation logic test indicators

NSSS trip logic isolation signal

Reactor pressure sensor signal

NSSS isolation signal

False LOCA interlock (reactor low pressure signal)

HPCI valve F028 control

Inboard/outboard valve control

Break detection logic

Reactor vessel water level indicating switches

4) Reactor protection system (RPS) conduits and wireways serving the following functions for Unit 1:

<u>RPS Channel A1</u>

RPS trip signal to group I HCU term boxes

Neutron monitor run mode interlock

APRM Channel E bypass switch

Neutron monitoring system scram trips

Channel A flow bypass switch

RIP system 'A' back-up scram valve control

RPS Channel A2

APRM Channel D bypass switch and flow bypass switch

APRM Channel C bypass switch and flow bypass switch

Reactor manual scram Channel A2

Neutron monitoring system scram trips

Reactor scram reset, mode select, and CRD scram discharge volume high water level bypass

RPS Channel B1

RPS trip pressure switch C72-1N005B - control

RPS trip stop valve C72-1N006A - control

RPS trip stop valve C72-1N006C - control

Neutron monitoring system IRM - sensor Channels A & B

Manual isolation

Reactor manual scram Channel B1

Steam tunnel hi-temp sensor

MSIV logic status indication

IRM Channels B & F bypass switches

Pool selector switch

CRD scram discharge volume high water trip bypass mode selection and siren reset

RPS trip system B back-up scram valve control

RPS Channel B2

RPS trip pressure switch C72-1N005D - control

RPS trip stop valve C72-1N006B - control

Manual scram Channel B2

IRM Channel D & H bypass switch

Steam tunnel hi-temp sensor

Manual isolation

MSIV logic status indication

Channels B flow bypass switch

APRM Channel F bypass switch

Essential raceway is listed in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	North & East, 36" reinforced concrete	3 hr
	South & West, gyp. board/metal studs	3 hr
Floor:	Carpet on steel panel flooring over metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete, on 3 hr rated fire proofed steel beams	3 hr
Doors:	1 steel door to Zone 0-24B	3 hr
	1 steel door to Zone 0-24E	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 130 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cables within Division II or Division I cable trays

2) Ignition of wire insulation within any Channel (A1, A2, B1 or B2) RPS conduits or wireways

3) Ignition of cable insulation and jacket material within any of the Division II panels, relay boards, instrument racks, etc.

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75, and panels/boards/racks which have internal separation in conformance with IEEE-279. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channels. The flame spread and fuel contribution ratings of the carpet are such as to assure that it will not provide a combustible pathway. Therefore, the postulated fire could cause:

1) Loss of Division II cable trays

2) Loss of any Division II control panels, relay boards etc. as listed in item a) above

3) Loss of any one RPS channel as listed in item a) above

Essential raceway is fire protected per section 2.11.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system and unitized Halon 1301, under PGCC floor.

h) Effects of safe shutdown:

See Fire Zone 0-246 part h.

4.5.11 FIRE ZONE 0-24E, COMPUTER ROOM (El. 698'-0" to 712'-11")

a) Major safety-related components in fire zone:

None.

b) Fire protection and detection systems in fire zone:

See Table 6-1.

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	East, 36" reinforced concrete	3 hr
	Remaining walls, gyp board/metal studs	3 hr
Floor:	Carpet on steel panel flooring over metal deck with 13 1/2" of reinforced concrete	Not rated
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Doors:	Steel doors to zones: 0-24, D, G, & F	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within non-safety related cable trays

2) Ignition of carpet on PGCC floor

3) Ignition of computer tapes and paper

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing or carpet will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways. Computer tape or paper fires will be short lived due to limited quantities of these combustibles.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire. If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system, inside room and above ceiling, and unitired Halon 1301 system, under PGCC floor.

h) Effects of fire on Safe shutdown:

None

4.5.12 FIRE ZONE 0-24F, MISC COMPUTER SERVICE ROOM, OFFICE AND VESTIBULE (El. 698'-0" to 712'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	East, gyp board/metal studs West, gyp. board/metal studs North, gyp. board/metal studs South, gyp. board/metal studs	3 hr
Floor:	Plastic lamination on steel access flooring over metal deck with 13 1/2" of reinforced concrete	3 hr 1 side

Ceiling:	Metal deck with 13 1/2" of reinforced concrete on 3 hr fire proofed steel beam	3 hr
Doors:	3 steel to zone 0-24E 2 steel to zone 0-24B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 85 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of non-safety related cable insulation and jacket material

2) Ignition of plastic laminated floor

3) Ignition of combustibles kept in file cabinets and office furniture.

f) Consequences of fire without active fire protection:

1) The plastic floor lamination will not propagate a fire once the fire source ceases to exist.

2) Fire of combustibles in the file cabinets and office furniture will be short lived and physically contained.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system in room C-206.

h) Effects of fire on safe shutdown:

None

4.5.13 FIRE ZONE 0-24G, LOWER RELAY ROOM (El. 698'1" to 712'-11")

a) Major safety-related components in fire zone:

Same as in fire zone 0-24D, but for Unit 2

Essential raceway is listed separately in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	South & East, 36" reinforced concrete	3 hr
	North & West, gyp. board.metal studs	3 hr
Floor:	Carpet on steel panels over metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete, on 3 hr rated fire proofed steel beams	3 hr
Doors:	1 steel door to Zone 0-24E	3 hr
	1 steel door to Zone 0-24B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 150 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Same as for fire zone 0-24D

f) Consequences of fire without active fire protection:

Same as for fire zone 0-24D

g) Consequences of fire with active fire protection:

Same as for fire zone 0-24D

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the Unit 2's safety-related equipment or components, as discussed in (f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains as well as isolating transfer switches to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.14 FIRE ZONE 0-24I, HVAC DUCT CHASE (El. 698'-0" to 805'-4")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10 thru 5-12

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" concrete block	2 hr
Floor:	12" reinforced concrete	Not rated
Ceiling:	12" reinforced concrete	Not rated

d) Combustible materials in zone: None

e) Postulated fire in zone:

No combustibles in this zone, therefore, no fire is postulated.

f) Consequences of fire without active fire protection:

None, see item (e) above

g) Consequences of fire with active fire protection:

None, see item (e) above.

h) Effects of fire on safe shutdown:

None

4.5.15 FIRE ZONE 0-24J, SOUTH CABLE CHASE (698'-0" to 712'-0")

a) Major safety related components in fire zone:

None

b) Fire protection and detection system in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-10 thru 5-12

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining 8" reinforced concrete	2 hr rated
Floor:	12" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel door to zone 0-24B	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: 25.92 lbs/ft

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1.

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

1) Ignition of non-safety related cable insulation and jacket material

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the fire source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors, followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.16 FIRE ZONE 0-24K, HVAC DUCT CHASE (El. 698'-0" to 805'-4")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figures 5-10 thru 5-12

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" reinforced concrete block	2 hr
Floor:	12" of reinforced concrete	Not rated
Ceiling:	12" of reinforced concrete	Not rated
Doors:	None	

d) Combustible materials in zone: None

1) Combustible loading: None

2) Equivalent fire severity: N/A

3) Quantities of combustibles: None

e) Postulated fire in zone:

No combustibles in this zone, therefore no fire is postulated.

f) Consequences of fire without fire protection:

None, see item (e) above

g) Consequences of fire with active fire protection:

None, see item (e) above.

h) Effects of fire on safe shutdown:

None

4.5.17 FIRE ZONE 0-24L, CENTER CABLE CHASE (El. 698'-0" to 712'-0")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zones:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" concrete	2 hr
Floor:	12" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door to zone 0-24B	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: 29.04 lbs/ft^2

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

1) Ignition of non-safety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the fire source ceases to exist. Further, the fire will not spread adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors, followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.18 FIRE ZONE 0-24M, NORTH CABLE CHASE (El. 698'-0" to 713'-10")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3hr
	Remaining walls, 8" reinforced concrete	2 hr
Floors:	12" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door to zone 0-24B	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: 24.89 lbs/ft

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

1) Ignition of non-safety related cable

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the fire source ceases to exist. Further, the fire will not spread into

adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors, followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.19 FIRE ZONE 0-25A, LOWER CABLE SPREADING ROOM (El. 714'-0" to 727'-0")

a) Major safety-related components in fire zone:

Same as in fire zone -025E, but for Unit 2

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	South, 54" reinforced concrete rated	3 hr
	East, 36" reinforced concrete	3 hr
	North, Gyp. board/metal studs	3 hr
	Remaining walls, 36" concrete 8" concrete block or gyp. board/ metal studs, both 2 hr rated	3 hr
Floor:	Metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete, on 3 hr rated fire proofed steel beams	3 hr

Doors: 1 steel door to zone 0-25E 3 hr

1 steel door to zone 0-21B 1 1/2 hr

1 steel access door to zone 0-25B 3 hr

d) Combustible materials in zone:

1) Combustible loading: 14.83 lbs/ft

2) Equivalent fire severity: 115 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Same as for fire zone 0-25E

f) Consequences of fire without active fire protection:

Same as for fire zone 0-25E

g) Consequences of fire with active fire protection:

Same as for fire zone 0-25E

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the of Unit 2's safety-related equipment or components, as discussed in (f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.20 ZONE 0-25B, SOUTH CABLE CHASE (El. 714'-0" to 723'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, concrete block	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door to zone 0-25A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of non-safety related cable insulation and jacket material

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on Safe shutdown:

None

4.5.21 FIRE ZONE 0-25C, CENTER CABLE CHASE (el. 714'-0" to 728'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" concrete block	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door to zone 0-25E	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1.

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of non-safety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the fire source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.22 FIRE ZONE 0-25D, NORTH CABLE CHASE (El. 714'-0" to 728'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" concrete block	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door to zone 0-25E	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of non-safety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketing will not propagate a fire once the fire source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened by early detection with heat detectors followed by automatic actuation of total flooding CO_2 system.

h) Effects of fire on safe shutdown:

None

4.5.23 FIRE ZONE 0-25E, LOWER CABLE SPREADING ROOM (El. 714'-0" to 727'-0")

a) Major safety-related components in fire zone:

1) Division II cable trays, conduits, and wireways

2) Channels B and D conduits

3) Division I cable trays, conduits, and wireways serving the following function:

NSSS isolation logic test indictors

NSSS isolation valve test interlocks

NSSS trip logic isolation signal

Reactor pressure sensor signal

NSSS isolation signal

False LOCA interlock (reactor low pressure signal)

HPCI valve F028 control

Inboard/outboard valve control

Break detection logic

Reactor vessel water level indicators

RCIC inboard steam line isolation valve E51-F007 indicators

4) Reactor protection system (RPS) conduits and wireways serving the following functions:

<u>RPS Channel A1</u>

Neutron monitor run mode interlock

APRM Channel E bypass switch

Neutron monitoring system scram trips

Channel A flow bypass switch

Trip system 'A' back-up scram valve control

Manual isolation

RPS trip signal to group I HCU terminal boxes

Neutron monitoring system LPRM group Channel B sensors

Neutron monitoring system APRM Channel E sensors

Neutron monitoring system APRM Channels A & B sensors

<u>RPS Channel A2</u>

APRM Channel D bypass switch and flow bypass switch

APRM Channel C bypass switch and flow bypass switch

Neutron monitoring system scram trips

Neutron monitor run mode interlock

Reactor manual scram Channel A2

Neutron monitoring system scram trips

Reactor scram reset, mode select, and CRD scram discharge volume high water level bypass

Neutron monitor run mode interlock

Manual isolation

RPS Channel B1

Manual isolation

Reactor manual scram Channel B

Steam tunnel hi-temp. sensor

MSIV logic status indication

IRM Channels B & F bypass switch

Rod selector switch

CRD scram discharge volume high H_2O trip bypass, mode selector, and scram reset

RPS trip system B back-up scram valve control

NSSS relay logic

RPS valve B21-1F028A - control

RPS valve B21-1F028B - control

RPS trip signals to group I HCU - control

Neutron monitoring system IRM

Neutron monitoring system FT-B31-1N024A

Neutron monitoring system FT-B31-1N014A

RPS Channel B2

APRM Channel F bypass switch

Manual scram Channel B2

IRM Channels D & H bypass switch

Steam tunnel hi-temp sensor

Manual isolation

MSIV logic status indication

Channel B flow bypass switch

APRM Channel F bypass switch

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-10

	Construction	Rating
Walls:	North, 54" reinforced concrete	3 hr
	East, 36" reinforced concrete	3 hr
	South, Gyp. board/metal studs	3 hr
	Remaining walls, 36" concrete	3 hr
	8" concrete block	2 hr
Floor:	Metal deck with 13 1/2" of reinforced concrete	3 hr 1 side
Ceiling:	Metal deck with 13 1/2" of reinforced concrete on 3 hr rated fire proofed steel beam	3 hr
Doors:	Metal access doors to zones 0-2J C&D	3 hr
	1 metal door to zone 0-22B	3 hr
	1 metal door to zone 0-25A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 115 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of II cable insulation and jacket material within Division II cable trays.

2) Ignition of cable insulation and jacket material in Division I or II, or Channel B or D conduits

3) Ignition of cable insulation and jacket material in RPS Channel A1 or B1 conduits or Channel A1, A2, B1, or B2 wireways

4) Ignition of cable insulation and jacket material in Division I or II wireways

f) Consequences of fire without active fire protection:

This area contains wireways/conduits/cable trays which have been separated to conform with Regulatory Guide 1.75. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channels. Therefore, the postulated fire could cause:

1) Loss of Division II cable tray, conduit, or wireway

2) Loss of Channel B and D conduits

3) Loss of one RPS channel as listed in item (a) above

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the pre-action sprinkler system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold,

safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the Unit 1's safety-related equipment or components as discussed in f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.24 FIRE ZONE 0-26A, Storage Room (El. 729'-1" to 740-8")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	West, 38" reinforced concrete	3 hr
	South, 8" concrete block	2 hr
	East, Gyp. board/metal studs	2 hr
	North, Gyp. board/metal studs and 8" concrete block both	2 hr
Floor:	Access floor over metal deck with 13 1/3 reinforced concrete	Not Rated
Ceiling:	Noncombustible acoustical tile and metal deck with 5" reinforced concrete above the tile ceiling	Not Rated
Doors:	1 steel door to zone 0-26H	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: less than 3 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of janitorial supplies stored in the zone

f) Consequences of fire without active fire protection:

None to safety related components since none is routed or located in this zone. Also insignificant amount of combustibles will result in a fire duration of being contained within 2 hr (minimum) rated enclosure, and will not be propagated to adjacent zones due to absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

None

4.5.25 FIRE ZONE 0-26B, South Cable Chase (El. 729'-1" to 740'-11")

a) Major safety-related components in fire zone:

1) Division I cable trays

2) Division II conduits to the following control structure HVAC equipment and components:

Control

Fans: 0V101B, 0V11B, 0V144B, 0V109B, 0V103B, 0V113B, 0V116B, and 0V117B

Pumps: 0P162B, 0P171B, and 0P170B

Status Indication

Dampers: HD-07833B, HD-07814B, HD-07871B1, HD-07842B, HD-07811B,12B & 13B, HD-07816B, HD-07802B, HD-07872B&73B, HD-07841B, HD-07821B&31B, HD-07801B,

HD-07551B2, HD-07552B,53B,55B&60B

Fans: 0V115B, 0V116B, 0V117B, 0V118B

3) Essential raceways are listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	West	36" reinforced concrete	3 hr
	Remaining walls	8" reinforced concrete	2 hr
Floor:		2" concrete on metal decking	Not Rated
Ceiling:		2" concrete on metal decking	Not Rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within Division I cable trays

2) Ignition of cable insulation and jacket material in Division II and Channel D conduits

f) Consequences of fire without active fire protection:

1) Loss of Division I cable trays

2) Loss of any or all Division II conduits, as listed in item (a) above

3) Essential raceway is not postulated to fail in the same fire with Division I cables due to cable separation and the CO_2 fire suppression system.

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will alert the operator to activate the manual spurt CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety related equipment which could be disabled by this postulated fire is limited to Division I and select Division II cables as identified in section (a) above. The plant shutdown systems are designed to function adequately with the loss of a division. The items which could be disabled by the postulated fire in Division II are limited to control structure HVAC, standby gas treatment system, and battery room exhaust system.

If control room HVAC is without air conditioning, the control room environment can be maintained within operability limits by opening doors and using portable fans for circulation.

Loss of battery room exhaust fans would permit long term hydrogen build-up. Portable fans will be used to maintain hydrogen delution and preclude an explosive mixture.

The standby gas treatment system is not required for shutdown.

4.5.26 FIRE ZONE 0-26C, Center Cable Chase (El. 729'-1" to 740'-11")

a) Major safety-related components in fire zone:

Division I cable trays

b) Fire protection and detection system in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	West, 36" concrete	3 hr
	Remaining walls, 8" concrete	2 hr
Floor:	2" concrete on metal deck	Not Rated
Ceiling:	2" concrete on metal deck	Not Rated
Doors:	1 steel access door to zone 0-26H	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in (f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will alert the operator to activate the manual spurt CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the

functionality of Division I safety related equipment or components could not be assumed.

4.5.27 FIRE ZONE 0-26D, North Cable Chase (El. 729'-1" to 740'-11")

a) Major safety-related components in fire zone:

Division I cable tray

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	West, 36" reinforced concrete Remaining walls, 8" reinforced concrete	3 hr 2 hr
Floor:	2" concrete on metal deck	Not Rated
Ceiling:	2" concrete on metal deck	Not Rated
Doors:	1 steel access door to zone 0-26H	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cables within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will alert the operator to activate the manual spurt CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2, except that the functionality of Division I safety related equipment or components could not be assumed.

4.5.28 FIRE ZONE 0-26E, Service Rooms (El. 729'-1" to 740'-8")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	West, 36" reinforced concrete	3 hr
	Remaining walls, 8" reinforced concrete, or 8" concrete block or gyp. board/metal studs, all	2 hr
Floor:	24" reinforced concrete	Not Rated
Ceiling:	Nonflammable acoustical tile and metal deck with 5" reinforced concrete above the tile ceiling	Not Rated
Doors:	1 steel access to zone 0-26H	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: 2.10 lbs/ft

2) Equivalent fire severity: 10 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of janitorial supplies or clothing in the locker room

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. Also the insignificant amount of combustibles will result in short duration of the fire, which will not propagate to any adjacent fire zones due to absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as above, except for room C-406 where the duration of the fire will be shortened by early detection with ionization detectors or by plant personnel. Then, the plant fire brigade will be dispatched to extinguish the fire.

h) Effects of fire on safe shutdown:

None

4.5.29 FIRE ZONE 0-26F, VESTIBULE (El. 729'-1" to 740'-8")

a) Major safety-related components in fire zone:

Division I wireway

RPS MSIV logic status indication, channel A1

RPS MSIV logic status indication, channel A2

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	Remaining walls	8" reinforced concrete block	2 hr
Floor:		Plastic lamination on steel access flooring over 13 1/2" of reinforced concrete on metal deck	Not Rated
Ceiling:		Non-combustible acoustical tile and metal deck with 5" reinforced concrete above the tile ceiling	Not Rated
Doors:		Steel bullet resistant door to zones 0-26H & 0-26S	1 1/2 hr
		Steel doors to zones 0-26B&G	1 1/2 hr
		1 steel door to zone 1-35C	3 hr

d) Combustible materials in zone: None

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material in Division I wireways

2) Ignition of cable insulation and jacket material in RPS channel A1 and A2 wireways

f) Consequences of fire without active fire protection:

1) Loss of Division I cables in the wireways

2) Loss of MSIV logic status indication, channel A1 and A2

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the Unit 1 reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or components could not be assumed. Loss of the RPS wires would have no effect on the scram function of the RPS system.

The postulated fire in the zone would have no effect on the Unit 2 reactor plant.

4.5.30 FIRE ZONE 0-26G, SECURITY & OFFICE ROOMS (El. 729-1" to 740'-8")

a) Major safety-related components in fire zone:

1) Division I cable tray

2) Channel C cable tray

3) Division II wireways serving the following functions:

RWCU system isolation logic

SLC pump control

Isolation reset circuit

Valve F045 position monitor

Valves F015B & F017B control

Break detection logic

Isolation logic test indicators

ADS valve status indication

ADS actuation logic

4) Reactor protection system (RPS) wireways serving the following functions:

Channel A1

Neutron monitoring system recirculation loop flow

Reactor manual scram Channel A2

Neutron monitor run mode interlock

Neutron monitor system scram trips

Trip system A backup scram valve control

CRD scram discharge volume high water trip bypass

APRM Channel E bypass switch

Channel A flow bypass switch

Channel A2

APRM Channel D bypass switch & flow bypass switch

APRM Channel C bypass switch & flow bypass switch

Neutron monitoring system scram trips

Reactor manual scram Channel A2

Neutron monitoring system scram trips

Reactor scram reset, mode select, and CRD scram discharge volume high water level bypass

Neutron monitor run mode interlock

IRM bypass switch

Channel B1

Trip system B break-up scram valve control

Manual isolation

Reactor manual scram Channel B1

Steam tunnel hi temp. sensor

See Fire Zone 0-24M

MSIV logic status indication

IRM Channels B&F bypass switch

Rod selector switch

CRD scram discharge volume high water trip bypass, mode select, and scram reset

Channel B2

Manual scram Channel B2

IRM Channels D&H bypass switch

Steam tunnel hi temp. sensor

Manual isolation

MSIV logic status indication

Channel B flow bypass switch

APRM Channel F bypass switch

Essential Raceways are listed in Appendix A.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	36"&54" reinforced concrete	3 hr
	East	36" reinforced concrete	3 hr
	West	8" concrete block	2 hr
	North & South	Gyp. board/metal studs	2 hr
Floor:	Carpet on steep access flooring over 13 1/2" reinforced concrete on metal deck with cable space in between		Not Rated

Ceiling:	Non-combustible acustical tile and metal deck with 5" reinforced concrete above the tile ceiling	Not Rated
Doors:	1 steel, bullet resistant door to zone 0-26F	1 1/2 hr
	1 steel door to zone 0-26H	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within Division I and Channel C cable trays

2) Ignition of cable insulation and jacket material in RPS Channels A1,A2,B1 or B2 wireways

3) Ignition of cables in Division I or II wireways

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channel. The carpet used in the area is fire rated to preclude its serving as a combustible fire pathway out of this zone. Therefore, the postulated fire could cause:

1) Loss of Division I and Channel C cable trays

2) Loss Division I wireways

3) Loss of one of the RPS channels as listed in item a) above

4) Essential raceway is fire protected per Section 2.11.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors,

will alert the operator to activate the manual spurt CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the Unit 1's safety related equipment or components, as discussed in f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains and isolating transfer switches to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.31 FIRE ZONE 0-26H, CONTROL ROOM (El. 729'-1" to 753'-11")

a) Major safety-related components in fire zone:

1) Unit 1 and Unit 2 control panels, each panel with Division I & II compartments, unless otherwise noted:

Unit operating benchboard

Plant operating benchboard

H&V control panels

NSSS temperature record and leak detection panels

Miscellaneous system recording

Standby information panel

MSIV leakage control system relay board, two separate Division I and Division II panels

2) Division I cable tray

3) Channel C cable tray

4) Reactor protection system wireways serving the following functions:

Channel A1

Reactor manual scram Channel A1

CRD scram discharge volume high water trip bypass

Neutron monitor run mode interlock

Neutron monitor system scram trips

Trip system A back-up scram valve control

APRM Channel E bypass switch

Channel A flow bypass switch

Channels A & E IRM bypass switches

Channel A2

IRM bypass switch

APRM Channel C bypass switch and flow bypass switch

Neutron monitoring system cram trips

Neutron monitor run mode interlock

Reactor manual scram Channel A2

Neutron monitoring system scram trips

Reactor scram reset, mode select, and CRD scram discharge volume high water level bypass

Neutron monitor run mode interlock

Channel B1

Manual isolation

Reactor manual scram Channel B1

Steam tunnel hi-temp sensor

MSIV logic status indication

IRM Channels B & F bypass switch

Rod selector switch

CRD scram discharge volume high water trip bypass, mode select, and scram reset

Channel B2

Manual scram Channel B2

IRM Channels D & H bypass switch

Steam tunnel hi-temp sensor

Manual isolation

MSIV logic status indication

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	Remainng walls, gyp. board/metal studs, 8" concrete, or 8" concrete block		2 hr
Floor:	Carpet on steel access flooring over 13 1/2" of reinforced concrete on fireproofed steel beams		Not Rated
Ceiling:	Non-combustible acoustical tile and metal deck with 13 1/2" reinforced concrete above the tile ceiling		Not Rated
Doors:	Steel to zones 0-26A,G,E&I		1 1/2 hr
	Steel, bullet resistant to Zone 0-26F&J		

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 28 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material in Division I or Channel C cable trays

2) Ignition in any Division I or Division II compartments of any Unit 1 or Unit 2 control panels

3) Ignition of cable insulation and jacket material in any RPS wireways as listed in item a) above

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75, and panels which contain internal separation in conformance with IEEE 279. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channels. Therefore, the postulated fire could cause:

1) Loss of Division I or Channel C cable trays

2) Loss of any Division I or Division II compartment of any single Unit 1 or Unit 2 control panel

3) Loss of a RPS channel as listed in item a) above

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will alert the operator to bring the fire brigade to manually extinguish the fire, and to activate the manual spurt CO_2 system, as necessary.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the safety-related equipment or components, as discussed in f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload

protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plants can be shutdown safely under this postulated fire condition. The control rooms HVAC has a smoke exhaust mode specifically designed to minimize the impact of smoke on control room occupancy.

4.5.32 FIRE ZONE 0-26I, OPERATIONAL SUPPORT CENTER (El. 721'-1" to 740'-0")

a) Major safety-related components in fire zone:

Same as in fire zone 0-26G, but for Unit 2

Essential raceways are listed separately in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	West	8" concrete block	2 hr
	North & South	Gyp. board/metal studs	2 hr
	East	36" concrete	3 hr
Floor:	Carpet on steel access flooring over 13 1/2" reinforced concrete on metal deck with cable space in between		Not Rated
Ceiling:	Non-combustible acoustical tile with 5" reinforced concrete above the tile ceiling		Not Rated
Doors:	1 steel door to Zone 0-26H		1 1/2 hr
	1 steel, bullet resistant to Zone 0-26J		1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 5 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Same as for fire zone 0-26G

f) Consequences of fire without active fire protection:

Same as for fire zone 0-26G

g) Consequences of fire with active fire protection:

Same as for fire zone 0-26G

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the Unit 2's safety related equipment or components, as discussed in (f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains and isolating transfer switched to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.33 FIRE ZONE 0-26J, VESTIBULE (El. 729'-1" to 740'-8")

a) Major safety-related components in fire zone:

Same as in fire zone 0-26F, but for Unit 2

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	South	36" reinforced concrete	3 hr
	West	36" reinforced concrete	3 hr
	Remaining walls	8" concrete block	2 hr
Floor:	Plastic lamination on steel access flooring over 13 1/2" reinforced concrete on steel deck		Not rated
Ceiling:	Nonflammable acoustical tile and metal deck with 5" reinforced concrete above the tile ceiling		Not rated
Doors:	Steel, bullet resistant doors to zones 0-26H&I		1 1/2 hr
	Steel to zone 2-35C		3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Same as for fire zone 0-26F

f) Consequences of fire without active fire protection:

Same as for fire zone 0-26F

g) Consequences of fire with active fire protection:

Same as for zone 0-26F

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the Unit 2 reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or

components could not be assumed. Loss of the RPS wires would have no effect on the scram function of the RPS system.

The postulated fire in this zone would have no effect on the Unit 1 reactor plant.

4.5.34 FIRE ZONE 0-26K, TECHNICAL SUPPORT CENTER, MONITOR/WORK AREA, DOCUMENT CONTROL AREA, NRC CONFERENCE ROOM, (El. 741'-1" or 754'-0")

a) Major safety-related components in fire zone: none

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls	West, 36" reinforced concrete	3 hr
	Remaining walls, 6" & 8" concrete block, both	
Floor:	Carpet over 5" reinforced concrete on metal deck	2 hr 1 side
Ceiling	Non-combustible acoustical tile and metal deck with 13 1/2" reinforced concrete above the tile ceiling	Not rated
Doors:	Steel, to zones 0-21B, 0-22B	1 1/2 hr
	Steel, to zone 0-26L	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of carpet on floor

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The carpet will not propagate a fire once the ignition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will alert occupants and initiate the Halon 1301 System in the space.

h) Effects of fire on safe shutdown:

None.

4.5.35 FIRE ZONE 0-26L, CONFERENCE ROOM, EMERGENCY DIRECTOR'S OFFICE, (El. 741'-1" to 751'-11")

a) Major safety-related components in fire zone:

None

b) Fire protection and detection systems in fire zone:

See table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	6" concrete block or gyp board/ metal studs, both	2 hr
Floor:	Vinyl tile over 5" reinforced concrete on metal deck	Not rated
Ceiling:	Non-combustible acoustical tile and metal deck with 13 1/2" of reinforced concrete above the tile ceiling	Not rated
Doors:	1 steel door to zone 0-26K	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Iqnition of non-safety related cable insulation

2) Iqinition of carpeting

f) Consequences of fire without active fire protection:

None to safety related components, since none is routed or located in this fire zone. The cable insulation and jacketinq or carpeting will not propagate a fire once the iqinition source ceases to exist. Further, the fire will not spread into adjacent fire zones because of absence of combustible pathways.

q) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors will alert the occupants and initiate the Halon 1301 System in the space.

h) Effects of fire on safe shutdown:

None.

4.5.36 FIRE ZONE 0-26M, ROOM C-411 SOFFIT (El. 729'-1" to 751'-11")

a) Major safety-related components in fire zone:

1) Division II wireways

2) Division I wireways serving the following functions:

Diesel generator "A" frequency meter

MSIV&LP turbine steam press transducer/chapter - instrument

Suppression pool level indicators

Containment & suppression pool temp/press - indicator

Level & pressure control actuating valves F053A & F052A

Level recorder

RCIC flow sensors

NSSS post accident mon "A" system B21-1N055A

NSSS post accident mon "A" system B21-1N026A

RCIC turbine control

Controller to I/P converter for valve E11-F053B

3) Channel C cable serving the following functions:

Power feeder breakers remote control - 4.14 kv bus channel C from ESS transformer 101 and 201

4) Reactor protection system (RPS) wireways serving the following functions:

<u>Channel A1</u>

Reactor manual scram Channel A1

Neutron monitor run mode interlock

Neutron monitoring system scram trips

Trip system A back-up scram valve control

CRD scram discharge volume high water trip bypass

Channels A&E IRM bypass switch

MSIV logic status indication

<u>Channel A2</u>

IRM bypass switch

Neutron monitor run mode interlock

Neutron monitoring system scram trips

APRM Channel C&D bypass switches and flow bypass switches

Reactor manual scram Channel A2

Reactor scram reset, mode selector, and CRD scram discharge volume high water level bypass

MSIV logic status indication

NSSS relay logic Channel A1 (B2-1N026A) control

RPS valve B21-1F028B control

RPS PS-B21-1N020A control

RPS PS-B21-1N023A control

RPS LIS-B21-1N024A

Neutron monitoring system IRM sensors

Channel B1

Trip system B breakup scram valve control

Channel B2

RPS trip signal to group I HCU terminal boxes

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	36"&54" reinforced concrete	3 hr
	Remaining walls, gpy. board/metal studs		2 hr
Floor	5" reinforced concrete on metal deck		Not rated
Ceiling:	Metal deck with 13 1/2" of reinforced concrete		Not rated

d) Combustile materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 4.67 minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within Division I cable trays

2) Ignition of cable insulation and jacket material in Division I wireways

3) Ignition of cable insulation and jacket material in Division II wireways

4) Ignition of cable insulation and jacket material within Channel C cable trays

5) Ignition of cable insulation and jacket material in any one channel RPS wireway, as listed in item a) above

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and decapacitating the other division/channel.

Therefore, the postulated fire could cause:

1) Loss of Division II wireways

2) Loss of Division I wireways, as listed in item a) above

3) Loss of Channel C cables, as listed in item a) above

4) Loss of any channel of RPS wireways, as listed in item a) above

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will alert the operator to activate the manual spurt CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except the Unit 1. Safety-related equipment or components, as discussed in (f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plants can be shut down safely under this postulated fire condition.

4.5.37 FIRE ZONE 0-26N, CONTROL ROOM UNIT 1 SOFFIT, (El. 741'-1" to 750'-11")

a) Major safety-related components in fire zone:

Division I cable tray

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	East, 36" reinforced concrete Remaining enclosures, removable gyp. boards	3 hr
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Floor:	Top of control panels	Not rated

d) Combustible materials in zone: See Table 6-1

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2.06 minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will alert the operator to activate the manual spurt CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2, except that the functionality of Division I safety related equipment or components could not be assumed.

4.5.38 FIRE ZONE 0-26P, CONTROL ROOM UNIT 2 SOFFIT, (El. 741'-1" to 750'-11")

a) Major safety-related components in fire zone:

Division I cable tray

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	East, 36" reinforced concrete Remaining enclosures, removable gyp. boards	3 hr
Ceiling:	Metal deck with 13 1/2" of reinforced concrete	Not rated
Floor:	Top of control panels	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2.06 minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms, by ionization detectors, will alert the operator to activate the manual spurt CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depednig on the availability of off-site power, the shutdown could be effected in any manner described in either section 4.2.1 or 4.2.2, except that the functionality of Division I safety related equipment or components could not be assumed.

4.5.39 FIRE ZONE 0-26R, ROOM C-412 SOFFIT (El. 727'-8" to 751'-11")

a) Major safety-related components in fire zone:

Same as in fire zone 0-26M, but for Unit 2

Essential raceway are listed separately in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

		Construction	Rating
Walls:	North	36"&54" reinforced concrete	3 hr
	Remaining walls, gpy. board/metal studs		2 hr
Floor:	5" reinforced concrete on metal deck		Not rated
Ceiling:	Metal deck with 13 1/2" of reinforced concrete		Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 4.67 minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Same as for fire zone 0-26M

f) Consequences of fire without active fire protection:

Same as for fire zone 0-26M

g) Consequences of fire with active fire protection:

Same as for fire zone 0-26M

Essential raceway is fire protected per Section 2.11

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that Unit 2's safety-related equipment or components, as discussed in (f) above, could not be assumed to function. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. It is noted that the remote shutdown panels remain operable and provide sufficient systems/trains and isolating transfer switches to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.40 FIRE ZONE 0-26S, SOUTH CABLE CHASE (El. 741'-1" to 752'-11")

a) Major safety-related components in fire zone:

Same as in fire zone 0-26B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-11

	Construction	Rating
Walls:	West 36" reinforced concrete	3 hr
	Remaining walls, 8" reinforced concrete	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated

d) Combustible material in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Same as for fire zone 0-26B

f) Consequences of fire without active fire protection:

Same as for fire zone 0-26B

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened by early detection with a thermal detector followed by automatic actuation of total flooding CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Division I and select Division II cables as identified in section (a) above. The plant shutdown systems are designed to function adequately with the loss of a division. The items which could be disabled by the postulated fire in Division II are limited to control structure HVAC, standby gas treatment system, and battery room exhaust system.

If control room HVAC is without air conditioning, the control room environment can be manitained within operability limits by opening doors and using portable fans for circulation.

Loss of battery room exhaust fans will permit long term hydrogen buildup. Portable fans could be used to maintain hydrogen dilution and preclude an explosive mixture.

The standby gas treatment system is not required for normal shutdown.

4.5.41 FIRE ZONE 0-26T, CENTER CABLE CHASE (El. 741'-1" to 753'-10")

a) Major safety-related components in fire zone:

Division I cable trays

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design featurs of zone:

See Figure 5-11

	Construction	Rating
Walls:	West 36" reinforced concrete	3 hr
	Remaining 8" reinforced concrete walls	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door, to Zone 0-26K	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Talbe 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened by early detection with a thermal detector followed by automatic actuation of total flooding CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or components could not be assumed.

4.5.42 FIRE ZONE 0-26V, NORTH CABLE CHASE (El. 741'-1" to 753'-1")

a) Major safety-related components in fire zone:

Division I cable trays

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

	Construction	Rating
Walls:	West 36" reinforced concrete	3 hr
	Remaining 8" reinforced concrete walls	2 hr
Floor:	2" concrete on metal deck	Not rated
Ceiling:	2" concrete on metal deck	Not rated
Doors:	1 steel access door, to Zone 0-26K	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of the alternate method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays

f) Consequences of fire without active fire protection:

Loss of Division I cables routed through this zone

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened by early detection with a thermal detector followed by automatic actuation of total flooding CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the functionality of Division I safety-related equipment or components could not be assumed.

4.5.43 FIRE ZONE 0-27A UPPER RELAY ROOM (El. 754'-1" to 763'-0")

a) Major safety-related components in fire zone:

Division I PGCC modules which include the following panels and electrical inputs:

2Z621	2C621
2C661	2C622
2C674	2C606
2C628	2C609
2C626	2C617
	2C613

Tray - ESS Division I

Conduit - B1, ESS Division I, and Channels "A" & "C"

Wireway - Division I

As The cables have not yet been routed, it is assumed the same Channel B1 functions will be represented as listed for zone 0-27E

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	South & East	36" reinforced concrete	3 hr
	North	4 3/4" gypsum wallboard	3 hr
	West	8" concrete block and 4 3/4" gypsum wallboard	2&3 hr
Floor:	13 1/2" reinforced concrete (below the PGCC panels)		3 hr 1 side
Ceiling:	6" reinforced concrete on 3 hr fire proofed steel beam		3 hr
Doors:	2 - steel doors 1-into zone 0-24H and 1-into zone 0-27B		3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 45 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Same as for fire zone 0-27E

f) Consequences of fire without active fire protection:

Same as for fire zone 0-27E

g) Consequences of fire with active fire protection:

Same as for fire zone 0-27E

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Unit 1's safety-related equipment or components to function, as discussed in (f) above, could not be assumed. The potential ignition source in this area is auto-ignition of insulation which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plant can be shutdown safely under this postulated fire condition.

4.5.44 FIRE ZONE 0-27B UPPER CABLE SPREADING ROOM, (El. 753'-0" to 769'-11")

a) Major safety-related components in fire zone:

Division I & II and RPS A1 & A2 wireway along with Channels "A", "B", "C", & "D" enclosed in conduit.

Specifically, this zone contains Division I wireways/cable trays/conduits as well as the following systems served from ESF Division II, RPS Channels A1 & A2 and Channels B & D:

Division II

1) Main steam isolation reset trip circuit

2) Isolation logic test indicator

3) Trip logic for outboard isolation valves B21-F028A-D

RPS Channels A1 & A2

Senses the following conditions:

1) Main steam line break
2) Reactor low low water
3) Main steam line high radiation
4) Steam line low pressure
5) Main condenser low vacuum
6) Manual isolation switch

Channels B & D

125 volt DC control power circuits to reactor building

b) Fire protection and detection systems in fire zone:

See Tabel 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	West	8" concrete block	2 hr
	North&South	4 3/4" gypsum wall board	3 hr
Floor:	13 1/2" reinforced concrete		3 hr 1 side
Ceiling:	13 1/2" reinforced concrete on 3 hr fire proofed steel beam		3 hr
Door:	3-steel doors, 1-into Zone 0-27A, 1-into Zone 0-27C, and 1-into Zone 0-24H		3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1
2) Equivalent fire severity: 150 minutes
3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within the wireways, cable trays, or conduit which serves Division I or II or RPS Channel A1, A2, electrical Channel B or D as listed in section a) above.

