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RECIP. NAME RECIPIENT AFFILIATION
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SUBJECT: Forwards advance copy of update of App F re fire protection evaluation for facility FSAR. Update will be formally submitted as Amend 37, currently scheduled for issue in June 1986.

see Ercls

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April 4, 1986
G02-86-310

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attn: E. G. Adensam, Project Director
BWR Project Directorate No. 3
Division of BWR Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

Subject: NUCLEAR PLANT NO. 2
SUBMITTAL OF ADVANCED COPY OF
APPENDIX F-FIRE PROTECTION EVALUATION

Enclosed is an advance copy of the update of Appendix F-Fire Protection Evaluation for the WNP-2 Final Safety Analysis Report (FSAR). This update will be formally submitted as Amendment #37 which is currently scheduled for issue in June 1986.

Should you have any further questions please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

GC Sorensen

G. C. Sorensen, Manager
Regulatory Programs

SIS/bk
Attachments

cc: JO Bradfute - NRC
C Eschels - EFSEC
JB Martin - NRC RV
E Revell - BPA
NS Reynolds - BLCP&R
NRC Site Inspector

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F.1 INTRODUCTION

On September 30, 1976, Washington Public Power Supply System was requested by the Nuclear Regulatory Commission to conduct a re-evaluation of the fire protection program of its nuclear power plant WNP-2. The re-evaluation was to consist of a comparison of the fire protection provisions of WNP-2 with the guidelines in Appendix A to Branch Technical Position APCSB 9.6-1. In order to perform such a re-evaluation, it was requested that a fire hazards analysis be performed with the assistance and technical direction of a qualified fire protection engineer. The fire hazards analysis was to consist of plan and elevation views of the plant defining fire areas, with descriptions for each fire area indicating safety-related equipment, potential sources of combustion with design fire loadings, detection and extinguishing capabilities, and consequencs of the design basis fire.

This fire hazards analysis and fire protection evaluation was performed by Mr. Theordore Kettler of Nuclear Energy Services, Inc., with the assistance of two fire protection engineers, Mr. Robert Chidsey and Mr. Richard Dennis, from Automation Industries, Inc., Vitro Engineering Division. Resumes of Messrs. Kettler, Chidsey and Dennis are included at the end of this section. The analysis is based on information provided by the Architect-Engineer, Burns and Roe, Inc., regarding the plant fire protection system design and other plant features and Washington Public Power Supply System as to plant operation after completion of construction and plant operations after startup. The operational aspects of the evaluation were conducted by a Washington Public Power Supply System task force under the direction of Mr. Robert Gough, whose resume is also included at the end of this section.

10CFR50 Appendix R was published in the Federal Register on November 19, 1980 with an effective date of February 1981. It added three new requirements beyond that previously required by APCSB 9.5-1. The three are: Modified Physical Protection and Spatial Separation Criteria, 8 hour Battery-Backed Emergency Lighting, and Non-Inerted Containment Reactor Coolant Pump Lubrication Oil Collection System (see section F.3).

Appendix "R" Section III-G "Fire Protection of Safe Shutdown Capability" imposed the specific requirements that resulted in extensive efforts for compliance. The above independent re-evaluation was performed using Burns and Roe, Inc. Engineering Criteria (Technical Memorandum 1227) which selected dedicated systems based upon "Event to Hot Shutdown and Hot Shutdown to Cold Shutdown". The systems designated were Division I - RCIC, Division II - SW "B", RHR "B". The Engineering Criteria was subsequently revised to use HPCS instead of RCIC for fire in any location other than the Control Room. At a later date the dedicated shutdown flowpath was revised again based on an "Event to Cold Shutdown scenario". The selected systems were limited to SW "B", RHR "B", and ADS "B". This was submitted to the NRC on March 21, 1983 in letter G02-83-243 with the attached report, "Fire Protection Safe Shutdown Analysis".

Results of the fire hazards analysis are presented in Section F.2 of the report. Included in the fire hazards analysis is a detailed description of the plant fire areas, fire loading in each area, and an evaluation of the ability to shut the plant down and maintain core cooling in the event of a fire in any one of the fire areas. This section has been revised to include a summary of the Appendix R evaluation for each fire area.

Section F.3 of the report presents a point-by-point comparison to the requirements of Branch Technical Position APCSB 9.5-1. At the beginning of this section is an Applicability matrix summarizing the results of this evaluation.

Section F.4 of the report presents the methodology used to implement Appendix R. This section includes a discussion of the specific and general requirements of Appendix R as well as a discussion of circuits associated with the shutdown systems.

F.2 FIRE HAZARDS ANALYSIS

This section presents the results of a Fire Hazards Analysis for the WNP-2 nuclear power plant. The objective of the analysis is examined in section F.4.4.

F.2.1 PLANT FIRE AREAS

The first step in performing the fire hazards analysis was to divide the plant into a number of fire areas. Figure 22 is a site plan used to develop fire areas. Buildings considered to have a potential impact on safety at the plant were considered in the Fire Hazards Analysis. The Radwaste Control Building, the Reactor Building, and the Diesel Generator Building were subdivided into fire areas. The remaining buildings that were considered were taken individually as fire areas. The fire areas within the Radwaste Control Building, the Reactor Building and the Diesel Generator Building are outlined on figures 1 thru 14 and 20 by heavy solid lines. Page F.2-11 presents a listing of all fire areas considered at the plant.

F.2.2 SHUTDOWN SYSTEMS

10CFR50, Appendix R requires that a fire must be considered with a simultaneous loss of off-site-power which, in turn, dictates that safe shutdown be accomplished by systems utilizing the suppression pool for reactor depressurization. The mode of depressurization used for the Fire Protection Safe Shutdown System is based on a rapid depressurization using the Automatic Depressurization System (ADS) in going from event initiation directly to cold shutdown where a dedicated low pressure system (RHRB) is utilized in the alternate shutdown cooling mode, see section F.4.4.3.

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F.2.3 FIRE HAZARDS ANALYSIS

This section presents the results of the plant fire hazards analysis. The analysis was performed by identifying the quantity and type of combustibles in each area and then determining the fire loading. The fire loading was then equated to the approximate equivalent fire severity and the fire severity compared to the fire area barrier fire rating. A compilation was also made of all Appendix R safety-related systems required for plant shutdown and any radioactive material in each fire area.

For each fire area an evaluation was made to determine the effect on the plant of a fire assuming no fire protection systems operate and all combustibles within the area release their total caloric value (see Section F.4 for a more detailed explanation). A second evaluation was then made to determine the effect of a fire assuming the plant fire protection systems function as designed. These evaluations have been identified as calculations and listed in section F.4. To aid in the analysis, the following sets of drawings were prepared:

a. Identification of areas protected by fixed automatic fire suppression systems in the plant.

b. Identification of the fire resistance of all walls, floors, ceilings, and doors in the plant.

c. Identification of the location of all pre-alarm fire detectors, hose stations, and manual pull boxes at the plant.

The above drawings have been included in the report as Figures 1 through 24, 25 through 52, and 53 through 73, respectively.

F.2.4 ASSUMPTIONS IN DETERMINING THE FIRE LOADING OF A FIRE AREA

a. Electrical cables have been considered as a heat source in the evaluation of a Design Basis Fire (DBF). See Appendix A and Appendix B of this report.

1. An electrically initiated fire can not propagate to a fully developed cable tray fire in a horizontal tray where all the cables are IEEE 383 qualified and there are less than ten cables. If there are more than ten cables the fire will not propagate more than thirty-six inches (36")(Reference NUREG-0581). Vertical tray runs are provided with fire breaks consisting of a fire rated material to limit fire propagation. All trays are continuously and solidly grounded. For externally generated fires, outside cable trays, cables in both open and enclosed trays are considered as combustibles.

The weight of the material, as found throughout the plant, times the BTU/lb or gallon value for each type of material determined the BTU loading for each combustible. The final figure represented the total BTU loading existing in each area.

e. The requirements for automatic protection was based on consideration of the combustibility of the involved materials; the distance and/or barrier separation from safety related equipment; and the accessibility to the area for extinguishment. In general, if the fire loading did not exceed a fixed combustible loading of 60,000 BTU/ft2, then portable fire extinguishers, one 1-1/2" fire hose, automatic fire detection, separation (spatial or by barrier) between redundant systems, and the trained Fire Brigade was considered adequate protection.

f. The cable spreading room has been divided into two fire areas by a 20 foot zone. The cables within this 20 foot zone (within both open and enclosed tray) are protected with a one hour thermolag covering in conjunction with an automatic sprinkler system.

g. Within the multi-division Reactor Building fire area R-I, rack mounted components have been protected by enclosing the rack within an 8" concrete wall about 6 inches higher than the rack with access via a one hour rated fire door. The combustible load in this area consists of cable jackets, electrical components and a maximum transient load of 1000 BTU per square foot. Minimal combustibles will be stored in this room which is controlled by the Fire Protection Program and Controls.

h. Stainless steel instrument and sensing line protection is not required (see section F.4.4.2) since the areas that contain Appendix R related instrument sensing lines have less than a 1/2 hour fire loading.

i. See sections F.4.4.1 and F.4.4.2 for a listing of additional design basis assumptions.

F.2.5 INADVERTENT OR CARELESS OPERATION OR RUPTURE OF EXTINGUISHING SYSTEMS

a. A survey of all areas containing safety-related equipment shows that a rupture of any fire line would not incapacitate any safety-related equipment by wetting or flooding.

b. Inadvertent or careless operation of a manual system by plant personnel trained in fire protection is not considered herein.

c. Inadvertent or careless operation of a fixed fire protection system in an area with safety-related equipment protected by pre-action sprinkler systems would result in flooding the pipe with water but water would not flow from the closed heads. Equipment such as the reactor building standby gas treatment units, reactor building sump vent filter units and control room emergency filter units are protected by deluge spray systems. Inadvertent or careless operation of these systems would cause the charcoal filters and/or the roughing filter to be inoperable. A standby unit is available for each filter unit.

F.2.6 DESIGN CRITERIA USED FOR FIRE PROTECTION FOR THE SAFETY-RELATED EQUIPMENT AND CABLING IN THE FIRE AREAS

a. The National Fire Protection Association's "National Fire Codes" dated 1973-74.

b. American Nuclear Insurers Fire/All-Risk Guidelines (current date)

c. Factory Mutual System Loss Prevention Data Sheets

d. Nuclear Energy Liability Property Insurance Association (NELPIA) "Basic Fire Protection for Nuclear Power Plants" DTD Revised March 1970.

F.2.7 CABLE CLASSIFICATIONS

Refer to document entitled "WNP-2 Electrical Separation Practices" submitted to the NRC under separate cover also see section 8.3.1.3.1.

F.2.8 GAP BETWEEN THE PRIMARY CONTAINMENT VESSEL AND BIOLOGICAL SHIELDING WALL

The annular gap constructed between the metal shell of the primary containment vessel and the concrete biological shielding wall is filled with a compressible insulating spacer system consisting of polyurethane flexible foam sheets, butted at the joints and cemented directly to the primary containment shell, a jacket of premolded fiberglass reinforced polyester (FRP) jacket panels and epoxy flashing.

The foam spacer system is in a confined space, exposed to a minimal quantity of air through clearance around pipe penetrations, the greatest of these being 3-5/8 inches. There is a spatial separation of six feet from the foam to the nearest combustible (electrical cable insulation). A fire in this confined space is not considered credible.

F.2.9 PENETRATION SEALS AND SEISMIC GAPS

All electric cable and conduit penetrations through fire barriers shall be embedded, capped with a steel plug, filled with concrete or filled with an approved material to provide a fire rating compatible with the barrier penetrated.

Seismic gaps, where required, have a rating compatible with the barrier penetrated.

REFERENCES

F.2-1 Mckinnon, G.P. (ed.) and Tower, K. (ed.): "Fire Protection Handbook," National Fire Protection Association, Boston, 1976

Electric Hydraulic Fluid	-	Trade Name: Fyrquel 220 Mfg by Stauffer Chemical Co. Data furnished under G.E. Instruction Manual VPF-3300-114 B&R File No. 2-07-1214
Charcoal	-	As supplied by Farr Co., El Segundo, CA. Under Contract Waive No. 19 Charcoal NACAR G615 Carbon as tested in accordance with ANSI/ASME N509-1980
Rubber Belting	-	B.F. Goodrich ltr. to B&R dated 7/3/80 D.H. Silvey to R.E. Snaith and Telecon dated 9/10/80 D.H. Silvey to W.J. Rochford
Permali (Type JN67M)	-	Permali Inc., Mount Pleasant, Pa. See U.S. Testing Inc. report of test no. 73890 dated 6/7/78

PLANT FIRE AREAS

Area	Code****	Identification***
HPCS Diesel Generator	-	DG-I
1A Diesel Generator	1	DG-II
1B Diesel Generator	2	DG-III
1A Diesel Oil Tank Pump Room	1	DG-IV
1B Diesel Oil Tank Pump Room	2	DG-V
HPCS Diesel Oil Tank Pump Room	-	DG-VI
HPCS Diesel Day Tank Room	-	DG-VII
1A Diesel Day Tank Room	1	DG-VIII
1B Diesel Day Tank Room	2	DG-IX
Diesel Generator Building Equipment Room	-	DG-X
Reactor Building General Equipment Area	D	R-I*****
Reactor Primary Containment	U-1	R-II
HPCS Pump Room	-	R-III
RHR Pump Room R1, Pipe Chase, and RHR Heat Exchanger B Equipment Room	2	R-IV
RHR Pump Room R2, Pipe Chase, and RHR Heat Exchanger A Equipment Room	D	R-V
RCIC Pump Room R3	2	R-VI
RHR Pump Room R4	1	R-VII
LPCS Pump Room R5	1	R-VIII
Stairs A6	-	R-IX
Elevator No. 2	-	R-X
Stairs A5	-	R-XI
Elevator No. 1	-	R-XII
Lobby Outside of Stairs A5 and Elevator No. 1	-	R-XV
South Valve Room Elev. 471'-0"	2	R-XVII
MCC Room Division 2 Elev. 522'-0"	2	R-XVIII
Hydrogen Recombiner MCC Room Division 2 Elev. 572'-0"	2	R-XIX
South Valve Room Elev. 522'-0"	2	R-XXI
Radwaste Building General Equipment Area	2	RC-I
Cable Spreading Room (Div. 1)	D	RC-IIA
Cable Spreading Room (Div. 2)	2	RC-IIB
Cable Spreading Room (20' Barrier)	U-3	RC-IIC
Cable Chase	D	RC-III
Electrical Equipment Room No. 1	1	RC-IV
Battery Room No. 1	1	RC-V
Battery Room No. 2	2	RC-VI
Electrical Equipment Room No. 2	2	RC-VII
Switchgear Room No. 2	2	RC-VIII
Remote Shutdown Room	2	RC-IX
Main Control Room.	U-2	RC-X
Unit A-Air Conditioning Room	1	RC-XI
Unit B-Air Conditioning Room	2	RC-XII

PLANT FIRE AREAS (Cont'd)

Area	Code****	Identification***
Communications Room, Emergency Chillers Area, and HVAC Chase	2	RC-XIII
Switchgear Room No. 1	1	RC-XIV
Stairs A8	-	RC-XV
Stairs A7	-	RC-XVI
Elevator #4	-	RC-XVII
Stairs A13	-	RC-XVIII
Corridor C205 (El. 467'-0")	2	RC-XIX
Reactor Building/Radwaste Building Access Area	1	RC-XX
Service Building	-	S-I**
Turbine Generator Building, General Equipment Area, Transformer Rooms and Corridors	D	TG-I
Stairs A1	-	TG-III
Elevator #3	-	TG-IV
Stairs A3	-	TG-VI
Stairs A4	-	TG-VIII
Circulating Water Pump House		
Cooling Tower Electrical Buildings No. 1 & 2		
Makeup Water Pump House		
Standby Service Water Pump House 1A	1	SW-I
Standby Service Water Pump House 1B	2	SW-II
[illegible] Water Pump House No. 2		
Turbine Oil Storage Room	-	TG-II*
Auxiliary Boiler Room	-	TG-V*
Hydrogen Seal Oil Room	-	TG-VII*
Turbine Oil Reservoir Room	-	TG-IX*

PLANT FIRE AREAS (Cont'd)

*Note: TG-III, IV, VI, and VIII are fire areas. TG-II, V, VII and IX are fire zones.

For the purposes of electrical analyses, TG-II through TG-IX are considered part of one common area

**Note: Fire area S-I encompasses fire zones S-II through S-VII for the purposes of electrical analysis.

***Note: The prefix of the Plant Fire Area Identification Number corresponds to a building number or location as follows:

- R - Reactor Building
- RC - Radwaste and Control Building
- DG - Diesel Generator Building
- TG - Turbine Generator Building
- S - Service Building
- SW-(I) - Service Water Pumphouse (1A)
- SW-(II) - Service Water Pumphouse (1B)

****Note: Code represents the Appendix R Safe Shutdown Analysis Methodology that is used.

- \- This fire area does not contain any Appendix R Safe Shutdown components, see section F.4.4. No Appendix R Safe Shutdown Analysis is required.
- 1 Redundant Analysis Method - Division 1 Fire Area
- 2 Redundant Analysis Method - Division 2 Fire Area
- D Dedicated Analysis Method - Multi-division Fire Area
- U-1 Unique Fire Area - Containment is inerted. No Appendix R Safe Shutdown Analysis is Required
- U-2 Unique Fire Area - Main Control Room. This event requires the use of the Appendix R Remote Shutdown System, see F.4.4.3.3

PLANT FIRE AREAS (Cont'd)

U-3 Unique Fire Zone - the area consists of a twenty (20) foot area of combustibles protected by thermolag give a one hour rating with a fire detection and sprinkler system. There are two mini fire zones within fire area R-I that require individual analysis as indicated below:

Firewall enclosed racks	****
E-IR-H22-P021	2
E-IR-H22-P027	2

<u>Fire Area</u> HPCS Diesel Generator, DG-I (includes both levels of the HPCS diesel generator area. (Elev. 441'-0" and 455'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a 3-hour fire rating, door assemblies have a 3-hour fire rating.

   b. Conduit penetrations and conduits are sealed.

   c. Ventilation penetrations to the day tank room have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinklers in the area.

   d. Piping penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

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4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Fixed Systems"

   e. NFPA Standard 24, "Outside Protection"

   f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

   g. NFPA Standard 72E, "Automatic Fire Detectors"

   h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate one or more smoke detectors, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

   b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

   c. Smoke would be removed through the operation of the building exhaust system.

   d. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 5.5 x 106 BTU

   b. 234 gallons diesel generator oil - 35.6 x 106 BTU

   c. Transient combustibles - 8.4 x 106 BTU

   d. 59 gallons oil in filter bath - 8.56 x 106 BTU

   e. Cleaning supplies and equipment 0.50 x 106 BTU

8. Fire loadings which represent combustibles in Item 7

   a. Diesel Area

      1) Floor area - 2,330 ft2

      2) Fire loading - 25,200 BTU/ft2

   b. Filter Room

      1) Floor Area - 191 ft^2

      2) Fire Loading - 44,800 BTU/ft2

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. Four (photo-electric cell) smoke detectors in D.G. Area

   b. Two manual pull boxes for alarm

   c. One manual pull box for activating pre-action system valve

   d. One automatic pre-action sprinkler system with heat actuating device in D.G. area

   e. Two ionization detectors in switchgear area

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers or equivalent rated fire damper/doors

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose stations

    b. Hose lines from two 2-1/2" outlets on yard hydrant

    c. Portable extinguishers

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown system to achieve reactor shutdown is not lost.

    b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

    c. For discussion of Analysis Methodology including spurious signals see section F.4.4.

Fire Area Diesel Generator 1A, DG-II (includes both levels of the 1A diesel generator area. (Elev. 441'-0" and 445'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a 3-hour fire rating, door assemblies have a 3-hour fire rating.

   b. Conduit penetrations and conduits are sealed.

   c. Ventilation penetrations to the day tank room have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinkler protection.

   d. Piping penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Fixed Systems"

   e. NFPA Standard 24, "Outside Protection"

   f. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   g. NFPA Standard 72E, "Automatic Fire Detectors"

   h. NFPA Standard 80, "Fire Pumps and Windows"

5. Consequences of Fire if Fire Protection System functions as Designed

   a. Smoke from a fire would activate one or more smoke detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

   b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

   c. Smoke would be removed through the operation of the building exhaust system.

   d. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

6. Radioactive Materials Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 7.6 x 106 BTU

   b. 468 gallons diesel generator oil - 71.1 x 106 BTU

   c. Transient combustible - 8.4 x 106 BTU

   d. 21.6 gallons oil in filter bath - 3.13 x 106 BTU

   e. Cleaning equipment and supplies - 0.50 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Diesel Area

      1) Floor Area - 2,330 ft2

      2) Fire loading is 39,000 BTU/ft2

   b. Filter Area

      1) Floor Area - 211 ft2

      2) Fire Loading - 14,830 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Two ionization detectors in switchgear area

   b. Four photo-electric cell smoke detectors in D.G. Area

   c. Two manual pull boxes for alarm

   d. One manual pull box for activating pre-action system valve

   e. One automatic pre-action sprinkler system with heat actuating device in D.G. area

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers or equivalent rated fire damper/doors

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose stations

    b. Hose lines from two 2-1/2" outlets on yard hydrant

    c. Portable extinguishers

12. Appendix R Evaluation

    a. Capability of the Appendix R - Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-2.

    c. For discussion of Analysis Methodology including spurious signals see section F.4.4.

    d. This fire area contains the Division I Emergency Diesel Generator (and auxiliaries) which are required for the operation of the Division I Appendix R Safe Shutdown System (Redundant System). All the equipment and cabling in this area will be lost as a result of a design basis fire. An analysis was made to ensure that all cables leaving this area, that route into a division 2 fire area, are isolated or are protected in those areas. This provides an additional verification for the Redundant Analysis methodology for these division 2 fire areas (since the Division II Safe Shutdown System is protected in "Multi-Division Fire Areas" and not protected in division 2 fire area). This method ensures the operability of the division 2 safe shutdown system.

Fire Area 1B Diesel Generator, DG-III (includes both levels of the 1B diesel generator area (EL. 441'-0" and 455'-0") (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a 3-hour fire rating, door assemblies have a 3-hour fire rating.

   b. Conduit penetrations and conduits are sealed.

   c. Ventilation penetrations to the day tank room have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinkler protection.

   d. Piping penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

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4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Fixed Systems"

   e. NFPA Standard 24, "Outside Protection"

   f. NFPA Standard 72, "Proprietary Protection Signaling Systems"

   g. NFPA Standard 72E, "Automatic Fire Detectors"

   h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate one or more smoke detectors, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

   b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

   c. Smoke would be removed through the operation of the building exhaust system.

   d. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustibles

   a. Fire retardant cable in trays - 6.8 x 106 BTU

   b. 468 gallons diesel generator oil - 71.1 x 106 BTU

   c. Transient combustible - 8.4 x 106 BTU

   d. 21.6 gallons oil in filter bath - 3.13 x 106 BTU

   e. Cleaning equipment and supplies - 0.50 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Diesel Area

      1) Floor Area - 2,330 ft2

      2) Fire Loading - 38,600 BTU/ft2

   b. Filter Area

      1) Floor Area - 211 ft2

      2) Fire Loading - 14,830 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Two ionization detectors in the switchgear area

   b. Four photo-electric cell smoke detectors in the D.G. area

   c. Two manual pull boxes for alarm

   d. One manual pull box for actuating pre-action system valve

   e. One automatic pre-action sprinkler system with heat actuating device

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers or equivalent rated fire damper/door

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose stations

    b. Hose lines from two 2-1/2" outlets on yard hydrant HT-1A

    c. Portable extinguishers

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-3.

    c. For discussion of analysis methodology including spurious signals see section F.4.4.

Fire Area 1A Diesel Oil Tank Pump Room, DG-IV (consists of the 1A Diesel Generator Oil Tank Pump Area (El. 441'-0")) (Figures 20, 52, and 73)

1. Barriers That Define the Area

   a. Concrete walls, floor, and ceiling with a 3-hour fire rating, door to the area has a 3-hour fire rating.

   b. Conduit penetrations and conduits are sealed.

   c. Piping penetrations are sealed.

   d. Exterior wall has a ventilation opening.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Fixed Systems"

   e. NFPA Standard 24, "Outside Protection"

   f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

   g. NFPA Standard 72E, "Automatic Fire Detectors"

   h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

   b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

   c. Smoke would be removed through the operation of the building exhaust system.

   d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. 0.16 gallon fuel oil at pump - 0.023 x 106 BTU

   b. Transient combustible 8.4 x 106 BTU

   c. Cleaning supplies and equipment 0.50 x 106 BTU

8. Fire Loadings which Represent Combustibles in Item 7

   a. Floor area - 216 ft2

   b. Fire loading - 41,310 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One pre-alarm thermal detector

   b. One automatic pre-action sprinkler system with thermal detector*

   *Note: The automatic pre-action sprinkler system is provided for potential fire hazard due to 60,000 gallon underground oil tank access housing.

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Hose lines from two 2-1/2" outlets on yard hydrant

   c. Portable extinguishers

   d. One manual pull box for alarm

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-4.

   c. For discussion of analysis methodology including spurious signals see section F.4.4.

<u>Fire Area</u> 1B Diesel Oil Tank Pump Room, DG-V (consists of the 1B Diesel Generator Oil Tank Pump Area (El. 441'-0"))(Figures 20, 52, and 73)

1. Barriers That Define the Area

    a. Concrete walls, floor, and ceiling with a 3-hour fire rating, door to the area has a 3-hour fire rating.

    b. Conduit penetrations and conduits are sealed.

    c. Piping penetrations are sealed.

    d. Exterior wall has a ventilation opening.

2. Safety-Related Equipment in the area

    a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

    a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling Area

    a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

    b. NFPA Standard 13, "Sprinkler Systems, Installation"

    c. NFPA Standard 14, "Standpipe and Hose Systems"

    d. NFPA Standard 15, "Water Spray Fixed Systems"

    e. NFPA Standard 24, "Outside Protection"

    f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

c. Smoke would be removed through the operation of the building exhaust system.

d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. 0.16 gallon fuel oil at pump - 0.023 x 106 BTU

b. Transient combistible - 8.4 x 106 BTU

c. Cleaning supplies and equipment 0.50 x 106 BTU

8. Fire Loadings which Represent Combustibles in Item 7

a. Floor area - 216 ft2

b. Fire loading - 41,300 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One thermal detector

   b. One automatic pre-action sprinkler system with heat actuating device.*

   *Note: The automatic pre-action sprinkler system is provided for potential fire hazard due to 60,000 gallon underground oil tank access housing.

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Hose lines from two 2-1/2" outlets on yard hydrant

   c. Portable extinguishers

   d. One manual pull box for alarm

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-5.

   c. For discussion of analysis methodology, spurious signals see section F.4.4.

Fire Area HPCS Diesel Oil Tank Pump Room DG-VI (consists of the HPCS Diesel Generator Oil Tank Pump Area. (Elev. 441'-0") (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floors, and ceiling with a 3-hour fire rating, door to the area has a 3-hour fire rating.

   b. Conduit penetrations and conduits are sealed.

   c. Piping penetrations are sealed.

   d. The exterior wall has a ventilation opening.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

c. NFPA Standard 14, "Standpipe and Hose Systems"

d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

c. Smoke would be removed through the operation of the building exhaust system.

d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. 0.16 gallon fuel oil at pump - 0.023×10^6 BTU

b. Transient combustibles - 8.4×10^6 BTU

c. Cleaning supplies and equipment 0.50×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 216 ft2

   b. Fire loading -41,300 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One thermal detector

   b. One automatic pre-action sprinkler system with heat actuating device.*

   *Note: The automatic pre-action sprinkler system is provided for potential fire hazard due to 60,000 gallon underground oil tank access housing.

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose stations

    b. Hose lines from two 2-1/2" outlets on yard hydrant

    c. Portable extinguishers

    d. One manual pull box for alarm

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

    c. For discussion of analysis methodology, spurious signals see section F.4.4.

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Fire Area HPCS Diesel Day Tank Room, DG-VII (consists of the area that contains the day tank for the HPCS Diesel Generator (Elev. 441'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floors, and ceiling with a 3-hour fire rating, door assembly has a 3-hour fire rating.

   b. Conduits and conduit penetrations are sealed.

   c. Piping penetrations are sealed.

   d. Ventilation penetrations have 3-hour fire dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinkler protection.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

c. Smoke would be removed through the operation of the building exhaust system.

d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. 3000 gallons diesel fuel oil 435 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 171 ft2

b. Fire loading - 2.54 x 106 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One pre-alarm thermal detector

   b. One automatic pre-action sprinkler system with thermal detector

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers or equivalent rated fire damper/doors

   b. Fixed extinguishing system in the area

   c. Room is curbed to contain a complete oil spill

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Hose lines from two 2-1/2" outlets on yard hydrant

   c. Portable extinguisher

   d. One manual pull box for alarm

   e. Two manual pull boxes for activating system valve

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

   c. For discussion of analysis methodology, spurious signals see section F.4.4.

Fire Area 1A Diesel Oil Day Tank Room, DG-VIII (consists of the area that contains the day tank for the 1A Diesel Generator (El. 441'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floors, and ceiling with a 3-hour fire rating, door assembly has a 3-hour fire rating.

   b. Conduits and the conduit penetrations are sealed.

   c. Piping penetrations are sealed.

   d. Ventilation penetrations have 3-hour fire dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinkler protection.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

   b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

   c. Smoke would be removed through the operation of the building exhaust system.

   d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. 3000 gallons diesel fuel oil 435 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 171 ft^2

   b. Fire loading - 2.54 x 106 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One thermal detector

   b. One automatic preaction sprinkler system with heat actuating device

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers or equivalent rated fire damper/doors

   b. Fixed extinguishing system in the area

   c. Room is curbed to contain a complete oil spill

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Hose lines from two 2-1/2" outlets on yard hydrant

   c. Portable extinguisher

   d. One manual pull box for alarm

   e. Two manual pull boxes for flooding system with water

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-8.

   c. For discussion of analysis methodology, spurious signals see section F.4.4.

Fire Area 1B Diesel Oil Day Tank Room, DG-1X (consists of the area that contains the day tank for the 1B Diesel Generator (El. 441'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

   a. Concrete walls, floors, and ceiling with a 3-hour fire rating, door assembly has a 3 hour fire rating.

   b. Conduits and the conduit penetrations are sealed.

   c. Piping penetrations are sealed.

   d. Ventilation penetrations have 3-hour fire dampers or doors in frames similar to fire door frames which are satisfactory due to automatic sprinkler protection.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

f. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Heat from a fire would activate the pre-alarm thermal detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plan and emergency response procedures. A manual hose is available.

b. The thermal detection system will sense a high heat condition activating the pre-action sprinkler system. Automatic spray heads would fuse and control the fire.

c. Smoke would be removed through the operation of the building exhaust system.

d. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. 3000 gallons diesel fuel oil 435 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 171 ft2

b. Fire loading - 2.54 x 106 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One thermal detector

   b. One automatic preaction sprinkler system with heat actuating device

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers or equivalent rated fire damper/door

    b. Fixed extinguishing system in the area

    c. Room is curbed to contain a complete oil spill

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose stations

    b. Hose lines from two 2-1/2" outlets on yard hydrant

    c. Portable extinguisher

    d. One manual pull box for alarm

    e. Two manual pull boxes for flooding system with water

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-9.

    c. For discussion of analysis methodology, spurious signals see section F.4.4.

<u>Fire Area</u> Diesel Generator Building Equipment Room, DG-X (consists of an equipment area at the east end of the Diesel Generator building (El. 455'-0")) (Figures 20, 52, and 73)

1. Barriers that Define the Area

    a. Concrete walls, floors, and ceiling with a 3-hour fire rating, door assembly has a 3 hour fire rating. .

    b. Conduits and the conduit penetrations are sealed.

    c. Ventilation penetrations have 3-hour fire dampers.

    d. Piping penertrations through the floor slab are sealed.

2. Safety-Related Equipment in the Area

    a. No safety-related equipment is located in this area.

3. Consequences of Design Basis Fire for Area

    a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

    a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

    b. NFPA Standard 14, "Standpipe and Hose Systems"

    c. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would flow out into the HPCS diesel area and activate the smoke detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

b. Smoke would be removed through the operation of the building exhaust system.

c. Water discharge could cause flooding until removed by portable pumping units.

6. Radioactive material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. Transient combustibles 8.4 x 106 BTU.

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 741 ft2

b. Fire loading - 11,300 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

a. None

10. Means for Containing and Inhibiting the Progress of Fire in the Area

a. Extinguishing equipment outside of area

b. Fire-rated barriers

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

a. Portable extinguisher

b. One manual pull box for alarm

c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

c. For discussion of analysis methodology, spurious signals see section F.4.4.

8. Fire Loading Which Represent Combustibles in Item 7 (d only)

   a. Floor area - 2,375 ft2

   b. Fire loading - 3,537 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. All areas are sprinkled except the water treatment area

   b. Ionization detectors are provided in the water treatment area, enclosed stairways, mechanical equipment room and record storage rooms, an ionization detector is located in the return air duct

   c. The following are located throughout the building along exit routes:

      1) Portable extinguishers

      2) Six standpipe hose stations

      3) Twelve manual pull boxes

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Fixed extinguishing system in the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Hose lines from two 2-1/2" outlets on yard hydrants

12. Appendix R Evaluation

   a. There are no components located in the building that are required to achieve reactor shutdown.

   b. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

c. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

d. For discussion of analysis methodology, spurious signals see section F.4.4.

<u>Fire Area</u> Turbine Generator Building, TG-1 (consists of the entire Turbine Generator Building General Equipment Areas, Transformer Rooms, and all corridors between buildings except for fire areas/zones TG II through IX (El. 441'-0", 471'-0", 501'-0"))(Figures 1 through 6, 25 through 32, and 52 through 58)

1. Barriers that Define the Area

   a. Concrete walls with a 3-hour fire rating where interfaced with other buildings. Exterior wall adjacent to transformer yard has a two-hour fire rating, the remainder of exterior wall is non-rated, the insulated steel roof is class I rated. Some door assemblies to other areas have 3-hour fire ratings or are of equivalent construction. This difference is due to the internal insulation and/or air tightness requirement. Corridors between the turbine generator, radwaste, reactor, and diesel generator buildings are considered to be a fire zone within the turbine generator building fire area. Walls are mostly reinforced concrete. Ceilings are reinforced concrete with a 4-inch seismic space, which is provided with a metal draft stop on one side. Seismic spaces in fire barriers are sealed.

   b. Mechanical penetrations from corridors are sealed.

   c. Conduit penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling that is not protected in this fire area will be lost as a consequence of a design basis fire. There are Appendix R Division 2 Safe Shutdown components in this fire area that require protection. See section F.4.4.3 for a detailed listing of the Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 24, "Outside Protection"

   e. NFPA Standard 72D, "Proprietary Protection Signaling Systems"

   f. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. A fire would activate the pre-alarm detectors, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

   b. A high heat condition in an area protected by a wet sprinkler system would fuse the individual sprinkler heads thus initiating extinguishment.

   c. Smoke would be removed through the operation of the building exhaust system, portable ducting and smoke ejector.

   d. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

   e. Thermal detectors sensing high heat conditions in the vicinity of oil lines and tanks would actuate the fire suppression system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - yes

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Material in Area

   a. Cable trays - light to moderate in general area

   b. Transient combustibles - 8.4×10^6 BTU

   c. Corridors

      (North/south corridor between reactor and radwaste buildings)
      Fire retardant cable in trays 101.5×10^6 BTU
      Note: Does not include the east-west corridors next to the turbine generator building.

d. Turbine oil line from reservoirs to equipment in rooms and turbine hall (oil quantities vary).

e. Closed cabinets of protective clothing. Two (501' elevation east wall), two (471' elevation corridors twelve (441' elevation west end by condensate pumps) and four (441' elevation east end reactor feedwater pumps) 72.1 x 10^6 BTU.

f. Pick-up bags and back-up supplies (4 locations as noted in e. above) 10.5 x 10^6 BTU.

g. Storage area, truck bay 441' elevation - maximum storage 10,000 lbs of plastic and clothing 120 x 10^6 BTU.

h. Cleaning supplies and equipment 0.50 x 10^6 BTU per floor.

i. Fire brigade equipment cabinets 441' main corridor, 471' main corridor, 120 x 10^6 BTU per location.

j. Crew boxes 0.50 x 10^6 BTU per floor.

8. Fire Loading Which Represent Combustibles In Item 7

   a. Floor area - 2,538 ft2

   b. Fire loading - 43,000 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. General Fire Area

      1) About 45 percent of the building is sprinklered by wet pipe, pre-action or deluge systems. This covers all areas of oil concentration.
      2) Standpipe hoses are provided
      3) Portable fire extinguishers are provided
      4) Smoke, heat and flame detectors for pre-alarm
      5) Manual pull boxes

   b. Corridors

      1) Ionization detectors
      2) Manual pull box
      3) Portable fire extinguisher (in the diesel generator corridor)
      4) 1-1/2" standpipe hose at stairways
      5) One pre-action sprinkler system outside Radwaste-Reactor Building corridor

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. General Fire Area

       1) 1-1/2" standpipe hose stations in stairways
       2) Hose lines from two 2-1/2" outlets on yard hydrants

    b. Corridors

       1) Hose lines from two 2-1/2" outlets on yard hydrants

2) 1-1/2" standpipe hose stations

12. Appendix R Evaluation

a. Appendix R Division 2 Safe Shutdown System cables in the corridor area must be protected in order to assure that the capability of plant dedicated shutdown components to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-12.

c. For discussion of analysis methodology, spurious signals see section F.4.4.

d. TG-V (Zone) - Auxiliary Boiler Room

1) 8" masonry walls and a reinforced concrete ceiling with 3-hour fire ratings, door assembly has a 3-hour fire rating.

2) Ventilation penetrations have 3-hour fire-rated doors in frames which are similar to fire door frames and are satisfactory for area due to the compensating fire protection from automatic sprinklers.

3) Mechanical penetrations are sealed.

4) Conduit and conduit penetrations are sealed.

e. TG-III, VI, VIII (Areas) - Stairwells A1, 3, and A4

1) 8" masonry walls and a reinforced concrete ceiling with minimum 2-hour fire ratings, door assemblies have 1-1/2-hour fire ratings.

2) Mechanical penetrations are sealed.

3) Conduit and conduit penetrations are sealed.

f. TG-IV (Area) - Elevator 3

1) Reinforced concrete walls with a minimum 2-hour fire rating, door assembly has 1-1/2-hour fire rating.

2) Mechanical penetrations are sealed.

3) Conduit and conduit penetrations are sealed.

2. Safety-Related Equipment in the Areas

a. This fire area contains safety related equipment. However analysis has been provided to show that loss of these components will not preclude safe shutdown (see GESSAR Docket STN50-477, FSAR Sections 7.2 and 7.6).

3. Consequences of Design Basis Fire for the Areas

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Areas

    a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

    b. NFPA Standard 13, "Sprinkler Systems, Installation"

    c. NFPA Standard 14, "Standpipe and Hose Systems"

    d. NFPA Standard 15, "Water Spray Fixed Systems"

    e. NFPA Standard 24, "Outside Protection"

    f. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

    g. NFPA Standard 72E, "Automatic Fire Detectors"

    h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

    a. Smoke from a fire would activate the smoke detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available.

    b. A high heat condition will fuse the individual heads of the wet pipe sprinkler system thus initiating extinguishment.

    c. Smoke would be removed through the operation of the building exhaust system, portable ducting and smoke ejector.

    d. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

e. Thermal detectors sensing high heat conditions in the oil rooms would actuate the respective deluge valve thus discharging water from the open heads.

6. Radioactive Material Contained in the Areas

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Material in the Areas

   a. TG-II - Turbine Oil Storage Room

      32,000 gallons of oil - 4864.0 x 10^6 BTU
      Cleaning supplies - 0.5 x 10^6 BTU

   b. TG-IX - Turbine Oil Reservoir Room

      15,000 gallons of oil - 2280.0 x 10^6BTU
      Cleaning supplies - 0.50 x 10^6 BTU

   c. TG-V - Auxiliary Boiler

      Transient combustibles - 8.4 x 10^6 BTU
      Storage of combustible in room - 10,000 lbs. max, 120 x 10^6 BTU

   d. TG-IV - Elevator (minimum grease and transient fire load combustibles - 8.4 x 10^6 BTU)

   e. TG-VII - Hydrogen Seal Oil Room

      284 gallons of oil - 41.2 x 10^6 BTU
      Cleaning supplies - 0.5 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

TG-II Floor Area - 1158 ft2
Fire Loading 4.2 x 106 BTU/ft2

TG-IX Floor Area - 991 ft2
Fire Loading 2.3 x 106 BTU/ft2

TG-V Floor Area - 3120 ft2
Fire Loading 41,200 BTU/ft2

TG-VII Floor Area- 466 ft2
Fire Loading 89,500 BTU/ft2

TG-IV Floor Area - 52 ft2
0.16 x 106 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. TG-II - Turbine Oil Storage Room

      1) Two ionization detectors

      2) Deluge system with heat detectors

   b. TG-IX - Turbine Oil Reservoir Room

      1) Deluge system with heat detectors

      2) Two ionization detectors

   c. TG-VII - Hydrogen Seal Oil Room

      1) Two ionization detectors

      2) Deluge system with heat detectors

   d. TG-V - Auxiliary Boiler

      1) Wet pipe sprinkler system

      2) Three photo-electric cell smoke detectors

   e. TG-III, VI, VIII - Stairwells

      1) One ionization detector in each

      2) One manual hose station at each door opening

      3) Wet pipe sprinkler system in each

   f. TG-IV - Elevator

      1) One photo-electric cell smoke detector

10. Means for Containing and Inhibiting the Progress of Fire in the Areas

   a. Fire-rated barriers and equivalent rated fire damper/doors

   b. Fixed extinguishing system in the area

b. TG-IX - Turbine Oil Reservoir Room

1) Manual pull box for alarm
2) Portable fire extinguishers
3) 1-1/2" standpipe hose stations
4) 2-1/2" hose from yard hydrant
5) Manual pull box for activating water spray system

c. TG-VII - Hydrogen Seal Oil Room

1) Manual pull box for alarm
2) Portable fire extinguishers
3) 1-1/2" standpipe hose stations
4) 2-1/2" hose from yard hydrant
5) Manual pull box for activating water spray system

d. TG-V - Auxiliary Boiler

1) Manual pull box for alarm
2) Portable fire extinguishers
3) 1-1/2" standpipe hose stations
4) 2-1/2" hose from yard hydrant

e. TG-III, VI, VIII - Stairwells

1) Portable fire extinguishers
2) 1-1/2" standpipe hose stations
3) 2-1/2" hose from yard hydrant

f. TG-IV - Elevator

1) Portable fire extinguishers
2) Hose lines from two 2-1/2" outlets on yard hydrant
3) 1-1/2" hose lines from adjacent area

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

c. For discussion of analysis methodology, spurious signals see section F.4.4.

<u>Fire Area</u> Circulating Water Pump House (consists of the Diesel Fuel Storage Area and Pump Area (Elev. Above 448' & Below 448') (Figures 18, 48, and 72).

1. Barriers that Define the Area

   a. Insulated steel panel walls with a Class I insulated steel roof, fuel oil for the fire pump is located in a separate room with 2-hour fire-rated walls and ceiling, a 1-1/2-hour fire-rated door, and fire dampers in frames which are similar to fire door frames and are satisfactory for the area due to automatic sprinkler protection.

   b. A trench connects the fuel oil room to the rest of the building, and it is sealed.

   c. CWPH is separated from all other areas by detachment.

2. Safety-Related Equipment in the Area

   a. There is no safety-related equipment in the area.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 24, "Outside Protection"

e. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

f. NFPA Standard 72E, "Automatic Fire Detectors"

g. NFPA Standard 80, "Fire Doors and Windows"

b. Pump Hall

1) Floor Area 5,488 ft2

2) Fire Loading 6,980 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

a. One wet pipe sprinkler system protects pump hall and day tank room

b. Portable fire extinguishers

c. Six ultraviolet flame detectors in pump hall

d. Three ionization smoke detectors in electrical area

e. One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

a. Fire-rated barriers in oil tank room

b. Fixed extinguishing system in the area

c. Separation from other areas by detachment

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

a. Hose lines from two 2-1/2" outlets on yard hydrants

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Cooling Tower Electrical Buildings No. 1 and 2 (consists of two Electrical Buildings serving the cooling towers) El. 448'-0"

1. Barriers that Define the Areas

   a. Separation from other fire areas by detachment

   b. Insulated steel panel walls with a Class I insulated steel deck roof

2. Safety-Related Equipment in the Area

   a. There is no safety-related equipment in the areas.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 24, "Outside Protection"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the prefire plans and emergency response procedures. A manual hose is available from the yard hydrants.

   b. Smoke would be removed through the operation of the building exhaust system.

   c. Water discharge could cause flooding until removed through the open door to the yard.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Moderate amount of fire retardant cable in trays

   b. Two oil filled transformers immediately adjacent to each cooling tower electrical building

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Fire Loading is considered light to moderate

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. For each electrical building:

      1) Four ionization detectors
      2) Portable Extinguisher
      3) One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Separation from other areas by detachment

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Hose lines from two 2-1/2" outlets on yard hydrants

   b. Three manual pull boxes for alarm

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Makeup Water Pump House (consists of the Makeup Water Pump House) (Figures 23, 49, 50, and 68)

1. Barriers that Define the Area

   a. Separation from other fire areas by detachment

   b. Constructed of concrete walls and roof

2. Safety-Related Equipment in the Area

   a. There is no safety-related equipment in the area.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   c. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from fire would activate the smoke detector, which would alarm in the control room. A brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures.

   b. Smoke removal by portable exhaust fans

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne- none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Small amount of combustible material is located in this area.

b. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Fire Loading is considered to be very low

   b. Floor Area - 2,775 ft^2

   c. Fire Loading (transient material) - 3,010 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Portable fire extinguisher

   b. Seven ionization smoke detectors

   c. One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Separation from other areas by detachment

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. No installed external fire fighting equipment is available to the area.

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Standby Service Water Pump House 1A, SW-I (consists of Standby Service Water Pump House 1A) El. 431'-0", 441'-0" (Figures 17, 47, and 71)

1. Barriers that Define the Area

   a. Exterior pumphouse walls and ceiling are reinforced concrete, doors are not fire-rated.

   b. Separation from all other areas by detachment.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 24, "Outside Protection"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Activation of the thermal detector in the pump area or the ionization detector in the cable vault would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available from the yard hydrant.

   b. Water discharge would be removed through the open door to the yard.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 0.3 x 106 BTU
   b. 27.5 gallons lubrication oil - 4.2 x 106 BTU
   c. Transients combustibles - 8.4 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area (pump) - 150 ft2

   b. Fire loading - 84,000 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One ionization detector in cable vault

   b. One thermal detector in pump area

   c. Portable extinguisher

   d. One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Separation from other areas by detachment

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Hose lines from two 2-1/2" outlets on yard hydrants

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-17.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Standby Service Water Pump House 1B SW-II (consists of Standby Service Water Pump House 1B) El. 431'-0", 441'-0" (Figures 17, 47, and 71)

1. Barriers That Define the Area

   a. Exterior pump house walls and ceiling are reinforced concrete, doors are not fire-rated.

   b. Separation from all other areas by detachment.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

b. NFPA Standard 24, "Outside Protection"

c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Activation of the thermal detector in the pump area or ionization detector in the cable vault would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available from the yard hydrant.

   b. Water discharge would be removed through the open door to the yard.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 0.3×10^6 BTU

   b. 26 gallons lubrication oil - 4.2×10^6 BTU

   c. Transients combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area pump - 150 ft^2

   b. Fire loading - 82,700 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One ionization detector in cable vault

   b. One thermal detector in pump area

c. Portable extinguisher

d. One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

a. Separation from other areas by detachment

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

a. Hose lines from two 2-1/2" outlets on yard hydrant

12. Appendix R Evaluation

a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-18.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Well Water Pump House #2 (Consists of the Number 2 Well Water Pump House)

1. Barriers That Define the Areas

   a. The area is separated from other fire areas by detachment.

   b. Constructed of insulated steel panel walls and roof.

2. Safety-Related Equipment in the Area

   a. There is no safety-related equipment in the areas.

3. Consequences of Design Basis Fire for Area

   a. Loss of fire pumps in well water pump house #2

   b. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 24, "Outside Protection"

   d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   e. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and emergency response procedures. A manual hose is available from a yard hydrant.

   b. A high heat condition will fuse the individual heads of the wet pipe sprinkler system thus initiating extinguishment.

c. Smoke would be removed through the operation of the building exhaust system.

d. Water discharge could cause flooding until removed through open doors.

e. Thermal detector sensing high heat condition from the oil tank area would activate the deluge valve thus discharging water from the open heads.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. 180 gallon diesel fuel oil storage tank outside non-rated wall.

b. 5 gallons fuel oil - 0.76×10^6 BTU

c. Transient combustible - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 348 ft^2

b. Fire loading - 23,850 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

a. Three ionization smoke detectors

b. Portable fire extinguisher

c. One wet pipe sprinkler system

d. One manual pull box

e. One water spray system with thermal detector over oil tank

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Separation from other areas by detachment

    b. Fixed extinguishing system in the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Hose lines from two 2-1/2" outlets on yard hydrant

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area General Equipment Area, RC-1 (consists of all floor areas in the radwaste building used to treat radioactive waste not included in areas RC-II through RC-XIX (Elev. 437'-0", 452'-0", 466'-0", 467'-0", 477'-0", 487'-0", 501'-0", and 507'-0")) (Figures 11 through 14, 39 through 44, and 64 through 67)

1. Barriers That Define the Area

   a. 12-inch or greater reinforced concrete walls interfacing TG-I fire area. Exterior building walls are 12" or greater below Elev. 467'-0" and insulated metal siding from Elev. 467'-0" to the roof.

   b. Conduit and conduit penetrations are sealed

   c. Pipe penetrations are sealed

   d. Door assemblies are 1-1/2-hour fire-rated.

   e. Roof is insulated metal deck with non-rated penetrations.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. HFPA Standard 15, "Water Spray Fixed Systems"

   e. NFPA Standard 24, "Outside Protection"

   f. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   g. NFPA Standard 72E, "Automatic Fire Detectors"

   h. NFPA Standard 80, "Fire Doors and Windows"

   i. NFPA Standard 90A, "Air Conditioning and Ventilating Systems"

4. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the prefire plans and the emergency response procedures. A manual hose is available.

b. Smoke would be removed through the operation of the building exhaust system.

c. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

d. Automatic sprinklers over the storage area on the 467' elevation would discharge water and control a fire in the area.

e. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

e. A high heat condition in one loop of charcoal absorbers will alarm in the control room. The automatic valve (OG-V-51) would be closed limiting the oxygen required for combustion.

f. Radiation monitors located downstream from the building exhaust air HEPA filter bank would sample the air being discharged to the atmosphere. Upon detection of a high level of radiation, an alarm would sound in the control room. By operator action, the filter unit's fan would be de-energized and the inlet damper closed to isolate the building.

