VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

September 11, 1987

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Serial No. 87-532
NOD/JDH:vlh
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION
APPENDIX R REPORT REVISIONS

Revisions 4 and 5 to the Surry Power Station 10 CFR 50 Appendix R Report are enclosed. These revisions update your copies of the report consistent with the information made available onsite during the recent Appendix R inspection. For your convenience, we have combined the two revisions. Please follow the enclosed instructions in updating your report.

Very truly yours,

W. L. Stewart

Enclosures

cc: U. S. Nuclear Regulatory Commission
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A006
1/1

REPLACEMENT INSTRUCTIONS
SURRY 10 CFR 50 APPENDIX R REPORT
REVISIONS 4 AND 5

Volume I

1. Remove entire Volume and insert entire Volume (Table of Contents, Executive Summary, Chapters 1-5, and Appendices A & B).

Volume II

1. Table of Contents - Remove Table of Contents and insert new Table of Contents.

2. Chapter 6 - Remove Chapter 6 and insert new Chapter 6.

10 CFR 50 APPENDIX R REPORT
SURRY POWER STATION - UNITS 1 AND 2

REVISION RECORD SHEET

REV.	INITIALS	DATE
1	ISSUED PREVIOUSLY	
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50-280

REVISIONS 4 AND 5 TO APPENDIX R REPORT

10 CFR 50 APPENDIX R REPORT
SURRY POWER STATION - UNITS 1 AND 2

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SURRY POWER STATION UNITS 1 AND 2

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SURRY POWER STATION UNITS 1 AND 2

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EXECUTIVE SUMMARY

This report describes the compliance with 10CFR50 Appendix R of Virginia Electric and Power Company's (also herein called Virginia Power and "the Company") Surry Power Station, Units 1 and 2 (Docket Nos. 50-280 and 50-281). The fire protection features described herein ensure the post-fire safe shutdown capability of Surry.

This report is a re-examination of compliance with Appendix R. The original responses to Appendix R were submitted on February 12, 1982 and on June 18, 1982. Additional information was submitted on August 13, 1982, and on the basis of this information the NRC issued a Safety Evaluation dated November 18, 1982 for Surry.

Subsequent to the Safety Evaluation, the NRC stated in Generic Letter 83-33 that some licensees were interpreting Appendix R requirements in a manner that was inconsistent with NRC positions. In response to Generic Letter 83-33, the Company commenced a re-examination of the Surry post-fire safe shutdown capability to verify the continuing compliance of Surry with the current NRC positions, guidelines, and clarifications. This report gives the results of this re-examination with the objectives of providing:

- o The technical basis for Surry's compliance with the current NRC requirements
- o An auditable stand-alone Appendix R report
- o A source document to ensure the future compliance with Appendix R

Whereas the original Appendix R Safe Shutdown Review of June 18, 1982 discussed compliance with Appendix R, the scope of this re-examination also includes a comparison of Surry with the NRC guidelines and clarifications issued subsequent to the effective date of Appendix R.

This report provides a history of Surry's fire protection commitments and responses; a description of the fire areas and the existing level of fire protection features; a description of the systems, components, repairs, and operations necessary for post-fire safe shutdown; and the required modifications and exemption requests. This report includes the results of the analyses but does not include the detailed cable separation analyses or marked-up schematic drawings. This information is available for detailed review at the Surry Power Station.

The results of this re-examination confirm that Surry Power Station will be in compliance with Appendix R and the related guidelines and clarifications when the modifications described in this report are implemented. Exemptions from the requirements of Appendix R have been requested where modifications would not enhance the fire protection safety of Surry. Schedular exemptions from the requirements of 10 CFR 50.48 have also been requested.

1. INTRODUCTION

1.1 Objective

The objective of this report is to describe the fire protection features that ensure safe shutdown capability at Surry Power Station, Units 1 and 2, and the relationship of these features to the requirements of 10 CFR 50 Appendix R. For those plant areas where fire protection of the safe shutdown systems and their associated circuits are not in compliance, modifications are proposed for the purpose of meeting the Nuclear Regulatory Commission's (NRC) requirements or exemptions have been requested from the specific requirements of Appendix R where compliance with the regulation would not significantly enhance fire protection.

The company is committed to both Appendix A to Branch Technical Position APCSB 9.5-1 and to 10 CFR 50 Appendix R. These commitments are reflected in several documents including the Appendix R program documents listed on Table 1-3, and also the following:

- o Updated Final Safety Analysis Report
- o "Fire Protection Plan" document for Surry Power Station

These documents supersede the 1977 Fire Protection Systems Review document. The commitments from Appendix A to BTP 9.5-1 (based on the 1977 Fire Protection Systems Review Document) are listed in Table 1-2 of this report for convenience.

The NRC has suggested that the contents of this Appendix R report need not exhaustively address every instance of compliance by including the details of the supporting analyses. Rather, the report should focus on the methods by which the Company has determined that either:

(1) The Surry Power Station, Units 1 and 2 design complies with or will comply with the specific requirements of Appendix R, Section III.G, III.J. III.L, and III.O; or

(2) Exemptions are requested from the specific requirements of Appendix R. By analysis and implementation of proposed modifications, the level of fire protection will provide assurance that at least one train of redundant safe shutdown systems would be free of fire damage.

This report (Chapters 1 through 5) discusses the proposed modifications that are listed in Chapter 6. Compensatory measures that have been implemented pending completion of these modifications are only discussed in Chapter 6.

1.2 Historical Background

1.2.1 1977 Fire Protection Systems Review

On September 30, 1976, the NRC requested a comparison between the Company's Fire Protection Program and Branch Technical Position (BTP) APCSB 9.5-1 for Surry Power Station Units 1 and 2. On July 1, 1977, the Company responded to this request with the Fire Protection Systems Review for Surry. The

Fire Protection Systems Review consisted of the following:

(1) A comparison of the existing fire protection program with the guidelines of Appendix A to BTP 9.5-1;

(2) A fire hazards analysis of identified fire areas;

(3) A safe shutdown analysis to evaluate the capability of the plant to be safely shut down in the event of a fire; and

(4) An analysis of the mitigating effects of prompt fire suppression as well as the effects of no active fire suppression.

In this report, the plant is subdivided into major fire areas based on existing features of construction. The fire area evaluations were written for Unit 1 areas, Unit 2 areas, and areas common to both units. The following list identifies the major fire areas utilized in the 1977 Fire Protection Systems Review:

- Containment (one per unit)
- Control Room (common to both units)
- Cable Vault and Tunnel (one per unit)
- Cable Spreading Room (one per unit)
- Switchgear Room (one per unit)
- Emergency Switchgear and Relay Rooms (one per unit)
- Battery Rooms (two per unit)
- Turbine Building (common to both units)
- Diesel Generator Room (one per unit and one common to both units)
- Fuel Oil Pump House (common to both units)
- Auxiliary Building (common to both units)
- MCC Room (one per unit)

- Main and Station Services Transformers (one per unit)
- Mechanical Equipment Rooms (three common to both units)
- Screenwell Transformers (common to both units)
- Reserve Station Service Transformers (common to both units)
- Safeguards Area (one per unit)
- Main Steam Valve House (one per unit)
- Fuel Building (common to both units)
- Reactor Trip Switchgear Room (one per unit)
- Boron Recovery House (common to both units)
- Decontamination Building (common to both units)
- Auxiliary Boiler Room (common to both units)
- Electrical Shop (common to both units)
- Locker and Lab Area (common to both units)
- Machine Shop (common to both units)
- Storeroom (common to both units)
- Gas Storage (common to both units)
- Fire Pump House (common to both units)
- Intake Vacuum Priming House (common to both units)
- Vacuum Priming House (one per unit)
- Intake Structure (common to both units)
- High Level Intake Control House (one per unit)
- Office Building (common to both units)

This subdivision resulted in a total of 53 fire areas, 15 of which are distinct structures separated from the main plant complex (i.e., Turbine, Auxiliary, Service and Containment Buildings) located on the site.

On September 19, 1979, the NRC submitted the Safety Evaluation Report (SER) for Surry Power Station Units 1 and 2. The SER listed several open items which still needed to be addressed (refer to Table 1-2).