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channels. Therefore, the postulated fire could cause:

1) Loss of Division I

2) Loss of Division II as listed in section a)

3) Loss of Channel A as listed in section a)

4) Loss of Channels B/D as listed in section a)

The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 System.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of unit 1's safety-related equipment or components to function as discussed in f) above, could not be assumed. The fire potential in this area is cable self-ignition which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that

the plant can be shutdown safely under this postulated fire condition.

4.5.45 FIRE ZONE 0-27C UPPER CABLE SPREADING ROOM, (El. 753'-0" to 769'-1")

a) Major safety-related components in fire zone:

Division I power sources as well as:

The following Division II systems:

MSIV isolation signal

Main steam drain and reactor water (outboard) sample valve

SLC pump control

RWCU system logic

RWCU isolation logic

Isolation logic test indicators

Break detection logic

Instrument power and HPCI initiation circuit

Valves F015B & F017B control

Isolation reset circuit

Valve F045 position monitor

The following systems are RPS A1 & A2:

(A1) Manual isolation

(A1) Steam tunnel hi-temp sensor

(A2) Manual isolation

(A2) Steam tunnel hi-temp sensor

Channels A, B, C & D cables have not yet been routed.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

c) Structural and architectural design features of zone:

See Figure 5-12

	Construction		Rating
Walls:	East	36" reinforced concrete	3 hr
	West	8" concrete block	2 hr
	North & South	4 3/4" gypsum wall board	3 hr
Floor:	13 1/2" reinforced concrete		3 hr 1 side
Ceiling:	13 1/2" reinforced concrete on 3 hr fire proofed steel beam		3 hr
Doors:	3-steel doors, 1-into Zone 0-27B, 1-into Zone 0-27E, and 1-into Zone 0-22B		3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 85 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within wireways, cable trays, or conduit which serves Division I or II or Channel A1, A2, B, C, or D as listed in section (a) above.

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and decapacitating the other division/channels. Therefore, the postulated fire could cause:

1) Loss of Division I

2) Loss of Division II as listed in section a)

3) Loss of RPS Channels A1/A2 as listed in section a)

4) Loss of Channels A, B, C, or D depending upon which cables are routed through this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 of 4.2.2, except that the ability of Unit 2's safety-related equipment or components, to function as discussed in f) above, could not be assumed. The fire potential source of ignition in this area is auto-iginition of electrical cable insulation which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plant can be shutdown safely under this postulated fire condition.

4.5.46 FIRE ZONE 0-27D ELECTRICAN OFFICE, (El. 754'-0" to 769'-11")

a) Major safety related components in fire zone:

No safety related components or equipment are located in the electricians office.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

	Construction	Rating
Walls:	West & North 36" reinforced concrete East & South 5/8" gypsum on 4" studs	Not rated Not rated
Floor:	13 1/2" reinforced concrete	3 hr 1 side
Ceiling:	13 1/2" reinforced concrete on 3 hr fire proofed steel beam	3 hr 3 hr
Door:	1 Steel door into zone 0-27C	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 85 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of vinyl asbestos tile or nonsafety related cable insulation and jacket material.

f) Consequences of fire without active fire protection:

Possible loss of nonsafety related equipment.

The fire would spread into fire zone 0-27C, the upper cable spreading room for Unit 1.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually estinquish the fire.

h) Effects of fire on safe shutdown:

None

4.5.47 FIRE ZONE 0-27B UPPER RELAY ROOM. (El. 754'-1" to 763'-0")

a) Major safety-related components in fire zone:

PGCC modules which include the following panels, electrical inputs:

Division I Panels:	1Z621	1C628	1C613
	1C661	1C609	1C617
	1C674	1C622	
	1C626	1C621	

Trays - ESS Division I

Conduit - RPS-B1, ESF Division I and Channels "A" & "C"

Wireway - Division I & II

The following systems are Division II:

Isolation reset switch

RWCU system isolation logic

Valves F015B a F017B control

SLC pump control

RWCU isolation logic

Valves F045 position monitor

MSIV isolation signal

Break detection logic

Isolation logic test indicators

1P6X103 - Main steam drain and reactor water (outboard) sample valve

1PPXX03 - Instrument power & HPCI initiation circuit

The following instruments are supplied with RPS B1 power:

LT-B21-N026 - Nuclear steam supply shutoff system

PS-B21-1N020B - Reactor vessel hi-pressure (trips closure isolation bypass)

PS-B21-1N023B - Reactor vessel hi-pressure

LS-B21-1N024B - Reactor vessel low water level

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North & East	36" reinforced concrete	3 hr
	South & West	4 3/4" gypsum wall board and 8" concrete block	3 hr
Floor:	13 1/2" reinforced concrete		3 hr 1 side
Ceiling:	6" reinforced concrete on 3 hr fire proofed steel beam		3 hr
Doors:	2 - steel doors into zone 0-27C		1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 45 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of carpet or cable insulation and jacket material within the zone or within a PGCC module.

f) Consequences of fire without active fire protection:

This area contains wireways which have been separated to conform with Regulatory Guide 1.75, and panels which have internal separation conforming to IEEE-279. Considering the absence of external combustibles in this fire area, the separation is adequate to prevent a fire in one division/channel from propagating and incapacitating the other division/channels. The flame spread and fuel

contributed ratings of the carpet are such as to assure that it will not provide a combustible pathway between channels/divisions. Therefore, the postulated fire could cause:

1) Loss of Division I, or

2) Loss of systems served from Division II as listed in paragraph a), or

3) Loss of Channel B1 as listed in paragraph a)

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually estinguish the fire.

If ionization detectors fail, the heat detectors will alarm at a later stage and actuate the total flooding CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plants from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Unit 1's safety-related equipment or components to function, as discussed in (f) above, could not be assumed. The potential source of ignition in this area is auto-ignition of electrical cable insulation which is minimal since these are low voltage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains to assure that the plants can be shutdown safely under this postulated fire condition.

4.5.48 FIRE ZONE 0-27F SOUTH CABLE CHASE, (El. 754'-0" through 771'-0")

a) Major safety-related components in fire zone:

See Zone 0-26B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

See Zone 0-26B

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

See Zone 0-26B

f) Consequences of fire without active fire protection:

See Zone 0-26B

g) Consequences of fire with active fire protection:

See Zone 0-26B

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1. or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Division I and select Division II cables as identified in section a) above. The plant shutdown systems are designed to function adequately with the loss of a division. The items which could be disabled by the postulated fire in Division II are limited to control structure HVAC, standby gas treatment system, and battery room exhaust system.

If control room HVAC would be lost, the control room environment would not become uninhabitable, although by opening doors and using protable fans acceptable, conditions can be maintained.

Although loss of battery room exhaust fans could result in long term hydrogen buildup, portable fans will be used to maintain the hydrogen concentrations at a delute level to preclude attainment of an explosive mixture.

The standby gas treatment system is not required for normal shutdown hence its loss of function can be accepted.

4.5.49 FIRE ZONE 0-27G CENTER CABLE CHASE, (El. 754'-0" to 771'-0")

a) Major safety-related components in fire zone:

See zone 0-26C

b) Fire protection and detection systems in fire zone:

See Figure 6-1

c) Structural and architectural design features of zone:

See zone 0-26C

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

See zone 0-26C

f) Consequences of fire without active fire protection:

See zone 0-26C

g) Consequences of fire with active fire protection:

See zone 0-26C

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

4.5.50 FIRE ZONE 0-27H NORTH CABLE CHASE (El. 754'-0" to 771'-0")

a) Major safety-related components in fire zone:

See Zone 0-26D

b) Fire protection and detection systems in fire zone:

See Figure 6-1

c) Structural and architectural design features of zone:

See Zone 0-26D

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

* See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

See Zone 0-26E

f) Consequences of fire without active fire protection:

See Zone 0-26D

g) Consequences of fire with active fire protection:

See Zone 0-26D

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Division I safety-related equipment or components to function could not be assumed.

4.5.51 FIRE ZONE 0-28A EQUIPMENT ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

Load Centers

2D612 - Channel "A"
2D622 - Channel "B"
2D632 - Channel "C"
2D642 - Channel "D"
2D652 - Division I
2D662 - Divison II

Miscellaneous Equipment

Distribution Panel

2D614 - Channel "A"/ Divison I
2D624 - Channel "B"/ Divison II
2D634 - Channel "C"
2D644 - Channel "D"
2D672 - Division I
2D682 - Division II

Battery Charger

2D613 - Channel "A"
2D623 - Channel "B"
2D633 - Channel "C"
2D643 - Channel "D"
2D653A&B - Division I
2D663 - Division II
2D673 - Division I
2D674 - Division I
2D683 - Division II
2D684 - Division II

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

	Construction	Rating
Walls:	8" concrete block	2 hr
	36" reinforced concrete	3 hr
Floor:	13 1/2" reinforced concrete	Not rated
Ceiling:	13 1/2" reinforced concrete	Not rated
Doors:	9 steel doors into zones 0-28B,C,D,E,F,G,&T	3 hr
	1 steel door to 0-24H	1 1/2 hr

A wing wall with door rated as a two hour fire barrier separates major Division I and II equipment in this fire zone.

Division II DC distribution panels located in the corridor near the cold instrument shop are enclosed in one hour rated barriers.

Minority raceway is fire protected from and external fire by either a one hour rated wrapping or a one hour rated false ceiling.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays, safety related distribution panels or safety related battery chargers.

f) Consequences of fire without active fire protection:

Loss of any one of the following dc power supply sources may occur, but ample separation conforming/exceeding Regulatory Guide 1.75 and IEEE 279, lack of combustible pathways and rated fire barriers will prevent the fire from spreading to another division:

1) Channel: "A", "B", "C", or "D"

2) Division I or II

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detection will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Unit 2's safety-related equipment or components, to function as discussed in (f) above, could not be assumed. The potential sources of ignition in this area is auto-ignition of electrical cable insulation which is minimal since these are low voltage control circuits with oveload protection. The remote shutdown panels remain operable and provide sufficient systems/trains and isolating transfer switches to assure that the plant can be shutdown safely under this postulated fire condition.

4.5.52 FIRE ZONE 0-28B EQUIPMENT ROOM, (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

Load Centers

1D612 - Channel "A"
1D622 - Channel "B"
1D631 - Channel "C"
1D642 - Channel "D"
1D652 - Division I
1D662 - Division II

Miscellaneous Equipment

Distribution Panel	Battey Charger
1D614 - Channel "A"/ Division I	1D613 - Channel "A"
1D624 - Channel "B"/ Division II	1D623 - Channel "B"

1D634 - Channel "C"
1D644 - Channel "D"
1D672 - Division I
1D682 - Division II

1D633 - Channel "C"
1D643 - Channel "D"
1D653A&B - Division I
1D663 - Division II
0D683 Spare
0D685 Spare
1D673 Channel "A"
1D674 Channel "A"
1D683 Channel "B"
1D684 Channel "B"
0D673 Spare

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

	Construction	Rating
Walls:	8" concrete block	2 hr
	36" reinforced concrete	3 hr
Floor:	13 1/2" reinforced concrete	Not rated
Ceiling:	13 1/2" reinforced concrete	Not rated
Doors:	10 steel doors into zones 0-28I,J,K,L,M,N,H, and 0-28A	3 hr
	1 steel door to zone 0-22B	1 1/2 hr

Wing walls with doors rated as a two hour fire barrier separate major Division I and II within this fire zone. Division II DC distribution panels located in the corridor near the cold instrument shop are enclosed within one hour rated barriers.

Minority raceway is fire protected from an external fire by either a one hour rated wrapping or a one hour rated false ceiling.

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays, safety related distribution panels or safety related battery changers.

f) Consequences of fire without active fire protection:

Loss of any one of the following dc power supply sources may occur, but ample separation conforming/exceeding Regulatory Guide 1.75 and IEEE 279, lack of combustible pathways and rated fire barriers will prevent the fire from spreading to another division:

1) Channel: "A","B","C", or "D"

2) Division: I or II

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detector will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability to function of Unit 1's safety-related equipment or components, as discussed in (f) above, could not be assumed. The potential source of ignition in this area is auto-ignition of electrical cable insulation which is minimal since these are low votage control circuits with overload protection. The remote shutdown panels remain operable and provide sufficient systems/trains and isolating transfer switches, to assure that the plant can be shutdown safely under this postulated fire condition.

4.5.53 FIRE ZONE 0-28C BATTERY ROOM, (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

2D670 - 24 volt Division I battery

2D610 - 125 volt Channel "A" battery

Conduit - Channel "A" & Division I

2D611 - Channel "A" 125 volt fuse box

2D671 - Division I 24 volt fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

	Construction	Rating
Walls:	East & South 36" reinforced concrete	3 hr
	West & North 8" concrete block	2 hr
Floor:	13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:	13 1/2" reinforced concrete on exposed steel beams	Not rated
Door:	1 steel door into zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery rooms.

f) Consequences of fire without active fire protection:

Loss of 24 volt dc Division I and 125 volt dc channel "A" power supplies from batteries 2D670 and 2D610.

The fire will not spread beyond the rated barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on Safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 2, Channel A and Division I. This includes the loss of function of the RCIC system. The plant shutdown systems are designed to function adequately with such a loss.

4.5.54 FIRE ZONE 0-28D BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

2D640 - 125 volt dc battery channel "D"

Conduit - Channel "D"

2D6412 - 125 volt dc fuse box channel "D"

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South, East & West	8" concrete block	2 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Door:		1 steel door into zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery rooms.

f) Consequences of fire without active fire protection:

Loss of 125 volt dc Channel "D" from battery 2D640.

The fire will not spread beyond the rated fire barrier of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated

fire is limited to Unit 2's channel D. The plant shutdown systems are designed to function adequately with such a loss.

4.5.55 FIRE ZONE 0-28E BATTERY ROOM (El. 771-0" to 781-11")

a) Major safety-related components in fire zone:

2D680 - 24 volt Division II battery

2D620 - 125 volt channel "B" battery

Conduit - Channel "B" & Division II

2D621 - Channel "B" 125 V fuse box

2D681 - Division II 24 V fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	North, South, & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Doors:		1 steel door into zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery rooms.

f) Consequences of fire without active fire protection:

Loss of 24 volt dc Division II and 125 volt dc channel "B" power supplies from batteries 2D680 and 2D620.

The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 2's channel B and Division II. This includes a potential loss of function of the HPCI system. The plant shutdown systems are designed to function adequately with such a loss.

4.5.56 FIRE ZONE 0-28F BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

2D650 - 250 volt dc Division I battery

Conduit (Unit 2) - channels "A"&"C" (125 volt dc) and 125 volt dc Division I

2D651 - Division I 250 volt dc fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

- Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South, East & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Doors:		2 steel doors into zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (Paragraph a.) may occur, but ample separation, protective enclosure (conduit) and lack of combustible pathways in this zone of low combustible loading will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 2's channel A/C or Division I. This includes potential loss of function of the RCIC system. As discussed in paragraph f), above, the postulated fire will involve only one channel/division. The plant shutdown systems are designed to function adequately with such a loss.

4.5.57 FIRE ZONE 0-28G BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

2D660 - 250 volt dc battery Division II

Conduit (Unit 2) - Channels "B"&"D" (125 volt dc) and 125 volt dc Division II

2D661 - Division II 250 volt dc fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	North, South & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire	

	proofed steel beams	3 hr
Ceiling:	13 1/2" reinforced concrete on exposed steel beams	Not Rated
Doors:	2 steel doors into zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severify: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (Paragraph a) may occur, but ample separation, protective enclosures (conduit) and lack of combustible pathways in this zone of low combustible loading will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 2's channels B/D or Division II. This includes potential loss of function of the HPCI system. As discussed in paragraph f, above, the postulated fire will

involve only one channel/division. The plant shutdown systems are designed to function adequately with such a loss.

4.5.58 FIRE ZONE)-28H COLD INSTRUMENT REPAIR SHOP (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

The following conduits are located in this zone:

Unit 1 from panel:

1D624 - Channel "B", 125 V dc to reactor building control circuits

1D622 - 1D624 - Channel "B" V dc main feeder to distribution panel

1D0002J - Channel "B" dc - low voltage alarm

1D0002F - Channel "B" dc - low voltage alarm

1D634 - Channel "C" 125 V dc distribution panel to R.B. control circuits

1D614 - Channel "A" 125 V dc distribution panel

1D613 - to 480 V ac power supply (ac power to battery charger)

Unit 2 from panel:

2D0002C - Channel "B" 125 V dc supply to R.B. control circuits.

Channel "B" - 125 V dc power supply to R.B. control circuits

Channel "D" - 125 V dc power supply to R.B. control circuits

Essential raceway is listed in Appendix A

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design feature of zone:

See Figure 5-12

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	North, South & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete	Not Rated
Ceiling:		13 1/2" reinforced concrete	Not Rated
Door:		1 - steel door into zone 0-28B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within a conduit

f) Consequences of fire without active fire protection:

Loss of any one of the 125 volt dc control circuits listed in section a) which go to R.B. distribution panels.

Due to lack of combustible pathways and ample separation of conduit the fire will not spread to other channels.

Essential raceway is fire protected per Section 2.11.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of one of the following power sources cannot be assumed to function: either Unit 1's Channel A, B, or C or Unit 2's Channel B or D.

4.5.59 FIRE ZONE 0-28I BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

1D650 - 250 volt dc battery Division I

Conduit (Unit 1) - Channels "A" & "C" (125 volt dc) and 125 volt dc Division I

1D651 - Division I 250 volt dc fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South, East & West	8" concrete block	2 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete	Not Rated
Doors:		1 - steel door into zone 0-28B	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (paragraph a) may occur, but ample separation, protective enclosure (conduit) and lack of combustible pathways will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of Unit 1's Division I safety-related equipment or components and Channels A & C to function could not be assumed.

4.5.60 FIRE ZONE 0-28J BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

1D660 - 250 volt dc Division II battery

Conduit - Channel "B" (125 volt dc) and Division II (125 volt dc)

1D661 - Division II 250 volt dc fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	East	36" reinforced concrete	3 hr
	North, South & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Doors:		1 - steel door into Zone 0-28B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (paragraph a) may occur, but ample separation, protective enclosure (conduit) and lack of combustible pathways in this zone of low combustible loading will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barrier of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 1's channel B or Division II. This includes potential loss of function of the HPCI system, as discussed in paragraph f, above, the postulated fire will involve only one channel/division. The plant shutdown systems are designed to function adequately with such as loss.

4.5.61 FIRE ZONE 0-28K BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

1D610 - 125 volt dc channel "A" battery

1D670 - 24 volt dc Division I battery

1D611 - 125 volt dc channel "A" fuse box

1D671 - 24 volt dc Division I fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	South, East & West	8" concrete blocks	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Door:		1 - steel door into Zone 0-28B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (paragraph a) may occur, but ample separation, protective enclosure (conduit) and lack of combustible pathways in this zone low combustible loading will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold,

safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 1's channel A or Division I. This includes the loss or function of the RCIC system. As discussed in paragraph f), above, the postulated fire will involve only one channel/division. The plant shutdown systems are designed to function adequately with such a loss.

4.5.62 FIRE ZONE 0-28L BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

1D630 - 125 volt dc channel "C" battery

1D631 - 125 volt dc channel "C" fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	South, East & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Door:		1 - steel door into Zone 0-28B	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of channel "C" 125 volt dc supply.

The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 1's channel C. The plant shutdown systems are designed to function adequately with such a loss.

4.5.63 FIRE ZONE 0-28M BATTERY ROOM (El. 771'-0" to 781'-11")

a) Major safety-related components in fire zone:

1D620 - 125 volt dc channel "B" battery

1D680 - 24 volt dc Division II battery

1D621 - 125 volt dc channel "B" fuse box

1D681 - 24 volt dc Division II fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	South, East & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete on fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated
Doors:		1 - steel door into Zone 0-28B	2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of any one of the aforementioned dc power sources (paragraph a) may occur, but ample separation, protective enclosure and lack of combustible pathways in this zone of low combustible loading will prevent the fire from spreading to another channel or division within the zone. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to Unit 1's channel B and Division II. This includes a potential loss of function of the HPCI system. The plant shutdown systems are designed to function adequately with such a loss.

4.5.64 FIRE ZONE 0-28N BATTERY ROOM (El. 771-0" to 781'-11")

a) Major safety-related components in fire zone:

1D640 - 125 volt dc channel "D" battery

1D641 - 125 volt dc channel "D" fuse box

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North & East	36" reinforced concrete	3 hr
	South & West	8" concrete block	3 hr
Floors:		13 1/2" reinforced concrete of fire proofed steel beams	3 hr
Ceiling:		13 1/2" reinforced concrete on exposed steel beams	Not Rated

Door: 1-steel door into Zone 0-28B 3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of 125 volt dc channel "D" may occur. The fire will not spread beyond the rated fire barriers of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the Unit 1 reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to channel "D". The plant shutdown systems are designed to function adequately with such a loss.

The postulated fire in this zone would have no effect on the Unit 2 reactor plant.

4.5.65 FIRE ZONE 0-28P SOUTH CABLE CHASE (El. 771-0" to 781'-11")

a) Major safety-related components in fire zone:

Channel "D" conduit

Division II conduit

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	West	36" reinforced concrete	3 hr
	East, South & North	8" concrete block	2 hr
Floors:		2" concrete on metal deck	Not Rated
Ceiling:		12" reinforced concrete	Not Rated
Door:		Steel access door to Zone 0-28A	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related conduit

f) Consequences of fire wihtout active fire protection:

Loss of Division II and channel "D"

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration will be shortened. Early total flooding with the automatic CO_2 system along with detection from heat detectors will bring the fire brigade to extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is limited to channel "D" and Division II. The plant shutdown systems are designed to function adequately with such a loss.

4.5.66 -- FIRE ZONE 0-28O CENTER CABLE CHASE (El. 771-0" to 782'-10")

a) Major safety-related components in the fire zone:

No safety related equipment or cables are located in this chase.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	West	36" reinforced concrete	3 hr
	East, North & South	6" concrete block & reinforced concrete	2 hr
Ceiling:		12" concrete on metal decking	Not Rated
Floor:		2" concrete on metal decking	Not Rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

No combustibles are present, therefore no fire can occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

None

4.5.67 FIRE ZONE 0-28R NORTH CABLE CHASE (El. 771'-0" to 732'-10")

a) Major safety-related components in fire zone:

Division I power to panels:

0C883A	SGTS	
0C887A	1.	Control room cooling
0C876A	2.	Computer room cooling
	3.	Control structure H&V
	4.	Emergency OA Supply

Channel "D" 125 vdc to panel 0C876B

Channel "C" 125 vdc to panel 0C876A

Division I power to emergency OA supply fan inlet vane

Division I power to PB pressure control

Division I power to SGTS fan inlet vane

Division II power to main steam tunnel/zone 1 isolation damper

Division II power to control structure H/V isolation damper between Unit 1 & Unit 2

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	West	36" reinforced concrete	3 hr
	East, North & South	6" concrete block & reinforced concrete	2 hr
Floor:		2" concrete on metal decking	Not Rated
Ceiling:		12" concrete on metal decking	Not Rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 2* minutes

3) Quantities of combustibles: See Table 6-1

*See Subsection 4.1.3 for discussion of method used for determining the expected duration of the fully developed period of the postulated fire.

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within trays, wireways or conduit.

f) Consequences of fire without active fire protection:

Loss of all equipment & systems mentioned in paragraph a).

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened by actuation of the automatic CO_2 system.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated

fire is designed to alleviate abnormal conditions such as chlorine gas cloud, high outside/inside air-born radioactivity and smoke in control room, which are assumed to not occur simultaneously with the fire. If HVAC is lost to the control room, the environment will become uncomfortable but not uninhabitable. By opening doors and using portable fans for circulation, condition can be improved. Although loss of battery room exhaust fans could result in eventual hydrogen build-up, portable fans will be provided to maintain the hydrogen concentrations remain sufficiently deluted to preclude an explosive mixture.

We estimate that the period of the fully developed fire will be well below the calculated equivalent fire severity, due to oxygen depletion and absence of other combustible materials necessary to sustain a cable insulation or jacket fire.

4.5.68 FIRE ZONE 0-28S HVAC DUCT CHASE (El. 771'-0" to 804'-11")

a) Major safety-related components in fire zone:

No equipment other than safety related duct.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	West	36" reinforced concrete	3 hr
	East, North & South	6" concrete block & reinforced concrete	2 hr
Ceiling:		12" reinforced concrete	Not Rated
Floor:		12" reinforced concrete	Not Rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles are present, therefore no fire can occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

None

4.5.69 FIRE ZONE 0-28T BATTERY ROOM (El. 771-0" to 781'-11")

a) Major safety-related components in fire zone:

2D630 - 125 volt dc battery channel "C"

2D631 - 125 volt dc fuse box channel "C"

Conduit - channel "C"

b) Fire protection and detection systems in fire zone:

See Table 6-1

Ventilation is provided in order to maintain hydrogen concentration well below 2% (by volume).

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	South	36" reinforced concrete	3 hr
	North, East & West	8" concrete block	3 hr
Floor:		13 1/2" reinforced concrete	Not Rated

Ceiling:	13 1/2" reinforced concrete	Not Rated
Door:	1 - steel door into Zone 0-28A	3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related battery room.

f) Consequences of fire without active fire protection:

Loss of 125 volt dc channel power supplies from batteries 2D630.

The fire will not spread beyond the rated fire barrier of this zone.

g) Consequences of fire with active fire protection:

Same as in f) above, except the duration of the fire will be shortened. Early detection alarms by ionization detectors will bring the fire brigade to manually extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the Unit 2 reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety related equipment which could be disabled by this postulated fire is limited to channel "C". The plant shutdown systems are designed to function adequately with the loss of Channel "C".

The postulated fire in this zone would have no effect on the Unit 1 reactor plant.

4.5.70 FIRE ZONE 0-29A VESTIBULE (El. 783'-0" to 804'-11")

a) Major safety-related components in fire zone:

No safety related equipment located within the zone.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	South	36" reinforced concrete	3 hr
	North, East & West	8" concrete block	2 hr
Floor:		13 1/2" reinforced concrete	Not Rated
Ceiling:		13 1/2" reinforced concrete	Not Rated
Door:		2-steel doors 1 into zone 0-24H and 1 into zone 0-29B	1 1/2 hr

d. Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles are present, therefore no fire can occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

None

4.5.71 FIRE ZONE 0-29B H&V EQUIPMENT ROOM
(El. 783'-0" to 804'-11")

a) Major safety-related components in fire zone:

1) 0V103A&B control structure H/V unit A&B

2) 0V115A&B control & computer room cooling units A&B

3) 0V116A&B battery room exhaust fans A&B

4) 0V117A&B control & computer room cooling units A&B

5) 0P162A&B control structure chilled water circulating pumps A&B

6) 0T113B control structure air separator

7) 0P171A&B control structure chiller condenser water (emergency service water) A&B

8) 0B136 (Division I) & 0B146 (Division II) MCC

9) 0C877A&B control structure HV/AC panels A&B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North, South, West & East	36" reinforced concrete	3 hr
	Stair well enclosure walls	concrete masonry	2 hr
Floor:		13 1/2" reinforced concrete	Not Rated

Ceiling:	13 1/2" reinforced concrete	Not Rated
Doors:	2 - steel doors 1 into zone 0-29C and 1 into zone 0-29A	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

Ignition of cable insulation and jacket material within safety related cable trays or divisionalized MCC panels (0B136 or 0B146)

f) Consequences of fire without active fire protection:

1) Loss of either Division I or Division II. Power supply, resulting in the loss of the following systems:

a) Control structure H/V unit

b) Control & computer room cooling unit (0V117)

c) Battery room exhaust fan

d) Control & computer room cooling unit (0V115)

e) Control structure chiller

f) Chiller auxillaries

g) SGTS

h) Emergency outside air supply

2) The minimum separation between Division I & II cable trays is approximately 11 feet, and no combustible pathways exist, thus preventing the spread of fire from one division to the other division.

g) Consequences of fire with active fire protection:

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be effected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated fire is designed to alleviate abnormal conditions such as chlorine gas, high outside/inside air-borne radioactivity, and smoke in control room provided these conditions do <u>not</u> occur simultaneously with the fire. If HVAC is lost to the control room, the environment will become uncomfortable but not uninhabitable. By opening doors and using portable fans for circulation, the condition can be improved, although loss of battery room exhaust fans may result in eventual buildup, portable fans will be provided to maintain the hydrogen concentrations sufficiently diluted to preclude an explosive mixture. Should control room evacuation occur, the plant could be shutdown from the remote shutdown panels.

4.5.72 FIRE ZONE 0-29C VESTIBULE (El. 783'-0" to 804'-11")

a) Major safety-related components in fire zone:

No safety related equipment located within the zone.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12.

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	South, East & West	8" concrete block	2 hr

Floor:	13 1/2" reinforced concrete	Not Rated
Ceiling:	13 1/2" reinforced concrete	Not Rated
Doors:	2 - steel doors 1 into zone 0-29B and 1 into zone 1-36B	2&3 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles are present, therefore no fire can occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

None

4.5.73 FIRE ZONE 0-29D PIPE ROOM (El. 783'-0" to 804'-11")

a) Major safety-related components in fire zone:

No major safety related component other than 2-8" emergency service water pipes for the chiller condensers and 2-"O" ducts (pressure boundary only) with fire dampers where penetrating the 783'-0" floor.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-12

		Construction	Rating
Walls:	North	36" reinforced concrete	3 hr
	East, West & South	8" concrete block	2 hr
Floor:		13 1/2" reinforced concrete	Not Rated
Ceiling:		13 1/2" reinforced concrete	Not Rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles are present, therefore no fire can occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

A postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown. The ducts are Q-listed solely to maintain control building pressure integrity in case of a chlorine gas release or high outside levels or air-borne radioactivity which are assmed to not occur simultaneously with the fire.

4.5.74 FIRE ZONE 0-30A HVAC EQUIPMENT ROOM (El. 806'-0" to 822'-0", roof)

a) Major safety-related components in fire zone:

1) 0K112A&B control structure chillers A&B

2) 0V109A&B standby gas treatment fans and filter trains A&B

3) 0V101A&B emergency outside air supply fans and filter trains A&B

4) 0V118A&B SGTS equipment room ventilation system fans A&B

5) 0C876A&B control panels for the EOAS system

6) 0C883A&B control panels for the SGTS

7) 0V114A&B SGTS equipment room heating unit A&B

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North, South, West & East	36" reinforced concrete	3 hr
	Stairwell enclosure walls	concrete masonry	2 hr
Floor:		13 1/2" reinforced concrete	Not Rated
Ceiling:		24" reinforced concrete	Not Rated
Doors:		2 - steel doors into zone 0-21B, 0-30B	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 25 minutes

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety-related cable trays

2) Ignition of the charcoal in either the SGTS filter or the EOAS filter housing

f) Consequences of fire without active fire protection:

1) Loss of both Division I and II power supply resulting in a loss of the following systems:

a) Control structure chillers

b) SGTS

c) Emergency outside air supply

d) SGTS equipment room vent system

e) SGTS equipment room heating system

2) Loss of the above systems, due to ambient temperatures above 104°F caused by a charcoal fire.

g) Consequences of fire with active fire protection:

Activation of the deluge valve will alarm the control room of a fire in the charcoal. The charcoal filter housings are provided with thermal detectors with two separate settings, one of which will alarm in the control room on above normal charcoal temperatures and the other on charcoal ignition. Upon ignition, the charcoal is completely flooded (EOAS) or deluged (SGTS) at a flow rate of 1400 gpm in order to extinguish the fire.

In addition to consequences in f) above, the smoke from a fire would activate the photo-electric detectors which would provide visual and audible alarms both locally and in the main control room. Manual fire fighting would then take place. The automatic suppression system would be initiated and would control and/or extinguish the fire.

h) Effects of fire on safe shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of offsite power, the shutdown could be affected in the manner described in either Section 4.2.1 or 4.2.2. The safety-related equipment which could be disabled by this postulated

fire is designed to alleviate abnormal conditions such as high airborne radioactivity which are assumed to not occur simultaneously with the fire, the standby gas treatment system is not essential for normal plant shutdown. If the control structure cooling is lost, the environment will become uncomfortable but not uninhabitable. By opening doors and using portable fans, acceptable conditions can be maintained. Should control room evacuation be necessary, the plant can be shutdown from the remote shutdown panels.

4.5.75 FIRE ZONE 0-30B STAIRWELL (El. 806'-0" to 823'-0")

a) Major safety-related components in fire zone:

No equipment in stairwell.

b) Fire protection and detection systems in fire zone:

See Table 6-1

c) Structural and architectural design features of zone:

See Figure 5-13

		Construction	Rating
Walls:	North and West	8" concrete block	2 hr
Floor:	South and East	13 1/2" reinforced concrete	Not Rated
Ceiling:		13 1/2" reinforced concrete	Not Rated
Doors:		1-steel door into Zone 0-30A	1 1/2 hr

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: Insignificant

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

No combustibles are present, therefore no fire will occur.

f) Consequences of fire without active fire protection:

None

g) Consequences of fire with active fire protection:

None

h) Effects of fire on safe shutdown:

A fire was not postulated in this stairwell, since combustible material will not be located in this zone. In the unlikely event that a fire were initiated in some non-mechanistic fashion, the fire would be confined to this stairwell by the rated fire barriers represented by the walls and doors. Therefore, a fire in this zone would not have an adverse affect on any system required for safe shutdown of the reactor plant. Furthermore, a fire in this zone would not prevent access to or egress from the control structure since the stairwell in fire zone 0-21B would be available.

4.6 FIRE HAZARDS ANALYSIS - DIESEL GENERATOR BUILDING

4.6.1 FIRE ZONE 0.41A, DIESEL GENERATOR "A" ROOM (El. 660' to 735'-6")

a) Major Safety-Related components in fire zone:

1) Diesel Generator "A" and associated auxiliaries

2) Ventilation system

3) MCC's

4) High voltage control panels

5) Transformer

6) Essential Div. II raceway listed in Appendix A

b) Fire Protection and detection systems in fire zone:

See Table 6-1

c) Structural and Architectural design features of zone:

See Figures 5-8, 5-9, and 5-10

		Construction	Rating
Walls:	North & South	24" reinforced concrete	3 hrs
	East & West	24" reinforced concrete	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 40 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacket material within safety related cable and trays.

2) Leakage of diesel fuel oil from the day tank and/or engine lube oil spread uniformly over the 677'-0" elevation and eventually running down

around the diesel pedestal to the 660'-0" elevation resulting in a severe oil fire in this area.

f) Consequences of Fire Without Active Fire Protection:

1) Loss of Diesel Generator A, all controls and instrumentation on Diesel Generator A and associated auxiliaries.

2) Essential Div. II raceway is fire protected per Section 2.11.

g) Consequences of Fire With Active Fire Protection:

The smoke and flame detectors would provide a visual and audible alarm in the main control room. If the room temperature rises to 190°F the deluge valve would open and the pre-action sprinkler system would be primed with water. At 212°F individual sprinkler heads would be activated to control and/or extinguish the fire. Plant fire brigade would be dispatched to ensure that the fire is extinguished.

h) Effects of fire on Safe Shutdown:

Since postulated fire would cause the loss of Div. I diesel generators only, there would be two other diesel generators to supply standby AC power for plant shutdown and as described in Section 4.2.2. If offsite power was available, the reactor plant could be shutdown by the methods described in Section 4.2.1.

4.6.2 FIRE ZONE 0-41B, DIESEL GENERATOR "B" ROOM (El. 660' - 735'-6")

a) Major Safety-Related components in fire zone:

1) Diesel Generator "B" and associated auxiliaries

2) Ventilation system

3) MCC's

4) High Voltage Control panels

5) Transformer

b) Fire Protection and detection systems in fire zone:

See Table 6-1.

c) Structural and Architectural design features of zone:

See Figure 5-8, 5-9, and 5-10.

		Construction	Rating
Walls:	North & South	24" reinforced concrete	3 hrs
	East & West	24" reinforced concrete	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 40 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacketing material within safety related cable trays.

2) Leakage of diesel fuel oil from the day tank and/or engine lube oil spread uniformly over the 677'-0" elevation and eventually running down around the diesel pedestal to the 660'-0" elevation and igniting. This would represent the most severe fire in this area.

f) Consequences of Fire Without Active Fire Protection:

1) Loss of Diesel Generator B, all controls and instrumentation on Diesel Generator B and associated auxiliaries.

g) Consequences of Fire With Active Fire Protection:

The smoke and flame detectors would provide a visual and audible alarm in the main control room. If the room temperature rises to 190°F the deluge valve would open and the pre-action sprinkler system would be primed with water. At 212°F individual sprinkler heads would be activated to control and/or extinguish the fire. Plant fire brigade would be dispatched to ensure that the fire is extinguished.

h) Effects of fire on Safe Shutdown:

Since postulated fire would cause the loss of channel "B" diesel generator only, there would be three other diesel generators to supply standby AC power for plant shutdown as described in Section 4.2.2. If offsite power was available, the reactor plant could be shutdown by the method described in Section 4.2.1.

4.6.3 FIRE ZONE 0-41C, DIESEL GENERATOR "C" ROOM (El. 660'-735'-6")

a) Major Safety-Related components in fire zone:

1) Diesel Generator "C" and associated auxiliaries

2) Ventilation system

3) MCC's

4) High voltage control panels

5) Transformer

6) Essential Div. II raceway listed in Appendix A

b) Fire Protection and detection system in fire zone:

See Table 6-1.

c) Structural and Architectural design features of zone:

See Figures 5-8, 5-9, and 5-10.

		Construction	Rating
Walls:	North & South	24" reinforced concrete	3 hrs
	East & West	24" reinforced concrete	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 120 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacketing material within safety related cable trays.

2) Leakage of diesel fuel oil from the day tank and/or engine lube oil spread uniformly over the 677'-0" elevation and eventually running down around the diesel pedestal to the 660'-0" elevation and igniting. This would represent the most severe fire in this area.

f) Consequences of Fire Without Protection:

1) Loss of Diesel Generator C, all controls and instrumentation on Diesel Generator C and associated auxiliaries.

2) Essential Div. II raceway is fire protected per Section 2.11.

g) Consequences of Fire With Active Fire Protection:

The smoke and flame detectors would provide a visual and audible alarm in the main control room. If the room temperature rises to 190°F the deluge valve would open and the pre-action sprinkler system would be primed with water. At 212°F individual sprinkler heads would be activated to control and/or extinguish the fire. Plant fire brigade would be dispatched to ensure that the fire is extinguished.

h) Effects of fire on Safe Shutdown:

Since postulated fire would cause the loss of the Channel "C" diesel generator only, there would be three other diesel generators to supply standby AC power for plant shutdown and as described in Section 4.2.2. If offsite power was available, the reactor plant could be shutdown by the method described in Section 4.2.1.