6. Radioactive Material Contained in the Area

a. Equipment/Piping

1) low level gaseous activity in piping
2) radioactive liquid waste
3) concentrated radioactive liquid waste
4) radioactive charcoal
5) radioactive demineralizer ion exchange resins

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. Elevation 437'-0"

Cable trays	= 126.6×10^6 Btu
Charcoal in steel tanks	= 2112 cu. ft. = 769×10^6 Btu
Dry waste (bales)	= 5000 lbs = 41.2×10^6 Btu
Drum waste	= 730 lbs = 5.8×10^6 Btu

b. Elevation 467'-0"

Cable trays	= 11.3×10^6 Btu

c. Elevation 487'-0"

Cable trays	= 38 x 106 Btu
V belts	= 0.5 x 106 Btu

d. Transient combustibles = 8.4 x 106 Btu

8. Fire Loadings Which Represent Combustibles in Item 7

a. Elevation 437'-0"**

Floor area	= 32,000 ft2
Fire loading	= 29,450 BTU/ft2 (29,720 BTU/ft2)*

b. Elevation 467'-0"**

Floor area	= 23,400 ft2
Fire loading	= 483 BTU/ft2 (840 BTU/ft2)*

c. Elevation 487'-0"

Floor area	= 23,400 ft2
Fire loading	= 1,645 BTU/ft2 (2,000 BTU/ft2)*

9. Extinguishing, Detection and Alarm Capabilities Within the Area

a. Photo-electric cell smoke detectors
b. Ionization detectors
c. Portable extinguishers
d. Manual pull boxes
e. Wet pipe sprinklers over storage area on the 467' elevation
f. 1-1/2" standpipe hose stations

* With transient combustibles
** Excludes area with automatic sprinkler protection and its associated storage

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment in and available to the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. Hose lines from two 2-1/2" outlets on yard hydrants

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown and capability is indicated in Table F.2-20.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Areas</u> Cable Spreading Room, RC-II, which is separated into fire zones RCIIA, RCIIB, RCIIC (consists of the Cable Spreading Room (El. 484'-0")) Figures 13, 41, and 66)

1. Barriers that Define the Area

   a. Walls, floor, and ceiling with a minimum 3-hour fire rating, door assemblies have a 3-hour fire rating.

   b. Ventilation penetrations are protected by 3-hour fire-rated doors in frames which are similar to fire door frames and are satisfactory for the area due to automatic sprinkler protection.

   c. Piping penetrations are sealed.

   d. Conduits and conduit penetrations are sealed.

   e. Ceiling openings for cable entrance into Main Control Room are sealed.

   f. Fire zone RCIIC consists of a 20' horizontal area with no intervening combustible fire loading. The cables in trays are coated with a one hour thermolag covering and the area is protected by an automatic sprinkler system and automatic detection.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. Fire Zone RCIIA: The equipment and cabling that is not protected in this fire zone will be lost as a consequence of a design basis fire. There are Appendix R Division 2 Safe Shutdown components in this fire zone that require protection with a one hour fire rated assembly and automatic sprinkler system. See section F.4.4.3 for a detailed listing of the Appendix R Safe Shutdown System components.

b. Fire Zone RCIIB: The equipment and cabling in this fire zone will be lost as a result of a design basis fire. There are no components or cabling in this fire zone that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

c. Fire Zone RCIIC: All cabling in this about 20 ft. wide area is protected by a one hour rated barrier (Thermolag). This barrier and automatic sprinkler protection results in a non-combustible area and thus a fire would not burn or spread into this area.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

b. NFPA Standard 13, "Sprinkler Systems, Installation"

c. NFPA Standard 14, "Standpipe and Hose Systems"

d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

f. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

g. NFPA Standard 72E, "Automatic Fire Detectors"

h. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Smoke from a fire would activate the ionization detection system, which would alarm in the control room and activate the pre-action system valve, causing the sprinkler system to fill with water. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. A further high heat condition will activate the individual sprinkler heads. A manual hose is available.

b. Smoke would be removed through the operation of the smoke exhaust system and portable ducting.

c. Water discharge could cause flooding until removed by the floor drain system or portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 650.0 x 106 BTU

   b. Transient combustibles - 8.4 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor Area - 8392 ft2

   b. Fire Loading - 78,500 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Thirty six ionization detectors

   b. Portable extinguishers

   c. Two manual pull boxes

   d. One automatic pre-action sprinkler system

   e. One ionization detector in each return air duct system

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers and equivalent rated fire damper/doors

   b. Fixed extinguishing system in the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Portable extinguishers

12. Appendix R Evaluation

a. For a design basis fire in fire zone RCIIA, capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost. Similarly for a design basis fire in fire zone RCIIB capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost. Both fire zone RCIIA and RCIIB are separated by a unique fire zone designated fire Zone RCIIC which consists of a twenty foot (20') area or space that does not contain any combustibles.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-21a & b.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Cable Chase, RC-III (consists of the electrical cable chase on the east side of the Radwaste Building (El. 467'-0", 484'-0", 487'-0", 501'-0", 507'-0" and 525'-0")) (Figures 12 through 14, 40 through 42, and 65 through 67)

1. Barriers that Define the Area

   a. Walls, floor, and ceiling with a minimum 3-hour fire rating, door assemblies have a 3-hour fire rating except for low range blast doors which are equivalent in construction to a 3-hour rated door.

   b. Ventilation penetrations are protected by 3-hour fire-rated doors in frames which are similar to fire door frames and are satisfactory for the area due to automatic sprinkler protection.

   c. Pipe penetrations from the reactor building are sealed and have non-fire-rated watertight boots.

   d. Pipe penetrations are sealed.

   e. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling that is not protected in this fire area will be lost as a consequence of a design basis fire. There are Appendix R Division 2 Safe Shutdown components in this fire area that require protection with a one hour fire rated assembly and automatic sprinkler system. See section F.4.4.3 for a detailed listing of the Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

c. NFPA Standard 14, "Standpipe and Hose Systems"

d. NFPA Standard 15, "Water Spray Fixed Systems"

e. NFPA Standard 24, "Outside Protection"

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. One ionization detector in each of the return air systems

   b. Five ionization detectors located at elevation 501'-0"

   c. One pre-action sprinkler system

   d. Six ionization detectors located at elevation 525'-0"

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers and equivalent fire damper/doors

   b. Fixed extinguishing system in the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

   a. 1-1/2" standpipe hose stations

   b. Portable extinguishers

   c. Two manual pull boxes

   d. Pull box for manually activating pre-action system valve at elevation 525'-0"

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is dependent upon protection of dedicated cabling in this area.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-22.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area   Electrical Equipment Room No. 1, RC-IV (consists of Battery Charger Room No. 1 and RPS Room No. 1, (El. 467'-0")) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating. Except a portion of the wall common with Battery Room 1 (RC-V) has a 2-hour fire rating.

   b. Ventilation penetrations are protected by 1-1/2-hour fire-rated dampers to fire area RC-V in frames which are similar to fire door frames and are satisfactory for the area due to its low fire loading.

   c. Conduit penetrations and conduits are sealed.

   d. Cable tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor Area - 825 ft2

   b. Fire Loading - 38,000 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Two ionization detectors

   b. Two high temperature switches

   c. Ionization detector in the return air duct

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers and equivalent rated fire damper/doors

   b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Portable extinguishers

   b. Two manual pull boxes

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-23.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Battery Room #1, RC-V (consists of Battery Room No. 1 and Electrical Repair Shop (El. 467'0')) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. North and south concrete walls, floor, and ceiling have a minimum fire rating of 3 hours, door assemblies have a 3-hour fire rating except east and west walls have a 2-hour fire rating.

   b. Ventilation penetrations are protected by 1-1/2-hour fire-rated dampers in the east and west walls

   c. Cable tray penetrations are sealed

   d. Conduit penetrations and conduits are sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 24, "Outside Protection"

   d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   e. NFPA Standard 72E, "Automatic Fire Detectors"

f. NFPA Standard 80, "Fire Doors and Windows"

g. NFPA Standard 90, "Air Conditioning and Ventilating Systems"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the prefire plans and the emergency response procedures. A manual hose is available.

   b. Smoke would be removed through the operation of the smoke exhaust system with portable ducting.

   c. Water discharge could cause flooding until removed by the floor drain system or by portable pumping units.

   d. Isolation of the room when the fire dampers are closed.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 11.3 x 106 BTU

   b. Battery containers (thermoplastic) - 15.4 x 106 BTU

   c. Transient combustibles - 8.4 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor Area - 1,330 ft2

   b. Fire Loading - 26,400 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Two ionization detectors

   b. Two high temperature switches

   c. One ionization detector in each of the return air and exhaust air duct systems

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Portable extinguishers

   b. Two manual pull boxes

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability are indicated in Table F.2-24.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Battery Room #2, RC-VI (consists of Battery Room No. 2 (El. 467'-0")) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete walls with a minimum fire rating of 2 hours, door assemblies have a 3-hour fire rating, floor and ceiling have a 3-hour fire rating

   b. Ventilation penetrations are protected by 1-1/2-hour fire-rated dampers

   c. Cable tray penetrations are sealed

   d. Conduit penetrations and conduits are sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 24, "Outside Protection"

   d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   e. NFPA Standard 72E, "Automatic Fire Detectors"

   f. NFPA Standard 80, "Fire Doors and Windows"

c. Ionization detector in the exhaust air duct

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguishers

    b. Two manual pull box

    c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-25.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Electrical Equipment Room No. 2, RC-VII (consists of Battery Charger Room No. 2 and RPS Room No. 2 (El. 467'-0")) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours except the wall common with Battery Room 2 (RC-VI) has a 2-hour fire rating.

   b. Ventilation penetrations are protected by 1-1/2-hour fire-rated dampers

   c. Cable tray penetrations are sealed

   d. Conduit penetrations and conduits are sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 19.5×10^6 BTU

   b. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 820 ft^2

   b. Fire loading battery charger section - 55,250 BTU/ft^2

   c. Fire loading - 50,500 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors

   b. Two high temperature switches

   c. Ionization detector in the return air duct system

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Portable extinguishers

   b. Two manual pull boxes for alarm

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-26.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Switchgear Room No. 2, RC-VIII (consists of Switchgear Room No. 2 (Elev. 467'-0")) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours except for north and east walls have a 2-hour fire rating, door assemblies have a 3-hour fire rating.

   b. Ventilation penetrations in walls are protected by 1-1/2-hour fire-rated dampers

   c. Ventilation penetrations in the ceiling have 3-hour fire-rated dampers

   d. Cable tray penetrations are sealed

   e. Conduit penetrations and conduits are sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 26.2×10^6 BTU

   b. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 1,262 ft^2

   b. Fire loading - 27,400 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors

   b. High temperature switch

   c. Ionization detector in the return air duct system

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Portable extinguishers

   b. Two manual pull boxes for alarm

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability are indicated in Table F.2-27.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Remote Shutdown Room, RC-IX (consists of Remote Shutdown Room located in the Radwaste Control Building (EL. 467'-0")) (Figures 12, 40 and 65)

1. Barriers that Define the Area

   a. Walls, floor, and ceiling with a minimum fire rating of 3 hours, door assembly has a 3-hour fire rating.

   b. Ventilation penetrations are protected by a 3-hour fire-rated damper or a fire door in a frame which is similar to a fire door frame and is satisfactory for the area due to the low fire loading.

   c. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 19.6 x 10^6 BTU

   b. Transient combustibles - 8.4 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 628 ft^2

   b. Fire Loading - 45,000 BTU/ft^2 w/transit, 31,200 BTU/ft^2 w/o transit

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One ionization detector

   b. High temperature switch

   c. Ionization detector in the return air duct system

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers or equivalent rated fire damper/door

   b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Portable extinguishers

   b. Two manual pull boxes for alarm

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-28.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Main Control Room, RC-X (consists of Main Control Room located in the Radwaste Control Building (El. 501'-0")) (Figures 14, 42 , and 67)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours, door with a total fire rating of 3 hours.

   b. Ventilation penetrations have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory for the area due to the low fire loading.

   c. Pipe penetrations, conduit penetrations and conduits and cable tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Remote Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R safe shutdown components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 12A, "Halon 1301 System"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 24, "Outside Protection"

12. Appendix R Evaluation

a. Capability of the Appendix R Remote Shutdown System to achieve reactor shutdown is not lost.

b. Analysis is discussed in Table F.2-29.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Unit A - Air Conditioning Room, RC-XI (consists of the Control Room Unit A Air Conditioning Room in the Radwaste Control Building (El. 525'-0")) (Figures 14, 42, and 67)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours except the wall to the communications area has a 2-hour fire rating due to the 1-1/2-hour door assembly. Door assembly to the cable chase has a 3-hour fire rating.

   b. Ventilation penetrations have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to the low fire loading.

   c. Pipe penetrations, conduit penetrations, and conduits and cable tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 8.8 x 10^6 BTU

   b. Charcoal - 3.3 x 10^6 BTU

   c. Oil and other items - 0.1 x 10^6 BTU

   d. 0.875 Gal. electro-hydraulic fluid - 0.123 x 10^6 BTU

   e. Transient combustibles - 8.4 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor Area - 2,272 ft^2

   b. Fire Loading - 9,121 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Heat detection and water spray system in the emergency filter unit

   b. Five ionization detectors

   c. Portable extinguisher

   d. One ionization detector in return air duct

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers and equivalent rated fire damper/door

    b. Extinguishing equipment in and available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguisher

    b. 1-1/2" standpipe hose stations

    c. One manual pull box for alarm

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-30.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Unit B - Air Conditioning Room, RC-XII (consists of the Control Room Unit B Air Conditioning Room in the Radwaste Control Building (Elev. 525'-0")) (Figures 14, 42, and 67)

1. Barriers That Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours except the wall to the communications area has a 2-hour fire rating due to the 1-1/2-hour door assembly.

   b. Ventilation penetrations have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to the low fire loading

   c. Pipe penetrations, conduit penetrations, and conduits and cable tray penetrations are sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

7. Type, Quantity and Characteristics of Combustible Materials in Area

    a. Fire retardant cable in trays - 8.8 x 10^6 BTU

    b. Charcoal - 3.3 x 10^6 BTU

    c. Oil and other items - 0.1 x 10^6 BTU

    d. 0.875 Ga. electro-hydraulic fluid - 0.123 x 10^6 BTU

    e. Transient combustibles - 8.4 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

    a. Floor Area - 2,272 ft^2

    b. Fire Loading - 9,121 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

    a. Heat detection and water spray system in the emergency filter unit

    b. Five ionization detectors

    c. Portable extinguisher

    d. One ionization detector in return air duct

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers and equivalent rated fire damper/door

    b. Extinguishing equipment in and available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguisher

    b. 1-1/2" standpipe hose station

    c. One manual pull box for alarm

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-31.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Communications Room, Emergency Chillers Area, and HVAC Chase, RC-XIII (consists of the Communications Room, and HVAC Chase (El. 484'-0" and 525'-0" and Duct Chase to 484'-0")) (Figures 14, 42, and 67)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum fire rating of 3 hours, door assemblies have a 1-1/2-hour fire rating except the door at the bottom of the duct chase has a 3-hour fire rating.

   b. Ventilation penetrations have 3-hour fire-rated dampers or doors in frames similar to fire door frames which are satisfactory due to the low fire loading.

   c. Pipe penetrations, conduit penetrations, and conduits and cable tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

b. NFPA Standard 14, "Standpipe and Hose Systems"

c. NFPA Standard 24, "Outside Protection"

d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

e. NFPA Standard 72E, "Automatic Fire Detectors"

f. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. A brigade would be dispatched which would take appropriate action in accordance with the prefire plans and the emergency response procedures. A manual hose is available.

b. Smoke would be removed through the operation of the smoke exhaust system with portable ducting.

c. Water discharge could cause flooding until removed by the floor drain system, through open doors, or by portable pumping units.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

a. Fire retardant cable in trays - 5.1×10^6 BTU

b. 8.75 gallon electro-hydraulic fluid - 1.1×10^6 BTU

c. Transient combustible - 8.4×10^6 BTU

d. I&C Shop equipment - 17.6×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 4,185 ft^2

   b. Fire loading - 7,700 BTU/ft^2

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. Two ionization detectors in the communications shop

   b. Five ionization detectors in the corridor

   c. Portable extinguisher

   d. Two manual pull boxes

   e. One ionization detector in the corridor return air duct served by Division 2 only.

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers or equivalent rated fire damper/doors

    b. Extinguishing equipment in and available to the area

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose station

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-32.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Switchgear Room #1, RC-XIV (consists of Switchgear Room No. 1 (El. 467'-0")) (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling with a minimum 3-hour fire rating, except the east wall which has a 2-hour fire rating. All door assemblies have a 3-hour fire rating.

   b. Ventilation penetrations are protected by 1-1/2-hour fire-rated dampers on the intradivisional east wall. Other ventilation penetrations are 3-hour fire-rated.

   c. Conduit penetrations and conduits and tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 24, "Outside Protection"

b. High temperature switch

c. Ionization detector in the return air duct system

10. Means for Containing and Inhibiting the Progress of Fire in the Area

a. Fire-rated barriers

b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

a. Portable extinguisher

b. Two manual pull boxes for alarm

c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-33.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Radwaste Building, RC-XV through RC-XVIII (consists of Stairs A8, A7, Elevator 4 and Stairs A13 (El. 437'-0", 452'-0", 467'-0", 484'-0", 487'-0", 501'-0", 525'-0"))(Figures 11 through 14, 39 through 44, and 64 through 67)

1. Barriers That Define the Area

   a. Concrete and reinforced masonary block walls with a minimum of 3-hour and 3-hour fire rating respectively. Door assemblies have a 1-1/2-hour fire rating or equivalent, except the exterior door to stairs A-8 is not fire-rated.

   b. Conduit penetrations and conduits are sealed.

   c. Piping penetrations are sealed.

2. Safety-Related Equiping in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 24, "Outside Protection"

   d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   e. NFPA Standard 72E, "Automatic Fire Detectors"

   f. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. A brigade would be dispatched which would take appropriate acton in accordance with the pre-fire plans and the emergency response procedures. A manual hose is available.

   b. Elevator smoke would gradually be removed through the vent opening in the roof. Smoke in stairs A-7 would be removed through a door to the roof. Smoke in stairs A-8 and A-13 would be removed by the normal building exhaust systems or portable venting units.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Transient combustibles in elevator - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Fire area - 52 ft^2

   b. Fire loading - 0.16×10^6 BTU/ft^2

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. Six standpipe hose stations in stairs A-7

   b. Four standpipe hose stations in stairs A-8

   c. One standpipe hose stations in stairs A-13

   d. One ionization detector in stairs A-7 and A-8

   e. One smoke (photo-electric cell) detector in elevator #4

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment in and accessible to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguishers

    b. Ten manual pull boxes

    c. Hose lines from two 2-1/2" outlets on yard hydrants on ground elevations

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Corridor C-205 RC-XIX (Elev. 467'-0") (Figures 12, 40, and 65)

1. Barriers that Define the Area

   a. Concrete ceiling and floor with a minimum of 3-hour fire rating. See Figure 40 for the specific details of doors and walls fire rating

   b. All piping penetrations are sealed

   c. Conduit penetrations and conduits are sealed

   d. Ventilation penetrations are protected with 1-1/2-hour fire-rated dampers except for 3-hour fire-rated dampers to RC-IX

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 24, "Outside Protection"

   d. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   e. NFPA Standard 72E, "Automatic Fire Detectors"

   f. NFPA Standard 80, "Fire Doors and Windows"

   g. NFPA Standard 90A, "Air Conditioning and Ventilating Systems"

5. Consequences of Fire if Fire Protection System Functions as Designed

    a. Smoke from a fire would activate the ionization detector, which would alarm in the control room. A brigade would be dispatched which would take appropriate action in accordance with the prefire plans and the emergency response procedures. A manual hose is available.

    b. Smoke would be removed through the operation of the smoke exhaust system with portable ducting.

    c. Water discharge would be removed by the floor drain system and portable pumping units if required.

6. Radioactive Material Contained in the Area

    a. Equipment/piping - none

    b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

    a. Fire retardant cable in trays - 25×10^6 BTU

    b. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

    a. Floor area - 1,316 ft^2

    b. Fire loading - 25,380 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

    a. Five ionization detectors

    b. Portable extinguisher

    c. One manual pull box

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

b. Extinguishing equipment inside and outside of area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

a. 1-1/2" manual hose stations

b. Hose line from one 2-1/2" outlet on yard hydrant

c. One manual pull box

12. Appendix R Evaluation

a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-35.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> Reactor Bldg/Radwaste Bldg Access Area, RC-XX (consists of the electrical cable chase and access area on the east side of the radwaste building (elev. 467'-0" and 487'-0"))(Figures 12, 13, 40, 41, 65, and 66)

1. Barriers That Define the Area

   a. Walls, floor and ceiling with a minimum 3-hour fire rating, door assemblies to the radwaste building have a 1-1/2-hour fire rating, door assemblies to the reactor building air lock are gasketed air tight door backed by a 1-1/2-hour fire door at the elevator entrance.

   b. Ventilation penetrations are protected by 3-hour fire-rated dampers in the 467'-0" elevation floor and 1-1/2-hour fire dampers in the radwaste building wall.

   c. Pipe penetrations are sealed.

   d. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

9. Extinguishing, Detection and Alarm Capabilities Within the Area

    a. Two ionization detectors

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment available to the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguishers

    b. Two manual pull boxes

    c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-35a.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area General Equipment Area, R-I, (consists of all open space and equipment rooms within secondary containment), (Elev. 422'-3", 441'-0", 471'-0", 501'-0", 522'-0", 548'-0", 572'-0", and 606'-10-1/2")) (Figures 7 through 10, 33 through 38, and 59 through 62)

Note: An analysis for rooms containing safety-related equipment is presented on the following pages.

1. Barriers That Define the Area

   a. Separated from all other buildings by concrete walls with a fire rating of 3 hours.

   b. Pipe penetrations through fire area walls are sealed.

   c. Horizontal access to exterior corridors at Elev. 441'-0", Elev. 471'-0", and Elev. 501'-0" is through noncombustible air locks with non-rated air tight doors.

   d. Roof is Class 1 insulated metal deck.

   e. Conduit penetrations and conduits are sealed.

   f. Horizontal access to the radwaste/control building at Elev. 471'-0" and 487'-0" is through noncombustible air locks with non-rated air tight doors.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

DELETED

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling that is not protected in this fire area will be lost as a consequence of a design basis fire. There are Appendix R Division 2 Safe Shutdown components in this fire area that require protection with a three hour fire rated assembly. Loss of all unprotected equipment in this fire area is not considered a credible event due to the low fire loading and geometrical configuration of the Reactor Building. See section F.4.4.3 for a detailed listing of the Appendix R Safe Shutdown System components.

Note: The amount and exact nature of equipment and cabling lost depend upon the location of the fire. See individual room or floor analyses for consequences.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler Systems, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 24, "Outside Protection"

   e. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

f. NFPA Standard 72E, "Automatic Fire Detectors"

g. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

a. Smoke or flame from a fire would activate an ionization or ultraviolet detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the prefire plans and the emergency response procedures. A manual hose is available.

b. Smoke would be removed by operation of the building exhaust system. In addition, portable fans and ducting will be utilized in the standby gas treatment unit area.

c. Water discharge could cause flooding until removed by the floor drain system or portable pumping.

6. Radioactive Material Contained in the Area

a. Equipment/piping - none

b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

Fire retardant cable in trays	942.7×10^6 BTU
Transient combustibles	8.4×10^6 BTU
121 gallons lubrication oil	18.5×10^6 BTU
220 gallons hydraulic fluid	29.7×10^6 BTU
170 ft^3 charcoal	6.2×10^6 BTU
Protective clothing, cleanup supplies, required equipment and related materials	105.43×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 49,900 ft^2

b. Fire loading - 22,265 BTU/ft^2

Note: The fire loading is considered to be slight.

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Ionization detectors (see individual room analysis for quantities)

   b. Ultra violet detectors (Elev. 606'-10-1/2")

   c. 1-1/2" standpipe hoses at each floor level

   d. Manual water spray sprinklers protect the Standby Gas Treatment and sump vent filter units' charcoal

   e. Portable fire extinguishers at each floor level

   f. Photo-electric cell smoke detectors in railroad air lock

   Note: Refer to Figures 59 through 62 for location of fire detection and extinguishing equipment.

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment in the area

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. None

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not affected provided dedicated equipment, valves, instrumentation and cables in this area are protected.

   b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-36a.

c. Instruments in the Appendix R Division 2 Safe Shutdown System that are located in this fire area are protected as follows:

MS-LITS-26D (B22-N026D) MS-PT-51B (B22-N051B)	Located on Instrument Rack E-IR-H22/P027*
RHR-FT-N015B (E12-N015B)	Located on Instrument Rack E-IR-H22/P021*

*Both instrument racks E-IR-H22/P021 & E-IR-H22/P027 have been enclosed with a fire shield wall with access through a 1 hour fire rated door. The mini-fire zones contain minimal combustibles.

d. For discussion of analysis methodology and spurious signals see section F.4.4.

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Room Analysis General Floor Area (Elev. 471'-0")

1. Barriers that Define the Room

   a. Concrete walls, floor, and ceiling, door assemblies to stairways and elevators have a 1-1/2-hour fire-rating, all other door assemblies are non-fire-rated. There are open stairways and equipment hatches to the upper and lower floors.

   b. Ventilation penetrations to other fire areas have 3-hour fire-rated dampers.

   c. Conduit penetrations, conduit and tray penetrations through floor and ceiling slabs only are sealed.

   d. Piping penetrations to other fire areas are sealed.

2. Safety-Related Equipment in the Room

   a. See the statement on page F.2-130 under item 2.

3. Consequences of Design Basis Fire for Room

   a. See the statement on Page F.2-132 under item 3.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate the ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. A manual hose is available.

   b. Water discharge could cause flooding until removed by the floor drain system.

   c. Smoke would be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level water activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 228.15 x 10^6 BTU

   b. Electro-hydraulic fluid (0.875 gal x 3 x 140,000 BTU) = 0.3675 x 10^6 BTU

   c. Transient combustibles - 8.4 x 10^6 BTU

   d. Clean-up cart - 0.2 x 10^6 BTU

   e. Two cabinets of protective clothing - 10.3 x 10^6 BTU

   f. Pick-up bags and backup supplies - 2.625 x 10^6 BTU

   g. Step-off pads and rope - 0.15 x 10^6 BTU

   h. Eight manuals - 0.01 x 10^6 BTU

   i. Crew box - 0.25 x 10^6 Btu

   j. Fiberglass ladders (2) - 0.06 x 10^6 BTU

   k. Air sampler - 0.13 x 10^6 BTU

   l. Test stand (REA-FN-16) with air tubing - 0.75 x 10^6 BTU

   m. Anti-C yellow plastic lining (2 rolls) - 0.90 x 10^6 BTU

   n. 23.75 pound grease - 0.441 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 10,000 ft^2

   b. Fire loading - 25,300 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Twenty-three ionization type detectors

   b. Portable fire extinguishers

   c. Four manual pull boxes

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Extinguishing equipment inside and outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. 1-1/2" standpipe hose station

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Room Analysis General Floor Area (Elev. 501'-0")

1. Barriers That Define the Room

   a. Concrete walls, floor, and ceiling, door assemblies to stairways and elevators have a 1-1/2-hour fire-rating, all other door assemblies are non-fire-rated. There are open stairways and equipment hatches to the upper and lower floors. Several room areas do not have doors.

   b. Ventilation penetrations do not have fire dampers.

   c. Piping penetrations are not sealed.

   d. Conduit penetrations, conduits and tray penetrations through floor and ceiling slabs only are sealed.

   e. An 8" thick fire shield wall is around instrument rack H22-P021 with a one hour fire door. There is no top to this wall, but the wall is about 6 inches higher than the instrument rack.

2. Safety-Related Equipment in the Room

   a. See the statement on page F.2-130 under item 2.

3. Consequences of Design Basis Fire for Room

   a. See the statement on Page F.2-132 under item 3.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until removed by the floor drain system.

   c. Smoke would be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity in water

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in tray - 198.9 x 10^6 BTU

   b. 2.08 cu. ft rubber closure strip (5' x 1/4" x 237.5') - 1.378 x 10^6 BTU

   c. Transient combustibles - 8.4 x 10^6 BTU

   d. Valve operators (26 lbs. grease) - 0.47 x 10^6 BTU

e. 0.32 cu. ft rubber closure strip (5' x 1/4" x 36') - 0.302 x 10^6 BTU

f. Cleanup cart - 0.20 x 10^6 BTU

g. Two closed cabinets of protective clothing - 10.3 x 10^6 BTU

h. Bags for pick-up and back-up supplies - 2.625 x 10^6 BTU

i. Protective ear plug box - 0.05 x 10^6 BTU

j. Fiberglass ladders (2) - 0.06 x 10^6 BTU

k. Step-off pads and ropes (4) - 0.12 x 10^6 BTU

l. Yellow Anti/c covering (2 rolls) - 0.90 x 10^6 BTU

m. Anti/c enclosure around Tip Room - 0.05 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

a. Floor area - 8318 ft^2

b. Fire loading - 26,900 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Room

   a. Twenty-one ionization detectors

   b. Four manual pull boxes

   c. Portable extinguishers

10. Means for Containing and Inhibiting the Progress of Fire in the Room

   a. Extinguishing equipment inside and outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Room

   a. Ionization detectors on general floor area

   b. Four manual pull boxes for alarm

   c. Portable extinguishers

   d. 1-1/2" standpipe hose station

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Room Analysis General Floor Area (Elev. 522'-0")

1. Barriers That Define the Room

   a. Concrete walls, floor, and ceiling. Door assemblies for stairways and elevators have a 1-1/2 hour fire-rating, door assembies for MCC room Division 2 (R-XVIII) have a three-hour fire-rating, all other door assemblies are non-fire-rated. There is an open equipment hatch in the floor and ceiling. There are two open stairways to general floor areas on elevation 501'-0" and 548'0".

   b. Ventilation penetrations do not have fire dampers.

   c. Some piping penetrations are not sealed.

   d. Conduit penetrations, conduits and tray penetrations through floor and ceiling slabs only are sealed.

   e. An 8 inch thick concrete fire shield wall is around instrument rack H22-P027 with one hour fire doors. There is no top to this wall but the wall is about 6 inches higher than the instrument rack.

2. Safety-Related Equipment in the Room

   a. See the statement on page F.2-130 under item 2.

3. Consequences of Design Basis Fire for Room

   a. See the statement on Page F.2-132 under item 3.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until removed by the floor drain system. The flooding would not cause damage to any safety-related system.

   c. Smoke would be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Room

   a. Equipment/piping - low level water activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in trays - 270.2×10^6 BTU

   b. Hydraulic power unit fluid reservoir (2) 110 x 135,000 = 29.7×10^6 BTU

   c. Transient combustibles - 8.4×10^6 BTU

   d. 40 pounds grease - 0.72×10^6 BTU

   e. Fire retardant cable in conduit (negligible)

   f. 0.3 ft^3 rubber closure strip (5-1/4" x1/4" x 35') - 0.23×10^6 BTU

   g. Clean-up cart - 0.20×10^6 BTU

   h. Two cabinets of protective clothing - 10.3×10^6 BTU

   i. Bags for pick-up and backup supplies - 2.625×10^6 BTU

   j. Step-off pads and ropes (3) - 0.09×10^6 BTU

   k. Yellow anti/c covering (2 rolls) - 0.90×10^6 BTU

   l. Air sampler - 0.13×10^6 BTU

   m. Crew box - 0.25×10^6 BTU

   n. H/P supplies in counting room - 10.0×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 9,254 ft^2

   b. Fire loading - 37,500 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Room

   a. Twenty-seven ionization detectors. An ionization detector is located in the south pipe space.

   b. Four manual pull boxes

   c. Portable extinguishers

10. Means for Containing and Inhibiting the Progress of Fire in the Room

   a. Extinguishing equipment inside and outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Room

   a. Ionization detectors in the general floor area for alarm

   b. Four manual pull boxes for alarm

   c. Portable extinguishers

   d. 1-1/2" standpipe hose stations

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Room Analysis General Floor Area (Elevation 548'-0")

1. Barriers that Define the Room

   a. Concrete walls, floor and ceiling, 1-1/2-hour fire-rated door assemblies to the enclosed stairways and elevators, 3-hour fire rated door assembly to the south valve room, all other door assemblies are non-fire-rated, there is an open equipment hatch in the floor and ceiling.

   b. Ventilation penetrations do not have fire dampers.

   c. Piping penetrations are not sealed.

   d. Conduit penetrations and conduits through floor and ceiling only are sealed.

   e. There is an open pipe tunnel to RHR heat exchanger room R-V. There are no combustibles in the thirty-foot long tunnel.

2. Safety-Related Equipment in the Room

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Room

   a. The equipment and cabling that is not protected in this fire area will be lost as a consequence of a design basis fire. There are Appendix R Division 2 Safe Shutdown components in this fire area that require protection. See section F.4.4.3 for a detailed listing of the Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until removed by the floor drain system.

   c. Smoke would be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in tray - 56.68 x 10^6 BTU

   b. 4.5 gal. CRD pump lube oil - 0.684 x 10^6 BTU

   c. 1.75 gal. electro-hydraulic fluid - 0.246 x 10^6 BTU

   d. Transient combustibles - 8.4 x 10^6 BTU

e. Foam glass insulation on walls and ceiling - negligible

f. Fire retardant cable in conduit (negligible)

g. 1.86 cu. ft. of rubber closure strip (5" x 1/4" x 74') - 1.776 x 10^6 BTU

h. 31 pounds grease 0.558 x 10^6 BTU

i. Clean-up cart 0.20 x 10^6 BTU

j. Two cabinets of protective clothing - 10.3 x 10^6 BTU

k. Pick-up bags and back-up supplies - 2.625 x 10^6 BTU

l. Air sampler - 0.13 x 10^6 BTU

m. Fiberglass ladders (2) - 0.06 x 10^6 BTU

n. Step-off pads and rope (2) - 0.06 x 10^6 BTU

o. Class A bottle H_2 (25%) in N_2(75%) - 9.9 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 10,875 ft2

   b. Fire loading - 8,450 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Room

   a. Twenty-six ionization detectors

   b. Four manual pull boxes

   c. Portable extinguishers

10. Means for Containing and Inhibiting the Progress of Fire in the Room

   a. Extinguishing equipment inside and outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Room

   a. Four manual pull boxes for alarm

   b. Portable extinguishers

   c. 1-1/2" standpipe hose station

   d. Ionization detectors in general floor area for alarm

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Room Analysis General Equipment Area (Elevation 572'-0")

1. Barriers That Define the Room

   a. Concrete walls, floor and ceiling, there are 1-1/2-hour fire-rated door assemblies at the elevator and enclosed stairway. There are 3-hour fire-rated doors to hydrogen recombiner MCC Room Division 2, there is an open equipment hatch in the ceiling and floor and an open hatch in the southeast corner to Elevation 548'-0" and 606'-0". There is an open area below the Dryer Separator Pool which connects this room to the Standby Gas Treatment Area.

   b. Ventilation penetrations do not have fire dampers.

   c. Piping penetrations are not sealed.

   d. Conduit penetrations and conduits are sealed.

   e. A fire barrier separates the two Standby Gas Treatment units.

2. Safety-Related Equipment in the Room

   a. See the statement on page F.2-130 under item 2.

3. Consequences of Design Basis Fire for Room

   a. See the statement on Page F.2-132 under item 3.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 13, "Sprinkler System, Installation"

   c. NFPA Standard 14, "Standpipe and Hose Systems"

   d. NFPA Standard 15, "Water Spray Systems"

   e. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   f. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until removed by the floor drain system.

   c. Smoke would be removed by the operation of the building exhaust system.

   d. Heat buildup in the sump vent filter unit would cause the temperature alarm to sound in the Control Room. The exhaust fan could be activated by the control room operator to draw air across the charcoal bed for cooling. A further heat buildup and the operator would activate the water spray system.

   e. Heat buildup in the SGT unit would cause the temperature alarm in the unit to sound in the control room. The control room operator could activate the exhaust fan to draw air through the charcoal for cooling and also send personnel to investigate. A further heat buildup and the operator would manually actuate the water spray system.

6. Radioactive Material Contained in the Room

   a. Equipment/piping - low level activity in gas

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in trays - 109.7 x 10^6 BTU

   b. 46 lbs fan V belts (10 @ 4.6 lbs each) - 0.368 x 10^6 BTU

   c. Fiberglass filters - negligible

   d. 9 cu. ft. charcoal (4.5 cu. ft. x 2 units) - 3.276 x 10^6 BTU

   e. 12.1 gallon electro-hydraulic fluid (6.03 x 2 units) = 1.694 x 10^6 BTU

   f. Transient combustibles - 8.4 x 10^6 BTU

   g. 1-1/2 pounds grease - 0.027 x 10^6 BTU

   h. 0.875 gallon electro-hydraulic fluid - 0.123 x 10^6 BTU

   i. 170 cu. ft. charcoal (85 cu. ft x 2 units) - 6.2 x 10^6 BTU

   j. 3.5 gallon electro-hydraulic fluid - (0.875 x 4) = 0.94 x 10^6 BTU

   k. 56 lbs. lube grease (14 valves x 4 lbs.) = 1.008 x 10^6 BTU

   l. Clean-up cart - 0.2 x 10^6 BTU

   m. 2 cabinets of protective clothing - 10.3 x 10^6 BTU

   n. Step-off pad (2) and ropes - 0.060 x 10^6 BTU

   o. Pick-up bags and back-up supplies - 2.7 x 10^6 BTU

p. Air sampler with cord - 0.13 x 10^6 BTU

q. I&C crew box - 0.25 x 10^6 BTU

r. Protective ear plugs - 0.005 x 10^6 BTU

s. Plywood ramp - 0.10 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 7,900 ft^2

   b. Fire loading - 18,500 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Room

   a. Twenty-six ionization detectors

   b. Four manual pull boxes

   c. Portable extinguishers

   d. Two manually actuated water spray systems (one in each vent filter train)

   e. Six thermal detectors (thermistor type)(three each SGT unit)

   f. Six manually actuated water spray systems (three each SGT unit)

10. Means for Containing and Inhibiting the Progress of Fire in the Room

    a. Charcoal contained in No. 11 gauge steel plated assembly

    b. Extinguishing equipment inside and outside of room

11. Extinguishing, Detection and Alarm Equipment Outside But With Access to the Room

    a. 1-1/2" standpipe hose station

    b. Ionization detectors in the general floor area for alarm

    c. Four manual pull boxes for alarm

    d. Portable extinguishers

Room Analysis General Floor Area Elevation 606'-10-1/2" (Operating Floor)

1. Barriers that Define the Room

   a. The concrete foor contains the dryer separator pool, reactor well, and the fuel pool. There are two open equipment hatches and one open stairway to general floor area at elevation 572'-0". There are non-fire-rated concrete plugs to the new fuel storage vault and Division 1 and 2 RHR heat exchanger rooms.

   b. Walls are insulated metal panels.

   c. Roof is Class I insulated steel.

   d. Door assemblies to enclosed stairs A5 and A6 and elevators 1 and 2 have 1-1/2-hour fire rating.

   e. Ventilation penetrations do not have fire dampers.

   f. Piping penetrations are not sealed.

   g. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Room

   a. See the statement on page F.2-130 under item 2.

3. Consequences of Design Basis Fire for Room

   a. See the statement on Page F.2-132 under item 3.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Flame from a fire would activate an ultraviolet flame detector which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses are available.

   b. Water discharge would be removed by the floor drain system open, hatches and stairs. The new fuel vault is curbed; water deflector covers are provided over fuel bundles.

   c. Smoke would fill the high bay area and would be removed by portable ducting and smoke ejectors.

6. Radioactive Material Contained in the Room

   a. Pool area - low level water activity

   b. Piping - low level gas activity

   c. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in conduit - none

   b. Transient combustibles - 8.4×10^6 BTU

   c. Clean-up cart - 0.20×10^6 BTU

   d. Two closed cabinets of protective clothing - 10.3×10^6 BTU

   e. Electrical wiring on cranes - 0.13×10^6 BTU

   f. Emergency floats - 0.45×10^6 BTU

   g. Four crew boxes - 0.100×10^6 BTU

h. Safety tape - 0.15 x 106 BTU

i. Step-off pad & rope - 0.30 x 106 BTU

j. Fire retardant wood box for reactor segment - 1.5 x 106 BTU

8. Fire Loading Which Represents Combustibles in Item 7

a. Floor area - 15,700 ft2

b. Fire loading - 1,400 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities within the Room

a. Six ultraviolet detectors

b. Four manual pull boxes

c. Portable extinguishers

d. 1-1/2" Standpipe hose station

10. Means for Containing and Inhibiting the Progress of Fire in the Room

a. Extinguishing equipment inside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Room

a. Portable Extinguishers on elevation 572'-0"

b. Four manual pull boxes on elevation 572'-0"

c. 1-1/2" hose stations on elevation 572'-0"

<u>Fire Area</u> Reactor Primary Containment, R-II (consists of the reactor primary containment Drywell and Suppression Pool, (El. 422'-3", 444'-0", 471'-0", 499'-6", 501'-0", 519'-2-1/4", 522'-0", 541'-2-1/4", 548'-0", 567'-0", 572'-0", 606'-10-1/2")(Figures 7 through 10, 33 through 38, and 59 through 62)

1. Barriers That Define the Area

   a. Concrete walls with a 3/4" to 1-1/2" thick steel liner, steel dome and concrete plugs define the ceiling, concrete floor defines the bottom.

   b. Equipment and personnel hatches are non-fire-rated, but due to their massive construction, they are considered more than adequate for the combustibles involved.

   c. All mechanical penetrations are sealed.

   d. All cabling enters containment via sealed electrical penetration assemblies.

   e. Suppression pool has concrete walls and floor, non-fire-rated watertight access hatch and all penetrations are embedded.

2. Safety-Related Equipment in the Area

   - This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The primary containment has a nitrogen inerted atmosphere which will not support combustion, therefore the consequences are "NONE".

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Portective Signaling Systems"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. The primary containment has a nitrogen inerted atmosphere which will not support combustion, therefore the consequences are "NONE".

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity in water

   b. Airborne - low level particulates and noble gases in the containment atmosphere during operation.

7. Type, Quantity and Characteristics of Combustible Materials in Area

   129.47 ft^3 of Permali - 83.2 x 10^6 BTU

   119 gallons Recirculation Pump lubrication oil (59 1/2 gallons in each of the two pumps) - 18.1 x 106 BTU

   147 pounds 5% Boron-Polyethylene neutron shielding material in a 1/8" steel plate enclosure - 2.25 x 10^6 BTU

   Cables for Control Rod and Power Range Monitoring - 6.3 x 10^6 BTU

11.4 gallons electro-hydraulic fluid (0.875 x 13 valves) - 1.6×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor Area - 4,607 ft^2

   b. Fire Loading - 23,700 BTU/ft^2

   NOTE: The Boron-Polyethylene shielding material is not included in the Fire Loading as it is enclosed in a metal skin with 3 small holes in the top for venting.

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. Area heat detectors (thermocouple) installed to monitor normal plant operation and are not part of the fire protection system

   b. Drywell spray of RHR ring header could be used if physical interlocks are overridden

   c. Suppression pool spray ring

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Inerted atmosphere

   b. Barrier construction

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

   a. Standpipe hose lines

   b. Portable fire extinguishers

   c. Manual pull boxes

12. Appendix R Evaluation

   a. Primary containment is inerted, therefore no fire hazards shutdown analysis is required. There are no requirements for protection of equipment within this fire area.

b. Portable fire extinguishers

c. Manual pull boxes

12. Appendix R Evaluation

a. Primary containment is inerted, therefore no fire hazards shutdown analysis is required. There are no requirements for protection of equipment within this fire area.

Fire Area HPCS Pump Room, R-III, (El. 422'-3" & 444'-0")
(Figures 7, 33, and 59)

1. Barriers That Define the Area

   a. El. 422'-3" - Concrete walls and floor and ceiling have a 3-hour fire rating, doors in the area are non-rated heavy gauge steel watertight doors.

   b. A ceiling hatch at El. 471'-0" is covered by a non-rated 12" concrete plug. Access to the 444'-0" platform is by ladder from level below (El. 422'-3") and through a non-rated heavy gauge steel door to the room from the south. This door is bolted in place and used for maintenance only.

   c. Ventilation penetrations in the 471'-0" ceiling have 3-hour fire-rated dampers.

   d. Piping penetrations through walls have fire-rated seals with non-rated watertight boots.

   e. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until removed by the floor drain system or portable pumps.

   c. Smoke would be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Room

   a. Fire retardant cable in tray - 191.9×10^6 BTU

   b. 41.25 gallons HPCS pump motor bearing lube oil - 6.27×10^6 BTU

   c. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 1,100 ft2

   b. Fire loading - 24,720 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors below 471'-0" ceiling

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. One manual pull box for alarm

   b. Portable extinguisher

   c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area RHR Pump Room R1, Pipe Chase and RHR Heat Exchanger B Equipment Room, R-IV, (Elevation 422'-3", 441'-0", 471'-0", 501'-0", 522-0", 548'-0" including south valve room, 572'-0") (Figures 7 through 10, 33 through 38, and 59 through 62)

1. Barriers that Define the Area

   a. Pump Room

      1) Elevation 422'-3" - Concrete walls, floor and ceiling have a three-hour fire rating, doors into the room are non-rated, heavy gauge steel watertight doors.

      2) A ceiling hatch is covered by a non-rated 12" concrete plug. Access to the 444'-0" platform is by ladder from level below (Elevation 422'-3"), and through a non-rated heavy gauge steel door to the area to the south. This door is bolted in place and used for maintenance only.

      3) Ventilation penetrations in ceiling have 3-hour fire dampers.

      4) Piping penetrations through walls have fire-rated seals with non-rated watertight boots. Penetrations through ceilings are sealed.

      5) Conduit penetrations and conduits are sealed.

   b. Pipe Chase

      1) Concrete and block walls.

      2) Pipe penetrations through the walls have fire rated seals. There is an open pipe tunnel on elevation 471'-0" to fire area R-XVII. There are no combustibles in the seventeen-foot long tunnel.

      3) Floor penetrations are open to pump room and heat exchanger room

c. Heat Exchanger Room

1) Concrete walls, floor and ceiling have a 3-hour fire rating, a non-fire-rated shielding door at elevation 548'-0" and a fire-rated door at elevation 572'-0". A ceiling hatch is covered by a non-rated 12" concrete plug.

2) Ventilation penetrations have a 3-hour fire dampers.

3) There is an open pipe tunnel on elevation 548'-0" to the south valve room in fire area R-IV. There are no combustibles in the thirty-foot long tunnel.

4) Piping wall penetrations are sealed, open pipe chase in the floor.

5) Conduit penetrations and conduit are sealed.

6) 4" construction gap between wall and ceiling at each floor is sealed.

d. South Valve Room (El. 548'-0")

1) Concrete walls, floor, and ceiling, with a minimum fire rating of three hours, door assembly is three hour rated.

2) Ventilation penetration has a three hour fire rated damper.

3) Piping penetrations are sealed.

4) Conduit penetrations and conduits are sealed.

5) (See above item C.3)

2. Safety-Related Equipment in the Area

a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Smoke would be removed by the operation of the building exhaust system.

   c. Water discharge could cause flooding until removed by the floor drain systems.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity in water

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. El. 422'-3"

      1) Fire retardant cable in trays - 3.3 x 10^6 BTU

      2) 13.25 gallons RHR pump motor bearing lube oil - 2 x 10^6 BTU

      3) Transient combustibles - 8.4 x 10^6 BTU

   b. El. 548'-0" and 572'-0"

      1) Fire retardant cable in tray - 0.75 x 10^6 BTU each floor

      2) 0.48 cu. ft. rubber closure strip 5" x 1/4" x 54.25' (each elevation) 0.453 x 10^6 BTU

      3) Transient combustibles - 8.4 x 10^6 BTU

      4) 41 pounds grease - 0.74 x 10^6 BTU

      5) 22 pounds grease - 0.4 x 10^6 BTU

      6) 0.875 gal. electro-hydraulic fluid - 0.123 x 10^6 BTU

8. Fire Loadings which Represent Combustibles in Item 7

   a. El. 422'-3"

      1) Floor area - 155 ft^2

      2) Fire Loading - 9100 BTU/ft^2

   b. El. 548'-0" and 572'-0"

      1) Floor area - 645 ft^2

      2) Fire loading - 17,900 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors at 471'-0" ceiling

   b. One ionization detector at ceiling, elevation 572'-0"

   c. One ionization detector at ceiling, elevation 548'-0"

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Elevation 422'-3"

      1) One manual pull box for alarm

      2) Portable extinguisher

      3) 1-1/2" standpipe hose stations

   b. Elevation 548'-0" and 572'-0"

      1) Ionization detectors on elevation 548'-0" and 572'-0" for alarm

      2) Four manual pull boxes on each elevation for alarm

      3) Portable extinguishers on each elevation

      4) 1-1/2" standpipe hose stations

5) The South Valve Room (R511) is upgraded to an independent fire area via the addition of a 3-hour rated door, HVAC duct fire dampers and penetration seals. This is to assure that the mechanical integrity of excess flow check valve and instrument root valves is not lost in the event of a fire occuring elsewhere in secondary containment. In all other respects this room is treated as part of R-IV.

12. Appendix R Evaluation

a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-39a.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

5) 4" construction gap between wall and ceiling at each floor is sealed.

2. Safety-Related Equipment in the Area

a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Room

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hose is available.

   b. Smoke would be removed by the operation of the building exhaust system.

   c. Water discharge could cause flooding until removed by the floor drain system or portable pumps.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity in water

   b. Airborne - none

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside But With Access to the Area

    a. Elevation 422'-3"

        1) One manual pull box for alarm

        2) 1-1/2" standpipe hose station

    b. Elevations 548'-0" and 572'-0"

        1) Four manual pull boxes on each elevation for alarm

        2) Portable extinguishers on each elevation

        3) 1-1/2" standpipe hose station

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-40.

c. For discussion analysis methodology and spurious signals see section F.4.4.

Fire Area RCIC Pump Room R3, R-VI, (El. 422'-3" & 444'-0")
(Figures 7, 33, and 59)

1. Barriers That Define the Area

   a. El. 422'-0" - Concrete walls, floor and ceiling have a 3-hour fire rating, doors into the room are non-rated heavy gauge steel watertight doors.

   b. A ceiling hatch at El. 471'-0" is covered by a non-rated 12" concrete plug. Access to the 444'-0" platform is by ladder from level below (El. 422-3").

   c. Ventilation penetrations in the 471'0" ceiling have 3-hour fire-rated dampers.

   d. Piping penetrations through walls have fire-rated seals with non-rated watertight boots, penetrations through ceilings are sealed.

   e. Conduit penetrations, conduits and tray penetrations are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for operation of the Appendix R Safe Shutdown Systems. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. A manual hose is available.

   b. Water discharge could cause flooding until removed by the floor drain system or portable pumps.

   c. Smoke would be removed through the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level water activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 4.037×10^6 BTU

   b. 2.5 gallons RCIC turbine lube oil - 0.38×10^6 BTU

   c. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 950 ft^2

   b. Fire loading - 13,500 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors below 471'-0" ceiling

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Portable extinguisher

    b. 1-1/2" standpipe hose stations

    c. One manual pull box for alarm

12. Appendix R Elevation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated in Table F.2-41.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> RCIC Pump Room R4, R-VII, (El. 422'-3" & 444'-0") (Figures 7, 33, and 59)

1. Barriers That Define the Area

   a. El. 422'-0" - Concrete walls, floor and ceiling have a 3-hour fire rating, doors into the room are non-rated heavy gauge steel watertight doors.

   b. A ceiling hatch at El. 471'-0" is covered by a non-rated 12" concrete plug. Access to the 444'-0" platform is by ladder from level below (El. 422-3").

   c. Ventilation penetrations in the 471'0" ceiling have 3-hour fire-rated dampers.

   d. Piping penetrations through walls have fire-rated seals with non-rated watertight boots, penetrations through ceilings are sealed.

   e. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the control room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. A manual hose is available.

   b. Water discharge could cause flooding until removed by the floor drain system or portable pumps.

   c. Smoke would be removed through the operation of the smoke exhaust system with portable ducting.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retardant cable in trays - 1.944×10^6 BTU

   b. 13.5 gallons RHR pump motor bearing lube oil - 2×10^6 BTU

   c. Transient combustibles - 8.4×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 775 ft^2

   b. Fire loading - 15,900 BTU/ft^2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Three ionization detectors below 471'0" ceiling

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside But With Access to the Area

    a. One manual pull box for alarm

    b. Portable extinguisher

    c. 1-1/2" standpipe hose stations

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown is indicated in Table F.2-42.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area HPCS Pump Room R5, R-VIII, (El. 422'-3" & 444'-0") (Figures 7, 33, and 59)

1. Barriers That Define the Area

   a. El. 422'-0" - Concrete walls, floor and ceiling have a 3-hour fire rating, doors into the room are non-rated heavy gauge steel watertight doors.

   b. A ceiling hatch at El. 471'-0" is covered by a non-rated 12" concrete plug. Access to the 444'-0" platform is by ladder from level below (El. 422-3").

   c. Ventilation penetrations in the 471'0" ceiling have 3-hour fire-rated dampers.

   d. Piping penetrations through walls have fire-rated seals with non-rated watertight boots, penetrations through ceilings are sealed.

   e. Conduit penetrations and conduits are sealed.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 2 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. Two ionization detectors at 471'-0" ceiling

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. One manual pull box for alarm

    b. Portable extinguisher

    c. 1-1/2" standpipe hose stations

12. Appendix R Evaluation

    a. Capability of the plant Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown is indicated in Table F.2-43.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

12. Appendix R Evaluation

a. Capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not lost.

b. This fire area does not contain any Appendix R Safe Shutdown System components and therefore requires no additional analysis.

c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> R-XIII

There is no Fire Area R-XIII

Fire Area R-XIV

This fire area has been assimilated into fire area R-I see room analysis on page F.2-186a.