1.2.2 <u>February 12 and June 18, 1982 Appendix R Submittals</u>

In its February 12 and June 18, 1982 Appendix R submittals, the Company described the means by which safe shutdown can be achieved in the event of fire and also described proposed modifications to Surry Power Station Units 1 and 2 to meet the requirements of Appendix R to 10 CFR 50, Sections III.G.3 and III.L. Alternate shutdown capability independent of the cabling and equipment was provided for the following plant locations which did not meet the requirements of Section III.G.2 of Appendix R:

(1) Common Control Room

(2) Emergency Switchgear Room, Unit 1

(3) Emergency Switchgear Room, Unit 2

(4) Cable Vault and Tunnel, Unit 1

(5) Cable Vault and Tunnel, Unit 2

(6) Common Auxiliary Building

The Company stated that the fire areas of the plant (identified in its 1977 Fire Protection Systems Review) not required to have an alternate safe shutdown system would comply with the requirements of Section III.G.2 of Appendix R.

In its Supplemental Safety Evaluation Report (SSER) for Surry Power Station Units 1 and 2 dated November 18, 1982, the NRC concluded that Surry was in compliance with 10 CFR 50 Appendix R Sections III.G.3 and III.L regarding safe shutdown in the event of fire, except for a fixed suppression system in the Control Room and Emergency Switchgear Rooms. In the SSER, the NRC noted that exemptions were requested from the fire protection requirements of Appendix R Section III.G.3(b), for fixed suppression system in the Control Room and the Emergency Switchgear Rooms. The Control Room exemption was granted on November 24, 1982; the exemption for the Emergency Switchgear Rooms was denied on January 19, 1983. The Company has committed to install a Halon 1301 fire suppression system in each units' Emergency Switchgear Room.

1.2.3 1983 - 1984 Appendix R Evaluation

Subsequent to the February 12 and June 18, 1982 Appendix R submittals and the resultant SSER dated November 18, 1982, the NRC issued Generic Letter 83-33, "NRC Positions on Certain Requirements of Appendix R to 10 CFR 50." In this letter, the NRC stated that some licensees were interpreting Appendix R requirements in a manner that was inconsistent with NRC positions. In addition, it stated that the NRC inspection teams would be using these positions as their criteria for conformance to the particular issues referenced in the letter. Specifically, the positions were:

(1) Full Area Detection and Suppression

(2) Fire Area Definitions

(3) Structural Steel Supporting Boundary Fire Barriers

(4) Fixed Suppression Systems

(5) Intervening Combustibles

(6) Transient Combustibles

The Company has reviewed the February 12 and June 18, 1982 Appendix R submittals with respect to the criteria contained within Generic Letter 83-33 and has determined that a re-evaluation of Surry Power Station Units 1 and 2 fire area boundaries and system separation is required. In this re-evaluation, fire areas are defined as those portions of the plant that are separated from other plant areas by boundary fire barriers that are protected and rated commensurate with the hazards in the areas.

For a detailed summary of historical events, refer to Table 1-1, Appendix R Chronological Major Developments. Table 1-2, a detailed commitment list with a reference to the implementing document for each commitment, has been provided to augment the summary of historical events.

1.3 Scope

The scope of this report is to evaluate the Surry Power Station, Units 1 and 2 to the requirements specified in 10 CFR 50 Appendix R and the NRC Generic Letter 81-12. The objective of these requirements is to limit damage to safe shutdown systems resulting from a fire so that the ability to achieve safe shutdown is assured. The analysis presented in this report evaluates the conformance of the Surry Power Station, Units 1 and 2 to these requirements and provides the necessary technical support for the acceptance of configurations that differ from those specified in the rule. This analysis involves a three-fold approach:

(1) Redundant systems and equipment necessary for safe shutdown are identified, including their associated circuits of concern using Commission guidelines and criteria;

(2) The location of the redundant systems and equipment within fire area boundaries is reviewed against Appendix R in order to ensure the availability of a method of achieving safe shutdown in the event of a fire.

(3) Wherever the requisite separation between safe shutdown systems does not exist, modifications are proposed to protect the safe shutdown capability, either through Section III.G compliance, alternative shutdown, or exemption requests.

1.4 Criteria

The criteria used in this analysis are derived from seven regulatory documents that form the basis for the conclusions and recommendations:

(1) "Fire Protection Program for Operating Nuclear Power Plants," 10 CFR 50 Appendix R, Section III.G (45 FR 76611, November 19, 1980 and 46 FR 44735, September 8, 1981);

(2) Letter to All Power Reactor Licensees with Plants Licensed Prior to January 1, 1979, from Mr. D. G. Eisenhut (NRR/DL), SUBJECT: "Fire Protection Rule (45 FR 76602, November 19, 1980) - Generic Letter 81-12," dated February 20, 1981;

(3) Memorandum to Mr. D. G. Eisenhut (NRR/DL) from Dr. R. J. Mattson (NRR/DSI), SUBJECT: "Fire Protection Rule - Appendix R," dated March 22, 1982 (Clarification of Generic Letter 81-12);

(4) Memorandum to Mr. R. H. Vollmer (NRR/DE) from Dr. R. J. Mattson (NRR/DSI), SUBJECT: "Position Paper on Allowable Repairs for Alternative Shutdown and the Appendix R Requirement for Time Required to Achieve Cold Shutdown," dated July 2, 1982;

(5) Memorandum to Dr. R. J. Mattson (NRR/DSI) from Mr. L. S. Rubenstein (DSI/AD), SUBJECT: "Statement of Staff Position Regarding Source Range Flux, Reactor Coolant Temperature and Steam Generator Pressure Indication to Meet Appendix R, Alternate Shutdown Capability," dated January 7, 1983;

(6) Letter to All Licensees and Applicants of Nuclear Power Reactors, from Mr. D. G. Eisenhut (NRR/DL), SUBJECT: "NRC Positions on Certain Requirements of Appendix R to 10 CFR 50 (Generic Letter 83-33)," dated October 19, 1983; and

(7) IE Information Notice No. 84-09: Lessons Learned from NRC Inspection of Fire Protection Safe Shutdown Systems (10 CFR 50, Appendix R), dated February 13, 1984.

1.5 Report Overview

This report contains ten chapters. Chapter 1 is a general introduction. Chapter 2 presents the fire areas identified to support the Appendix R analyses described in this report. Criteria for establishing fire areas are discussed and the process used to determine the associated fire hazard severity is detailed. (Active fire protection features for those areas requiring exemption requests are summarized in Chapter 7, which identifies existing detection, existing suppression, the minimum fire boundary rating and the fire severity for each area.)

Chapter 3 describes the process used to identify safe shutdown performance goals, safe shutdown systems and components, and the methodology used to identify associated circuits of concern and equipment selection for spurious operations. Related definitions and assumptions are also discussed. A description of safe shutdown system operation is also provided.

Chapter 4 provides a summary of Appendix R compliance for each plant fire area. Also, a discussion of safe shutdown capability is provided for each fire area requiring alternative shutdown, describing the method of achieving the safe shutdown performance goals in the event of a fire in that area.

Chapter 5 describes the proposed fire scenario, manpower loading and time lines used to demonstrate that compliance with the requirements of Appendix R can be achieved.

Chapter 6 provides a description of proposed modifications necessary to achieve Appendix R compliance.

Chapter 7 presents the formal exemption requests for each plant area not in strict compliance with Appendix R, but where the existing fire protection features already provide equivalent protection to Appendix R requirements. The equivalent protection determinations are based upon detailed fire hazards analysis.

Chapter 8 provides an updated combustible loading analysis based on the fire areas identified in the Appendix R analysis.

Chapter 9 presents the breaker coordination study to substantiate coordination of electrical protective devices necessary to comply with the requirements of Appendix R.

Chapter 10 is a compilation of engineering evaluations that address areas of concern that were not fully elaborated on in Volume I of the analysis.

1.6 Results of Analysis

Table 4-2 highlights the results of this re-analysis for each fire area. The table identifies the fire areas at Surry, the applicable Appendix R provisions, and technical approaches selected to achieve the appropriate levels of protection. The results of the analysis confirm the adequacy of the existing fire protection features in the majority of fire areas when compared with the specific criteria of Appendix R Section III.G.

For those areas not in conformance, proposed modifications will achieve the necessary level of protection. Refer to Chapter 6 for a description of proposed modifications.

1.7 Appendix R Program Documents

This report (Volumes I through IV) provides the results of the Appendix R analysis; however, the station's total Appendix R program includes other controlled documents. All of the Appendix R program documents are listed on Table 1-3.