4.6.4 FIRE ZONE 0-41D, DIESEL GENERATOR "D" ROOM (El. 660' - 735'-6")

a) Major Safety-Related components in fire zone:

1) Diesel Generator "D" and associated auxiliaries

2) Ventilation system

3) MCC's

4) High Voltage Control panels

5) Transformer

b) Fire Protection and detection systems in fire zone:

See Table 6-1.

c) Structural and Architectural design features of zone:

See Figures 5-8, 5-9, and 5-10.

		Construction	Rating
Walls:	South	24" reinforced concrete	3 hrs
	North, East & West	24"reinforced concrete	Not rated

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 40 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of cable insulation and jacketing materials within safety related cable trays.

2) Leakage of diesel fuel oil from the day tank and/or engine lube oil spread uniformly over the 677'-0" elevation and eventually running down around the diesel pedestal to the 660'-0" elevation and igniting. This would represent the most severe fire in this area.

f) Consequences of Fire Without Active Fire Protection:

1) Loss of Diesel Generator D, all controls and instrumentation on Diesel Generator D and associatd auxiliaries.

g) Consequences of Fire With Active Fire Protection:

The smoke and flame detectors would provide a visual and audible alarm in the main control room. If the room temperature rises to 190°F the deluge valve would open and the pre-action sprinkler system would be

primed with water. At 212°F individual sprinkler heads would be activated to control and/or extinguish the fire. Plant fire brigade would be dispatched to ensure that the fire is extinguished.

h) Effects of fire on Safe Shutdown:

Since postulated fire would cause the loss of the Channel "D" diesel generator only, there would be three other diesel generators to supply standby AC power for plant shutdown as described in Section 4.2.2. If offsite power was available, the reactor plant could be shutdown by the methods described in Section 4.2.1.

4.7 FIRE HAZARDS ANALYSIS - ENGINEERED SAFEGUARDS SERVICE WATER PUMPHOUSE

4.7.1 FIRE ZONE 0-51, LOOP "A" PUMP ROOM (El. 685'-6" to 712'-6")

a) Major Safety-Related components in fire zone:

Elevation 685'-6"

Two (2) Emergency Service Water pumps Loop A, Division I, OP-504 A & C

Two (2) RHR Service Water pumps Loop A, Division I, 1P-506 A & 2P-506 A

Emergency & RHR Service Water System A, Panel OC-529A

ESSW pumphouse MCC OB-517 for Loop A equipment

Elevation 704'-8"

ESSW pumphouse ventilation fans OV-521 A & C

RHR SW pump room exhaust fans IV-506A & 2B5-506A

b) Fire Protection and detection systems in fire zone:

See Table 6-1.

c) Structural and Architectural design features of zone:

See Figure 5-19.

		Construction	Rating
Walls:	North, East, South	24" reinforced concrete	Not rated
	West	24" reinforced concrete	3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of service water pump motor winding and associated lube oil.

2) Ignition of cable insulation and jacketing material within safety-related cable trays, MCC and/or control panel.

3) Leakage of lube oil from all four motors spread uniformly over the floor of this fire zone then ignites burning all 4 motors and all cables. This should result in the most severe fire in this area and generate the maximum heat release rate.

4) Ignition of motor winding on ventilation fans in this area.

f) Consequences of Fire Without Active Fire Protection:

1) Loss of Loop A ESSW cooling for Division I ESW components and Division I RHR heat exchangers.

2) Loss of ventilation system for Loop A ESSW pump room.

3) Loss of controls for all four Division I ESSW pumps and Loop A spray pond valves.

4) A fire in the cable insulation and jacket material will self-extinguish once the power source is interrupted or the fire source is extinguished. A fire in this zone will not spread into adjacent Division II ESSW fire zone because of the absence of a pathway through the fire rated separation wall. No safety-related cables pass between Division I and Division II ESSW fire areas.

g) Consequences of Fire With Active Fire Protection:

Smoke will activate the ionization detectors which provide an audible alarm in the main control room. Once the alarm was received in the main control room, an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of Fire on Safe Shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a

cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be effected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of "A" loop of the RHR and Emergency Service water systems to function could not be assumed. Both Unit 1 and 2 reactor plans could be brought to and maintained in a cold shutdown condition by use of the "B" loop of these engineered safeguard service water systems.

4.7.2 FIRE ZONE 0-52, LOOP "B" PUMP ROOM (El. 685'-6" to 712'-6")

a) Major Safety-Related components in fire zone:

Elevation 685'-6"

Two (2) Emergency Service Water Pumps Loop B, Division II OP-504 B & D

Two (2) RHR Service Water Pumps Loop B, Division II 1P-506B & 2A-506B

ESSW pump house Loop B panel OC-529B

ESSW pump house Loop B MCC OB-527

Elevation 704'-8"

ESSW pump house ventilation fans OV-521 B & D

RHR SW pump room exhaust fans 1V-506B & 2V-506B

b) Fire Protection and detection systems in fire zone:

See Table 6-1.

c) Structural and Architectural design features of zone:

See Figure 5-19.

		Construction	Rating
Walls:	North, West, South	24" reinforced concrete	Not rated
	East	24" reinforced concrete	3 hrs

d) Combustible materials in zone:

1) Combustible loading: See Table 6-1

2) Equivalent fire severity: 3 min.

3) Quantities of combustibles: See Table 6-1

e) Postulated fire in zone:

1) Ignition of a service water pump motor winding and associated with lube oil.

2) Ignition of cable insulation and jacket material within safety-related cable trays, MCC and/or control panel.

3) Leakage of lube oil from all service water pump motors spread uniformly over the floor of this fire zone then ignites burning all 4 motors and all cables. This should result in the most severe fire in this area and generate the maximum heat release rate.

4) Ignition of motor windings on ventilation fans in this area.

f) Consequences of Fire Without Active Protection:

1) Loss of Loop B ESSW cooling for Division II ESW components and Division II RHR heat exchangers.

2) Loss of ventilation system for Loop B ESSW pump room.

3) Loss of controls for all four Division II ESSW pumps and Loop B spray pond valves.

4) A fire in the cable insulation and jacketing will self-extinguish once the power source is interrupted or the fire source is extinguished. A fire in this zone will not spread to the adjacent Division I ESSW fire zone because of the absence of a pathway through the fire rated separation wall. No safety-related cables pass between Division II and Division I ESSW fire areas.

g) Consequences of Fire With Active Fire Protection:

Smoke will activate the ionization detectors which provides an audible alarm in the main control room. Once the alarm was received in the main control room,

an announcement of the occurrence of the fire and its location would be made over the plant public address system and the plant fire brigade would be dispatched to extinguish the fire.

h) Effects of Fire on Safe Shutdown:

The postulated fire in this zone would not prevent the reactor plant from being placed and maintained in a cold, safe shutdown condition. Depending on the availability of off-site power, the shutdown could be affected in any manner described in either Section 4.2.1 or 4.2.2, except that the ability of "B" loop of the RHR and Emergency Service Water systems to function could not be assumed. Both Unit 1 and 2 reactor plants could be brought to and maintained in a cold shutdown condition by use of the "A" loop of these engineered safeguard service water systems.

4.8 FIRE HAZARDS ANALYSIS - UNITS 1 & 2 TURBINE BUILDING

The turbine building does not contain any safety-related components or system whose loss would prevent the safe shutdown of the reactor plant. Therefore, the analysis that follows will consider the effects of a fire in the turbine building on the limited amount of Class IE cable; power and control cables for the fire pumps and on adjacent buildings. Figures 5-8 through 5-14 should be consulted for purposes of this discussion.

The only safety-related equipment or components located in the turbine building are four channels of RPS cables that terminate at the position switches for the turbine stop valves and the turbine control valves. A major fire in the turbine building that would cause an open circuit in three or more of these cables (per unit) would result in a reactor scram. If one or two cables were open-circuited, then a scram would occur upon the closure of one or two of these valves.

In the event that these cables were short-circuited as a result of a fire, the reactor would be protected by scram initiated by inputs to the RPS from the neutron monitoring system or from a high reactor pressure signal. Therefore, the loss of these cables would not have an adverse impact or reactor safety or the ability to place the reactor in a safe shutdown condition.

The motor control center, 1B-180, for the electrical motor driven fire pump, OP512, is located in fire zone 1-36A at elevation 762' on column lines 23 and "L". The electric-driven fire pump is powered from two power sources off the "start-up" bus, thus power to this pump motor will only be lost upon the total loss of offsite power. The cables for the control power, manual actuation and alarm circuits for the diesel-driven fire pump are routed with the manual actuation and alarm circuits of the electric fire pump. If a fire in the turbine building were to cause the loss of MCC 1B-180 and the control circuits for both fire pumps, the diesel-driven pump would start automatically on either a drop in pressure in the fire main or loss of AC power to the controller. Therefore, a fire in the turbine building will not result in the loss of the water suppression capabilities of the fire protection system.

The common walls, doors, and penetrations between the reactor buildings, the control structure, the radwaste building, and the turbine building have 3-hour fire ratings. The principal type of combustible material in the turbine building fire zones that are immediately adjacent to the reactor buildings and the control structure is the insulation material for the nonsafety related cable routed in these zones. These cables are protected from thermal overload conditions by overcurrent trip devices. If a fire were initiated by an electrical overload condition, the

power source would be interrupted and the cable insulation would self-extinguish. If a fire were initiated by an external, non-electrical source, the cables would self-extinguish once the ignition source was either removed or extinguished.

Nonetheless, there are several fire zones adjacent to the control structure that contain significant quantities of lubricating oil. Zones with significant quantities of lubricating oil are individually enclosed in 3 hour fire rated barriers and protected with automatic water suppression systems. These particular zones are, therefore, separated from the reactor bulidings and control structure by two 3 hour fire rated barriers.

Zones 1-31F and 2-31F, at elevation 686'-0" and on column line intersections 18&K, 20&K, 22&K, 36&K, 38&K, and 40&K, contain 6 lubricating oil reservoirs for the reactor feedwater pump turbines. The capacity of each reservoir is 1,000 gallons. Zones 1-36A and 2-36A, at elevation 762'-0" and between column line intersections 21 to 23 and N to L and 35 to 37 and N to L contain 4 exhaust system filters. Each filter assembly contains 10,222 pounds of activated charcoal. The capability exists for isolating these filters at both the inlet and outlet of each assembly. All of these areas are provided with deluge type sprinkler systems with the capability to extinguish any postulated fire. In the unlikely event that a failure occurred in the deluge sprinkler system, a fire in these areas would not prevent a reactor plant shutdown since the turbine building is separated from the reactor buildings and control structure by 3 hour fire rated walls, doors, and penetrations. Thus the systems required for shutdown would not be adversely affected.

4.9 FIRE HAZARDS ANALYSIS - RADWASTE BUILDING

The radwaste building is separated from the turbine building by walls, doors, and penetrations that have a 3 hour fire rating and does not share any common walls with either the control structure or the reactor building. Furthermore, the radwaste building does not contain any safety-related components or systems. Therefore, the analysis that follows will consider the possible effects of a fire in the radwaste building with respect to potential radioactive releases. Figure 5-15 should be consulted for purposes of this discussion.

Within the radwaste building, there is located solid, liquid and gaseous radioactive waste treatment systems. For purposes of this analysis a fire was postulated to occur in the main charcoal adsorber beds of the offgas treatment system. The probability of such a fire is rather low, since the adsorbent material is essentially in an inert atmosphere because the principal constituent of the process stream is nitrogen. Furthermore, the entire train of charcoal adsorber tanks can be isolated at both the inlet and outlet, thus if a fire were to start in a bed it would self-extinguish once the available oxygen was consumed. The charcoal adsorber tanks are constructed of 1-3/16 inch carbon steel and this would act as a barrier to prevent the spread of the fire.

A fire in these charcoal beds might result in the release of some radioactive gases. This accident is analyzed in Section 15.7.1.1 of the Final Safety Analysis Report (FSAR) and, as indicated therein, the radiological dose consequences are a small percentage of the guideline values of 10CFR100.

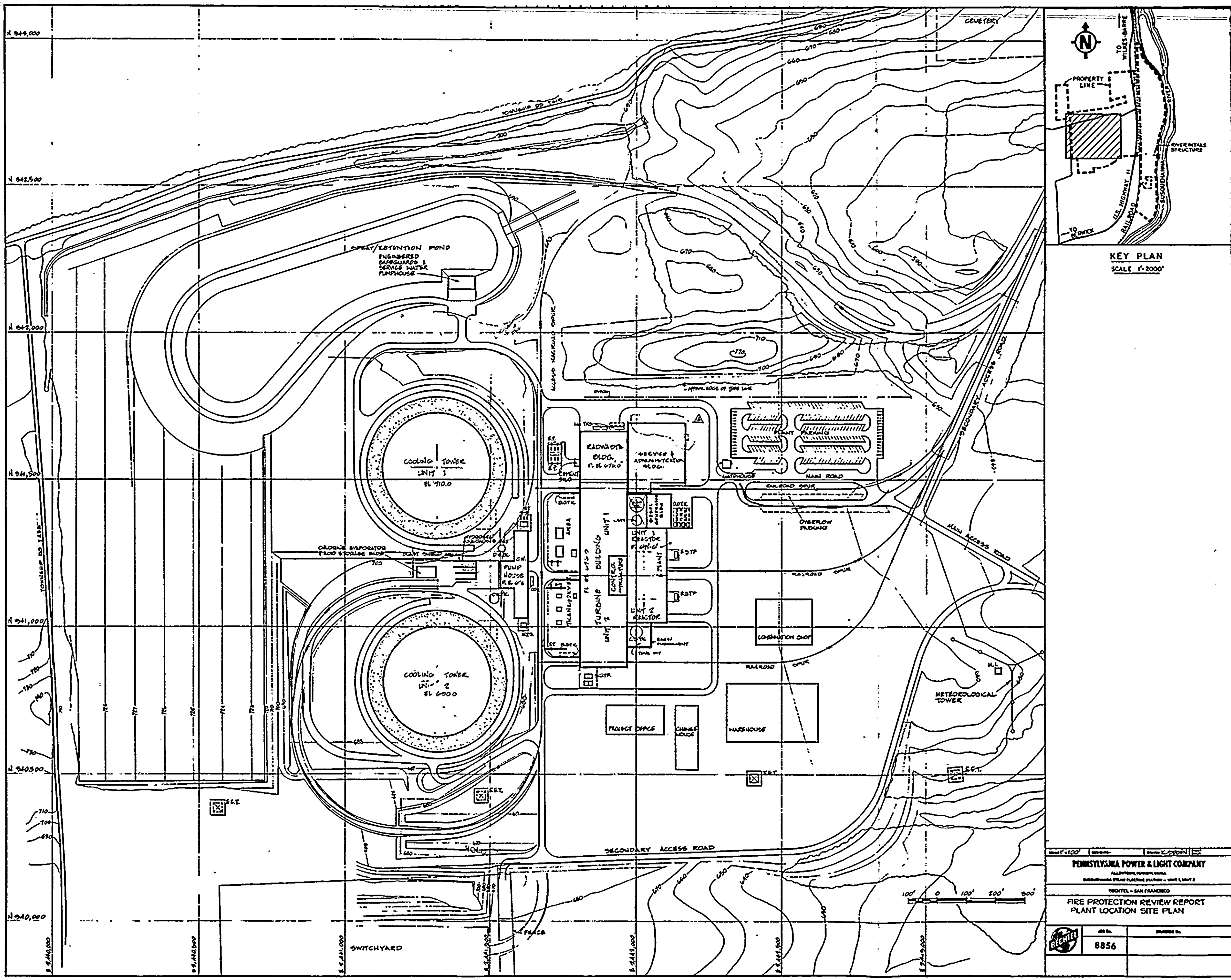
Again for purposes of this analysis, it was postulated that a fire would cause the rupture of a liquid radwaste tank with the worst radiological consequences. The tank selected for this evaluation was the radwaste evaporator concentrate storage tank. The probability of a fire in the immediate area of this tank is rather low since the combustible loading is insignificant. Nonetheless, even if it is that a fire caused the rupture of this tank, the radiological dose consequences would be a small fraction of the guideline values of 10CFR100. An analysis of the radiological consequences for this tank is provided in FSAR Subsection 15.7.2.

4.10 FIRE HAZARD ANALYSIS - SERVICES AND ADMINISTRATION BUILDING

The services and administration (S&A) building is separated from the radwaste building by walls, doors, and penetrations that have a 3-hour fire rating and does not share any common walls with either the control structure, the reactor building, or the diesel generator building. Furthermore, the S&A building does not contain any safety-related components or systems. The analysis that follows will consider the possible effects of a fire in the S&A building or the buildings having systems required for shutdown. Figure 5-20 should be consulted for purposes of this discussion.

The most significant areas for potential fires in the S&A building are the oil storage room, the paint storage room and the warehouse. All of these areas are separated from the remainder of the S&A building by 3-hour fire barriers and are protected by water sprinkler systems. These areas of the S&A building are separated from the diesel generator building by the 30 feet represented by the loading dock and the railroad track. In addition, the oil and paint storage areas are separated from the diesel generator building by 2 three-hour fire barriers.

In light of the separation by 3-hour fire barriers, it can be concluded that a fire in this building will not have any adverse safety or radiological effects on the plant.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RIVER INTAKE STRUCTURE
RAILROAD
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SUSQUEHANNA RIVER
CEMETERY
SPRAY/RETENTION POND
ENGINEERED SAFEGUARDS & SERVICE WATER PUMPHOUSE
COOLING TOWER UNIT 1
EL 710.0
COOLING TOWER UNIT 2
RADWASTE BLDG.
SERVICE & ADMINISTRATION BLDG.
TURBINE BUILDING
UNIT 1
UNIT 2
CONTROL STRUCTURE
UNIT 1 REACTOR
UNIT 2 REACTOR
PUMP HOUSE
PLANT PARKING
MAIN ROAD
GATEHOUSE
RAILROAD SPUR
OVERFLOW PARKING
MAIN ACCESS ROAD
SECONDARY ACCESS ROAD
COMBINATION SHOP
PROJECT OFFICE
CHANGE HOUSE
WAREHOUSE
METEOROLOGICAL TOWER
SWITCHYARD
TOWNSHIP RD T438
FENCE
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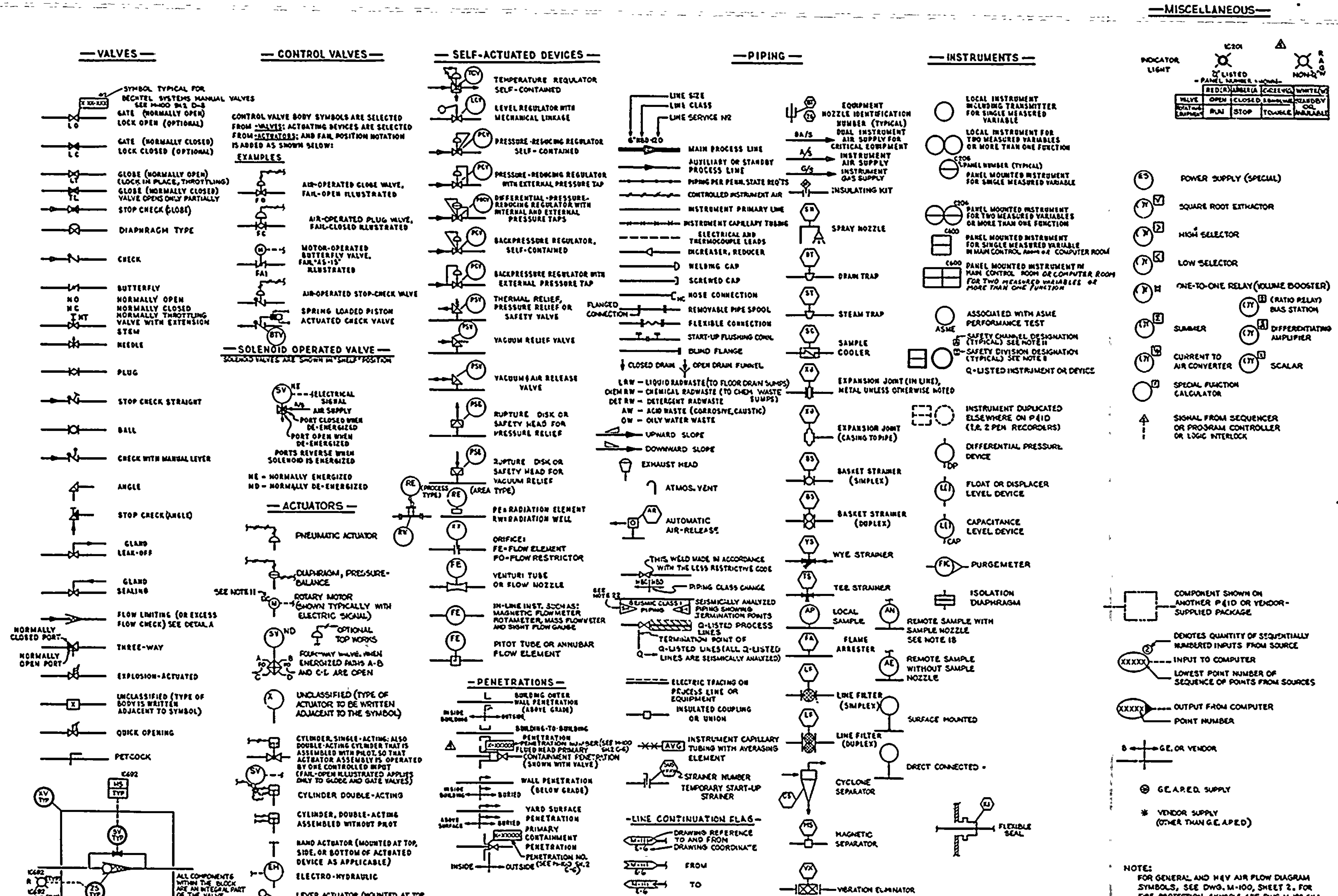

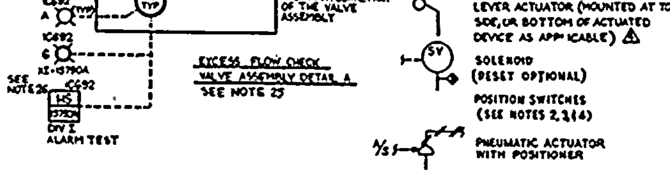

FIRST LETTER: MEASURED VARIABLE	SYMBOL FOR MEASURED VARIABLES	DISPLAY DEVICES: INDICATING	DISPLAY: RECORDING	DISPLAY: INTEGRATING INDICATOR (SEE NOTE 4)	ALARM (SEE NOTE 10): LOW	ALARM: HIGH	ALARM: HIGH-LOW	CONTROLLING DEVICES: INDICATING	CONTROLLING: RECORDING	CONTROLLING: BLIND	CONTROL VALVE	SELF ACTUATED VALVE	DAMPER	SWITCH (SEE NOTE)	SENSING DEVICES: PRIMARY ELEMENT	SENSING: BLIND TRANSMITTER	SENSING: INDICATING TRANSMITTER	LOCAL OBSERVATION GLASS	TEST CONNECTION	CALCULATOR RELAY OR CONVERTER (BLIND)
TYPICAL SYMBOL	( )	( )I	( )R	( )QI	( )AL	( )AH	( )AHL	( )IC	( )RC	( )C	( )V	( )CV	( )D	( )S( )	( )E	( )T	( )IT	( )G	( )P	( )Y
ANALYSIS (SEE NOTE 12)	A	AI	AR		AAL	AAH	AAHL	AIC	ARC	AC	AV			AS( )	AE	AT	AIT		AP	AY
CONDUCTIVITY	C	CI	CR		CAL	CAH	CAHL	CIC	CRC		CV			CS( )	CE	CT	CIT		CP	CY
DENSITY	D	DI	DR		DAL	DAH	DAHL	DIC	RRC		DV			DS( )	DE	DT	DIT		DP	DY
FLOW	F	FI	FR	FQI	FAL	FAH	FAHL	FIC	FRC	FC	FV	FCV	FD	FS( )	FE	FT	FIT	FG	FP	FY
HAND	H							HIC		HC	HV		HD	HS(S)						HY
TIME	K	KI	KR	KQI	KAL	KAH	KAHL	KIC	KRC	KC	KV	KCV	KD	KS( )		KT	KIT			
LEVEL	L	LI	LR		LAL	LAH	LAHL	LIC	LRC	LC	LV	LCV		LS( )	LE	LT	LIT	LG	LP	LY
LEVEL DIFFERENTIAL	LD	LDI	LDR		LDAL	LDAH	LDAHL	LDIC	LDRC	LDC	LDV	LDCV		LDS( )						
MOISTURE or HUMIDITY	M	MI	MR		MAL	MAH	MAHL	MIC	MRC	MC	MV		MD	MS( )	ME	MT	MIT			MY
NEUTRON FLUX	N	NI	NR	NQI	NAL	NAH	NAHL	NIC	NRC	NC				NS( )	NE	NT	NIT		NP	
FLOW DIFFERENTIAL	FD	FDI	FDR		FDAL	FDAH	FDAHL	FDIC	FDRC	FDC				FDS( )		FDT	FDIT			
QUANTITY OR EVENT	Q	QI	QR	QQI	QAL	QAH	QAHL	QIC	QRC	QC	QV			QS( )		QT	QIT			
PRESSURE	P	PI	PR		PAL	PAH	PAHL	PIC	PRC	PC	PV	PCV	△	PS( )	PE	PT	PIT		PP	PY
PRESSURE DIFFERENTIAL	PD	PDI	PDR		PDAL	PDAH	PDAHL	PDIC	PDRC	PDC	PDV	PDCV	PDD	PDS( )		PDT	PDIT			
RADIATION (NUCLEAR)	R	RI	RR	RQI	RAL	RAH	RAHL	RIC	RRC	RC				RS( )	RE	RT	RIT		RP	RY
SPEED	S	SI	SR		SAL	SAH	SAHL	SIC	SRC	SC				SS( )	SE	ST	SIT			SY
TEMPERATURE	T	TI	TR		TAL	TAH	TAHL	TIC	TRC	TC	TV	TCV	TD	TS( )	TE	TT	TIT		TW	TY
															(SEE NOTE 8)				(SEE NOTE 8)	
TEMPERATURE DIFFERENTIAL	TD	TDI	TDR		TDAL	TDAH	TDAHL	TDIC	TDRC	TDC	TDV	TDCV		TDS( )						TDY
VIBRATION	V	VI	VR		VAL	VAH	VAHL	VIC	VRC	VC	VV			VS( )	VE	VT	VIT			VY
WEIGHT FACTOR	W	WI	WR	WQI	WAL	WAH	WAHL	WIC	WRC	WC	WV			WS( )	WE	WT	WIT			WY
UNCLASSIFIED (SEE NOTES)	X	XI	XR	XQI	XAL	XAH	XAHL	XIC	XRC	XC	XV		XD	XS( )	XE	XT	XIT		XP	XY
POSITION	Z	ZI	ZR		ZAL	ZAH	ZAHL	ZIC	ZRC	ZC	ZV			ZS( )	ZE	ZT	ZIT			ZV
	—																			

SCALE NONE — G. WILSON

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BECHTEL – SAN FRANCISCO

FIRE PROTECTION REVIEW REPORT
P & ID-LEGEND & SYMBOLS

JOB No. 8856 — DRAWING No. FIG. 5-1 SHEET 1 OF 3

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EQUIPMENT NUMBERING SYSTEM

SAMPLE: 1P - 101 A
(A)(B) (C) (D)

A. THIS NUMBER IDENTIFIES THE UNIT SERVED BY THE EQUIPMENT AS FOLLOWS:

0 - EQUIPMENT COMMON TO UNITS 1 AND 2
1 - UNIT 1 EQUIPMENT
2 - UNIT 2 EQUIPMENT

B. THIS LETTER CLASSIFIES EQUIPMENT ITEMS BY BASIC TYPES AS FOLLOWS:

A 13.8 & 4.16 KV SWITCHGEAR
B 480 V.C., MCC & DISTRIBUTION PANELS
C CONTROL BOARDS AND LOCAL PANELS
CB COMPONENT BOX
D DC EQUIPMENT
E HEAT EXCHANGERS
F FILTERS AND CLEANING EQUIPMENT (DEMINERALIZERS)
G GENERATORS (TURBINE, DIESEL) AND ASSOCIATED EQUIPMENT
H HOISTS, CRANES
HC HOSE RACK CABINETS
HR HOSE REELS
K AIR COMPRESSORS, CHILLER COMPRESSORS
L [illegible]
M 500KV & 230KV EQUIPMENT
N MISCELLANEOUS
P PUMPS
T TANKS AND PRESSURE VESSELS
V VENTILATION AND AIR CONDITIONING FANS
X TRANSFORMERS
Y 120V AC POWER DISTRIBUTION PANELS
Z COMPUTER EQUIPMENT

C. THIS 3-DIGIT NUMBER DISTINGUISHES IDENTICAL EQUIPMENT ITEMS IN THE SAME SERVICE FROM OTHERS IN THE BASIC EQUIPMENT GROUP. FOR EXAMPLE, ALL CIRCULATING WATER PUMPS WILL HAVE THE SAME NUMBER TO IDENTIFY THEIR UNIQUE SERVICE AND DISTINGUISH THEM FROM ALL OTHER PUMPS.

NUMBERS ARE ASSIGNED ACCORDING TO PLANT AREAS OR NSSS CLASSIFICATION AS FOLLOWS:

001-099	NSSS LOCAL PANELS & RACKS
101-199	TURBINE BUILDING & CONTROL STRUCTURE △
201-299	REACTOR BUILDING
301-399	RADWASTE BUILDING
401-499	PRIMARY CONTAINMENT VESSEL
501-599	MISCELLANEOUS LOCATIONS
601-699	CONTROL ROOM PANELS
801-899	UNCLASSIFIED-AS DEFINED IN EQUIPMENT LIST

UNIT 2 EQUIPMENT WILL HAVE THE SAME 3-DIGIT NUMBER AS UNIT 1 EQUIPMENT IN SIMILAR SERVICE. EQUIPMENT COMMON TO UNIT 1 AND UNIT 2 WILL BE IN THE UNIT 1 EQUIPMENT LIST AND WILL NOT BE DUPLICATED IN THE UNIT 2 EQUIPMENT LIST.

D. THIS LETTER DISTINGUISHES ONE ITEM FROM OTHER DUPLICATE ITEMS OF EQUIPMENT IN THE SAME SERVICE. FOR EXAMPLE, CIRCULATING WATER PUMPS WILL BE DESIGNATED AS A, B, C OR D TO DISTINGUISH THEM FROM EACH OTHER.

EXCEPT WHERE DESIGN CONSIDERATIONS TAKE PRECEDENCE, E.G., TO RETAIN THE CONTINUITY OF FLOW THROUGH AN "A", "B", OR "C" FEEDWATER HEATER TRAIN, EQUIPMENT ITEMS ARE LETTERED IN ALPHABETICAL ORDER AS FOLLOWS:

1. IN ELEVATION FROM TOP TO BOTTOM
2. FROM EAST TO WEST
3. FROM SOUTH TO NORTH
4. FROM NORTH TO SOUTH (UNIT 1 TURBINE BLDG ONLY)

PIPING NUMBERING SYSTEM

LINE CLASS

PIPE AND VALVE CLASSES ARE DESIGNATED BY A THREE-LETTER CODE. THE FIRST LETTER INDICATES THE PRIMARY VALVE AND FLANGE PRESSURE RATING; THE SECOND LETTER, THE TYPE OF MATERIAL; AND THIRD LETTER, THE CODE TO WHICH THE PIPING IS DESIGNED.

PIPING

FIRST LETTER

PRIMARY PRESSURE RATING (Unless otherwise noted, all ratings are in accordance with ANSI B16.5)

A - SPECIFIC PRESSURE AT SPECIFIC TEMPERATURE
B - 2500#
C - 1500#
D - 900#
E - 600#
F - 400#
G - 300#
H - 150#
J - 1350 ANSI B16.1
K - 1750 WOG, W.L.
L - 2500 ANSI B16.1
X - GRAVITY RATING
Y - CRITICAL USE AS DESIGNATED ON PIPING CLASS SHEETS.

SECOND LETTER

MATERIAL

A - ALLOY STEEL
B - CARBON STEEL
C - AUSTENITIC STAINLESS STEEL
D - COPPER, BRASS OR BRONZE
E - COPPER-NICKEL
F - CARBON STEEL-COPPER BEARING
G - CARBON STEEL-LINED
H - CAST IRON
J - CONCRETE
K - VITRIFIED CLAY
L - CARBON STEEL-IMPACT TESTED
M - CAST IRON-HIGH SILICON
N - CARBON STEEL-GALVANIZED
P - CAST IRON-CEMENT LINED
Q - ASBESTOS-CEMENT
R - CARBON STEEL-RHRSW, ESW & SW SYSTEMS

THIRD LETTER

APPLICABLE CODES

A - ASME B&PV CODE, SECT. III, CLASS 1*
B - ASME B&PV CODE, SECT. III, CLASS 2
C - ASME B&PV CODE, SECT. III, CLASS 3
D - POWER PIPING CODE, ANSI B31.1.0
F - NATIONAL FIRE PROTECTION ASSOCIATION CODE
G - UNIFORM PLUMBING CODE
H - ASME B&PV CODE, SECT. I
J - AMERICAN WATER WORKS ASSOCIATION STANDARDS

* PRIMARY PRESSURE RATING IN ACCORDANCE WITH ASME B&PV CODE, SECTION III

SERVICE NUMBER

PIPE LINE IDENTIFICATION NUMBERS (SERVICE NUMBERS) ARE AS FOLLOWS:

	SERVICE
PIPING COMMON TO BOTH UNITS	0-99 AND 3000-3999
PIPING FOR UNIT 1	100-199 AND 1000-1999
PIPING FOR UNIT 2	200-299 AND 2000-2999

DUCT NUMBERING SYSTEM

FIRST LETTER GROUP

LV - LOW VELOCITY
HVM - HIGH VELOCITY, MEDIUM PRESSURE
HVH - HIGH VELOCITY - HIGH PRESSURE
HVNP - HIGH VELOCITY - NEGATIVE PRESSURE

NOTE - FIRST LETTER GROUP REPRESENTS DUCT CONSTRUCTION STANDARDS AS DEFINED BY "SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA)".

SECOND LETTER GROUP

MATERIAL

GS - GALVANIZED STEEL
SS - STAINLESS STEEL
AL - ALUMINUM

THIRD LETTER GROUP

G - GAS TIGHT

EXAMPLE:
HVM - GS - G
G - GAS TIGHT
GS - GALV STEEL
HVM - HIGH VELOCITY, MEDIUM PRESSURE

VALVE NUMBERING SYSTEMS

A. FOR MANUAL VALVES—BECHTEL SYSTEMS

SAMPLE: (INCLUDES BOX) SEE NOTE 27 & SEE M-100 SH1 G-8

1 - 51 - 019

019 - VALVE SEQUENCE NO.
51 - LAST TWO DIGITS OF P&ID NO.
1 - UNIT DESIGNATION:
0: COMMON
1: UNIT 1
2: UNIT 2

B. G.E.—NSSS SYSTEMS

MANUAL VALVES USE G.E. NUMBERING SYSTEM AND ARE SHOWN DIRECTLY WITH THE VALVE.

SAMPLE: F002 SEE NOTE 27

C. REMOTE OR SELF-ACTUATED VALVES

SELF-ACTUATED VALVES AND VALVES WITH OPERATORS WILL HAVE THE SAME NUMBER AS THEIR CORRESPONDING ACTUATOR OR OPERATOR, AND WILL FOLLOW THE INSTRUMENT NUMBERING SYSTEM. SEE H-3 THIS SHEET.

D. FOR VALVE NUMBERS OF MANUAL VALVES INCLUDED IN VENDOR SUPPLIED PACKAGES REFER TO APPROPRIATE VENDOR DRAWINGS.

REACTOR PRIMARY CONTAINMENT PENETRATION NUMBERING SYSTEM

SAMPLE: (INCLUDES BOX) △

X - 040A - 3

3 - I.D. NUMBER OF INSTRUMENT LINE PASSING THROUGH PENETRATION (FOR INSTRUMENT PENETRATIONS ONLY)
040A - PENETRATION I.D. NUMBER
X - DENOTES PRIMARY CONTAINMENT PENETRATION

INSTRUMENT NUMBERING SYSTEM

BOP SYSTEMS:

LAH 00701A

LAH - SEE TABLE ON SHEET 1
A - LETTER DIFFERENTIATING SIMILAR LOOPS AND/OR COMPONENTS
01 - INSTR. AND/OR LOOP NUMBER
07 - LAST 2 DIGITS OF P&ID NO. (E.G., "07" FOR P&ID M-107)
0 - UNIT DESIGNATION:
0 = COMMON
1 = UNIT 1
2 = UNIT 2

GE-NSS SYSTEMS (COVERS ONLY INSTRUMENTS LISTED IN MPL. OTHER INSTRUMENTS ARE NUMBERED SAME WAY AS BOP SYSTEMS)

B-21 LAH 1N001A

LAH - SEE TABLE ON SHEET 1
A - LETTER DIFFERENTIATING SIMILAR LOOPS AND/OR COMPONENTS
N001 - G.E. NUMBER PER MPL (GE DOCUMENT NO. 236X3500AE)
1 - UNIT DESIGNATION:
0 = COMMON
1 = UNIT 1
2 = UNIT 2
B-21 - G.E. SYSTEM IDENTIFICATION. THIS NUMBER APPEARS IN THE NOTES OF EACH P&ID AND APPLIES TO EACH INSTRUMENT ON GE MPL

HEATING AND VENTILATING AIR FLOW AND CONTROL DIAGRAM DUCT & INSTRUMENTATION SYMBOLS

XO - SEE SHEET 1 FOR MEASURED VARIABLE (TYPICAL)
( )O - AIR OPERATED DAMPER FAIL-OPEN ILLUSTRATED
FO

XOM - MOTOR OPERATED DAMPER FAIL-CLOSED ILLUSTRATED
( )O
FC

XO - HAND CONTROLLED DAMPER

BDD - BACKDRAFT ISOLATION DAMPER

Q-LISTED DUCT
TERMINATION POINT OF Q LISTED DUCT.