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Fire Area R-XVI

There is no Fire Area R-XVI

Fire Area South Valve Room, R-XVII (El. 471'-0")(Figures 8, 34, and 60)

1. Barriers That Define the Area

   a. Concrete walls, floors, and ceiling have a 3-hour fire-rating, there is a 3-hour fire-rated door assembly.

   b. Ventilation penetrations have 3-hour fire-rated damper.

   c. Piping penetrations are sealed.

   d. Conduit penetrations and conduits are sealed.

   e. Four (4) inch construction gap between walls and ceiling is sealed.

   f. There is an open pipe tunnel to RHR pipe chase R-IV. There are no combustibles in the seventeen-foot long tunnel.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

   e. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could flood the floor, the water would be relieved through the door to the general area floor drain system or by portable pumps.

   c. Smoke would be removed by the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - low level water activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. 0.875 gal electro-hyrdaulic fluid - 0.123 x 10^6 BTU

   b. 23 lbs. grease in valve operators - 0.414 x 10^6 BTU

   c. Transient combustibles - 8.4 x 10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 259 ft2

   b. Fire loading - 34,500 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One ionization detector

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment outside of room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

   a. Four manual pull boxes on floor for alarm

   b. Portable extinguishers on floor

   c. 1-1/2" standpipe hose stations

12. Appendix R Evaluation

   a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which requires analysis to verify safe shutdown capability is indicated in Table F.2-50.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

<u>Fire Area</u> MCC Room Division 2 R-XVIII (Elevation 522'-0")
(Figures 9, 35, and 61)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling have a 3-hour fire-rating, one 3-hour fire-rated door assembly and one pair of 3-hour fire-rated equipment removal doors.

   b. Ventilation penetrations have 3-hour fire dampers.

   c. Piping penetrations are sealed.

   d. Conduit penetrations, conduits, and tray penetations are sealed.

   e. 4" construction gap between wall and ceiling is sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appen-dix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

9. Extinguishing, Detection, and Alarm Capabilities in the Area

    a. One ionization detector

10. Means for Containing and Inhibiting the Progress of Fire in the Area

    a. Fire-rated barriers

    b. Extinguishing equipment outside of room

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

    a. Four manual pull boxes on floor for alarm

    b. Portable extinguishers

    c. 1-1/2" standpipe hose station

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which requires analysis to verify safe shutdown capability is indicated in Table F.2-51.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area Hydrogen Recombiner MCC Room Division 2, R-XIX, (Elevation 572'-0") (Figures 10, 36, and 62)

1. Barriers that Define the Area

   a. Concrete walls, floor, and ceiling have a 3-hour fire rating, a 3-hour fire-rated door assembly and one 3-hour fire-rated equipment removal door.

   b. Ventilation penetrations have 3-hour fire dampers.

   c. Piping penetrations are sealed.

   d. Conduit penetrations, conduits, and tray penetations are sealed.

   e. 4" construction gap between wall and ceiling is sealed

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

   e. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of Fire if Fire Protection System Functions as Designed

   a. Smoke from a fire would activate an ionization detector, which would alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the emergency response procedures. Manual hoses from standpipes are available.

   b. Water discharge could cause flooding until relieved by the floor drain system or a portable pumping unit.

   c. Smoke would gradually be removed by the operation of the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - none

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. Fire retandant cable in tray - 5.3×10^6 BTU

   b. Foam glass insulation on ceiling and walls - negligible

   c. Transient combustibles - 0.13×10^6 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 140 ft2

   b. Fire loading - 38,800 BTU/ft2

9. Extinguishing, Detection, and Alarm Capabilities Within the Area

   a. One ionization detector

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers

   b. Extinguishing equipment outside of room

11. Extinguishing, Detection, and Alarm Equipment Outside but with Access to the Area

   a. Two manual pull boxes for alarm

   b. Portable extinguishers

   c. 1-1/2" standpipe hose stations

12. Appendix R Evaluation

   a. Capability of the plant Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

   b. Cabling which requires analysis to verify safe shutdown capability is indicated in Table F.2-52.

   c. For discussion of analysis methodology and spurious signals see section F.4.4.

Fire Area R-XX

There is no Fire Area R-XX.

2/25/86

Please print whatever you have in memory on pages F.2-245 thru F.2-268.

Sally, I only printed pgs where what you had & what I had was different

Maureen

<u>Fire Area</u> South Valve Room, R-XXI (El. 522'-0") (Figures 9, 35 and 61)

1. Barriers That Define the Area

   a. Concrete walls, floors, and ceiling have a 3-hour fire-rating; there is a 3-hour fire-rated door assembly.

   b. Ventilation penetrations have 3-hour fire-rated damper.

   c. Piping penetrations are sealed.

   d. Conduit penetrations and conduit are sealed.

   e. 4" construction gap between walls and ceiling is sealed.

   f. There are four (24" x 24") non-fire-rated blowout panels in the east wall to a valve access area, with 3-hour fire-rated damper.

2. Safety-Related Equipment in the Area

   a. This fire area contains safety related equipment.

3. Consequences of a Design Basis Fire for Area

   a. The equipment and cabling in this fire area will be lost as a result of a design basis fire. There are no components or cabling in this fire area that are required for the operation of the Appendix R Division 1 Safe Shutdown System. See section F.4.4.3 for a detailed listing of Appendix R Safe Shutdown System components.

4. Design Criteria for Fire Protection of Item 2 Equipment and Cabling in Area

   a. NFPA Standard 10, "Portable Fire Extinguisher Installation"

   b. NFPA Standard 14, "Standpipe and Hose Systems"

   c. NFPA Standard 72D, "Proprietary Protective Signaling Systems"

   d. NFPA Standard 72E, "Automatic Fire Detectors"

   e. NFPA Standard 80, "Fire Doors and Windows"

5. Consequences of a Fire if Fire Protection Systems Function as Designed

   a. Smoke from a fire would activate an ionization detector and an alarm in the Control Room. The fire brigade would be dispatched which would take appropriate action in accordance with the pre-fire plans and the fire emergency response procedures. A manual hose is also available.

   b. Water discharge could flood the floor, the water would be relieved through the door to the general area floor drain system or by portable pumps.

   c. Smoke would be removed by the building exhaust system.

6. Radioactive Material Contained in the Area

   a. Equipment/piping - high level water activity

   b. Airborne - none

7. Type, Quantity and Characteristics of Combustible Materials in Area

   a. 20 lbs. grease in valve operators - 0.36 x 106 BTU

   b. Transient combustibles - 8.4 x 106 BTU

8. Fire Loadings Which Represent Combustibles in Item 7

   a. Floor area - 149 ft2

   b. Fire loading - 5880 BTU/ft2

9. Extinguishing, Detection and Alarm Capabilities Within the Area

   a. One ionization detector

10. Means for Containing and Inhibiting the Progress of Fire in the Area

   a. Fire-rated barriers with fire rated door.

b. Extinguishing equipment outside the room

11. Extinguishing, Detection and Alarm Equipment Outside but with Access to the Area

    a. Four manual pull boxes on floor for alarm

    b. Portable extinguishers on floor

    c. 1-1/2" standpipe hose stations

12. Appendix R Evaluation

    a. Capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not lost.

    b. Cabling which required analysis to verify safe shutdown capability is indicated on Table. F.2-53a,b.

    c. For discussion of analysis methodology and spurious signals see section F.4.4.

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TABLE F.2-2

FIRE AREA DG-II CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. B:	BCOMD-9191, 9050 through 9054, 9318, 9513, 9390, 9189, 9190 BANN-9793, BSYNC-9027, 9030

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cable does not negate the capability of the Appendix R Division 2 safe shutdown system to achieve reactor shutdown.

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TABLE F.2-3a

FIRE AREA DG-III CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Division A	ATGV1-9072

Note: Analysis indicates that the cable listed above does not require protection. Loss of this cable does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-4

FIRE AREA DG-IV CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Div. 1
III.	Cable Category:	Intruding
IV.	Cable Data:	There are no intruding cables in this fire area.

TABLE F.2-5

FIRE AREA DG-V CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Div. 2
III.	Cable Category:	Intruding
IV.	Cable Data:	There are no intruding cables in this fire area.

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TABLE F.2-8

FIRE AREA DG-VIII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Div. 1
III.	Cable Category:	Intruding
IV.	Cable Data:	There are no intruding cables in this fire area.

TABLE F.2-9

FIRE AREA DG-IX CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Div. 2
III.	Cable Category:	Intruding
IV.	Cable Data:	There are no intruding cables in this fire area.

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TABLE F.2-12

FIRE AREA TG-I CABLE DATA

I.	Fire Area Analysis Method:	Dedicated
II.	Fire Area Designation:	General
III.	Cable Category:	Appendix R Division 2 Safe Shutdown Cables
IV.	Cable Data:	
	Div. 2:	2M8A-40, 48, 50, 57, 90, 140 2M8AA-162, 164, 165, 180, 181, 182, 183 2SM8-35, 50, 80, 89, 110, 115, 116, 211, 257 2MISC-1, 150 2M12D-10, 11, 20, 21, 30, 31, 40, 41 2SM28-11, 12, 13, 14 2D12-8 2DG2-23, 24, 26, 31, 41, 44, 45, 47, 50, 94, 101
	Div. B:	BIR22-9064

Note: Analysis indicates that all cables listed above require protection in order that the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not negated.

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TABLE F.2-17

FIRE AREA SW-I CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 2	2M8A-100, 105 2IR26-20, 30, 31 2P8AG-2 2MISC-363
	Div. B	BANN-9246
	Div. 3	3HPCS-90, 95, 190, 193 thru 197, 199, 200, 203, 204, 206, 422, 510 3IR24-21 thru 25, 31, 32

Note:

1. Analysis indicates that none of the above requires protection in order that the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown is not negated.

2. The only Appendix R Safe Shutdown System instrument sensing lines in this fire area are Division 1 which are assumed to fail.

TABLE F.2-18

FIRE AREA SW-II CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1 (Class 1E):	1M7A-90, 96, 97 1P7AG-1 1IR25-30, 31 1MISC-357
	Div. A (Assoc. Ckt.):	ACOMA-9251 thru 9254, 9045

Note:

1. Analysis indicates that none of the above cables require protection in order that the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown is not negated.

2. The only Appendix R Safe Shutdown instrument sensing lines in this fire area are Division 2 which are assumed to fail.

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TABLE F.2-20

FIRE AREA RC-I CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. A	AANN-253, 9011, 9012, 9025, 9033, 9043, 9135, 9175, 9176, 9215, 9134 AGFD-741, 9744 AIR50-9021 ALDS-9039 AM3D-9010 AM5D-9282, 9292, 9492, 9512, 9532, 9542, 9560 AM7A-9132 AM7CA-9042, 9043, 9045, 9052, 9062, 9082, 9083 AM7E-9021, 9020 AOGS-9046, 9047, 9048, 9049, 9050, 9083, 9084, 9085, 9086, 9089, 9090, 9103, 9104, 9105, 9106, 9107, 9108, 9110, 9111, 9113, 9155, 9156, 9157, 9158, 9162, 9165, 9167, 9168, 9169, 9170, 9171, 9172, 9175, 9176, 9180, 9195, 9196, 9213, 9214, 9215, 9292, 9045, 9109 AMISC-9026, 9770, 9772 AP7EB-9005 AP7FA-9050, 9053, 9055, 9058 APRM-9003, 9004, 9013, 9017, 9018, 9019, 9023, 9025, 9030, 9031, 9032, 9146, 9150, 9158, 9153, 9155, 9029, 0042, 9120, 9121, 9122, 9123

(cont'd on next page)

TABLE F.2-20 (Continued)

IV. Cable Data:

Div. A (Assoc. Ckts.):	ARWC-9001, 9003 ARWV-9063 ASL71-9062 ASM3-9112, 9113, 9114, 9115 ASM7-9100, 9114 ATDAS-9101 AVUS-9001, 9009 AARM-9153, 9157, 9161, 9145, 9135, 9127, 9131, 9149, 9165, 9073 ASM1-9141, 9142

NOTE: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of Division 1 Appendix R systems to achieve reactor shutdown.

TABLE F.2-21a

FIRE AREA RC-IIA CABLE DATA

I.	Fire Area Analysis Method:	Dedicated
II.	Fire Area Designation:	General
III.	Cable Category:	Appendix R Division 2 Safe Shutdown Cables
IV.	Cable Data:	2DG2-0026, 44, 45, 106, 107 2SM28-0011 2SM8-0011, 21, 31, 41, 111, 121, 131, 211, 235, 236, 237 *2M8A-0041 *2M8A-0042 *2M8A-0043 *2M8A-0045 *2M8A-0048 *2M8A-0051 *2M8A-0052 *2M8A-0053 *2M8A-0057 BSM8-9039, 9101

NOTE: Analysis indicates that all Appendix R Division 2 Safe Shutdown cables* (including spurious signal cables) listed above require protection.

TABLE F.2-21c

FIRE ZONE RC-IIC CABLE DATA

In the Cable Spreading Room, a twenty foot zone of no intervening combustibles has been created between fire zones RC-IIA and RC-IIB. This unique fire zone is identified as RC-IIC and is protected with a smoke detection and automatic suppression system. All combustibles including cables in trays in this zone are protected with a one hour fire rated barrier. All cables routed in conduit in this zone are not considered combustibles, however, Division 1 and 2 Appendix R System Cables (and spurious signal cables to these systems) that are routed in conduit in this fire zone (RC-IIC) required that the conduits be protected with a one hour fire rated barrier.

CABLE AND CONDUIT DATA:

Appendix R Division 2 Cables Routed in Conduit in this Fire Zone (Conduit # ID is in parenthesis)	2MISC-402(2MISC-123-1) 2SM8-87, 2M8AA-43, 53 (BM8A-9102-1) BIR22-9062 (BIR22-9062-2)
Spurious Signal Cables to the Appendix R Division 2 System in this Fire Zone (Conduit # ID is in parenthesis)	2COV5-3 (2M8F-172-2) 2SM8-84 (BM8CB-9222-1) BSL81-9041, 9054 (BM8A-9102-1)
Appendix R Division 1 Cables Routed in Conduit in this Fire Zone	None
Spurious Signal Cables to the Appendix R Division 1 System in this Fire Zone	None

1. A design basis fire originating in fire zone RC-IIA, requires that the above listed cables in conduits in fire zone RC-IIC be protected for the Division 2 Appendix R Safe Shutdown System to achieve Reactor Safe Shutdown.

2. A design basis fire originating in fire zone RC-IIB does not require any cables in conduits in this fire zone (RC-IIC) to be protected for the Division 1 Appendix R Safe Shutdown System to achieve Reactor Safe Shutdown.

TABLE F.2-21b

FIRE AREA RC-IIB CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	AADS-9022 AADS-9023 AADS-9024 AADS-9046 AADS-9047 AADS-9048 AANN-0127 AANN-0128 AANN-0135 AANN-0213 AANN-9023 AANN-9024 AANN-9025 AANN-9026 AANN-9027 AANN-9028 AANN-9029 AANN-9033 AANN-9040 AANN-9041 AANN-9042 AANN-9043 AANN-9116 AANN-9126 AANN-9134 AANN-9215 AANN-9264 AANN-9748 AANN-9808 AARM-9072 AARM-9073 AARM-9103 AARM-9107 AARM-9111 AARM-9115 AARM-9119 AARM-9127

TABLE F.2-21b (Cont'd)

IV. Cable Data (Cont'd):

AARM-9131
AARM-9135
AARM-9145
AARM-9149
AARM-9153
AARM-9157
AARM-9161
AARM-9165
ABPAI-0025
ABPAI-9005
ACACS-9343
ACOMA-0268
ACOMA-0272
ACOMA-0273
ACOMA-0274
ACOMA-0275
ACOMA-0276
ACOMA-0282
ACOMA-0286
ACOMA-0291
ACOMA-9279
ACRD-9010
AD11B-9004
AD11B-9007
AD11B-9010
AD11B-9011
ADOA-9002
AFWC-9012
AIR10-0013
AIR10-0044
AIR11-0012
AIR11-0013
AIR11-0014
AIR11-0015
AIR11-0016
AIR13-0010
AIR13-0020
AIR16-0112
AIR1B-0010
AIR1B-0020
AIR2-0080
AIR23-9050
AIR50-9021
AIR27-0020
AIR27-0021
AIR27-0022

TABLE F.2-21b (Cont'd)

IV. Cable Data (Cont'd):

AIR3-0283
AIR9-9050
ALDS-9039
AM1A-0172
AM1A-0372
AM1A-0382
AM1A-0392
AM1A-0402
AM1A-0482
AM1A-0552
AM1B-0011
AM1B-0022
AM1B-0041
AM1B-0052
AM1B-0072
AM1B-0082
AM1B-0091
AM1B-0111
AM1B-0172
AM1B-0191
AM1B-0251
AM1B-0262
AM1B-9401
AMISC-0703
AMISC-9003
AMISC-9066
AMISC-9067
AMISC-9069
AMISC-9070
AMISC-9071
AMISC-9072
AMISC-9073
AMISC-9074
AMISC-9075
AMISC-9084
AMISC-9645
AMISC-9762
AMISC-9764
AM21B-0023
AM3DA-9141
AM5D-9133
AM7C-9053
AM7C-9115
AM7CA-9045
AM7CB-9203
AM7CB-9241

TABLE F.2-21b (Cont'd)

IV. Cable Data (Cont'd):

AM7E-9021
AP3AA-0171
AP7AZ-9005
AP7CA-9117
AP7CA-9514
AP7EB-0071
AP7FA-2071
AP7FA-9602
APRM-9006
APRM-9007
APRM-9017
APRM-9018
APRM-9019
APRM-9020
APRM-9021
APRM-9022
APRM-9023
APRM-9024
APRM-9025
APRM-9029
APRM-9030
APRM-9031
APRM-9120
APRM-9121
APRM-9122
APRM-9123
APRM-9124
APRM-9125
APRM-9126
APRM-9127
APRM-9128
APRM-9129
APRM-9130
APRM-9131
APRM-9132
APRM-9146
APRM-9147
APRM-9148
APRM-9149
APRM-9150
APRM-9151
APRM-9152
APRM-9153
APRM-9154
APRM-9155
APRM-9156

TABLE F.2-21b (Cont'd)

IV. Cable Data (Cont'd):

APRM-9157
APRM-9158
ARFWT-0004
ARFWT-0011
ARFWT-0031
ARFWT-0033
ARFWT-0041
ARFWT-0042
ARFWT-9043
ARFWT-9065
ARFWT-9067
ARFWT-9094
ARFWT-9096
ARFWT-9098
ARFWT-9101
ARFWT-9102
ARMC-0701
ARMC-0702
ARMC-9686
ARPM-9025
ARR-0010
ARR-0011
ARR-0012
ARR-0026
ARR-0027
ARR-0205
ARR-0241
ARR-0242
ARR-0248
ARR-0300
ARR-0328
ARR-9216
ARR-9252
ARWC-0002
ARWC-9001
ARWC-9003
ARWC-9004
ASGT-9018
ASGT-9026
ASGT-9028
ASGT-9052
ASH5-0031
ASH5-0032
ASH5-0037
ASH5-0038
ASLC-9001

TABLE F.2-21b (Cont'd)

IV. Cable Data (Cont'd):

ASLC-9002
ASM1-0201
ASM1-0202
ASM7-9096
ASM7-9097
ASM7-9098
ASM7-9137
ATC-0001
ATC-0011
ATC-0018
ATC-0021
ATC-0031
ATC-0041
ATC-0051
ATC-0061
ATC-0092
ATC-0102
ATC-0111
ATC-0141
ATC-0151
ATC-0161
ATC-0242
ATC-0244
ATC-0247
ATC-0253
ATC-0255
ATRB-0003
ATRB-9010
ATU-0028
ATU-0029
ATU-0075
ATU-0144
ATU-0145
ATU-0147
ATU-0148
ATU-0152
ATU-0153
ATU-0154
ATU-0155
ATU-0166
ATU-0167
ATU-0168
ATU-0169
ATU-0208
ATU-0215
ATU-0216

TABLE F.2-21b (Cont'd)

IV.	Cable Data (Cont'd):	ATU-0218 ATU-0252 ATU-0253 ATU-0296 ATU-0306 ATU-0307 ATU-0340 ATU-0341 ATU-0342 ATU-0116 ATU-0224

Note: Analysis indicates that none of the cables listed above required protection. Loss of these cables does not negate the capability of the Appendix R Division I Safe Shutdown System to achieve reactor shutdown.

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TABLE F.2-22

FIRE AREA RC-III CABLE DATA

I.	Fire Area Analysis Method:	Dedicated
II.	Fire Area Designation:	General
III.	Cable Category:	Appendix R Division 2 Safe Shutdown Cables
IV.	Cable Data:	

2D12-8
2ADS-32, 33
2DG2-23, 24, 26, 31, 41, 44, 45, 50, 94, 101, 47
2M8A-40, 48, 50, 57, 90, 140
2M8B-101, 102, 104, 151
2M8F-21, 31, 33, 51, 56
2M8AA-162, 164, 165, 181, 182, 183
2SL81-10
2SL83-20
2SM8-35, 50, 80, 89, 93, 110, 115, 116, 131, 211, 257
2SM28-11, 12, 13, 14
2P8AF-4
BIR22-9064
2M8BA-13, 18, 23, 93, 103, 143, 153, 282, 318, 319, 392, 314, 434, 505
2M8BB-111, 112, 114, 122, 132, 142, 222, 232, 234
2M12D-10, 11, 20, 21, 30, 31, 40, 41
2NS4-8, 9, 10, 11, 23
2RHR-10, 11, 12, 14, 35, 42, 76, 105
2CACS-269, 270, 271
2IR63-41

F.2-22 (Continued)

Notes: Analysis indicates that all Appendix R Division 2 Safe Shutdown cables listed above require protection.

TABLE F.2-23

FIRE AREA RC-IV CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. B	BANN-9299 BCOMD-9291, 9293, 9294, 9295, 9296, 9298, 9299, 9301, 9302, 9303, 9342, 9450

Note: Analysis indicates that none of the cables listed above required protection. Loss of these cables does not negate the capability of Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-24

FIRE AREA RC-V CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. B (Assoc. Ckts.):	BCOMD-9294, 9297, 9300 BSL81-9055

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-25

FIRE AREA RC-VI CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	There are no intruding cables in this fire area.

TABLE F.2-26

FIRE AREA RC-VII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. A:	AANN-9109 APRPS-9012, 9016, 9017, 9025 AP7A-9001 ARPS-9003, 9004

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-27

FIRE AREA RC-VIII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1	1SM7-212 1M7A-98
	Div. A	AANN-9210 AP7EB-9005 AM11D-9166, 9167 ASL71-9058 ASL71-9040, 9063 ASL73-9053 ASL73-9048 ASM7-9215 ASM7-9208 ASM3-9080, 9112, 9113, 9114

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-28

FIRE AREA RC-IX CABLE DATA

I. Fire Area Analysis Method: Redundant

II. Fire Area Designation: Division 2

III. Cable Category: Intruding

IV. Cable Data:

Group 1
(See Note 2)

Div. 1:

1D11-8
1M7A-92, 93, 94
1M7BA-42, 43, 44, 582, 583
1P7AF-2, 3, 4, 6, 11
1ADS-35, 36
1D11D-2, 3, 6, 8, 15
1M21A-12, 13, 14, 22, 23, 24, 42, 43, 102, 103, 124, 125, 134, 135, 142, 143, 162, 163, 164, 172, 173, 174, 181, 182, 191, 192, 202, 203
1PASS-40, 50
1RCIC-31, 40, 41, 46, 75, 76, 81, 82, 86
1M11D-12, 13, 32, 33, 52, 53, 54, 152, 153, 160

Div. A:

ACACS-9201, 9203
ACOMA-9219
ATDAS-9101, 9001

TABLE F.2-28 (Continued)

AD11D-9012, 9013, 9014, 9016
AMISC-9003, 9084
ANS4-9003, 9004
ASCAN-9031
ASM1-9141, 9142
ASM3-9112, 9115
ASM7-9100
ASL71-9062

ARCIC-9056, 9057
1D11D-2, 3, 6

Notes:

1. Analysis indicates that cables listed above do not require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

2. As per the redundant analysis main control room/remote shutdown room transfer switches for RHR-V-6A and RHR-V-8 have been relocated to a Div. I fire area (SWGR RM-1 RC-XIV). The cables for normal operation of these division 1 valves do not route through the Remote Shutdown Room.

3. The DC Division 1 circuits (cables numbers 1D11D-10, 19, & 20) were recircuited to a new distribution panel DP-S1-1F located in a Division 1 fire area (Switchgear Room 1 RC-XIC).

4. The AC Division 1 circuits from power panel PP-7A-F are only required for a main control room design basis fire.

TABLE F.2-29

FIRE AREA RC-X CABLE DATA

I.	Fire Area Analysis Method:	Unique
II.	Fire Area Designation:	None
III.	Cable Category:	Unique
IV.	Cable Data:	See Description Below

The main control room represents a unique case in terms of fire analysis. For a design basis fire in the main control room the Appendix R Remote Shutdown System is required to bring the reactor to safe shutdown see section F.4.4.3.3.

The Appendix R Remote Shutdown System contains manual controls of three main steam relief valves (not part of the ADS system) which are adequate for RPV depressurization. This is based on studies (NEDO-24708A) referenced in F.4 which indicate that only approximately 50% of the design ADS capacity is required to depressurize the RPV without peak fuel clad temperatures exceeding safety limits. If evacuation to the remote shutdown room were required due to a main control room fire, the RCIC system would actually be used as the preferred method of maintaining RPV water level, since controls and instrumentation for this system are available in the remote shutdown room.

The RCIC system has not been fully protected to the degree that it would if it were the designated shutdown system for a fire in the main control room. For example, transfer switches for valve RCIC-V-110 in the vacuum relief line for the RCIC turbine exhaust, and for valve SW-V-34 which controls service water flow to the fan coil unit for RCIC pump room cooling, were not provided in the remote shutdown room to preclude unintended closing of these valves due to shorts in the main control room resulting from fire damage in cables. However, given a fire in the main control room, the probability of failure of essential components in the RCIC system which would preclude operation from the remote shutdown room is considered remote because transfer switches have been provided. For a main control room fire, the availability of both the RCIC system, which is not fully protected, plus the SRV/RHR-B system, which is fully protected but has smaller, but adequate relief capacity than the 7-valve ADS system is considered to meet the intent of

TABLE F.2-29 (Continued)

Appendix R for a dedicated shutdown system. For simplicity, the instrumentation and equipment required for shutdown due to a main control room fire, which may differ in some cases from instrumentation and equipment required for a fire in other general fire areas, has been indicated in Table F.4.1.

Analysis of the capability to achieve cold reactor shutdown in the event of a main control room fire assumes that:

a. The entire main control room is lost (not considered credible)

b. Operators SCRAM the reactor and initiate MSIV closure as they evacuate the area

TABLE F.2-29 (Continued)

FIRE AREA RC-X CABLE DATA

Analysis then addressed the following:

a. The Appendix R Remote Shutdown System cabling does not route into the main control room.

b. All common Appendix R shutdown system components have been isolated by transfer switches located in a remote area and are not affected by a main control room fire.

The results of main control room analysis are as follows:

1. The following Appendix R remote shutdown system equipment can be controlled from the remote shutdown room.

RHR-FCV-64B*	RRA-FN-10*
SW-V-4B	RRA-FN-14*
SW-PCV-38B	WMA-FN-52B*
	WMA-FN-53B*

Equipment indicated with an asterisk (*) is not required to change state during the move from power operation to cold shutdown.

2. Diesel generator breakers 8-DG-2 and DG2-8 control circuits are such that local control of these dedicated shutdown system breakers are maintained in the event of a fire in the main control room.

3. The reactor level and pressure instruments on the remote shutdown panel are powered by Class 1E Division I source. If Division 1 power is unavailable due to main control room fire it is necessary to utilize Class 1E Division 2 power source to supply these instruments. The Division 2, 24 VDC power supply shall be available at a normally open transfer switch located on the remote shutdown control panel.

TABLE F.2-30

FIRE AREA RC-XI CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 2:	2M8F-42, 44 2COV-2-148
	Div. B:	BCOMD-9321, 9322 BMISC-9566, 9567, 9651

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-31

FIRE AREA RC-XII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1:	1M7F-215 1COV1-148
	Div. A:	AMISC-9651

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-32

FIRE AREA RC-XIII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	1CHA-1, 2, 3, 4, 5, 6, 7, 8, 10 1COV1-90, 111, 114, 121, 122, 130, 133, 140, 144, 146, 148 1M7F-30, 70, 72, 170, 191, 200, 215 1P7AF-6 1SL71-40, 50 1SM7-121 AANN-9147, 9772 ABPA1-9006, 9008, 9010, 9013, 9015, 9016, 9018, 9020, 9021, 9022, 9023, 9024, 9061, 9070 AD11C-9023 AD11D-9009, 9011, 9012, 9050 AMISC-9055, 9650, 9651, 9761, 9763, 9765, 9767, 9769, 9771, 9773, 9775, 9813, 9814 AM3C-9326 AM50-9131, 9136 AM7E-9011, 9041, 9191, 9293 AM7F-9320 APPAA-9013 AP3CC-9006 AP7FA-9001, 9003, 9005, 9066, 9007, 9008, 9204, 9213, 9250 AP7EB-9014 ASH5-9512, 9514, 9516 ASLF3-9030 ASM1-9130, 9132, 9134 ASM3-9100, 9101, 9103, 9105

TABLE F.2-32 (Cont'd)

IV.	Cable Data (Cont'd):	ASM7-9230, 9231, 9232, 9233, 9234, 9235 ATRB-9010 ATRM-9009, 9013, 9015, 9021, 9022, 9025, 9029 ATRS-9025, 9020 ATU-9001, 9002, 9003, 9057, 9058 AVUS-9008, 9010

Note: Analysis indicated that none of the cables listed above requires protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown components to achieve reactor shutdown.

TABLE F.2-33

FIRE AREA RC-XIV CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 2	2M8A-101
	Div. B	BSM7-9126, 9130 BM8A-101 BSM8-9089, 9208 BTRB-9027 BSL83-9034, 9056, 9067 BSL81-9055 BSL73-9012, 9001 BSL71-9008, 9012 BCOMD-9252, 9272 BANN-9863 BP8AF-9006

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

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TABLE F.2-35

FIRE AREA RC-XIX CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1:	1M7A-98
	Div. A:	ASM7-9215 ASM7-9208 ASM3-9080, 9112, 9115 ASL73-9053 ASL73-9048 ASL71-9058, 9063 ASL71-9040 ARPS-9003, 9004 AP7A-9001 APRPS-9016, 9017, 9025 AM7A-9093 AM11D-9166, 9167 AANN-9109, 9210 AP7EB-9005 AGFD-9744

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-35a

FIRE AREA RC-XX CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 2:	2PASS-5, 6, 7, 8, 9, 10, 11, 12, 13, 20, 31
	Div. B:	BPASS-9005, 9006, 9007, 9008, 9009, 9010, 9011, 9012, 9013, 9101, 9102 BM8A2-9001

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of Division 2 components to achieve reactor shutdown.

TABLE F.2-36a

FIRE AREA R-I CABLE DATA

I.	Fire Area Analysis Method:	Dedicated
II.	Fire Area Designation:	General
III.	Cable Category:	Appendix R Division 2 Safe Shutdown Cables
IV.	Cable Data:	

2ADS-32, 33
2CACS-269, 270, 271
2IR63-41
2M8B-20, 101, 102, 103, 104, 150, 151, 152
2M8BA-13, 15, 16, 17, 18, 23, 93, 100, 102, 103, 143, 153, 280, 281, 282, 314, 318, 319, 392, 434, 505
2M8BB-111, 112, 113, 114, 122, 130, 131, 132, 142, 220, 221, 222, 232, 234
2NS4-8, 9, 10, 11, 23
2RHR-10, 11, 12, 14, 26, 35, 42, 76, 105
2SL81-10
2SM8-93

TABLE F.2-36a (Continued)

Note:

1. Analysis indicates that all Appendix R Division 2 Safe Shutdown System cables listed above require protection.

2. High pressure-low pressure interface valve analysis has determined that the following cables:

   2M8BA-314, 434, 502
   2NS4-2, 30

   will be treated as Appendix R Division 2 Safe Shutdown System cables while in this dedicated fire area.

3. The instrument sensing lines for the following instrument:

   MS-LITS-26A,D
   MS-PT-51A,B
   RHR-FT-15A,B
   SMS-LT-1,2

   are routed in the R-1 fire area which has less than a one half (1/2) hour fire loading. These instrument sensing lines will not fail in this fire area due to this fire. The instruments are protected by being located within the fire shield wall enclosed racks E-IR-H22/P021 & E-IR-H22/P027 within this fire are 2(R-I).

4. This fire area contains the following three other Appendix R Division 2 Safe Shutdown components:

TB-R301	Containment penetration
TB-R313	Terminal boxes
RHR-V-16B	Drywell spray shutoff valve

   Both terminal boxes are thermolaged, however valve RHR-V-16B and its motor operator are not thermolaged since a design basis fire could not cause this valve to energize open as the control circuits are isolated by the main control room control switches. See elevation on page F.4-35.

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TABLE F.2-39a

FIRE AREA R-IV CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1:	1M11D-130, 131 1LDS-116, 118, 123, 176, 183, 186, 193 1NS4-1 1PASS-10, 12, 15, 16
	Div. 3:	3HPCS-344, 374, 422, 510
	Div. A:	ASM7-9090 ASCAN-9024 AM7CA-9084, 9212, 9214 ACOMA-9201 APASS-9011, 9013, 9016, 9017, 9026 APT29-9020, 9021, 9050

Note: Analysis indicates that cables listed above do not require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-40

FIRE AREA R-V CABLE DATA

I.	Fire Area Analysis Method:	Dedicated
II.	Fire Area Designation:	General
III.	Cable Category:	Appendix R Division 2 Safe Shutdown Cables
IV.	Cable Data:	
		2SM8-93

Note: Analysis indicates that the Appendix R Division 2 Safe Shutdown cable listed above requires protection in this fire area.

TABLE F.2-41

FIRE AREA R-V CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1	ILDS-104, 105, 109, 110, 111, 120, 171 1M11D-10, 11, 30, 31, 161, 210 1M21A-10, 11, 12, 101, 122, 130, 131, 140, 141, 150, 151, 170, 171, 180, 190, 200, 201, 207, 208 1M7B-340 1P7AE-13 1RCIC-2, 4, 5, 7, 8, 15, 24, 27, 28, 29, 31, 32, 34, 40, 41, 42, 46, 47, 48, 49, 51, 52, 53, 58, 63, 64, 65, 85, 86, 93, 94
	Div. A	AIVD-9106, 9108, 9110 AM7CA-9211, 9213, 9214, 9215, 9219 AP7AE-9062, 9063 ARCIC-9052, 9061, 9062, 9063, 9064, 9065, 9066, 9071, 9076 ATDAS-9008, 9302

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-42

FIRE AREA R-VII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Div. 1
III.	Cable Category	Intruding
IV.	Cable Data:	
	Div. 2	2ADS-52 2LDS-54, 63, 82 2M8B-140, 142, 360, 450 2M8BA-30, 32, 212, 290, 291, 420, 421 2SM8-60 2RHR-43
	Div. 3	3HPCS-251, 254, 260, 261, 269, 290, 712, 714, 715
	Div. B	BANN-9223, 9224, 9225, 9226, 9086, 9087 BARM-97, 9016, 9018, 9053, 9054, 9098, 9099 BCOMD-9212, 9213, 9218, 9219 BIVD-9100, 9101, 9102 BLDS-9038, 9039, 9212 BMISC-9525, 9527 BM8A2-9231 BM8CA-9010, 9040 BP6BA-9205 BP8A2-9173 BRWGE-9753, 9831

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-43

FIRE AREA R-VIII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 1
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 3:	3HPCS-251, 254, 260, 261, 269, 290, 712
	Div. B:	BMISC-9527 BCOMD-9212, 9213

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 2 Safe Shutdown System to achieve reactor shutdown.

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TABLE F.2-50

FIRE AREA R-XVII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1	1M11D-100, 101 1CACS-6, 66, 77, 78 1PASS-19, 22, 24 1VID-4, 5, 9
	Div. A	AIVD-9086, 9087 ACACS-9261, 9262, 9263, 9264, 9265, 9266, 9267, 9268, 9269 APASS-9001, 9020, 9023 APT29-9061

Note: Analysis indicates that none of the cables listed above require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-51

FIRE AREA R-XVIII CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. A	AM7B-9065 AANN-9286, 9301 ARCIC-9025

Note: Analysis indicates that cables listed above do not require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

TABLE F.2-52

FIRE AREA R-XIX CABLE DATA

I.	Fire Area Analysis Method:	Redundant
II.	Fire Area Designation:	Division 2
III.	Cable Category:	Intruding
IV.	Cable Data:	
	Div. 1	1SGT-80, 81
	Div. A:	AANN-9310, 9732

Note: Analysis indicates that cables listed above do not require protection. Loss of these cables does not negate the capability of the Appendix R Division 1 Safe Shutdown System to achieve reactor shutdown.

F.3 COMPLIANCE WITH BRANCH TECHNICAL POSITION APCSB 9.5-1

F.3.1 SUMMARY OF COMPLIANCE

Construction has been completed at WNP-2. The applicable NRC fire protection criteria are contained in Appendix A to Branch Technical Position APCSB 9.5-1. The following Summary of Compliance serves to correlate the requirements of the BTP with each fire area/zone and summarizes the areas of compliance and non-compliance with APCSB 9.5-1 Appendix A. (See Table F.3-1).

F.3.2 COMPLIANCE EVALUATION

This section presents the results of a comparison of the fire protection systems at WNP-2 with the criteria set forth in Appendix A to APCSB 9.5-1. A response is presented for each position item. In brief, the response describes how each criterion is met and, for criteria that are not met, describes the impact on plant safety.

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Response

Responsibility for the overall fire protection program within the Supply System is assigned to the Plant Manager. Responsibility for program development and auditing of implementation is delegated to the Manager, Industrial Safety and Fire Protection, (IS&FP). The Manager, IS&FP maintains a staff of qualified personnel trained in fire protection, including registered Fire Protection Engineers, and safety to assist in implementing the program.

Responsibility for implementation of the program operational aspects, including personnel training, testing and maintenance of fire detection, suppression and extinguishing systems, fire brigade training, and other fire protection activities is delegated to the Plant Manager.

The FSAR will discuss provisions for updating and inspecting the fire protection equipment as well as training and fire drills for maintaining the competence of the plant fire brigade. Also discussed is the training of personnel responsible for maintaining and inspecting the fire protection equipment.

Original design of the plant fire protection system was performed by the Architect-Engineer, Burns and Roe, Inc., under the direction of their registered professional engineers having previous nuclear power plant fire protection system design experience. Testing and inspection of the fire protection systems during installation was performed by the Contractors involved, under the surveillance of the A/E and Owner's site personnel. Pre-operational startup testing was performed by personnel meeting Level 1, 2 and 3 requirements of ANSI Standard N45.2.6, 1973.

NRC Position A2

Design Basis

The overall fire protection program should be based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fires related to maintaining ability to perform safety shutdown functions and minimize radioactive releases to the environment.

Response

The overall fire protection program is based upon evaluation of potential fire hazards throughout the plant relative to maintaining the ability to safely shutdown the plant and minimize the releases of radioactivity to the environment. This evaluation has resulted in several types of alarm and detection devices installed in the plant. Specifically, Control Room alarms result for the actuation of smoke, fire and/or heat detectors, sprinkler alarms, and pull boxes. Automatic and manual fire suppression equipment is installed relative to the fire hazard and type of fire possible. Equipment installed at the plant includes wet pipe sprinklers, deluge spray, pre-action sprinklers, CO_2 suppression, Halon, fire hose, and portable extinguishers.

Failure or inadvertent operation of a pre-action sprinkler system in the cable spreading room, cable chase or in the diesel generator building does not incapacitate the safety-related systems as two actions would be required for water to be released: the feed mains and lines must be flooded and the sprinkler heads must be fused.

Failure or inadvertent operation of the PGCC Halon 1301 system does not incapacitate safety-related systems.

Fire suppression systems that are pressurized during normal plant operation meet the guidelines specified in APCSB Branch Technical Position 3-1.

NRC Position A7

Fuel Loading

The fire protection program for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit.

Schedule for implementation of modifications, if any, will be established on a case-by-case basis.

Response

The fire protection programs for the entire power unit were fully operational prior to initial fuel loading.

B. ADMINISTRATIVE PROCEDURES, CONTROLS AND FIRE BRIGADE

NRC Position B1

Administrative Procedures, Controls and Fire Brigade

Administrative procedures consistent with the need for maintaining the performance of the fire protection system and personnel in nuclear power plants should be provided.

Guidance is contained in the following publications:

- NFPA 4 - Organization for Fire Services (Now NFPA 1201)
- NFPA 4A - Organization for Fire Department (Now NFPA 1202)
- NFPA 6 - Industrial Fire Loss Prevention*
- NFPA 7 - Management of Fire Emergencies*
- NFPA 8 - Management Responsibility for Effects of Fire on Operations*
- NFPA 27 - Private Fire Brigades

Response

Administrative procedures for maintaining performance of fire protection systems and personnel are provided in accordance with applicable NFPA codes and standards.

* NFPA standards no longer exist, they have been incorporated into other standards

NRC Position B2

Administrative Procedures, Controls and Fire Brigade

Effective administrative measures should be implemented to prohibit bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants", provides guidance of houskeeping, including the disposal of combustible materials.

Response

Administrative procedures are provided which prohibit bulk storage of combustible materials inside safety-related buildings or adjacent to safety-related systems. Regulatory Guide 1.39 will be used as a guide in procedure preparation. Plant Procedure Manuals 1.3.10 and 1.3.35 controls the introduction of combustible materials into the plant.

NRC Position B3

Administrative Procedures, Controls and Fire Brigade

Normal and abnormal conditions or other anticipated operations such as modifications (e.g., breaking fire stops, impairment of fire detection and suppression systems) and refueling activities shold be reviewed by appropriate levels of management for appropriate special actions and procedures such as fire watches or temporary fire barriers implemented to assure adequate fire protection and reactor safety. In particular:

a. Work involving ignition sources such as welding and flame cutting should be done under closely controlled conditions. Procedures governing such work should be reviewed and approved by persons trained and experienced in fire protection. Persons performing and directly assisting in such work should be trained and equipped to prevent and combat fires. If this is not possible, a person qualified in fire protection should directly monitor the work and function as a fire watch.

b. Leak testing, and similar procedures such as air flow determination, should use one of the commercially available aerosol techniques. Open flames or combustion generated smoke should not be permitted.

c. Use of combustible material, e.g., HEPA and charcoal filters, dry ion exchange resins or other combustible supplies, in safety-related areas should be controlled. Use of wood inside buildings containing safety-related systems or equipment should be permitted only when suitable non-combustible substitutes are not available. If wood must be used, only fire retardant treated wood (scaffolding, lay down blocks) should be permitted. Such materials should be allowed into safety-related areas only when they are to be used immediately. Their possible and probable use should be considered in the fire hazard analysis to determine the adequacy of the installed fire protection systems.

Response

Normal and abnormal conditions and other anticipated operations and refueling activities are reviewed by management for appropriate special actions. In particular:

a. Work involving ignition sources is done under controlled conditions and procedures governing such work will be reviewed and approved by persons trained and experienced in fire protection. Persons performing and assisting in such work are trained and equipped to prevent and control fires. Qualified personnel monitor the work and act as fire watch.

b. Leak testing and similar procedures use one of the commercially available aerosol techniques. Open flames or combustion generated smoke are not permitted.

c. Provisions have been made for controlling the use of combustible materials in safety-related areas. Use of wood in buildings containing safety-related systems or equipment is not permitted except when suitable non-combustible substitutes are not available. If wood is used only pressure impregnated fire retardant wood is permited. Such materials are allowed in safety-related areas only during periods of use.

NRC Position B4

Administrative Procedures, Controls and Fire Brigade

Nuclear power plants are frequently located in remote areas, at some distance from public fire departments. Also, first response fire departments are often volunteer. Public fire department response should be considered in the overall fire protection program. However, the plant should be designed to be self-sufficient with respect to fire fighting activities and rely on the public response only for supplemental or backup capability.

Response

The plant is designed to be self-sufficient with respect to fire-fighting activities. The plant fire brigade is trained in proper fire fighting procedures. Supplemental fire-fighting capability is available from local fire departments. They have been made aware of the facility design and special hazards associated with our nuclear power plants.

mit supervising personnel to evaluate the effectiveness of communications within the fire brigade and with the on-scene fire team leader, the reactor operator in the control room, and the offsite command post.

c. To have proper coverage during all phases of operation, members of each shift crew should be trained in fire protection. Training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and implemented into the training of the local fire department staff. Local fire departments should be educated in the operational precautions when fighting fires on nuclear power plant sites. Local fire departments should be made aware of the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant site.

d. NFPA 27, "Private Fire Brigade" should be followed in organization, training, and fire drills. This standard also is applicable for the inspection and maintenance of fire fighting equipment. Among the standards referenced in this document, the following should be utilized: NFPA 194, "Standard for Screw Threads and Gaskets for Fire Hose Couplings", NFPA 196, "Standards for Fire Hose", NFPA 197, "Training Standard on Initial Fire Attacks", NFPA 601, "Recommended Manual of Instructions and Duties for the Plant Watchman on Guard". NFPA booklets and pamphlets listed on page 27-11 of Volume 8, 1971-72 are also applicable for good training references. In addition, courses in fire prevention and fire suppression which are recognized and/or sponsored by the fire protection industry should be utilized.

Response

Fire protection industry standards and reference material, and Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants" were followed as applicable, for ogranization, training and equipping of the plant fire brigade.

Procedures have been prepared for the testing and maintenance of the fire protection equipment, emergency lighting and communication equipment. The procedures include a test plan listing individuals and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems. The plan contains the types, frequency and detailed procedures for testing. Procedures will also contain instructions on maintaining fire protection during periods when the fire protection system is impaired.

The plant fire brigade is trained by conducting drills at least quarterly. The purpose of the drills are to familiarize brigade members with their individual duties, the plant layout, equipment location and operation, and train them to operate effectively as a team. Drills will include participation of the local fire department at least annually.

Members of each shift crew are trained in fire protection. Training of the plant fire brigade has been coordinated with the local fire department so that the responsibilities and duties are clearly delineated. The responding fire departments will be educated in the operational precautions required when fighting fires at a nuclear power plant as well as the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant.

Applicable fire protection industry standards and other pertinent industry reference material were used to develop the fire brigade program.

C. QUALITY ASSURANCE PROGRAM

NRC Position Cl

Design Control and Procurement Document Control

Measures should be established to assure that all design-related guidelines of the Branch Technical Position are included in design and procurement documents and that deviations therefrom are controlled.

Response

At the time BTP APCSB 9.5-1 was issued, the basic design of all fire protection equipment and systems had been completed. The established engineering procedures require the design and design changes to be reviewed by cognizant personnel to assure material, parts and equipment specified will meet or exceed the design criteria. Design and design changes are incorporated into procurement documents which contain requirements that deviations be documented and controlled. Design and procurement activities are audited and reviewed on a scheduled and surveillance basis.

This report compares the plant design to the requirements of BTP APCSB 9.5-1.

NRC Position C2

Instructions, Procedures and Drawings

Inspections, tests, administrative controls, fire drills, and training that govern the fire protection program should be prescribed by documented instructions, procedures, or drawings and should be accomplished in accordance with these documents.

Response:

Specifications are prepared, when required, to define design requirements. Instructions, procedures, and drawings additionally define and implement fire protection requirements. Contractors/suppliers are requested to provide instructions, procedures, or drawings, as stipulated by contract/procurement documents. During plant operation, the fire protection program and those portions of the fire protection systems of safety-related equipment or protecting areas which contain potential fire hazards to safety-related equipment, as defined in the plant technical specifications, are subject to the applicable portions of the WNP-2 Operational Quality Assurance Program so as to comply with Fire Protection Quality Assurance Criteria.

NRC Position C3

Control of Purchased Material, Equipment, and Services

Measures should be established to assure that purchased material, equipment, and services conform to the procurement documents.

Response

Contractors/suppliers are required to provide inspection and/or test documentation as stipulated by contract/procurement documents.

Identification and traceability requirements are included in procurement documents as required. Source surveillance and/or receiving inspection will depend on the degree of design control by the Supply System.

NRC Position C4

Inspection

A program for independent inspection of activities affecting fire protection should be established and executed by, or for, the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities.

Response

Purchase orders/contracts are reviewed to provide applicable Quality Assurance requirements. Source surveillance and/or receiving inspections are performed depending on the degree of design control by the Supply System. Plant Quality Control or cognizant field engineering performs inspection/surveillance, as required, to assure compliance with fire protection requirements.

NRC Position C5

Test and Test Control

A test program should be established and implemented to assure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures; test results should be properly evaluated and acted on.

Response

Contractors performing installation and tests were required to perform inspections which assured system readiness were performed in accordance with approved procedures. Additionally, these contractors were subject to surveillance and/or audit for compliance to fire protection requirements. Modifications to installations are required to be tested to assure system readiness utilizing approved procedures.

NRC Position C6

Inspection, Test, and Operating Status

Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections.

Response

All items received are identified to assure proper traceability and status. This traceability is sufficiently assured during installation and test. A system of tagging is utilized during operations to establish operating status or to prevent inadvertent operation.

NRC Position C7

Non-Conforming Items

Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use or installation.

Response

Non-conformance reports are used to identify and control items that do not conform to specified requirements. Discrepant items are tagged and segregated to prevent inadvertant installation.

NRC Position C9

Records

Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program.

Response

The Quality Assurance Program, Vendors, and Contractors were required to prepare and maintain documents indicating compliance with criteria C1 through C8. During operations, documents indicating compliance with criteria C1-C8 will be subject to the applicable portions of the WNP-2 Operational Quality Assurance Program.

NRC Position C10

Audits

Audits should be conducted and documented to verify compliance with the fire protection program including design and procurement documents; instructions; procedures and drawings; and inspection and test activities.

Response

I. Design and Construction Phase

A surveillance/audit program has been implemented, to include design and procurement documents, instructions, procedures, and drawings; inspection, and test activities. Procurement documents are reviewed for application of source surveillance requirements.

Site contractors are subject to surveillance/audit to assure compliance to fire protection requirements.

II. Operational Phase

Operational audits are performed in accordance with NRC generic letter No. 82-21 dated October 6, 1982, subject: Technical Specifications For Fire Protection Audits.

NRC Position D1(b)

Building Design

In order to accomplish 1.(a) above, safety-related systems and fire hazards should be identified throughout the plant. Therefore, a detailed fire hazard analysis should be made. The fire hazards analysis should be reviewed and updated as necessary.

Additional fire hazards analysis should be done after any plant modification.

Response

In designing the plant careful consideration has been given to locating equipment, fire walls, barriers, selecting materials and designing the fire protection system. An updated fire hazards analysis, performed in accordance with 10CFR50, Appendix R is included in F.4. The impact of plant modifications on the validity of the fire hazards analysis are evaluated. Additional fire hazards analyses are performed.

NRC Position D1(d)

Building Design

Interior wall and structural components, thermal insulation materials and radiation shielding materials and sound-proofing should be non-combustible. Interior finishes should be non-combustible or listed by a nationally recognized testing laboratory, such as Factory Mutual or Underwriters' Laboratory, Inc. for flame spread, smoke and fuel contribution of 25 of less in its use configuration (ASTM E-84 Test, "Surface Burning Characteristics of Building Materials").

Response

Interior wall and structural components, thermal insulation materials, and radiation shielding materials are non-combustible. Decontaminable coatings and finish painting material have flame spreads less than 25. Auxiliary rooms within the Control Room and the north wall of the Radwaste Control Room have plastic laminate faced wall panels. The plastic laminate faced wall panels are UL listed for a flame spread of 25 and a smoke developed rating of 40. The materials in these rooms are not, however, considered to present a fire hazard.

Shielding material installed within access doors at certain penetrations in the primary containment sacrificial shield wall is under the trade name of "Permali". Flame spread and smoke contribution are both under 25.