TABLE 1-1

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

APPENDIX R CHRONOLOGICAL MAJOR DEVELOPMENTS

YEAR	DATE	EVENT
1976	MAY 11	NRC REQUESTED COMPARISON OF SURRY UNITS 1 & 2 FIRE PROTECTION PROGRAM TO APPENDIX A OF BTP APCSB 9.5-1.
1977	JULY 1	THE COMPANY SUBMITTED THEIR FIRE PROTECTION REPORT IN REFERENCE TO APPENDIX A OF BTP APCSB 9.5-1.
1979	SEPT 19	NRC TRANSMITTED SURRY UNITS 1 & 2 FIRE PROTECTION SAFETY EVALUATION REPORT (FPSER) FOR APPENDIX A. FPSER CONTAINED SEVERAL OPEN ITEMS. (SEE TABLE 1-2)
1980	MONTHLY	THE COMPANY CONTINUED TO INFORM THE NRC ON A MONTHLY BASIS OF FIRE PROTECTION REVIEW PROJECT STATUS SUMMARY.
	MAY 29 & OCT 9	NRC RESPONDED TO MONTHLY PROJECT STATUS SUMMARIES BY ACCEPTING CERTAIN ITEMS AND BY LISTING THE OPEN ITEMS THAT NEEDED TO BE RESOLVED.
	OCT 31	THE COMPANY SUBMITTED A SAFE SHUTDOWN EVALUATION IN RESPONSE TO THE OPEN NRC ITEMS.
	NOV 24	NRC TRANSMITTED A COPY OF 10 CFR 50.48 AND APPENDIX R TO 10 CFR 50 TO THE COMPANY.
	DEC 18	NRC TRANSMITTED SUPPLEMENT 1 TO FPSER. SOME OPEN ITEMS WERE REMAINING.
	DEC 23	THE COMPANY PROVIDED THE NRC WITH DESCRIPTIONS OF MODIFICATIONS REQUIRED TO BRING SURRY UNITS 1 & 2 INTO COMPLIANCE WITH SECTION III.G OF APPENDIX R TO 10 CFR 50.

TABLE 1-1
(continued)

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

APPENDIX R CHRONOLOGICAL MAJOR DEVELOPMENTS

YEAR	DATE	EVENT
1981	VARIOUS	THE COMPANY CONTINUED TO INFORM THE NRC OF THE FIRE PROTECTION REVIEW PROJECT STATUS AND PROVIDE ENGINEERING AND DESIGN INFORMATION AS REQUIRED.
	FEB 13	NRC TRANSMITTED SUPPLEMENT 2 TO FPSER. NRC LISTED THE OPEN ISSUES REMAINING FROM THE FPSER.
	FEB 20	NRC GENERIC LETTER 81-12 REQUIRED LICENSEES OF PLANTS LICENSED PRIOR TO JANUARY 1, 1979 TO COMPLY WITH APPENDIX R.
	MAR 18	NRC INFORMED THE COMPANY THAT THE PROPOSED POST-FIRE ALTERNATIVE SHUTDOWN CAPABILITY FOR SURRY POWER STATION, UNITS 1 & 2 DID NOT CONFORM TO SECTION III.L OF APPENDIX R TO 10 CFR 50.
	MAY 19	THE COMPANY RESPONDED TO THE NRC RELATIVE TO ALTERNATIVE SAFE SHUTDOWN AND COMPLIANCE TO APPENDIX R.
	DEC 4	NRC ISSUED SAFETY EVALUATION (SE) FOR SECTION III.G AND III.L OF APPENDIX R TO 10 CFR 50.
1982	VARIOUS	THE COMPANY CONTINUED TO PROVIDE NRC WITH ENGINEERING AND DESIGN INFORMATION AS REQUIRED.
	APR 12	NRC REQUESTED ADDITIONAL INFORMATION FOR SECTION III.G.3 OF APPENDIX R 10 CFR 50 AND ISSUED CLARIFICATION LETTER TO GENERIC LETTER 81-12.
	JUNE 18	POST-FIRE SAFE SHUTDOWN REVIEW FOR SURRY POWER STATION SUBMITTED TO NRC.
	JULY 23	THE COMPANY SUBMITTED EXEMPTION REQUESTS FOR LACK OF FIXED SUPPRESSION SYSTEMS IN THE CONTROL ROOM AND EMERGENCY SWITCHGEAR ROOMS.
	AUG 13	THE COMPANY PROVIDED A RESPONSE FOR ALL ITEMS REMAINING OPEN FROM THE FPSER.
	NOV 18	NRC ISSUED SUPPLEMENTAL SAFETY EVALUATION REPORT (SSER) FOR SECTION III.G.3 AND III.L OF APPENDIX R OF 10 CFR 50. SURRY POWER STATION, UNITS 1 & 2 FOUND IN COMPLIANCE WITH THE EXCEPTION OF FIXED SUPPRESSION SYSTEMS IN CONTROL ROOM AND EMERGENCY SWITCHGEAR ROOMS.
	NOV 24	NRC GRANTED EXEMPTION FROM REQUIREMENT INSTALL A FIXED FIRE SUPPRESSION SYSTEM IN CONTROL ROOM.
	DEC 31	SCHEDULE PROVIDED FOR IMPLEMENTATION OF MODIFICATIONS IDENTIFIED IN JUNE 18 POST-FIRE SAFE SHUTDOWN REVIEW.

TABLE 1-1
(continued)