LV-GS-G | LV-SS-G - DUCTWORK CLASS AND/OR MATERIAL CHANGE

AIR FLOW-NOT DUCTED
SUPPLY AIR
RETURN OR EXHAUST AIR
AIR FLOW THRU LIGHT FIXTURE
CVR - CONSTANT VOLUME REGULATORS
BPL - BAFFLE PLATE
BALANCING DAMPER (BD)
BACK DRAFT DAMPER (BDD)
FPD - FIRE PROTECTION DAMPER
MOD - MOTOR OPERATED DAMPER
AOD - AIR OPERATED DAMPER
ISOLATION DAMPER
PSD - PRESSURE RELIEF DAMPER

CFM	CUBIC FEET PER MINUTE
OA	OUTSIDE AIR
SA	SUPPLY AIR
RA	RETURN AIR
EA	EXHAUST AIR

NOTES

1. ALL HAND SWITCHES SHALL HAVE PILOT LIGHT INDICATION WITH THE SWITCH; NO SYMBOL IS REQUIRED ON THE P&ID TO DENOTE THIS REQUIREMENT.
2. ALL MOTOR-OPERATED VALVES AND SOLENOID-OPERATED PNEUMATIC VALVES SHALL HAVE POSITION SWITCHES. NO SYMBOL IS REQUIRED ON THE P&ID TO DENOTE THIS REQUIREMENT. (ALL AIR OPERATED MODULATING VALVES SHALL BE EQUIPPED WITH POSITIONERS.)
3. RED AND AMBER VALVE POSITION INDICATING LIGHTS WILL BE MOUNTED ON THE SAME PANEL WITH THE HAND SWITCH CONTROLLING THE VALVE.
4. ALL POSITION SWITCHES WILL BE LISTED AND IDENTIFIED IN THE INSTRUMENT INDEX.
5. "X" IS USED TO REPRESENT ANY "SPECIAL" VARIABLES AND MAY BE DEFINED AS REQUIRED. EXAMPLES: XR = MASS FLOW RECORDER, XAH-OVERLOAD ALARM
6. WHEN "Q" IS USED AS A SECOND OR SUCCEEDING LETTER, IT DENOTES AN INTEGRATING MODIFIER. FOR EXAMPLE, "FQI" IS AN INDICATING FLOW INTEGRATOR (OR TOTALIZER). "J" IS FOR SCANNING.
7. SWITCH FUNCTIONS MAY BE FURTHER MODIFIED BY "L" FOR LOW AND "H" FOR HIGH. I.E., PSL, LSH. "HSS" MAY BE USED TO DESIGNATE: "HAND SWITCH SELECT."
8. "TW" DENOTES AN EMPTY THERMOWELL. "TE" DENOTES A THERMOWELL WITH THERMOCOUPLE OR RESISTANCE BULB AND HEAD SUITABLE FOR CONNECTION TO ANOTHER INSTRUMENT. "TP" IS A WELL-LESS TW.
9. INSTRUMENT IDENTIFICATIONS ARE BASED UPON ISA STANDARD "S5.1".
10. HIGH-HIGH ALARMS WILL BE DESIGNATED "(I)AHH" AND LOW-LOW ALARMS "(I)ALL." FOR EXAMPLE: LAHH DENOTES "HIGH-HIGH LEVEL ALARM."
11. MOTOR AND SOLENOID OPERATED VALVES ARE POWERED FROM THE NORMAL A.C. SUPPLY. WHEN SPECIFICALLY DESIGNATED AS [illegible] STANDBY A.C. POWER SUPPLY IS REQUIRED. WHEN DESIGNATED [illegible] ETC. D.C. POWER SUPPLY IS REQUIRED.
12. A( )Y IS USED FOR ALL ANALYTICAL VARIABLES, E.G., O_2, CO_2, pH, ETC.
13. FOR THREE-WAY VALVE NOTATION FOR SOLENOID VALVES, SEE DWG. NO. M-100, SHEET 1 - SOLENOID OPERATED VALVE.
14. FOR FIRE PROTECTION SYMBOLS, SEE DWG. NO. M-122, SHEET 1.
15. ALL PNEUMATIC VALVES INSIDE CONTAINMENT OPERATE FROM THE CONTAINMENT INSTRUMENT GAS SYSTEM (SEE DWG. NO. M-126).
16. ALL INSTRUMENT LINES CONNECTED TO Q-LISTED DUCTING & PROCESS LINES ARE ALSO Q-LISTED. Q DESIGNATION FOR INSTRUMENT LINES IS NOT SHOWN ON P&ID'S.
17.
18. ROOT VALVES ARE NOT SHOWN ON P&ID - SEE PIPING DETAIL ON SHEET 1 OF P&ID M-123.
19. ELECTRONIC INSTRUMENTATION IS POWERED AS SHOWN ON INSTRUMENT LOOP DIAGRAMS, EXCEPT NSSS INSTRUMENTATION WHICH IS SHOWN ON ELECTRICAL SCHEMATIC DIAGRAMS.
20. "( )Z" IS A FINAL CONTROL ELEMENT, I.E. TZ, HEATER ELEMENT, ETC.
21. "I( )" IS USED FOR A CURRENT DEVICE, I.E. ISH - HIGH CURRENT SWITCH.
22. THIS SYMBOL WILL ONLY BE SHOWN FOR NON Q-LISTED LINES WHICH REQUIRE SEISMIC ANALYSIS. (SHEET 1, D-4)
23. FOR POWER SUPPLY ASSIGNMENTS FOR THE BALANCE OF PLANT ANALOG LOOPS REFER TO DRAWING 8856-J-655.
24. P&ID'S ARE NUMBERED AS FOLLOWS, M-1XX FOR UNIT 1 & COMMON SYSTEMS AND M-21XX FOR UNIT 2 SYSTEMS. HVAC CONTROL DIAGRAMS ARE NUMBERED VC-1XX OR VC-21XX. UNIT 2 DRAWINGS ARE LISTED IN THE DRAWING CONTROL.
25. REFER TO J-157 FOR TABULATION OF EXCESS FLOW CHECK VALVES AND ASSOCIATED COMPONENTS.
26. SWITCH HS-157908 AND INDICATOR XI-157908 ARE FOR TEST AND ALARM INDICATION OF DIV. I. (SH.1, B-8)
27. MANUAL VALVES NUMBERED BY THIS SYSTEM, WHICH ARE LOCATED IN "Q" LINES, ARE Q. FURTHER "Q" DESIGNATION OF THE NUMBER IS NOT NEEDED. △
28. REFER TO J-6100 FOR SPECIFICATION OF INSTRUMENT VALVES, FIVE-VALVE MANIFOLDS, TUBING AND TUBE FITTINGS.
29. DERIVED ALARMS ARE SHOWN ON LOGIC DIAGRAMS AND NOT ON THE P&ID'S UNLESS NOTED OTHERWISE ON THE P&ID

SCALE NONE	DRAWN G. WILSON	CHECKED	

PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION - UNIT 1, UNIT 2

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FIRE PROTECTION REVIEW REPORT
P & ID-LEGEND & SYMBOLS

JOB No.	DRAWING No.
8856	FIG. 5-2 SHEET 2 OF 3

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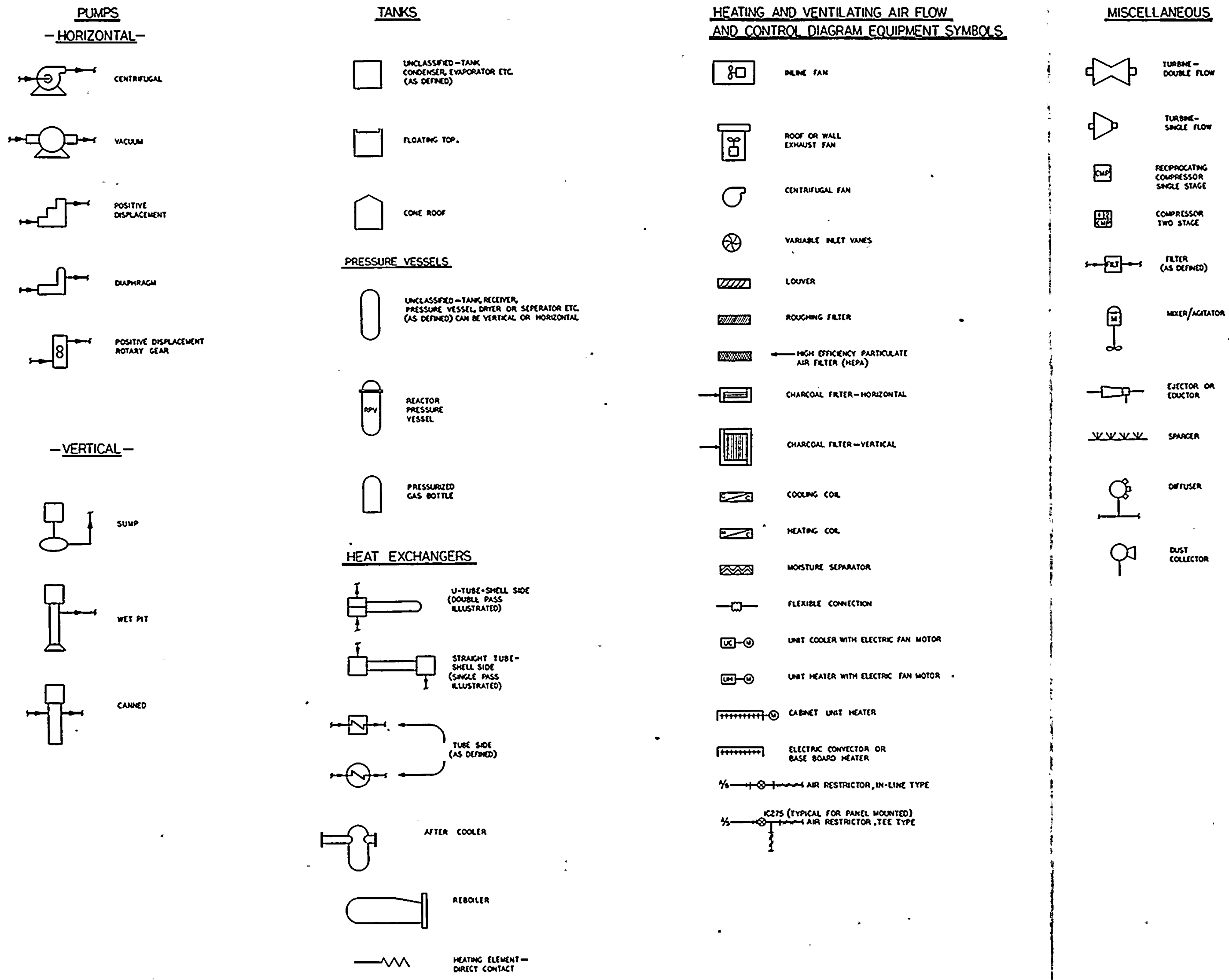

NOTE:

PIPING, DETAIL & SIZE MAY BE REFINED AS NECESSARY TO SHOW ACCURATE INFORMATION REQUARDING FLOW & INSTRUMENTATION ONLY. DETAILS OF EQUIPMENT APPEAR ON VENDORS DRAWINGS.

NONE | G. WILSON | A. KATANIC

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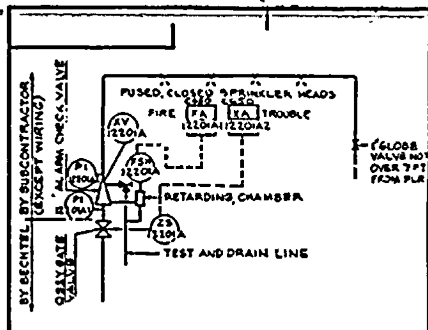
FIRE PROTECTION REVIEW REPORT
P & ID-LEGEND & SYMBOLS

8856

FIG. 5-3
SHEET 3 OF 3

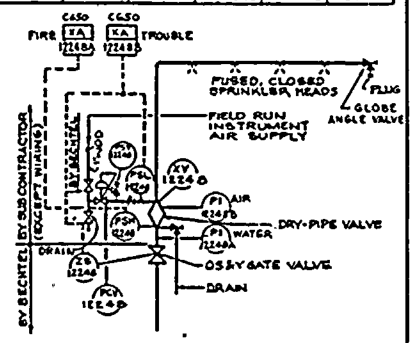


TYPICAL WET PIPE SPRINKLER SYSTEM

TURBINE BUILDING			
AREA	ELEV	SYSTEM NO	INSTR. NO
CONDENSER AREA	655'-0"	WPS-111	--12201A
CONDENSER GALLERY	675'-0"	WPS-121	--12201B
CONDENSER MEZZANINE	699'-0"	WPS-131	--12201C
CONDENSER AREA	656'-0"	WPS-211	--22201A
CONDENSER GALLERY	676'-0"	WPS-221	--22201B
CONDENSER MEZZANINE	699'-0"	WPS-231	--22201C
RADWASTE BUILDING			
LAUNDRY & DECON. ROOM	691'-6"	WPS-041	--02203
CONTROL STRUCTURE			
CENTRAL ACCESS CONTROL	676'-0	WPS-029	--02204
CIRCULATING WATER PUMPHOUSE			
DIESEL FIRE PUMP ROOM	676'-0"	WPS-012	--02205

O.S.&Y GATE VALVE NUMBERS

SYST NO.	VALVE NO.	SYST. NO.	VALVE NO.	SYST. NO.	VALVE NO.
WPS-111	1-22-005	WPS-211	2-22-006	WPS-041	0-22-043
WPS-121	1-22-012	WPS-221	2-22-012	WPS-029	0-22-012
WPS-131	1-22-022	WPS-231	2-22-023	WPS-012	0-22-010

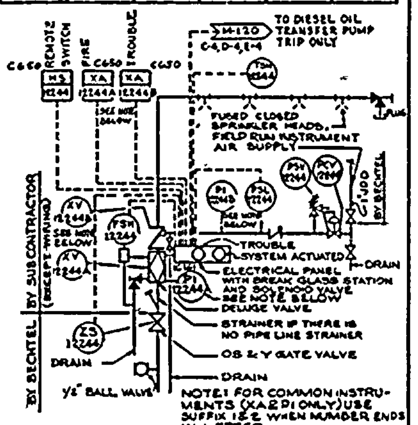


TYPICAL DRY PIPE SPRINKLER SYSTEM

TURBINE BUILDING			
AREA	ELEV	SYS. No	INST. No
CENTRAL AREA	676'-0"	DPS-021	--02248
NORTH RAILROAD BAY	676'-0"	DPS-121	--12240
SOUTH RAILROAD BAY	676'-0"	DPS-221	--22248
REACTOR BUILDING			
RAILROAD AIR LOCK	670'-0"	DPS-122	--12249
TRUCK AIR LOCK	670'-0"	DPS-222	--22249

O.S.&Y GATE VALVE NUMBERS

SYST. NO	VALVE NO	SYST. NO	VALVE NO	SYST. NO	VALVE NO
DPS-121	1-22-011	DPS-122	1-22-018	DPS-021	0-22-062
DPS-221	2-22-011	DPS-222	2-22-018		

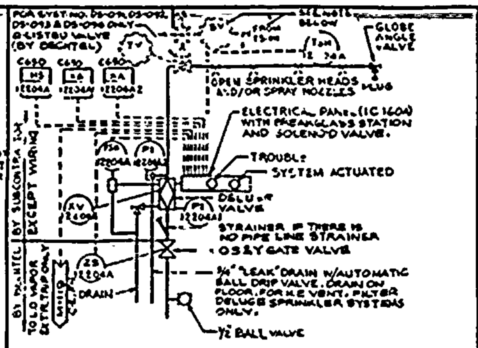


TYPICAL PRE-ACTION SYSTEM

TURBINE BUILDING				
AREA	ELEV.	SYS. NO		INST NO.
TURB. GEN. BEARINGS	729'-0"	PA-141	1C161	--12244
TURB. GEN BEARINGS	729'-0"	PA-241	2C161	--22244
CONTROL STRUCTURE				
LOWER CABLE SPREAD RM	714'-0"	PA-142	1C685	--12245
LOWER CABLE SPREAD RM	714'-0"	PA-242	2C685	--22245
UPPER CABLE SPREAD RM	754'-0"	PA-161	1C686	--12246
UPPER CABLE SPREAD RM	754'-0"	PA-261	2C686	--22246
STAND-BY DIESEL GENERATOR BLDG.				
DIESEL GEN. ROOM	679'-0"	PA-011	0C508A	--02247A
DIESEL GEN. ROOM	679'-0"	PA-012	0C508A	--02247B
DIESEL GEN. ROOM	679'-0"	PA-013	0C508A	--02247C
DIESEL GEN. ROOM	679'-0"	PA-014	0C508A	--02247D

O.S.&Y GATE VALVE NUMBERS

SYST. NO.	VALVE NO.	SYST. NO.	VALVE NO.	SYST. NO.	VALVE NO.
PA-141	1-22-032	PA-161	1-22-061	PA-013	0-22-006
PA-241	2-22-032	PA-261	2-22-061	PA-014	0-22-007
PA-142	1-22-033	PA-011	0-22-004		
PA-242	2-22-033	PA-012	0-22-005		



TYPICAL DELUGE SPRINKLER SYSTEM

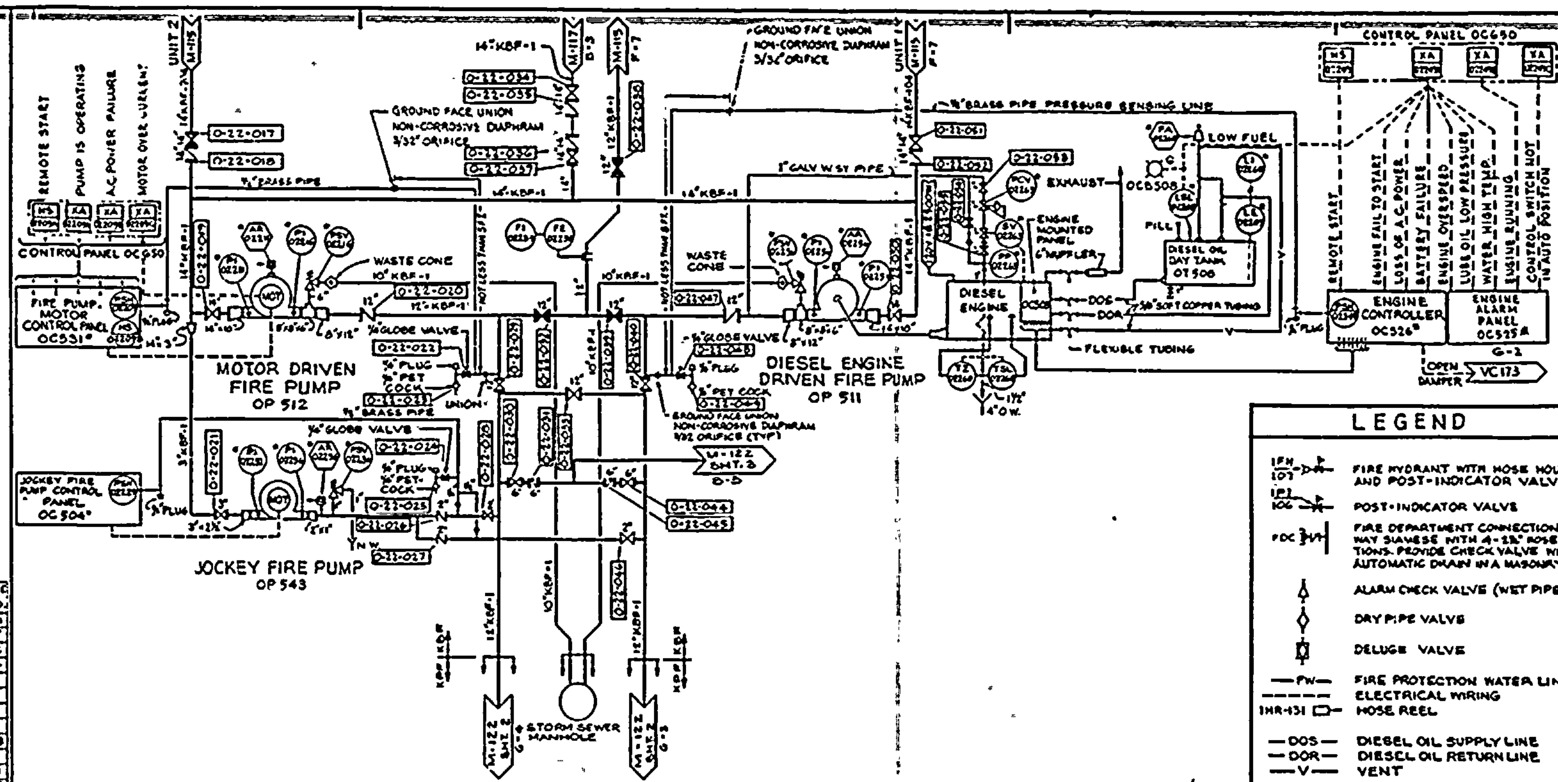
TURBINE BUILDING					OS&Y GATE
AREA	ELEV.	SYS. NO.	CONTROL PANEL NO.	INST. NO.	VALVE NO.
R.F.P. LUBE OIL RES.	656'-0"	DS-111	1C160A	--12204A	1-22-008
R.F.P. LUBE OIL RES.	656'-0"	DS-112	1C160A	--12204B	1-22-007
R.F.P. LUBE OIL RES.	656'-0"	DS-113	1C160A	--12204C	1-22-006
LUBE OIL COND. RM.	656'-0"	DS-114	1C160D	--12204D	1-22-004
TURB. LUBE OIL RES.	699'-0"	DS-131	1C160H	--12204H	1-22-021
H_2 SEAL OIL UNIT	699'-0"	DS-132	1C160I	--12204I	1-22-023
MOTOR GEN. SETS	729'-0"	DS-141	1C160J	--12204J	1-22-031
H&V FILTER 1F158A	762'-0"	DS-151	1C160K	--12204K	1-22-041
H&V FILTER 1F158B	762'-0"	DS-152	1C160K	--12204L	1-22-042
R.F.P. LUBE OIL RES.	656'-0"	DS-211	2C160A	--22204A	2-22-009
R.F.P. LUBE OIL RES.	656'-0"	DS-212	2C160A	--22204B	2-22-006
R.F.P. LUBE OIL RES.	656'-0"	DS-213	2C160A	--22204C	2-22-007
LUBE OIL COND. RM.	656'-0"	DS-214	2C160D	--22204D	2-22-005
TURB. LUBE OIL RES.	699'-0"	DS-231	2C160H	--22204H	2-22-021
H_2 SEAL OIL UNIT	699'-0"	DS-232	2C160I	--22204I	2-22-022
MOTOR GEN. SETS	729'-0"	DS-241	2C160J	--22204J	2-22-031
H&V FILTER 2F158A	762'-0"	DS-251	2C160K	--22204K	2-22-041
H&V FILTER 2F158B	762'-0"	DS-252	2C160K	--22204L	2-22-042
REACTOR BUILDING					
HPCI PUMP LUBE OIL TK.	645'-0"	DS-115	1C218A	--12242A	1-22-016
RCIC PUMP LUBE OIL TK.	645'-0"	DS-116	1C218B	--12242B	1-22-017
H&V FILTER 1F257A	799'-0"	DS-181	1C218C	--12242C	1-22-081
H&V FILTER 1F257B	799'-0"	DS-182	1C218C	--12242D	1-22-082
H&V FILTER 1F217A	799'-0"	DS-183	1C218C	--12242E	1-22-083
H&V FILTER 1F217B	799'-0"	DS-184	1C218C	--12242F	1-22-084
HPCI PUMP LUBE OIL TK.	645'-0"	DS-215	2C218A	--22242A	2-22-016
RCIC PUMP LUBE OIL TK.	645'-0"	DS-216	2C218B	--22242B	2-22-017
H&V FILTER 2F257A	799'-0"	DS-281	2C218C	--22242C	2-22-081
H&V FILTER 2F257B	799'-0"	DS-282	2C218C	--22242D	2-22-082
H&V FILTER 2F217A	799'-0"	DS-283	2C218C	--22242E	2-22-083
H&V FILTER 2F217B	799'-0"	DS-284	2C218C	--22242F	2-22-084
RADWASTE BUILDING					
H&V FILTER OF 359	646'-0"	DS-011	0C332A	--02206A	0-22-011
H&V FILTER (FUTURE)	691'-0"	DS-041	0C332B	--02206B	0-22-041
H&V FILTER (FUTURE)	691'-0"	DS-042	0C332C	--02206C	0-22-042
CONTROL STRUCTURE					
H&V FILTER OF135	676'-0"	DS-021	0C501A	--02207A	0-22-013
H&V FILTER OF138	676'-0"	DS-022	0C501A	--02207B	0-22-014
H&V FILTER OF141	676'-0"	DS-023	0C501A	--02207C	0-22-015
H&V FILTER OF146	676'-0"	DS-024	0C501A	--02207D	0-22-016
H&V FILTER OF129A	806'-0"	DS-091	0C501E	--02207E	0-22-091
H&V FILTER OF125B	806'-0"	DS-092	0C501E	--02207F	0-22-092
H&V FILTER OF169A	806'-0"	DS-093	0C501E	--02207G	0-22-093
H&V FILTER OF169B	806'-0"	DS-094	0C501E	--02207H	0-22-094
		YARD			
TRANS. 1X-101	676'-0"	DS-117	1C502A	--12243A	1-22-001
TRANS. 1X-102	676'-0"	DS-118	1C502A	--12243B	1-22-002
TRANS. 1X-105	676'-0"	DS-119	1C502A	--12243C	1-22-003
TRANS. 0X-103	676'-0"	DS-014	0C502A	--02243A	0-22-008
TRANS. 2X-101A	676'-0"	DS-217	2C502A	--22243A	2-22-004
TRANS. 2X-101B	676'-0"	DS-218	2C502A	--22243B	2-22-003
TRANS. 2X-101C	676'-0"	DS-219	2C502A	--22243C	2-22-002
TRANS. 2X-105	676'-0"	DS-210	2C502A	--22243D	2-22-001
TRANS. 0X-104	676'-0"	DS-015	2C502A	--02243B	0-22-001
TRANS. 0X-201	676'-0"	DS-016	0C502C	--02243C	0-22-002
TRANS. 0X-203	676'-0"	DS-017	0C502D	--02243D	0-22-003
HYDROGEN TANKS	676'-0"	DS-018	0C502E	--02243E	0-22-009
TRANS. 0X-501	526'-0"	DS-013	0C505	--02244A	0-22-059
TRANS. 0X-502	526'-0"	DS-012	0C505	--02244B	0-22-060
PRE-ACTION SYSTEM (CONTINUED)					
TURBINE BUILDING					
R.F.P. ROOM	676'-0"	PA-121	1C160E	--12205A	1-22-013
R.F.P. ROOM	676'-0"	PA-122	1C160E	--12205B	1-22-014
R.F.P. ROOM	676'-0"	PA-123	1C160E	--12205C	1-22-015
R.F.P. ROOM	676'-0"	PA-221	2C160E	--22205A	2-22-013
R.F.P. ROOM	676'-0"	PA-222	2C160E	--22205B	2-22-014
R.F.P. ROOM	676'-0"	PA-223	2C160E	--22205C	2-22-015

NOTES:

SYSTEM NO'S. DS-091, DS-092, DS-093 & DS094 WILL HAVE Q-LISTED TSHH. ALL OTHER H&V FILTER DELUGE SYSTEMS WILL HAVE NONE Q-LISTED TSHH. ALL OTHER DELUGE SYSTEMS WILL HAVE TSH.

SYSTEM NUMBERING METHOD

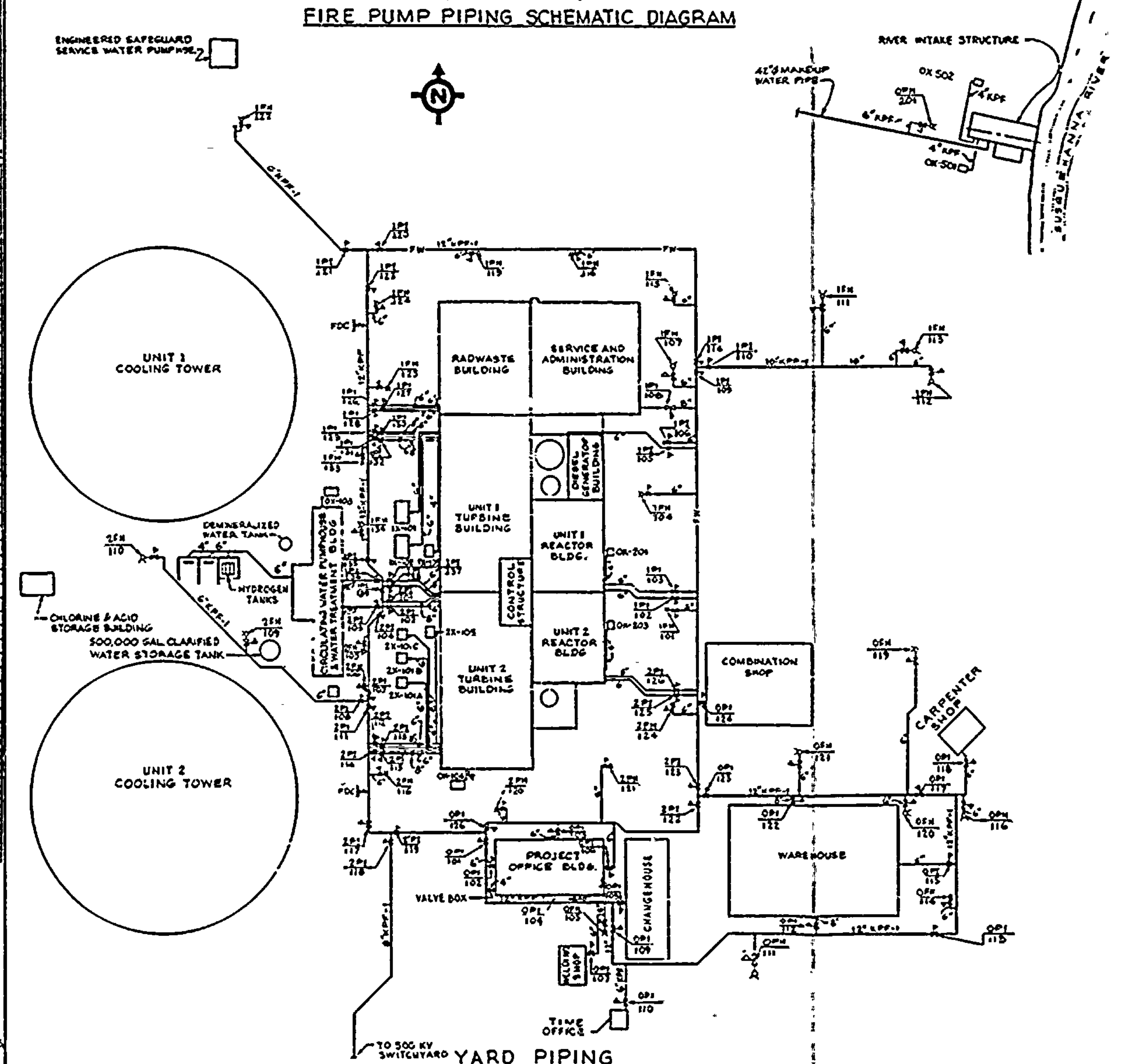
A. LETTER PORTION INDICATES SYSTEM TYPE.
   WPS. - WET PIPE SPRINKLER
   DPS. - DRY PIPE SPRINKLER
   PA - PRE-ACTION
   DS - DELUGE SPRINKLER
B. FIRST NUMBER INDICATES PLANT UNIT NUMBER 1 FOR UNIT 1, 2 FOR UNIT 2 AND 0 FOR BUILDINGS COMMON TO BOTH UNITS
C. SECOND NUMBER INDICATES FLOOR LEVEL
D. THIRD NUMBER INDICATES THE SYSTEM NUMBER FOR THAT FLOOR LEVEL.



FIRE PUMP PIPING SCHEMATIC DIAGRAM

LEGEND

- FIRE HYDRANT WITH HOSE HOUSE AND POST-INDICATOR VALVE
- POST-INDICATOR VALVE
- FDC — FIRE DEPARTMENT CONNECTION, FOUR-WAY SIAMESE WITH 4-2 1/2" HOSE CONNECTIONS. PROVIDE CHECK VALVE WITH AN AUTOMATIC DRAIN IN A MASONRY PIT.
- ALARM CHECK VALVE (WET PIPE SPRINKLER)
- DRY PIPE VALVE
- DELUGE VALVE
- —FW— FIRE PROTECTION WATER LINE
- ELECTRICAL WIRING
- HR-131 — HOSE REEL
- —DOS— DIESEL OIL SUPPLY LINE
- —DOR— DIESEL OIL RETURN LINE
- —V— VENT



YARD PIPING

SCALE NONE	DESIGNED S.FLORES	DRAWN S.F.			

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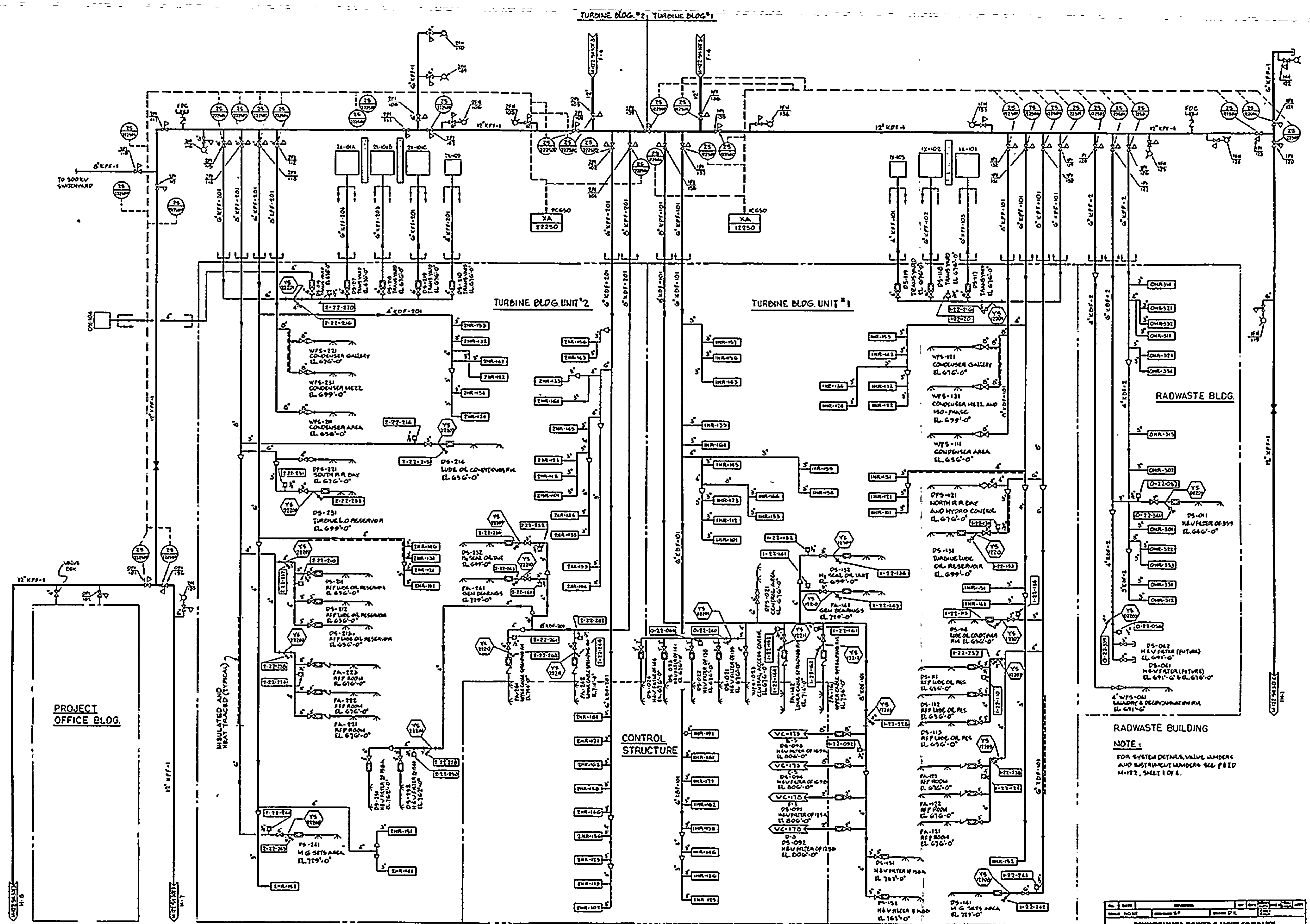
FIRE PROTECTION REVIEW REPORT
P&ID - FIRE PROTECTION
YARD PIPING, LEGEND AND DETAILS

JOB No.	DRAWING No.
8856	FIG. 5-4 SHEET 1 OF 4

1/78

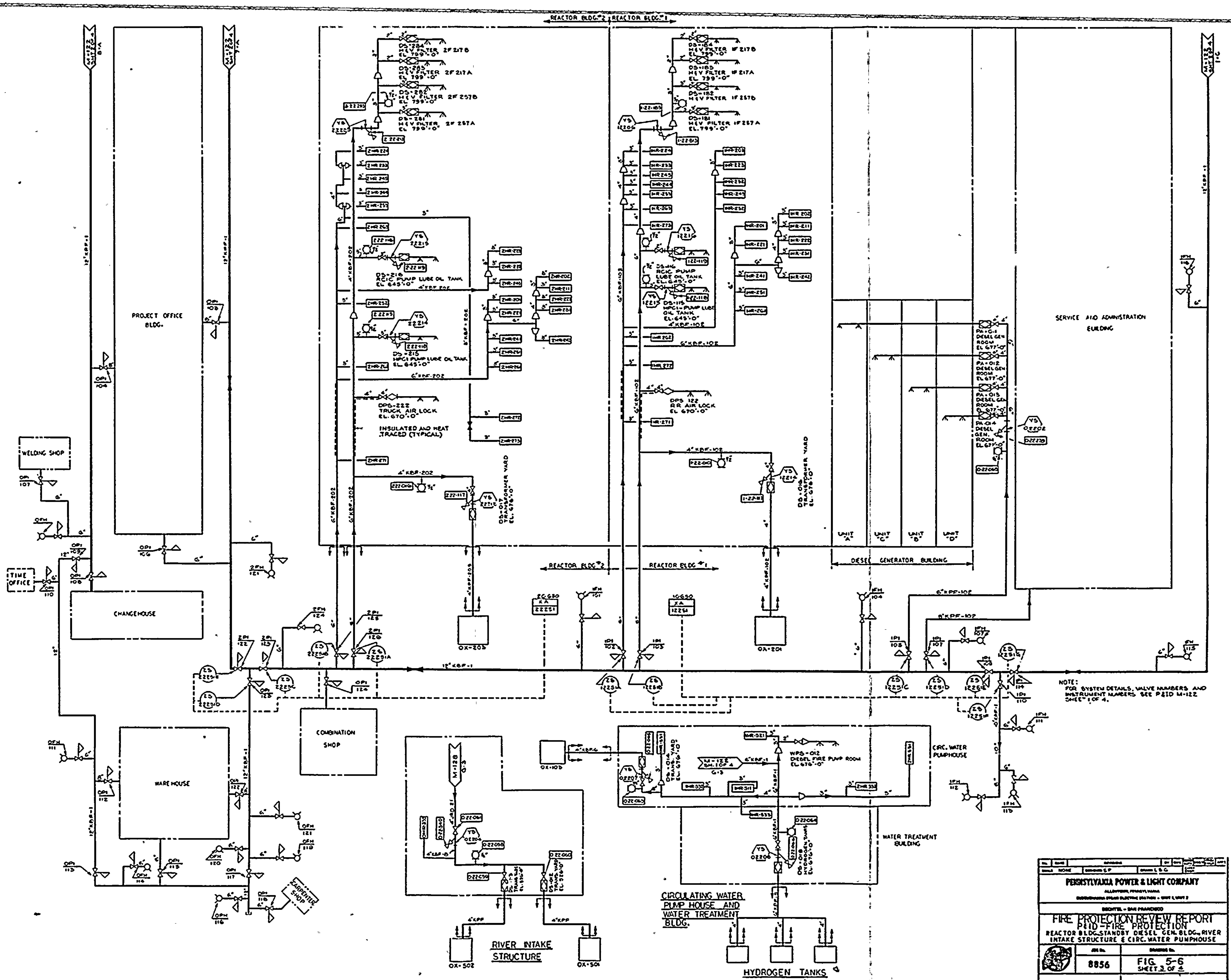


PENNSYLVANIA POWER & LIGHT COMPANY

SCALE NONE

FIRE PROTECTION REVEW REPORT
P&ID - FIRE PROTECTION
TURBINE BLDG., CONTROL STRUCTURE, AND RADWASTE BLDG.