NRC Position D1(e)

Building Design

Metal deck roof construction should be non-combustible (see the building materials directory of the Underwriters' Laboratory, Inc.) or listed as Class I by Factory Manual System Approval Guide.

Where combustible material is used in metal deck roofing design, acceptable alternatives are (i) replace combustibles with non-combustible materials, (ii) provide an automatic sprinkler system, or (iii) provide ability to cover roof exterior and interior with adequate water volume and pressure.

Response

All metal deck roof systems meet the requirements of Factory Mutual Class I Insulated Steel Roof Decks.

NRC Position D1(g)

Building Design

High voltage - high amperage transformers installed inside buildings containing safety related systems should be of the dry type or insulated and cooled with non-combustible liquid.

Safety related systems that are exposed to flammable oil filled transformers should be protected from the effects of a fire by:

(i) replacing with dry transformers or transformers that are insulated and cooled with non-combustible liquid; or

(ii) enclosing the transformer with a three-hour fire barrier and installing automatic water spray protection.

Response

All high voltage transformers installed inside safety-related building areas are installed and cooled with high flash point insulating medium.

NRC Position D2(a)

Control of Combustibles

Safety-related systems should be isolated or separated from combustible materials. When this is not possible because of the nature of the safety system or the combustible material, special protection should be provided to prevent a fire from defeating the safety system function. Such protection may involve a combination of automatic fire suppression, and construction capable of withstanding and containing a fire that consumes all combustibles present. Examples of such combustible materials that may not be separable from the remainder of its system are: (1) Emergency diesel generator fuel oil day tanks (2) Turbine-generator oil and hydraulic control fluid systems (3) Reactor coolant pump lube oil system.

Response

Safety-related systems have been isolated or separated from combustible materials to the extent possible. The emergency diesel generator fuel oil day tanks are located in separate rooms with three-hour fire-rated walls and three-hour fire-rated door assemblies. The turbine-generator oil reservoir and coolers and hydraulic control reservoir and coolers are separated from each other by fire-rated walls and are protected by deluge sprinkler system. The turbine-generator oil reservoir coolers are open to the turbine-generator operating floor but the opening is protected by a deluge sprinkler system. The reactor recirculation pumps are not protected by an automatic fire suppression system since the containment is inerted with nitrogen. In addition, monitoring of bearing temperature, oil level, containment temperature, and pressure is provided.

NRC Position D2(b)

Control of Combustibles

Bulk gas storage (either compressed or cryogenic), should not be permitted inside structures housing safety-related equipment. Storage of flammable gas such as hydrogen, should be located outdoors or in separate detached buildings so that a fire or explosion will not adversely affect any safety related systems or equipment. (Refer to NFPA 50A, "Gaseous Hydrogen Systems.") Care should be taken to locate high pressure gas storage containers with the long axis parallel to building walls. This will minimize the possibility of wall penetration in the event of a container failure. Use of compressed gases (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 5, "Industrial Fire Loss Prevention.")

Response

A separate building, remote from the main buildings of the plant, is provided for bulk storage of hydrogen bottles. The building is of non-combustible construction and complies with NFPA Standard 50A. The location of the building is such that a fire or explosion would not affect any safety-related buildings or equipment. All bottles are stored in a vertical position.

Nitrogen and compressed air cylinders are stored along the interior wall of the reactor building railroad airlock. In addition, nitrogen cylinder are located in the Reactor Building - 6 on the 572' elevation and 6 on the 522' elevation. This cylinder is secured to building walls. A failure of a cylinder in this area would not affect any safety-related equipment. A class A bottle of 25% hydrogen and 75% nitrogen is attached to the outside of the sample room. Due to the mixture of hydrogen and nitrogen, an explosion is not possible. The plant is considered essentially in compliance.

NRC Position D2(c)

Control of Combustibles

The use of plastic materials should be minimized. In particular, haloginated plastics such as polyvinyl chloride (PVC) and neoprene should be used only when substitute non-combustible materials are not available. All plastic materials, including flame and fire retardant materials, will burn with an intensity and BTU production in a range similar to that of ordinary hydrocarbons. When burning, they produce heavy smoke that obscures visibility and can plug air filters, especially charcoal and HEPA. The haloginated plastics also release free chlorine and hydrogen chloride when burning, which are toxic to humans and corrosive to equipment.

Response

The use of plastic materials, in particular halogenated plastics, has been minimized. They have, however, been used in the following areas:

a. a finish on the north wall of the radwaste control room,

b. a finish on walls in auxiliary rooms or spaces in the main control room,

c. weather stripping and gasketing on doors,

d. water tight boot seals on pipes in reactor building exterior walls and on interior walls below elev. 471'-0",

e. wire used for lighting (this wire is enclosed in conduit),

f. wire used in the motor control centers,

g. all electric cable labels,

h. wire used in hydrogen recombiner control cabinets,

i. plastic coated flexible conduit,

j. absorbant oil pads (polypropylene) are used for environmental oil spills.

k. circ. water sample piping 441' elev. T.G. bldg.

l. TSW corrosion coupon sample piping located on service bldg. chiller elev. 422' of service building.

NRC Position D2(d)

Control of Combustibles

Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."

Response

Flammable liquids, as defined in NFPA 30, are not stored in the plant. With the exception of the diesel generator oil day tanks, all combustible liquids are stored in accordance with the requirements of NFPA 30. Refer to the response to F9.

NRC Position D3(c)

Electric Cable Construction, Cable Trays, and Cable Penetrations

Automatic water sprinkler systems should be provided for cable trays outside the cable spreading room. Cables should be designed to allow wetting down with deluge water without electrical faulting. Manual hose stations and portable hand extinguishers should be provided as backup. Safety-related equipment in the vicinity of such cable trays, that does not itself require water fire protection, but is subject to unacceptable damage from sprinkler water discharge, should be protected from sprinkler system operation or malfunction.

When safety-related cables do not satisfy the provisions of Regulatory Guide 1.75, all exposed cables should be covered with an approved fire retardant coating and a fixed automatic water fire suppression system should be provided.

Response:

Separation or barriers have been provided between redundant safety-related cable trays as described in FSAR Section 8.3.1.4. Fixed water suppression systems for all such cable trays outside the cable spreading room are, therefore, considered unnecessary. The Radwaste Control Building cable spreading room, cable chase and the Radwaste Reactor Building's corridor, however, contain redundant safety-related cables in trays and are located such that the heat resulting from a fire could not be dissipated. Therefore, these areas are provided with automatic water sprinkler systems even where the guidelines of WNP-2 physical separation of redundant safety-related cable trays have been met. Additionally, the cable spreading room is provided with a 20 foot area containing no combustibles (all cables are coated except those in conduit) to provide separation between redundant safe shutdown circuits.

Manual hose stations and portable extinguishers are available for backup. All hose stations shall be equipped with fog nozzles. (See Response E3.) Use of these fog nozzles is not likely to cause unacceptable damage to any safety-related equipment when used by trained personnel in the prescribed manner.

Essential compliance is considered for all redundant safety-related cable trays outside of the cable spreading room because:

a. all cables are fire retardant and waterproof (IEEE 383 qualified);

b. separation criteria is maintained;

c. barriers are installed wherever the WNP-2 electrical separation criteria cannot be met;

d. there is pre-alarm monitoring and the availability of manual hoses and portable extinguishers.

A physical walkdown of the entire plant raceway installation in safety-related areas was performed prior to fuel load. This physical review provided visual verification of conformance of separaton of redundant safety-related cable trays to the WNP-2 separation guidelines.

Cable tray and conduit separation requirements imposed by 10CFR50, Appendix R are addressed in F.2 of this report. It should be noted that, in accordance with Appendix R, both exposed cables (tray installation) and enclosed cables (conduit installation) have been reviewed.

Refer also to 8.3.1.4 for specific discussion of WNP-2 conformance to Regulatory Guide 1.75 (Revision 1).

NRC Position D3(d)

Electric Cable Construction, Cable Trays and Cable Penetrations

Cable and cable tray penetration of fire barriers (vertical and horizontal) should be sealed to give protection at least equivalent to that fire barrier. The design of fire barriers for horizontal and vertical cable trays should, as a minimum, meet the requirements of ASTM E-119, "Fire Test of Building Construction and Materials," including the hose stream test.

Where installed penetration seals are deficient with respect to fire resistance, these seals may be protected by covering both sides with an approved fire retardant material. The adequacy of using such material should be demonstrated by suitable testing.

Response

All cable and cable penetration seals in fire barriers (vertical and horizontal) meet the requirements of ASTM E-199, see response to NRC Position D1(g) on page F.3-49 and section F.2.9.

NRC Position D3(e)

Electric Cable Construction, Cable Trays and Cable Penetrations

Fire breaks should be provided as deemed necessary by the fire hazards analysis. Flame of flame retardant coatings may be used as a fire break for grouped electrical cables to limit spread of fire in cable ventings. (Possible cable derating owing to use of such coating materials must be considered during design.)

Response

Fire breaks have been provided in all vertical tray runs where the typical floor spacing is 30 feet or more.

Where coating materials are used on cables derating of cables has been considered in the design.

NRC Position D3(f)

Electric Cable Construction, Cable Trays and Cable Penetrations

Electric cable constructions should as a minimum pass the current IEEE No. 383 flame test. (This does not imply that cables passing this test will not require additional fire protection).

For cable installation in operating plants and plants under construction that do not meet the IEEE No. 383 flame test requirements, all cables must be covered with an approved flame retardant coating and properly derated.

Response

All cables meet the IEEE No. 383 1974 flame test requirements.

NRC Position D3(g)

Electric Cable Construction, Cable Trays and Cable Penetrations

To the extent practical, cable construction that does not give off corrosive gases while burning should be used. Applicable to new cable installations.

Response

Cable construction uses Raychem control cable with Flamtrol insulation and type XLPE Okonite power cable. These cables give off as little corrosive gas as practical. See Reference A and B at the end of Appendix F of this FSAR.

NRC Position D3(i)

Electric Cable Construction, Cable Trays and Cable Penetrations

The design of cable tunnels, culverts and spreading rooms should provide for automatic or manual smoke venting as required to facilitate manual fire fighting capability.

Response

There are no cable tunnels or culverts used in the plant which fall under this position.

Air from the cable spreading room normally passes into the cable chase through openings protected by 3-hour fire-rated dampers and then back to an air conditioning unit. Ionization detectors spaced through both areas and a smoke detector, mounted in the ductwork, monitor the return air. Upon actuation of the detector, an alarm sounds in the control room. The control room operator can then shut down the air conditioning unit.

As the cable spreading room and cable chase are each protected by an automatic pre-action sprinkler system designed for cable tray fire extinguishment, the fire would be of limited duration. Smoke from a cable chase fire would be purged through the actuation of a fixed exhaust fan and ductwork which would discharge directly to the atmosphere.

The plant is considered essentially in compliance because of the utiliztion of fans and ducting to discharge smoke to the atmosphere to maintain visibility in both the cable chase and the cable spreading room.

All cables in the suspended ceiling area (lighting, communication, fire detector, etc.) are non-safety-related and enclosed in conduit. For this reason, an automatic flooding system is not deemed necessary.

NRC Position D4(h)

Ventilation

Self-contained breathing apparatus, using full face positive pressure masks, approved by NIOSH (National Institute of Occupational Safety and Health - approval formerly given by the U.S. Bureau of Mines) should be provided for fire brigade, damage control and control room personnel. Control room personnel may be furnished breathing air by a manifold.

Response

Provisions have been made for adequate self-contained breathing apparatus near containment entrances for fire-fighting and damage control personnel and in the control room for operating personnel. These units are independent of respiratory protective equipment provided for general plant activities.

NRC Position D4(i)

Ventilation

Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should close upon initiation of gas flow to maintain necessary gas concentration. (See NFPA 12, "Carbon Dioxide Systems," and 12A, "Halon 1301 Systems.")

Response

The total flooding halon 1301 fire suppression system in the security central control station has an electrical interlock with the thermal detecting device which closes zoned dampers and de-energizes ventilation fans to maintain the halon design concentrations.

NRC Position D5(b)

Lighting and Communication

Suitable sealed-beam battery powered portable hand lights should be provided for emergency use.

Response

Suitable sealed-beam, battery-powered portable hand lights have been provided.

E. FIRE DETECTION AND SUPPRESSION

NRC Position E1(a)

Fire Detection

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

Response

The fire detection system conforms to NFPA 72D for a Class B designation with the following exceptions: detection circuits that actuate fire suppression systems in safety-related areas are Class A. All signals coming into the central supervising station (control room) are not automatically recorded. WNP-2 employs a pre-alarm detection system which sounds an alarm signal in the control room only. The control room operator manually sounds a building wide alarm over the public address system. An alarm also can be sent to the DOE 300 Area.

All signals to the control room are distinctively divided into zones which designate the building, floor and cause of alarm. Supervising signals and alarms from sprinkler system actuation and pull boxes from all buildings except the warehouses shall sound in the control room and are automatically sent to the DOE 300 Area.

Pre-alarm detectors are provided according to UL recommendations and are spaced to provide the following coverage in the main plant:

a. Ionization Detector 520 ft2
b. Photoelectric Smoke Detector. . . . 1200 ft2
c. Combination Rate of Rise and
   Fixed Temperature Detector 500 ft2

NRC Position E1(b)

Fire Detection

Fire detection system should give audible and visual alarm and annunciation in the control room. Local audible alarms should also sound at the location of the fire.

Response

Fire detection systems provide audible and visual alarms in the Control Room.

An electronic tone generator automatically initiates a fire alarm gonging tone over the public address system loudspeakers located throughout the plant whenever the main control room operator actuates the appropriate pushbutton on the fire control/display panel. Oral instructions from the main control room operator will follow.

NRC Position E2(a)

Fire Protection Water Supply Systems

An underground yard fire main loop should be installed to furnish anticipated fire water requirements. NFPA 24 - Standard for Outside Protection - gives necessary guidance for such installation. It references other design codes and standards developed by such organizations as the American National Standards Institute (ANSI) and the American Water Works Association (AWWA). Lined steel or cast iron pipe should be used to reduce internal tuberculation. Such tuberculation deposits in an unlined pipe over a period of years can significantly reduce water flow through the combination of increased friction and reduced pipe diameter. Means for treating and flushing the systems should be provided. Approved visually indicating sectional control valves, such as post indicator valves, should be provided to isolate portions of the main for maintenance or repair without shutting off the entire system.

The fire main system piping should be separate from service or sanitary water system piping.

Visible location marking signs for underground valves is acceptable. Alternative valve position indicators should also be provided.

For operating plants, fire main system piping that can be isolated from service or sanitary water system piping is acceptable.

Response

The underground yard fire main circles the entire plant and is designed in accordance with NFPA 24. The fire main is constructed on 12" ductile iron, ductile steel, and cast iron pipe. The cast iron pipe has a factory applied coating of bituminous material with a minimum thickness of 1 mil. The coating conforms to the requirements of ANSI A21.4. All underground valves in the fire main loop have post indicators for visual indication and to isolate portions of the fire main. Each system has been flushed and hydorstatic tested.

As back up, a diesel driven pump with a flow rate of 2500 GPM in the #3 pumphouse is provided. The pump draws water from a 280,000 gallon dedicated water supply in 300,000 gallon water storage tank and supplies water to the north side of the plant fire water supply loop.

All pumps are installed in accordance with NFPA Standard 20.

The fire pumps are U.L. listed. The 2500 gpm is also Factory Mutual approved.

Alarms indicating pump running, power failure malfunction are provided for each pump in the Control Room.

The overall water supply system design is in essential compliance and is acceptable to the insuring authority.

NRC Position E2(e)

Fire Protection Water Supply Systems

The fire water supply (total capacity and flow rate) should be calculated on the basis of the largest expected flow rate for a period of two hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 1000 gpm for manual hose stream plus the greater of:

a. all sprinkler heads opened and flowing in the largest designed fire area; or

b. the largest open head deluge system(s) operating.

Response

The requirement of 1000 gpm for manual hose streams has been reduced to 500 gpm by BTP CMEB 9.5.1 (NUREG-0800).

The fire protection system water supply is designed to meet the water flow demand assuming the shortest leg of the fire main loop is inoperable. All wet pipe sprinkler systems are designed to provide a discharge density of not less than 0.3 gpm/sq. ft. with all heads operating within the most remote 3,000 sq. ft. of floor area. The sprinkler system serving the largest designed fire area is also capable of providing an average discharge density of 0.2 gpm with all heads operating within the most remote 10,000 sq. ft. of floor area. The largest sprinkler system demand is 2385 gpm including 500 gpm for the cable spread room.

The required water supply based on a two-hour flow period is 286,200 gallons. This water is drawn from the circulating water pump house basin. (See NRC Response E2(d)).

NRC Position E3(b)

Water Sprinklers and Hose Standpipe Systems

All valves in the fire water systems should be electrically supervised. The electrical supervision signal should indicate in the control room and other appropriate command locations in the plant (See NFPA 26, "Supervision at Valves.")

When electrical supervision of fire protection valves is not practicable, an adequate management supervision program should be provided. Such a program should include locking valves open with strict key control; tamper proof seals; and periodic visual check of all valves.

Response

All control valves within the plant are either locked open or have monitor switches which alarm in the Control Room. Monitoring is in conformance with NFPA 26, "Supervision of Valves", and NFPA 72D, "Proprietary Protective Signaling Systems." Valves in the yard fire main loop are provided with post indicators. Valves FP-V-16A and 16B have monitor switches with alarms in the Control Room. All other valves in the yard and valves in the circulating water pump house and well water pump house No. 2 are sealed in the open position. A program of management supervision has been instituted for these valves.

NRC Position E3(d)

Water Sprinklers and Hose Standpipe Systems

Interior manual hose installation should be able to reach any location with at least on effective hose stream. To accomplish this, standpipes with hose connections equipped with a maximum of 75 feet of 1-1/2-inch woven jacket lined fire hose and suitable nozzles should be provided in all buildings, including containment, on all floors and should be spaced at not more than 100-foot intervals. Individual standpipes should be of at least 4-inch diameter for multiple hose connections and 2-1/2-inch diameter for single hose connections. These systems should follow the requirements of NFPA No. 14 for sizing, spacing and pipe support requirements (NELPIA).

Hose stations should be located outside entrances to normally unoccupied areas and inside normally occupied areas. Standpipes serving hose stations in areas housing safety-related equipment should have shut off valves and pressure reducing devices (if applicable) outside the area.

Response

Standpipes and manual hose stations are designed in accordance with NFPA 14. Hose stations are presently provided with 150 feet of 1-1/2-inch single jacket, fabric rubber lined fire hose with shutoff type fog nozzle and are capable of reaching any location with at least one effective hose stream in all building fire areas. The interior manual hose installations were modified to provide standpipes with hose connections equipped with a maximum of 100 feet of 1-1/2-inch fire hose in safety-related areas. The modified arrangement allows any location that contains, or could present a fire exposure hazard, to safety-related equipment to be reached with at least one effective hose stream as defined in NFPA 14.

Hose stations are presently located inside enclosed stairways to the various fire areas of all buildings except at the following locations:

a. Two open stairways at the south end of the turbine generator building,

b. One enclosed cabinet on the service building mezzanine level,

c. One new station in the radwaste-reactor corridor Col. P.1 and 10.

All hose stations and their shutoff valves serving areas housing safety-related equipment are located outside of the area.

NRC Position E4

Halon Suppression Systems

The use of Halon fire extinguishing agents should as a minimum comply with the requirements of NFPA 12A and 12B, "Halogenated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL of FM approved agents should be used.

In addition to the guidelines of NFPA 12A and 12B, preventative maintenance and testing of the systems, including check weighing of the Halon cylinders should be done at least quarterly.

Particular consideration should also be given to:

a. minimum required Halon concentration and soak time

b. Toxicity of Halon

c. Toxicity and corrosive characteristics of thermal decomposition products of Halon

Response

The following are areas where Halon 1301 extinguishing systems are installed:

a. Control room PGCC sub-floor sections longitudinal cable ducts

b. Main guardhouse, security central control station (SCCS)

The systems comply with the requirements of NFPA Standard 12A.

The Halon System for the control room PGCC sub-floor sections longitudinal cable ducts in Area 1 consist of high pressure cylinders and necessary piping, nozzles, valves and detectors for suppressing fires in each of the sub-floor sections longitudinal cable ducts. The Halon system will provide 20% concentration by volume for a twenty (20) minute duration in the sub-floor section ducts in compliance with the PGCC licensing topical report, NEDO-10466-A.

The Halon 1301 agent is considered non-injurious to room occupants when the design concentration of the gas for total flooding does not exceed 7% of room volume. However, a local alarm is installed to alert personnel prior to any discharge. It is considered that there will be no adverse effects to sensitive electronic equipment due to thermal decomposition products of Halon 1301 under fire and non-fire conditions.

The main guardhouse SCCS system, Area 4, is divided into two zones. The occupied control station shall have a total flooding discharge to the room and raised floor area with a combined concentration not exceeding 7% of room volume. The unmanned lower level equipment area of the SCCS shall have a total flooding discharge with a design concentration of 10%. The soak time is a minimum of ten minutes. A 100% reserve capacity in separate cylinders is provided. The operator has the option of clearing the air by actuating the automatic dampers in the ventilation system.

Procedures for preventive maintenance and testing of Halon fire extinguishing systems have been established consistent with NFPA and manufacturer guidelines. Halon cylinders are weighed once every six months.

NRC Position E5

Carbon Dioxide Suppression Systems

The use of carbon dioxide extinguishing systems should as a minimum comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems."

Particular consideration should be given to:

a. minimum required CO_2 concentration and soak time:

b. toxicity of CO_2;

c. possibility of secondary thermal shock (cooling damage);

d. offsetting requirements for venting during CO_2 injection to prevent overpressurization versus sealing to prevent loss of agent;

e. design requirements from overpressurization;

f. possibility and probability of CO_2 systems being out-of-service because of personnel safety consideration. CO_2 systems are disarmed whenever people are present in an area so protected. Areas entered frequently (even though duration time for any visit is short) have often been found with CO_2 systems shut off.

Response

A low pressure carbon dioxide extinguishing system has been installed in exciter housing of the turbine generator.

The system as designed meets the above requirements.

NRC Position F1(b)

Refueling and Maintenance

Refueling and maintenance operations in containment may introduce additional hazards such as contamination control materials, decontamination supplies, wood planking, temporary wiring, welding and flame cutting (with portable compressed fuel gas supply). Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems.

Management procedures and controls necessary to assure adequate fire protection are discussed in Section B3.a.

In addition, manual fire fighting capability should be permanently installed in containment. Standpipes with hose stations, and portable fire extinguishers, should be installed at strategic locations throughout containment for any required manual fire fighting operations.

Equivalent protection from portable systems should be provided if it is impractical to install standpipes with hose stations.

Adequate self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breathing apparatus or air supply systems provided for general plant activities.

Response

Adequate protection procedures and control will be provided during refueling and provided for maintenance operations to assure adequate fire protection.

Manual fire fighting capability is provided in secondary containment by standpipes with hose stations and portable fire extinguishers.

Adequate self-contained breathing apparatus has been provided near containment entrances for fire fighting.

vented from entering the control room from other areas due to the pressurization of the room by the A/C system. Makeup air for the control room A/C system is drawn through the outside air intake (OAI), located at El. 527'-6", which is 87 feet above the ground. If smoke is observed entering the OAI, the control room operator has the option of drawing the makeup air through intakes remote from the main plant buildings. If it is necessary to exhaust smoke from the room, then fixed fan and flexible ducting shall be utilized, (see Response D4(g)) therefore, the plant is considered in compliance with this position.

All cables in the suspended ceiling of the control room are in electric metallic tubing (EMT) type conduit. All cables in the raised floor extending beyond the PGCC cabinets are either in covered metal troughs or in flexible metal conduit. (See response D3(j).) There are no automatic fixed halon systems other than the PGCC sub-floor sections longitudinal cable ducts.

NRC Position F3(a)

Cable Spreading Room

The preferred acceptable methods (for fire suppression) are:

a. Automatic water system such as closed head sprinklers, open head deluge, or open directional spray nozzles. Deluge and open spray systems should have provisions for manual operation at a remote station; however, there should also be provisions to preclude inadvertent operation. Location of sprinkler heads of spray nozzles should consider cable tray sizing and arrangements to assure adequate water coverage. Cables should be designed to allow wetting down with deluge water without electrical faulting. Open head deluge and open directional spray systems should be zoned so that a single failure will not deprive the entire area of automatic fire suppression capability. The use of foam is acceptable, provided it is of a type capable of being delivered by a sprinkler or deluge system, such as an Aqueous Film Forming Foam (AFFF).

b. Manual hoses and portable extinguishers should be provided as backup.

c. Each cable spreading room of each unit should have divisional cable separation, and be separated from the other and the rest of the plant by a minimum three-hour rated fire wall (Refer to NFPA 251 or ASTM E-119 for fire test resistance rating).

d. At least two remote and separate entrances are provided to the room for access by fire brigade personnel; and

e. Aisle separation provided between tray stacks should be at least three feet wide and eight feet high.

Response

The cable spreading room is protected by a closed head pre-action sprinkler system designed to protect the overhead and alternate cable trays horizontally every 10 feet of the cable tray. Cables have been designed to allow wetting without

electrical fault. Inadvertent operation is prevented by the pre-action system because either a manual trip from a local station or an automatic trip from the locally mounted ionization detectors is required to actuate the deluge type valve and flood the system with water. In addition sprinkler heads must be actuated before water will flow from the system. The system has been designed taking into consideration cable tray sizing and arrangements such that there is adequate water coverage.

A dry chemical portable extinguisher is available inside the cable spreading room and dry chemical portable extinguishers are available outside. A manual hose station is located immediately outside one of the entrances. An additional hose can be extended from the next lower floor at the other entrance.

The cable spreading room is separated from other areas of the plant by walls having a minimum fire resistance of three hours. There are two remote and separate entrances to the room having doors with a three-hour rating.

Tray stacks are separated by three-foot aisles. Aisle headroom is typically eight feet, however, there are some tray crossover and support obstructions which hamper but do not preclude access. Cables have been arranged to provide divisional separation in accordance with WNP-2 electrical separation guidelines as described in FSAR Section 8.3.1.4. A physical walkdown of the cable spreading room raceway installation was done prior to fuel load. This physical inspection/review will provide visual verification of conformance of the installation as described in WNP-2 separation guidelines. Cable tray and conduit separation requirements imposed by 10CFR50, Appendix R are addressed in Section F.2.

It should be noted that the Appendix R fire evaluation for this area is based upon the Redundant Analysis Methodology. A twenty foot (20') barrier has been formed that divides the cable spreading room into two separate fire area. The barrier runs the entire length of the room (east-west) and consist of providing a thermo-lag covering over all cables in trays to eliminate all combustibles within this area for twenty feet. This area is also protected by the cable spreading room pre-action sprinkler system. For additional information see section F.4.4.

NRC Position F3(b)

Cable Spreading Room

For cable spreading rooms that do not provide divisional cable separation of c, in addition to meeting a, b, d, and e above, the following should also be provided:

a. Divisional cable separation should meet the guidelines of Regulatory Guide 1.75, "Physical Independence of Electric Systems".

b. All cabling should be covered with a suitable fire retardant coating.

c. As an alternate to a above, automatically initiated gas systems (Halon or CO_2) may be used for primary fire suppression, provided a fixed water system is used as a backup.

d. Plants that cannot meet the guidelines of Regulatory Guide 1.75, in addition to meeting a, b, d and e above, an auxiliary shutdown system with all cabling independent of the cable spreading room should be provided.

Response

The cable spreading room was designed to provide divisional separation in accordance with the WNP-2 Electrical Separation Criteria (See Response D3(c). The room is separated from the rest of the plant by fire barriers with a minimum three-hour rating. A large number of ionization detectors (36) have been installed to reduce detection time. A fixed pre-action sprinkler system has been installed with branches spaced every 10 feet dropping down to protect alternate open trays on each tray bank. This position is, therefore, not applicable.

Refer to F.4 for the 10CFR50, Appendix R fire hazards shutdown analysis of the cable spreading room.

NRC Position F7

Station Battery Rooms

Battery rooms should be protected against fire explosions. Battery rooms should be separated from each other and other areas of the plant by barriers having a minimum fire rating of three-hours inclusive of all penetrations and openings. (See NEPA 69, "Standard on Explosion Prevention Systems.") Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 vol. % hydrogen concentration. Standpipe and hose and portable extinguishers should be provided.

Alternatives:

a. Provide a total fire rated barrier enclosure of the battery room complex that exceeds the fire load contained in the room.

b. Reduce the fire load to be within the fire barrier capability of 1-1/2 hours.

OR

c. Provide a remote manual actuated sprinkler system in each room and provide the 1-1/2 hour fire barrier separation.

Response

Battery rooms are separated from each other and other areas of the plant by walls with a minimum fire rating of three hours. Door assemblies have a fire-rating of three hours. Ventilation penetrations serving the battery rooms are protected by 1-1/2 hour fire rated dampers. This is in excess of that required by the fire-loading. Other penetrations serving the battery rooms are sealed.

The ventilation systems serving the battery room complies with NFPA 69 and will maintain the hydrogen concentration well below 2%.

Dry chemical portable extinguishers are available for fire protection, two standpipe hose stations are available to both battery rooms. For additional considerations see section F.4.4.2 and note 11 of Table F.4.1.

NRC Position F8

Turbine Lubrication and Control Oil Storage and Use Areas

A blank fire wall having a minimum resistance rating of three hours should separate all areas containing safety-related systems and equipment from the turbine oil system.

When a blank wall is not present, open head deluge protection should be provided for the turbine oil hazards and automatic open head water curtain protection should be provided for wall openings.

Response

The turbine oil system is located in the Turbine Generator Building, separate from all safety-related equipment by a minimum 3-hour fire-rated barrier and by a spatial separation of at least 50 feet. All components of the turbine oil system are protected by deluge spray or wet sprinkler systems. The plant is considered essentially in compliance with this position.

NRC Position F11

Safety-Related Pumps

Pump houses and rooms housing safety-related pumps should be protected by automatic sprinkler protection unless a fire hazards analysis can demonstrate that a fire will not endanger other safety-related equipment required for safe plant shutdown. Early warning fire detection should be installed with alarm and annunciation locally and in the Control Room. Local hose stations and portable extinguishers should also be provided.

Response

The main circulating water pumps and fire pumps in the Circulating Water Pump House are protected by automatic sprinklers. The secondary fire pump in the Filtration Building is protected by an automatic sprinkler system. Safety-related pumps in the Reactor Building and in the Standby Service Water Pumphouses are not protected by sprinklers, however, due to the low inventory of combustibles where they are located, a fire in these pumps is not considered to endanger other safety-related equipment required for safe shutdown.

Early warning fire detection is installed which alarms and annunciates in the Control Room and gives local visual indication. Hose stations and portable extinguishers are also provided.

Fire hazards analysis for all pump houses and pump rooms, performed in accordance with 10CFR50, Appendix R, is detailed in F.2.

NRC Position F14

Radwaste Building

The radwaste building should be separated from other areas of the plant by fire barriers having at least three-hour ratings. Automatic sprinklers should be used in all areas where combustible materials are located. Automatic fire detection should be provided to annunciate the alarm in the control room and alarm locally. During a fire, the ventilation systems in these areas should be capable of being isolated. Water should drain to liquid radwaste building sumps.

Acceptable alternative fire protection is automatic fire detection to alarm and annunciate in the control room, in addition to manual hose stations and portable extinguishers consisting of hand held and large wheeled units.

Response

The Radwaste Building is separated from other areas of the plant by walls and door assemblies which have fire ratings found by the fire hazards analysis to be equivalent to or greater than the fire loading. All penetrations in the fire barrier walls are sealed. Automatic sprinkler systems have been provided to protect the prefiltration in the Radwaste Building exhaust filter systems. In addition, automatic sprinkler protection has been provided over the combustible storage on the 467' elevation. Water from the fire suppression systems shall be drained into the floor drain system which is then pumped into the floor drain collection tank.

Fire protection is provided by fire detectors that alarm and annunciate in the Control Room, and by manual hose stations and portable hand held extinguishers.

NRC Position F15

Decontamination Areas

The decontamination areas should be protected by automatic sprinklers if flammable liquids are stored. Automatic fire detection should be provided to annunciate and alarm in the control room and alarm locally. The ventilation system should be capable of being isolated. Local hose stations and hand portable extinguishers should be provided as backup to the sprinkler system.

Response

Decontamination areas are located in the turbine generator building, on the 441-foot level, the Reactor Building on the 501-foot level, and the Radwaste Building on the 437, 467, and 487 foot levels.

Flammable liquids will not be stored or used in decontamination areas.

All decontamination areas are monitored by automatic fire detectors. The decontamination area on the 467' elevation has been provided with automatic sprinkler protection. Each area has a dry chemical portable extinguisher, a manual hose station, and a manual pull box available to it. Capability for isolation of the ventilation system is not considered necessary for fire control due to the lack of combustible loading in the area. The plant is considered essentially in compliance.

NRC Position F17

Cooling Towers

Cooling towers should be of non-combustible construction or so located that a fire will not adversely affect any safety-related systems or equipment. Cooling towers should be of non-combustible construction when the basins are used for the ultimate heat sink or for the fire protection water supply.

Cooling towers of combustible construction, so located that a fire in them could adversely affect safety-related systems or equipment should be protected with an open head deluge system installation with hydrants and hose houses strategically located.

Response

The cooling towers are constructed of non-combustible materials. The cooling towers are located remote from any safety-related buildings or equipment.

G. SPECIAL PROTECTION GUIDELINES

NRC Position G1

Welding and Cutting, Acetylene - Oxygen Fuel Gas Systems

This equipment is used in various areas throughout the plant. Storage locations should be chosen to premit fire protection by automatic sprinkler systems. Local hose stations and portable equipment should be provided as backup. The requirements of NFPA 51 and 51B are applicable hazards. A permit system should be required to utilize this equipment. (Also refer to 2G herein.)

Response

Bulk storage of welding gases is in a special structure well separated from plant structures. When not in use, welding equipment inside the plant is not stored in areas not containing safety systems and equipped with automatic sprinklers.

During normal plant operation ordinary welding and cutting is done in the designated welding area of the machine shop. This area is protected by hand portable extinguishers, a standpipe hose station, and an automatic sprinkler system. A permit is used for welding control in all areas except in the Machine Shop. Procedures call for protection or removal of combustibles, protection of equipment, and, fire watch during and after the welding operation.

NRC Position G2

Storage Areas for Dry Ion Exchange Resins

Dry ion exchange resins should not be stored near essential safety-related systems. Dry unused resins should be protected by automatic wet pipe sprinkler installations. Detection by smoke and heat detectors should alarm and 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. (Refer to NFPA 92M, "Waterproofing and Draining of Floors.")

Response

Bulk storage of dry ion exchange resins is located on 467 ft. elevation of the Radwaste Building. There are no safety-related systems or equipment located in this area. Automatic sprinklers are provided. Portable extinguishers and hose stations are available. Ionization fire detectors alarm and annunciate in the control room and give visual indication locally. Floor drains are provided for removal of fire fighting water.

NRC Position G4

Materials Containing Radioactivity

Materials that collect and contain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal tanks or containers that are located in areas free from ignition sources of combustibles. These materials should be protected from exposure to fires in adjacent areas as well. Consideration should be given to requirements for removal of isotopic decay heat from entrained radioactive materials.

Response

Spent resins are contained in metal vessels or containers. HEPA and charcoal filters are handled in accordance with 49CFR Section 171-178. Filters are disposed of on a routine basis such that no large accumulation exists. Interior storage after removal are in a controlled area where hose stations and fire extinguishers are readily available.

that additional detectors were added per the requirements of 72D.

g. Fire Protection of Safe Shutdown Capability

The WNP-2 plant complies with this section of Appendix R, see Section F.4.4.

h. Fire Brigade

The WNP-2 plant complies with these requirements. See answer to BTP 9.5-1 Positions Bl through B5 in F.3.

i. Fire Brigade Training

Same response as Item h. above.

j. Emergency Lighting

The WNP-2 plant complies with the 8-hour emergency lighting requirement.

k. Administrative Controls

Same response as Item h. above.

l. Alternative or Dedicated Shutdown Capability

WNP-2 complies with this section, see Section F.4.4.3.

m. Fire Barrier Cable Penetration Seal Qualification

The WNP-2 plant complies with this requirement.

n. Fire Doors

The WNP-2 plant complies with this requirement either by the installation of the required electronic indicating equipment or by the required daily inspections via administrative control.

o. Oil Collection System for Reactor Coolant Pump

The WNP-2 plant has a nitrogen inerted containment and therefore this requirement does not apply to WNP-2.

F.4.3 GENERAL REQUIREMENTS OF APPENDIX R

It is recognized that Appendix R only added three new requirements beyond that previously required by BTP 9.5-1. The three are: Modified physical protection and spatial separation criteria, 8-hour battery-backed emergency lighting, and non-inerted containment reactor coolant pump lubrication oil collection system. Each of these new items has been addressed in the previous section.

The general requirements of Section II of Appendix R are as follows:

a. Fire Protection Program

b. Fire Hazards Analysis

c. Fire Prevention Features

d. Alternative or Dedicated Shutdown Capability

Each of the above general requirements are addressed below:

a. Fire Protection Program

The WNP-2 plant complies with this requirement, see Section F.3.

b. Fire Hazards Analysis

The WNP-2 plant complies with this requirement, see Section F.2 and Section F.4.4.

c. Fire Prevention Features

1. The fire hazards analysis for each fire area identifies and considers all fire hazards for that area. In addition, the entire fire area is considered to be lost in any given fire unless justifying analysis to the contrary is provided.

2. Transient fires are considered as a possible design basis fire in all fire areas.

3. WNP-2 complies with this requirement.

4. Where the fire hazards analysis indicates cables or equipment needed to be protected, the cables and equipment will be either: relocated to another independent fire area where analysis for the other fire area (including the relocated cables and equipment) shows that protection is no longer required; wrapped, or protected with a 3-hour approved barrier; wrapped or protected with a 1-hour barrier, with detectors and sprinklers, physically inspected to verify 20-feet separation with no intervening combustibles or fire hazards, plus sprinkler and detection systems; provided with sub-fusing.

5. WNP-2 complies with this requirement.

6. WNP-2 complies with this requirement.

7. WNP-2 complies with this requirement.

d. Alternative or Dedicated Shutdown Capability

WNP-2 complies with this requirement. See response to F.4.2 Item 1, under Specific Requirements of Appendix R.

F.4.4 FIRE HAZARDS ANALYSIS CRITERIA

This section presents the engineering criteria used to provide the Fire Hazards Analysis for the WNP-2 nuclear power plant. The objective of the analysis was to assure that a fire will not adversely affect the ability to bring the plant to a safe shutdown condition or result in a significant release of radioactivity to the environment.

F.4.4.1 Design Basis

The analysis is based on the following stipulations in accordance with the 10 CFR 50 Appendix "R" requirements:

1. Fire must be considered in conjunction with a loss of off site power.

2. The following events are not considered in conjunction with fire:

    a. Operating Basis Earthquake (OBE)/Safe Shutdown Earthquake (SSE)

    b. LOCA

    c. Single Failure (for example a single failure is not considered when operation of the Remote Shutdown Transfer Switches is required per a DBF).

3. All plant equipment is functional (not in test or maintenance) at the time of fire.

4. The safe shutdown systems need not be designed to cope with other plant accidents such as pipe breaks or stuck valves: (Appendix A BTP 9.5-1) except those portions of the systems which interface with or impact existing safety systems.

5. Appendix R Section III.L requires that if an Alternate/Dedicated Safe Shutdown System scheme is utilized for any fire area the design shall meet the following:

    The postulated fire shall not compromise the integrity of the fission product boundary. This includes, but is not limited to, fuel clad damage or rupture of the containment

coolant boundary or rupture of the containment boundary. The reactor coolant system process variables shall be within those predicted for a loss of offsite power transient.

As stated in the WNP-2 SER the requirements of Section III.L apply only to the Remote Shutdown System which is provided to mitigate the consequences of a Main Control Room fire.

Since the loss-of-offsite power transient is the least severe of the Chapter 15 analyzed transients no other transients would be allowed. This is impractical to implement. Discussions with the NRC and interpretations of General Letter 85-01 allow consideration of a single transient bounded by the FSAR Chapter 15 transient analysis. The WNP-2 scheme of shutdown, using the Remote Shutdown System, does not result in any single unanalyzed transients. Therefore WNP-2 complies with Appendix R Section III.L.

All other Safe Shutdown System schemes meet the requirements of Appendix R Section III.G.

F.4.4.2 Design Assumptions

The fire hazards analysis is based upon the following assumptions that limit the postulated failure modes.

1. Three phase power feeders will not fail in such a manner as to reconnect to an adjacent three phase power feeder and cause an electrically isolated motor to operate.

2. Due to low fire loading or available sprinkler systems Seismic Class I supports and steel raceways will not fail in such a manner that safe shutdown systems are affected. Therefore cross circuiting of cables between raceways or loss of safe shutdown equipment from falling debris are not considered to be credible events.

3. Failure of non Seismic I supported electrical components of lighting, communication, fire protection and security systems have been evaluated on a separate task to ensure safety related components in Class I areas are not affected.

4. The only raceway supports which require protection (thermolag) are those that are load bearing supports for safe shutdown raceways located in the three (3) hour fire rated area R-I.

5. Stainless steel instrument sensing lines will not rupture when exposed to a design basis fire in a fire area that has less than a 1/2 hour fire loading.

6. A properly coordinated circuit protective device (fuse, breaker, etc.) will isolate any downstream fault that results from a design basis fire, even if the protective device is in the fire area. Therefore failure of electrical cables in proximity to the designated Appendix R safe shutdown system cables will not degrade shutdown capability.

7. For a design basis fire in a Division I fire area (or in any fire area not containing any Appendix R Safe Shutdown components) or a Dedicated fire area (multi-division) the operator will use the Appendix R Division 2 Safe Shutdown System (as described in Section 4.4.3.1). The automatic features of these systems such as the RHR-B logic circuitry or auto synchronizing of the diesel generator will not be used.

   a. A design basis fire in fire area RC-XIII will require Operator action within 48 hours to restore ventilation to the Battery Rooms to prevent hydrogen build up. In addition the Main Control Room doors should be opened and the operators don breathing apparatus in the event of over pressurization due to loss of Control Room exhaust fan WEA-FN-51 and loss of fresh air due to closure of fire damper WMA-FD-1.

   b. A design basis fire in dedicated fire area RC-IIA will cause the loss of E-SM-85 and E-SM-75 switchgears which will result in the loss of Plant Service Water pups TSW-P-1A & 1B and the loss of Plant Make-up Water pumps TMU-P-1A,1B & 1C. The Operator should trip breaker E-CB-8/85 if E-SM-8 switchgear is powered from diesel generator DG-2.

   c. A design basis fire in dedicated fire area TG-I will result in the same condition described in 7b and requires the same Operator responses.

   d. A design basis fire in fire area RC-III will cause the loss of both control room chillers, however the Division 2 Appendix R (control room HVAC and service water loop B) Safe Shutdown system is available in conjunction with the River Water Make-up Pump for additional cooling capacity to maintain control room habitability.

8. For a design basis fire in a Division 2 fire area (or in any fire area not containing any Appendix R Safe Shutdown components) the Operator will use the Appendix R Division 1 Safe Shutdown System (as described in Section F.4.4.3.2). The automatic features of these systems such as the RHR-A logic circuitry or auto synchronizing of the diesel generator will not be used.

9. For a design basis fire in the Main Control Room the Operator will use the Appendix R Remote Shutdown System (as described in F.4.4.3.3). Following a Main Control Room evacuation; before operation of the remote shutdown transfer switches, it is assumed that the results of spurious signal failures, for analysis purposes, are limited to loss of power supplies and blown fuses.

10. The Operator will react in accordance with the Emergency Response Procedures which allow the operator sufficient information to judge which equipment is available to safely shutdown. During a design basis fire annunciator signal indication and plant parameter indicators are generally not considered reliable, as such designated Appendix R safe shutdown system instrumentation is provided (see F.4.4.2.6, 7, 8).

11. Protective coating (Thermo-Lag) of steel raceway supports in a one hour fire rated area is not required if the steel is protected by an automatic sprinkler system.

F.4.4.3 Safe Shutdown Systems

For any postulated fire in the plant a single set of undamaged systems including power and control and instrumentation must be available to bring the plant to a cold shutdown condition. In order to remain undamaged by the fire, the systems must be either protected or located outside the fire area. For general fire areas, a minimum set of systems is protected from the effects of the fire. These systems are referred to as Appendix R Division 2 Safe Shutdown Systems (refer to letter G02-83-243, Supply System to NRC, dated March 21, 1983, and the attached report, "Fire Protection Safe Shutdown Analysis"). Alternate systems located outside the fire area may be available. The redundant safe shutdown

systems to the Appendix R Division 2 Safe Shutdown Systems that are required to achieve cold shutdown are referred to as Appendix R Division 1 Safe Shutdown Systems. Either of these sets of systems can be used to achieve cold shutdown, and are referred to as a whole as the Appendix R Safe Shutdown Systems.

It should be noted that the WNP-2 Appendix R Safe Shutdown Scheme does not depend on high pressure system (HPCS/RCIC) availability. Seven ADS valves and one LPCI loop provide the basis for the shutdown scheme meeting the requirements of Appendix R Section III.G for all areas except the Main Control Room.

In the case of the Main Control Room fire, however, the Remote Shutdown System is described in the SER as meeting the requirements of Section III.L. During this event the reactor core is uncovered for a short period of time but clad temperatures remain at 1500°F or less. With the inclusion of the Alternate Remote Shutdown System in the WNP-2 design the number of ADS valves available will be increased to six. Six valves will provide less core uncovery and resulting lower fuel clad temperatures.

F.4.4.3.1 Appendix R Division 2 Safe Shutdown Systems

The Appendix R Division 2 Safe Shutdown Equipment is made up of components of the following systems. These components as a whole make up the Division 2 Appendix R Safe Shutdown system/path.

RHR B (Alternate Shutdown Cooling Mode Division 2)
SW B (Division 2)
ADS/MSRV* (Division 2
Supporting HVAC Systems (Division 2)
Reactor Vessel Instrumentation (Division 2)
Main Steam Isolation Valves (Division 2)
Supporting Electrical Power, DG and Battery (Division 2)

* (Any three Main Steam relief valves are adequate for RPV depressurization. Studies (NEDO-24708A) indicated that only aproximately 50% of the design ADS capacity is required to depressurize the RPV without peak fuel clad temperatures exceeding safety limits, refer to letter GO-83-243).

systems to the Appendix R Division 2 Safe Shutdown Systems that are required to achieve cold shutdown are referred to as Appendix R Division 1 Safe Shutdown Systems. Either of these sets of systems can be used to achieve cold shutdown, and are referred to as a whole as the Appendix R Safe Shutdown Systems.

It should be noted that the WNP-2 Appendix R Safe Shutdown Scheme does not depend on high pressure system (HPCS/RCIC) availability. Seven ADS valves and one LPCI loop provide the basis for the shutdown scheme meeting the requirements of Appendix R Section III.G for all areas except the Main Control Room.

In the case of the Main Control Room fire, however, the Remote Shutdown System is described in the SER as meeting the requirements of Section III.L. During this event the reactor core is uncovered for a short period of time but clad temperatures remain at 1500°F or less. With the inclusion of the Alternate Remote Shutdown System in the WNP-2 design the number of ADS valves available will be increased to six. Six valves will provide less core uncovery and resulting lower fuel clad temperatures.

F.4.4.3.1 Appendix R Division 2 Safe Shutdown Systems

The Appendix R Division 2 Safe Shutdown Equipment is made up of components of the following systems. These components as a whole make up the Division 2 Appendix R Safe Shutdown system/path.

RHR B (Alternate Shutdown Cooling Mode Division 2)
SW B (Division 2)
ADS/MSRV* (Division 2
Supporting HVAC Systems (Division 2)
Reactor Vessel Instrumentation (Division 2)
Main Steam Isolation Valves (Division 2)
Supporting Electrical Power, DG and Battery (Division 2)

* (Any three Main Steam relief valves are adequate for RPV depressurization. Studies (NEDO-24708A) indicated that only aproximately 50% of the design ADS capacity is required to depressurize the RPV without peak fuel clad temperatures exceeding safety limits, refer to letter GO-83-243).

Refer to the flow diagram on figures 76 through 93 and the component listing on Tables F.4.1, 2 and 3 for specific Appendix R Division 2 Shutdown Components and their alternative safe shutdown counterparts.

F.4.4.3.2 Appendix R Division 1 Safe Shutdown Systems

The Division 1 shutdown systems utilize equipment (and cabling) not in the Division 2 fire area or zone where the fire is postulated. There are many possible combinations that would be sufficient. However, for the purposes of this evaluation only one set of equipment is defined. The following systems make up the Division 1 Shutdown Flow Path.

These components as a whole make up the Division 1 Appendix R safe shutdown system/path.

RHR A (Alternate Shutdown Cooling Mode, Division 1)
SW A (Division 1)
ADS/MSRV (Division 1)
Supporting HVAC Systems (Division 1)
Reactor Vessel Instrumentation (Division 1)
Main Steam Isolation Valves (Division 1)
Supporting Electrical Power Including DG and Battery (Division 1)

Refer to the flow diagrams on figures 76 thru 93 and the component listing on Tables F.4.1, 2 and 3 for specific Appendix R Division 1 Shutdown components and their alternative safe shutdown counterparts.

F.4.4.3.3 Remote Shutdown Equipment

The equipment required to provide cold shutdown capability, in the event of a Main Control Room fire, consists of an isolated portion of the Appendix R Division 2 Safe Shutdown equipment; three division I SRV's along with auxiliary components (including instrumetation) which are located in the Remote Shutdown Panels E-CP-FRTP, E-CP-H22/P100 and E-CP-C61/P001. This is the preferred shutdown path for the single event of a Main Control Room fire. Consequently components in this system that are outside the Main Control Room fire area do not require additional protection once they are isolated from the main control room. In the event of a Main Control Room evacuation the Operator is required to perform the actions identified in procedure PPM #4.12.1.1 which includes the following:

a. Scram the Reactor
b. Close Main Steam Isolation Valves
c. Trip the Main Generator
d. Trip RRC pumps to LFMG
e. Operate transfer switches (H22-P100, C61-P001, FRTS, SM-8 and DG-2 Control Panel)

Safe shutdown components in the Main Control Room that are isolated by operator action of the remote shutdown transfer switches, are not considered part of the (remote) safe shutdown path and do not require analysis. The Main Steam Isolation valves and the Reactor Protection System are fail safe systems which are routed in grounded raceways to ensure that loss of power resulting from a fire will fail these circuits to a safe condition. In the event that Reactor Scram and Isolation cannot be performed prior to Control

Room evacuation, the RPS MG set output breakers will be opened to perform these functions after control of the three available SRV's is established. The components of the systems listed below as a whole make up the Appendix R Remote Shutdown System and are isolated from the main control room influences and called simply the "Remote Shutdown System/Path".

RHRB (Division 2)
SWB (Division 2)
Main Steam Safety Relief Valves (Division 1)
Supporting Ventilation (Division 2)
Reactor Vessel Instrumentation (Non-1E)
Supporting Power Train Including DG-2 and Division 1 and Division 2 Batt
(See Table F.4.2. for additional explanation.)

Refer to the flow diagrams on Figures 76 through 93 and the component listing on Tables F.4.1, 2 and 3 for specific Remote Shutdown components and their alternative safe shutdown counterparts.

F.4.4.3.4 Safe Shutdown Equipment

The components relating to maintaining the high/low pressure primary reactor coolant boundary have been integrated into the safe shutdown systems (including the Remote Shutdown System) as follows: The inboard valves (RHR-V-9, RHR-V-123A, RHR-V-123B components and supporting power train) are included in the Appendix R Division 1 Safe Shutdown System. In the RHR system there are five pairs of electrically operated valves that define the high/low pressure interface as follows:

a. RHR-V-8, RHR-V-9
b. RHR-V-52A, RHR-V-87A - Locked Closed
c. RHR-V-52B, RHR-V-87B - Locked Closed
d. RHR-V-53A, RHR-V-123A
e. RHR-V-53B, RHR-V-123B

F.4.4.4 Methodology by Fire Area

The analysis method utilized divides the plant into distinct fire areas such that a continuous fire rated boundary can be defined for each. Fire ratings are assigned to each fire barrier according to construction, and shall not be less than a 1-1/2 or 3 hour rating. The penetration seals and doors must have a fire rating equivalent to the barrier. There are special areas that were analyzed in which spatial separation and lack of combustibles were used to define fire zones with in a fire area.