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

APPENDIX R CHRONOLOGICAL MAJOR DEVELOPMENTS

YEAR	DATE	EVENT
1983	JAN 19	NRC DENIED THE REQUEST FOR EXEMPTION TO SECTION III.G OF APPENDIX R FOR FIXED SUPPRESSION SYSTEM IN EMERGENCY SWITCHGEAR ROOMS.
	MAY 3, JUNE 27, AND AUG 1	NRC ADVISED OF CHANGE IN MODIFICATION SCHEDULE.
	OCT 7	THE COMPANY INITIATES A RE-ANALYSIS FOR CONFORMANCE TO APPENDIX R OF 10 CFR 50.
	OCT 19	NRC ISSUED GENERIC LETTER 83-33.
1984	JULY 6	THE COMPANY SUBMITTED 10 CFR 50 APPENDIX R REPORT, VOLUME II.
	OCT 24	COMPANY/NRC MEETING TO DISCUSS SCHEDULE FOR COMPLETING APPENDIX R MODIFICATIONS.
	NOV 30	PHASE II OF 10 CFR 50 APPENDIX R REPORT, VOLUME II, SUBMITTED.
1985	JAN	NRC ISSUED DRAFT GENERIC LETTER 85-01 FOR COMMENT.
	VARIOUS	THE COMPANY ADVISED THE NRC OF CHANGES IN MODIFICATION SCHEDULES.
1986	FEB	THE COMPANY SUBMITTED 10 CFR 50 APPENDIX R REPORT, VOLUME I AND REVISED VOLUME II TO THE NRC.
	APR 24	NRC ISSUED GENERIC LETTER 86-10.
1987	APR	THE COMPANY ISSUED REVISION 4 TO THE 10 CFR 50 APPENDIX R REPORT (AFFECTING CHAPTERS 1-6 AND 8-10).
	MAY 4-8	NRC APPENDIX R INSPECTION.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
1. UNIT 1 SERVICE BUILDING CABLE VAULT AND TUNNEL		
INSTALL COVERS ON CABLE TRAYS WHERE MINIMUM SEPARATION DOES NOT MEET THE REQUIREMENTS OF REGULATORY GUIDE 1.75	FIRE PROTECTION SYSTEMS REVIEW-SURRY POWER STATION UNITS 1 & 2 JULY 1, 1977 (FPSR-77) PAGE III-48	COMPLETE. INSPECTED MONTHLY BY SUADM-ADM-20.
2. CONTAINMENT INSTRUMENT AIR COMPRESSORS		
REPLACE AIR COMPRESSORS WITH NEW COMPRESSORS LOCATED OUTSIDE THE CONTAINMENT.	FPSR-77 PAGE III-101	DC-76-14. IN COMPLIANCE.
3. HAZARDOUS CHEMICALS		
ORDER APPROVED STORAGE LOCKERS FOR STORAGE OF HAZARDOUS MATERIALS IN CHEMISTRY LABORATORY STORAGE ROOM.	FPSR-77 PAGE IV-64	COMPLETE. CHECKED BY PT-24.19.
4. DRY UNUSED ION EXCHANGER RESINS WILL BE STORED IN A SINGLE FULLY PROTECTED (PROVIDED WITH SPRINKLERS AND CURBS AND DRAINS) STORAGE AREA NOT NEAR SAFETY-RELATED EQUIPMENT.	FPSER-77 PAGE IV-64	COMPLETE. STORAGE IS IN THE CONDENSATE POLISHING BUILDING. INSPECTED BY SUADM-ADM-20.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.1. ADMINISTRATIVE CONTROLS		
(1) THE ADMINISTRATIVE CONTROLS WHICH PROHIBIT SMOKING IN THE CABLE TRAY ROOMS WILL BE STRICTLY ENFORCED.	FIRE PROTECTION SAFETY EVALUATION REPORT SEP. 19, 1979 (FPSER-79) PAGE 3-1	COMPLETE. INSPECTED MONTHLY BY SUADM-ADM-20.
(2) THE LICENSEE WILL ADMINISTRATIVELY CONTROL SMOKING AND HOT WORK OPERATIONS IN THE VICINITY OF THE COMPRESSED GAS STORAGE AREA ADJACENT TO THE AUXILIARY BUILDING.		SIGNS ARE POSTED. INSPECTED MONTHLY BY SUADM-ADM-20.
(3) THE FIRE STRATEGY PLAN FOR THE DIESEL GENERATOR COMPARTMENTS WILL INCLUDE PROVISIONS FOR MANUALLY SECURING DIESEL FUEL TRANSFER PUMPS FROM THE EMERGENCY SWITCHGEAR ROOM.		COMPLETE.
3.1.2. AIR FLOW DETECTORS		
(1) AIR FLOW DETECTORS WILL BE INSTALLED IN THE VENTILATION DUCTS OF THE BATTERY ROOMS TO ALARM IN THE CONTROL ROOM IF THERE IS A LOSS OF AIR FLOW TO THESE ROOMS.	FPSER-79 PAGE 3-1	DC-78-08L IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 5/29/80.
3.1.3 BREATHING APPARATUS		
(1) SELF-CONTAINED BREATHING APPARATUS WITH SUFFICIENT SPARE CYLINDERS AND/OR RECHARGING CAPABILITY DEDICATED FOR FIRE BRIGADE USE WILL BE MAINTAINED TO PROVIDE EMERGENCY BREATHING AIR FOR A MINIMUM OF 10 MEN FOR A SIX-HOUR PERIOD AT A RATE OF THREE CYLINDERS OF AIR PER HOUR.	FPSER-79 PAGE 3-1	DC-79-83 IN COMPLIANCE. INSPECTED BY PT 24.21.
(2) THE BREATHING AIR COMPRESSOR AND RECHARGING CASCADE SYSTEM CURRENTLY LOCATED IN THE SOUTH ANNEX BUILDING WILL BE RELOCATED TO AN AREA OF THE BUILDING REMOTE FROM COMBUSTIBLE MATERIALS AND AWAY FROM ANY OTHER ITEMS THAT MAY OBSTRUCT THE EFFICIENT USE OF THE SYSTEM AT ANY TIME.		IN COMPLIANCE. INSPECTED BY PT 24.21. ACCEPTED BY NRC LETTER DATED 5/29/80.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.3. <u>BREATHING APPARATUS (CONT.)</u>		
(3) THE PROPOSED INCREASE OF THE PRESENT CASCADE SYSTEM FROM FOUR CYLINDERS TO TEN CYLINDERS WILL BE IMPLEMENTED ON A PRIORITY BASIS.	FPSER-79 PAGE 3-3	DC-79-83/ EXISTING SYSTEM HAS 6 CYLINDERS AND WAS ACCEPTED BY NRC, LETTER SER 506, 5-29-80. IN COMPLIANCE.
(4) THE AIR INTAKE FOR THE BREATHING AIR COMPRESSOR WILL BE EXTENDED TO THE EXTERIOR OF THE BUILDING AND WILL BE SUITABLY SCREENED AND SHIELDED FROM THE ELEMENTS.		IN COMPLIANCE.
(5) A WATER SUBMERSION COOLING TANK FOR FILLING AIR CYLINDERS WILL BE PROVIDED AT THE COMPRESSOR/CASCADE LOCATION.		IN COMPLIANCE.
(6) THE SELF-CONTAINED BREATHING APPARATUS LOCATED IN THE CONTROL ROOM WILL BE STORED ON WALL-MOUNTED RACKS TO ASSURE ITS CONTINUOUS STATE OF READINESS.		IN COMPLIANCE. CHECKED BY HP P.T.
3.1.4. <u>CABLE TRAY COVERS</u>		
(1) SOLID TRAY COVERS WILL BE INSTALLED ON TRAYS WHERE THE EXISTING MINIMUM SEPARATION OF THE REDUNDANT SAFETY-RELATED CABLES DOES NOT MEET THE GUIDELINES OF REGULATORY GUIDE 1.75.	FPSER-79 PAGE 3-3	DC-78-08C/ IN COMPLIANCE. INSPECTED MONTHLY BY SUADM-ADM-20.
3.1.5. <u>SAFE SHUTDOWN CIRCUITRY</u>		
(1) A CHANGE TO CONTROL CIRCUITRY WILL BE MADE TO PROVIDE COMPLETE ELECTRICAL ISOLATION BETWEEN CIRCUITS IN THE MAIN CONTROL ROOM AND THOSE LOCATED IN THE AUXILIARY SHUTDOWN PANELS.	FPSER-79 PAGE 3-3	DC-79-69/ ISOLATION EXISTS FOR THOSE COMPONENTS WHICH THE CURRENT REANALYSIS RELIES UPON. IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.6. COMBUSTIBLES		
(1) ALL TRASH CONTAINERS IN ALL SAFETY-RELATED AREAS OF THE PLANT WILL BE PROVIDED WITH SUITABLE METAL COVERS.	FPSER-79 PAGE 3-3	IN COMPLIANCE. ALL ITEMS CHECKED BY SUADM-ADM-20 MONTHLY INSPECTION.
(2) STORAGE OF COMBUSTIBLE MATERIALS IN THE CABLE TRAY ROOMS WILL BE DISCONTINUED AND A PERMANENT SIGN WILL BE POSTED IN THE WORKSHOP CAGE LOCATED IN THE UNIT 2 ROOM WHICH STATES THAT, "NO COMBUSTIBLE MATERIAL OR IGNITION SOURCES ARE PERMITTED IN THE AREA."		
(3) STORAGE OF COMBUSTIBLES IN THE CONTROL ROOM COMPLEX AND MOTOR CONTROL CENTER ROOM AND THE AUXILIARY BUILDING, ELEVATION 45 FEET 10 INCHES, WILL BE DISCONTINUED.		
(4) STORAGE OF ALL UNNECESSARY COMBUSTIBLE MATERIALS IN THE AUXILIARY BUILDING, ELEVATION 27 FEET, 6 INCHES, INCLUDING TEMPORARY STORAGE OF REACTOR COOLANT PUMP LUBE OIL WILL BE DISCONTINUED.		
(5) STORAGE OF KEROSENE FUELED PORTABLE HEATING UNITS IN THE INTAKE STRUCTURE AREA WILL BE DISCONTINUED.		
(6) VEGETATION WITHIN THE FUEL OIL TANK DIKED AREA WILL BE REMOVED AND APPLICATION OF A SUITABLE CHEMICAL WILL BE MADE TO PREVENT FURTHER GROWTH.		
3.1.7. CHARCOAL FILTERS		
(1) HEAT DETECTORS SET TO ALARM IN THE SECURITY BUILDING AT FILTER TEMPERATURES ABOVE 190^{O}F WILL BE INSTALLED IN THE GASEOUS WASTE SYSTEM CHARCOAL FILTER.	FPSER-79 PAGE 3-4	DC-78-08I MEET INTENT OF FPSER. ALARM IS IN CONTROL ROOM. IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.8. EMERGENCY LIGHTING		
(1) TWELVE EMERGENCY LANTERNS WILL BE PROVIDED FOR THE FIRE BRIGADE.	FPSER-79 PAGE 3-4	DC-79-75 AND DC-79-115/ IN COMPLIANCE.
(2) FIXED INDIVIDUALLY-BATTERY-POWERED SEALED BEAM LIGHTS WILL BE INSTALLED IN: THE CONTROL ROOM; THE EMERGENCY SWITCHGEAR AND RELAY ROOMS; SERVICE BUILDING CABLE VAULTS; CABLE TUNNELS; AND CONTAINMENT PENETRATION, CABLE VAULTS.		EMERGENCY LIGHTING HAS BEEN ADDRESSED IN REANALYSIS. NEW LIGHTS INSTALLED BY DC-84-24.
3.1.9. FIRE DETECTION SYSTEMS		
THE LICENSEE WILL INSTALL ADDITIONAL EARLY WARNING DETECTORS IN:	FPSER-79 PAGE 3-4	DC-79-75/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 12/18/80.
(1) AREAS OF THE CONTROL ROOM COMPLEX ADJACENT TO THE MAIN CONTROL ROOM.		
(2) IN THE VERTICAL BOARDS LOCATED IN THE MAIN CONTROL ROOM AND AT THE CEILING OF THE MAIN CONTROL ROOM NEAR THE AIR FLOW RETURN.		
(3) VENTILATION EXHAUST DUCTS OF EACH BATTERY ROOM.		
(4) THE AUXILIARY BUILDING GENERAL AREA EXHAUST VENTILATION DUCTS.		
(5) THE CEILING OF THE SPENT FUEL POOL PUMP AREA.		
(6) AT THE CEILING OF THE 19 FEET 6 INCHES ELEVATION OF THE SAFEGUARDS EQUIPMENT BUILDING.		
(7) THE EMERGENCY SWITCHGEAR ROOM AND THE RELAY ROOMS OF EACH UNIT.		
(8) THE SOLID WASTE DRUMMING ROOM.		
(9) THE VENTILATION EXHAUST DUCTS FROM THE CONTAINMENT SPRAY PUMP AND AUXILIARY FEEDWATER PUMP BUILDING.		