JOB No.	DRAWING No.
8856	FIG. 5-5 SHEET 2 OF 4



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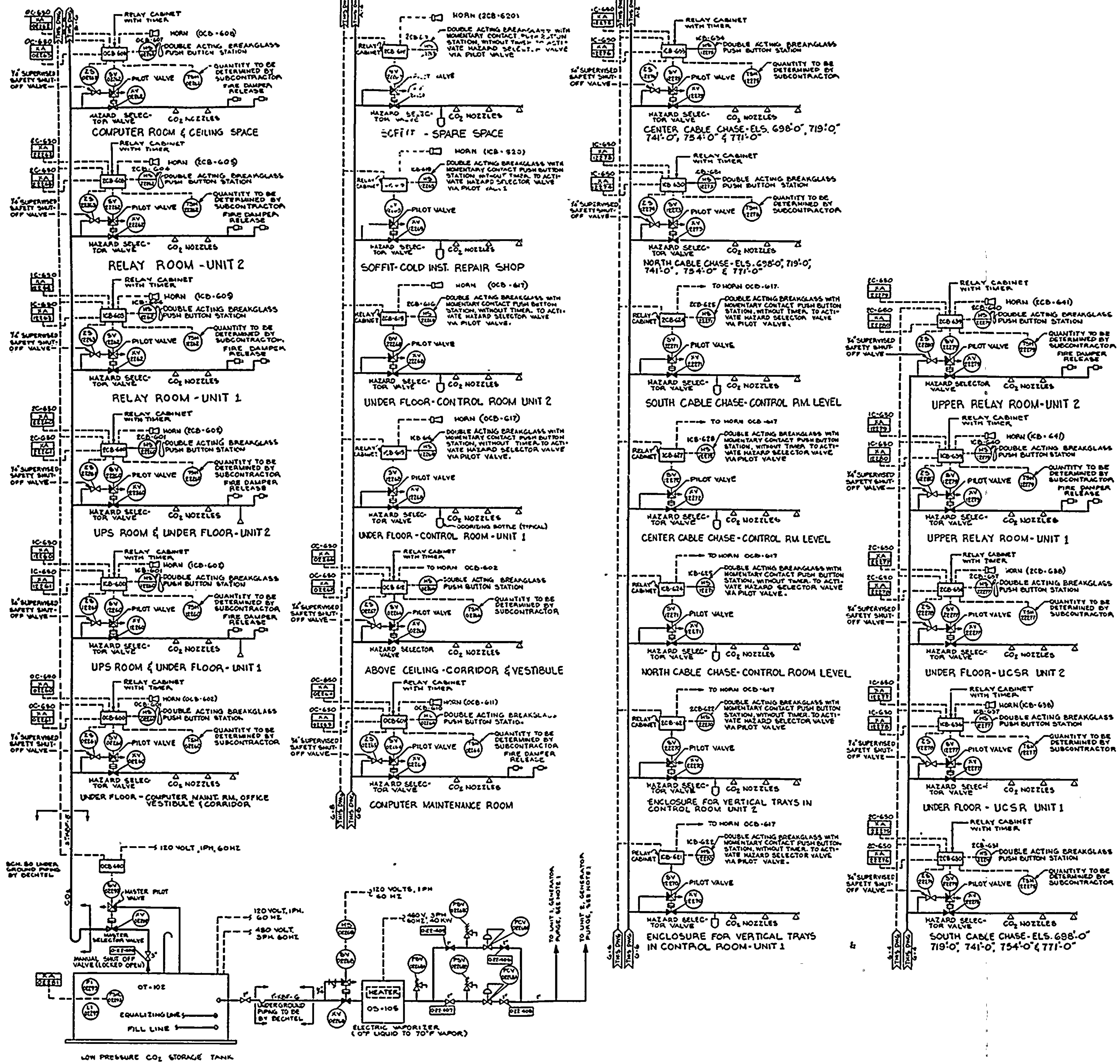
FIRE PROTECTION REVIEW REPORT
P&ID – FIRE PROTECTION
REACTOR BLDG., STANDBY DIESEL GEN. BLDG., RIVER INTAKE STRUCTURE & CIRC. WATER PUMPHOUSE

Scale: NONE

8856

FIG. 5-6
SHEET 3 OF 4



CARBON DIOXIDE FIRE PROTECTION & GENERATOR PURGE SYSTEM

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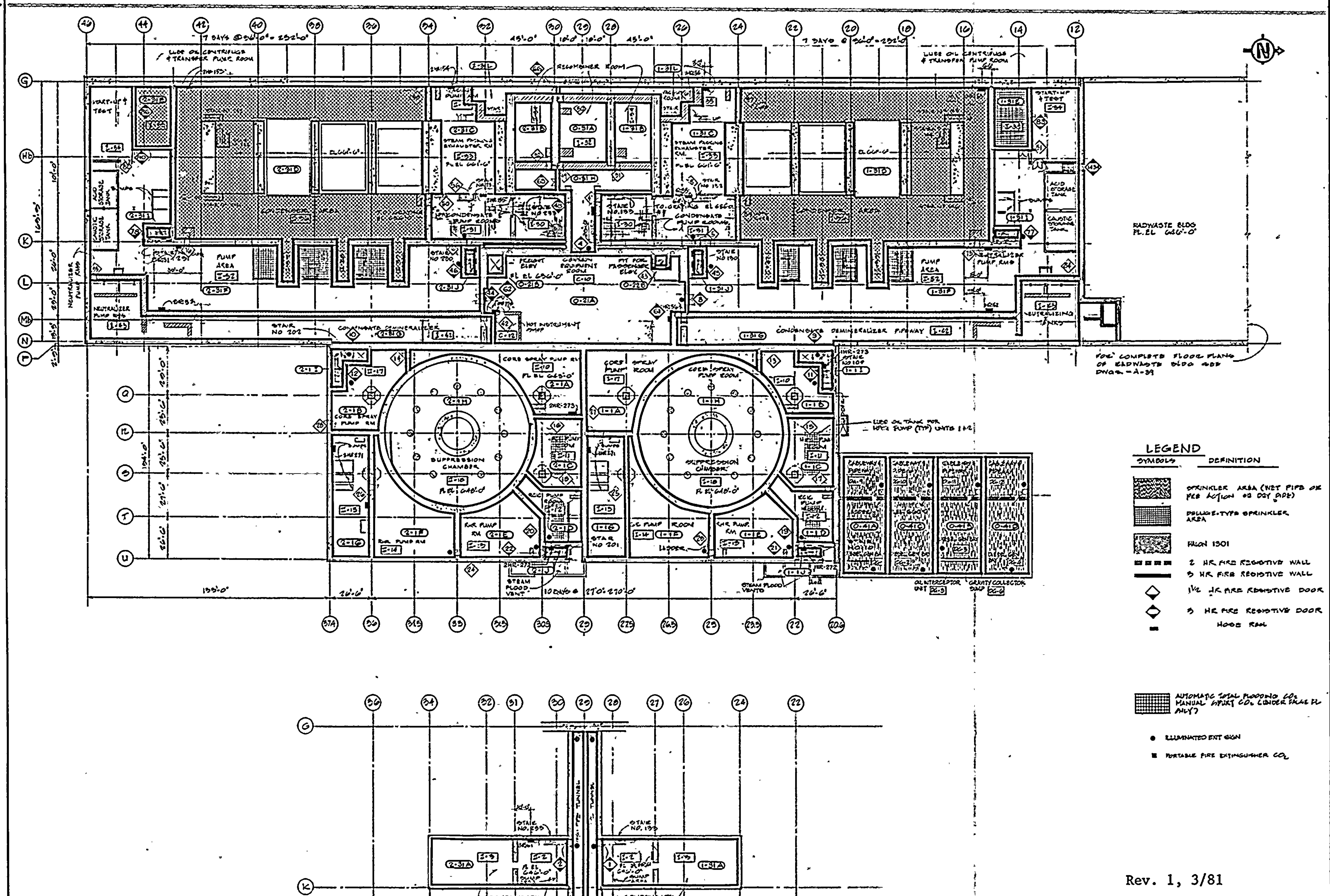
FIRE PROTECTION REVIEW REPORT
P&ID - FIRE PROTECTION
CARBON DIOXIDE SYSTEMS

JOB No. 8856

DRAWING No. FIG. 5-7
SHEET 4 OF 4



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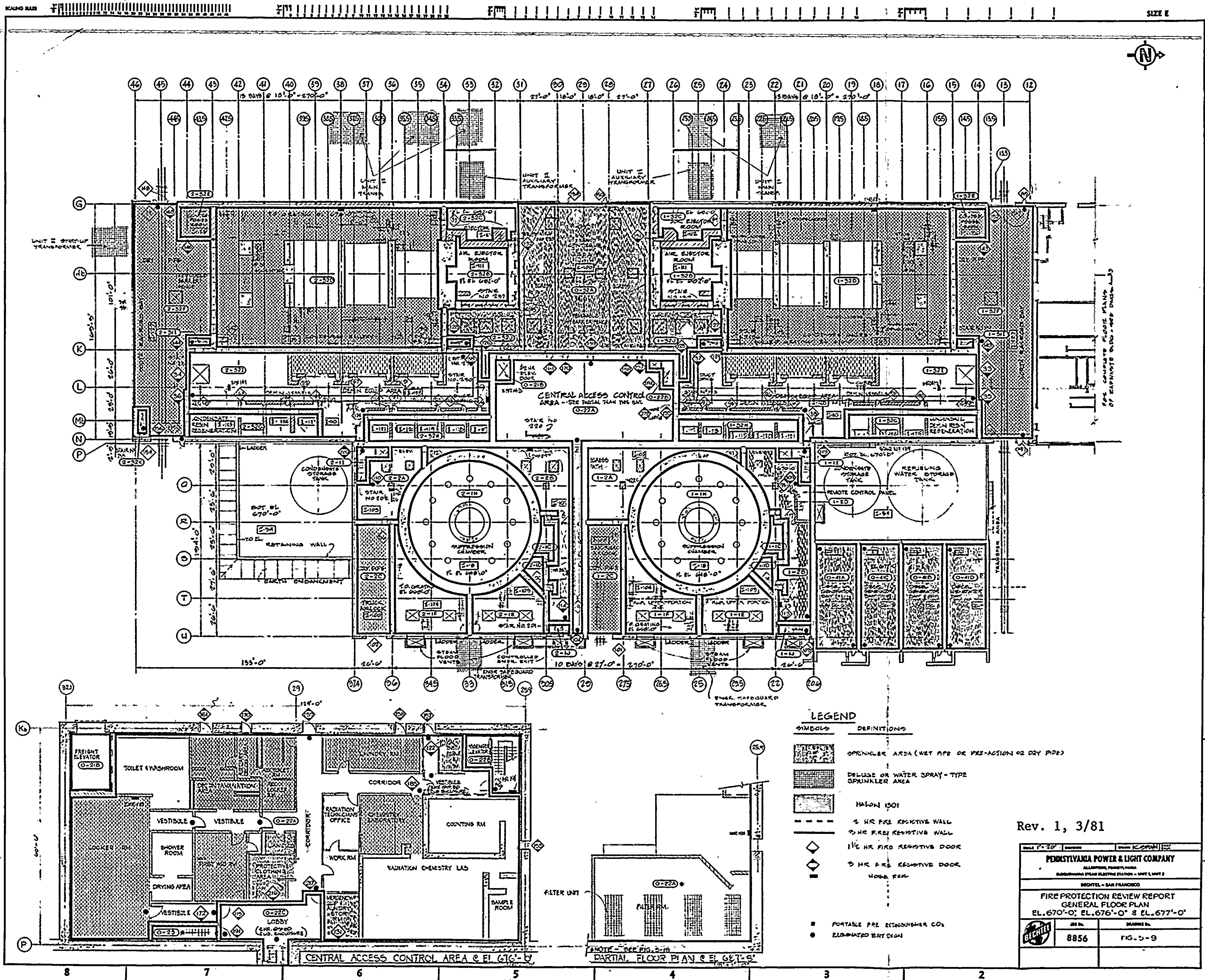
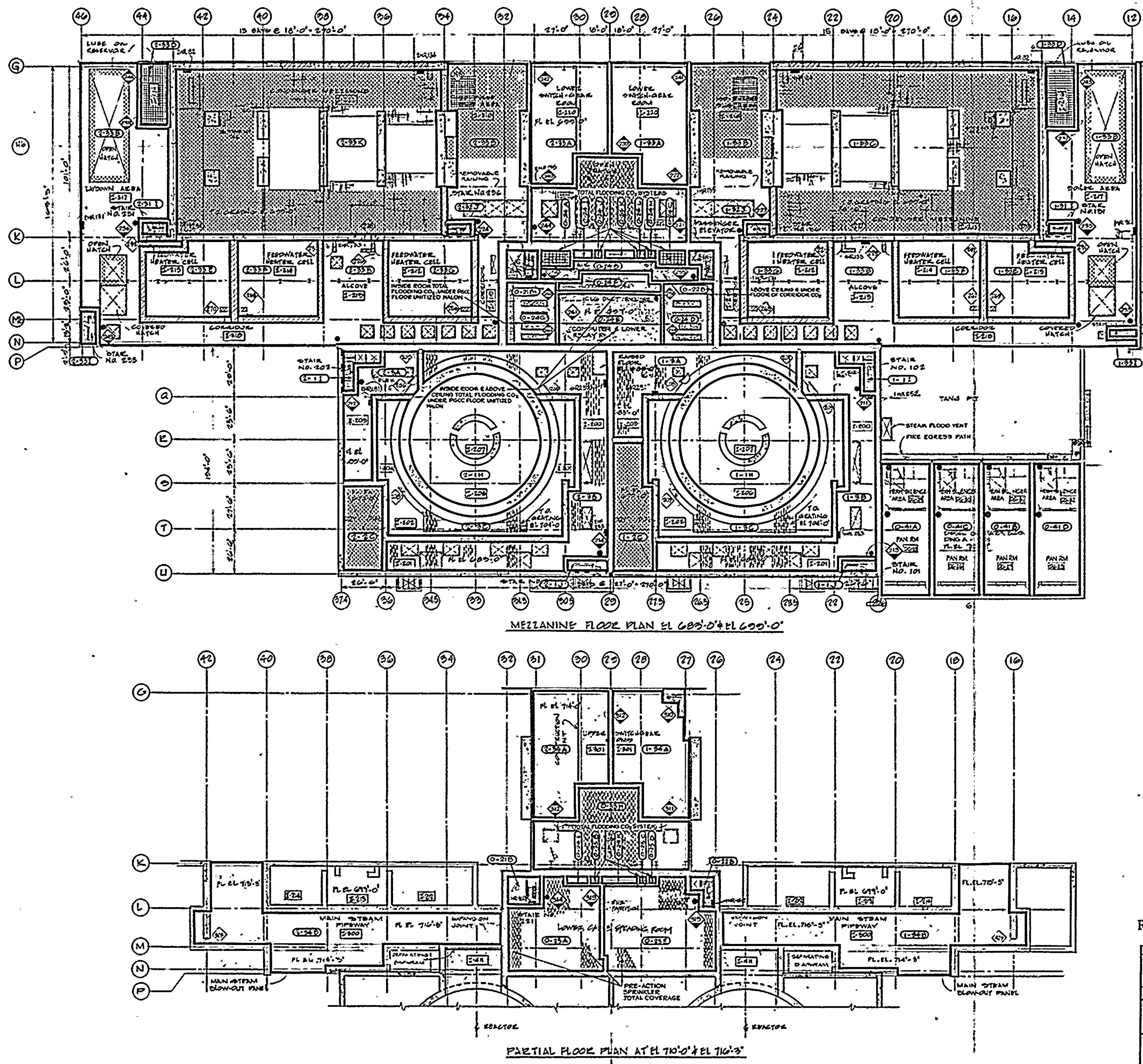
FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL.645'-0"; EL.646'-0"; EL.656'-0" & EL.660'-0"

8856	FIG. 5-8


CENTRAL ACCESS CONTROL AREA - SEE PARTIAL PLAN THIS DWG.
SUPPRESSION CHAMBER
CONDENSATE STORAGE TANK
REFUELING WATER STORAGE TANK
REMOTE CONTROL PANEL
RETAINING WALL
EARTH EMBANKMENT
TOILET & WASHROOM
FREIGHT ELEVATOR
VESTIBULE
LOCKER RM
SHOWER ROOM
DRYING AREA
CORRIDOR
RADIATION TECHNICIANS OFFICE
WORK RM
COUNTING RM
RADIATION CHEMISTRY LAB
SAMPLE ROOM
LOBBY
FILTER UNIT
FILTER RM.
CENTRAL ACCESS CONTROL AREA @ EL 676'-0"
PARTIAL FLOOR PLAN @ EL 677'-0"
LEGEND
SYMBOLS
DEFINITIONS
SPRINKLER AREA (WET PIPE OR PRE-ACTION OR DRY PIPE)
DELUGE OR WATER SPRAY - TYPE SPRINKLER AREA
HALON 1301
2 HR FIRE RESISTIVE WALL
3 HR FIRE RESISTIVE WALL
1½ HR FIRE RESISTIVE DOOR
3 HR FIRE RESISTIVE DOOR
HOSE REEL
PORTABLE FIRE EXTINGUISHER CO₂
ILLUMINATED EXIT SIGN
Rev. 1, 3/81
PENNSYLVANIA POWER & LIGHT COMPANY
FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL.670'-0", EL.676'-0" & EL.677'-0"
BECHTEL
8856
FIG.5-9



LEGEND

SYMBOLS	DEFINITIONS
	SPRINKLER AREA (WET PIPE OR PRE-ACTION OR DRY PIPE)
	DELUGE-TYPE SPRINKLER AREA
	HALON 1301
	2-HR FIRE RESISTIVE WALL
	3-HR FIRE RESISTIVE WALL
	1½-HR FIRE RESISTIVE DOOR
	3-HR FIRE RESISTIVE DOOR
	HOSE REEL
	ILLUMINATED EXIT SIGN
	AUTOMATIC TOTAL FLOODING CO2 OR MANUAL SPRIT CO2 (UNDER FALSE FL ONLY)
	PORTABLE FIRE EXTINGUISHER CO2

NOTES: COMPUTER & LOWER RELAY ROOMS PGCC AREAS WILL BE PROTECTED WITH UNITIZED HALON FOR THE GE-PGCC UNITS AND TOTAL FLOODING CO_2 IN ROOMS.

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PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PENNSYLVANIA
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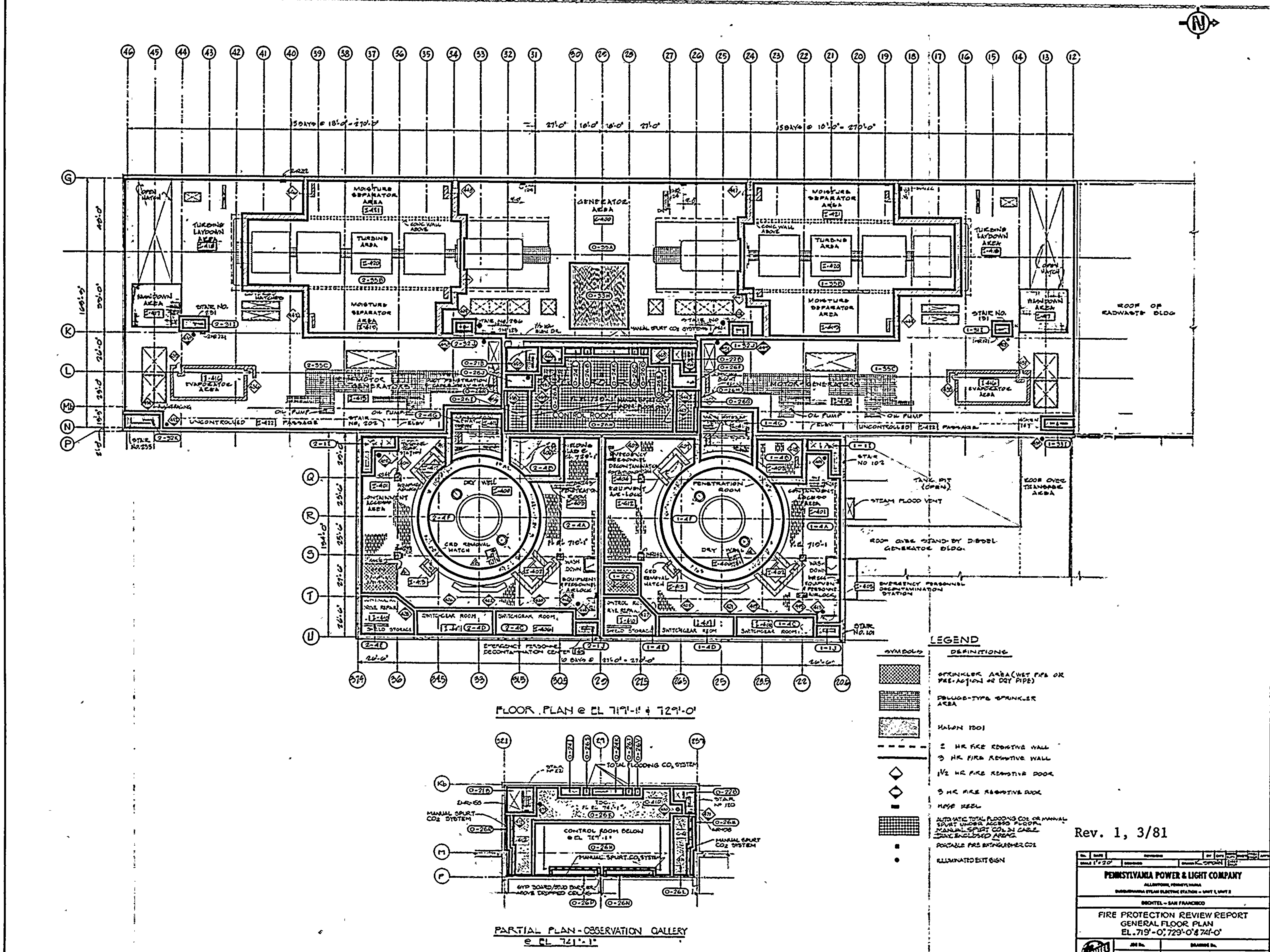
BECHTEL – SAN FRANCISCO

FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL. 683'-0", EL. 699'-0", EL. 710'-0" & EL. 716'-3"

JOB No. 8856 | DRAWING No. FIG. 5-10



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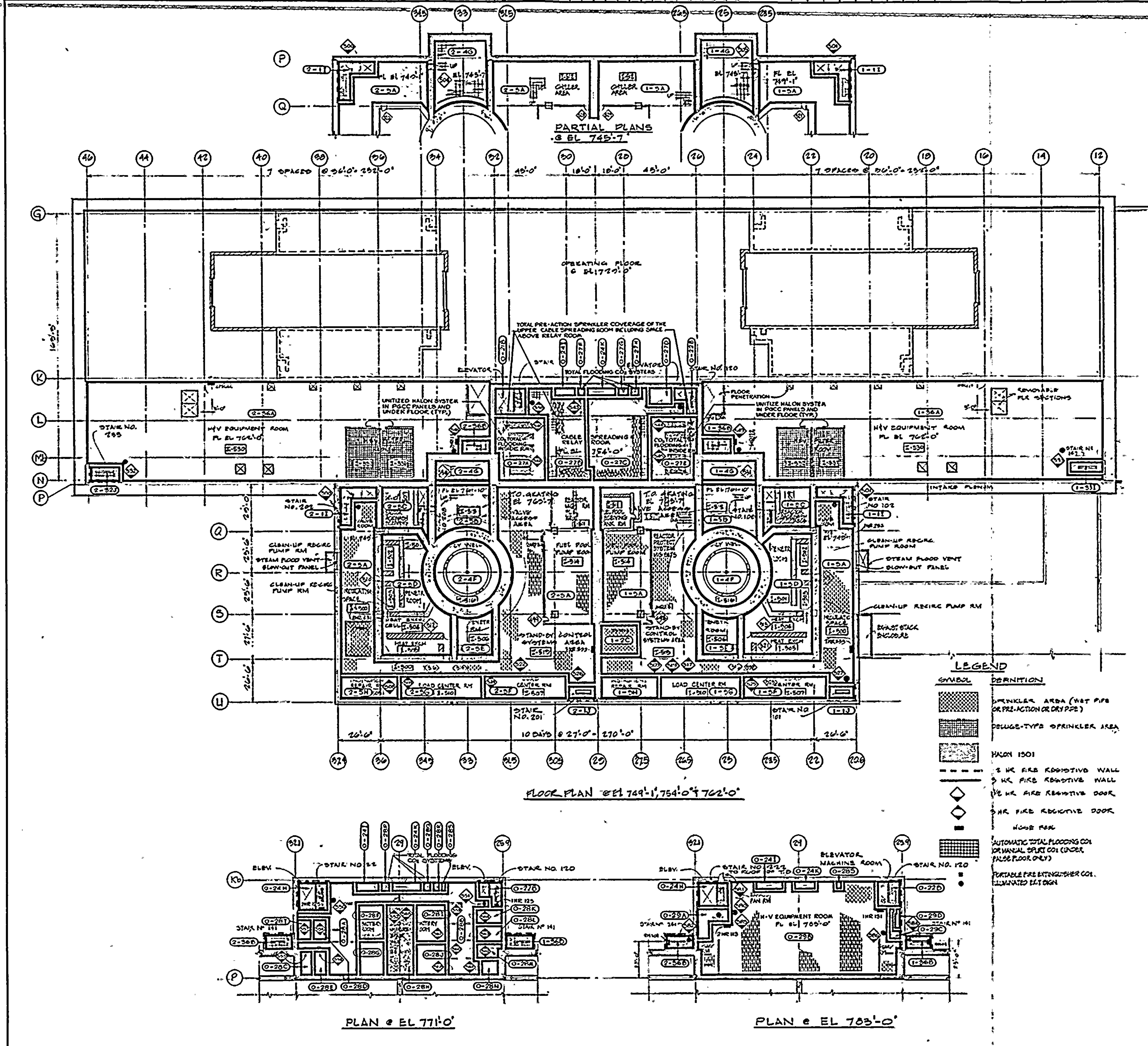
PENNSYLVANIA POWER & LIGHT COMPANY

BECHTEL – SAN FRANCISCO

FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL. 719'-0", 729'-0" & 741'-0"

Job No.	Drawing No.
8856	FIG. 5-11



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SCALE 1" = 20'

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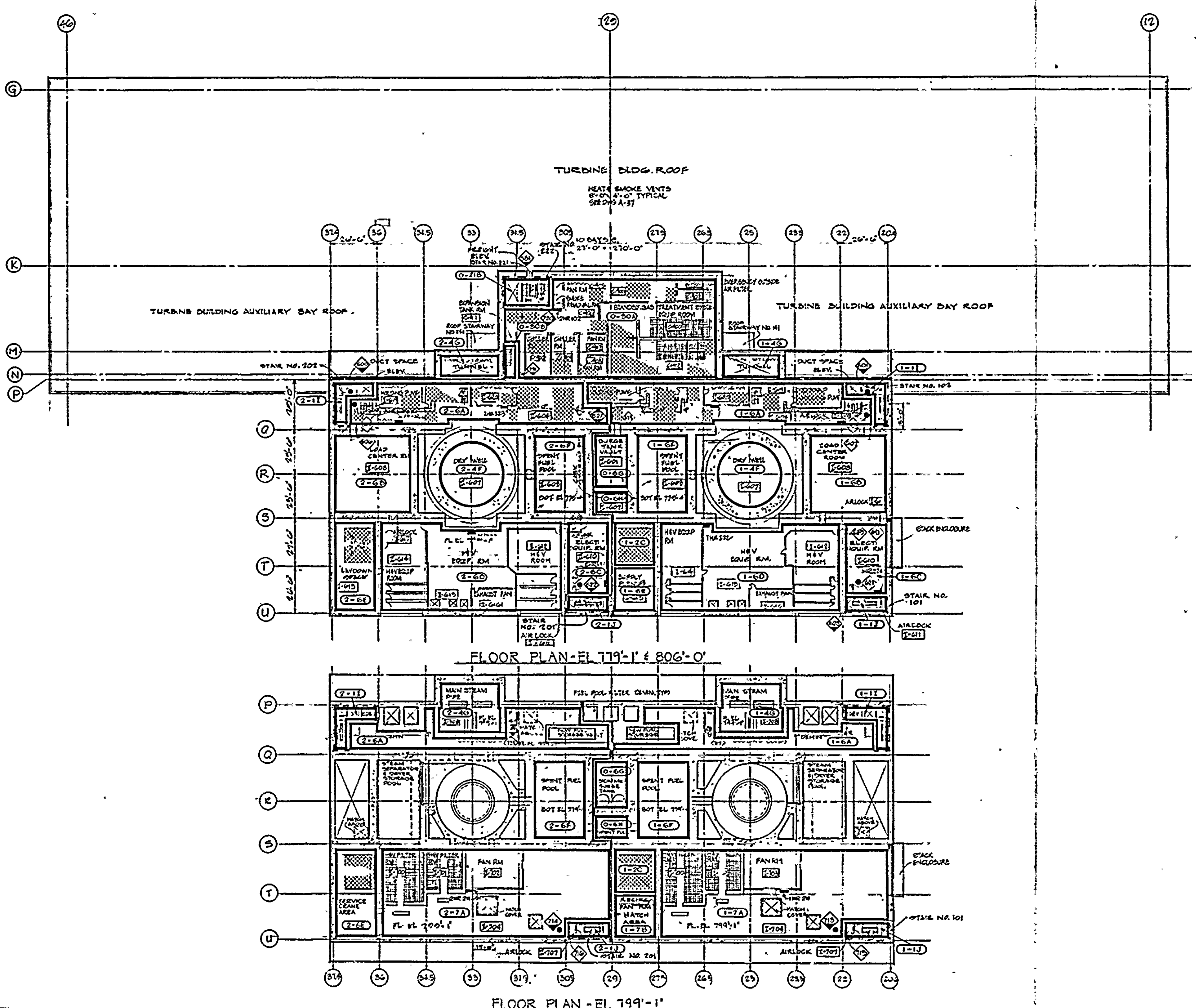
FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL. 749'-1", 754'-0", 762'-0", 771'-0" & EL. 783'-0"

JOB No.	DRAWING No.
8856	FIG. 5-12



LEGEND

SYMBOL	DEFINITION
	SPRINKLER AREA (WET PIPE OR PRE-ACTION OR DRY PIPE)
	DELUGE-TYPE SPRINKLER AREA
	HALON 1301
	2 HR FIRE RESISTIVE WALL
	3 HR FIRE RESISTIVE WALL
	1½ HR FIRE RESISTIVE DOOR
	3 HR FIRE RESISTIVE DOOR
	HOSE REEL
	PORTABLE FIRE EXTINGUISHER CO_2
	ILLUMINATED EXIT SIGN

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ALLENTOWN, PENNSYLVANIA
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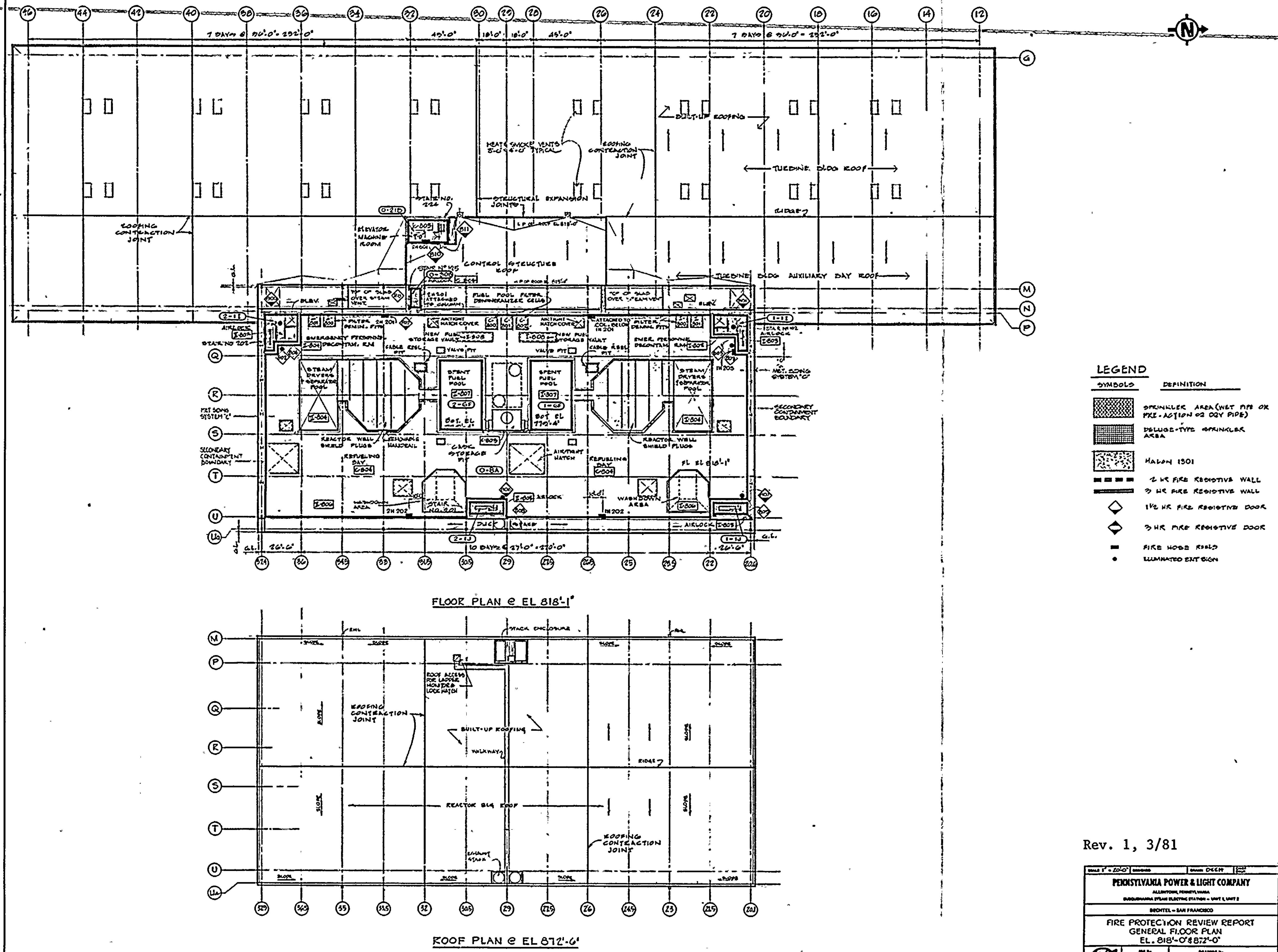
FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL. 779'-1", 806'-0" & 799'-1"

JOB No.	DRAWING No.
8856	FIG. 5-13



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ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION – UNIT 1, UNIT 2
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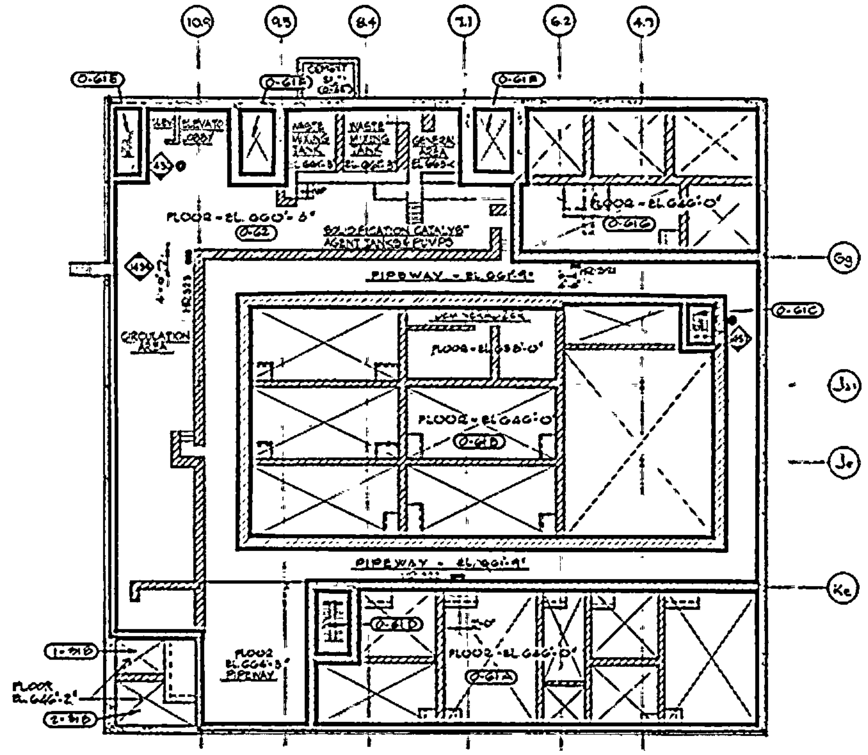
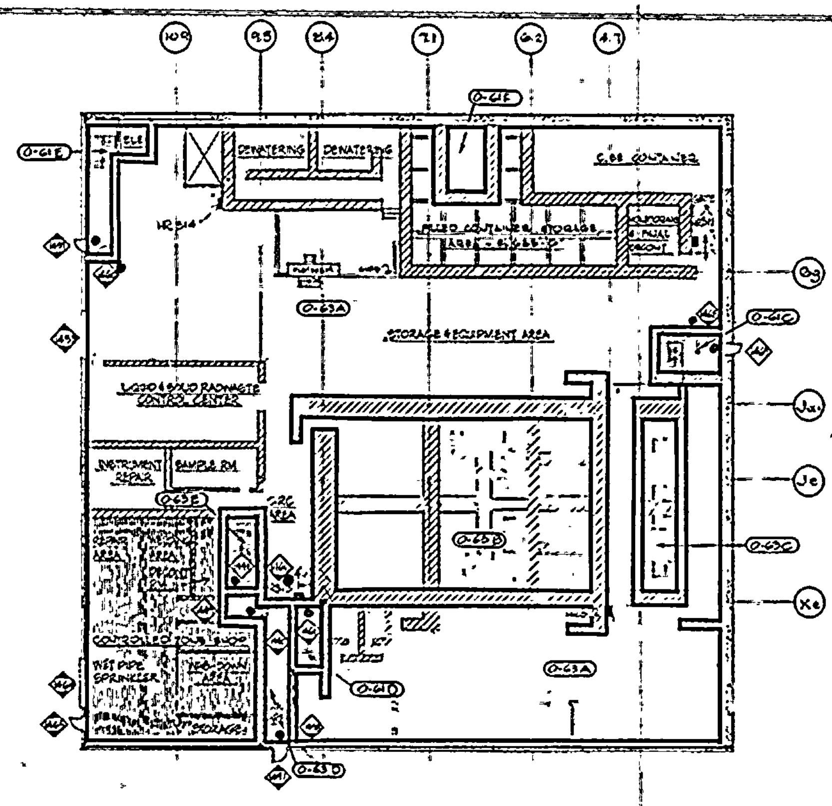
FIRE PROTECTION REVIEW REPORT
GENERAL FLOOR PLAN
EL. 818'-0" & 872'-0"