The presence of safe shutdown equipment and cabling in each fire area is then determined. If the fire area is not large enough to permit acceptable spatial separation of redundant systems, equipment and components required for safe shutdown, it is assumed that design basis fire for that area will destroy everything in the area. However, potential failure modes are limited in some areas by general plant design features. Based on the loss of equipment or cabling in the fire area, it is then determined if the plant can be safely shutdown. If the plant can be safely shutdown, then no fix is required. If the plant cannot be safely shutdown, the essential equipment or cabling must be protected or relocated to another fire area.

Two (2) methods of analysis are available; a Redundant Fire Area analysis method and a Dedicated Fire Area analysis method. There are three (3) unique fire areas that contain safe shutdown components which are not subject to either analysis methodology. They are the reactor containment (Fire Area R-II, which has an inerted atmosphere), the Main Control Room (Fire Area RC-X, which utilizes the Remote Shutdown System for mitigation), and the twenty foot (20') area in the Cable Spreading Room where Thermolag has been provided covering area cables to eliminate intervening combustibles (Fire Area RC-IIC): Each of these areas have unique analyses applied. Fire areas that do not contain safe shutdown components or spurious signal cables do not require analysis.

F.4.4.4.1 Redundant Analysis Methodology

The Redundant Method takes advantage of the separation of redundant equipment into different fire areas that are an inherent part of plant layout and design.

The area is assigned to one of the two major safety-related Divisions (Division 1 or 2). The area is then reviewed to determine what cabling and equipment located therein is not compatible with (intrudes upon) the Division to which the room has been assigned. Intruding cabling and equipment is then analyzed to verify that the effects of fire do not defeat the capability of the safety systems of the intruding divisions to achieve safe shutdown. If the plant can be safely shutdown, then no fix is required. If the plant cannot be safely shutdown, the intruding cabling and equipment must be protected or relocated to another fire area, or analyzed to ensure that alternate capability can complete the safe shutdown path.

F.4.4.4.2 Dedicated Analysis Methodology

In large areas where extensive amounts of equipment from all divisions are present, the Dedicated Shutdown method is used. All components of the Appendix R Division 2 Safe Shutdown Systems within the Dedicated Fire Area are protected.

Fire protection for Appendix R Division 2 Safe Shutdown System cables shall be provided as required, for either one (1) or three (3) hour fire protection ratings. One (1) hour fire protection rating is secured by applying approximately 1/2" thickness of fire protection Thermo-Lag (T.L.). Three (3) hour fire protection rating is secured by applying 2 layers of 1/2" thickness of T.L. Both thicknesses are applied as recommended by the vendor (TSI) based on fire tests to ANI guidelines. Test data and loading information on the protective coating was provided by the Vendor (TSI) to update the raceway structural support calculations which also indicated that additional cable de-rating was not required.

F.4.4.4.3 Spurious Signal Cables

Spurious signal cables are those cables, which are located in a design basis fire area, whose circuit integrity has been compromised by "hot shorts" or "open circuits" or "shorts to ground" and could cause an Appendix "R" safe shutdown circuit to malfunction (See Table 4.4). In order to differentiate the types of spurious signals these cables have been prefixed by the Appendix R Safe Shutdown System that they affect. For example: "Appendix R Division 2 Safe Shutdown System spurious signal cables", "Appendix R Division 1 Safe Shutdown System spurious signal cables" or "Remote Shutdown spurious signal cables". The spurious signal cables have been categorized to facilitate review as follows:

1. Spurious signal cables to Appendix R system component circuits
2. Spurious signal cables to the Appendix R power distribution circuits
3. Spurious signal cables to the Diesel Generator and auxiliary systems within the confines of the DG building.
4. Miscellaneous spurious signal cables to the Appendix R System.

F.4.4.4.3.1 Appendix R Division 2 Safe Shutdown System Spurious Signal Cables

Appendix R Division 2 Safe Shutdown System spurious signal cables affect the Appendix R Division 2 Safe Shutdown System and are based upon the following assumptions (see Table 4.4):

1. The cause of the spurious signal is a design basis fire in a dedicated fire area (fire areas R-I, RC-IIA, RC-III, RC-V or TG-I) or any Division 1 fire area.

2. All Appendix R Division 2 Safe Shutdown System components located in Division 2 fire areas will perform their designed function.

3. For a fire in a Division 2 fire area the "Appendix R Division 1 Safe Shutdown System" Appendix R Safe Shutdown System will be used.

4. Spurious signals are isolated by manually operated transfer switches if available.

5. Spurious signals are isolated by normally open circuit devices that are located in a Division 2 fire area and are not adversely affected by the design basis fire.

6. Spurious signal cables that are routed in Dedicated fire areas TG-I, R-I and RC-III or in Division 1 fire areas that are thermolagged to the same requirements as "Appendix R Division 2 Safe Shutdown System cables" are considered protected (otherwise an analysis is required).

F.4.4.4.3.2 Appendix R Division 1 Safe Shutdown System Spurious Signal Cables

Redundant spurious signal cables affect the Appendix R Division 1 Safe Shutdown System and are based upon the following assumptions (See Table 4.4):

1. The cause of the spurious signal is a design basis fire in any Division 2 fire area.

2. All Appendix R Division 1 Safe Shutdown System components located in a Division 1 or unique fire area will perform their designed function.

3. For a fire in a Division 1 fire area the "Appendix R Division 2 Safe Shutdown System" Appendix R Safe Shutdown System will be used.

4. Spurious signals are isolated by manually operated transfer switches if available.

5. Spurious signals are isolated by normally open circuit devices that are both located in a Division 1 fire area and are not adversely affected by the design basis fire.

6. Spurious signal cables that are routed in Division 2 fire areas are thermolagged to the same requirements as "Appendix R Division 1 Safe Shutdown System" are considered protected.

7. "Appendix R Division 1 Safe Shutdown System" cables that contain potentially spurious signals to other Division 1 circuits do not require analysis (but should be listed as a spurious signal cable as well).

F.4.4.4.3.3 Remote Shutdown Spurious Signal Cables

Remote Shutdown spurious signal cables affect the Remote Shutdown Appendix R Safe Shutdown System and are based upon the following assumptions (see Table 4.4):

1. The cause of the spurious signal is a design basis fire in the Main Control Room fire area (RC-X).

2. All "Appendix R" Remote Shutdown components located fire area other than the Main Control Room will perform their designed function and do not require additional protection.

3. Spurious signals are isolated by manually operated transfer switches.

4. Spurious signals are isolated by normally open circuit devices that are located outside the Main Control Room fire area and are not adversely affected by the design basis fire.

F.4.4.5 Results of Criteria Implementation

To ensure that the capability exists to safely shutdown the plant in the event of fire the following was implemented in accordance with the "Appendix R analysis".

1. Thermo-lagging of Appendix R Division 2 Raceways in Fire Areas TG-I, R-I, R-V, RC-III, and Fire Zone RCIIA.

   In R-I the thermo-lag barrier is rated (3) three hours and includes all raceway supports. In TG-I and RC-III, due to existence of automatic fire suppression and detection, the barrier is rated (1) one hour. Two (2) instrument racks E-CP-H22/P021 and E-CP-H22/P027 are protected by virtue of fire shield walls built around them. The protected equipment, raceway, and cabling are depicted on contract drawings E948. The field work is implemented in accordance with WNP-2 specification, Section 15 S.

2. In Cable Spreading Room (fire area RC IIA, B, C) protection to the Appendix R Division 2 Safe Shutdown train (system) was provided by creating 20 feet of space of no intervening combustibles between the redundant trains (RC-IIC). The intervening combustibles (cables) are thermo-lagged with a 1 hour coating to provide clear space as per the requirements of Appendix "R". In addition fire detectors and automatic suppression systems are provided. Analysis for Fire Area RC-IIC consists only of identification of safe shutdown circuits routed in unthermo-lagged conduits in this area.

3. Electrical Isolation of circuits is done by providing properly co-ordinated fuses.

4. Relocation of circuits from the fire area and the addition of a new distribution panel (DPS1-1F) has been implemented.

5. Transfer Swtiches have been provided in the Remote Shutdown Room and in the switchgear rooms (which are adjacent rooms) for Appendix R Safe Shutdown equipment to eliminate effects of a Main Control Room fire. This ensures operability of the Appendix R shutdown systems.

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

RHR SYSTEM

Note # (Typ)

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2)●	COMPONENT	FIRE AREA (2)○	COMPONENT	FIRE AREA
(3)	RHR-P-2B [EO]	R-IV	RHR-P-2A [EO]	R-V	RHR-P-2B [EO]	R-IV
CABLE	2SM8-50, 51, 55, 56, 57 2D12D-4, 8313-E12A-012 8001-E12A-003	RC-IIB, IIC, III, VII, VIII, IX, X, XIX, TG-I (2) R-IV	1SM7-60, 61 8201-E12A-002 1D11F-4	RC-IIA, III, X, XIV, R-I, V	2SM8-50, 51, 55 2D12D-5	IIB, IIC, III, VII, VIII, IX, XIX TG-I R-IV
EQUIP	SM-8/RHR-2B(10), C61-P001 H13-P601, P618, P680, P683		DP-S1-1F H13-P601, P682		SM-8/RHR-2B(10) C61-P001	
		EWD 9E003		EWD 9E001		EWD 9E003
(7)	RHR-V-3B [VO/VO] (2)	R-IV	RHR-V-3A [VO/VO]	R-V	RHR-V-3B [VO/VO]	R-IV
CABLE	(2M8BB-140) (2M8BB-141) 2M8BB-142, 143 8001-E12A-004	R-I, IV, XIX, RC-IIB, IIC, III, IX, X	1M7BB-110, 111, 112 8201-E12A-003	R-I, V RC-IIA, III, X	2M8BB-140, 141, 142 2P8AF-1	R-I, IV, XIX IIB, IIC, III, IX
EQUIP	MC-8B-B/5B, C61-P001 H13-P601, P680		MC-7B-B/5B H13-P601, P682		MC-8B-B/5B, C61-P001 PP-8A-F	
		EWD 9E017		EWD 9E016		EWD 9E017
	RHR-V-4B [VO/VO]	R-IV	RHR-V-4A [VO/VO]	R-V	RHR-V-4B [VO/VO]	R-IV
CABLE	(2M8BA-20) (2M8BA-22) 2M8BA-23, 24 8001-E12A-006	R-I, IV, XVIII RC-IIB, IIC, III, IX, X	1M7BA-50, 52, 53 8201-E12A-004	R-I, V RC-IIA, III, X	2M8BA-20, 22, 23 2P8AF-1	R-I, IV, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/2C, C61-P001 H13-P601, P680		MC-7B-A/3B H13-P601, P682		MC-8BA/2C, C61-P001, PP-8A-F	
		EWD 9E019		EWD 9E018		EWD 9E019
	RHR-V-6B [VC/VC]	R-IV	RHR-V-6A [VC/VC]	R-V	RHR-V-6B [VC/VC]	R-IV
CABLE	(2M8BA-10) (2M8BA-12) 2M8BA-13, 14, 15, 16, 17, 18 8001-E12A-005	R-I, IV, XVII, XVIII RC-IIB, IIC, III, IX, X	1M7BA-40, 41, 42, 43, 44, 45, 46, 47, 753 8201-E12A-004	R-I, V RC-IIA, III, IX, X, XIV (20)*	2M8BA-10, 12, 13 2P8AF-1	R-I, IV, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/2B, H13-P601, P680 RHR-V-4B/LS6, RHR-V-24B/LS6, RHR-V-27B/LS6, C61-P001		MC-7B-A/3A, C61-P001, FRTP-1 RHR-V-4A/LS6, RHR-V-24A/LS6 RHR-V-27A/LS6, H13-P601, P682		MC-8B-A/2B, C61-P001 PP-8A-F	
		EWD 9E022		EWD 9E021		EWD 9E022

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
	RHR-V-24B [VC/VC]	R-XVII	RHR-V-24A [VC/VC]	R-I	RHR-V-24B [VC/VC]	R-XVII
CABLE	(2M8BA-90) (2M8BA-92) 2M8BA-93, 94 8318-E12A-011, 1801-E12A-010	R-I, XVII, XVIII RC-IIB, IIC, III, IX, X	1M7BA-110, 112, 113 8429-E12A-008 2901-E12A-007	R-I RC-IIA, III, X	2M8BA-90, 92, 93 2P8AF-1	R-I, XVII, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/4B, C61-P001, H13-P601, P618, P683	EWD 9E034	MC-7B-A/4D H13-P601, P629, P684	EWD 9E033	MC-8B-A/4B, C61-P001 PP-8A-F	EWD 9E034

	RHR-V-27B [VC/VC]	R-XVII	RHR-V-27A [VC/VC]	R-I	RHR-V-27B [VC/VC]	R-XVII
CABLE	(2M8BA-150) (2M8BA-152) 2M8BA-153, 154 8318-E12A-010, 1801-E12A-009	R-I, XVII, XVIII RC-IIB, IIC, III, IX, X	1M7BA-160, 162, 163 8429-E12A-007 2901-E12A-006	R-I RC-IIA, III, X	2M8BA-150, 152, 153 2P8AF-1	R-I, XVII, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/5D, C61-P001, H13-P601, P618, P683	EWD 9E038	MC-7B-A/5C H13-P601, P629, P684	EWD 9E037	MC-8B-A/5D, C61-P001 PP-8A-F	EWD 9E038

(6)	RHR-V-42B [VC/VO]	R-XXI	RHR-V-42A [VC/VO]	R-I	RHR-V-42B [VC/VO]	R-XXI
CABLE	2M8BA-100, 102, 103, 104 8318-E12A-007 1801-E12A-006	R-I, XVIII, XXI RC-IIB, IIC, III, IX, X	1M7BA-120, 122, 123 8429-E12A-004 2901-E12A-003	R-I RC-IIA, III, X	2M8BA-100, 102, 103 2P8AF-1	R-I, XVIII, XXI IIB, IIC, III, IX
EQUIP	MC-8B-A/4C, C61-P001, H13-P601, P618, P683	EWD 9E044	MC-7B-A/5A H13-P601, P629, P684	EWD 9E043	MC-8B-A/4C, C61-P001 PP-8A-F	EWD 9E044

	RHR-V-47B [VO/VO]	R-IV	RHR-V-47A [VO/VO]	R-V	RHR-V-47B [VO/VO]	R-IV
CABLE	(2M8BB-120) (2M8BB-121) 2M8BB-122, 123 8001-E12A-005	R-I, IV, XIX RC-IIB, IIC, III, IX, X	1M7BB-90, 91, 92 8201-E12A-003	R-I, V RC-IIA, III, X	2M8BB-120, 121, 122 2P8AF-1	R-I, IV, XIX IIB, IIC, III, IX
EQUIP	MC-8B-B/4D, C61-P001 H13-P601, P680	EWD 9E047	MC-7B-B/4D H13-P682, P601	EWD 9E046	MC-8B-A/4C, C61-P001 PP-8A-F	EWD 9E047

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ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX						
	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
	RHR-V-48B [VO/VC]	R-IV	RHR-V-48A [VO/VC]	R-V	RHR-V-48B [VO/VC]	R-IV
CABLE	2M8BB-130, 131, 132, 133 8318-E12A-008 1801-E12A-007	R-I, IV, XIX RC-IIB, IIC, III, IX, X	1M7BB-100, 101, 102 8429-E12A-005 2901-E12A-004	R-I, V RC-IIA, III, X	2M8BB-130, 131, 132 2P8AF-1	R-I, IV, XIX IIB, IIC, III, IX
EQUIP	MC-8B-B/5A, C61-P001 H13-P601, P618, P683		MC-7B-B/5A H13-P601, P629, P684		MC-8B-B/5A, C61-P001 PP-8A-F	
		EWD 9E049		EWD 9E048		EWD 9E049
	RHR-FCV-64B [VO/VO]	R-IV	RHR-FCV-64A [VO/VO]	R-V	RHR-FCV-64B [VO/VO]	R-IV
CABLE	(2M8BA-390) (2M8BA-391) 2M8BA-392, 318, 319 8318-E12A-015, 1801-E12A-015	R-I, IV, XVIII RC-IIB, IIC, III, IX, X	1M7BA-180, 182, 183 8429-E12A-012 2901-E12A-010	R-I, V RC-IIA, III, X	2M8BA-319, 390, 391 2P8AF-1	R-I, IV, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/3D, C61-P001 H13-P601, P618, P683		MC-7B-A/7B H13-P601, P629, P684		MC-8B-A/3D, C61-P001	
		EWD 9E057		EWD 9E056		EWD 9E057
(4)	RHR-V-16B [VC/VC]	R-I	RHR-V-16A [VC/VC]	R-I	RHR-V-16B [VC/VC]	R-I
CABLE	(2M8BA-140)(2M8BA-142) (2M8BA-145) 2M8BA-143, 144 8318-E12A-005,008 1801-E12A-007	R-I, XVIII RC-IIB, IIC, III, IX, X	1M7BB-221, 230, 232, 233 8429-E12A-004, 005 2901-E12A-004	R-I RC-IIA, III, X	2M8BA-140, 142, 143	R-I, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/5C, C61-P001 RHR-V-17B/LS13 H13-P601, P618, P683		MC-7B-B/7C H13-P601, P629, P684 RHR-V-17A/LS13		MC-8B-A/5C, C61-P001	
		EWD 9E028		EWD 9E027		EWD 9E028
(5)	RHR-V-49 [VC/VC]	R-IV	N/A		RHR-V-49 [VC/VC]	R-IV
CABLE	(2M8BB-230) (2M8BB-231) (2M8BB-234) 2M8BB-232, 233 8322-B22H-005, 2201-B22H-003	R-I, IV, XIX RC-IIB, IIC, III, IX, X			2M8BB-230, 231, 232, 234	R-I, IV, XIX IIB, IIC, III, IX
EQUIP	MC-8B-B/7A, C61-P001 H13-P601, P622, P683				MC-8B-B/7A, C61-P001	
		EWD 9E078				EWD 9E078

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) o	COMPONENT	FIRE AREA
	RHR-V-68B [VC/VO]	R-IV	RHR-V-68A [VC/VO]	R-V	RHR-V-68B [VC/VO]	R-IV
CABLE	2M8BB-220, 221, 222, 223, 224, 225, 226 8001-E12A-004	$\boxed{\text{R-I}}$, IV, XIX RC-IIB, $\boxed{\text{IIC}}$ $\boxed{\text{III}}$, VIII, IX, X	1M7BB-210, 211, 212 8201-E12A-002	R-I, V RC-IIA, III, X	2M8BB-220, 221, 222, 225 2P8AF-2	R-I, IV, XIX IIB, $\boxed{\text{IIC}}$ III, IX
EQUIP	MC-8B-B/6D, C61-P001 H22-P100, SM-8/SW1B (4), H13-P601, P680	EWD | 58E047	MC-7B-B/7A H13-P601, P682	EWD | 58E046	MC-8B-B/6D, C61-P001 H22-P100, PP-8A-F	EWD | 58E047
CABLE						
EQUIP						

SW System

(8)	SW-P-1B [EO]	SW-II	SW-P-1A [EO]	SW-I	SW-P-1B [EO]	SW-II
CABLE	2SM8-80, 81, 85, 86, 87, 89, 93, 256, 55, 57 2D12D-4, CM-A2-4-4	SW-II, $\boxed{\text{TG-I}}$, DG-III $\boxed{\text{R-I}}$ IV, $\boxed{\text{V}}$ VI RC-IIB, $\boxed{\text{IIC}}$, $\boxed{\text{III}}$, VII, VIII, IX, X, XIX	1SM7-80, 81, 85, 88 1M7A-52, 53 CM-A2-1-10, 1D11F-4	SW-I, TG-I, DG-II RC-IIA, $\boxed{\text{IIC}}$, III, IV, X, XIV, XX	2SM8-80, 81, 85, 86, 89, 93, 256 2D12D-12	SW-II, TG-I, DG-III R-I, IV IIB, $\boxed{\text{IIC}}$ III, VII, VIII, IX, XIX
EQUIP	TB-R435, SM-8/SW1B (4) H22-P100, SUPV. PNL. CS2, DG2-8 (1), H13-P805, P820	EWD | 58E003	MC-7A, SM-7/SW1A (7) DG-7/AUX (1), SUPV PNL. CS1 H13-P805, P840	EWD | 58E001	TB-R435, SM-8/SW1B (4), H22-P100, SUPV. PNL. CS2 DG2-8 (1)	EWD | 58E003

	SW-V-2B [VC/VO]	SW-II	SW-V-2A [VC/VO]	SW-I	SW-V-2B [VC/VO]	SW-II
CABLE	2M8A-40, 41, 42, 43, 44, 45, 46, 47, 48 CM-A2-4-4	SW-II, $\boxed{\text{TG-I}}$, RC-IIB, $\boxed{\text{IIC}}$, $\boxed{\text{III}}$, VII, VIII, IX, X IIA	1M7A, 50, 51, 52, 53, 55, 56, 185 1MISC-112, 1IR21-20 CM-A2-1-10	SW-I, TG-I, DG-II RC-IIA, $\boxed{\text{IIC}}$, III, IV, X, XIV	2M8A-40, 41, 42, 46, 47, 48 2P8AF-2	SW-II, TG-I, RC-IIA, IIB, $\boxed{\text{IIC}}$, III, VII, IX
EQUIP	TB-SW1508, IR-22, MC-8A/3C, SM-8/SW1B (4) H22-P100, SUPV. PNL. CS2, H13-P805, P820	EWD | 58E015	TB-SW1507, IR-21, MC-7A/2D, SM-7/SW1A (7) TB-W163, SUPV. PNL. CS1, H13-P805, P840	EWD | 58E012	TB-SW1508, IR-22, MC-8A/3C, PP-8A-F, H22-P100, SUPV. PNL. CS2	EWD | 58E015

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ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM COMPONENT	FIRE AREA (2) ●	(1) APPENDIX R DIV. 1 SYSTEM COMPONENT	FIRE AREA (2) ○	(1) REMOTE SHUTDOWN COMPONENT	FIRE AREA
	SW-V-4B [VC/VO]	DG-III	SW-V-4A [VC/VO]	SW-I	SW-V-4B [VC/VO]	DG-III
CABLE	2M8AA-160, 161, 162, 163, 164, 165 CM-K2-3-14	DG-III, TG-I RC-IIB, IIC, III, IX, X	1M7AA-160, 161, 162, 163 CM-K1-3-13	SW-I-TG-I DG-II RC-IIA, III, X	2M8AA-160, 161, 163, 164, 165 2P8AF-9	DG-III, TG-1 IIB, IIC, III, IX
EQUIP	MC-8A-A/5D, DG-EP2, FRTP, H13-P825, P891		MC-7A-A/4D, DG-EP1, H13-P825, P892		MC-8A-A/5D, DG-EP2 FRTP	
		EWD 58E017		EWD 58E016		EWD 58E017
	SW-TCV-11B [VC-VO/VO]	RC-XII	SW-TCV-11A [VC-VO/VO]	RC-XI	N/A	
CABLE	2COV2-20, 21, 22 2CHB-8, 2P8AF-4	RC-XII, IIB, XIII, IIC, III	1COV1-20, 22 1COV5-3 1P7AA-170	RC-IIA, III, X, XI		
EQUIP	COHV-2, MC-8F/4A, SW-TCV-11B, SW-PS-11B, CCH-CR-1B		COHV-1, COHV-5A, SW-PS-11A, PP-7A-A			
		EWD 84E018		EWD 84E017		EWD 84E018
	SW-V-12B [VO/VO]	SW-II	SW-V-12A [VO/VO]	SW-I	SW-V-12B [VO/VO]	SW-II
CABLE	2M8A-50, 51, 52, 53, 54, 56, 57 CM-A2-4-5	SW-II, TG-1 RC-IIB, IIC III, VII, XI, X	1M7A-30, 31, 32, 34, 37 1MISC-112 CM-A2-1-11	SW-I, TG-I, DG-II RC-IIA, IIC, III, IV, X	2M8A-50, 51, 52, 56, 57 2P8AF-2	SW-II, TG-I RC-IIA, IIB, IIC, III, VII, IX
EQUIP	TG-SW1508, MC-8A/2D, SUPV. PNL. C52, H22-P100 H13-P805, P820		MC-7A/1D, TB-SW1507 SUPV. PNL. CS1 H13-P805, P840		TB-SW1508, MC-8A/2D, SUPV. PNL. CS2, H22-P100 PP-8A-F	
		EWD 58E021		EWD 58E020		EWD 58E021
	SW-V-24B [VC/VO]	R-IV	SW-V-24A [VC/VO]	R-V	SW-V-24B [VC/VO]	R-IV
CABLE	2M8BA-280, 281, 282, 283, 284 CM-K2-3-13	R-I, IV, XVIII RC-IIB, IIC, III, VIII, IX, X IIA	1M7B-120, 121, 122, 123 CM-K1-3,11	R-I, V RC-IIA, III, X, XIV	2M8BA-280, 281, 282 2P8AF-2	R-I, IV, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A/9A H22-P100, SM8/RHR-2B (10) H13-P825, P891		MC-7B/3A, SM7/RHR2A (2) H13-P825, P892		MC-8B-A/9A, H22-P100 PP-8A-F	
		EWD 58E024		EWD 58E023		EWD 58E024

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	ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX					
	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2)●	COMPONENT	FIRE AREA (2)o	COMPONENT	FIRE AREA
	SW-PCV-38B [VC/VO]	SW-II	SW-PCV-38A [VC/VO]	SW-I	SW-PCV-38B [VC/VO]	SW-II
CABLE	2SM8-86, 256 BIR22-9060, 9061, 9062, 9063, 9064 CM-A2-4-7,2P8AG-1, 2P8AF-10	SW-II, $\boxed{\text{TG-I}}$, RC-IIB, $\boxed{\text{IIC}}$ $\boxed{\text{III}}$, VIII, IX, X	1SM7-81, 85 AIR21-9060, 9061, 9062, 9063 CM-A2-1-8, 1P7AG-2	SW-I, TG-I, DG-II RC-IIA, $\boxed{\text{IIC}}$ III, X, XIV	2SM8-86, 256 BIR22-9060, 9061, 9063, 9064 2P8AG-1, 2P8AF-10	SW-II, TG-I, IIB, $\boxed{\text{IIC}}$, III, VIII, IX
EQUIP	TB-SW1508, H22-P100 SM8/SW1B (4), SUPV. PNL. CS2, H13-P805, P820, IR-22	EWD | 58E031	TB-SW1507, IR-21 SM7/SW1A (7), SUPV. PNL. CS1, H13-P805, P840, PP-7A-G	EWD | 58E029	TB-SW1508, H22-P100, SM8/SW1B (4), SUPV. PNL. CS2 PP-8A-G, PP-8A-F, IR-22	EWD | 58E031
	DSA-SPV-40B1 [VC-VO/VO]	DG-III	DSA-SPV-40A1 [VC-VO/VO]	DG-II	DSA-SPV-40B1 [VC-VO/VO]	DG-III
CABLE	2DG2-19	DG-III	1DG1-19	DG-II	2DG2-19	DG-III
EQUIP	DG-1B (DG-2) T.B. ON ENG. 2 DG-EP2	EWD | 47E50 ELEM | E543-2VB-2	D.G.1A (DG-1) T.B. ON ENG. 1 DG-EP1	EWD | 47E42 ELEM | E543-2VB-2	D.G. 1B (DG-2) T.B. ON ENG. 2 DG-EP2	EWD | 47E50 ELEM | E543-2BV-2
	DSA-SPV-40B2 [VC-VO/VO]	DG-III	DSA-SPV-40A2 [VC-VO/VO]	DG-II	DSA-SPV-40A2 [VC-VO/VO]	DG-III
CABLE	2DG2-22 2D12E-2	DG-III	1DG1-22 1D11E-2	DG-II	2DG2-22 2D12E-6	DG-III
EQUIP	D.G. 1B (DG-2) TB ON ENG 2 DG-EP2	EWD | 47E50 ELEM | E543-2VB-2	D.G. 1A (DG-1) TB ON ENG. 1 DG-EP1	EWD | 47E42 ELEM | E543-2VB-2	D.G. 1B (DG-2) TB ON ENG 2 DG-EP2	EWD | 47E50 ELEM | E543-2VB-2
CABLE						
EQUIP						

HVAC SYSTEMS

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
	DEA-FN-21 [EO]	DG-III	DEA-FN-11 [EO]	DG-II	DEA-FN-21 [EO]	DG-III
CABLE	2M8AA-30, 31, 32	DG-III	1M7AA-30, 31, 32	DG-II	2M8AA-30, 31, 32	DG-III
EQUIP	MC-8A-A/1D, DGHV-2 DEA-dPS-21		MC-7A-A/1D DGHV-1 DEA-dPS-11		MC-8A-A/1D, DGHV-2 DEA-dPS-21	
		EWD 88E004		EWD 88E003		EWD 88E004
	DEA-FN-22 [EO]	DG-III	DEA-FN-12 [EO]	DG-II	DEA-FN-22 [EO]	DG-III
CABLE	2M8AA-60, 61	DG-III	1M7AA-60, 61	DG-II	2M8AA-60, 61	DG-III
EQUIP	MC-8A-A/6E DGHV-2		MC-7A-A/7C DGHV-1		MC-8A-A/6E DGHV-2	
		EWD 88E023		EWD 88E021		EWD 88E023
	DMA-FN-21 [EO]	DG-III	DMA-FN-11 [EO]	DG-II	DMA-FN-21 [EO]	DG-III
CABLE	2M8AA-10, 11	DG-III	1M7AA-10, 11	DG-II	2M8AA-10, 11	DG-III
EQUIP	MC-8A-A/1C DGHV-2		MC-7A-A/1C DGHV-1		MC-8A-A/1C DGHV-2	
		EWD 88E013		EWD 88E012		EWD 88E013
	DMA-FN-22 [EO]	DG-III	DMA-FN-12 [EO]	DG-II	DMA-FN-22 [EO]	DG-III
CABLE	2M8AA-20, 21	DG-III	1M7AA-20, 21	DG-II	2M8AA-20, 21	DG-III
EQUIP	MC-8A-A/1B DGHV-2		MC-7A-A/1B DGHV-1		MC-8A-A/1B DGHV-2	
		EWD 88E007		EWD 88E006		EWD 88E007

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
	PRA-FN-1B [EO]	SW-II	PRA-FN-1A [EO]	SW-I	PRA-FN-1B [EO]	SW-II
CABLE	2M8AA-180, 181, 182, 183 2IR22-30, 31, 32 2MISC-1, 150 2P8AG-1	SW-II, TG-I DG-III RC-IIB, IIC, III, VIII, IX	1M7AA-200, 201, 202, 203 1IR21-30, 31, 32 1P7AG-2	SW-I DG-II RC-IIA, III, X, XIV	2M8AA-180, 181, 182, 183 2IR22-30, 31, 32 2MISC-1, 150 2P8AG-1	SW-II, TG-I DG-III IIB, IIC, III, VIII, IX
EQUIP	SUPV. PNL S2 & CS2, PP-8A-G PRA-dPS-1B, IR-22 SM8/SW1B (4), MC-8A-A/4B		MC-7A-A/3D, PP-7A-G SUPV. PNL. S1 & CS1, IR-21, PRA-dPS-1A, SM-7/SW1A (7)		SUPV. PNL. S2 & CS2, PP-8A-G PRA-dPS-1B, IR-22 SM8/SW1A (7), MC-8A-A/4B	
		EWD 87E010		EWD 87E009		EWD 87E010
	RRA-FN-3 [EO]	R-IV	RRA-FN-2 [EO]	R-V	RRA-FN-3 [EO]	R-IV
CABLE	2M8B-150, 151, 152	R-I, IV, XVIII RC-IIB, III, VIII	1M7B-160, 161, 162	R-I, V RC-IIA, III, XIV	2M8B-150, 151, 152	R-I, IV XVIII RC-IIB, III, VIII
EQUIP	MC-8B/4B SM-8/RHR-2B (10)		MC-7B/4B SM-7/RHR-2A (2)		MC-8B/4B SM-8/RHR-2B (10)	
		EWD 81E005		EWD 81E004		EWD 81E005
	RRA-FN-10 [EO]	R-XVIII	RRA-FN-11 [EO]	R-I	RRA-FN-10 [EO]	R-XVIII
CABLE	2M8B-100, 101, 102, 103, 104 CM-K2-3-5	R-I, XVIII RC-IIB, IIC III, IX, X	1M7B-220, 221, 222, 223 CM-K1-3-5	R-I RC-IIA, III, X	2M8B-100, 103, 104 2P8AF-12	R-I, XVIII IIB, IIC, III, IX
EQUIP	MC-8B/3D, FRTP, ROA-SPV-10, RC-2, H13-P812, P891		RC-1, MC-7B/2C H13-P812, P892 ROA-SPV-11		MC-8B/3D, FRTP, ROA-SPV-10, PP-8A-F	
		EWD 81E009		EWD 81E010		EWD 81E009
	RRA-FN-14 [EO]	R-XIX	RRA-FN-13 [EO]	R-I	RRA-FN-14 [EO]	R-XIX
CABLE	2M8BB-110, 111, 112, 113, 114 CM-K2-3-7	R-I, XIX RC-IIB, IIC, III, IX, X	1M7BB-150, 151, 152, 153 CM-K1-3-8	R-I RC-IIA, III, X	2M8BB-110, 113, 114 2P8AF-12	R-I, XIX IIB, IIC, III, IX
EQUIP	MC-8B-B/1E, FRTP, ROA-SPV-14, RC-2, H13-P812, P891		MC-7B-B/1E, RC-1 ROA-SPV-13 H13-P812, P892		MC-8B-B/1E, FRTP ROA-SPV-14, PP-8A-F	
		EWD 81E013		EWD 81E012		EWD 81E013

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TABL

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
(11)	WEA-FN-53A [EO]	RC-XIII				
CABLE						
EQUIP		EWD				
(11)	WEA-FN-53B [EO]	RC-XIII				
CABLE						
EQUIP		EWD				
(10)	WMA-FN-51B [EO]	RC-XII	WMA-FN-51A [EO]	RC-XI	N/A	
CABLE	2M8F-20, 21 CM-K2-3-1	RC-IIB, III, X, XII	1M7F-50, 51 CM-K1-3-1	RC-IIA, III, X, XI		
EQUIP	MC-8F/2C H13-P826, P891	EWD 84E010	MC-7F/3E H13-P826, P892	EWD 84E008		
	WMA-FN-52B [EO]	RC-XII	WMA-FN-52A [EO]	RC-XI	WMA-FN-52B [EO]	RC-XII
CABLE	2M8F-30, 31, 32, 33 CM-K2-3-1	RC-IIB, IIC, III, IX, X, XII	1M7F-10, 11, 12 CM-K1-3-1	RC-IIA, III, X, XI	2M8F-30, 32, 33 2P8AF-11	IIB, IIC, III, IX, XII
EQUIP	MC-8F/1B, COHV-4 H13-P826, P891 FRTP	EWD 84E011	MC-7F/2C, COHV-3 H13-P826, P892	EWD 84E009	MC-8F/1B, COHV-4 FRTP; PP-8A-F	EWD 84E011

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	ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX					
	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
	WMA-FN-53B [EO]	RC-XII	WMA-FN-53A [EO]	RC-XI	WMA-FN-53B [EO]	RC-XII
CABLE	2M8F-50, 51, 55, 56 CM-K2-3-4	RC-IIB, $\boxed{\text{IIC}}$, $\boxed{\text{III}}$, IX, X, XII	1M7F-20, 21, 25 CM-K1-3-3	RC-IIA, III, X, XI	2M8F-50, 55, 56 2P8AF-11	IIB, $\boxed{\text{IIC}}$, III, IX, XII
EQUIP	MC-8F/IE, COHV-4 H13-P826, P891 FRTP	EWD 84E005	MC-7F/1D, COHV-3 H13-P826, P892	EWD 84E004	MC-8F/IE, COHV-4 FRTP, PP-8A-F	EWD 84E005

CABLE						
EQUIP						

ADS/SRV SYSTEM

19	MS-RV-3D (Sol. B) [VC/VO]	R-II	MS-RV-3D (Sol. A&C) [VC/VO]	R-II	MS-RV-2A [VC/VO]	R-II
CABLE	2ADS-31, 32 2D12A-5 3101-B22C-001, 8331-B22C-001	$\boxed{\text{R-I}}$, II RC-IIB, $\boxed{\text{III}}$, X	1ADS-2, 20, 31, 34, 40, 63 1D11A-8 8428-B22C-001, 005, 0011 2801-B22C-001, 0010	R-I, II RC-IIA, III, X	1ADS-6, 36 1D11D-7 8428-B22C-004	R-I, II RC-IIA, III, IX
EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD 1E038	H22-P026, DP-S1-1A TB-R322, TB-C522 H13-P601, P628, P684, P851	EWD 1E038	C61-P001, DP-S1-1D TB-C522, TB-R322	EWD 1E026

19	MS-RV-4A (Sol. B) [VC/VO]	R-II	MS-RV-4A (Sol. A&C) [VC/VO]	R-II	MS-RV-2C [VC/VO]	R-II
CABLE	2ADS-29, 32 2D12A-5 3101-B22C-001, 8331-B22C-001	$\boxed{\text{R-I}}$, II RC-IIB, $\boxed{\text{III}}$, X	1ADS-4, 25, 31, 37, 42, 63 1D11A-8 8428-B22C-003, 006, 0011 2801-B22C-002, 0011	R-I, II RC-IIA, III, X	1ADS-13, 36 1D11D-7 2801-B22C-007	R-I, II RC-IIA, III, IX
EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD 1E036	H22-P026, DP-S1-1A TB-R322, TB-C522 H13-P601, P628, P684, P851	EWD 1E036	C61-P001, DP-S1-1D TB-C522, TB-R322	EWD 1E027

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ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

		(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
		COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
(19)		MS-RV-4B (Sol. B) [VC/VO]	R-II	MS-RV-4B (Sol. A&C) [VC/VO]	R-II	MS-RV-3B [VC/VO]	R-II
	CABLE	2ADS-28, 33 2D12A-5 8331-B22C-001, 3101-B22C-001	R-I, II RC-IIB, III, X	1ADS-11, 24, 33, 37, 42, 63 1D11A-8 8428-B22C-004, 006, 0011 2801-B22C-004, 0011	R-I, II RC-IIA, III, X	1ADS-17, 36 1D11D-7, 8428-B22C-005, 2801-B22C-006	R-I, II RC-IIA, III, IX
	EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD 1E035	H22-P026, DP-S1-1A TB-R322, TB-C522 H13-P601, P528, P684, P851	EWD 1E035	C61-P001, DP-S1-1D TB-C522, TB-R322	EWD 1E029
(19)		MS-RV-4C (Sol. B) [VC/VO]	R-II	MS-RV-4C (Sol. A&C) [VC/VO]	R-II		
	CABLE	2ADS-25, 33 2D12A-5, 8331-B22C-002 8331-B22C-004, 3101-B22C-002	R-I, II RC-IIB, III, X	1ADS-1, 21, 31, 37, 42, 62 1D11A-8 8428-B22C-001, 006, 008, 0010 2801-B22C-001, 0011	R-I, II RC-IIA, III, X		
	EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD 1E032	H22-P026, DP-S1-1A TB-R322, TB-C522 H13-P601, P628, P684, P851	EWD 1E032		
(19)		MS-RV-4D (Sol. B) [VC/VO]	R-II	MS-RV-4D (Sol. A&C) [VC/VO]	R-II		
	CABLE	2ADS-27, 33 2D12A-5 8331, B22C-001, 3101-B22C-002	R-I, II RC-IIB, III X	1ADS-3, 23, 31, 37, 42, 63 1D11A-8 8428-B22C-003, 006, 0011 2801-B22C-003, 0011	R-I, II RC-IIA, III, X		
	EQUIP	DP-S1-2A, H13-P683, TB-R313, TB-C513 H13-P631, P601	EWD 1E034	H22-P026, DP-S1-1A TB-C522, TB-R322 H13-P601, P628, P684, P851	EWD 1E034		
(19)		MS-RV-5B (Sol. B) [VC/VO]	R-II	MS-RV-5B (Sol. A&C) [VC/VO]	R-II		
	CABLE	2ADS-30, 32 2D12A-5 8331-B22C-001, 3101-B22C-001	R-I, II RC-IIB, III, X	1ADS-5, 19, 31, 34, 40, 63 1D11A-8 8428-B22C-003, 005, 0011 2801-B22C-002, 0010	R-I, II RC-IIA, III, X		
	EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD 1E037	H22-P026, DP-S1-1A TB-C522, TB-R322 H13-P601, P628, P684, P851	EWD 1E037		

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
19	MS-RV-5C (Sol. B) [VC/VO]	R-II	MS-RV-5C (Sol. A&C) [VC/VO]	R-II		
CABLE	2ADS-26, 33 2AD12A-5 8331-B22C-001, 3101-B22C-002	R-I II RC-IIB, III X	1ADS-12, 22, 33, 37, 42, 63 1D11A-8 2801-B22C-003, 0011 8428-B22C-003, 004, 006, 0011	R-I, II RC-IIA, III, X		
EQUIP	DP-S1-2A, H13-P683 TB-R313, TB-C513 H13-P631, P601	EWD | 1E033	H22-P026, DP-S1-1A TB-C522, TB-R322 H13-P601, P628, P684, P851	EWD | 1E033		
CABLE						
EQUIP						

MSIV SYSTEM

9	MS-V-22A [VO/VC]	R-II	N/A		N/A	
CABLE	2NS4-11 (2NS4-21 & 22) (BPRPS-9015) (BPRPS-9027) 8322-B22H-001, 2, 3, 4, 7, 8 2201-B22H-001, 2, 3, 7 2209-B22H-001, 2211-B22H-001	R-I II RC-IIB, III X				
EQUIP	TB-R313, TB-C513 H13-P601, P622, P683, P609, P611	EWD | 1E048				
9	MS-V-22B [VO/VC]	R-II	N/A		N/A	
CABLE	2NS4-9, (2NS4-19, 20) (BPRPS-9015 & 9027) SAME GE CABLES AS MS-V-22A	R-I II RC-IIB, III X				
EQUIP	TB-R313, TB-C513 H13-P601, P622, P683 P609, P611	EWD | 1E049				

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ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
(9)	MS-V-22C [VO/VC]	R-II	N/A		N/A	
CABLE	2NS4-10, (2NS4-17 & 18) (BPRPS-9015 & 9027) SAME AS GE CABLES AS MS-V-22A	R-I II RC-IIB, III, X				
EQUIP	TB-R313, TB-C513 H13-P601, P622, P683, P609, P611	EWD 1E050				
(9)	MS-V-22D [VO/VC]	R-II	N/A		N/A	
CABLE	2NS4-8, (2NS4-15 & 16) (BPRPS-9015 & 9027) SAME AS GE CABLES AS MS-V-22A	R-I II RC-IIB, III, X				
EQUIP	TB-R313, TB-C513 H13-P601, P622, P683, P609, P611	EWD 1E051				
CABLE						
EQUIP						

APPENDIX R INSTRUMENTATION

(13)	RHR-FI-R603B	RC-X	RHR-FI-R603A	RC-X	RHR-FI-5	RC-IX
CABLE	2RHR-35, 2P8AA-6 1301-E12A-001 8313-E12A-001	R-I RC-IIB, III, X	1RHR-4, 1P7AA-4 1201-E12A-001 8212-E12A-001	R-I RC-IIA, III, X	2RHR-92 2P8AF-1	R-I RC-IIB, IIC, III, IX
EQUIP	RHR-FT-N015B H22-P021 H13-P601, P613, P683	EWD 9E111	RHR-FT-N015A H22-P018 H13-P601, P612, P682	EWD 9E109	RHR-FT-1 C61-P001 (C61-N001) PP-8A-F	EWD —

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ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	1 APPENDIX R DIV. 2 SYSTEM		1 APPENDIX R DIV. 1 SYSTEM		1 REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA 2	COMPONENT	FIRE AREA 2	COMPONENT	FIRE AREA
	15 SW-FI-9B	RC-X	SW-FI-9A	RC-X	14 CRITICALITY IND	
CABLE	2MISC-1, 150, 401, 402 2IR22-60 2P8AF-7, 2P8AG-1, 2P8AA-33 CBDB-1,CTCG2-2.6,CJB-TCG2-2.1	SW-II TG-I RC-I, IIA IIB, IIC, IX, X	1MISC-7, 150, 401, 402 1IR21-60 CBDA-32, CTCGI-4.15 1P7AA-18, CJB-TCG1-2.1	SW-I TG-I RC-III, X, IIA		
EQUIP	SW-FT-8B, IR-22 SUPV. PNL. S2 & CS2 PP-8A-F, PP-8A-G H13-P820, P833, P893	EWD 58I009	SW-FT-8A, IR-21 SUPV. PNL. S1 & CS1 H13-P840, P841, P894	EWD 58I009		
	17 SW POND LEVEL		N/A		16 SW-PI-32BR	RC-IX
CABLE					BIR22-9078, BMISC-9200 2MISC-1, 150, 434 2P8AF-7, 2P8AG-1	SW-II TG-1 RC-I, IX
EQUIP					SW-PT-32BR, IR-22 SUPV. PNL. S2 & CS2 H22-P100 PP-8A-F, PP-8A-G	EWD 58I008
	18 CMS-LR/PR-4	RC-X	CMS-LR/PR-3	RC-X	CMS-LI-2R	RC-IX
CABLE	2IR63-41 CTCG2-4.9 3301-CMS-001	R-I IV RC-IIB, III, X	1IR66-40, 60 CTCGI-4.10 4101-CMS-001	R-I, VII, VIII RC-IIA, III, X	BMISC-9202	R-I, IV RC-IIB, III, IX
EQUIP	CMS-LT-2 JB @ TS-6228, JB @ TS-1855 H13-P601, P833, P893	A-LOOP M634-43/J17	CMS-LT-1 IR-66 H13-P601, P841, P894	EWD 25I020	CMS-LT-2R H22-P100	EWD 25I017
	18 SPTM-TR-4	RC-X	SPTM-TR-3	RC-X	CMS-TI-43R	R-IX
CABLE	2CACS-261 thru 271 & 311 thru 316 CTCG2-3.3 & 3.4 3101-SPTM-3, 4, 6	R-I II RC-IIB, III, X	1CACS-211 thru 221, 301 thru 304, 315, 316 CTCGI-1.7 &1.8 3101-SPTM-1, 2, 5	R-I, II RC-IIA, III, x	2CACS-144, 315 BCACS-9251	R-I, II RC-IIB, III, IX
EQUIP	SPTM-TE-1B, 8B,10,12,14,16 EPA-X-107B, TB-C561, C501, R301, JB @ TS-6228, JB @ TS-1855 H13-P601, P831, P893	A-LOOP M634-19/V17	SPTM-TE-1A, 8A, 9, 11, 13, 15 EPA-X-107A, TB-R300 TB-C500, TB-C560 H13-P601, P831, P894	A-LOOP M634-19/V5	CMS-TE-43 EPA-X-107B, TB-R301 TB-C501, TB-C561 H22-P100	EWD 25I014

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) ●	COMPONENT	FIRE AREA (2) ○	COMPONENT	FIRE AREA
(12)	MS-LR/PR-R623B	RC-X	MS-LR/PR-R623A	RC-X	MS-LI-10	RC-IX
CABLE	2NS4-23, 2P8AA-3, 8 1301-B22H-001, 1813-B22H-001, 8001-E12A-012, 8313-B22H-001, 8318-E12A-013	R-I RC-IIB, III X	1NS4-26, 1P7AA-1, 2 1201-B22H-001, 8201-E21A-003 8212-B22H-001, 002	R-I RC-IIA, III, X	ANS4-9004 2P8AF-1	R-I RC-IIA, III, IX, XIV
EQUIP	MS-LITS-26D H22-P027, PP-8A-A H13-P601, P613, P618, P680, P683	EWD 1E062	MS-LITS-26A H22-P004, PP-7A-A H13-P601, P612, P682	EWD 1E061	C61-P001 H22-P026, MS-LITS-26B PP-8A-F	CVI 02C61-05/6/5

(12)	MS-LR/PR-R623B	RC-X	MS-LR/PR-R623A	RC-X	MS-PI-2	RC-IX
CABLE	2NS4-23, 2P8AA-3, 8 1301-B22H-001, 1813-B22H-001, 8001-E12A-012, 8313-B22H-001, 8318-E12A-013	R-I RC-IIB, III X	1NS4-26, 1P7AA-1, 2 1201-B22H-001, 8201-E12A-003 8212-B22H-001, 002	R-I RC-IIA, III, X	ANS4-9004 2P8AF-1	R-I RC-IIA, III, IX, XIV
EQUIP	MS-PT-51B H22-P027, PP-8A-A H13-P601, P613, P618, P680, P683	EWD 1E062	MS-PT-51A H22-P004, PP-7A-A H13-P601, P612, P682	EWD 1E061	C61-P001 (MS-PT-2) H22-P026 PP-8A-F	CVI 02C61-05/6/5

CABLE						
EQUIP						

CABLE						
EQUIP						

TAB

HI-LO PRESS INTERFACE

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX

	(1) APPENDIX R DIV. 2 SYSTEM		(1) APPENDIX R DIV. 1 SYSTEM		(1) REMOTE SHUTDOWN	
	COMPONENT	FIRE AREA (2) •	COMPONENT	FIRE AREA (2) o	COMPONENT	FIRE AREA
	RHR-V-9	R-II	RHR-V-8	R-I	RHR-V-9	R-II
CABLE	2M8BA-310, 311, 312, 313, 314, 315, 316 2NS4-2, 30, 8322-B22H-006 2201-B22H-004	R-I, II, XVIII RC-IIB, IIC, III, IX, X	1M21A-20, 21, 22, 23, 24 1NS4-5, 40 8423-B22H-001 2301-B22H-001	R-I RC-IIA, III, IX, X, XIV 20*	2M8BA-310, 311, 312, 313, 314, 316 2NS4-30	R-I, II, XVIII IIB, IIC, III, IX
EQUIP	MC-8B-A, C61-P001 TB-R321, TB-R323 TB-C521, TB-C523, H22-P021, P022, H13-P601, P622, P683	EWD 9E011	MC-S2-1A, FRTP-1 H13-P684, P623, P601 H22-P006 H22-P018	EWD 9E023	MC-8B-A, C61-P001, TB-R321, TB-R323, TB-C521, TB-C523, H22-P021, P022	EWD 9E011
	RHR-V-123A	R-II	RHR-V-53A	R-I	RHR-V-123A	R-II
CABLE	2M8BA-500, 501, 505, 503, 504, 506 2RHR-96 8322-E12A-002 2201-E12A-001	R-I, II, XVIII RC-IIB, III, IX, X	1M7BA-130, 132, 133 8429-E12A-003 2901-E12A-002	R-I RC-IIA, III, X	2M8BA-500, 501, 503, 504, 505 2RHR-96	R-I, II, XVIII RC-IIB, III, IX
EQUIP	C61-P001, MC-8B-A, TB-C513, TB-C521, TB-R313, TB-R321, TB-R475 H13-P601, P622, P683	EWD 9E070	MC-7B-A H13-P601, P629, P684	EWD 9E054	MC-8B-A C61-P001, TB-C513, TB-C521, TB-R313, TB-R321, TB-R475	EWD 9E070
	RHR-V-123B	R-II	RHR-V-53B	R-I	RHR-V-53B	R-I
CABLE	2M8BA-430, 431, 432, 433, 434 2RHR-96 8322-E12A-001 2201-E12A-001	R-I, II, XVIII RC-IIB, III, X	1M7BA-580, 581, 582, 583 8429-E12A-012 2901-E12A-010	R-I RC-IIA, III, IX, X 21*	1M7BA-580, 581, 582	R-I RC-IIA, III, IX
EQUIP	MC-8B-A, TB-C513, TB-C521, TB-R313, TB-R321, TB-R475, H13-P601, P622, P683	EWD 9E071	MC-7B-A C61-P001 H13-P601, P629, P684	EWD 9E055	MC-7B-A, C61-P001	EWD 9E055
CABLE						
EQUIP						

NOTES FOR TABLE 4.1

1 The equipment which is part of the Appendix R safe shutdown systems requiring protection or analysis is described in Sections F.4.4.3.1, F.4.4.3.2, F.4.4.3.3 and F.4.4.3.4. This protection includes not only the equipment itself, but also the power circuit and control logic elements that are necessary to support operation of the indicated equipment. The equipment listed below has been locked in the open (O) or closed (C) position as indicated and has had all power removed.