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.9. <u>FIRE DETECTION SYSTEMS (CONT.)</u>		
(10) THE CONTAINMENT RECIRCULATION VENTILATION SYSTEM AND IN THE CABLE PENETRATION AREAS INSIDE CONTAINMENT.	FPSER-79 PAGE 3-4	DC-78-08E/ IN COMPLIANCE.
(11) VENTILATION EXHAUST SYSTEM OF MECHANICAL EQUIPMENT ROOM #3.		
(12) THE CHARGING PUMP EXHAUST VENTILATION DUCTS OF THE AUXILIARY BUILDING, ELEVATION 13 FEET.		
(13) BOTH FIRE PUMP ROOMS.		
3.1.10. <u>FIRE BARRIERS</u>		
(1) THE FIRE STOPS WILL BE PROVIDED IN CABLE TRAYS PASSING THROUGH OPENINGS BETWEEN SWITCHGEAR ROOMS AND BETWEEN THE SWITCHGEAR ROOM AND THE RELAY ROOM.	FPSER-79 PAGE 3-5	DC-78-08C/ FIRE STOPS HAVE BEEN PROVIDED IN CABLE TRAYS PASSING BETWEEN ROOMS. NOTE: THE INTERMEDIATE FIRE STOPS WITHIN EACH UNIT'S ESR AND BETWEEN THE ESR AND RELAY ROOM WILL NOT BE INSPECTED OR MAINTAINED DUE TO THE FOLLOWING: (A) PENETRATION SEALS IN THE FIRE AREA BOUNDARIES FOR EACH UNIT'S ESR WILL BE MAINTAINED. THE ESR AND THE RELAY ROOM ARE THE SAME FIRE AREA. (B) ALTERNATIVE SHUTDOWN IN COMPLIANCE WITH APPENDIX R IS PROVIDED FOR EACH UNIT'S ESR. (C) A TOTAL FLOODING HALON SYSTEM HAS BEEN INSTALLED IN EACH UNIT'S ESR. THE HALON SYSTEM WILL PREVENT THE SPREAD OF FIRE FROM ONE ROOM TO THE OTHER.
(2) MARINITE BOARD FIRE BARRIERS WILL BE INSTALLED BETWEEN CABLE TRAYS CARRYING REDUNDANT DIVISIONS OF SAFETY-RELATED CABLES IN THE SAFEGUARD EQUIPMENT BUILDINGS.		DC-78-08C/ MEET INTENT OF FPSER. KAOWOOL INSTALLED INSTEAD OF MARINITE BOARD. IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.11. <u>FIRE DOORS</u>		
(1) ADMINISTRATIVE CONTROLS WILL BE PROVIDED TO ASSURE THE EFFECTIVENESS OF OTHER FIRE DOORS LEADING TO SAFETY-RELATED AREAS AS FOLLOWS:	FPSER-79 PAGE 3-5	DC-78-08A. IN COMPLIANCE.
(A) FIRE DOORS WILL BE INSPECTED SEMI-ANNUALLY TO VERIFY THAT SELF-CLOSING MECHANISMS AND LATCHES ARE IN GOOD WORKING ORDER.		IN COMPLIANCE. CHECKED MONTHLY BY PT 24.11A.
(B) FIRE DOORS WILL BE PROVIDED WITH ELECTRICAL SUPERVISION FROM THE CONTROL ROOM OR MAINTAINED CLOSED BY ONE OF THE FOLLOWING:		
. LOCKED CLOSED AND INSPECTED WEEKLY TO VERIFY THAT DOORS ARE IN THE CLOSED POSITION. THE FIRE BRIGADE COMMANDER WILL HAVE READY ACCESS TO KEYS OF ALL LOCKED DOORS		IN COMPLIANCE. CHECKED BY PT 24.23.
. PROVIDED WITH AUTOMATIC RELEASE MECHANISMS AND INSPECTIONS MONTHLY TO VERIFY THAT THE DOORWAYS ARE FREE OF OBSTRUCTIONS		IN COMPLIANCE. CHECKED BY PT 24.11A.
. PROVIDED WITH SELF-CLOSING MECHANISM AND INSPECTED DAILY TO VERIFY THAT THEY ARE IN THE CLOSED POSITION		IN COMPLIANCE. CHECKED BY PT 24.24.
(2) THE DOORS INTO THE CONTROL ROOM COMPLEX FROM THE TURBINE BUILDING AND THE INSTRUMENT REPAIR SHOP WILL BE REPLACED WITH THREE-HOUR FIRE-RATED DOORS.		COMPLETE. INSPECTED BY PT 24.11A. FIRE DOOR 13 REPLACED BY EWR-85-349. (SEE CHAPTER 6, SECTION III.12.)
(3) A THREE-HOUR FIRE-RATED DOOR WILL BE INSTALLED BETWEEN THE TWO FIRE PUMP ROOMS.		COMPLETE. INSPECTED BY PT 24.11A.
(4) ALL NONFIRE-RATED DOORS IN THE FIRE BARRIER SURROUNDING THE UNIT 1 AND 2 EMERGENCY SWITCHGEAR AND RELAY ROOMS WILL BE REPLACED WITH THREE-HOUR FIRE-RATED DOORS.		COMPLETE. INSPECTED BY PT 24.11A.
(5) A THREE-HOUR FIRE DOOR WILL BE INSTALLED IN THE NUMBER 2B BATTERY ROOM.		COMPLETE. INSPECTED BY PT 24.11A.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.11. FIRE DOORS (CONT.)		
(6) IN THE AUXILIARY BUILDING ELEVATION 27 FEET, 6 INCHES, THE DOOR TO THE HEALTH PHYSICS AREA HALLWAY IN THE SERVICE BUILDING WILL BE REPLACED WITH A FIRE-RATED DOOR.	FPSER-79 PAGE 3-5	DC-78-08A/ COMPLETE. INSPECTED BY PT 24.11A.
(7) THE DOOR BETWEEN UNIT 2 CABLE TRAY ROOM AND THE TURBINE BUILDING WILL BE REPLACED WITH A THREE-HOUR FIRE-RATED DOOR.		COMPLETE. INSPECTED BY PT 24.11A.
(8) IN THE AUXILIARY BUILDING, ELEVATION 13 FEET, THE DOORS TO UNIT 1 AND 2 CABLE VAULTS WILL BE REPLACED WITH FIRE-RATED DOORS.	FPSER-79 PAGE 3-6	COMPLETE. INSPECTED BY PT 24.11A.
(9) IN THE AUXILIARY BUILDING, ELEVATION 45 FEET, 10 INCHES, THE DOOR TO THE FUEL BUILDING WILL BE REPLACED WITH A FIRE-RATED DOOR.		FIRE DOOR REMOVED. WALL IS NO LONGER A FIRE BARRIER.
(10) IN THE INTAKE STRUCTURE AREA, THE DOOR TO THE FUEL OIL TANK CUBICLE WILL BE REPLACED WITH A THREE-HOUR FIRE-RATED DOOR.		COMPLETE. INSPECTED BY PT 24.11A.
(11) THE DOOR IN THE WALL BETWEEN MECHANICAL EQUIPMENT ROOM NO. 3 AND THE UNIT 2 EMERGENCY SWITCHGEAR ROOM WILL BE REPLACED WITH A FIRE-RATED DOOR.		COMPLETE. INSPECTED BY PT 24.11A.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.11. FIRE DOORS (CONT.)		
(12) IN THE TURBINE BUILDING, THE FOLLOWING MODIFICATIONS WILL BE MADE:	FPSER-79 PAGE 3-6	DC-78-08A/ IN COMPLIANCE.
(A) THREE-HOUR FIRE DOORS WILL BE PROVIDED AT THE OPENINGS TO THE DIESEL GENERATOR ROOMS, CONTROL ROOM, BATTERY ROOM 2B, AND THE EMERGENCY SWITCHGEAR AREA, ALL OF WHICH COMMUNICATE WITH THE TURBINE BUILDING.		COMPLETE. INSPECTED BY PT 24.11A.
(B) A THREE-HOUR FIRE DOOR WILL BE PROVIDED AT THE OPENING IN THE EAST WALL OF THE LUBE OIL STORAGE ROOM. THE VENTILATION OPENINGS TO THIS ROOM WILL ALSO BE UPGRADED BY INSTALLING THREE-HOUR FIRE-RATED DAMPERS.		COMPLETE. DOOR INSPECTED BY PT 24.11A. DAMPERS INSPECTED BY PT 24.38.
(C) THE PAINTED FUSIBLE LINK CONTROLLING AUTOMATIC CLOSURE OF THE SLIDING FIRE DOOR AT THE LUBE OIL STORAGE ROOM WILL BE REPLACED WITH A NEW FUSIBLE LINK.		IN COMPLIANCE. INSTALLED NEW DOOR AND CABLING.
(13) THE DOOR BETWEEN THE MAIN CONTROL ROOM AND THE CONTROL ROOM ANNEX WILL BE REPLACED WITH A BULLET-PROOF DOOR LOCKED CLOSED WITH A CARD READER. ANY LOUVERS IN THE DOOR WILL BE FITTED WITH MANUALLY OPERATED SMOKE DAMPERS.		DC-81-21/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 10/9/80.
(14) THE LICENSEE WILL PROVIDE EITHER A FIRE-RATED DOOR THAT IS NORMALLY CLOSED BETWEEN UNITS 1 AND 2 SWITCHGEAR ROOMS OR A FIRE-RATED SWING DOOR WITH A SMOKE DETECTOR ACTUATED RELEASE.		DC-78-08A AND DC-84-01 IN COMPLIANCE. INSEPCTED BY PT 24.11A. INSTALLED SLIDING DOOR WITH SMOKE DETECTOR ACTUATED RELEASE.
3.1.12. FIRE DAMPERS		
(1) ALL VENTILATION DUCTS WHICH PENETRATE THE EMERGENCY SWITCHGEAR AND RELAY ROOMS WILL BE EQUIPPED WITH THREE-HOUR FIRE-RATED DAMPERS.	FPSER-79 PAGE 3-6	DC-78-08K/ IN COMPLIANCE. INSPECTED BY PT 24.38 AND PT 24.11.
(2) IN THE CABLE TRAY ROOMS, THREE-HOUR FIRE DAMPERS WILL BE INSTALLED IN VENTILATION DUCTS WHICH PENETRATE FIRE BARRIERS.		IN COMPLIANCE. INSPECTED BY PT 24.38.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.12. FIRE DAMPERS (CONT.)		