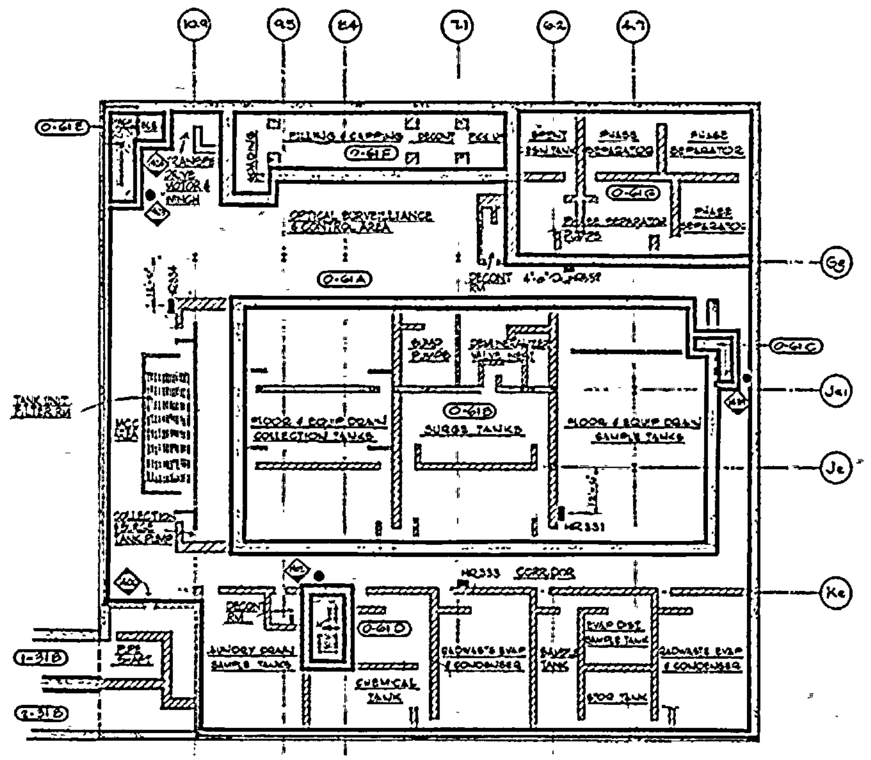
JOB No.	DRAWING No.
8856	FIG. 5-14



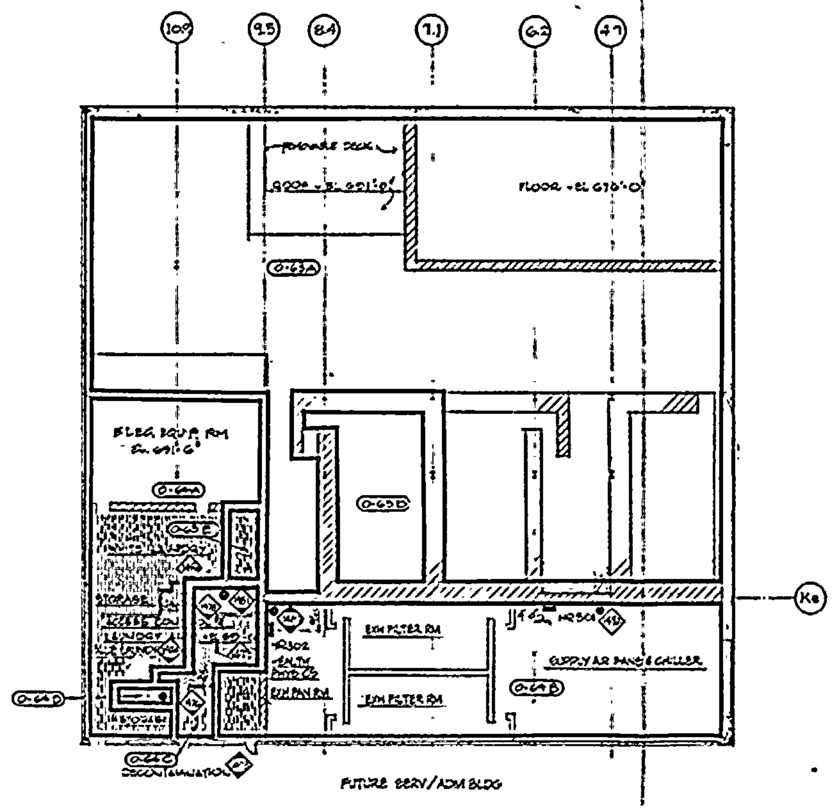
FLOOR PLAN - EL. 660'-3"



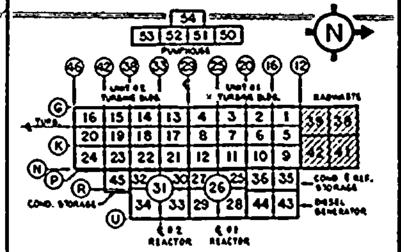
FLOOR PLAN - EL. 676'-0"



FLOOR PLAN - EL. 646'-0"



FLOOR PLAN - EL. 691'-6"



KEY PLAN

LEGEND

SYMBOLS	DEFINITION
	SPRINKLER AREA DELUGE
	HOSE REEL
	1½ HR. FIRE RESISTIVE DOOR
	3 HR. FIRE RESISTIVE DOOR
	2 HR. FIRE RESISTIVE WALL
	3 HR. FIRE RESISTIVE WALL
	PORTABLE FIRE EXTINGUISHER CO_2
	ILLUMINATED EXIT SIGN

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ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION — UNIT 1, UNIT 2

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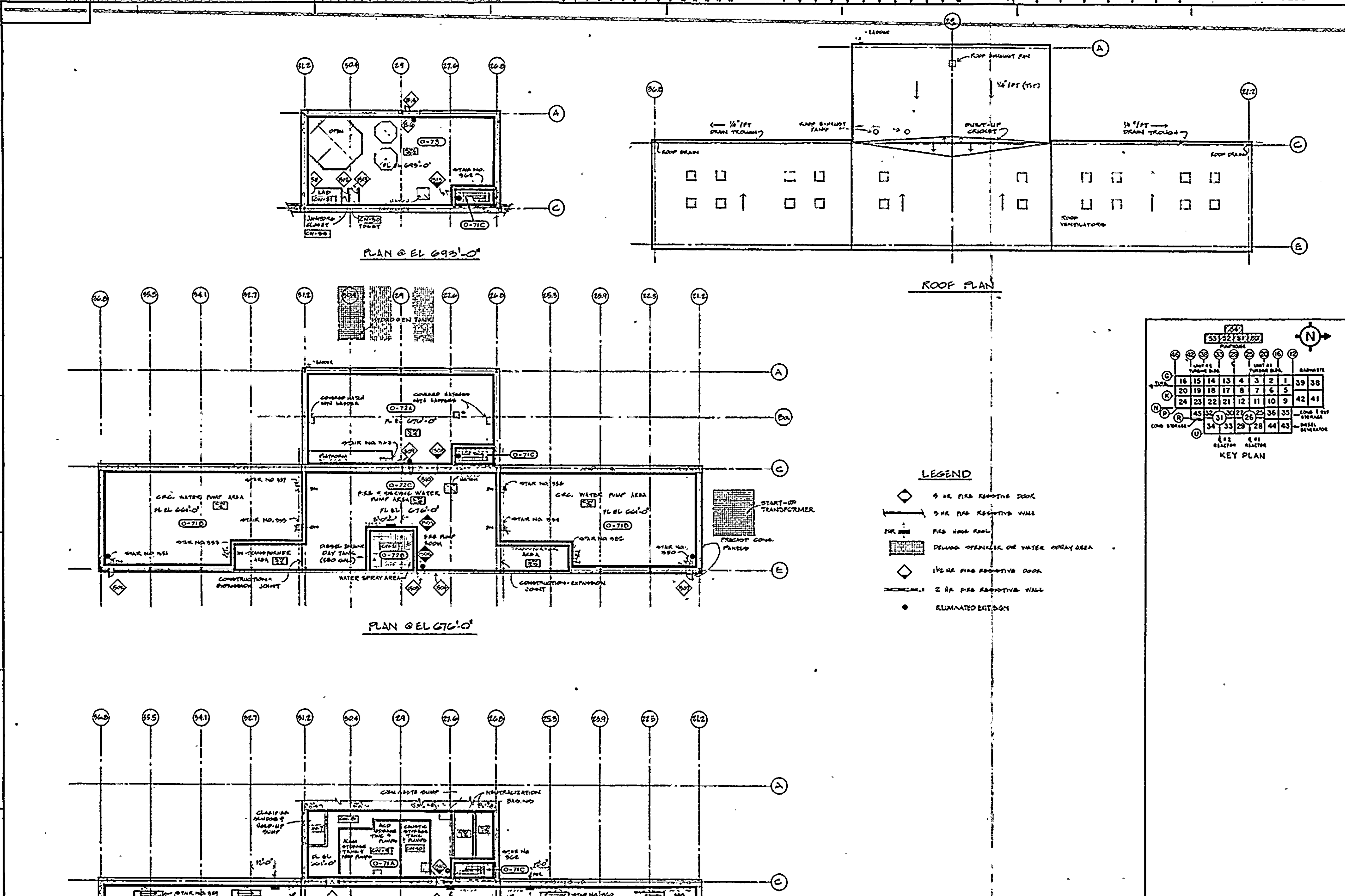
FIRE PROTECTION REVIEW REPORT
RADWASTE FLOOR PLAN
EL. 646'-0", 660'-3", 676'-0" & EL. 691'-6"

JOB No.	DRAWING No.
8856	FIG. 5-15



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ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION — UNIT 1, UNIT 2

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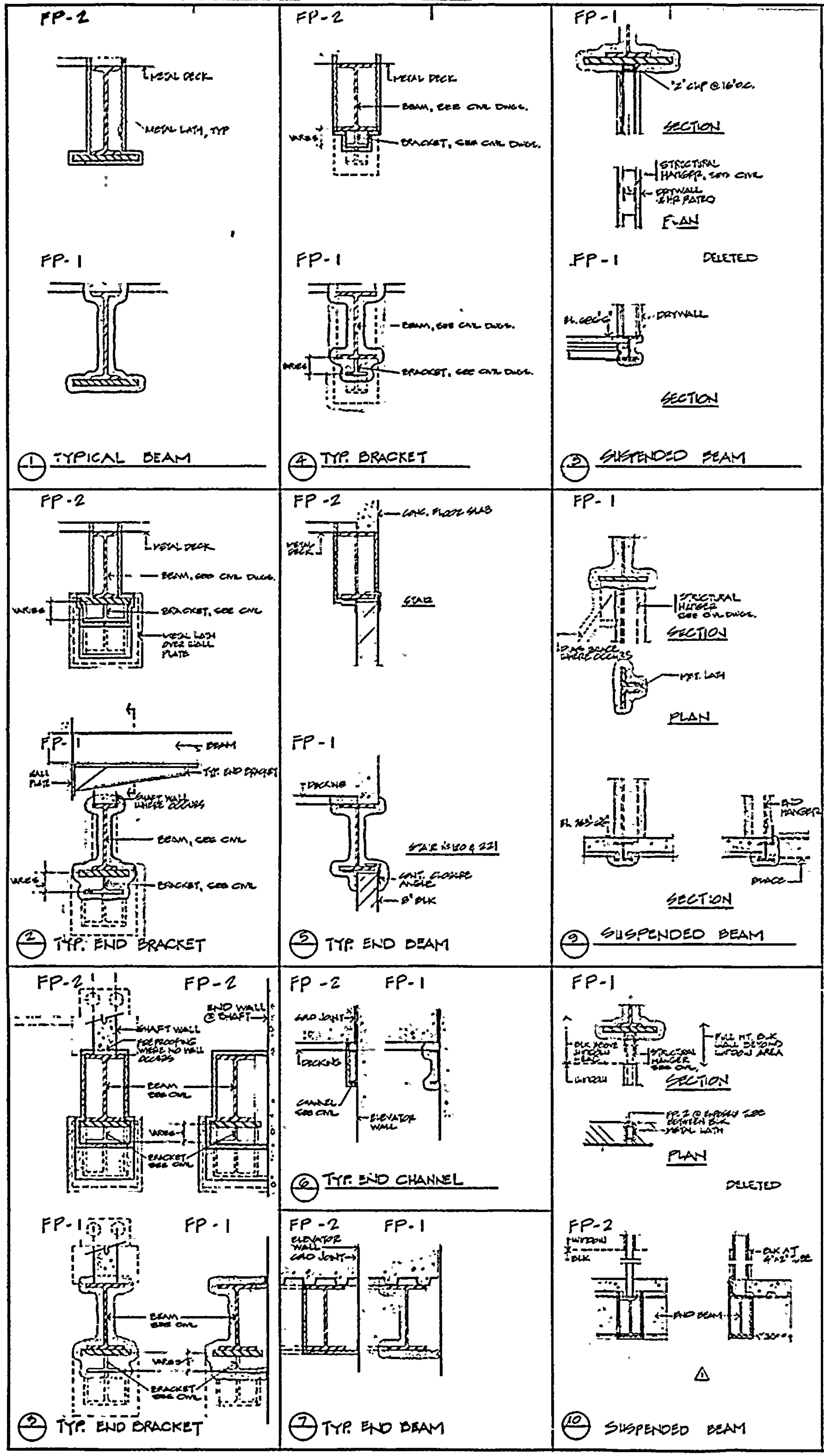
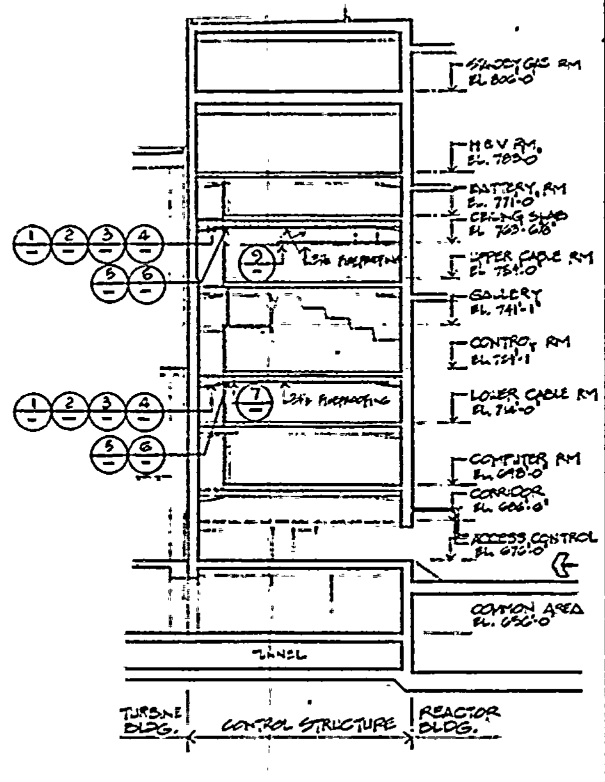
FIRE PROTECTION REVIEW REPORT
CIRCULATION, WATER PUMPHOUSE & WATER TREATMENT BUILDING

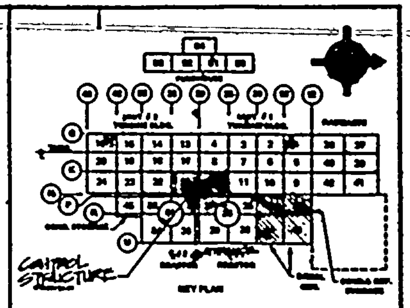
JOB No.	DRAWING No.
8856	FIG. 5-16





TYPICAL SECTION

N.T.S.



GENERAL NOTES

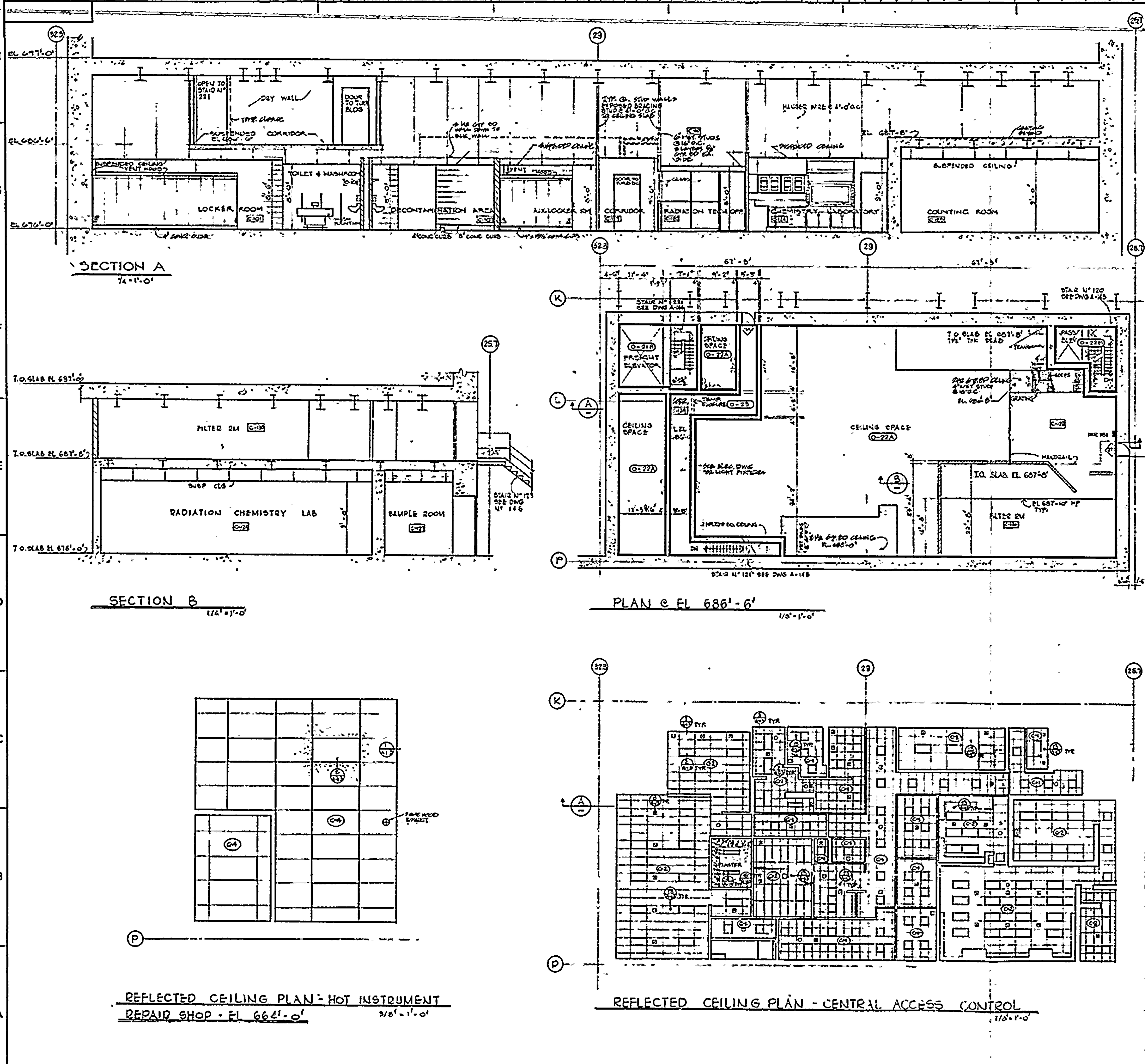
1. FIREPROOFING DETAILS SHOWN ARE TYPICAL CONDITIONS. FOR OTHER SPECIFIC CONDITIONS NOT SHOWN – SEE CIVIL REFERENCE DRAWINGS.

2. "FP-1" AND "FP-2" DESIGNATIONS REFER TO FIREPROOFING TYPES DESCRIBED IN SPECIFICATION 8856-A 54

FIREPROOFING DETAILS SHOWN ARE INTENDED TO INDICATE THE BASIC TYPES OF APPLICATIONS REQUIRED. SPECIFIC APPLICATIONS SHALL CONFORM TO THE APPLICABLE UNDERWRITERS' LABORATORY OR FACTORY MUTUAL SYSTEM APPROVED DESIGNS.

FIRE PROTECTION REVIEW REPORT
TYPICAL SECTIONS & DETAILS

8856	FIG. 5-17



NOTES

C1	SUSPENDED ACOUSTICAL CLG. SEE SPEC. A-B2
C2	SUSPENDED ACOUSTICAL CLG. SEE SPEC. A-B2
C4	SUSPENDED ACOUSTICAL CLG. SEE SPEC. A-B2
▭	2'x4' RECESSED FLUORESCENT FIXTURE
▢	2'x2' RECESSED FLUORESCENT FIXTURE
•	INCANDESCENT FIXTURE.
•	CEILING GRILLE - SEE MECH DWG. FOR SUPPLY OR EXHAUST
▭	1'x4' RECESSED FLUORESCENT FIXTURE
•	SPRINKLER HEAD - SEE VENDOR'S DWG FOR NUMBERS & LOCATIONS

FOR CEILING HEIGHTS SEE FINISH SCHEDULE A-71 TO A-76

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SCALE AS NOTED | DRAWN R. GARCIA

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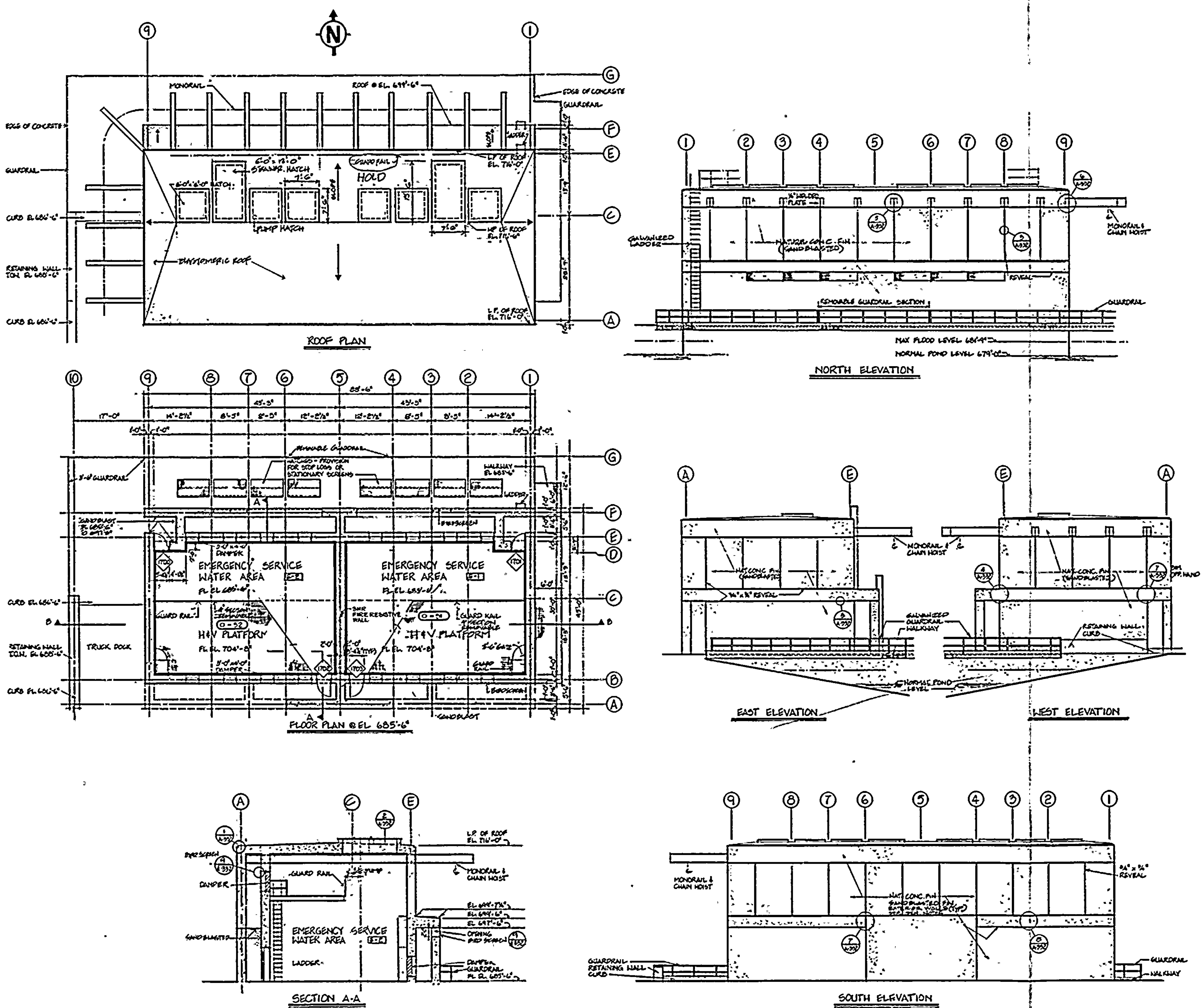
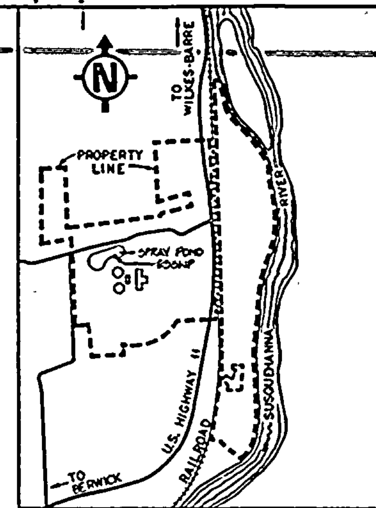
FIRE PROTECTION REVIEW REPORT
CONTROL BUILDING SECTION
EL. 676'-0" THRU 697'-0"

JOB No.	DRAWING No.
8856	FIG. 5-18





KEY PLAN
SCALE 1"=2000'

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ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION – UNIT 1, UNIT 2

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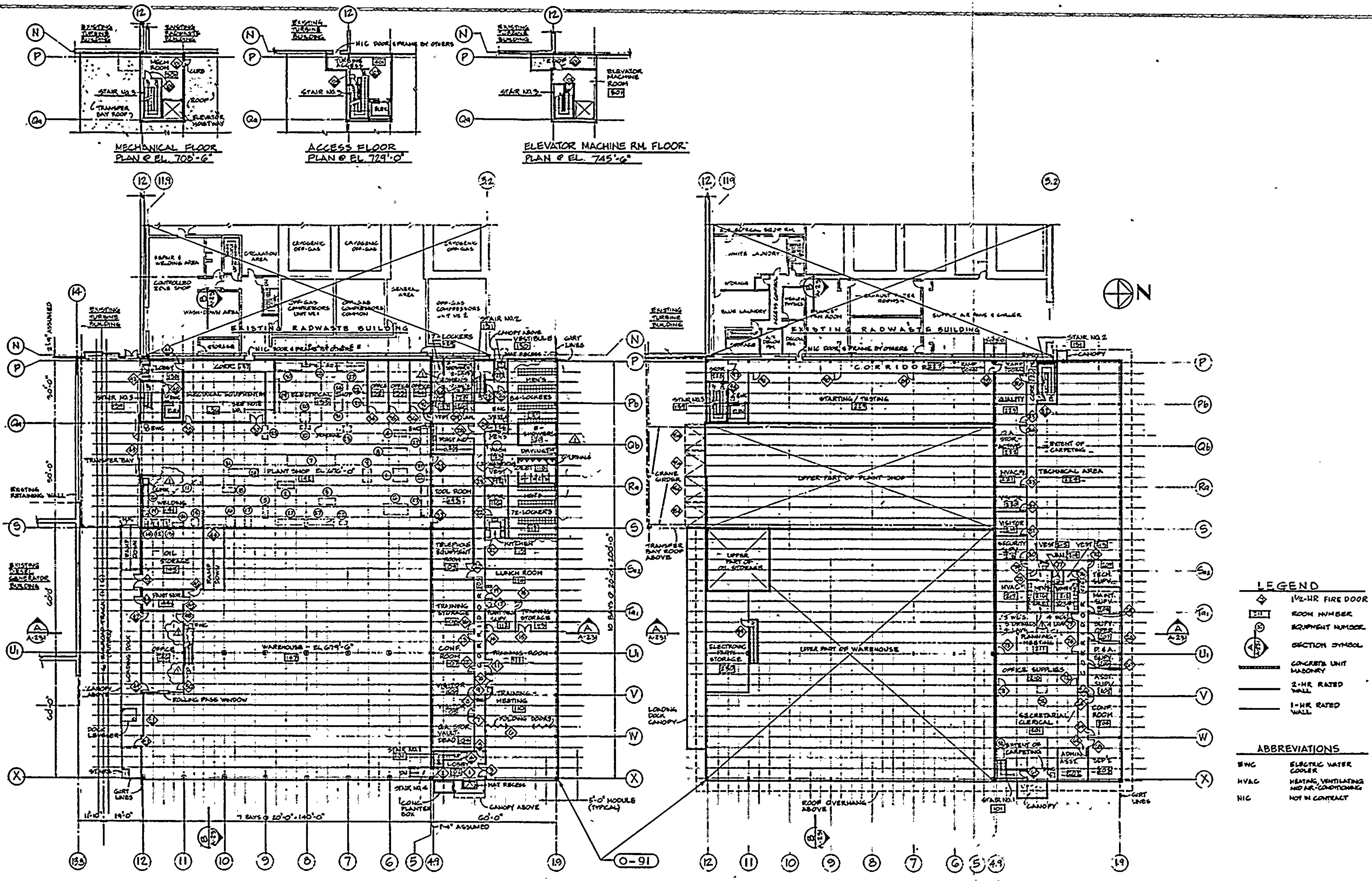
FIRE PROTECTION REVIEW REPORT
ESSW PUMPHOUSE
FLOOR & ROOF PLAN, ELEVATIONS & SECTION

JOB No.	DRAWING No.
8856	FIG. 5-19



GROUND FLOOR PLAN @ EL. 676'-0" & EL. 679'-6"

SECOND FLOOR PLAN @ EL. 689'-0" & EL. 691'-0"

PLANT SHOP & ELECTRICAL SHOP EQUIPMENT: (SEE GENERAL NOTE #2)

1. MILLING MACHINE
2. 19"x54" ENGINE LATHE
3. DUPLICATE ENGINE LATHE
4. UPRIGHT DRILL
5. DO-ALL SAW
6. UNIVERSAL TABLE SHAPER
7. 16" ENGINE LATHE
8. RADIAL DRILL
9. SURFACE GRINDER
10. PIPE THREADER
11. CUTOFF BAND SAW
12. AC WELDING MACHINE
13. DC WELDING MACHINE
14. HELIWELD MACHINE
15. ABRASIVE CUTOFF WHEEL
16. GLASS BEAD BLASTER
17. DEGREASER
18. MANLEY PRESS
19. OVEN (WELDING ROD)
20. OVEN (ELEC. COMPONENT DRYING)
21. UTILITY GRINDER (3)
22. TOOL GRINDER (3)
23. DRILL GRINDER
24. BENCH DRILL PRESS (2)
25. PORTABLE POWER SAW
26. 3'x10' WORK BENCH
27. 3'x14' WORK BENCH & CABINETS (5)
28. 1'x4'x7' STAND-UP CABINETS
29. LOCKERS
30. 4'x14' WORK BENCH W/ TEST PANEL
31. 4'x14' WORK BENCH (2)
32. CONVENIENCE COPIERS (ON SECOND FLOOR IN ROOM 201)

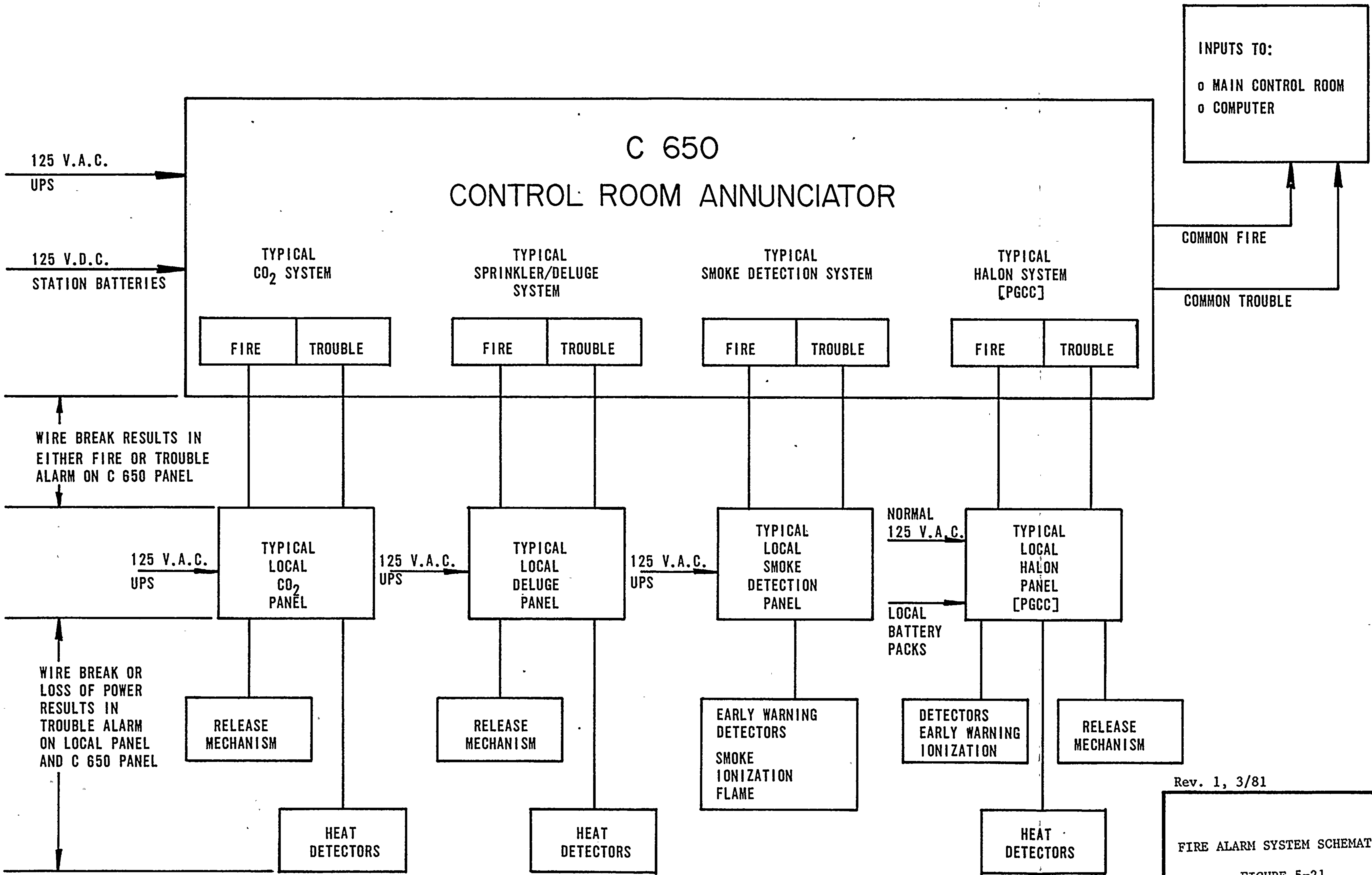
SCALE 1/16"=1'-0" | GO & AK | A. KATANIKS

PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PENNSYLVANIA
SUSQUEHANNA STEAM ELECTRIC STATION – UNIT 1, UNIT 2

BECHTEL – SAN FRANCISCO

FIRE PROTECTION REVIEW REPORT
SERVICE & ADMINISTRATION BUILDING
EL. 676'-0", EL. 679'-6", EL. 689'-0" & EL. 691'-0"

JOB No.	DRAWING No.
8856	FIG. 5-20.