SW-V-69B(C)	SW-V-69A(C)	RHR-V-26B(C)	RHR-V-26A(C)
SW-V-70B(C)	SW-V-70A(C)	RHR-V-87B(C)	RHR-V-87A(C)
		RHR-V-11B(C)	RHR-V-11A(C)

RHR-V-65A & B deactivated

2 All Appendix R Division 2 Safe Shutdown components in the following fire areas R-I, RC-II, TG-1, RC-IIA, R-V are thermolagged or protected with the exception of power feeders whose loss of operation is not required (see Section F.4.4.2.1). These cable numbers are shown in brackets as follows: (2M8BB-140). All cables routed through fire area RC-IIC in trays are covered with thermolag (for the elimination of combustibles in this area).

Next to the component number, such as RHR-V-3B is a bracket which provides the components operating requirements as follows [NORMAL OPERATION/EVENT TO COLD SHUTDOWN OPERATION]

i.e., [VO/VO] where VO - Valve Open
VC - Valve Closed
[EO] EO - Equipment Operable

SYMBOLS: FIRE AREA• = Redundant Division 2 fire areas, dedicated fire areas or unique fire areas (RC-X and R-II) all Division 1 fire areas in this column shall be identified by Astericks*

FIRE AREA• = Division 1 fire areas or unique fire areas (RC X and R-II) all Division 2 fire areas in this column will be identified by Astericks*.

NOTES FOR TABLE 4.1 (Continued)

3 RHR-P-3 maintains the RHR loop B piping full of water and pressurized during normal plant operation. If this pump were to fail as a result of a postulated fire, the RHR loop B piping will depressurize and begin to develop high point voids as water leaks out.

<u>Evaluation</u>

In response to FSAR question 211.206, the loop B leakage rate was determined to be approximately 1300 CC (1/3 gallon per hour). This is the maximum leakage rate, actual leakage rate would be expected to be less. The formation of high point voids will stop once the RHR loop B pump is started. If this pump start takes place soon after the water leg pump fails, little, if any, water hammer will result. Operating procedures will require starting the RHR loop B pump within one hour after loss of RHR-P-3 pump or pump running indication during a fire event. Based on the above, no protection of the water leg pump is required.

4 One of these valves (RHR-V-16B & 17B) must remain closed to prevent diversion of coolant to the drywell spray header during alternate shutdown cooling. This can be accomplished by either protecting one of the valves or by analyzing the results of a fire to show that both valves could not be open simultaneously.

<u>Evaluation</u>

Analysis for the above valves shows that the cables, that can cause valve RHR-V-16B to open on a postulated fire, are protected by virtue of being installed in thermo-lagged trays or in trays which meet the spatial separation, all the way from the valve to the Control Room. In the event of a control room fire, RHR-V-16B is designed to be isolated from the Control Room and controlled from the Remote Shutdown Room via a transfer switch. Therefore, no further protection is required.

NOTES FOR TABLE 4.1 (Continued)

5 These Valves (RHR-V-40/49) are provided to allow heat-up of RHR piping from heat exchanger to RPV by draining water from vessel to Radwaste. If both valves should go open due to fire damage (hot shorts) during shutdown cooling, some RHR flow would be diverted to Radwaste.

Evaluation

The design status for the above valves indicates that the cables which can cause valve RHR-V-49 to open on a postulated fire are protected by virtue of being installed in thermo-lagged trays, or in trays which meet spatial separation, all the way from the valve to the Control Room. In the event of fire in the control room, control of RHR-V-49 is designed to be transferred from the Control Room and operated from the Remote Shutdown Room via a transfer switch. Therefore, no further protection is required.

6 During RHR Alternate Shutdown Cooling Mode operation following a postulated fire, coolant is injected to the reactor through RHR-V-42B. If RHR-V-53B or RHR-V-23 (parallel flow paths) were to open due to hot shorts, RHR pump run out might occur which would be detrimental to the pump.

Evaluation

In RHR Alternate Shutdown Cooling Mode configuration, flow exists the reactor vessel through a minimum of two manually opened SRVs. Initially, the flow is steam as the reactor vessel depressurizes. Upon initiation of RHR injection the reactor vessel fills with water as does the Main Steam Lines. At this point flow through the SRVs changes from steam to water and the reactor pressure stabilizes at the pressure required to pass all RHR pump flow through the open SRVs. Test data for water flow through Crosby SRVs* yield a reactor pressure of approximately 140 psig as being required to pass RHR pump run out flow through two SRVs. This pressure is well above that of pump run out conditions. There-

NOTES FOR TABLE 4.1 (Continued)

fore, it can be concluded that RHR pump run out will not occur in Alternate Shutdown Cooling Mode configuration if RHR-V-23 and/or RHR-V-53B were to open. Therefore, no protection is required for these valves and their associated cabling.

*NEDO-24989-P

7 Check valve RHR-V-89 will prevent flow from RHR to SW. Some SW flow into RHR could occur if both valves (RHR-V-115/116) were to open as a result of fire damage (hot shorts). However, the SW flow into RHR would be relatively small due to the small pressure differential between SW and RHR (approximately 20 psid). This is considered to be acceptable for heat removal purposes. Makeup to the spray ponds could be achieved through operator action since it would not be required for a period of days. Therefore, no protection is required.

8A Failure of valve SW-V-75B due to hot shorts does not affect the ability to safely shutdown the plant. There is a closed manual valve upstream (SW-V-75BB) which would prevent diversion of standby service water. If fuel pool makeup is needed, this can always be done manually. The fuel pool will not need makeup for at least a day because it takes on the order of 24 hours before the pool begins to boil. Therefore, no protection is required.

8B If either inertie valves SW-V-187B and 188B were to open as a result of fire damage (hot shorts) some SW flow would divert into the RCC System. Diverted Flow would be limited by the 4" overflow on the RCC surge tank. Sufficient SW flow to the RHR heat exchanger would remain to remove reactor decay heat. Makeup to the spray ponds would be by Operator action if normal makeup was not available. Effects of flooding due to RCC surge tank overflow would be countered by operator action as required by operating procedure. Therefore, no protection is required.

NOTES FOR TABLE 4.1 (Continued)

8C If valve SW-V-90 were to fail close due to the results of a fire room heat-up without cooling is not sufficient to damage cabling. Therefore protection of SW-V-90 and DMA-FN-51 is not required.

9 During RHR Alternate Shutdown Coolding Mode operation following a postulated fire, reactor water must be discharged through the SRVs to the Suppression Pool. Diversion of flow down the main steam lines to the turbine/condenser would result in loss of suppression pool inventory. Although not very probable, it is conceivable that sufficient water could be transferred to the turbine/condenser such that make-up to the reactor would be jeopardized.

Evaluation

Diversion of reactor coolant to the turbine/condenser requires that at least one valve in each of three sets of valves remain open or reopen due to hot shorts. These sets of valves are:

1. MS-V-22A, B, C, D (Division II)
2. MS-V-28A, B, C, D (Division I)
3. Turbine Governor/stop valves and MS-V-146/Bypass Valves

Analysis of the four MS-V-22 valves shows that the cables which can cause the valves to go open on a postulated fire outside the Control Room are protected by virtue of being installed in thermo-lagged trays, or in trays which meet the spatial separation, all the way from the valves to the Control Room.

In the event of a Control Room fire, the operator will, per operating procedure, manually SCRAM the reactor, shut the MSIVs and trip the main generator before evacuating the Control Room. This latter action will cause the turbine governor valves to trip closed which will indirectly result in closure of the stop valves. The turbine bypass indirectly result in closure of the stop valves. The turbine bypass valves may open for a very short period of time to regulate pressure but will then close. It

NOTES FOR TABLE 4.1 (Continued)

can be postulated that hot shorts could initiate re-opening of the MSIVs (both MS-V-22s and MS-V-28s). This is extremely unlikely since it would require the occurrence of a specific hot short condition (an unlikely event in itself) in each of two independent and separate circuits. Nevertheless, should this combination occur, significant transfer of suppression pool water would be precluded by the closed turbine stop/governor valves and the closed turbine Bypass valves. Hot shorts causing these valves to re-open in combination with re-opening both sets of MSIVs is not considered credible. Therefore, no further protection is required.

10 Cooling coil WMA-CC-51A-1 of air handling unit WMA-AH-51 shall be valved for automatic operation on standby service water (valves SW-V-822A, 823A Open; valves SW-V-224A, 225A and 227A closed). The control room temperature shall not exceed 104°F (same as maximum temperature in Remote Shutdown Room). Loss of emergency chillers CCH-CR-1A and 1B will have no effect on safe shutdown of plant since the cooling capacity of both service water spray ponds and the river water makeup pump will be available following a design basis fire in fire area RC-XIII.

NOTE: With above arrangement chiller CCH-CR-1B is automatically energized on F, A, Z (if WMA-AH-51B is in auto) but chiller CCH-CR-1A will not be automatically energized on F, A, Z. If required for operation during F, A, Z its valving has to be manually reversed (close SW-V-822A, 823A; open SW-V-224A and 227A and open 225A to preset position).

NOTES FOR TABLE 4.1 (Continued)

11 Within 12 hours of loss of fan WEA-FN-53A due to fire, the Battery Room 'A' should be provided with some means to exhaust air. For this purpose, smoke purge fan WEA-FN-7 (shaft-driven) located at 507'-0" level of Radwaste Building may be used. Flexible ducts for temporary connection are provided similarly for fan WEA-FN-53B and Battery Room 'B'.

12 Reactor pressure and water level are displayed in the control room on two redundant, divisionally powered recorders. Sensing for these displays is accomplished through two (2) redundant and independent process instrument loops. One loop originates from vessel instrument nozzle taps located at 340° azimuth for the Division I recorder, and the second loop at 200° azimuth for the Division II recorder.

In-containment routing of the process instrument lines within each loop is maintained to the azimuth of the vessel instrument nozzle taps associated with those loops. Furthermore, the instrument taps and associated containment penetrations are maintained to within approximately 5° of the same azimuth. The process instrument loops originate from the vessel at azimuths which are sufficiently separate to limit the affects of fire to no more than one loop. The azimuths of the containment penetratins and their respective instrument racks deviate as much as 19°. However, the radial distances to the racks provide assurance of adequate process line routing separation. The worst case fire effects on a single instrument loop, whether loss of indication or inconservative indication, will not jeopardize required control room data since alternate instrumentation is available.

NOTES FOR TABLE 4.1 (Continued)

13A The process instrument loops for RHR flow consist of differential pressure sensing across flow elements for RHR injection paths A and B. The instrument loop for each RHR path consists of a process sensing line from each side of a flow element, each of which is routed in close proximity to one another to a flow (dP) transmitter. The fire effects on the process lines are considered equal, with equal boil-off in each line the result. The effects on differential pressure are thereby offsetting and considered to have no significant effect on sensed flow. Process fluid perturbatins from boil-off are also considered to have no significant effect on instrument performance.

13B System pressure is only one of the variables that can be used to monitor system performance. Since, system flow indication is provided in both the Control Room and remote shutdown areas, sufficient information is available to determine correct system operation.

14 The GE Remote Shutdown design specification assumes that for a Main Control Room evacuation event, the Operator SCRAMS the reactor before leaving the Control Room. This implies that the operator takes action before damage to control circuitry could take place. Similarly, for a postulated fire outside the Main Control Room, it is assumed that the Operator initiates and confirms shutdown before the control circuitry is damaged. Therefore, no critically instrumentation need be protected.

15 Operation of the SW system from the Main Control Room can be monitored by the flow indicator provided.

16 For the case of a fire outside the Main Control Room, system pressure is not considered to be an essential indication for Operator use since flow indication is available (see evaluation for SW flow). For a fire in the Main Control Room, indication of proper system function appears on the Remote Shutdown Panels. SW flow is not indicated in this situation; however, SW pressure is available as well

NOTES FOR TABLE 4.1 (Continued)

as positive indication and control switches for all valves required for proper system lineup. With SW pump discharge pressure and SW system valve lineup available, corrective action can be initiated for either pump or valve lineup problems.

17 SW Pond Level is not considered essential since no Operator action would be required for a period of days even in the event that the RHR/SW intertie valves were to open.

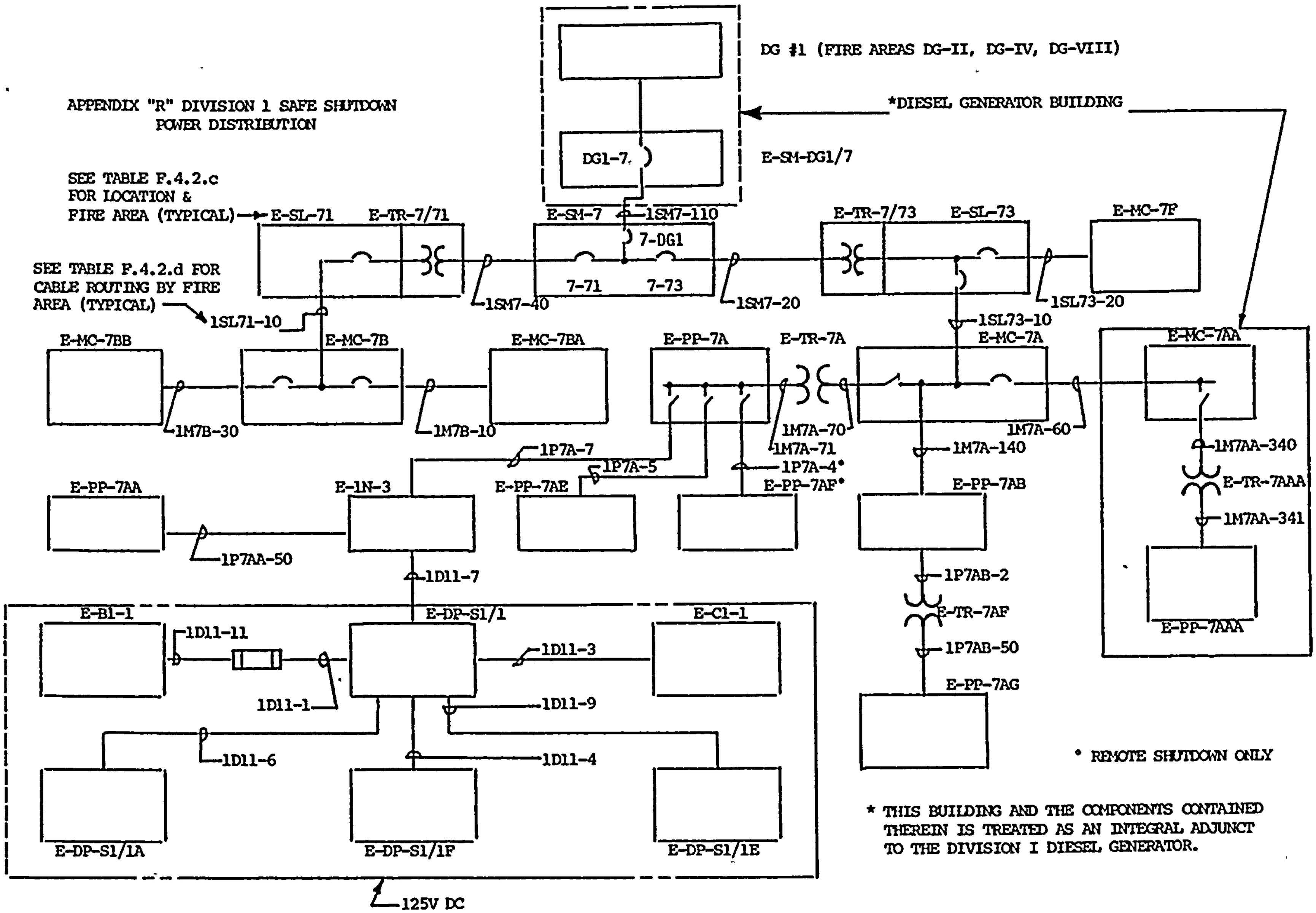
18 Redundant Suppression Pool level and temperature instrumentation is provided in the Main Control Room. Fires postulated to occur in any plant area, except the control and cable spreading rooms, will not disable both redundant sets of instrumentation.

A postulated fire in the Main Control Room requires that plant control be transferred to the Remote Shutdown Room. This room has all controls necessary for aligning the Appendix R Division 2 RHR shutdown system to draw water from the suppression pool, route through the RHR heat exchanger and return the flow to the RPV. No pipe breaks will occur during a fire that would cause RHR water to be lost and any water drawn from the suppression pool will be returned to the pool from the RPV. Therefore, suppression pool level will remain unchanged however it can be monitored on the RS panel (see CMS-LI-2R). Similarly, since the suppression pool water is continuously cooled by the RHR heat exchanger, pool water temperature will always remain within specified limits and however it can be monitored (see CMS-TI-43R).

19 The maximum and/or minimum blowdown transients caused by inadvertent opening of the main steam relief valves due to hot shorts caused by a cable fire is bounded by the analyses provided in Chapter 15.

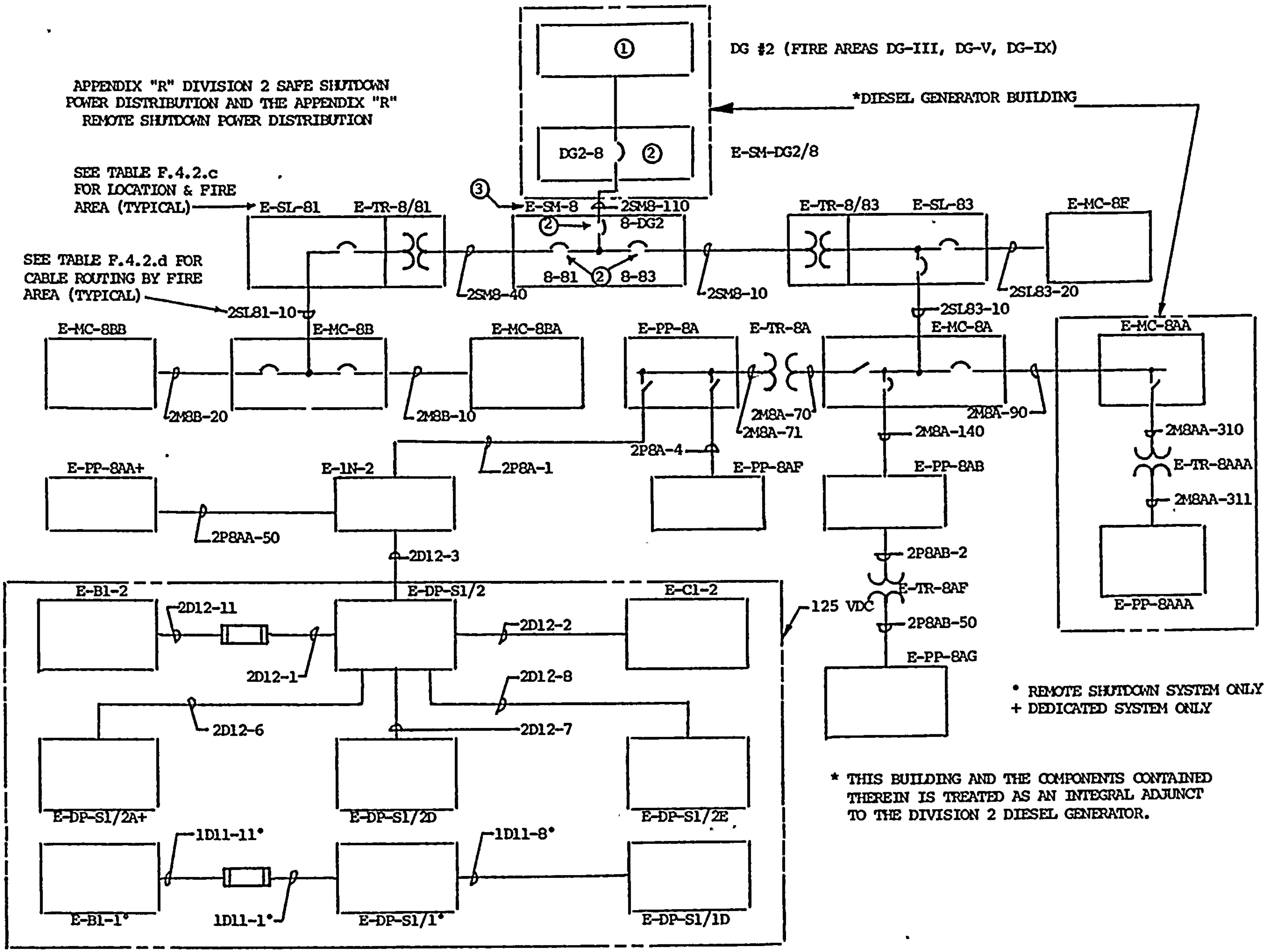
20 Transfer switches for valves RHR-V-6A and RHR-V-8 have been relocated into a Division I fire area (Switchgear Room #1, RC XIV). The cables required for normal operation of these valves do not route through the Remote Shutdown Room fire area RC-IX and would not be affected by a design basis fire in RC-IX. The transfer switches for these valves are required to be operated following an emergency evacuation of the main control room for an event such as a main control room design basis fire.

21 A design basis fire in the Remote Shutdown Room RC-IX would not disable the redundant valve RHR-V-123B which could be controlled from the main control room and would thus preserve the high and low pressure interface for the LPCI.


APPENDIX "R" DIVISION 1 SAFE SHUTDOWN POWER DISTRIBUTION
DG #1 (FIRE AREAS DG-II, DG-IV, DG-VIII)
*DIESEL GENERATOR BUILDING
DG1-7
E-SM-DG1/7
SEE TABLE F.4.2.c FOR LOCATION & FIRE AREA (TYPICAL)
E-SL-71
E-TR-7/71
E-SM-7
1SM7-110
7-DG1
7-71
7-73
E-TR-7/73
E-SL-73
E-MC-7F
SEE TABLE F.4.2.d FOR CABLE ROUTING BY FIRE AREA (TYPICAL)
1SL71-10
1SM7-40
1SM7-20
1SL73-20
1SL73-10
E-MC-7BB
E-MC-7B
E-MC-7BA
E-PP-7A
E-TR-7A
E-MC-7A
E-MC-7AA
1M7B-30
1M7B-10
1M7A-70
1M7A-71
1M7A-60
1M7A-140
1M7AA-340
E-TR-7AAA
1M7AA-341
1P7A-7
1P7A-5
1P7A-4*
E-PP-7AA
E-1N-3
E-PP-7AE
E-PP-7AF*
E-PP-7AB
1P7AA-50
1D11-7
1P7AB-2
E-TR-7AF
1P7AB-50
E-PP-7AG
E-PP-7AAA
E-B1-1
E-DP-S1/1
E-C1-1
1D11-11
1D11-3
1D11-1
1D11-9
1D11-6
1D11-4
E-DP-S1/1A
E-DP-S1/1F
E-DP-S1/1E
125V DC
* REMOTE SHUTDOWN ONLY
* THIS BUILDING AND THE COMPONENTS CONTAINED THEREIN IS TREATED AS AN INTEGRAL ADJUNCT TO THE DIVISION I DIESEL GENERATOR.

T[illegible].4.2b

APPENDIX "R" DIVISION 2 SAFE SHUTDOWN POWER DISTRIBUTION AND THE APPENDIX "R" REMOTE SHUTDOWN POWER DISTRIBUTION



* REMOTE SHUTDOWN SYSTEM ONLY
+ DEDICATED SYSTEM ONLY

* THIS BUILDING AND THE COMPONENTS CONTAINED THEREIN IS TREATED AS AN INTEGRAL ADJUNCT TO THE DIVISION 2 DIESEL GENERATOR.

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NOTES FOR TABLE F.4.2b (Continued)

The effects of spurious signals resulting from a main control room design basis fire has been isolated by the use of transfer switches. To ensure the availability of the Division II Diesel Generator power distribution system for the Appendix R Remote Shutdown System. The following electrical components have been accordingly isolated.

1 The Division 2 Diesel Generator - This will require operation of DG #2 from the local control panel. Eight hour emergency lights have been provided from the main control room to the Remote Shutdown Room and then to the DG #2 building control panel.

2 Electrical breakers E-CB-DG2/8, E-CB-8/DG2, E-CB-8/81, E-CB-8/83, E-CB-SW1B, E-CB-RHR/2B have transfer switches located on the switchgear which is located in an adjacent room to the Remote Shutdown panel.

3 Switchgear E-SM-8 bus is protected from the effects of a Main Control Room fire by transfer switches located on the Switchgear and on the Remote Shutdown panels.

F.4.2c

SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (POWER-EQUIP.)

APPENDIX R DIVISION 2 SAFE SHUTDOWN AUX. PWR. DIST. EQUIP. (Note 1)

EPN #	BLDG./ELEV.	FIRE AREA
E-B1-2	RW/467	RC-VI
E-C1-2	RW/467	RC-VII
E-1N-2	RW/467	RC-VII
E-DP-S1/2	RW/467	RC-VII
E-DP-S1/2A	RW/501	RC-X•
E-DP-S1/2D	RW/467	RC-IX
E-DP-S1/2E	DG/441	DG-III
E-MC-8A	RW/467	RC-VII
E-MC-8AA	DG/441	DG-III
E-MC-8B	RB/522	R-XVIII
E-MC-8BA	RB/522	R-XVIII
E-MC-8BB	RB/572	R-XIX
E-MC-8F	RW/525	RC-XII
E-PP-8A	RW/467	RC-VII
E-PP-8AA	RW/501	RC-X•
E-PP-8AAA	DG/441	DG-III
E-PP-8AB	SWPH-1B/441	SW-II
E-PP-8AF	RW/467	RC-IX
E-PP-8AG	SWPH-1B/441	SW-II
E-SL-81	RW/467	RC-VIII
E-SL-83	RW/467	RC-VIII
E-SM-DG2/8	DG/441	DG-III
E-SM-8	RW/467	RC-VIII
E-TR-8A	RW/467	RC-VII
E-TR-8AAA	DG/441	DG-III
E-TR-8AF	SWPH-1B/441	SW-II
E-TR-8/81	RW/467	RC-VIII
E-TR-8/83	RW/467	RC-VIII

APPENDIX R DIVISION 1 SAFE SHUTDOWN AUX. PWR. DIST. EQUIP. (Note 2)

EPN #	BLDG./ELEV	FIRE AREA
E-B1-1	RW/467	RC-V
E-C1-1	RW/467	RC-IV
E-1N-3	RW/467	RC-IV
E-DP-S1/1	RW/467	RC-IV
E-DP-S1/1A	RW/501	RC-X•
E-DP-S1/1F	RW/467	RC-XIV
E-DP-S1/1E	DG/441	DG-II
E-MC-7A	RW/467	RC-IV
E-MC-7AA	DG/441	DG-II
E-MC-7B	RB/522	R-I+
E-MC-7BA	RB/522	R-I+
E-MC-7BB	RB/572	R-I+
E-MC-7F	RW/525	RC-XI
E-PP-7A	RW/467	RC-IV
E-PP-7AA	RW/501	RC-X•
E-PP-7AAA	DG/441	DG-II
E-PP-7AB	SWPH-1A/441	SW-I
E-PP-7AE	RB/471	R-I+
E-PP-7AG	SWPH-1A/441	SW-I
E-SL-71	RW/467	RC-XIV
E-SL-73	RW/467	RC-XIV
E-SM-DG1/7	DG/441	DG-II
E-SM-7	RW/467	RC-XIV
E-TR-7A	RW/467	RC-IV
E-TR-7AAA	DG/441	DG-II
E-TR-7AF	SWPH-1A/441	SW-I
E-TR-7/71	RW/467	RC-XIV
E-TR-7/73	RW/467	RC-XIV

APPENDIX R REMOTE SHUTDOWN SYSTEM AUX. PWR. DIST. EQUIP. (Note 3)

EPN #	BLDG./ELEV.	FIRE AREA
E-B1-2	RW/467	RC-VI
E-C1-2	RW/467	RC-VII
E-1N-2	RW/467	RC-VII
E-DP-S1/2	RW/467	RC-VII
E-DP-S1/2D	RW/467	RC-IX
E-DP-S1/2E	DG/441	DG-III
E-MC-8A	RW/467	RC-VII
E-MC-8AA	DG/441	DG-III
E-MC-8B	RB/522	R-XVIII
E-MC-8BA	RB/522	R-XVIII
E-MC-8BB	RB/572	R-XIX
E-MC-8F	RW/525	RC-XII
E-PP-8A	RW/467	RC-VII
E-PP-8AAA	DG/441	DG-III
E-PP-8AB	SWPH-1B/441	SW-II
E-PP-8AF	RW/467	RC-IX
E-PP-8AG	SWPH-1B/441	SW-II
E-SL-81	RW/467	RC-VIII
E-SL-83	RW/467	RC-VIII
E-SM-DG2/8	DG/441	DG-III
E-SM-8	RW/467	RC-VIII
E-TR-8A	RW/467	RC-VII
E-TR-8AAA	DG/441	DG-III
E-TR-8AF	SWPH-1B/441	SW-II
E-TR-8/81	RW/467	RC-VIII
E-TR-8/83	RW/467	RC-VIII
E-B1-1	RW/467	RC-V
E-DP-S1/1	RW/467	RC-IV
E-DP-S1/1D	RW/467	RC-IX
E-PP-7AF	RW/467	RC-IX

• UNIQUE FIRE AREA MAIN CONTROL ROOM
+ DEDICATED FIRE AREA

NOTES 1 - ALL FIRE AREAS IN THIS COLUMN ARE DIVISION 2 FIRE AREAS EXCEPT AS NOTED.
2 - ALL FIRE AREAS IN THIS COLUMN ARE DIVISION 1 FIRE AREAS EXCEPT AS NOTED.
3 - ALL FIRE AREAS IN THIS COLUMN ARE EXTERNAL TO THE MAIN CONTROL ROOM.

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June 1986

TABLE F.4.2d
SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (POWER CABLES)

EVENT I: POWER DISTRIBUTION FOR A DESIGN BASIS FIRE IN A DIVISION 2 FIRE AREA

APPENDIX R DIVISION 1 SAFE SHUTDOWN POWER DISTRIBUTION CABLES	DIVISION 1 FIRE AREAS (CABLE ROUTING)	DEDICATED* FIRE AREAS (CABLE ROUTING)	UNIQUE FIRE AREA (CABLE ROUTING)
1SM7-20, 40, 110	RC-IIA	R-I	RC-X
1SL73-10, 20	RC-IV	RC-III	
1SL71-10	RC-V	TG-I	
1M7B-10, 30	RC-XI		
1M7A-60, 70, 71, 140	RC-XIV		
1P7AB-2, 50	RC-XX		
1M7AA-340, 341	DG-II		
1P7A-5, 7	SW-I		
1P7AA-50			
1D11-1, 3, 4, 6, 7, 9, 11			

EVENT II: POWER DISTRIBUTION FOR A DESIGN BASIS FIRE IN A DIVISION 1 OR DEDICATED FIRE AREA

APPENDIX R DIVISION 2 SAFE SHUTDOWN POWER DISTRIBUTION CABLES	DIVISION 2 FIRE AREAS (CABLE ROUTING)	DEDICATED* FIRE AREAS (CABLE ROUTING)	UNIQUE FIRE AREA (CABLE ROUTING)
2SM8-10, 40, 110	RC-IIB	R-I	RC-X
2SL83-10, 20	RC-VI	RC-III	
2SL81-10	RC-VII	TG-I	
2M8A-70, 71, 90, 140	RC-VIII		
2P8AB-2, 50	RC-IX		
2M8AA-310, 311	RC-XII		
2P8A-1, 4	DG-III		
2M8B-10, 20	SW-II		
2P8AA-50	R-XVIII		
2D12-1, 2, 3, 6, 7, 8, 11	R-XIX		

TABLE F.4.2d
SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (POWER)

EVENT III: POWER DISTRIBUTION FOR DESIGN BASIS FIRE IN THE MAIN CONTROL ROOM

APPENDIX R REMOTE SHUTDOWN POWER DISTRIBUTION CABLES	DIVISION 2 FIRE AREAS (CABLE ROUTING)	DIVISION 1 FIRE AREAS (CABLE ROUTING)	DEDICATED* FIRE AREA (CABLE ROUTING)
2SM8-10, 40, 110	RC-VI		
2SL83-10, 20	RC-VII		
2SL81-10	RC-VIII		R-I
2M8A-70, 71, 90, 140	RC-IX		RC-III
2P8AB-2, 50	RC-XII		TG-1
2P8A-1, 4	DG-III		
2M8B-10, 20	SW-II		
2D12-1, 2, 3, 7, 8, 11	R-XVIII		
	R-XIX		
1D11-1, 8, 11	RC-IX	RC-IV	
1P7A-4		RC-V	
		RC-XIV	

* Appendix R division 1 shutdown power distribution cables are not protected in dedicated fire areas; however Appendix R division 2 safe shutdown power distribution cables are protected in dedicated fire areas. Cables 2D12-8, 2M8A-90, 140, 2M8B-20, 2SL81-10, 2SL83-20 and 2SM8-110 are Appendix R division 2 safe shutdown power distribution cables that are protected in Dedicated fire areas (the other division 2 cables do not route through these fire areas).

TABLE F.4.3

SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (AUX.-EQUIP.)

APPENDIX R DIVISION 2 SAFE SHUTDOWN AUX. EQUIP. (Note 1)

EPN #	BLDG./ELEV.	FIRE AREA
E-CP-COHV/2	RW/525	RC-XII
E-CP-COHV/4	RW/525	RC-XII
E-CP-CS2	RW/467	RC-IX
E-CP-DG/EP2	DG/441	DG-III
E-CP-DG/RP2	DG/441	DG-III
E-CP-DGHV/II	DG/441	DG-III
E-CP-FRTP	RW/467	RC-IX
E-CP-LSP/S2	SWPH-1B/441	SW-II
E-CP-C61/P001	RW/467	RC-IX
E-CP-P601	RW/501	RC-X°
E-CP-P609	RW/501	RC-X°
E-CP-P611	RW/501	RC-X°
E-CP-P613	RW/501	RC-X°
E-CP-P618	RW/501	RC-X°
E-CP-P622	RW/501	RC-X°
E-CP-P631	RW/501	RC-X°
E-CP-P680	RW/501	RC-X°
E-CP-P683	RW/501	RC-X°
E-CP-P800	RW/501	RC-X°
E-CP-P801	RW/501	RC-X°
E-CP-P805	RW/501	RC-X°
E-CP-P812	RW/501	RC-X°
E-CP-P820	RW/501	RC-X°
E-CP-P825	RW/501	RC-X°
E-CP-P826	RW/501	RC-X°
E-CP-P831	RW/501	RC-X°
E-CP-P833	RW/501	RC-X°
E-CP-P891	RW/501	RC-X°
E-CP-P893	RW/501	RC-X°
E-CP-RC/2	RW/501	RC-X°
E-CP-RS	RW/467	RC-IX

APPENDIX R DIVISION 1 SAFE SHUTDOWN AUX. EQUIP. (Note 2)

EPN #	BLDG./ELEV	FIRE AREA
E-CP-COHV/1	RW/525	RC-XI
E-CP-COHV/3	RW/525	RC-XI
E-CP-COHV/5A	RW/501	RC-X°
E-CP-CS1	RW/501	RC-X°
E-CP-DG/EP1	DG/441	DG-II
E-CP-DG/RP1	DG/441	DG-II
E-CP-DGHV/I	DG/441	DG-II
E-CP-FRTP-1	RW/467	RC-XIV
E-CP-LSP/S1	SWPH-1A/441	SW-I
E-CP-C61/P001	RW/467	RC-IX
E-CP-P601	RW/501	RC-X°
E-CP-P612	RW/501	RC-X°
E-CP-P628	RW/501	RC-X°
E-CP-P629	RW/501	RC-X°
E-CP-P682	RW/501	RC-X°
E-CP-P684	RW/501	RC-X°
E-CP-P800	RW/501	RC-X°
E-CP-P802	RW/501	RC-X°
E-CP-P805	RW/501	RC-X°
E-CP-P812	RW/501	RC-X°
E-CP-P825	RW/501	RC-X°
E-CP-P826	RW/501	RC-X°
E-CP-P831	RW/501	RC-X°
E-CP-P840	RW/501	RC-X°
E-CP-P841	RW/501	RC-X°
E-CP-P851	RW/501	RC-X°
E-CP-P892	RW/501	RC-X°
E-CP-RC/1	RW/501	RC-X°
E-IR-21	SWPH-1A/441	SW-I
E-IR-H22/P004	RB/522	R-I^{+}
E-IR-H22/P018	RB/501	R-I^{+}

APPENDIX R REMOTE SHUTDOWN SYSTEM AUX. EQUIP. (Note 3)

EPN #	BLDG./ELEV.	FIRE AREA
E-CP-COHV/4	RW/525	RC-XII
E-CP-CS2	RW/467	RC-IX
E-CP-DG/EP2	DG/441	DG-III
E-CP-DGHV/II	DG/441	DG-III
E-C-FRTP/1	RW/467	RC-XIV
E-CP-LSP/S2	SWPH-1B/441	SW-II
E-CP-C61/P001	RW/467	RC-IX
E-CP-RS	RW/467	RC-IX
E-DP-S1-1D	RW/467	RC-IX
E-IR-22	SWPH-1B/441	SW-II
E-IR-H22/P026	RB/522	R-I^{+}
E-JB-TB/SW1508	SWPH-1B/441	SW-II
E-JB-TB/C501	CONT/471	R-II°
E-JB-TB/C522	CONT/522	R-II°
E-JB-TB/C561	CONT/488	R-II°
E-JB-TB/R301	RB/471	R-I^{+}
E-JB-TB/R322	RB/522	R-I^{+}
E-JB-TB/R435	RB/548	R-IV

TABLE F.4.3

ALTERNATIVE SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (AUX.-EQUIP.)

APPENDIX R DIVISION 2 SAFE SHUTDOWN AUX. EQUIP. (Note 1)

EPN #	BLDG./ELEV.	FIRE AREA
E-CP-COHV/2	RW/525	RC-XII
E-CP-COHV/4	RW/525	RC-XII
E-CP-CS2	RW/467	RC-IX
E-CP-DG/EP2	DG/441	DG-III
E-CP-DG/RP2	DG/441	DG-III
E-CP-DGHV/II	DG/441	DG-III
E-CP-FRTP	RW/467	RC-IX
E-CP-LSP/S2	SWPH-1B/441	SW-II
E-CP-P001	RW/467	RC-IX
E-CP-P601	RW/501	RC-X*
E-CP-P609	RW/501	RC-X*
E-CP-P611	RW/501	RC-X*
E-CP-P613	RW/501	RC-X*
E-CP-P618	RW/501	RC-X*
E-CP-P622	RW/501	RC-X*
E-CP-P631	RW/501	RC-X*
E-CP-P680	RW/501	RC-X*
E-CP-P683	RW/501	RC-X*
E-CP-P800	RW/501	RC-X*
E-CP-P801	RW/501	RC-X*
E-CP-P805	RW/501	RC-X*
E-CP-P812	RW/501	RC-X*
E-CP-P820	RW/501	RC-X*
E-CP-P825	RW/501	RC-X*
E-CP-P826	RW/501	RC-X*
E-CP-P831	RW/501	RC-X*
E-CP-P833	RW/501	RC-X*
E-CP-P891	RW/501	RC-X*
E-CP-P893	RW/501	RC-X*
E-CP-RC/2	RW/501	RC-X*
E-CP-RS	RW/467	RC-IX

APPENDIX R DIVISION 1 SAFE SHUTDOWN AUX. EQUIP. (Note 2)

EPN #	BLDG./ELEV	FIRE AREA.
E-CP-COHV/1	RW/525	RC-XI
E-CP-COHV/3	RW/525	RC-XI
E-CP-COHV/5A	RW/501	RC-X*
E-CP-CS1	RW/501	RC-X*
E-CP-DG/EP1	DG/441	DG-II
E-CP-DG/RP1	DG/441	DG-II
E-CP-DGHV/I	DG/441	DG-II
E-CP-FRTP-1	RW/467	RC-XIV
E-CP-LSP/S1	SWPH-1A/441	SW-I
E-CP-C61/P001	RW/467	RC-IX
E-CP-P601	RW/501	RC-X*
E-CP-P612	RW/501	RC-X*
E-CP-P628	RW/501	RC-X*
E-CP-P629	RW/501	RC-X*
E-CP-P682	RW/501	RC-X*
E-CP-P684	RW/501	RC-X*
E-CP-P800	RW/501	RC-X*
E-CP-P802	RW/501	RC-X*
E-CP-P805	RW/501	RC-X*
E-CP-P812	RW/501	RC-X*
E-CP-P825	RW/501	RC-X*
E-CP-P826	RW/501	RC-X*
E-CP-P831	RW/501	RC-X*
E-CP-P840	RW/501	RC-X*
E-CP-P841	RW/501	RC-X*
E-CP-P851	RW/501	RC-X*
E-CP-P892	RW/501	RC-X*
E-CP-RC/1	RW/501	RC-X*
E-IR-21	SWPH-1A/441	SW-I
E-IR-H22/P004	RB/522	R-I+
E-IR-H22/P018	RB/501	R-I+

APPENDIX R REMOTE SHUTDOWN SYSTEM AUX. EQUIP. (Note 3)

EPN #	BLDG./ELEV.	FIRE AREA
E-CP-COHV/4	RW/525	RC-XII
E-CP-CS2	RW/467	RC-IX
E-CP-DG/EP2	DG/441	DG-III
E-CP-DGHV/II	DG/441	DG-III
E-C-FRTP/1	RW/467	RC-XIV
E-CP-LSP/S2	SWPH-1B/441	SW-II
E-CP-C61/P001	RW/467	RC-IX
E-CP-RS	RW/467	RC-IX
E-DP-S1-1D	RW/467	RC-IX
E-IR-22	SWPH-1B/441	SW-II
E-IR-H22/P026	RB/522	R-I+
E-JB-TB/SW1508	SWPH-1B/441	SW-II
E-JB-TB/C501	CONT/471	R-II*
E-JB-TB/C522	CONT/522	R-II*
E-JB-TB/C561	CONT/488	R-II*
E-JB-TB/R301	RB/471	R-I+
E-JB-TB/R322	RB/522	R-I+
E-JB-TB/R435	RB/548	R-IV

TABLE F.4.3 (Continued)

SAFE SHUTDOWN COMPONENTS CROSS REFERENCE INDEX (AUX.-EQUIP.)

APPENDIX R DIVISION 2 SAFE SHUTDOWN AUX. EQUIP. EPN #	BLDG./ELEV.	(Note 1) FIRE AREA	APPENDIX R DIVISION 1 SAFE SHUTDOWN AUX. EQUIP. EPN #	BLDG./ELEV	(Note 2) FIRE AREA	APPENDIX R REMOTE SHUTDOWN SYSTEM AUX. EQUIP. EPN #	BLDG./ELEV.	(Note 3) FIRE AREA
E-IR-22	SWPH-1B/441	SW-II	E-IR-H22/P026	RB/522	R-I$^+$			
□E-IR-H22/P021	RB/501	R-I$^+$	E-IR-66	RB/501	R-I$^+$			
□E-IR-H22-P027	RB/522	R-I$^+$	E-JB-TB/SW1507	SWPH-1A/441	SW-I			
E-JB-TB/SW1508	SWPH1B/441	SW-II	E-JB-TB/C500	CONT/471	R-II°			
E-JB-TB/C501	CONT/471	R-II°	E-JB-TB/C560	CONT/488	R-II°			
E-JB-TB/C513	CONT/522	R-II°	E-JB-TB/R300	RB/471	R-I$^+$			
E-JB-TB/C561	CONT/488	R-II°						
⊠E-JB-TB/R301	RB/471	R-I$^+$						
⊠E-JB-TB/R313	RB/501	R-I$^+$						
E-JB-TB/R435	RB/548	R-IV						

°Unique Fire Area Main Control Room, or Containment
+Dedicated Fire Area
□These Racks Are Enclosed Within 8" Concrete Walls With Access Via a One Hour Fire Rated Door.
⊠Thermolagged

NOTES 1 - All fire areas in this column are Division 2 fire areas except as noted.
2 - All fire areas in this column are Division 1 fire areas except as noted.
3 - All fire areas in this column are external to the Main Control Room.

DELETED

There are four categories of spurious signal cables for each Appendix "R" Safe Shutdown System as they affect 1) System Component Ckts., 2) System Pwr. Distr. Ckts., 3) System Diesel Gen. Bldg., 4) Miscellaneous System Ckts.

Spurious Signal Cable Definition: Cables that are located in a design basis fire area whose circuit integrity has been compromised by "Hot Shorts" or "Open Circuits" or "Shorts to Ground" and could cause an Appendix "R" Safe Shutdown Circuit to malfunction.

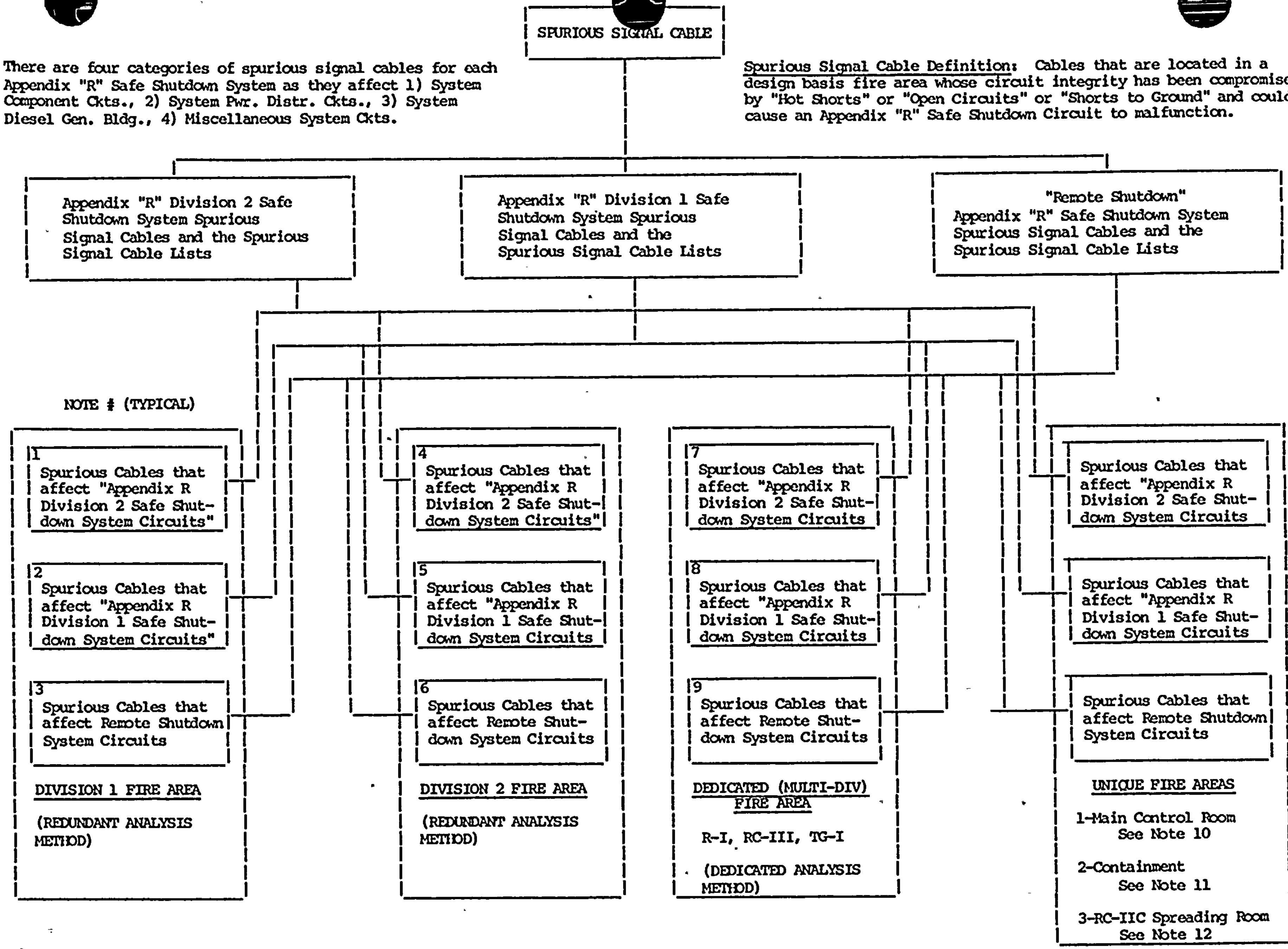


Table F.4.4

AMENDMENT NO. 37
June 1986

NOTES F.4.4:

1. These cables (if not isolated) shall be identified as Division 2 Appendix "R" safe shutdown cables while routed in this Division 1 Fire Area and protected with a fire rated barrier (thermolag). (Note these cables could be both Division 1 and Division 2 cables.)

2. These cables do not require any analysis since a design basis fire in a Division 1 fire area pre-supposes the inoperability of the Division 1 Appendix R Safe Shutdown System.

3. These cables consist of two types those that are spurious signal cable to the Division 2 Appendix "R" Safe Shutdown Cables (and the Remote Shutdown Appendix "R" Safe Shutdown cables) which should be identified per Note 1, and the second type that only affects the Remote Shutdown Appendix "R" safe shutdown cables. The second type of cables do not require any analysis since a design basis fire in a Division 1 fire area pre-supposes that the Division 2 Appendix R system is available and unaffected or protected.

4. These cables do not require any analysis since a design basis fire in a Division 2 fire area pre-supposes the inoperability of the Division 2 Appendix "R" Safe Shutdown System.

5. These cables (if not isolated) shall be identified as Division 1 Appendix "R" safe shutdown cables while routed in this Division 2 fire area and protected with a fire rated barrier (thermolag).

6. These cables do not require any analysis since a design basis fire in a Division 2 fire area pre-supposes that the Division 1 Safe Shutdown System is available and unaffected or in the particular case that Note 5 applies they would be protected with a fire rated barrier.

7. These cables (if not isolated) shall be identified as Division 2 Appendix "R" safe shutdown cables while routed in this multi-division dedicated fire area and protected with a fire rated barrier.

NOTES F.4.4: (Continued)

8. These cables do not require analysis since a design basis fire in a dedicated fire area pre-supposes that all Division 1 Appendix "R" Safe Shutdown cables are lost.

9. These cables consist of two types those that are identified per Note 7 and those that only affect the Remote Shutdown Appendix "R" Safe Shutdown System. Those cables that only affect Remote Shutdown Appendix "R" Safe Shutdown System should be isolated from the Division 2 system by acceptable isolation devices.

10. In the Main Control Room all spurious signal cables affecting the Remote Shutdown Appendix "R" Safe Shutdown System should be isolated from the effects of a Main Control Room fire. All spurious signal cables that affect only the Division 2 Appendix "R" Safe Shutdown System and not the Remote Shutdown Appendix "R" Safe Shutdown cables and all spurious signals to the Division 1 Appendix "R" Safe Shutdown System do not require analysis since a DBF pre-supposes the loss of these cables.

11. The containment is inerted and no fire hazard is postulated.

12. The Cable Spreading Room RC-IIC fire zone consists of a 20' area between Fire Zones RC-IIA & B of no intervening combustibles. All cables in trays require a 1-hour fire rated barrier, while only the division 1 & 2 Appendix R Safe Shutdown System cables and their spurious signal cables that are routed in conduit in this fire zone require a one hour rated barrier. All other cables enclosed in conduit in this fire zone do not require a one hour fire rated barrier. This fire area is also protected with an automatic sprinkler and fire detection system.