(3) IN THE INTAKE STRUCTURE AREA, THE 1-1/2 HOUR FIRE DAMPER IN THE FUEL OIL TANK CUBICLE WALL WILL BE REPLACED WITH A THREE-HOUR FIRE-RATED DAMPER.	FPSER-79 PAGE 3-6	DC-78-08K/ COMPLETE. INSPECTED BY PT 24.38.
(4) A THREE-HOUR FIRE-RATED DAMPER WILL BE INSTALLED IN THE VENTILATION DUCT BETWEEN THE TWO FIRE PUMP ROOMS.		COMPLETE. INSPECTED BY PT 24.38.
(5) VENTILATION DUCTS THAT SUPPLY AIR TO THE MAIN CONTROL ROOM FROM ADJACENT AREAS OF THE CONTROL ROOM COMPLEX WILL BE PROVIDED WITH SMOKE DAMPERS THAT CAN BE MANUALLY OPERATED.	FPSER-79 PAGE 3-7	DC-79-71/ IN COMPLIANCE.
(6) ALL VENTILATION DUCTS WHICH PENETRATE THE BOUNDARY OF THE CONTROL ROOM COMPLEX WILL BE PROVIDED WITH THREE-HOUR FIRE-RATED DAMPERS. MOTOR-OPERATED VALVES IN VENTILATION PIPE PENETRATIONS ARE ACCEPTABLE SUBSTITUTES.		DC-78-08K/ COMPLETE. INSPECTED BY PT 24.38.
3.1.13. FIRE EXTINGUISHERS		
(1) THE LICENSEE WILL PROVIDE ADDITIONAL PORTABLE FIRE EXTINGUISHERS IN THE EMERGENCY SWITCHGEAR AND RELAY ROOMS; EACH OF THE SWITCHGEAR ROOMS; CONTROL ROOM; OUTSIDE EACH CONTAINMENT PENETRATION VAULT AND SERVICE BUILDING CABLE VAULT, AT THE ENTRANCE TO EACH CABLE TRAY ROOM; ON THE 2 FEET AND 13 FEET ELEVATIONS OF THE AUXILIARY BUILDING; INSIDE THE EXTERIOR DOOR AND NEAR THE LADDER AT THE 19 FEET, 6 INCHES ELEVATION OF THE SAFEGUARDS EQUIPMENT BUILDINGS; AND AT THE INTAKE STRUCTURE (PORTABLE AND WHEELED UNITS)	FPSER-79 PAGE 3-7 FPSER-79 PAGE 5-36	COMPLETE. CHECKED BY PTs 24.4F, B, C, D.
(2) ADDITIONAL CARBON DIOXIDE PORTABLE EXTINGUISHERS WILL BE PROVIDED IN THE MAIN CONTROL ROOM AND A 2-1/2 GALLON PRESSURIZED WATER EXTINGUISHER WILL BE PROVIDED IN THE CONTROL ROOM ANNEX.		COMPLETE. CHECKED BY PT 24.4D.
(3) A PORTABLE 15 LB. CARBON DIOXIDE FIRE EXTINGUISHER WILL BE PROVIDED IN EACH TRAIN J EMERGENCY SWITCHGEAR ROOM, ADJACENT TO THE DOOR TO THE CABLE VAULT.		COMPLETE. CHECKED BY PT 24.4F.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.14. FIRE LADDER		
(1) A LADDER WILL BE PROVIDED IN THE OUTSIDE CONTAINMENT CABLE PENETRATION VAULTS. THE LADDER WILL HAVE SUFFICIENT HEIGHT TO REACH THE UPPERMOST CABLE TRAYS TO FACILITATE MANUAL FIRE FIGHTING.	FPSER-79 PAGE 3-7	COMPLETE. IN COMPLIANCE.
3.1.15. FLOOR DRAINS, DIKES, CURBS AND OIL COLLECTION SYSTEMS		
(1) A CURB WILL BE INSTALLED AROUND THE LUBE OIL CONDITIONING UNIT AND TRANSFER PUMP TO CONTAIN THE FULL CONTENTS OF THE UNIT PLUS 10 PERCENT OF THAT VOLUME FOR CONTAINMENT OF FIRE SUPPRESSION WATER.	FPSER-79 PAGE 3-7	DC-78-08B/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 5/29/80.
(2) DIKES WILL BE INSTALLED AROUND THE DIESEL GENERATOR DAY TANKS AND FLOOR DRAINS AND AT THE DOORWAY TO THE ROOM TO CONTAIN A FUEL OIL OR LUBE OIL SPILL. THE ADDITION OF THE DIKES AROUND THE FLOOR DRAINS WILL PREVENT THE SPREAD OF OIL FROM ONE DIESEL GENERATOR ROOM TO ANOTHER VIA THE DRAIN SYSTEM.		IN COMPLIANCE. FLOOR DRAINS HAVE COVER PLATES, NOT DIKES. INTENT OF FPSER IS MET. ACCEPTED BY NRC LETTER DATED 5/29/80.
(3) THE DIESEL DRIVEN FIRE PUMP ROOM WILL BE PROVIDED WITH A CURB OF SUFFICIENT HEIGHT TO CONTAIN THE CONTENTS OF THE FUEL OIL DAY TANK WITHIN THE ROOM. THE FLOOR DRAIN WILL BE DIKED TO PREVENT THE SPREAD OF FUEL OIL TO THE MOTOR-DRIVEN FIRE PUMP VIA THE DRAIN SYSTEM.		IN COMPLIANCE. FLOOR DRAIN HAS COVER PLATES, NOT DIKE. INTENT OF FPSER IS MET. ACCEPTED BY NRC LETTER DATED 5/29/80.
(4) AN OIL COLLECTION SYSTEM WILL BE INSTALLED TO COLLECT REACTOR COOLANT PUMP LUBE OIL FROM POTENTIAL LEAKAGE SITES.	FPSER-79 PAGE 3-8	DC-79-76/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 5/29/80.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.16. <u>GAS SUPPRESSION SYSTEMS</u>		
(1) MANUAL LOCK OUT OF THE CARBON DIOXIDE SYSTEM, WITH ALARM IN THE CONTROL ROOM, WILL BE PROVIDED FOR THE BELOW GRADE FUEL OIL PUMP ROOM IN THE YARD.	FPSER-79 PAGE 3-8	DC-78-13/ IN COMPLIANCE.
(2) THE HIGH PRESSURE CARBON DIOXIDE EXTINGUISHING SYSTEMS WILL BE PROVIDED WITH MONITORING DEVICES ARRANGED TO SIGNAL INADEQUATE PRESSURIZATION OF THE PILOT BOTTLE IN THE CONTROL ROOM.		ITEM IS NOT APPLICABLE, SINCE NO PILOT BOTTLES ARE USED. ACCEPTED BY NRC LETTER DATED 12/31/81.
(3) ADDITIONAL NOZZLES WILL BE PROVIDED FOR THE AUTOMATIC TOTAL FLOODING CARBON DIOXIDE SUPPRESSION SYSTEMS IN THE OUTSIDE CONTAINMENT CABLE PENETRATION VAULTS.		DC-79-70/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 12/18/80.
3.1.17. <u>HOSE NOZZLES</u>		
(1) WHERE DAMAGE TO SENSITIVE EQUIPMENT IS POSSIBLE, FIRE HOSE WILL BE PROVIDED WITH 1-1/2 INCH ABC RATED ADJUSTABLE FOG NOZZLES.	FPSER-79 PAGE 3-8	IN COMPLIANCE.
(2) HOSE AT THE EXISTING HOSE STATION SERVICING THE CONTROL ROOM WILL BE EQUIPPED WITH VARIABLE GALLONAGE NOZZLES WITH BALL VALVE SHUTOFF.		IN COMPLIANCE. SECURITY BRINGS VARIABLE GALLONAGE NOZZLES TO SCENE.
3.1.18. <u>HOSE STATIONS</u>		
(1) THE LICENSEE WILL PROVIDE ADDITIONAL MANUAL HOSE STATIONS TO COVER ALL AREAS OF THE PLANT CONTAINING SAFETY-RELATED EQUIPMENT SUCH AS THE CONTROL ROOM COMPLEX. IN ADDITION THE LICENSEE WILL VERIFY THAT THE EXISTING HOSE STATIONS IN THE TURBINE BUILDING HAVE SUFFICIENT HOSE REACH FOR ALL AREAS OF THE SWITCHGEAR ROOMS.	FPSER-79 PAGE 3-8	COMPLETE. IN COMPLIANCE. INSPECTED BY PT 24.4B. ACCEPTED BY NRC LETTER DATED 2/13/81.
(2) AS AN INTERIM MEASURE, THE LICENSEE WILL PROVIDE ALL EXISTING HOSE STATIONS WITH SUFFICIENT COUPLED AND RACKED HOSES TO ASSURE REACHING ALL SAFETY-RELATED AREAS.		COMPLETE. IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.18. HOSE STATIONS (CONT.)		
(3) A 1-1/2 INCH HOSE STATION WILL BE PROVIDED AT THE ENTRANCE OF THE UNIT 2 CABLE TRAY ROOM WITH SUFFICIENT HOSE TO REACH ALL AREAS OF BOTH CABLE TRAY ROOMS AND MECHANICAL EQUIPMENT ROOMS 1 AND 2.	FPSER-79 PAGE 3-8	DC-78-08J(3)/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 2/13/81.
(4) ALL HOSES WILL BE INSPECTED PERIODICALLY TO DETERMINE THAT THEY ARE IN GOOD CONDITION WITH NO TRACES OF WATER INSIDE FROM LEAKING HOSE VALVES, AND THAT THEY MEET HYDROSTATIC TEST REQUIREMENTS.		IN COMPLIANCE. INSPECTED BY VARIOUS PTs.
(5) A DRY STANDPIPE HOSE STATION WILL BE INSTALLED IN EACH SERVICE BUILDING CABLE VAULT. THESE HOSE STATIONS WILL BE PROVIDED WITH LOW CAPACITY VARIABLE GALLONAGE FOG NOZZLES WITH BALL VALVE SHUTOFF.		DC-79-78/ HOSE STATIONS HAVE A REGULAR NOZZLE. VARIABLE GALLONAGE NOZZLES BROUGHT TO SCENE BY SECURITY. IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 10/9/80.