Rev. 1, 3/81

FIRE ALARM SYSTEM SCHEMATIC

FIGURE 5-21

TABLE 6-1

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-1A	Unit 1 Reactor	645'	Core Spray Pump Room I-17	Yes	Lube Oil Cable Insul	B C	26.5 gal 2,292 lbs.	1.38	Ionization Smoke Detector	7	Hose Station Port. Exting.	Manual Manual
1-1B	"	"	Core Spray Pump Room I-10	Yes	Lube Oil Cable Insul	B C	26.5 gal. 1,262 lbs.	1.67	Ionization Smoke Detector	5	Hose Station Port. Exting.	Manual Manual
1-1C	"	"	HPCI Pump Room I-11	Yes	Lube Oil Cable Insul	B C	155 gal. 1,089 lbs.	3.08	Photoelect. Smoke Detector Heat Detector	7 2	Water Spray Port. Exting. Hose Station	Auto Manual Manual
1-1D	"	"	RCIC Pump Room I-12	Yes	Lube Oil Cable in Conduit	B C	2.5 gal. 150 lbs.	0.26	Photoelect. Smoke Detector Heat Detector	5 2	Water Spray Port. Exting. Hose Station	Auto Manual Manual
1-1E	"	645' Thru 681'	RHR Pump Room I-13 & RHR Upper Portions I-103	Yes	Lube Oil Cable in	B C	151.5 gal 572 lbs.	2.2	Photoelect. Smoke Detector	13	Port. Exting. Hose Station	Manual Manual
1-1F	"	"	RHR Pump Room I-14 & RHR Upper Portions I-104	Yes	Lube Oil Cable Insul	B C	151.5 gal. 3,111 lbs.	2.88	Photoelect. Smoke Detector	15	Port. Exting. Hose Station	Manual Manual
1-1G	"	645'	Sump Pump Room I-15	Yes	Oil Cable Insul	B C	300 gal.max. 1,089 lbs.	3.64	Ionization Smoke Det.	2	Hose Station	Manual
1-1H	"	648' Thru 700'	Suppression Chamber I-18, I-206 & I-207	Yes	Cable in Conduit	C	1,500 lbs.	0.4	None		Inerted with Nitrogen Atmosphere	
1-1I	"	645' Thru 827'2"	Stair No. 102, Elev. Shaft & Air Lock I-803	No	None				None		Hose Station	Manual
1-1J	"	"	Stair No. 101, Air Locks I-805, I-611 & I-707	No	None				None		Hose Station	Manual
1-2A	"	670'	Access Area I-105	Yes	Cable Insul	C	3,017 lbs.	1.50	Ionization Smoke Det.	4	Hose Station	Manual

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TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-2B	Unit 1 Reactor	670'	Personnel Access Corridor I-102	Yes	Cable Insul	C	1,975 lbs.	0.80	Ionization Smoke Det.	4	Hose Station Port. Exting.	Manual Manual
1-2C	"	670' Thru 818"	Railroad Airlock I-100 Hoist & Crane Ways	Yes	Freight Transient Axle Grease & Misc.	B A	2 lbs. 500 lbs.	0.30	None		Dry Pipe Sprink. Hose Station	Auto Manual
1-2D	"	"	Remote Shutdown Panel Rm I-109	Yes	Cable Insul.	C			Ionization Smoke Det.	1	Port. Exting.	Manual
1-3A	"	683'	Access Area I-203	Yes	Cable Insul	C	7,230 lbs.	4.1	Ionization Smoke Det.	4	Hose Station Sprinkler	Manual Auto
1-3B	"	"	Access Area I-200, Access Area I-201	Yes	Cable Insul	C	11,215 lbs.	3.37	Ionization Smoke Det.	9	Hose Station Sprinkler (Partial)	Manual Auto
1-3C	"	"	Access Area I-202, I-204 & I-205	Yes	Cable Insul	C	5,309 lbs.	1.83	Photoelectric Smoke Det.	9	Hose Station	Manual
1-4A	"	719'	Containment Access Area I-401 North & South	Yes	Cable Insul Inst. Comp Lube Oil Tip Drive Grease	C B B	19,596 lbs. 26 lbs. 20 lbs.	2.43	Ionization Smoke Detector	17	Hose Station Sprinkler	Manual Auto
1-4A	"	"	Equipment and Personnel Air Lock I-402 & I-414 Equipment Air Lock I-412 CRD Removal Hatch I-413 Emergency Personnel Decontamination Room I-404 & I-405	Yes	None				None		Hose Station	Manual
1-4B	"	"	Pipe Penetration Room I-403	Yes	Cable Insul	C	1,634 lbs.	2.55	Photoelectric Smoke Det.	2	Hose Station	Manual
1-4C	"	"	Switchgear Room I-406	Yes	Cable Insul	C	4,139 lbs.	7.17	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
1-4D	"	"	Switchgear Room I-407	Yes	Cable Insul	C	3,697 lbs.	6.40	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
1-4E	"	"	Control Rod Drive Repair and Shield Storage I-410	No	None				None		Hose Station Port. Exting.	Manual Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-4F	Unit 1 Reactor	704' Thru 807'	Dry Well I-400, I-516 & I-607	Yes	Cable Insul Lube Oil	C B	9,633 lbs. 108 gal.	3.82	None		Inerted with Nitrogen Atmosphere	
1-4G	"	719'1" Thru 816'1"	Main Steam Pipe Way I-411 & Recirculation Fan Room I-709	Yes	Cable Insul	C	650 lbs.	1.72	Photoelectric Smoke Det.	4	Located outside room-Radiation Zone V	
1-5A	"	749'1" Thru 771'1"	Circulation Space I-500, Fuel Pool Receiving Tank Room I-511, Chiller Room I-512, Standby Control System Area I-513 & RPS MG Sets Rm I-517	Yes	Cable Insul Lube Oil	C B	20,638 lbs. 30 gal.	2.58	Ionization Smoke Det.	17	Hose Station Port. Exting.	Manual Manual
1-5A	"	749'	Fuel Pool Pump Room I-514	No	Cable in Conduit	C	900 lbs.	0.60	Photoelect. Smoke Det.	7	Hose Station Port. Exting. Sprinkler	Manual Manual Auto
1-5B	"	761'10"	Valve Access Area I-515	Yes	Cable Insul	C	460 lbs.	0.57	Photoelectric Smoke Det.	2	Located Outside room-Radiation Zone V	
1-5C	"	"	Reactor Backwash Receiving Tank Room I-509 & Stair Access Area	No	Cable Insul	C	405 lbs.	0.94	None		Hose Station	Manual
1-5D	"	749'1"	Pipe Penetration Room I-501, Clean-up Recirculation Pump Rooms I-502 & 503, Heat Exchanger Cells I-504 & I-505	Yes	Cable in Conduit	C	10 lbs.	0.005	Photoelectric Smoke Det.	2	Located outside room-Radiation Zone V	
1-5E	"	"	Pipe Penetration Room I-506	Yes	Cable Insul	C	650 lbs.	1.52	Photoelectric Smoke Det.	2	Located outside room-Radiation Zone V	
1-5F	"	"	Swgr Center Room I-507	Yes	Cable Insul	C	3,756 lbs.	5.28	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
1-5G	"	"	Swgr Center Room I-510	Yes	Cable Insul	C	3,674 lbs.	5.17	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-5H	Unit 1 Reactor	749'1"	Instrument Repair Shop I-508	No	None			None			Hose Station Port. Exting.	Manual Manual
1-6A	"	779'1"	Air Lock I-606, Access Area I-604, Clean-up Holding Pump Room I-619, Sample Room I-620 & Fuel Pool Holding Pump I-621	Yes	Cable Insul	C	2,372 lbs.	0.79	Ionization Smoke Det.	8	Hose Station Preaction Sprinkler	Manual Auto
1-6B	"	"	Load Center Room I-608	No	Cable Insul	C	2,420 lbs.	1.40	Ionization Smoke Detector	4	Hose Station Port. Exting.	Manual Manual
1-6C	"	"	Elect. Equipment Room I-610, Air Lock I-617	No	Cable Insul	C	1,441 lbs.	1.84	Ionization Smoke Detector	2	Hose Station Port. Exting.	Manual Manual
1-6D	"	"	H & V Equip. Room I-612, Fan Room I-613, Fan Room I-614, Exhaust Fan Room I-616	Yes	Cable Insul	C	8,300 lbs.	1.95	Ionization Smoke Det.	10	Hose Station Port. Exting.	Manual Manual
1-6E	"	"	Air Plenum Room I-615	Yes	Cable in Conduit	C			Ionization Smoke Det.	2	None	
1-6F	"	"	Spent Fuel Pool I-603	No	None				None		None	
0-6G	"	779'4" Thru 816'1"	Surge Tank Vault I-601	Yes	Cable in Conduit	C			Ionization Smoke Det.	2	None	
0-6H	"	775'5" Thru 816'1"	Cask Storage Pit I-602	No	None				None		None	
1-7A	"	799'1"	H&V Filter Room I-700	No	Charcoal Filter	A	14,668 lbs.	37.68	Photoelectric Smoke Det. Heat	2 2	Deluge Spray In Unit Hose Station Radiation Zone IV	Auto Manual
1-7A	"	"	H&V Filter Room I-702	No	Charcoal Filter	A	4,090	15.13	Photoelectric Smoke Det. Heat	2 2	Deluge Spray In Unit Hose Station Radiation Zone IV	Auto Manual
1-7A	"	"	Access Area I-704 & Fan Room I-703	Yes	Cable Insul	C	2,519 lbs.	0.59	Ionization Smoke Det.	9	Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-7B	Unit 1 Reactor	799'1"	Recirculation Fan Room I-701	Yes	Cable in Conduit	C	20 lbs.	0.04	Ionization Smoke Det.	2	Hose Station	Manual
0-8A	"	818'1"	Clean-up Filter Demineralizer Pits I-800 & I-801, Emergency Personnel Decont. I-802 & New Fuel Storage Vault I-808	Yes	None				Photoelectric Smoke Det.	7	Hose Station Port. Exting.	Manual Manual
0-8A	"	"	Steam Dryer & Separator Pool I-804, Wash Down Area I-806 Spent Fuel Pool I-807 & Refueling Bay C-804	Yes	Cable in Conduit	C	900 lbs.	0.02	Photoelect. Smoke Detector	7	Hose Station Port. Exting.	Manual Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-1A	Unit 2 Reactor	645'	Core Spray Pump Room II-10	Yes	Lube Oil Cable Insul	B C	26.5 gal. 1,262 lbs.	1.03	Ionization Smoke Detector	8	Hose Station Port. Exting.	Manual Manual
2-1B	"	"	Core Spray Pump Room II-17	Yes	Lube Oil Cable Insul	B C	26.5 gal. 2,292 lbs.	2.22	Ionization Smoke Detector	6	Hose Station Port. Exting.	Manual Manual
2-1C	"	"	HPCI Pump Room II-11	Yes	Lube Oil Cable Insul	B C	155 gal. 1,089 lbs.	3.08	Photoelect. Smoke Detector Heat Det.	7 2	Water Spray Port. Exting. Hose Station	Auto Manual Manual
2-1D	"	"	RCIC Pump Room II-12	Yes	Lube Oil Cable in Conduit	B C	2.5 gal. 150 lbs.	0.26	Photoelect. Smoke Detector Heat Det.	5 2	Water Spray Port. Exting. Hose Station	Auto Manual Manual
2-1E	"	645' Thru 681'	RHR Pump Room II-13 & RHR Upper Portion II-103	Yes	Lube Oil Cable Insul	B C	151.5 gal. 572 lbs.	2.2	Photoelect. Smoke Det.	13	Port. Exting. Hose Station	Manual Manual
2-1F	"	"	RHR Pump Room II-14 & RHR Upper Portion II-104	Yes	Lube Oil Cable Insul	B C	151.5 gal. 3,110 lbs.	2.88	Photoelect. Smoke Det.	15	Port. Exting. Hose Station	Manual Manual
2-1G	"	645'	Sump Pump Room II-15	Yes	Oil Cable Insul	B C	300 gal.max. 1,087 lbs.	3.64	Ionization Smoke Det.	2	Hose Station	Manual
2-1H	"	648'	Suppression Chamber II-18 II-206 & II-207	Yes	Cable in Conduit	C	1,500 lbs.	0.4	None		Inerted with Nitrogen Atmosphere	
2-1I	"	645' To 827'2"	Stair No. 202, Elev. Shaft & Air Lock II-803	No	None				None		Hose Station	Manual
2-1J	"	"	Stair No. 201, Air Lock Rooms II-805, II-611 & II-707	No	None				None		Hose Station	Manual
2-2A	"	670'	Access Area II-105	Yes	Cable Insul	C	3,017 lbs.	1.50	Ionization Smoke Det.	4	Hose Station	Manual

TABLE 6-1

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-2B	Unit 2 Reactor	670'	Personnel Access Corridor II-102, Remote Control Panel Area II-109	Yes	Cable Insul	C	1,975 lbs.	0.70	Ionization Smoke Det.	4	Hose Station Port. Exting.	Manual Manual
2-2C	"	670' To 717'	Truck Airlock II-100, Laydown Space II-615, Service Crane Area II-703	No	Gasoline Wooden Crates & Misc	B A	30 gal. 1,000 lbs.	0.93	None		Dry Pipe Sprink. Hose Station	Auto Manual
2-2D	"	670'	Pump Room and Remote Control Panel II-109	Yes	Cable Insul	C			Ionization	1	Port. Exting.	Manual
2-3A	"	683'	Access Area II-203	Yes	Cable Insul	C	7,230 lbs.	5.29	Ionization Smoke Det.	4	Hose Station	Manual
2-3B	"	"	Access Area II-200, Access Area II-201	Yes	Cable Insul	C	11,215 lbs.	3.37	Ionization Smoke Det.	9	Hose Station Sprinkler	Manual Auto
2-3C	"	"	Access Area II-202 & II-204, Access Area II-205	Yes	Cable Insul	C	5,309 lbs.	1.83	Photoelectric Smoke Det.	17	Hose Station	Manual
2-4A	"	719'	Containment Access Area II-401 North & South	Yes	Cable Insul Inst. Comp. Lube Oil Tip Drive Grease	C B B	19,596 lbs. 26 lbs. 20 lbs.	2.43	Ionization Smoke Det.	17	Hose Station Sprinkler	Manual Auto
2-4A	"	"	Equipment and Personnel Air Lock II-402, Equipment Air Lock II-412, Air Lock II-414, Emergency Personnel Decontamination Room II-404 & II-405, CRD Removal Hatch II-413	Yes	None				Ionization Smoke Det.	17	Hose Station Sprinkler	Manual Auto
2-4B	"	"	Pipe Penetration Room II-403	Yes	Cable Insul	C	1,634 lbs.	2.55	Photoelectric Smoke Det.	2	Hose Station Sprinkler	Manual Auto
2-4C	"	"	Switchgear Room II-406	Yes	Cable Insul	C	2,817 lbs.	4.88	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
2-4D	"	"	Switchgear Room II-407	Yes	Cable Insul	C	2,512 lbs.	4.35	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
2-4E	"	"	Control Rod Drive Repair and Shield Storage II-410	No	None				None		Hose Station Port. Exting.	Manual Manual

TABLE 6-1

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-4F	Unit 2 Reactor	704' To 807'	Dry Well II-206, II-207, II-400, II-516 & II-607	Yes	Cable Insul Lube Oil	C B	9,633 lbs. 108 gal.	3.82	None		Inerted with Nitrogen Atmosphere	
2-4G	"	719'1" To 816'1"	Main Steam Pipeway Area II-411 Recirculation Fan Room II-709	Yes	Cable Insul	C	650 lbs.	1.72	Photoelectric Smoke Det.	4	Hose Station	Manual
2-5A	"	749'1" To 771'1"	Circulation Space II-500, Fuel Pool Receiving Tank Room II-514, Chiller Room II-512, Standby Control System Area II-513 & RPS MG Set Room II-511	Yes	Cable Insul Lube Oil	C B	20,638 lbs. 30 gal.	2.58	Ionization Smoke Det.	4	Hose Station Port. Exting.	Manual Manual
2-5A	"	749'	Fuel Pool Pump Room II-514	No	Cable in Conduit	C	900 lbs.	0.60	Photoelect. Smoke Det.	7	Hose Station Port. Exting.	Manual Manual
2-5B	"	761'10"	Valve Access Area II-515	Yes	Cable in Conduit	C	460 lbs.	0.57	Photoelectric Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
2-5C	"	"	Reactor Backwash Receiving Tank Room II-509	No	Cable Insul	C	405 lbs.	0.94	None		Hose Station	Manual
2-5D	"	749'1"	Pipe Penetration Room II-501, Clean-up Recirculation Pump Rooms II-502 & II-503 Heat Exchanger Cells II-504 & II-505	Yes	Cable in Conduit	C	10 lbs.	0.005	Photoelectric Smoke Det.	10	Hose Station Port. Exting.	Manual Manual
2-5E	"	"	Pipe Penetration Room II-506	Yes	Cable Insul	C	650 lbs.	1.52	Photoelectric Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
2-5F	"	"	Swg Center Room II-507	Yes	Cable Insul	C	3,756 lbs.	5.28	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual
2-5G	"	"	Swgr Center Room II-510	Yes	Cable Insul	C	3,674 lbs.	5.17	Ionization Smoke Det.	2	Hose Station Port. Exting.	Manual Manual

TABLE 6-1

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-5H	Unit 2 Reactor	749'1"	Instrument Repair Shop II-508	No	None				None		Hose Station Port. Exting.	Manual Manual
2-6A	"	779'1"	Air Lock II-606, Access Area II-604, Clean-up Holding Pump Room II-619, Sample Room II-620, Fuel Pool Holding Pump Room II-621	Yes	Cable Insul	C	2,372 lbs.	0.79	Ionization Smoke Det.	8	Hose Station	Manual
2-6B	"	"	Load Center Room II-608	No	Cable Insul	C	2,420 lbs.	1.40	Ionization Smoke Det.	4	Hose Station Port. Exting.	Manual Manual
2-6C	"	"	Elect. Equipment Room II-610	No	Cable Insul	C	1,441 lbs.	1.84	Ionization Smoke Det.	2	Hose Station Port Exting.	Manual Manual
2-6D	"	"	H & V Equip. Room II-612, Fan Room II-613, Fan Room II-614, Exhaust Fan Room II-616 & Air Lock II-617	Yes	Cable Insul	C	8,300 lbs.	1.95	Ionization Smoke Det.	10	Hose Station Port. Exting.	Manual Manual
2-6E	"	779'1" To 797'1"	Hatch & Laydown Area	No	None				Ionization Smoke Det.	2	None	
2-6F	"	779'4" Thru 818'1"	Spent Fuel Pool II-603	No	None				None		None	
2-7A	"	799'1"	H&V Filter Room II-700	No	Charcoal Filter	A	14,668 lbs.	37.68	Heat Detector Photoelectric Smoke Det.	- 2	Water Spray Hose Station Deluge Spray In Unit	Auto Manual
2-7A	"	"	H&V Filter Room II-701		Charcoal Filter	A	4,090 lbs.	15.13	Heat Det. Photoelectric Smoke Det.	- 2	Water Spray Hose Station Deluge Spray In Unit	Auto Manual
2-7A	"	"	Circulation & Equip. Office II-702, Fan Room II-704	Yes	Cable Insul	C	2,519 lbs.	0.59	Ionization Smoke Det.	9	Hose Station	Manual

TABLE 6-1

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-21A	Control	656'	Common Equipment Room C-10	No	Cable Insul in motors, conduits and MCC.	C	9,740 lbs.	1.69	Ionization Detector	1	Hose Station Port. Exting.	Manual Manual
0-21A	"	"	Chemical Waste Tank Room C-11 & Hot Instrument Shop C-12	No	None				None		Hose Station Port. Exting.	Manual Manual
0-21A	"	"	Storage C-13	No	Misc.	A	30 lbs.	0.60	None		Hose Station Port. Exting.	Manual Manual
0-21B	"	656' To 836'	Freight Elevator Shaft, and Stair No. 221 (698' thru 825') and Elevator Machine Room	No	Cable Insul Oil	C B	112 lbs. 0.5 gal.	0.61	None		None	
0-22A	"	676'	Toilet and Wash Room C-102 Shower C-103, Drying Room C-104 & Vestibule C-105, Storage Room C-106, Corridor C-117 & C-119, Work Room C-121, Counting Room C-125, Radiation Chem. Lab C-126, Sample Room C-127, Vestibule C-128	No	None				Ionization Detector (Vestibule)	1	Port. Exting. Hose Station	Manual Manual
0-22A	"	"	Decontamination Area C-107, Aux. Decontamination Area C-110, Aux. Locker Room C-113, Janitor Closet Room C-114, Laundry Room C-118, Aux. Toilet Room C-112, Instrument Calibration Room C-123, Chemistry Lab C-124	No	Clothing, Vinyl Flr & Misc.	A	560 lbs.	0.20	None		Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-22A	"	"	Vestibule C-108 & Toilet C-111	No	None				None		Port. Exting. Hose Station	Manual Manual
0-22A	"	"	First Aid Room C-109	No	Furniture	A	300 lbs.	1.00	None		Sprinkler Port. Exting. Hose Station	Auto Manual Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-22A	Control	676'	Protective Clothing Area Room C-115	No	Clothing	A	500 lbs.	2.95	None	-	Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-22A	"	"	Radiation Technician Office C-120	No	Furniture & Misc.	A	100 lbs.	0.66	None		Port. Exting. Hose Station	Manual Manual
0-22A	"	"	Emergency Equipment & Laundry Storage Room C-122	No	Supplies & Laundry	A	300 lbs.	2.30	None		Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-22A	"	687'8"	Filter Area C-129, 130, 131, 132 & 133 and Ceiling Space	Yes	Charcoal Filter Cable Insul	A C	1,400 lbs. 8,686 lbs.	1.81	Heat Detector (Inside Filter Housing)		Deluge Sprinkler (Inside Filter Housing) Hose Station	Auto Manual
0-22B	"	656' To 803'	Stair No. 120 & Passenger Elevator Shaft and Elevator Machine Room	No	Cable Insul	C	112	1.78	None		Hose Station	Manual
0-22C	"	676'	Lobby C-116	No	None				None		Port. Exting. Hose Station	Manual Manual
0-23	"	676' To 695'11"	Stair No. 121 & Suspended Corridor	No	None			None	None		Hose Station	Manual
0-24A	"	698'	UPS Panel Room C-209	No	Cable Insul	C	2,566 lbs.	20.0	Heat Det. Ionization Detector	1 1	Total Flood CO_2 Port. Exting. Hose Station	Auto Manual Manual
0-24B	"	"	Corridor C-200 & C-204	No	Plastic Lam. Flr. Cable Insul	A C	535 sq.ft. 4,076 lbs.	9.17	Heat Det. Ionization Detector	1 1	Port. Exting. Total Flood. CO_2 Above Ceiling & Under Floor Hose Station	Manual Auto Manual
0-24C	"	"	UPS Panel Room C-208	No	Cable Insul	C	3,392 lbs.	25.47	Heat Detector Ionization Detector	1 1	Total Flood. CO_2 Port. Exting. Hose Station	Auto Manual Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES: MATERIAL	COMBUSTIBLES: CLASS	COMBUSTIBLES: QUANTITY	COMBUSTIBLE LOADING: LBS EQUIV WD PER SQ FT FLR AREA	DETECTION CAPABILITY: TYPE	DETECTION CAPABILITY: NO.	SUPPRESSION CAPABILITY: TYPE	SUPPRESSION CAPABILITY: ACTUATION
0-24D	Control	698'1"	Lower Relay Room C-203 & Under PGCC Floor	Yes	Carpeted PGCC Floor.	A	795 sq.ft.	17.50	Ionization Detector	4	Total Flood. CO_2	Auto
					Cable Insul	C	17,900 lbs.		Heat Det.	4	Port. Exting.	Manual
											Unitized Halon Under PGCC Flr.	Auto
											Hose Station	Manual
0-24E	"	698'	Computer Room C-202 & Under PGCC Floor	No	Carpeted PGCC Floor.	A	1,515 sq.ft.	1.55	Ionization Detector	6	Total Flood. CO_2 Inside Rm & Above Ceiling	Auto
					Computer Tapes & Paper.	A	380 lbs.		Heat Det.	12	Port. Exting.	Manual
					Cable Insul	C	1,768 lbs.				Unitized Halon Under PGCC Flr.	Auto
											Hose Station	Manual
0-24F	"	"	Office C-205 & Under PGCC Flr	No	Plastic Lam. Flr.	A	264 sq.ft.	3.78	Ionization Detector	1	Port. Exting.	Manual
					File Cab. & Furniture	A	300 lbs.		Heat Det.	1	Hose Station	Manual
					Cable In Conduit	C	538 lbs.				Total Flooding CO_2	Auto
											Unitized Halon under PGCC Flr.	Auto
0-24F	"	"	Computer Maintenance Room C-206 & Under PGCC Floor	No	Cable Insul	C	1,724 lbs.	6.06	Ionization Detector	3	Total Flood. CO_2	Auto
					Plastic Lam. Flr.	A	450 sq.ft.		Heat Det.	3	Port. Exting.	Manual
					Computer Tape & Paper	A	600 lbs.				Hose Station	Manual
											Unitized Halon under PGCC Flr.	Auto
0-24F	"	"	Vestibule C-207 & Under PGCC Flr.	No	Plastic Lam. Flr.	A	40 sq.ft.	12.57	Ionization Detector	4	Total Flood CO_2	Auto
					Cable Insul	C	421 lbs.		Heat Det.	4	Port. Exting.	Manual
											Hose Station	Manual
											Unitized Halon Under PGCC Flr.	Auto
0-24G	"	698'	Lower Relay Room C-201 & Under PGCC Floor	Yes	Carpeted PGCC Floor	A	795 sq.ft.	19.36	Ionization Detector	4	Total Flood. CO_2	Auto
					Plastic Lam. Flr.	A	160 sq.ft.		Heat Det.	4	Port. Exting.	Manual
					Cable Insul	C	20,066 lbs.				Unitized Halon under PGCC Flr.	Auto
											Hose Station	Manual
0-24I	"	698' To 805'4"	HVAC Duct Chase	No	None				None		None	
0-24J	"	698'	South Cable Chase	No	Cable Insul	C	930 lbs.	25.92	Heat Detector	1	Total Flood. CO_2	Auto

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-24K	Control	698' To 805'4"	HVAC Duct Chase	No	None				None		None	
0-24L	"	698'	Center Cable Chase	No	Cable Insul	C	1,042 lbs.	29.04	Heat Detector	1	Total Flood. CO_2	Auto
0-24M	"	"	North Cable Chase	No	Cable Insul	C	1,042 lbs.	24.89	Heat Detector	1	Total Flood. CO_2	Auto
0-25A	"	714'	Lower Cable Spreading Room C-300	Yes	Cable Insul	C	43,429 lbs.	14.83	a. Ion. Det. b. Heat Det.	6 26	Pre-Action Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-25B	"	"	South Cable Chase	Yes	Cable Insul	C	1,740 lbs.	67.9	Heat Detector	1	Total Flood. CO_2	Auto
0-25C	"	"	Center Cable Chase	Yes	Cable Insul	C	870 lbs.	24.26	Heat Detector	1	Total Flood. CO_2	Auto
0-25D	"	"	North Cable Chase	Yes	Cable Insul	C	870 lbs.	20.78	Heat Detector	1	Total Flood. CO_2	Auto
0-25E	"	"	Lower Cable Spreading Room C-301	Yes	Cable Insul	C	43,429 lbs.	14.78	a. Ion. Det. b. Heat Det.	6 20	Pre-Action Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-26A	"	729'1"	Storage Room C-408	No	Supplies	A	100 lbs.	0.56	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-26B	"	"	South Cable Chase	Yes	Cable Insul	C	983 lbs.	27.42	Ionization Detector	1	Manual Spurt CO_2	Manual
0-26C	"	"	Center Cable Chase	Yes	Cable Insul	C	817 lbs.	22.77	Ionization Detector	1	Manual Spurt CO_2	Manual
0-26D	"	"	North Cable Chase	Yes	Cable Insul	C	817 lbs.	27.33	Ionization Detector	1	Manual Spurt CO_2	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-26E	Control	729'1"	Kitchen C-405	No	Cable in Conduit	C	20 lbs.	0.80	None		Port. Exting. Hose Station	Manual Manual
0-26E	"	"	Toilet and Locker Room C-406	No	14 Lockers w/Clothing	A	70 lbs.	0.80	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-26E	"	"	Janitor Closet C-407	No	Supplies	A	30 lbs.	2.00	None		Port. Exting. Hose Station	Manual Manual
0-26F	"	"	Vestibule C-404	Yes	Plastic Lam. Flr. Cable in Conduit	A C	180 sq.ft. 30 lbs.	0.30	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-26G	"	"	Security - Office Room C-401	Yes	Cable Insul Carpet Furniture	C A A	172 lbs. 375 sq.ft.	1.17	Ionization Detectors	2	Port. Exting. Hose Station Manual Spurt CO_2 (Under Floor)	Manual Manual Manual
0-26H	"	"	Control Room C-409	Yes	Carpet Ceiling Light Fixt. Diffusers Cable Insul	A A C	5,490 sq.ft. 690 sq.ft. 26,325	4.77	Ionization Detector	49	Port. Exting. Manual Spurt CO_2 Under Flr. Hose Station	Manual Manual Manual
0-26I	"	"	Operational Support Ctr.	No	Cable Insul Carpet	C A	192 lbs. 375 sq.ft.	1.26	Ionization Detector	1	Port. Exting. Hose Station Manual Spurt CO_2 (under floor)	Manual Manual Manual
0-26J	"	"	Vestibule C-403	Yes	Plastic Lam. Flr. Cable Insul	A C	96 sq.ft. 30 lbs.	0.61	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-26K	"	741'	Technical Support Center C-410	No	Carpet	A			Ionization Detector	4	Halon 1301 Port. Exting.	Auto Manual
0-26L	"	"	TSC Conference Rom C-411 Emergency Directors Offc-416 & Electrical Rm C-413	No	carpet	A	400 sq.ft.		Ionization Detector	3	Halon 1301 Port. Exting.	Auto Manual
0-26M	"	729'1" To 751'11"	Room C-411 Soffit	Yes	Cable Insul	C	1,218 lbs.	17.8	Ionization Detector	2	Manual Spurt CO_2 System	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-26N	Control	741'	Control Room Unit 1 Soffit (Over Ceiling)	Yes	Cable Insul	C	829 lbs.	7.13	Ionization Detector	2	Manual Spurt CO_2 System	Manual
0-26P	"	"	Control Room Unit 2 Soffit (Over Ceiling)	Yes	Cable Insul	C	819 lbs.	7.05	Ionization Detector	2	Manual Spurt CO_2 System	Manual
0-26K	"	"	Document Control Area C-412	No	None				Ionization Detector	3	Halon Port. Exting. Hose Station	Auto Manual Manual
0-26R	"	727'8" To 751'11"	Room C-412 Soffit	Yes	Cable Insul	C	1,266 lbs.	18.52	Ionization Detector	2	Manual Spurt CO_2 System	Manual
0-26S	"	741'1"	South Cable Chase	Yes	Cable Insul	C	1,589 lbs.	44.29	Heat Detector	1	Total Flood. CO_2	Auto
0-26T	"	"	Center Cable Chase	Yes	Cable Insul	C	795 lbs.	22.16	Heat Detector	1	Total Flood. CO_2	Auto
0-26V	"	"	North Cable Chase	Yes	Cable Insul	C	795 lbs.	26.59	Heat Detector	1	Total Flood. CO_2	Auto
0-27A	"	754'1"	Upper Relay Room C-502	Yes	Carpeted PGCC Flr. Cable Insul	A C	850 sq.ft. 7,884 lbs.	7.64	Ionization Detector Heat Det.	2 2	Unitized Halon in PGCC Floor & Cabinets Port. Exting. Total Flooding CO_2 Inside Rm Hose Station	Auto Manual Auto Manual
0-27B	"	753'	Vestibule No.2 C-505	No	Plastic Lam. Flr. Cable in Conduit	A C	101 sq.ft. 20 lbs.	0.30	Ionization Detector	1	Total Flood. CO_2 Port. Exting. Pre-Action Sprinkler Hose Station	Auto Manual Auto Manual
0-27B	"	"	Upper Cable Spreading Room C-507	Yes	Cable Insul	C	18,669 lbs.	20.74	Ionization Detector Heat Det.	5 24	Total Flood. CO_2 Port. Exting. Hose Station Preaction Sprinkler	Auto Manual Manual Auto

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-27C	Control	753'	Upper Cable Spreading Room C-500	Yes	Cable Insul	C	17,855 lbs.	13.94	Ionization Detector Thermal Heat Det.	6 25	Total Flooding CO_2 Under Flr Port. Exting. Pre-Action Sprinkler Hose Station	Auto Manual Auto Manual
0-27C	"	"	Vestibule No. 1 C-503	No	Plastic Lam. Flr. Cable in Conduit	A C	300 sq.ft. 20 lbs.	0.40	Ionization Detector	1	Total Flood. CO_2 Port. Exting. Pre-Action Sprinkler Hose Station	Auto Manual Auto Manual
0-27D	"	754'	Electrician Office C-504	No	Vinyl Asbes-tos Tile Cable Insul	A C	137 sq.ft. 815 lbs.	5.76	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-27E	"	754'1"	Upper Relay Room C-501	Yes	Carpeted PGCC Flr. Cable Insul	A C	850 sq.ft. 7,884 lbs.	7.64	Ionization Detector Heat Det.	2 2	Unitized Halon in PGCC Floor & Cabinets Port. Exting. Total Flooding CO_2 Inside Rm Hose Station	Auto Manual Auto Manual
0-27F	"	754'	South Cable Chase	Yes	Cable Insul	C	2,133 lbs.	83.24	Heat Det.	1	Total Flood. CO_2	Auto
0-27G	"	"	Center Cable Chase	Yes	Cable Insul	C	1,066 lbs.	29.71	Heat Det.	1	Total Flood. CO_2	Auto
0-27H	"	"	North Cable Chase	Yes	Cable Insul	C	1,066 lbs.	18.01	Heat Det.	1	Total Flood. CO_2	Auto
0-28A	"	771'	Equipment Room C-611, C-612, & C-113	Yes	Cable in Conduit	C	40 lbs.	0.04	Ionization Detector	3	Port. Exting. Hose Station	Manual Manual
0-28B	"	"	Equipment Room C-604, C-605, & C-606	Yes	Cable in Conduit	C	40 lbs.	0.04	Ionization Detector	3	Port. Exting. Hose Station	Manual Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-28C	Control	771'	Battery Room C-615	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28D	"	"	Battery Room C-616	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28E	"	"	Battery Room C-614	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28F	"	"	Battery Room C-610	Yes	Cell Covers Cable Insul	A C	90 lbs. 40 lbs.	0.34	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28G	"	"	Battery Room C-609	Yes	Cell Covers Cable Insul	A C	90 lbs. 40 lbs.	0.34	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28H	"	"	Cold Instrument Repair Shop C-618	Yes	Vinyl Asbes-tos Tile Cable in Conduit	A	688 sq.ft. 40 lbs.	0.48	Ionization Detector	2	Halon 1301 Port. Exting. Hose Station	Auto Manual Manual
0-28I	"	"	Battery Room C-607	Yes	Cell Covers Cable Insul	A C	90 lbs. 40 lbs.	0.34	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28J	"	"	Battery Room C-608	Yes	Cell Covers Cable Insul	A C	90 lbs. 40 lbs.	0.34	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28K	"	"	Battery Room C-600	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28L	"	"	Battery Room C-601	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detection	1	Port. Exting. Hose Station	Manual Manual
0-28M	"	"	Battery Room C-602	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-28N	"	"	Battery Room C-603	Yes	Cell Covers Cable Insul	A C	40 lbs. 20 lbs.	0.40	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-28P	Control	771'	South Cable Chase	Yes	Cable Insul	C	2,133 lbs.	83.24	Heat Det.	1	Total Flood. CO_2	Auto
0-28Q	"	"	Center Cable Chase	Yes	Cable Insul	C	1,066 lbs.	29.71	Heat Det.	1	Total Flood. CO_2	Auto
0-28R	"	"	North Cable Chase	Yes	Cable Insul	C	1,066 lbs.	18.01	Heat Det.	1	Total Flood. CO_2	Auto
0-28S	"	"	HVAC Duct Chase	No	None				None		None	
0-28T	"	"	Battery Room C-617	Yes	Cell Covers Cable Insul	A C	45 lbs. 20 lbs.	0.42	Ionization Detector	1	Hose Station	Manual
0-29A	"	783'	Vestibule C-704	No	None				Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-29B	"	"	H & V Equipment Room C-700	Yes	Cable Insul		4,887 lbs.	1.30	Ionization Detector	8	Port. Exting. Hose Station	Manual Manual
0-29B	"	771'	Fan Room OV-116 A & B, C-701	Yes	Cable in Conduit	C	50 lbs.	0.80	Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-29B	"	783'	Pump Rooms C-702 & C-703	No	Cable in Conduit	C	80 lbs.	0.40	Ionization Detector	1	Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-29C	"	"	Vestibule C-705	No	None				Ionization Detector	1	Port. Exting. Hose Station	Manual Manual
0-29D	"	"	Pipe Room	No	None				None			
0-30A	"	806'	Standby Gas Treatment Filters C-900 & C-912	Yes	Charcoal Filter	A	14,112 lbs.	10.0	Ionization Linear Heat Detector	1 1	Sprinkler Deluge Sprink. in the Filter Hose Station	Auto Auto Manual
0-30A	"	"	Emergency Outside Air Filters C-901 & C-902	Yes	Charcoal Filter	A	2,336 lbs.	14.40	Ionization Heat Detector	1 1	Sprinkler Deluge Sprink. in the filter Hose Station	Auto Auto
0-30A	"	"	Control Panel Room C-903	Yes	Cable Insul	C	30 lbs.	1.09	Ionization Detector	1	Sprinkler Port. Exting. Hose Station	Auto Manual Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-30A	Control	806'	Exhaust Fan Area C-904	No	Cable Insul	C	2,420 lbs.	2.17	Ionization Detector	2	Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-30A	"	"	Smoke Removal Fan Rooms C-905, C-906, C-907, C-908, C-909 & C-910, Expansion Tank Room C-911	No	Cable in Conduit Oil in Chillers	C B	100 lbs. 24 gal.	0.30	Ionization Detector	4	Sprinkler Port. Exting. Hose Station	Auto Manual Manual
0-30B	"	806' To 823'	Stair No. 125	No	None						Hose Reel	Manual

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-31A	Unit 1 Turbine	646'2"	Sump and Condensate Pump Room I-2 & Condensate Pump Room I-3	No	Lube Oil Cable Insul	B C	375 gal max (enclosed) 100 lbs.	2.73	None		Hose Station	Manual
0-31A	"	656'	Recombiner Room I-32	No	None				None		Hose Station	Manual
1-31B	"	646' & 656'	Pipe Tunnel I-1 & Recombiner I-34	No	None				None		Hose Station	Manual
1-31C	"	656'	Condensate Pump Room I-30	No	Cable Insul	C	850 lbs.	1.16	None		Hose Station	Manual
1-31C	"	"	Condensate Pump Room I-31	No	Cable Insul	C	666 lbs.	0.59	None		Hose Station	Manual
1-31C	"	661'6"	Steam Packing Exhauster Room I-33	No	Cable Insul		3,827 lbs.	2.06	None		Hose Station	Manual
1-31C	"	656'	Recombiner Piping Room I-35 & Pipeway I-56	No	None				None		Hose Station	Manual
1-31D	"	"	Condenser Area I-36	No	Cable Insul	C	9,418 lbs.	1.43	None		Sprinkler Hose Station	Auto Manual
1-31D	"	"	Reactor Feed Pump Turbine Exhaust Areas I-37, I-38 & I-39	No	Lube Oil	B	180 gal. (Each)	17.65	None		Sprinkler Hose Station	Auto Manual
1-31D	"	661'6"	Condenser Pad I-40	No	Cable Insul	C	7,365 lbs.	1.30	None		Hose Station	Manual
1-31E	"	656'2"	Centrifuge and Conditioner Room I-53	No	Lube Oil Cable Insul	B C	50 gal. 977 lbs.	2.57	Heat Det.	6	Deluge Sprinkler Hose Station	Auto Manual
1-31F	"	"	Caustic Storage Tank I-44 Acid Storage Tank I-45	No	Cable Insul	C	5,382 lbs.	2.38	None		Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-31F	Unit 1 Turbine	656'2"	Neutralizing Pumps I-51	No	Cable Insul	C	1,625 lbs.	1.43	None		Hose Station	Manual
1-31F	"	"	Pump Area I-52	No	Lube Oil Cable Insul	B C	3,000 gal. 12,318 lbs.	11.32	Heat Det.	6	Deluge Sprinkler Hose Station	Auto Manual
1-31F	"	"	Startup & Test Room I-54	No	Cable Insul	C	1,590 lbs.	1.38	None		Hose Station	Manual
1-31G	"	"	Condensate Demineralizer Pipeway I-42	No	Cable Insul	C	5,469 lbs.	2.01	None		Hose Station	Manual
1-31G	"	"	Neutralizing Tanks I-43	No	Cable Insul	C	1,331 lbs.	1.14	None		Hose Station	Manual
0-31H	"	"	Vacuum Pump Rooms I-55 & II-55, Corridor C-15	No	Cable in Conduit	C	2,196 lbs.	1.76	None		Hose Station	Manual
1-31I	"	656' To 737'	Stair No. 131	No	None				None		Hose Station	Manual
1-31J	"	656' To 684'	Stair No. 130	No	None				None		Hose Station	Manual
0-32A	"	676'	Central Area C-100	No	Cable Insul	C	31,298 lbs.	2.83			Sprinkler Hose Station	Auto Manual
1-32B	"	682'	Air Ejector Room I-111	No	Cable Insul	C	1,165 lbs.	0.97	None		Hose Station	Manual
1-32C	"	"	Air Ejector Room I-112	No	Cable Insul	C	339 lbs.	0.43	None		Hose Station	Manual
1-32D	"	676'	Condenser Gallery I-113	No	Lube Oil Cable Insul	B C	2,000 gal. 16,464 lbs.	4.90	None		Sprinkler Hose Station	Auto Manual
1-32E	"	"	Hydro Control Power Room I-126	No	Cable in Conduit	C	130 lbs.	0.30	None		Sprinkler Hose Station	Auto Manual