TABLE F.4.4a

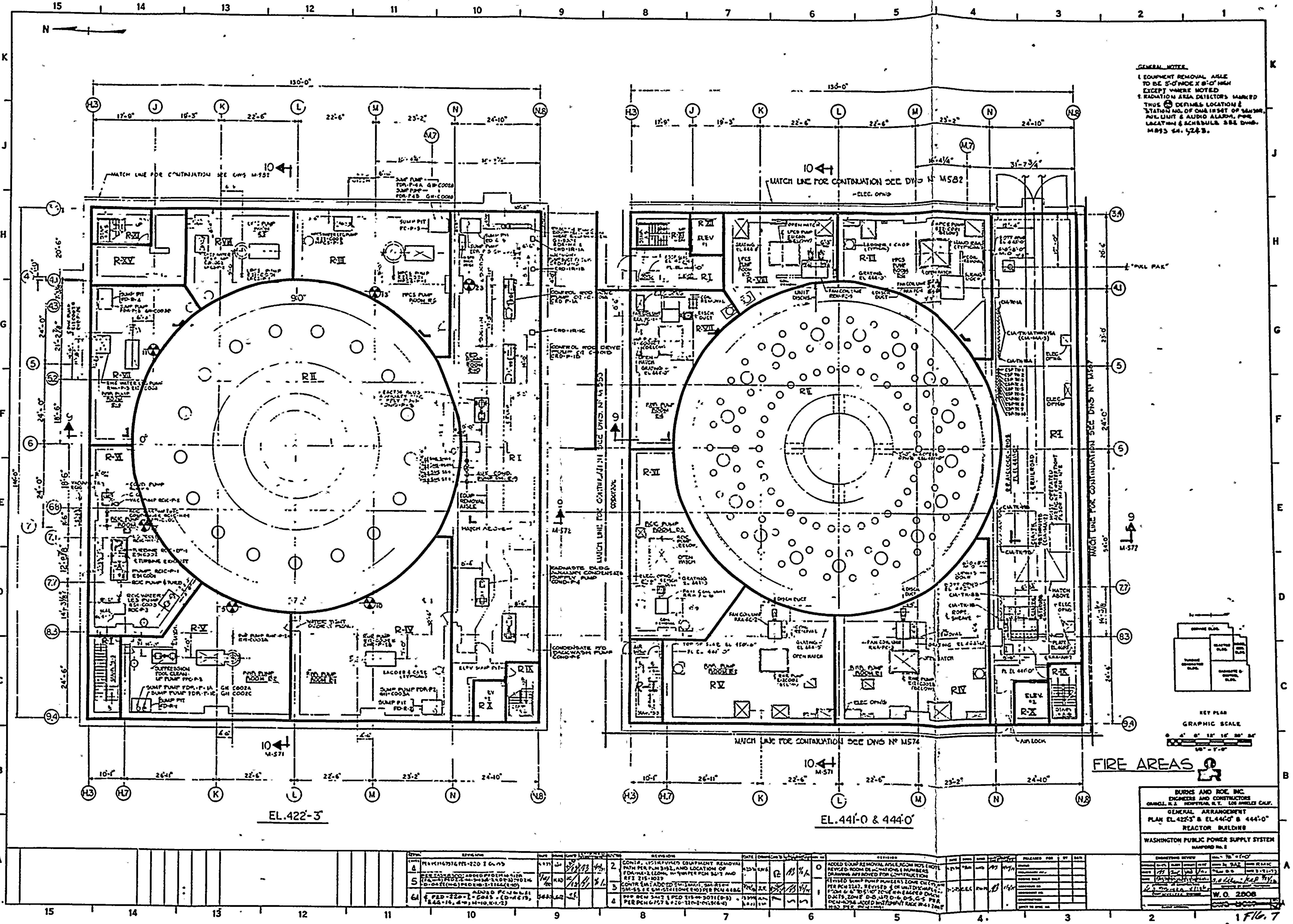
SPURIOUS SIGNAL CABLES REQUIRING PROTECTION

APPENDIX R DIVISION 2 SPURIOUS SIGNAL CABLES						APPENDIX R DIVISION 1 SPURIOUS SIGNAL CABLES		APPENDIX R REMOTE SHUTDOWN SPURIOUS SIGNAL CABLES	
	Div. 1 & Dedicated Fire Areas								
CABLE NUMBER	RC-IIA	RC-III	TG-I	R-I	RC-IIC	CABLE NUMBER	Div. 2 Fire Areas	CABLE NUMBER	Main Control Room
2DG2-26	X	X	X					None	
2DG2-31		X	X						
2DG2-44	X	X	X						
2DG2-45	X	X	X						
2DG2-94		X	X						
2DG2-101		X	X						
2M12D-10		X	X						
2M12D-11		X	X						
2M12D-20		X	X						
2M12D-21		X	X						
2M12D-30		X	X						
2M12D-31		X	X						
2M12D-40		X	X						
2M12D-41		X	X						
2SM28-11	X	X	X						
2SM28-12		X	X						
2SM28-13		X	X						
2SM28-14		X	X						
2SM8-11	X								
2SM8-21	X								
2SM8-31	X								
2SM8-35		X	X						
2SM8-41	X								
2SM8-111	X								
2SM8-115		X	X						
2SM8-116		X	X						
2SM8-121	X								
2SM8-211	X	X	X						
2SM8-235	X								
2SM8-236	X								
2SM8-237	X								
BSM8-9038	X								
BSM8-9101	X								

TABLE F.4.4a (Continued)

SPURIOUS SIGNAL CABLES REQUIRING PROTECTION

APPENDIX R DIVISION 2 SPURIOUS SIGNAL CABLES						APPENDIX R DIVISION 1 SPURIOUS SIGNAL CABLES		APPENDIX R REMOTE SHUTDOWN SPURIOUS SIGNAL CABLES	
CABLE NUMBER	Div. 1 & Dedicated Fire Areas					CABLE NUMBER	Div. 2 Fire Areas	CABLE NUMBER	Main Control Room
2DG2-23		X	X						
2DG2-24		X	X						
2DG2-41		X	X						
2DG2-47		X	X						
2DG2-50		X	X						
2DG2-106	X								
2DG2-107	X								
2SM8-257		X	X						
2SM8-131	X	X							
2RHR-10		X		X					
2RHR-11		X		X					
2RHR-12		X		X					
2RHR-14		X		X					
2RHR-42		X		X					
2RHR-76		X		X					
2RHR-105		X		X					
2COV5-3		X			X				
2SM8-84					X				
BSL81-9041					X				
BSL81-9054					X				



TI APERTURE CARD

Also Available On Aperture Card

8604100214-01

[illegible]

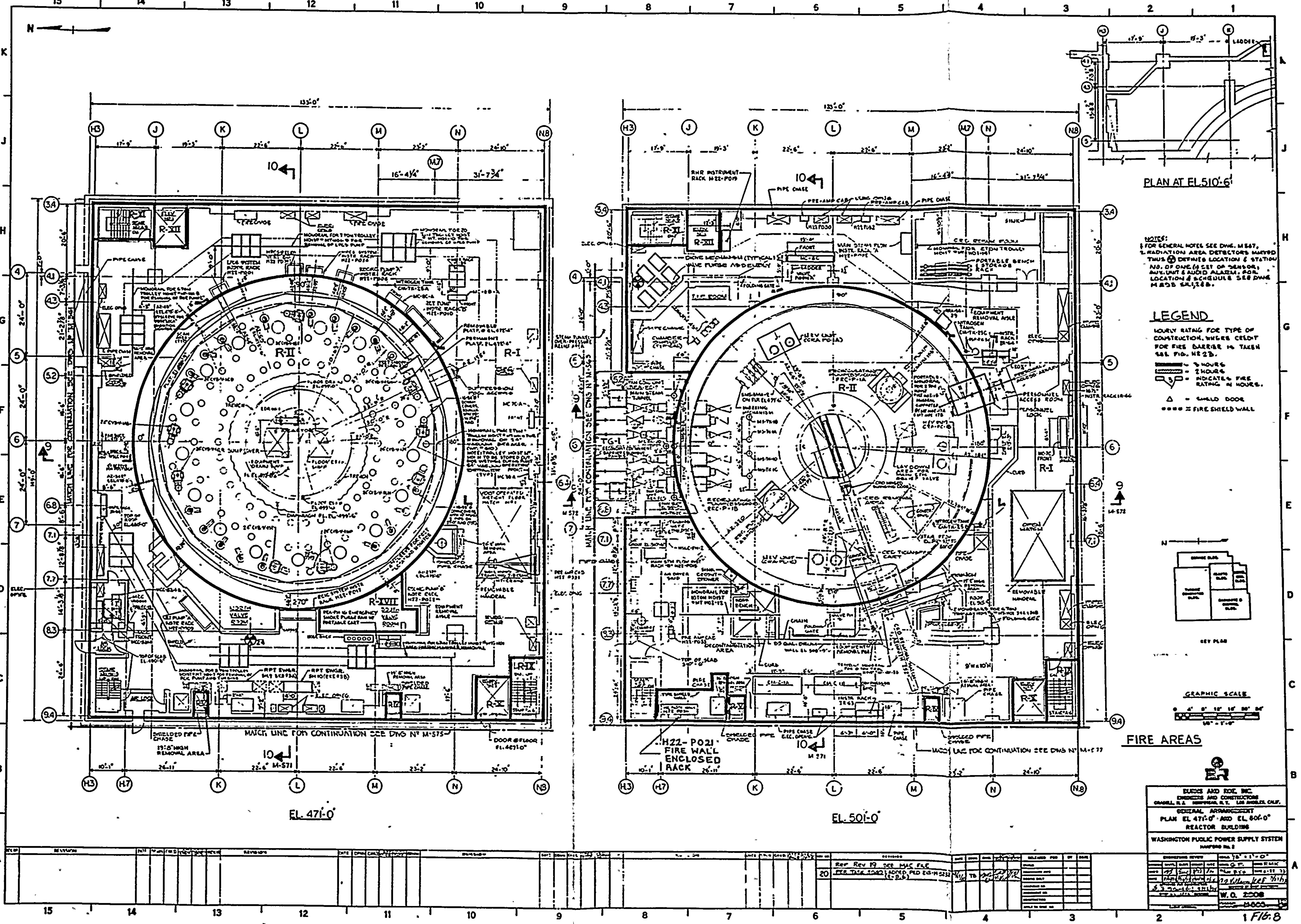
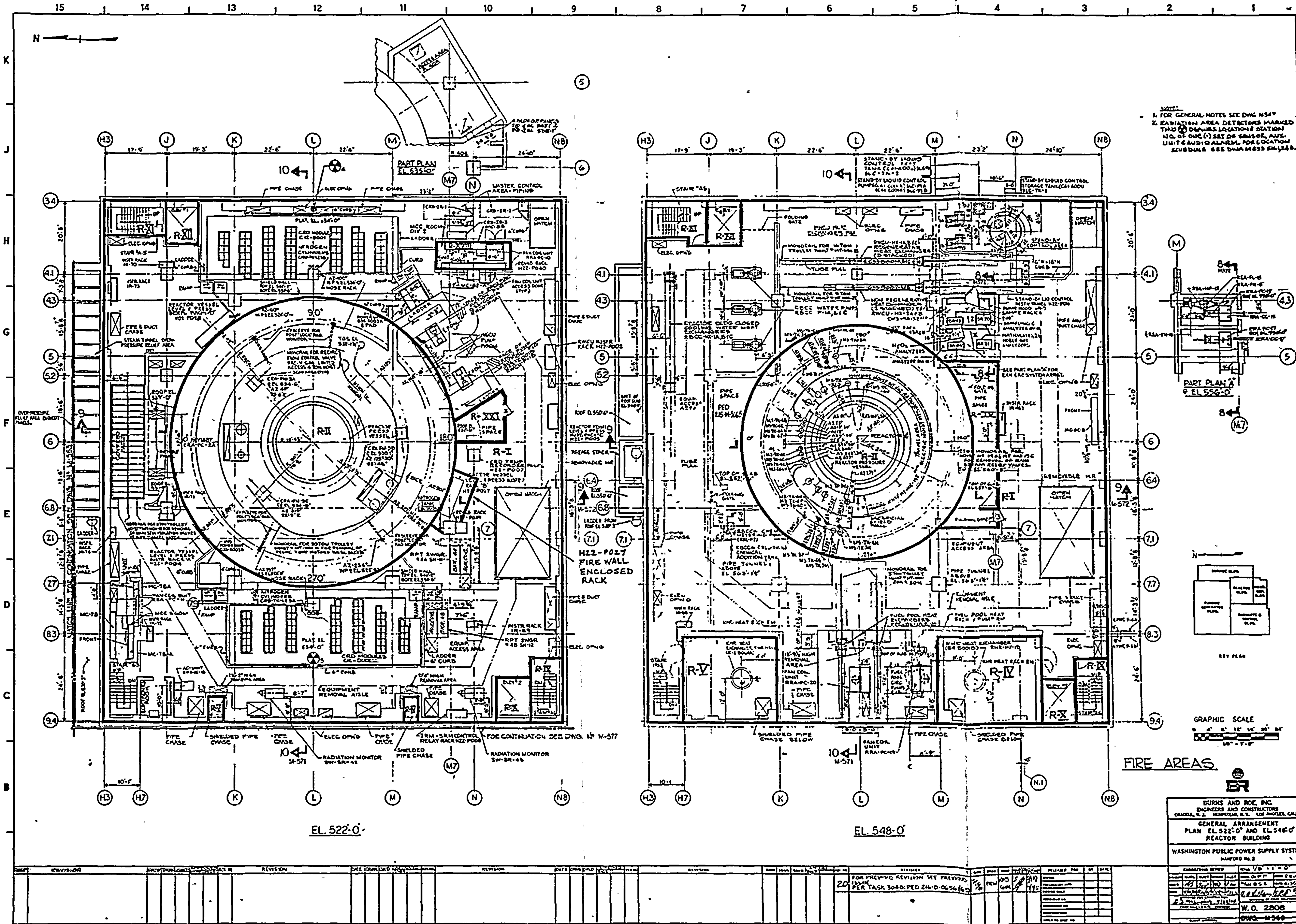


FIG. 8

TI APERTURE CARD

Also Available On Aperture Card

8604100214-02



TI APERTURE CARD

Also Available On Aperture Card

FIG. 9

8604100214-03

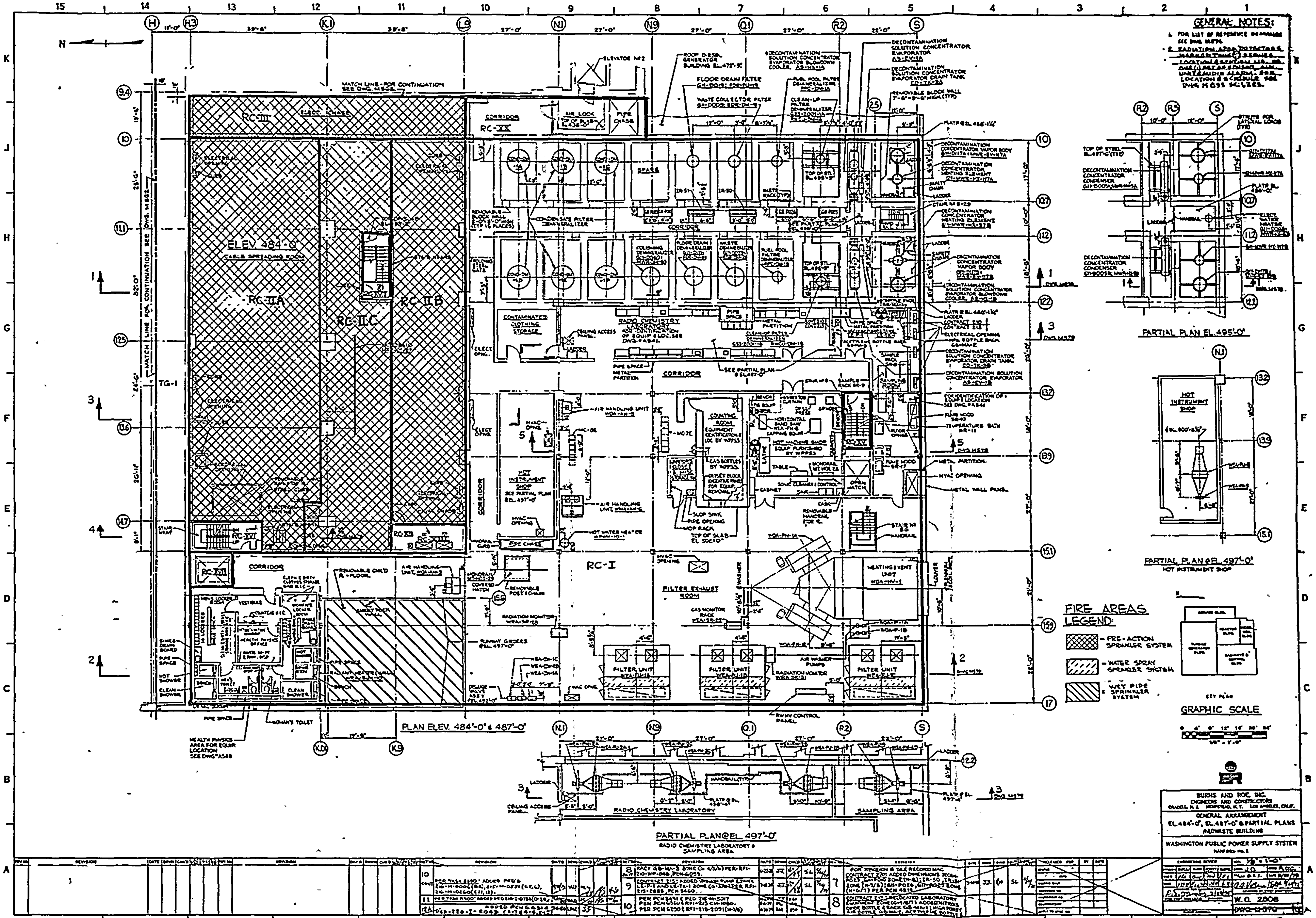


FIG. 13

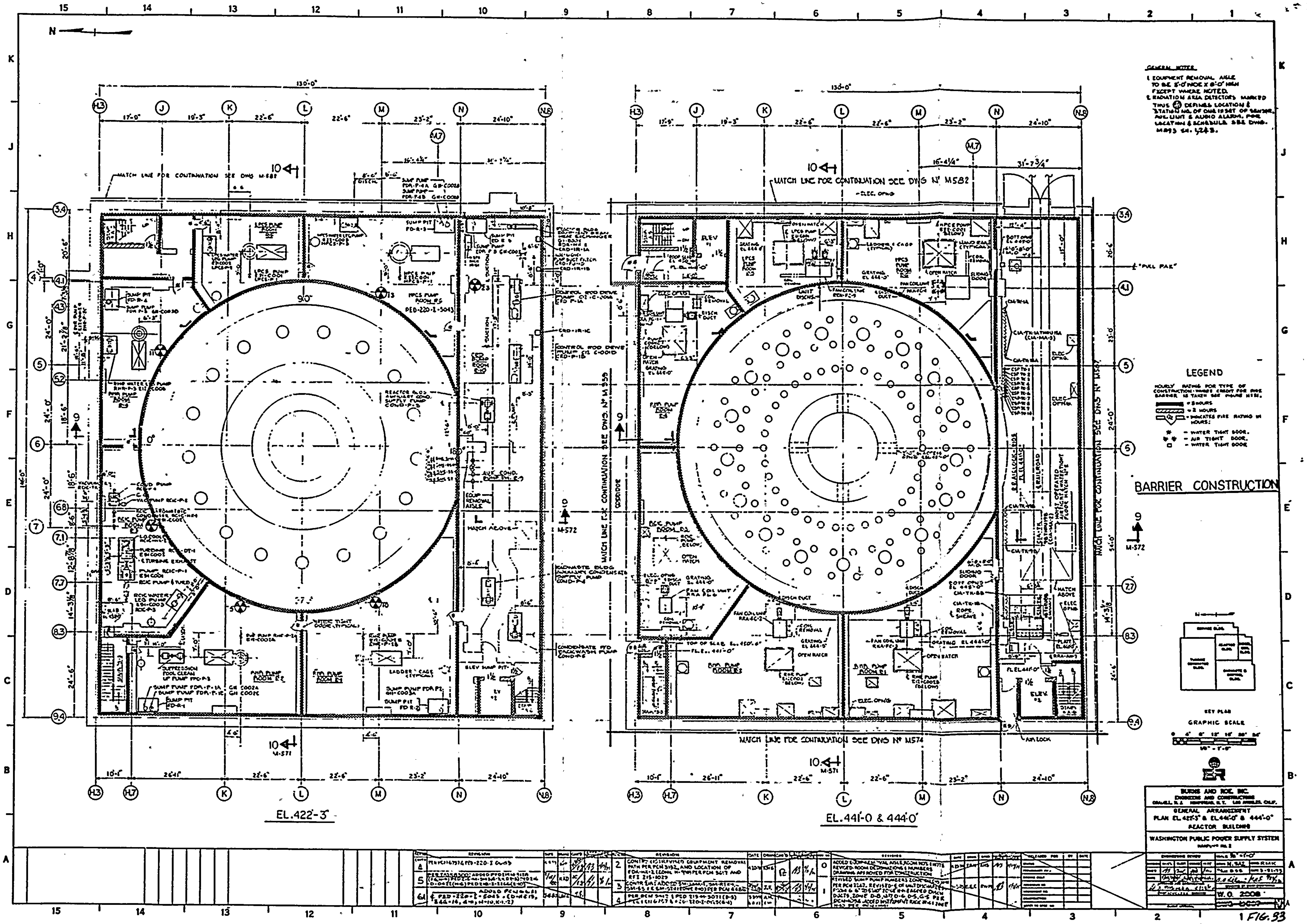
TI APERTURE CARD

Also Available On Aperture Card

8604100214-04

TI
APERTURE
CARD

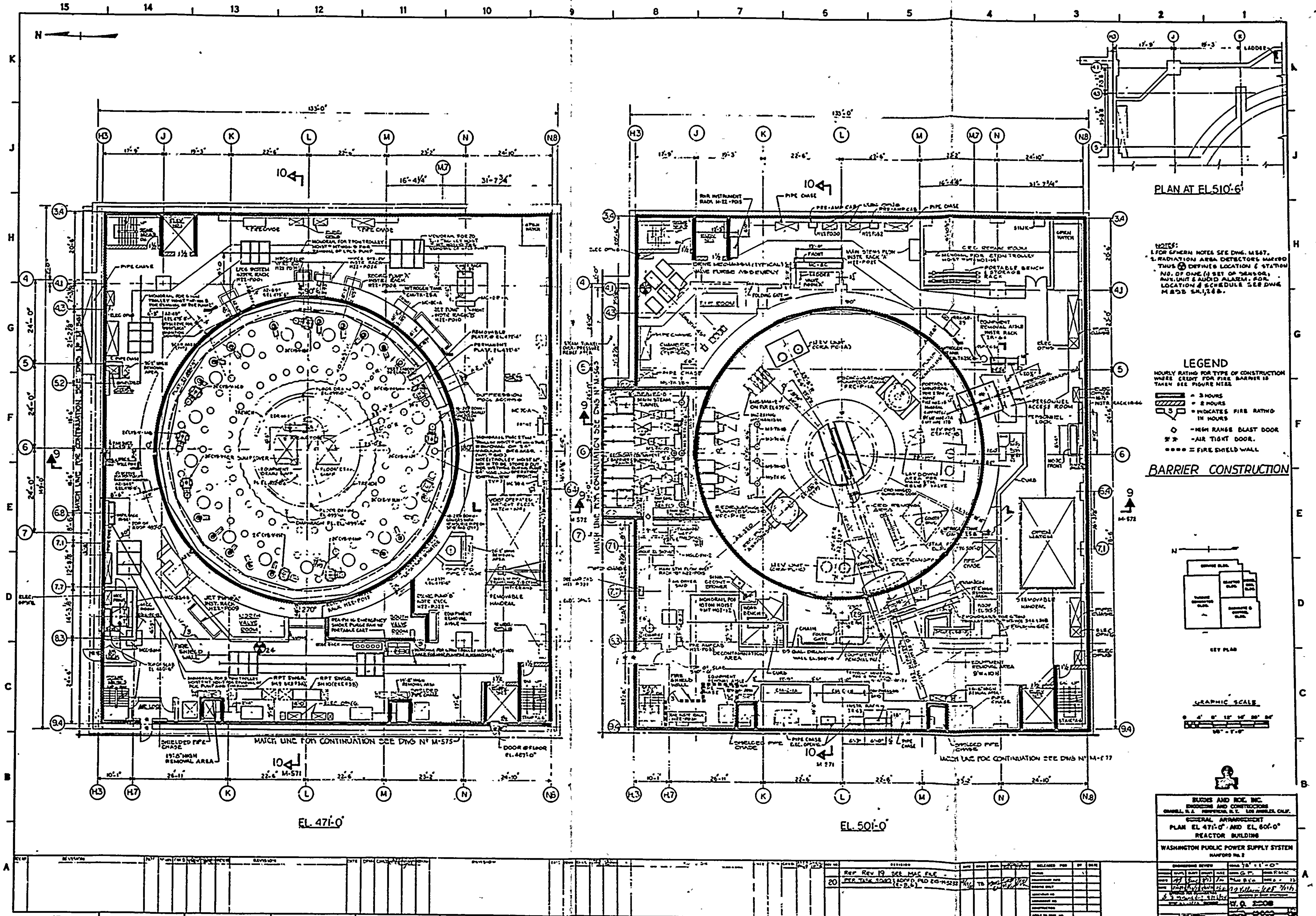
Also Available On
Aperture Card



8604100214-05

TI APERTURE CARD

Also Available On Aperture Card



8604100214-06

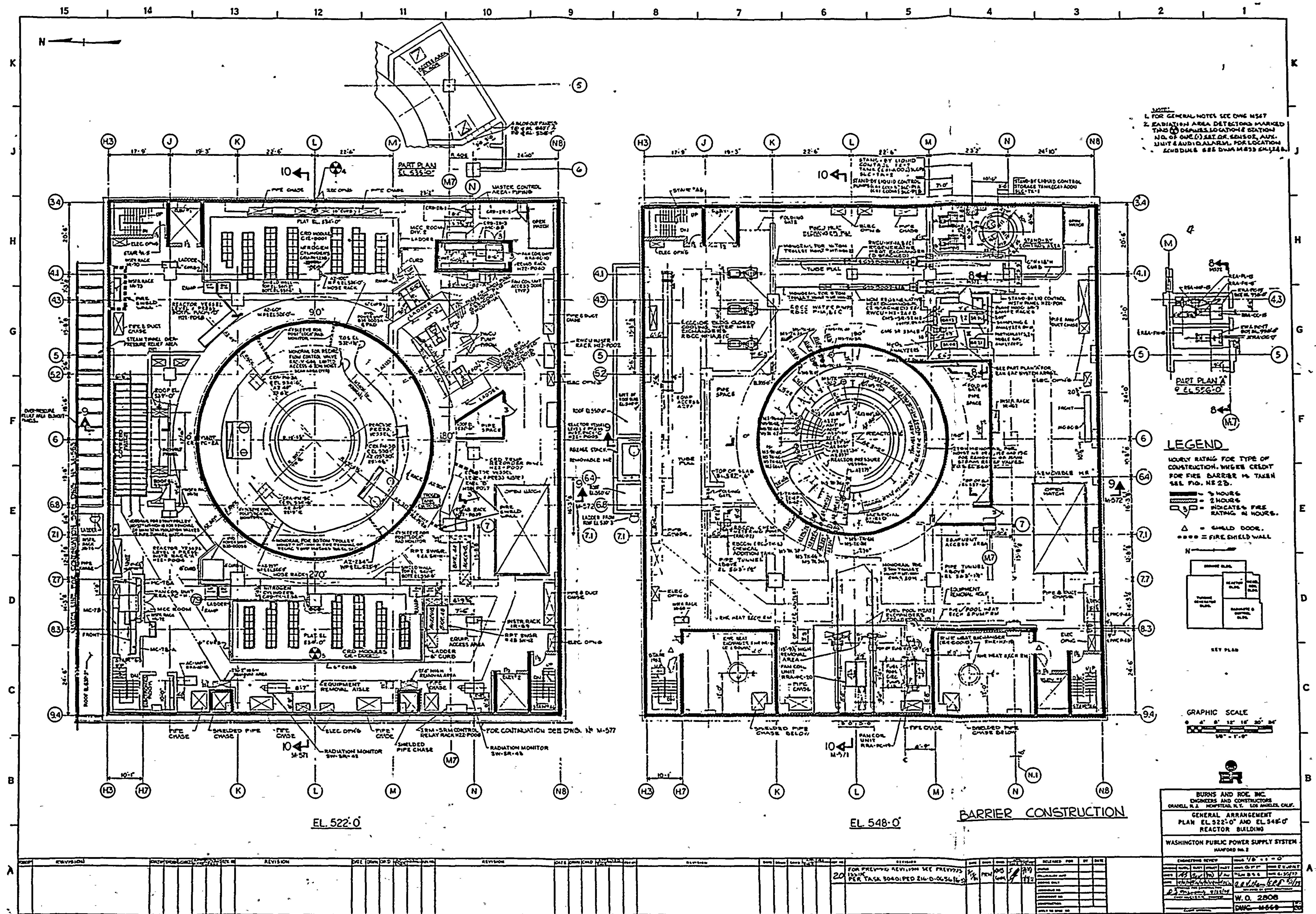
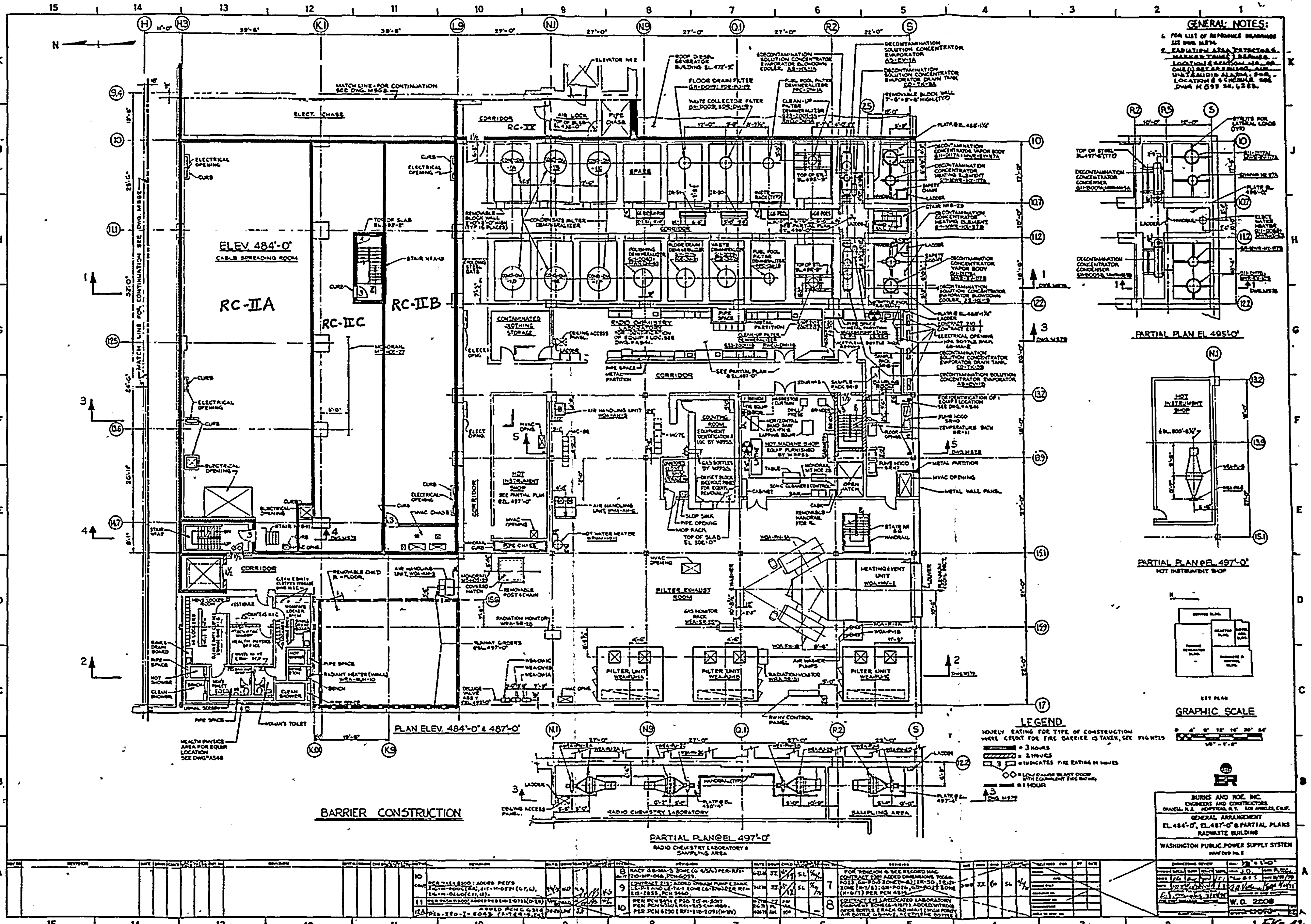


FIG. 35

TI APERTURE CARD

Also Available On Aperture Card

8604100214-07



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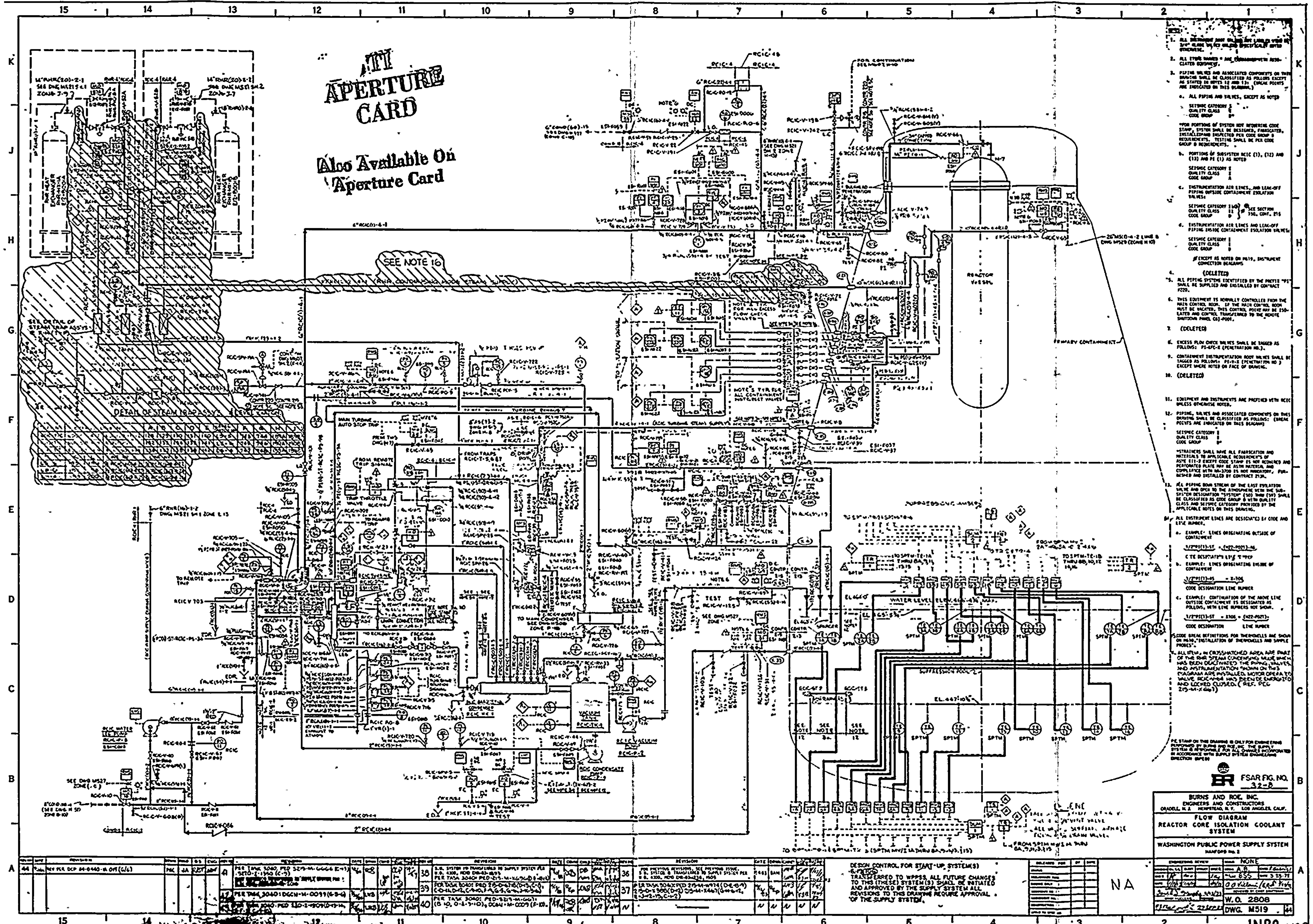
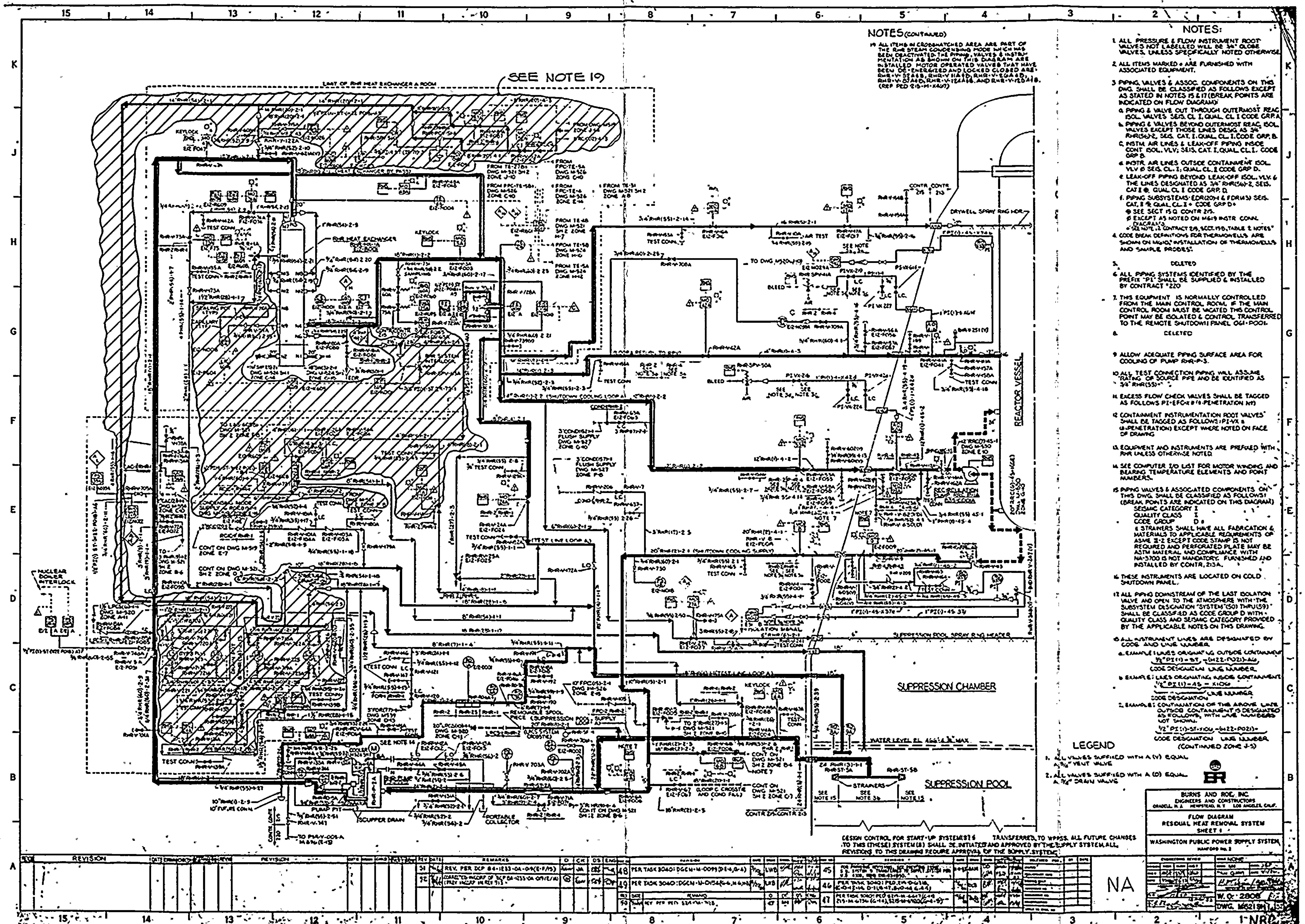


RED— Dedicated Shutdown Path

GREEN—Redundant Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM SUPPRESSION POOL INSTRUMENTATION		FIGURE 76
	Draw. No. M519	Rev. 44	Sheet 1 Of 18	Rev. 0

8604100214-09



ATI APERTURE CARD

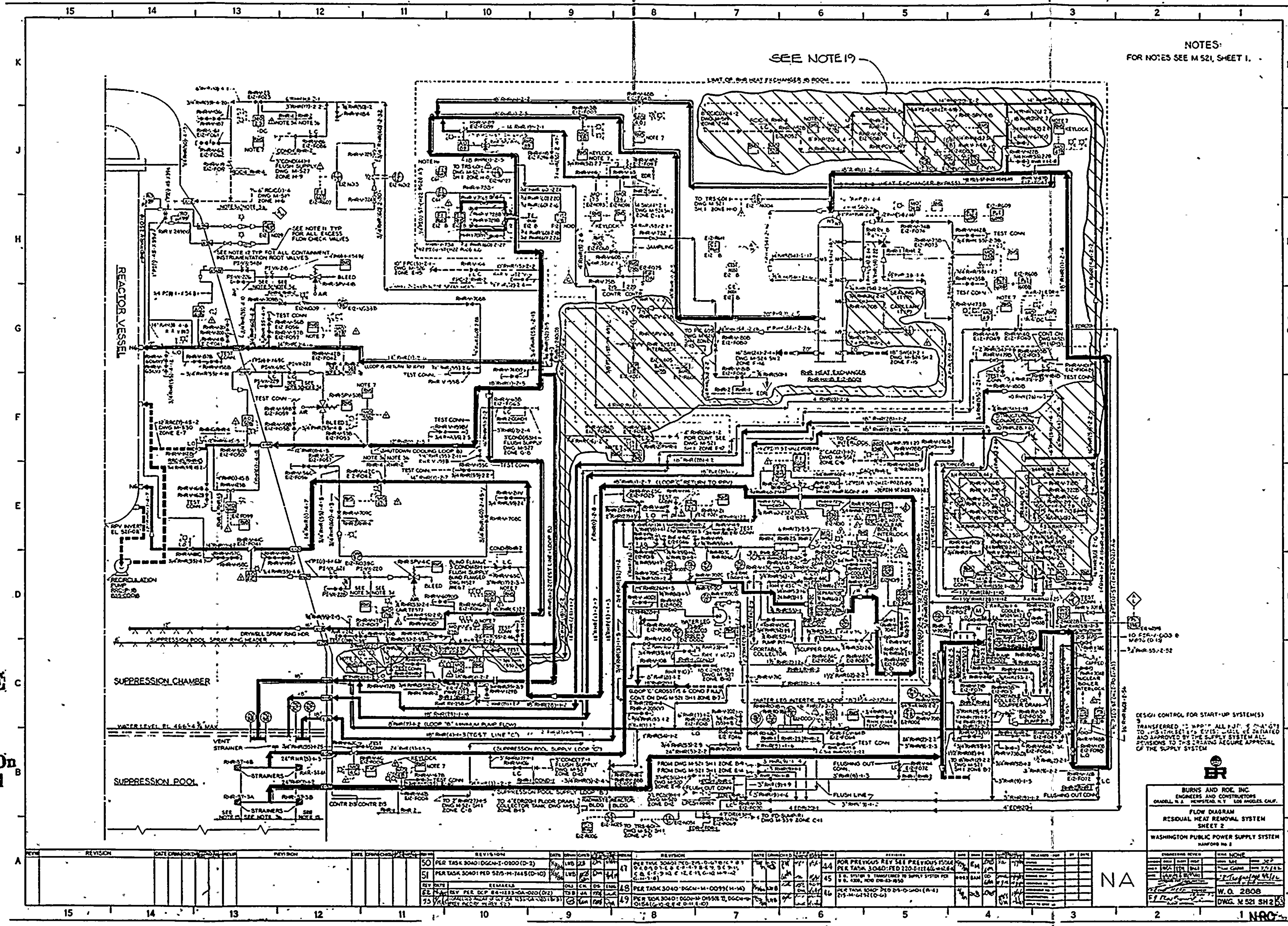
Also Available On Aperture Card

RED— Dedicated Shutdown Path

GREEN—Redundant Shutdown Path

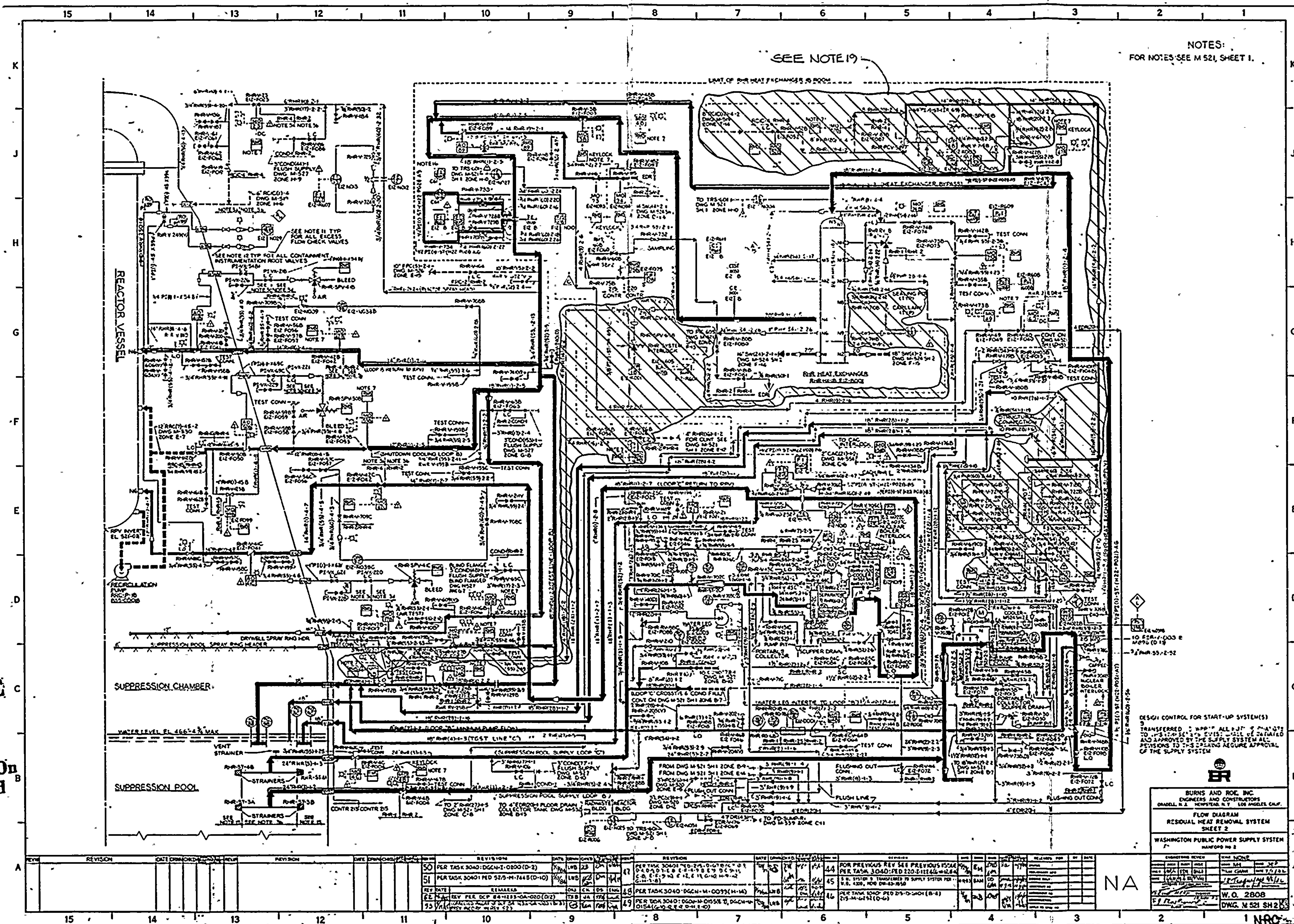
WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 1 RHR SYSTEM		FIGURE 77
	Draw No. M521-1	Rev. 52	Sheet 2 Of 18	Rev. 0

8604100214-10



RED— Dedicated Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 2 RHR SYSTEM		FIGURE 78
	Draw No. M524-1	Rev. 53	Sheet 3 Of 18	Rev. 0



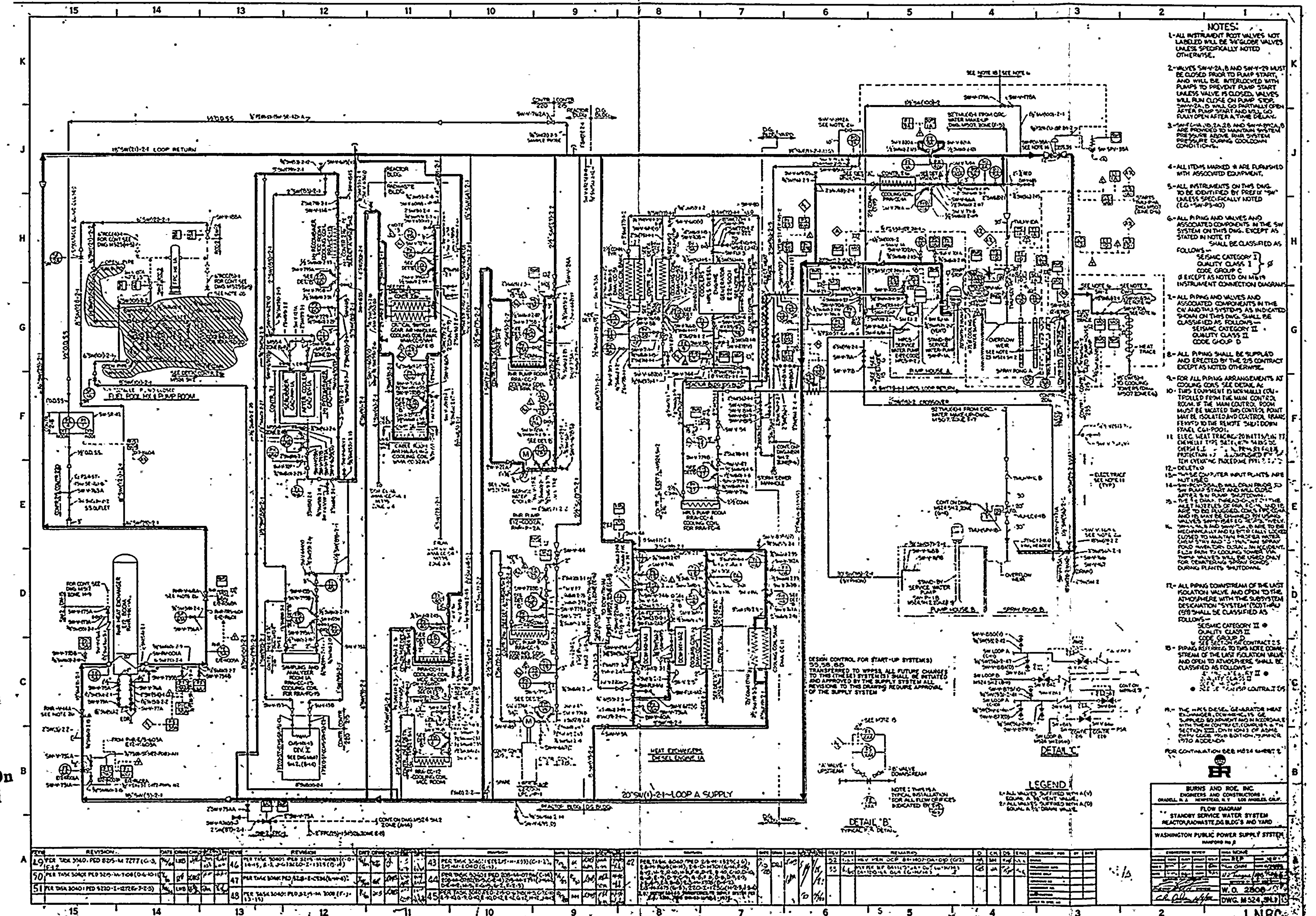
TI APERTURE CARD

Also Available On Aperture Card

BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM REMOTE SHUTDOWN RHR SYSTEM			FIGURE 79
	Draw No. M521-2	Rev. 53	Sheet 4 Of 18	Rev. 0	