(6) A DRY STANDPIPE HOSE STATION WILL BE INSTALLED IN EACH CONTAINMENT BUILDING TO REACH ALL SAFETY-RELATED AREAS WITH A MAXIMUM OF 100 FEET OF HOSE.	FPSER-79 PAGE 3-9	DC-78-08J(1) AND DC-78-08J(2)/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 5/29/80.
(7) AN ANALYSIS WILL BE MADE OF THE MANUAL HOSE STATION PLACEMENT IN ORDER TO VERIFY THAT ALL LOCATIONS ON THE 29 FEET, 6 INCHES ELEVATION OF THE TURBINE BUILDING CAN BE REACHED BY A MAXIMUM OF 100 FEET OF 1-1/2 INCH HOSE ATTACHED TO INTERIOR HOSE STATIONS OR ATTACHED TO 2-1/2 INCH HOSE FROM A YARD HOSE CABINET. IF NECESSARY, ADDITIONAL HOSE STATIONS WILL BE PROVIDED.		DC-78-08J(3)/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 2/13/81.
(8) THE LICENSEE WILL VERIFY THAT EXISTING HOSE STATIONS IN THE TURBINE BUILDING HAVE SUFFICIENT HOSE REACH FOR ALL AREAS OF THE SWITCHGEAR ROOMS AND ARE EQUIPPED WITH NOZZLES SUITABLE FOR EXTINGUISHING ELECTRICAL FIRES.		IN COMPLIANCE. VARIABLE FLOW NOZZLES BROUGHT TO SCENE BY RESPONDING FIRE BRIGADE MEMBERS. ACCEPTED BY NRC LETTER DATED 2/13/81.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.18. HOSE STATIONS (CONT.)		
(9) THE LICENSEE WILL UPGRADE THE INVENTORY OF EACH HOSE HOUSE TO INCLUDE:	FPSER-79 PAGE 3-9	
(A) 200 FEET OF 1-1/2 INCH HOSE (B) 300 FEET OF 2-1/2 INCH HOSE (C) 1 - 2-1/2 INCH X 1-1/2 INCH X 1-1/2 INCH GATED WYE (D) 1 - FORCIBLE ENTRY TOOL (HALLIGAN TYPE) (E) 2 - 1-1/2 INCH ADJUSTABLE NOZZLES (F) 1 - PORTABLE HANDLIGHT		IN COMPLIANCE. CHECKED BY PT 24.4H.
(10) HOSE HOUSES WILL BE RAISED TO PROVIDE A 2 INCH DOOR CLEARANCE ABOVE GRADE, AND INCLUDE CONCRETE PADS ARRANGED TO PREVENT WATER ACCUMULATION.		IN COMPLIANCE.
(11) EQUIPMENT IN THE HOSE HOUSES WILL BE MAINTAINED IN A CLEAN CONDITION.		IN COMPLIANCE.
(12) AREAS AROUND HOSE HOUSES WILL BE CLEARED OF OBJECTS THAT COULD BLOCK ACCESS TO THE EQUIPMENT AND/OR MAKE THE STRETCHING OF HOSE FOR FIRE FIGHTING DIFFICULT OR HAZARDOUS.		IN COMPLIANCE.
(13) FIRE HOSE IN HOSE HOUSES WILL BE STORED COUPLED AND RACKED ON SHELVES WITH FEMALE BUTT TOWARD THE EXTERIOR.		IN COMPLIANCE.
(14) IN WALL MOUNTED HYDRANT HOSE HOUSE, HOSE WILL BE STORED IN DONUT ROLLS.		IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.18. HOSE STATIONS (CONT.)		
(15) THE FOLLOWING EQUIPMENT WILL BE ADDED TO THE NEAREST YARD HOSE HOUSE TO THE CONTAINMENT SPRAY PUMP AND AUXILIARY FEEDWATER PUMP BUILDING:	FPSER-79 PAGE 3-9	(HOSE HOUSES #5 AND #12.) INSPECTED BY PT 24.4A.
(A) SUFFICIENT LENGTHS OF 2-1/2 INCH HOSE TO REACH THE EXTERIOR DOOR TO THE CONTAINMENT SPRAY PUMP BUILDING;		ALL COMPLETE. IN COMPLIANCE.
(B) SUFFICIENT LENGTHS OF 1-1/2 INCH HOSE TO REACH ALL AREAS OF THE BUILDING FROM THE EXTERIOR DOOR;		
(C) ONE GATED WYE, 2-1/2" X 1-1/2"; AND		
(D) TWO 1-1/2 INCH ADJUSTABLE SPRAY NOZZLES.		
(16) AN ADDITIONAL WATER SUPPLY CONNECTION WILL BE PROVIDED TO THE INTERIOR FIRE HOSE SYSTEM IN THE AUXILIARY BUILDING.	FPSER-79 PAGE 3-10	DC-79-73/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 10/9/80.
3.1.19. HYDROGEN LINES		
(1) ALL HYDROGEN LINES IN THE AUXILIARY BUILDING AND TURBINE BUILDING WILL BE IDENTIFIED BY COLOR CODING OR LABEL.	FPSER-79 PAGE 3-10	COLOR CODED YELLOW. IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.20. <u>HOSE AND FOAM CARTS</u>		
(1) A HOSE AND FOAM CART WILL BE PROVIDED IN A CENTRAL LOCATION EQUIPPED AS FOLLOWS: (A) 300 FEET OF 2-1/2 INCH HOSE IN DONUT ROLLS (B) 200 FEET OF 1-1/2 INCH HOSE IN DONUT ROLLS (C) ONE 2-1/2 INCH FOG NOZZLE (D) TWO 1-1/2 INCH FOG NOZZLES - ONE NOZZLE WILL BE LOW CAPACITY VARIABLE GALLONAGE WITH BALL VALVE SHUTOFF (E) ONE FORCIBLE ENTRY TOOL (HALLIGAN TYPE) (F) TWO HOSE STRAPS (G) TWO 2-1/2 INCH SPANNER WRENCHES (H) TWO 1-1/2 INCH SPANNER WRENCHES (I) ONE HYDRANT WRENCH (J) ONE PORTABLE HANDLIGHT (K) ONE GATED WYE, 2-1/2 X 1-1/2 X 1-1/2 INCH (L) HOSE GASKETS, 2-1/2 INCH AND 1-1/2 INCH (M) 20 GALLONS OF AQUEOUS FILM FORMING FOAM (N) ONE FOAM EDUCTOR, AND (O) ONE 2-1/2 INCH FOAM APPLICATOR PLAYPIPE	FPSER-79 PAGE 3-10	FIRE PUMPER HAS REPLACED HOSE AND FOAM CART; PUMPER INVENTORY EXCEEDS THIS EQUIPMENT LIST. IN COMPLIANCE. CHECKED BY PT 24.4H.
3.1.21. <u>HYDRANTS</u>		
(1) A BLOCK VALVE WILL BE PROVIDED IN THE LINE TO THE HYDRANT THAT BRANCHES FROM THE AUXILIARY BUILDING FIRE MAIN FEEDER.	FPSER-79 PAGE 3-10	DC-79-35/ IN COMPLIANCE.
3.1.22. <u>VALVE SUPERVISION</u>		
(1) THE LICENSEE WILL PROVIDE ELECTRICAL SUPERVISION OR CHAINS AND LOCKS OR TAMPER PROOF SEALS SUPPLEMENTED WITH INSPECTIONS AT LEAST MONTHLY TO ASSURE THAT ALL VALVES CONTROLLING THE FLOW OF FIRE SUPPRESSION WATER ARE MAINTAINED IN THE OPEN POSITION.	FPSER-79 PAGE 3-10	IN COMPLIANCE. CHECKED BY PT 24.33. ACCEPTED BY NRC LETTER DATED 5/29/80.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.23. MONITORING PANELS		
(1) A PANEL WILL BE INSTALLED IN THE FUEL BUILDING TO PROVIDE AN ALTERNATE CAPABILITY FOR MONITORING PARAMETERS REQUIRED FOR SAFE SHUTDOWN, NAMELY: REACTOR COOLANT HOT LEG TEMPERATURE AND PRESSURIZER PRESSURE AND LEVEL. THIS ALTERNATE SHUTDOWN PROVISION WILL BE INDEPENDENT OF INSTRUMENTATION CABLES LOCATED IN THE EMERGENCY SWITCHGEAR AND RELAY ROOMS AND THE CABLES FROM THE PANEL WILL BE ROUTED THROUGH A SEPARATE CONTAINMENT PENETRATION AREA.	FPSER-79 PAGE 3-10	DC-79-68/ COMPLETE. CURRENT REANALYSIS ADDRESSES THIS. (CHAPTER 6, SECTIONS I.1, I.2.) THE PANEL IS LOCATED IN THE CABLE SPREADING ROOM.
3.1.24. PENETRATIONS		
(1) VERIFICATION WILL BE PROVIDED THAT ALL PENETRATIONS (CABLE, PIPE AND VENTILATION DUCT) ARE SEALED TO HAVE A FIRE RATING AT LEAST EQUIVALENT TO THE TEST CRITERIA DESCRIBED IN THE LICENSEE'S FIRE HAZARDS ANALYSIS REPORT. IF THIS VERIFICATION CANNOT BE PROVIDED, ALL UNSEALED OR INADEQUATELY SEALED PENETRATIONS WILL BE SEALED OR THE SEALS WILL BE UPGRADED TO PROVIDE A FIRE RESISTANCE EQUAL TO THE FIRE SEVERITY ON BOTH SIDES OF THE BARRIER UP TO A MAXIMUM OF THREE HOURS. IN PARTICULAR, THE FOLLOWING PENETRATIONS WILL BE ADDRESSED:	FPSER-79 PAGE 3-11	IN COMPLIANCE. CHECKED BY PT 24.11. ACCEPTED BY NRC LETTER DATED 12/18/80.
(A) IN THE BOUNDARY SURROUNDING THE OUTSIDE CONTAINMENT PENETRATION VAULTS; CABLE TUNNELS AND SERVICE BUILDING CABLE VAULTS; AND EACH BATTERY ROOM.		
(B) IN THE CONTROL ROOM COMPLEX BARRIERS (INCLUDING FLOOR AND CEILINGS).		
(C) BETWEEN THE AUXILIARY BUILDING, ELEVATIONS 13 FEET AND 27 FEET, 6 INCHES, AND OTHER FIRE AREAS.		
(D) BETWEEN THE AUXILIARY BUILDING, ELEVATION 45 FEET, 10 INCHES, AND THE FUEL BUILDING.		