TABLE 6-1

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-32F	Unit 1 Turbine	676'	North Railroad Bay I-127	No	Freight Transient Cable Insul	C	7,793 lbs.	1.52	None		Sprinkler Hose Station	Auto Manual
1-32G	"	"	Demineralizer Vessel I-123 & I-124, Condensate Demin Resin Regeneration I-125	No	None				None		Hose Station	Manual
1-32H	"	"	Demineralizer Vessel I-117, I-118, I-119, I-120 & I-121	No	None				None		Hose Station	Manual
1-32I	"	"	Sample Station I-110	No	Cable Insul	C	533 lbs.	1.78	None		Hose Station	Manual
1-32I	"	"	RFP Turbine Room I-114	No	Cable Insul Lube Oil	C B	436 lbs. 180 gal.	5.53	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
1-32I	"	"	RFP Turbine Room I-115	No	Cable Insul Lube Oil	C B	327 lbs. 180 gal.	5.36	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
1-32I	"	"	RFP Turbine Room I-116	No	Cable Insul Lube Oil	C B	291 lbs. 180 gal.	5.29	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
1-32I	"	"	Personnel Air Lock I-122	No	None				None		Hose Station	Manual
1-32I	"	"	Demin Equip. Area I-128	No	Cable Insul	C	29,529 lbs.	6.00	None		Hose Station	Manual
1-32J	"	676' To 737'	Stair No. 136	No	None				None		Hose Station	Manual
1-33A	"	699'	Lower Switchgear Room I-220	No	Cable Insul	C	7,395 lbs	2.80	Ionization Detector	5	Port. Exting. Hose Station	Manual Manual

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
1-33B	Unit 1 Turbine	699'	Hydro Seal Oil Unit Iso Phase Bus Area I-210	No	Oil Seal Cable Insul	B C	680 gal. 12,244 lbs	7.00	Heat Det.	4	Deluge Sprinkler Sprinkler Hose Station	Auto Auto Manual
1-33B	"	"	Alcove I-213	No	Cable Insul	C	3,652 lbs.	2.33	None		Hose Station	Manual
1-33B	"	"	Boiler Area I-217	No	Cable Insul	C	10,739 lbs.	1.96	None		Hose Station	Manual
1-33B	"	"	Corridor I-218	No	Cable Insul	C	9,833 lbs.	8.12	None		Hose Station	Manual
1-33B	"	"	Corridor I-219	No	Cable Insul	C	4,417 lbs.	4.27	None		Hose Station	Manual
1-33C	"	"	Condenser Mezzanine I-211	No	Cable Insul	C	15,055 lbs.	1.23	None		Sprinkler Hose Station	Auto Manual
1-33D	"	"	Main Turbine Lube Oil Reservoir I-216	No	Lube Oil Cable Insul	B C	10,000 gal. 286 lbs.	304.0	Heat Det.	3	Deluge Sprinkler Hose Station	Auto Manual
1-33E	"	"	Feedwater Heater Cell I-215	No	Cable Insul	C	3,945 lbs.	2.37	None		Hose Station	Manual
1-33F	"	"	Feedwater Heater Cell I-214	No	Cable Insul	C	2,551 lbs.	1.27	None		Hose Station	Manual
1-33G	"	"	Feedwater Heater Cell I-212	No	Cable Insul	C	4,039 lbs.	2.09	None		Hose Station	Manual
0-33H	"	"	Hatch Access Area C-212	No	Cable Insul	C	14,140 lbs.	4.43	None		Hose Station	Manual
1-33I	"	699' To 770'	Stair No. 147	No	None				None		Hose Station	Manual
1-34A	"	714'	Upper Switchgear Room I-301	No	Cable Insul	C	2,462 lbs.	1.00	Ionization Detector	5	Port. Exting. Hose Station	Manual Manual
1-34B	"	714'9"	Main Steam Pipeway I-300, I-411 (For cont. see Reactor Fire Zone 1-4G)	No	Cable Insul	C	605 lbs.	1.60	None		Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-35A	Unit 1 Turbine	729'	Generator Area C-400	No	Cable Insul Lube Oil	C B	9,620 lbs. 2 gal.	0.58	None		Hose Station	Manual
1-35B	"	"	Moisture Separator Area I-419 & I-421, Turbine Area I-420	No	Cable Insul Lube Oil	C B	6,500 lbs. 8 gal.	0.67	Heat Det.	12	Hose Station Deluge Sprinkler (Bearings)	Manual Auto
1-35C	"	"	Motor Generator Area I-415	No	Cable Insul Lube Oil	C B	6,553 lbs. 50 gal.	0.77	Heat Det.	14	Deluge Sprinkler Hose Station	Auto Manual
1-35C	"	"	Evaporator Area I-416	No	Cable Insul	C	157 lbs.	0.22	None		Hose Station	Manual
1-35C	"	"	Turbine Laydown Area I-418	No	None				None		Hose Station	Manual
1-35C	"	"	Uncontrolled Passage Area I-422	No	Cable Insul	C	6,710 lbs.	2.15	None		Port. Exting. Hose Station	Manual Manual
1-36A	"	762'	Turbine Bldg H&V Equipment Room I-530	No	Cable Insul	C	11,507 lbs.	1.96	None		Port. Exting. Hose Station	Manual Manual
1-36A	"	"	Filter Room I-531 & Filter Room I-532	No	Charcoal Filter	A	10,222 lbs.	28.65	Heat Det.		Deluge Sprinkler	Auto
1-36B	"	762' To 793'	Stair No. 141	No	None				None		Hose Station	Manual

TABLE 6-1

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-31A	Unit 2 Turbine	646'	Sump and Condensate Pump Room II-2 & Condensate Pump Room I-3	No	Lube Oil Cable Insul	B C	375 gal max (enclosed) 100 lbs.	2.73	None		Hose Station	Manual
2-31B	"	646' & 656'	Pipe Tunnel II-1 & Recombiner Room II-34	No	None				None		Hose Station	Manual
2-31C	"	656'	Condensate Pump Room II-30	No	Cable Insul	C	850 lbs.	1.16	None		Hose Station	Manual
2-31C	"	"	Condensate Pump Room II-31	No	Cable Insul	C	666 lbs.	0.59	None		Hose Station	Manual
2-31C	"	661'6"	Steam Packing Exhauster Room II-33	No	Cable Insul		3,827 lbs.	2.06	None		Hose Station	Manual
2-31C	"	656'	Recombiner Piping Room II-35 & Pipeway II-56	No	None				None		Hose Station	Manual
2-31C	"	"	Pipeway II-56	No	None				None		Hose Station	Manual
2-31D	"	"	Condenser Area II-36	No	Cable Insul	C	9,418 lbs.	1.43	None		Sprinkler Hose Station	Auto Manual
2-31D	"	"	Reactor Feed Pump Turbine Exhaust Areas II-37, II-38 & II-39	No	Lube Oil	B	180 gal. (Each)	17.65	None		Sprinkler Hose Station	Auto Manual
2-31D	"	661'6"	Condenser Pad II-40	No	Cable Insul	C	7,365 lbs.	1.30	None		Hose Station	Manual
2-31E	"	656'2"	Centrifuge and Conditioner Room II-53	No	Lube Oil Cable Insul	B C	50 gal. 977 lbs.	2.57	Heat Det.	6	Deluge Sprinkler Hose Station	Auto Manual
2-31F	"	"	Caustic Storage Tank II-44 Acid Storage Tank II-45	No	Cable Insul	C	5,382 lbs.	2.38	None		Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-31F	Unit 2 Turbine	656'2"	Neutralizing Pumps II-51	No	Cable Insul	C	1,625 lbs.	1.43	None		Hose Station	Manual
2-31F	"	"	Pump Area II-52	No	Lube Oil Cable Insul	B C	3,000 gal. 12,318 lbs.	11.32	Heat Det.	6	Deluge Sprinkler Hose Station	Auto Manual
2-31F	"	"	Startup & Test Room II-54	No	Cable Insul	C	1,590 lbs.	1.38	None		Hose Station	Manual
2-31G	"	"	Condensate Demineralizer Pipeway II-42	No	Cable Insul	C	5,469 lbs.	2.01	None		Hose Station	Manual
2-31G	"	"	Neutralizing Tanks II-43	No	Cable Insul	C	1,331 lbs.	1.14	None		Hose Station	Manual
2-31I	"	656' To 737'	Stair No. 231	No	None				None		Hose Station	Manual
2-31J	"	656' To 684'	Stair No. 230	No	None				None		Hose Station	Manual
2-32B	"	682'	Air Ejector Room II-111	No	Cable Insul	C	1,165 lbs.	0.97	None		Hose Station	Manual
2-32C	"	"	Air Ejector Room II-112	No	Cable Insul	C	339 lbs.	0.43	None		Hose Station	Manual
2-32D	"	676'	Condenser Gallery II-113	No	Lube Oil Cable Insul	B C	2,000 gal. 16,464 lbs.	4.90	None		Sprinkler Hose Station	Auto Manual
2-32E	"	"	Hydro Control Power Room II-126	No	Cable in Conduit	C	130 lbs.	0.30	None		Sprinkler Hose Station	Auto Manual
2-32F	"	"	North Railroad Bay II-127	No	Freight Transient		7,793 lbs.	1.52	None		Sprinkler Hose Station	Auto Manual
2-32G	"	"	Demineralizer Vessel II-123 & II-124, Condensate Demin Resin Regeneration II-215	No	None				None		Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-32H	Unit 2 Turbine	676'	Demineralizer Vessel II-117, II-118, II-119, II-120 & II-121	No	None				None		Hose Station	Manual
2-32I	"	"	Sample Station II-110	No	Cable Insul	C	533 lbs.	1.78	None		Hose Station	Manual
2-32I	"	"	RFP Turbine Room II-114	No	Cable Insul Lube Oil	C B	436 lbs. 180 gal.	5.53	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
2-32I	"	"	RFP Turbine Room II-115	No	Cable Insul Lube Oil	C B	327 lbs. 180 gal.	5.36	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
2-32I	"	"	RFP Turbine Room II-116	No	Cable Insul Lube Oil	C B	291 lbs. 180 gal.	5.29	Heat Detector	3	Pre-Action Sprinkler Hose Station	Auto Manual
2-32I	"	"	Personnel Air Lock II-122	No	None				None		Hose Station	Manual
2-32I	"	"	Demin Equip. Area II-128	No	Cable Insul	C	29,529 lbs.	6.00	None		Hose Station	Manual
2-32J	"	676' Thru 737'	Stair No. 236	No	None				None		Hose Station	Manual
2-32K	"	676' Thru 770'	Stair No. 235	No	None				None		Hose Station	Manual
2-33A	"	699'	Lower Switchgear Room II-220	No	Cable Insul	C	7,395 lbs	2.80	Ionization Detector	5	Port. Exting. Hose Station	Manual Manual
2-33B	"	"	Hydro Seal Oil Unit Iso Phase Bus Area II-210	No	Oil Seal Cable Insul	B C	680 ga. 12,244 lbs	7.00	Heat Detector	4	Deluge Sprinkler Sprinkler Hose Station	Auto Auto Manual
2-33B	"	"	Alcove II-213	No	Cable Insul	C	3,652 lbs.	2.33	None		Hose Station	Manual
2-33B	"	"	Boiler Area II-217	No	Cable Insul	C	10,739 lbs.	1.96	None		Hose Station	Manual

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-33B	Unit 2 Turbine	699'	Corridor II-218	No	Cable Insul	C	9,833 lbs.	8.12	None		Hose Station	Manual
2-33B	"	"	Corridor II-219	No	Cable Insul	C	4,417 lbs.	4.27	None		Hose Station	Manual
2-33C	"	"	Condenser Mezzanine II-211	No	Cable Insul	C	15,055 lbs.	1.23	None		Sprinkler Hose Station	Auto Manual
2-33D	"	"	Main Turbine Lube Oil Reservoir II-216	No	Lube Oil Cable Insul	B C	10,000 286 lbs.	304.0	Heat Detector	3	Deluge Sprinkler Hose Station	Auto Manual
2-33E	"	"	Feedwater Heater Cell II-215	No	Cable Insul	C	3,945 lbs.	2.37	None		Hose Station	Manual
2-33F	"	"	Feedwater Heater Cell II-214	No	Cable Insul	C	2,551 lbs.	1.27	None		Hose Station	Manual
2-33G	"	"	Feedwater Heater Cell II-212	No	Cable Insul	C	4,039 lbs.	2.09	None		Hose Station	Manual
2-34A	"	714'	Upper Switchgear Room II-301	No	Cable Insul	C	2,462 lbs.	1.00	Ionization Detector	5	Port. Exting. Hose Station	Manual Manual
2-34B	"	714'9"	Main Steam Pipeway II-300 (For cont. see Reactor Fire Zone 2-4G)	No	None				None		Port. Exting.	Manual
2-35B	"	729'	Moisture Separator Area II-419 & II-421, Turbine Area II-420	No	Cable Insul Lube Oil	C B	6,500 lbs. 8 gal.	0.67	Heat Detector	12	Hose Station Deluge Sprinkler (Bearings)	Manual Auto
2-35B	"	"	Moisture Separator Area II-421	No	Cable Insul	C	3,037 lbs.	1.42	None		Hose Station	Manual
2-35C	"	"	Motor Generator Area II-415	No	Lube Oil Cable Insul	B C	50 gal. 6,553 lbs.	0.77	Heat Detector	14	Deluge Sprinkler Hose Station	Auto Manual

TABLE 6-1

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
2-35C	Unit 2 Turbine	729'	Evaporator Area II-416	No	Cable Insul	C	157 lbs.	0.22	None		Hose Station	Manual
2-35C	"	"	Turbine Laydown Area II-418	No	None				None		Hose Station	Manual
2-35C	"	"	Uncontrolled Passage Area II-422	No	Cable Insul	C	6,710 lbs.	2.15	None		Port. Exting. Hose Station	Manual Manual
2-36A	"	762'	Turbine Bldg H&V Equipment Room II-530	No	Cable Insul	C	11,507 lbs.	1.96	None		Port. Exting. Hose Station	Manual Manual
2-36A	"	"	Filter Room II-531 & Filter Room II-532	No	Charcoal Filter	A	10,222 lbs.	28.65	Heat Detector		Deluge Sprinkler	Auto
2-36B	"	762' Thru 793'	Stair No. 241	No	None				None		Hose Station	Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-41A	Diesel Generator	660', 677', 710'9", and 723'	Diesel Generator Bay DG-1 & Cableway & Pipeway DG-9 Diesel Generator Bay DG-16 Fan Room DG-25 & Exhaust Silencer Area DG-29	Yes	Cable Insul Diesel Fuel Oil Lube Oil	C B B	90 lbs. 550 gal. 300 gal.	8.18	Smoke Det. Flame Det. Heat Det.	15 2 22	Pre-Action Sprinkler Port. Exting.	Auto Manual
0-41B	"	"	Diesel Generator Bay DG-3, Oil Interceptor Unit DG-5 & Gravity Collector Sump DG-6, Cableway & Pipeway DG-11, Diesel Gen. Bay DG-18, Fan Room DG-27 & Exhaust Silencer Area DG-31	Yes	Max. Oil w/Water (Sump) Cable Insul Diesel Fuel Oil Lube Oil	B C B B	99 gal. 90 lbs. 550 gal. 300 gal.	8.23	Smoke Det. Flame Det. Heat Det.	15 2 23	Pre-Action Sprinkler Port. Exting.	Auto Manual
0-41C	"	"	Diesel Generator Bay DG-2, Cableway & Pipeway DG-10, Diesel Generator Bay DG-17, Fan Room DG-26 & Exhaust Silencer Area DG-30	Yes	Dirty Lube Oil Cable Insul Diesel Fuel Oil Lube Oil	B C B B	1200 gal. 90 lbs. 550 gal. 300 gal.	19.66	Smoke Det. Flame Det. Heat Det.	15 2 22	Pre-Action Sprinkler Port. Exting.	Auto Manual
0-41D	"	"	Diesel Generator Bay DG-4 & Cableway & Pipeway DG-12, Diesel Generator Bay DG-19, Fan Room DG-28 & Exhaust Silencer Area DG-32	Yes	Cable Insul Diesel Fuel Oil Lube Oil	C B B	90 lbs. 550 gal. 300 gal.	8.18	Smoke Det. Flame Det. Heat Det.	15 2 22	Pre-Action Sprinkler Port. Exting.	Auto Manual

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Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-61A	Radwaste	646'	Laundry Drain Sample Tank R-2, Chemical Tank R-3, Chemical Tank Pumps R-4, Evaporator & Condenser R-5, Evap. Concentrate Sample Tank R-6, Evap. Dist. Sample Tank R-7, Evap. Concentrate Storage Tank R-8 & Evaporator & Condenser R-9	No	Wiring in Conduit	C	60 lbs.	0.06	None		Hose Station	Manual
0-61A	"	"	Corridor R-10	No	Cable Insul	C	9,494 lbs.	8.12	None		Hose Station	Manual
0-61A	"	"	Collection & Surge Tank Pumps R-20, Decontamination Room R-35 & R-36, Transfer Motor & Winch Area R-37	No	None				None		Hose Station	Manual
0-61A	"	"	MCC Area R-21	No	Cable Insul	C	2,572 lbs.	4.48	None		Hose Station	Manual
0-61A	"	"	Optical Surveillance and Control Area R-22	No	Cable Insul	C	2,915 lbs.	1.68	None		Hose Station	Manual
0-61A	"	"	Elevator Lobby R-23	No	None				Ionization Detector	1	Hose Station	Manual
0-61A	"	"	Tank Vent Filter Room R-34	No	Charcoal Filter	A	210 lbs.	0.92	Heat Det.		Hose Station Deluge Sprinkler	Manual Auto
0-61B	"	646' to 674'	Sample Tanks R-11, Sample Tanks Pumps R-12, Demineralizer Valve Nest R-13, Sump Pumps R-14, Surge Tanks R-15, Surge Tanks R-16, Collection Tanks R-17, Collection Tanks R-18, Collection Tanks R-19 & Demineralizer R-102	No	Wiring in Conduits	C	60 lbs.	0.20	None		Hose Station	Manual
0-61C	:	646' To 686'8"	Stair No. 520	No	None				None		Hose Station	Manual
		646'	H&V Filter OF 359	Yes	Charcoal	A					Hose Station Deluge Sprinkler	Manual Auto

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-61D	Radwaste	646' To 684'	Stair No. 501	No	None				None		Hose Station	Manual
0-61E	"	646' To 684'	Stair No. 502	No	None				None		Hose Station	Manual
0-61E	"	646'	Machine Room R-33	No	Cable Insul	C	15 lbs.	0.31	None		Port. Exting.	Manual
0-61F	"	"	Loading R-24, Filling & Capping R-25, Decontamination Room R-26 & Pick-up R-27	No	None				None		Hose Station	Manual
0-61G	"	646' To 674'	Spent Resin Tank R-28, Phase Separator Pumps R-29, Waste Sludge Phase Separator R-30, Phase Separator R-31, Water Clean-up Phase & Separator R-32	No	Wiring in Conduit	C	60 lbs.	0.04	None		Hose Station	Manual
0-62	"	660'3"	Degasifier Filter of 373								Deluge Sprinkler	Auto
0-62	"	661'3"	Pipeway R-100 & R-101	No	None				None		Hose Station	Manual
0-62	"	661'3"	Circulation Area R-103, Waste Mixing Tank R-106 & R-107 & General Areas R-108	No	Cable Insul	C	2,398 lbs.	1.16	None		Hose Station	Manual
0-62	"	660'3"	Elevator Lobby R-104	No	None				Ionization Det.	1	Hose Station	Manual
0-62	"	"	Solidification Catalyst Agents Tanks & Pumps R-105	No	Cable Insul	C	1,905 lbs.	1.52	None		Hose Station	Manual
0-62	"	661'3"	Cement Silo R-217	No	None				None		Port. Exting.	Manual
0-63A	"	676'	Controlled Zone Shop R-200	No	Bales	A	500 lbs.	0.35	None		Sprinkler Hose Station	Auto Manual

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-63A	Radwaste Bldg.	676' To 714'	Washdown Area R-201, Passage R-203, Vestibule R-204, Passage R-221, Cube Container R-222, Monitoring & Final Decontamination R-223, Filled Container Storage Area R-224, Dewatering R-225 & R-227, Decontamination R-229	No	None				None		Sprinkler Hose Station	Auto Manual
0-63A	"	676'	Storage R-202	No	Misc Supplies	A	200 lbs.	0.05	None		Sprinkler Hose Station	Auto Manual
0-63A	"	"	Welding Area R-205 & Repair Area R-216	No	Cable in Conduit	C	20 lbs.	0.14	None		Sprinkler Hose Station	Auto Manual
0-63A	"	"	Hepa Filter Rooms R-212 & R-213, Trash Compactor Room	No	Cable in Conduit & Misc.	C	120 lbs.	0.18	None		Hose Station	Manual
0-63A	"	"	Liquid and Solid Radwaste Control Center R-206	No	Cable Insul	C	5,129 lbs.	3.84	Ionization Det.	5	Port. Exting. Hose Station	Manual Manual
0-63A	"	"	Sampling Station R-207, Repair Room R-208, Off-Gas Compressor Unit 2 R-218	No	Cable in	C	300 lbs.	0.4	None		Port. Exting. Hose Station	Manual Manual
0-63A	"	"	Circulation Area R-209	No	Cable Insul	C	1,267 lbs.	1.56	None		Hose Station	Manual
0-63A	"	"	General Area R-210	No	Cable Insul	C	1.853 lbs.	2.05	None		Hose Station	Manual
0-63A	"	"	Passage R-211	No	Cable Insul		577 lbs.	1.08	None		Hose Station	Manual
0-63A	"	"	Storage & Equip. Area R-220	No	Cable Insul	C	6,366 lbs.	1.8	None		Hose Station	Manual
0-63A	"	"	Filter & Precoat Tanks R-226	No	Cable Insul	C	1,625 lbs.	4.09	None		Hose Station	Manual
0-63A	"	"	Elevator Lobby R-228	No	None				Ionization Det.	1	Hose Station	Manual

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TABLE 6-1

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FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-63B	Radwaste Bldg.	677'9"	Charcoal Adsorber Rms RI-240, RII-240, RI-242 & RII-242, Guard Bed RI-243 & RII-243, Access Area RI-241 & RII-241, Water Removal Skid RI-244, RII-244, RI-245 & RII-245	No	Charcoal Adsorber Vessels	A	331,000 lbs.	2.09	None		Hose Station	Manual
0-63C	"	676'	Hepa Filters RI-246, RII-246, RI-247 & RII-247	No	None				None		Hose Station	Manual
0-63D	"	"	Circulation Area R-230	No	None				None		Hose Station	Manual
0-63E	"	676' To 714'	Stair No. 508	No	None				None		Hose Station	Manual
0-64A	"	691' -6"	Storage R-300	No	Suppliers	A	100 lbs.	0.78	None	–	Sprinkler Hose Station	Auto Manual
0-64A	"	"	Blue Laundry R-305, Janitor Room R-306, Storage Room R-307	No	Clothes Supplies	A A	150 lbs. 70	0.30	None		Sprinkler Hose Station	Auto Manual
0-64A	"	"	White Laundry R-308	No	Cable Insul Clothes	C A	148 lbs. 150 lbs.	0.43	None		Sprinkler Hose Station	Auto Manual
0-64A	"	"	Electric Equipment Room R-309	No	Cable Insul	C	1,099 lbs.	0.90	Ionization Det.	5	Hose Station	Manual
0-64B	"	"	Decontamination Room R-302	No	Cable Insul	C	51 lbs.	0.62	None	–	Sprinkler Hose Station	Auto Manual
0-64B	"	"	Exhaust Fan Room R-310	No	Cable Insul	C	97 lbs.	0.14	None		Hose Station	Manual
0-64B	"	"	Exhaust Filter Room R-311, Exhaust Filter Room R-312	No	Cable Insul	C	176 lbs.	0.32	None		Hose Station Port. Exting.	Manual Manual
0-64B	"	"	Supply Air Fans & Chiller R-313	No	Cable Insul	C	4,249 lbs.	2.10	None		Hose Station Port. Exting.	Manual Manual

TABLE 6-1

Date: 3/81 Page 35

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-64C	Radwaste Bldg.	691' -6"	Auxiliary Decontamination Room R-301	No	Cable Insul	C	60 lbs.	0.83	None	-	Sprinkler Hose Station	Auto Manual
0-64C	"	"	Health Physics R-303	No	Clothing	A	50 lbs.	0.30	None		Sprinkler Hose Station	Auto Manual
0-64C	"	"	Access Control R-304	No	Cable Insul	C	125 lbs.	0.94	None		Sprinkler Hose Station	Auto Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-71A	CW Pump House & Water Treat	661'	Clarifier Sludge Discharge Pump Area CW-8	No	Cable Insul	C	2,629 lbs.	3.32	None		Hose Station	Manual
0-71A	"	"	Acid Storage Tank and Pump Area CW-9, Chemical Waste Sump CW-11, Neutralization Basins CW-12 & CW-13, Clarifier Sludge Hold Up Sump CW-7 & Caustic Storage Tank & Pump Area CW-10	No	Cable Insul	C	120 lbs.	0.10	None		Hose Station	Manual
0-71B	"	"	Fire and Service Water Pump Area CW-1 & Oil Separator CW-5 & CW-6	No	Cable Insul Oil in Separator	C B	7,265 lbs. 108 gal.	2.24	None		Hose Station	Manual
0-71B	"	"	Circulating Water Pump Areas CW-2 & CW-3	No	Cable Insul	C	437 lbs.	0.11	None		Hose Station	Manual
0-71B	"	676'	Transformer Areas CW-22 & CW-23	No	2-1500 KVA 13.8-4.16 KV Transformer Cable Insul	C	900 lbs.	0.69	None		Hose Station Port. Exting.	Manual Manual
0-71C	"	661' To 701'	Stair No. 362	No	None				None		Hose Station	Manual
0-72A	"	676'	Equipment Area CW-24	No	Cable Insul	C	60 cu. ft. 2,505 lbs.	0.69	None		Hose Station	Manual
0-72B	"	"	Diesel Engine Driven Fire Pump Room CW-21	No	Diesel Fuel Oil	B	550 gal.	21.73	None		Wet Pipe Sprinkler Port. Exting.	Auto Manual
0-72C	"	"	Fire and Service Water Pump Area CW-20	No	Cable Insul	C	3,526 lbs.	0.78	None		Hose Station	Manual
0-73	"	693'	Toilet CW-30, Laboratory CW-31 & Janitory Closet CW-33	No	Misc. Supplies	A	50 lbs.	0.78	None		Hose Station	Manual

TABLE 6-1

Date: 3/81

FIRE ZONE	BUILDING	ELEV	SPACE DESIGNATED	SAFETY RELATED	COMBUSTIBLES			COMBUSTIBLE LOADING	DETECTION CAPABILITY		SUPPRESSION CAPABILITY	
					MATERIAL	CLASS	QUANTITY	LBS EQUIV WD PER SQ FT FLR AREA	TYPE	NO.	TYPE	ACTUATION
0-73	CW Pump House & Water Treat	693'	Equipment Area CW-32	No	Cable Insul	C	1,277 lbs.	0.38	None		Hose Station	Manual
0-81	River Intake Structure	526'	River Intake Structure	No	Cable Insul	C	4,800 lbs.	1.15	Ionization Detector	12	Hose Station Port. Exting.	Manual Manual
0-82	Chlorine and Sulfuric Acid	697'	Chlorine and Sulfuric Acid Storage Bldg	No	Cable in Conduit	C	1,400 lbs.	0.25	None		None	
0-51	Loop A ESSW Pump House	685'-6"	Loop A Engineered Safeguard Service Water Pump Room	Yes	Lube Oil Cable Insul	B C	20 gal. 1,050 lbs.	1.64	Ionization Detector	7	Port. Exting.	Manual
0-52	Loop B ESSW Pump House	"	Loop B Engineered Safeguard Service Water Pump Room	Yes	Lube Oil Cable Insul	B C	20 gal. 1,050 lbs.	1.64	Ionization Detector	7	Port. Exting.	Manual

TABLE 6-2

INSULATION AND JACKETING OF CABLES USED IN SSES

Cable Application	Insulation	Jacket
Instrumentation	EPR (Ethylene Propylene Rubber)	Hypalon (Chlorosulfonated Polyethylene)
Coaxial and Triaxial	Rayoline F (Cross-linked Radiation Resistant Polyolefin)	Flamtrol (Flame Retardant Cross-linked Polyolefin)
600 V Control	EPR	Hypalon
600 V Power	EPR	Hypalon
5kV and 15 kV Power	Hi-Temp Kerite	Kerite FR
Communication	PVC (Partial) EPR (Partial)	PVC (Partial) Hypalon (Partial)

TABLE 6-3

GE SUPPLIED ACR/PGCC, AND COMPUTER CABLES USED IN SSES

Cable Application	Insulation	Jacket
Instrumentation & Control	Vulkene	Geoprene
Instrumentation & Control	Radiation cross-linked Polyalkene polyvinylidene Fluoride or Tefzel ETRE Fluoropolymer	Radiation cross-linked modified polyolefin or Tefzel ETRE
Instrumentation & Control	Tefzel	Tefzel
Instrumentation & Control	1st Alkene-imide Polymer 2nd Crosslinked Radiation Resistant Polyolefin 3rd Crosslinked Radiation Resistant Polyolefin	Flame retardant noncorrosive crosslinked Polyolefin
Instrumentation & Control	Crosslinked Polyolefin	Crosslinked Polyolefin
Computer Cables	Polyvinyl Chloride (PVC)	Polyvinyl Chloride (PVC)

TABLE 6-4

SYSTEMS REQUIRED FOR SAFE SHUTDOWN

Group I - Systems Required for Both Hot and Cold Shutdown

Control Rod Drive - Manual Scram Circuits only
Main Steam Isolation Valves (manual closure functions only)
Suppression Pool Temperature Monitoring
Reactor Pressure Vessel Instrumentation

Group II - Systems Required for Hot Shutdown

Division I

RCIC
ADS
ESW
ESSW Pumphouse HVAC
Diesel Generators and Auxiliaries
Diesel Generator HVAC
Containment Instrument Gas

Division II

HPCI
plus all Division II of those systems under Group II,
Division I except RCIC

Group III - Systems Required for Cold Shutdown

Division I

RHR
RHRSW
ESW
ESSW Pumphouse HVAC
Diesel Generators and Auxiliaries
Diesel Generator HVAC

Division II

All Division II of above systems under Group III,
Division I.

Appendix A to this report
is considered to be
confidential in nature
and its distribution is
controlled.

APPENDIX B - SAFETY-RELATED RACEWAY AND CABLE NOMENCLATURE

A. Raceway Number

1. Cable Tray Number

Trays are identified by 6-character numbers of the form LNLLNN (L = Letter, N = Number).

A. Channel/Division identification letter is assigned to the first character for the tray numbers. This identification is used for separation and semi-automatic cable routing for engineered safeguard systems. The identification letters are as follows:

A - Engineered Safeguard Channel A

B - Engineered Safeguard Channel B

C - Engineered Safeguard Channel C

D - Engineered Safeguard Channel D

E - Engineered Safeguard Div I

F - Engineered Safeguard Div II

B. Plant unit number is assigned to the second character for the cable tray numbers. "1" indicates Unit 1 or common to Units 1 and 2; "2" indicates Unit 2.

C. A letter indicating system voltage is assigned to the third character for the tray number as follows:

P, R - Low Voltage Power System

K, L - Control

M, N - Instrumentation

D. Fourth character of engineered safeguard trays identifies "Main" runs, and letters A through Z are used for these runs.

E. The fifth and sixth characters are arbitrary section numbers. The sections are consecutively numbered (01 through 99).

F. Notes

1. Tray designations are not related to building areas or elevations.

2. Tray and conduit numbers are not changed at area boundaries.

3. The third character of an engineered safeguard tray number is also the tray run identification.

G. Examples

1. Engineered-Safeguard (Main Run)

A I K B 99

- 99 — Tray Section 99
- B — Main or Branch Run B
- K — Control
- I — Unit 1
- A — Engineered Safeguard Channel A

2. Conduit Number

Conduits are identified by a 6 character number of the form LNLNN for engineered safeguard and reactor protection systems.

A. A letter is assigned to identify engineered safeguard and reactor protection systems. This identification is essential for separation and cable routing. This system identification letter is assigned to the first character of the engineered safeguard and reactor protection system conduit numbers as listed below:

A - Engineered Safeguard Channel A

B - Engineered Safeguard Channel B

C - Engineered Safeguard Channel C

D - Engineered Safeguard Channel D

E - Engineered Safeguard Div I

F - Engineered Safeguard Div II

U - Reactor Protection System Channel A1

V - Reactor Protection System Channel A2

X - Reactor Protection System Channel B1

Y - Reactor Protection System Channel B2

B. Plant unit number is assigned to the second character for the conduit numbers. "1" indicates Unit 1 or common to Units 1 and 2; "2" indicates Unit 2.

C. A letter indicating system voltage is assigned to the third character for the conduit numbers as follows:

H, G - 13.8 kV Power

F, E - 4.16 kV Power

P, R - Low Voltage Power

K, L - Control

M, N - Instrumentation

D. All of the conduits have an arbitrary three digit serial number (001 through 999) assigned to the last three characters of the conduit number.

E. Example

1. Engineered-Safeguard

```
A  1  9  999
|  |  |   |
|  |  |   └──── Serial number 999
|  |  |
|  |  └──────── Low Voltage Power
|  |
|  └─────────── Unit 1
|
└────────────── Engineered Safeguard Channel A
```

F. If the Sequential Numbering Series (001-999) in Para. D is exhausted it will be supplemented by an alpha numeric sequence. This series will start with OA1 through OA9 and continue in sequence thru OZ9.

Example:

1. Engineered-Safeguard

```
A  1  P  OA1 - thru OA9, to and thru OZ9.
|  |  |   |
|  |  |   └──────────Serial Number
|  |  |
|  |  └──────────────Service Level
|  |
|  └─────────────────Unit 1
|
└────────────────────Channel A
```

II. SCHEME NUMBERS

Scheme numbers are identified by a six-character number of the form NLNNNN.

A. Plant unit number is assigned to the first character "1" indicates Unit 1, "2" indicates Unit 2, and "0" indicates common for Units 1 and 2.

B. The second character classifies the electrical scheme by system as follows:

   A. 4.16KV and 13.8KV Systems

      1. 13.8KV Start-Up and Auxiliary Systems and Station Grounding system.

      2. 4.16KV Auxiliary System

   B. 480V System

      1. 480V Auxiliary (Load Centers)

      2. 480V Auxiliary (MCCs)

      3. 480V Lighting power supply system

   C. Condensate and Circulating Water Systems

      1. Circulating Water and Water Box Priming system.

      2. Cooling Towers

      3. Intake Screens

      4. Screen Wash & Chlorination system

5. Make-up Demineralizer

6. Condensate Filter/Demineralizer system

7. Condensate system

8. Condenser and Air Removal (Vacuum) system

9. Demineralizer Water Storage and Transfer system.

D. DC Systems

1. ±24V d.c. system

2. 250V d.c. power system

3. 125 d.c. power system

E. GE Prefabricated Cables (E - Dwgs)

F. Feedwater and Main Steam Systems

1. Feedwater system

2. Moisture Separation, Reheaters, Drains and Level Control

3. Extraction Steam system

4. Feedwater heaters

5. Feedwater Pump Turbines

6. Main Steam system

7. Bypass Steam

G. Generation and Transmission

1. Stator Cooling

2. Main Generator & Excitation system

3. Standby Transformer and Auxiliaries

4. Main & Auxiliary Transformers and Isolated Phase Bus

5. Hydrogen and Seal Oil system

6. Standby Diesel Generators

7. 230KV System

I. Miscellaneous Instrumentation

J. GE Prefabricated cables (U Dwgs)

K. Annunciation

1. All non-vendor wired annunciation systems

L. Computer - Analog Inputs

1. Analog inputs

M. Computer - Digital Inputs

1. Digital inputs
2. Computer system and power supply

N. Miscellaneous Systems

1. Security and Surveilance
2. Meteorological
3. Communications
4. Evacuation system

P. GE-NED Prefabricated cables (NSS)

Q. Nuclear Steam Supply System

1. CRD - Hydraulic and Manual
2. Recirculation system & MG sets
3. RCIC
4. Reactor Water Cleanup
5. Standby Liquid Control
6. Core Spray
7. HPCI
8. RHR
9. Reactor Non-nuclear Instrumentation

10. RPS
11. Neutron Monitoring and Nuclear Instrumentation
12. Process and Area Radiation Monitoring
13. Fuel Handling
14. Containment and Suppression
15. Fuel Pool Cooling and Cleanup System
16. Reactor Vessel and Auxiliaries
17. Containment Atmospheric Control
18. MSIV Leakoff
19. BIS
20. RPT
21. ATWS

R. Radioactive Waste Disposal

1. Solid Radwaste
2. Liquid Radwaste
3. Gaseous Radwaste

S. General Station Services (Misc. B.O.P.)

1. Domestic or Well Water System
2. Air Systems
3. Building Drains
4. Oil Storage and Transfer Systems
5. Cathodic protection
6. Station Service and Seal Water System
7. Fire Protection and Deluge System
8. Emergency Service Water System
9. Nitrogen, Hydrogen, and CO_2 Systems

10. Water Pre-Treatment
11. Sampling System
12. Reactor Building Cooling Water System
13. Turbine Building Cooling Water System
14. Auxiliary Boiler
15. RHR Service Water

T. <u>Turbine</u>

1. Turbine Steam Seal and Drain System
2. Main Turbine & Turbine Controls including Oil System

V. <u>Heating and Ventilating Systems</u>

1. Central Heating and Air Conditioning System
2. H&V System Miscellaneous areas
3. H&V System Administration Building
4. H&V System Service & Control Building
5. H&V System Control Room
6. H&V System Turbine Building
7. H&V System Reactor Building
8. Standby Gas Treatment
9. Containment Atmospheric Circulation
10. Radwaste Building Air Supply

Y. <u>Uninterruptible and Miscellaneous 120 VAC</u>

1. 120V lighting power system
2. Uninterruptible a.c.
3. Instrument AC Dist.

C. The third through sixth characters of the scheme number are arbitrary.

D. Example

1 Q 0501

Scheme No. 501 for RHR Pump 1A

System Q, Nuclear Steam Supply System

Unit 1

E. Notes

1. A scheme number is assigned to each scheme and is logged in the Scheme Number Index.

III. CABLE NUMBER

Each cable in the plant is uniquely identified by a scheme cable number which is composed of Nine (9) characters.

A. The first character indicates the separation group to which the cable belongs, and is in accordance with the channel/division identification letters listed below:

A - Engineered Safeguard Channel A

B - Engineered Safeguard Channel B

C - Engineered Safeguard Channel C

D - Engineered Safeguard Channel D

E - Engineered Safeguard Division I

F - Engineered Safeguard Division II

B. The second character identifies the system voltage level as follows:

H - 13.8kV Power

F - 4.16kV Power

P - Low Voltage Power

K - Control

M - Instrumentation

C. The scheme number(Section II) assigned to the circuit is used for the third through eight characters of the scheme cable number.

D. The ninth character is a letter assigned to each cable in block diagram shown on the scheme drawings.

E. Example

1. Nuclear Steam Supply System

A K 1Q0501 R

Cable 'R' in the Block Diagram

Scheme No. 1Q0501 for RHR Pump 1A

Voltage Level Control

Separation Group, Engineered Safeguard Channel A