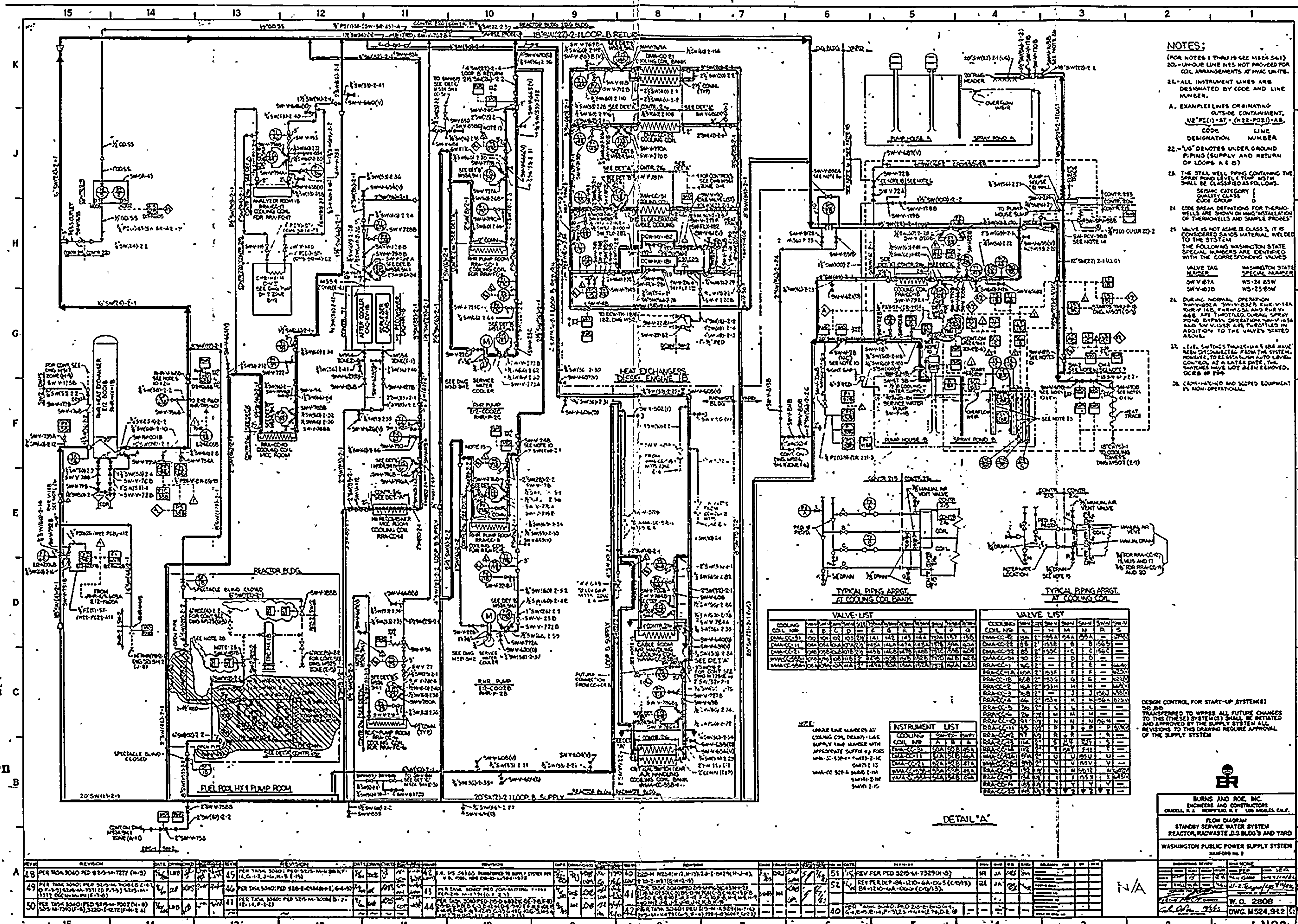
8604100214-12



GREEN—Redundant Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 1 STANDBY SERV. WATER SYSTEM	FIGURE 80
	Draw No. M524-1	Sheet 5 Of 18	Rev. 0

8604100214-/3



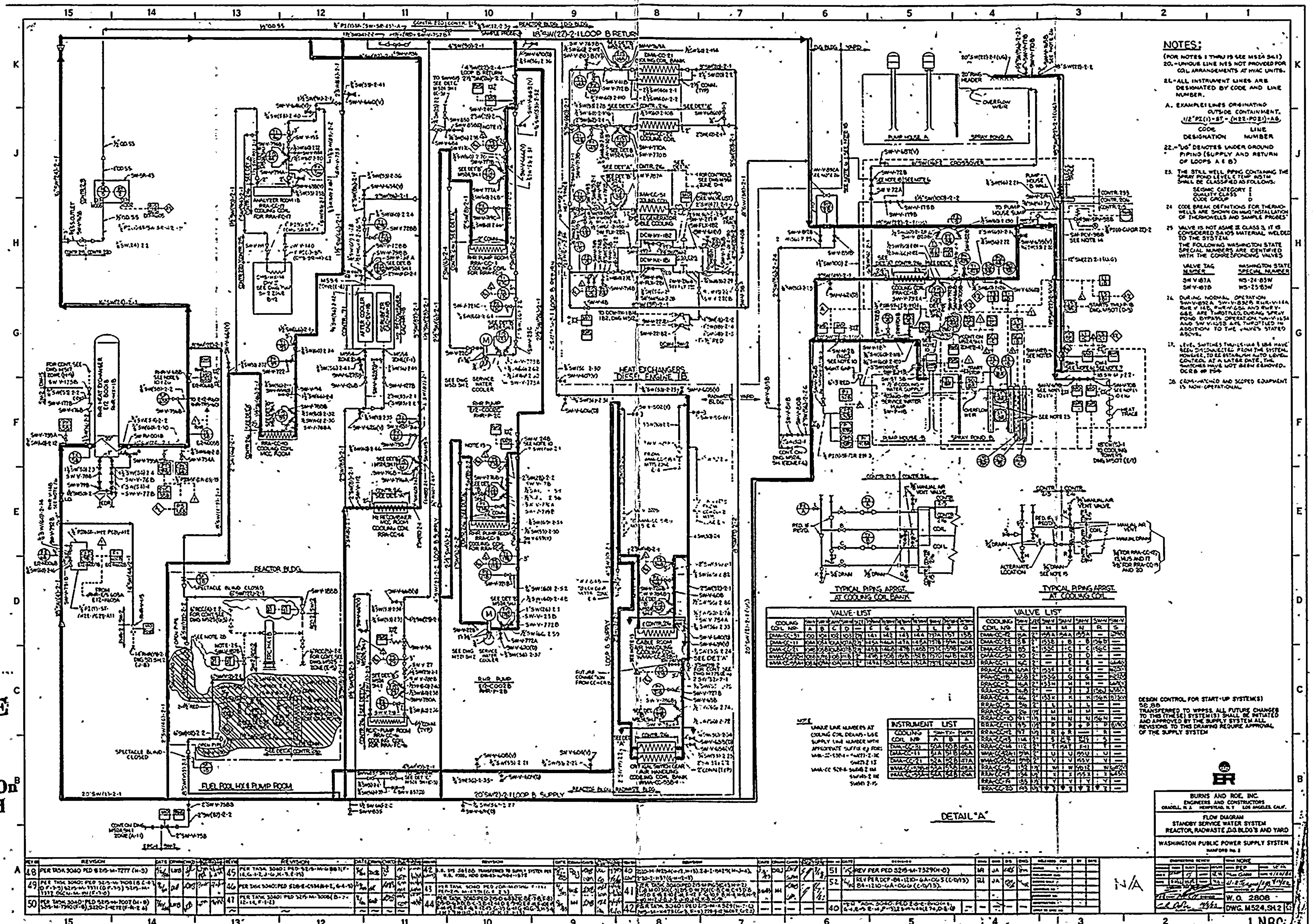
RED— Dedicated Shutdown Path

AT APERTURE CARD

Also Available On Aperture Card

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 2 STANDBY SERV. WATER SYSTEM		FIGURE 81
	Draw. No. M524-2	Rev. 52	Sheet 6 Of 18	Rev. 0

8604100214-14



BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
NUCLEAR PLANT 2

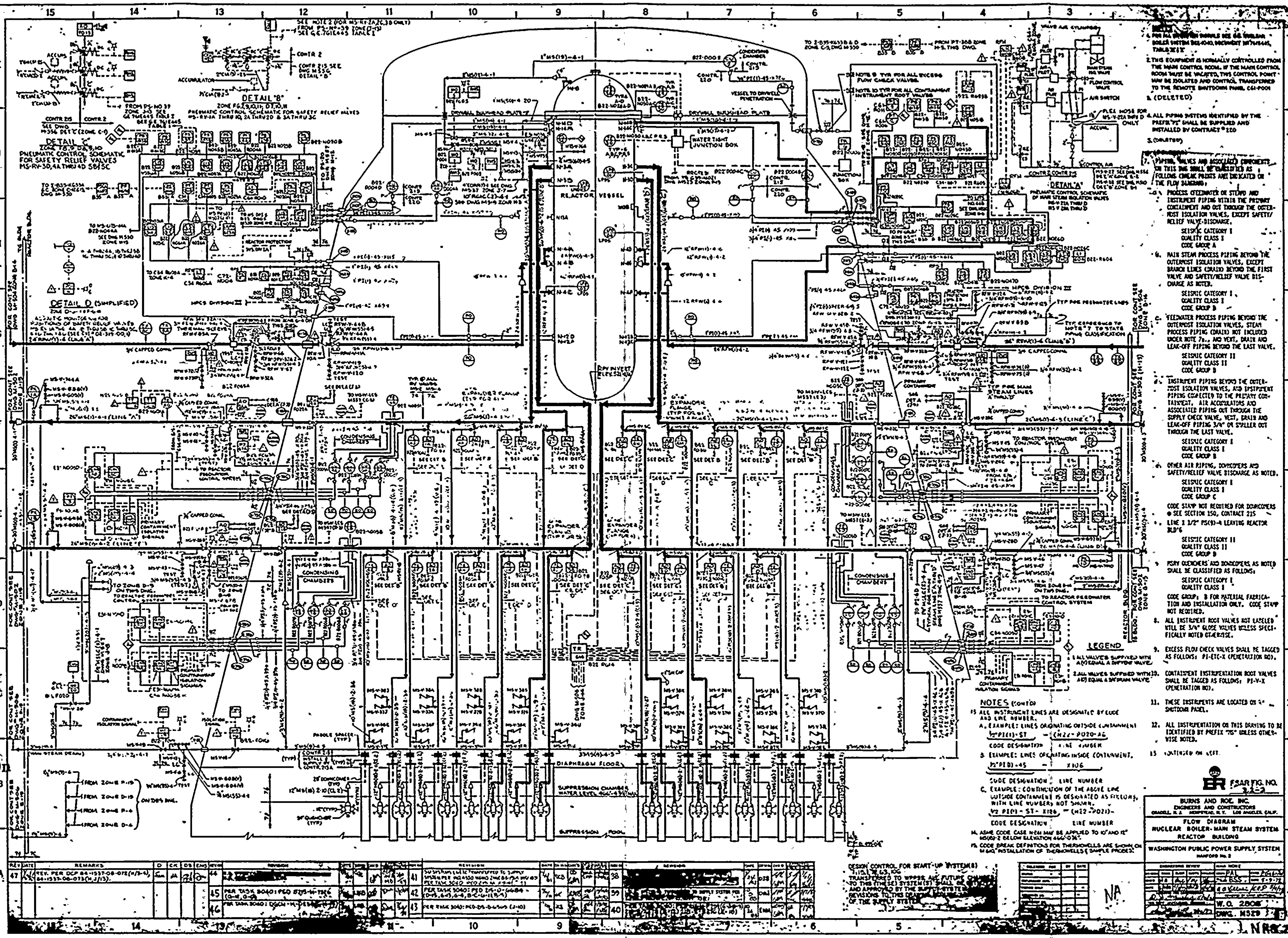
APPENDIX R

SAFE SHUTDOWN PATH FLOW DIAGRAM
REMOTE SHUTDOWN - STANDBY SERV. WATER SYSTEM

FIGURE 82

Draw. No. M524-2 | Rev. 52 | Sheet 7 Of 18 | Rev. 0

8604100214-15



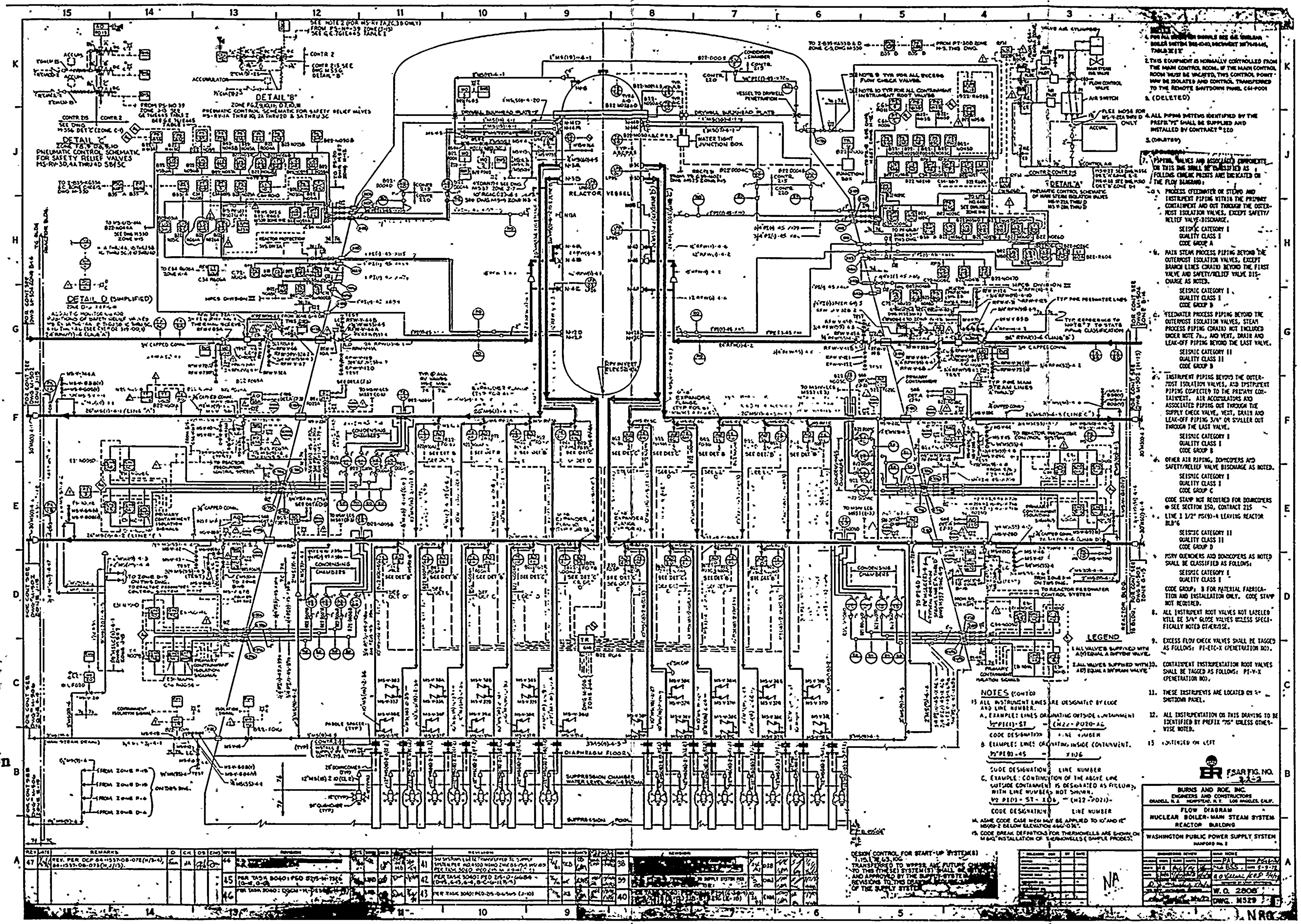
RED— Dedicated Shutdown Path

AM APERTURE CARD

Also Available On Aperture Card

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 2 - MAIN STEAM SYSTEM	FIGURE 83
	Draw. No. M529	Rev. 47 / Sheet 8 Of 18	Rev. 0

8604100214-16



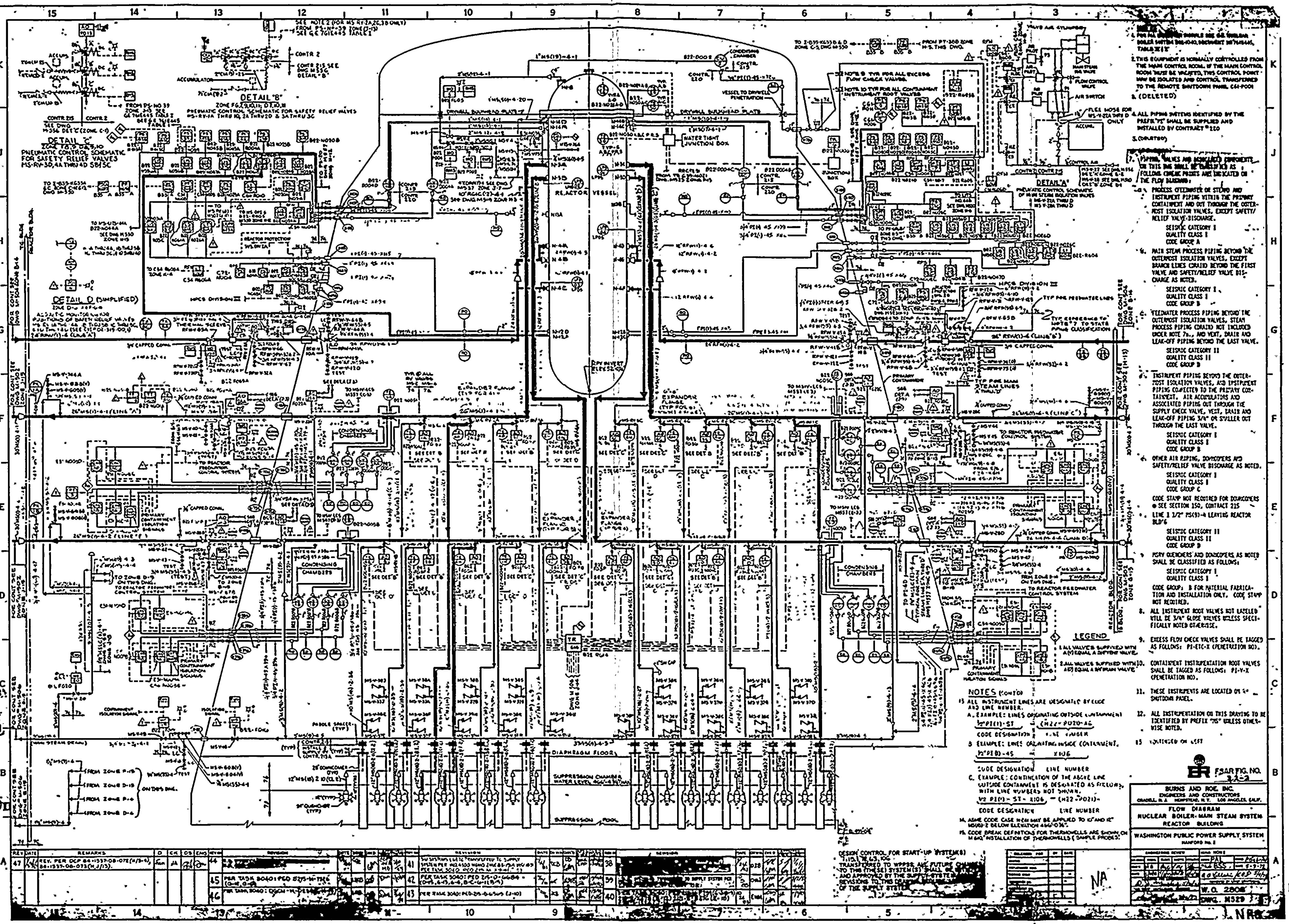
ATI APERTURE CARD

Also Available On Aperture Card

GREEN—Redundant Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIVISION 1 - MAIN STEAM SYSTEM			FIGURE 84
	Draw. No. M529	Rev. 47	Sheet 9 Of 18	Rev. 0	

8604100214-17



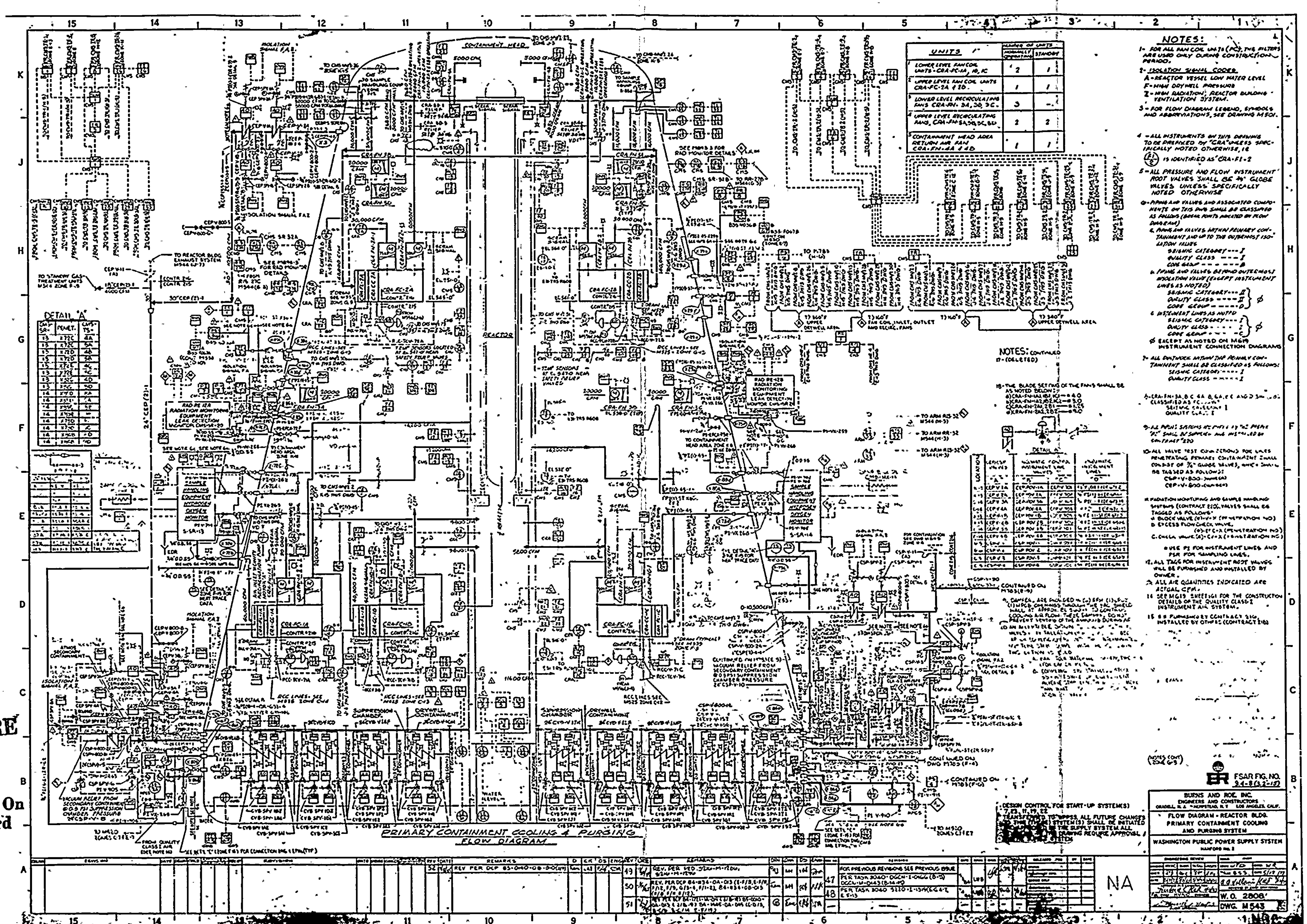
BLUE— Remote Shutdown Path

APERTURE CARD

Also Available On Aperture Card

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM REMOTE SHUTDOWN - MAIN STEAM SYSTEM			FIGURE 85
	Draw No. M529	Rev. 0	Sheet 10 Of 18	Rev. 47	

8604100214-18



RED— Dedicated Shutdown Path

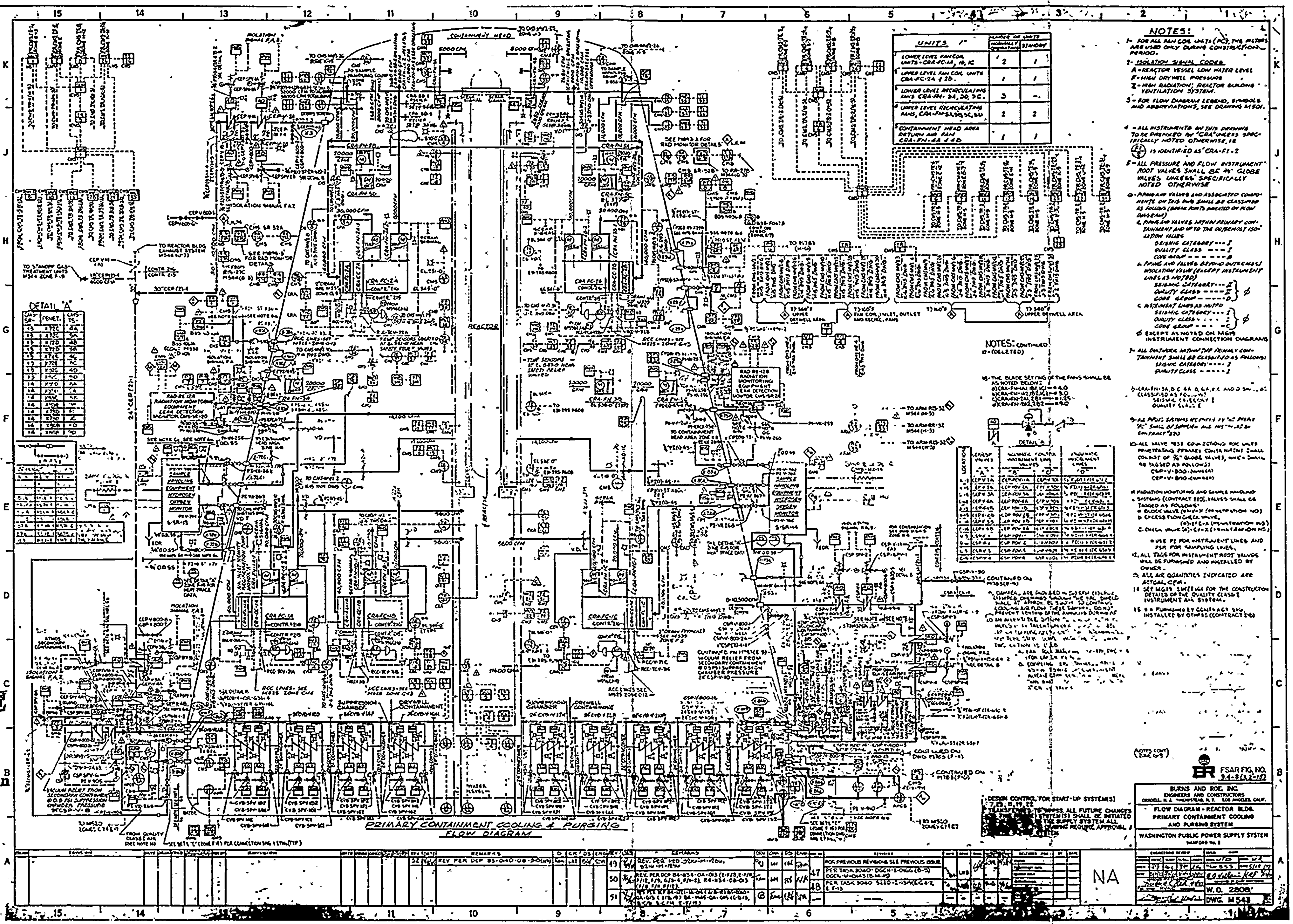
GREEN—Redundant Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIV. 2 & DIV. 1 - PRIMARY CONT. COOLING INSTRUMENTATION			FIGURE 86
	Draw No. M543	Rev. 52	Sheet 11 Of 18	Rev. 0	

8604100214-19

APERTURE CARD

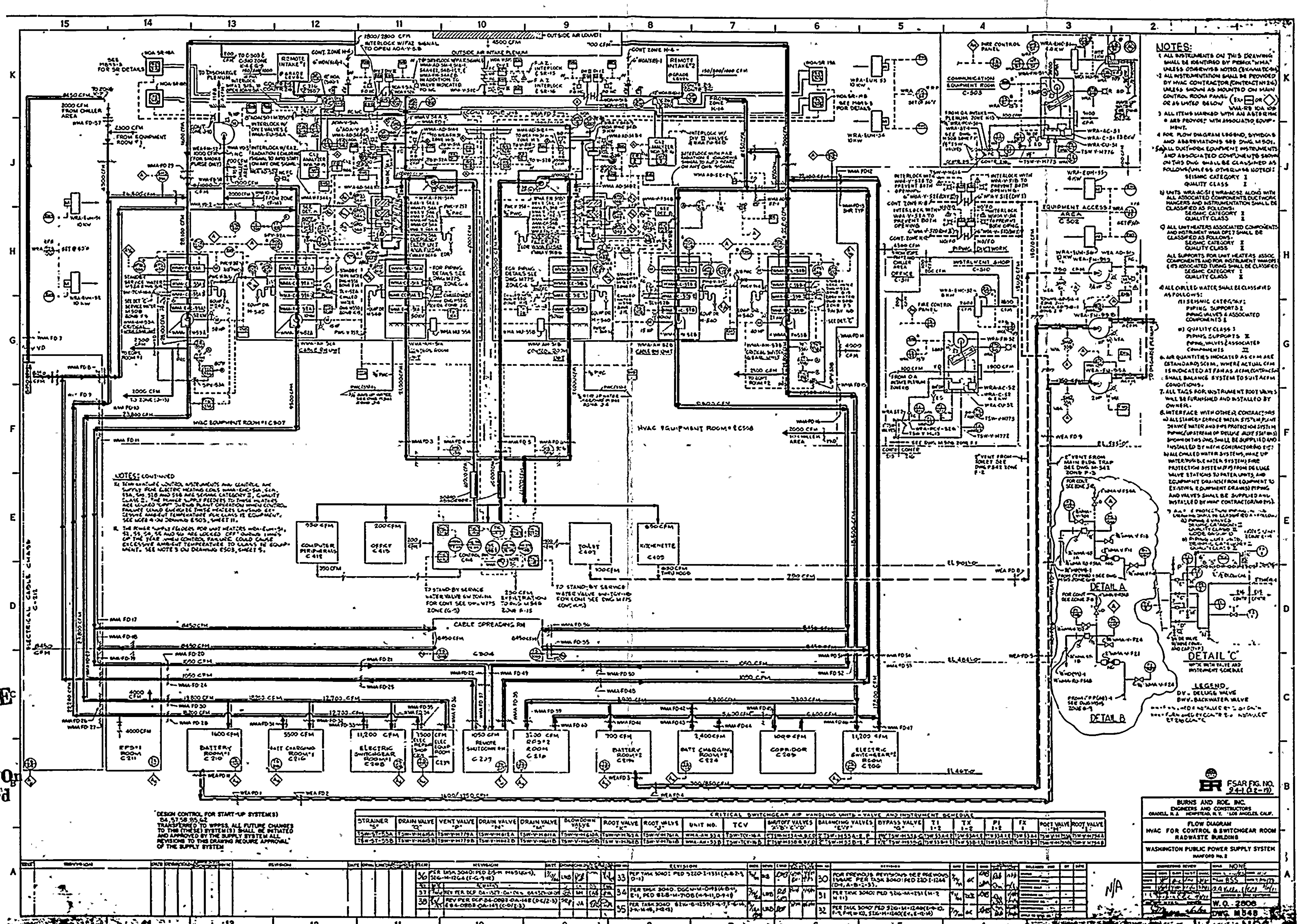
Also Available On Aperture Card



BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R SAFE SHUTDOWN PATH FLOW DIAGRAM REMOTE SHUTDOWN - PRIMARY CONT. COOLING INSTRUMENTATION				FIGURE 87
	Draw. No. M543	Rev. 52	Sheet 12 Of 18	Rev. 0	

8604100214-20



RED— Dedicated Shutdown Path

GREEN—Redundant Shutdown Path

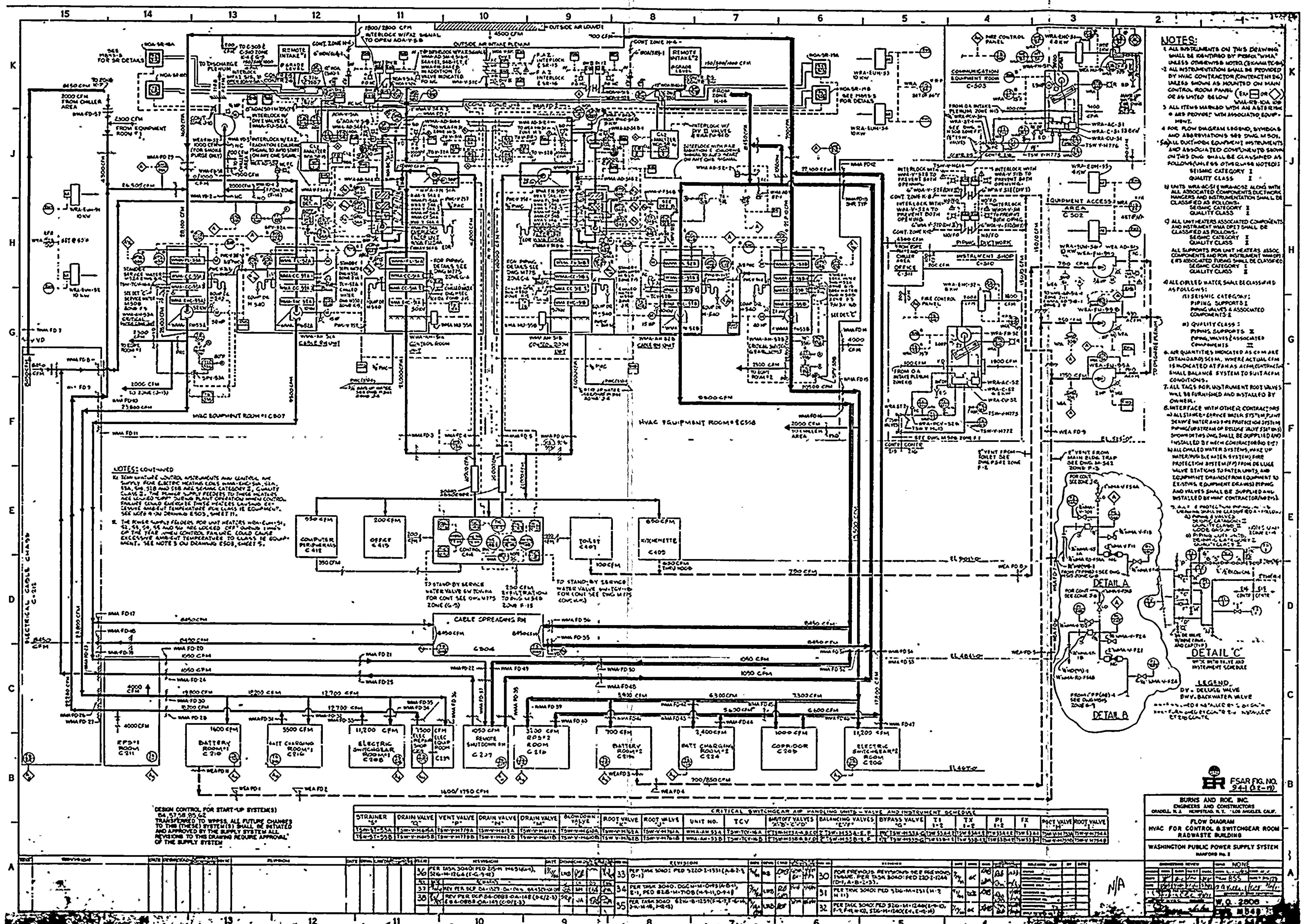
TI APERTURE CARD

Also Available On Aperture Card

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIV. 2 - & DIV. 1 - HVAC SYST. FOR CONT. RM & SWGR RM.	FIGURE 88
	Draw. No. M548	Rev. 38 — Sheet 13 Of 18 — Rev. 0	

851074.11A

8604100214-21



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BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
NUCLEAR PLANT 2

APPENDIX R

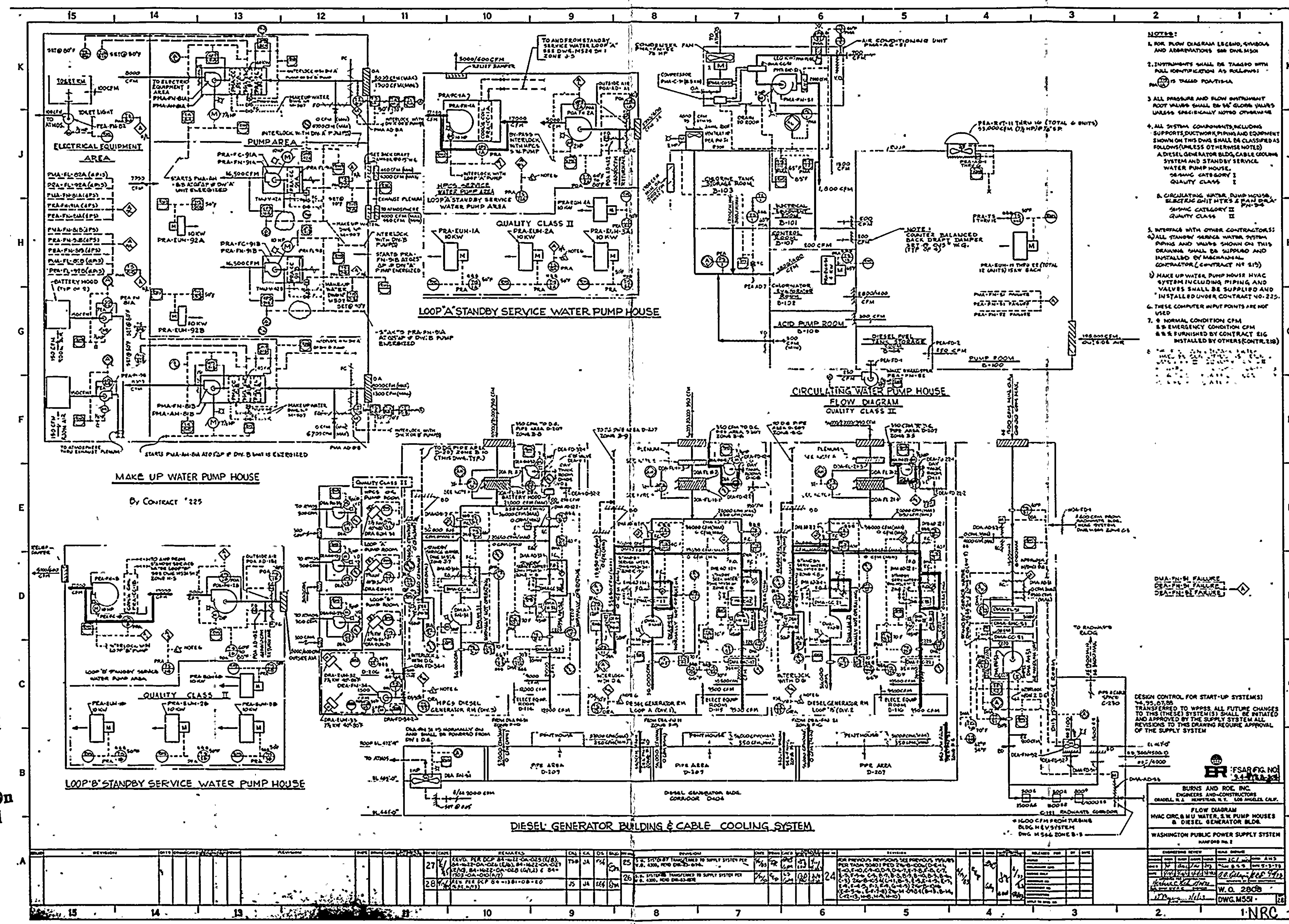
SAFE SHUTDOWN PATH FLOW DIAGRAM
REMOTE SHUTDOWN - HVAC SYST.
FOR CONT. RM & SWGR RM.

FIGURE 89

Draw. No. M548 | Rev. 38 | Sheet 14 Of 18 | Rev. 0

851074.11A

8604100214-22



RED— Dedicated Shutdown Path

GREEN—Redundant Shutdown Path

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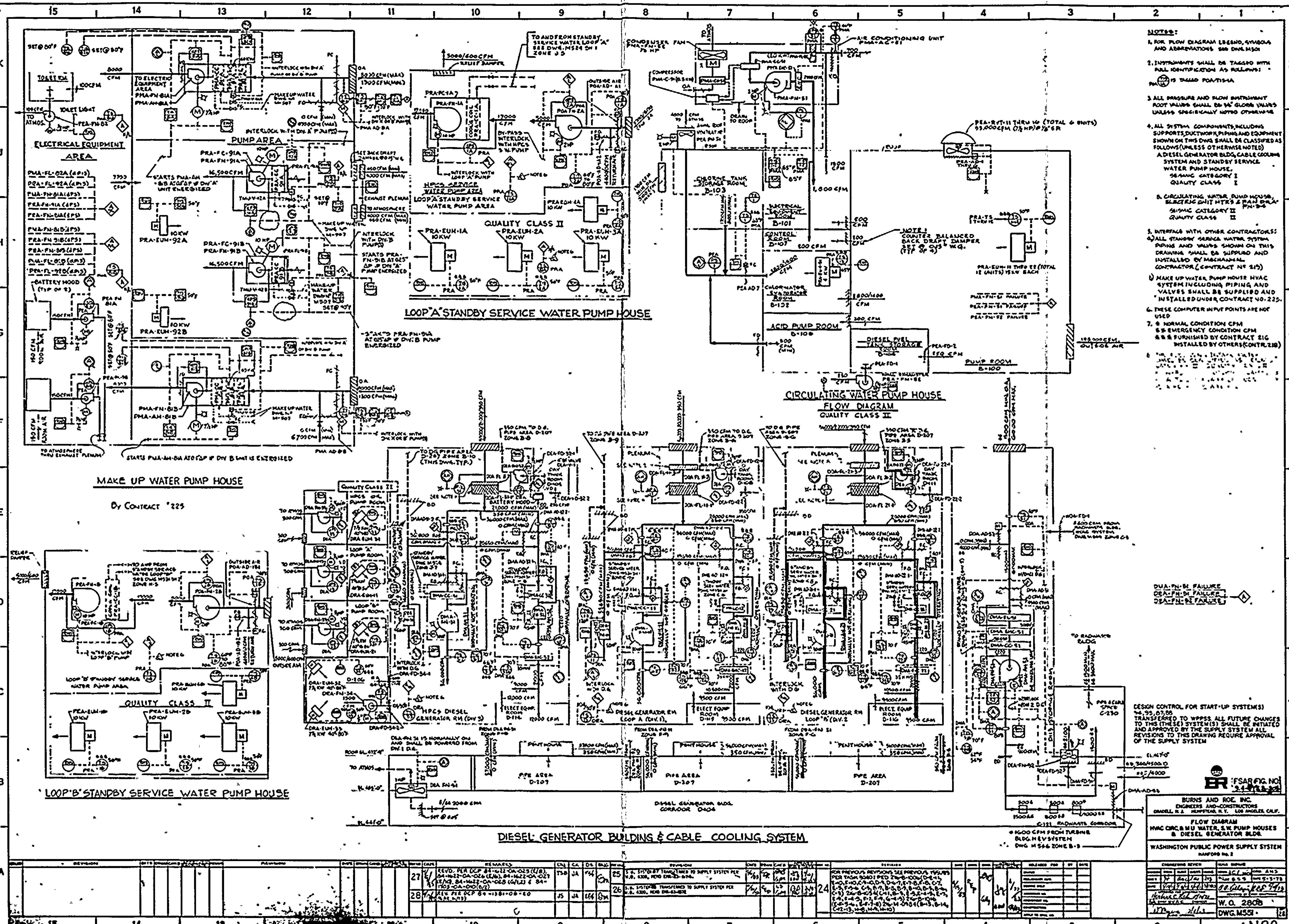
WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIV. 2 & DIV. 1 - HVAC SYSTEM, DG BLDG.			FIGURE 90
	Draw. No. M551	Rev. 28	Sheet 15 Of 18	Rev. 0	

8604100214-23



BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R SAFE SHUTDOWN PATH FLOW DIAGRAM REMOTE SHUTDOWN - HVAC SYSTEM, DG BLDG.			FIGURE 91
	Draw. No. M551	Rev. 28	Sheet 16 Of 18	Rev. 0

8604100214-24

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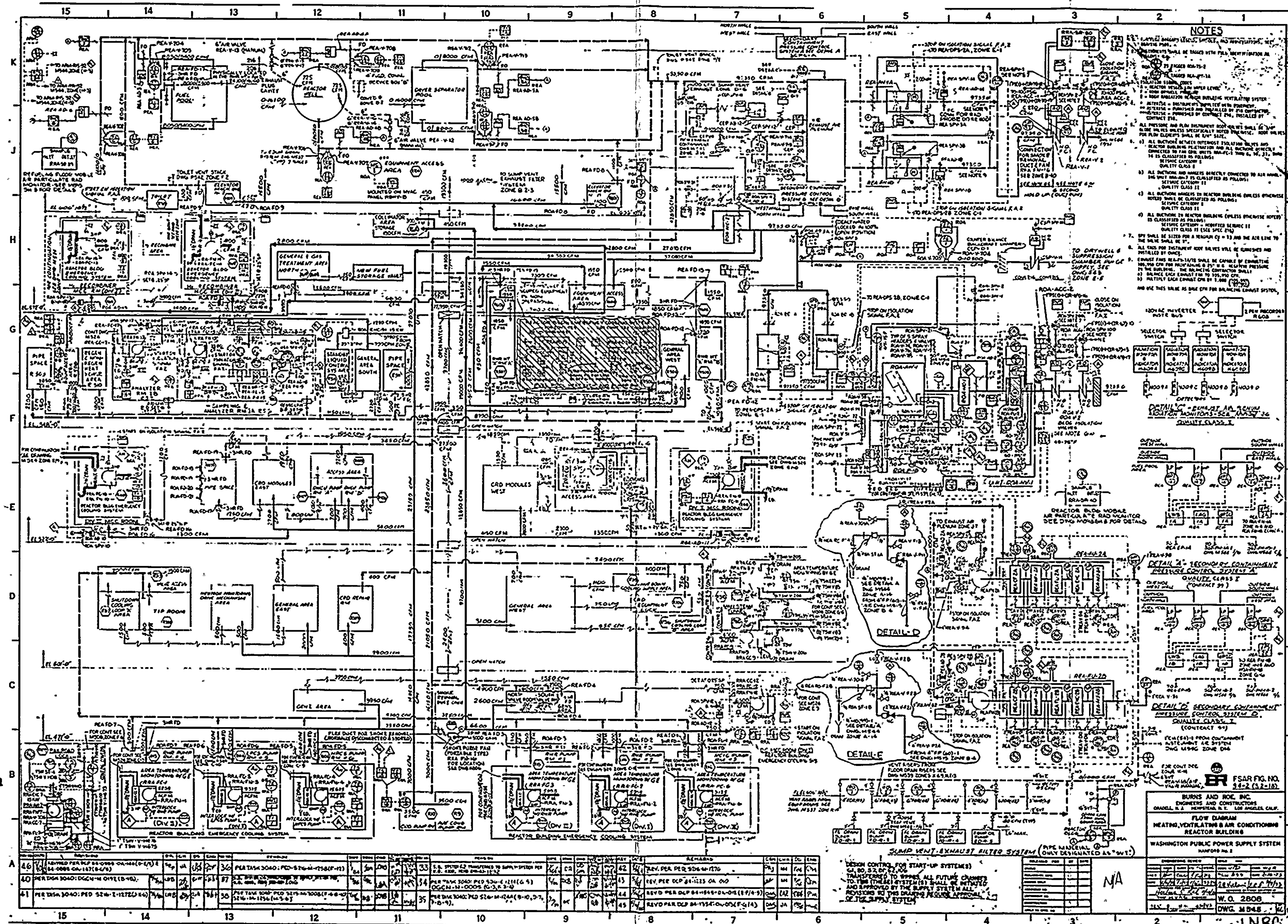
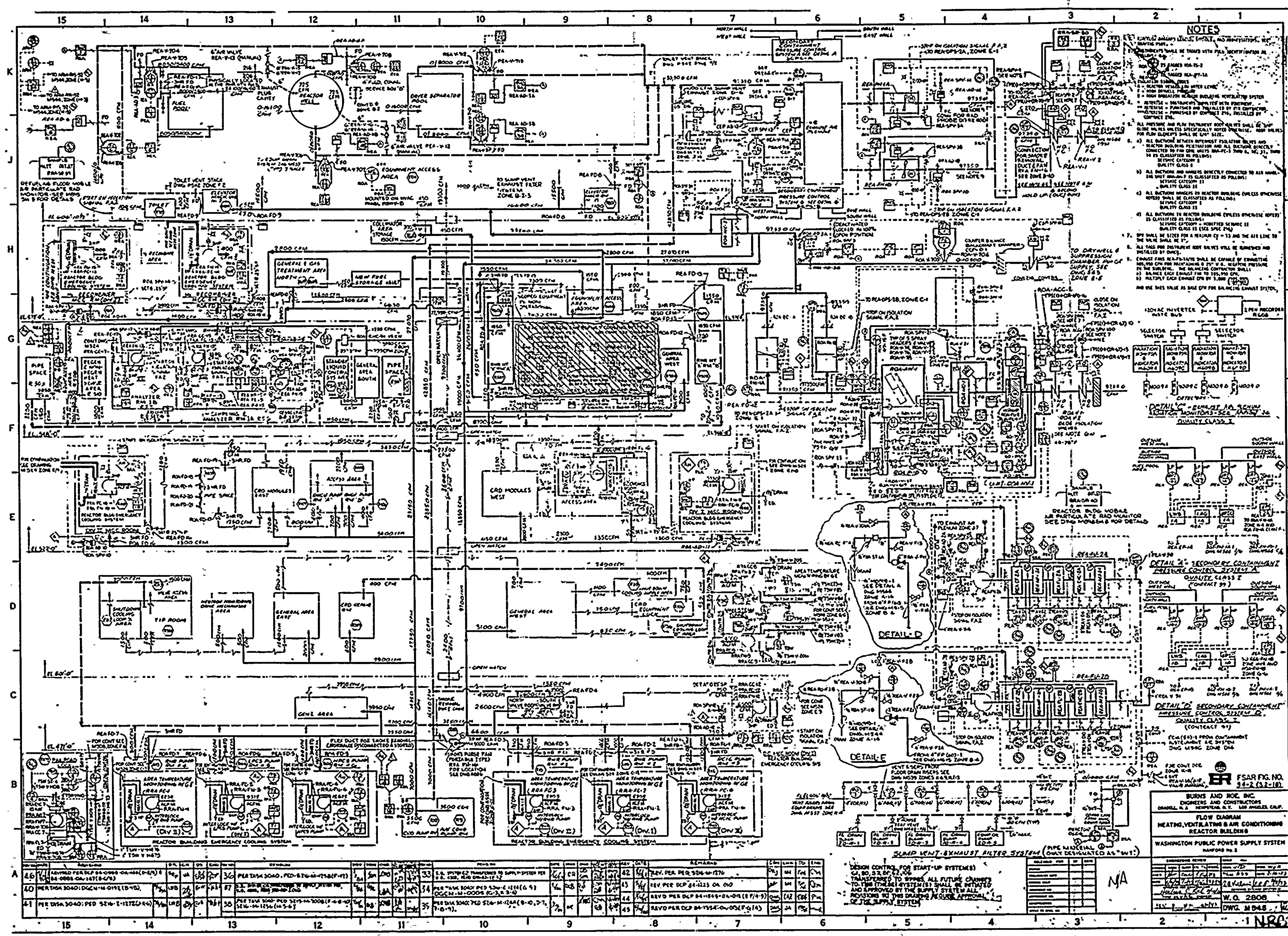


RED— Dedicated Shutdown Path

GREEN—Redundant Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM NUCLEAR PLANT 2	APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM DIV. 2 & DIV. 1 - HVAC SYSTEM, REACTOR BLDG.		FIGURE 92
	Draw. No. M545	Rev. 46	Sheet 17 Of 18	Rev. 0

8604100214-25



TI APERTURE CARD

Also Available On Aperture Card

BLUE— Remote Shutdown Path

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

APPENDIX R	SAFE SHUTDOWN PATH FLOW DIAGRAM REMOTE SHUTDOWN - HVAC SYSTEM, REACTOR BLDG.			FIGURE 93
Draw. No. M545	Rev. 46	Sheet 18 Of 18	Rev. 0	

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