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.24. PENETRATIONS (CONT.)		
(E) IN THE WALL BETWEEN THE SAFEGUARDS EQUIPMENT BUILDING AND THE CONTAINMENT SPRAY PUMP AND AUXILIARY FEEDWATER PUMP BUILDING.	FPSER-79 PAGE 3-11	IN COMPLIANCE CHECKED BY PT 24.11.
(F) IN THE WALLS OF THE MECHANICAL EQUIPMENT ROOM #3.		
(2) ANY ELECTRICAL CABLE AND CONDUIT PENETRATION SEALS WHICH MUST BE REPLACED WILL BE SEALED USING A SILICONE FOAM INSTALLED AS APPROVED BY THE NRC STAFF FOR USE AT SURRY POWER STATION, UNITS 1 AND 2.		
(3) ALL PENETRATIONS IN BARRIERS IN THE CABLE TRAY ROOMS WILL BE SEALED TO PROVIDE A THREE-HOUR RESISTANCE TO FIRE.		
3.1.25. SAFE SHUTDOWN		
(1) THE CHARGING SYSTEMS OF UNITS 1 AND 2 WILL BE MODIFIED SO THAT THE CHARGING PUMPS CAN BE CROSS-CONNECTED.	FPSER-79 PAGE 3-11	DC-79-67/ IN COMPLIANCE.
(2) AN ALTERNATE SOURCE OF CHARGING PUMP SERVICE WATER WILL BE PROVIDED WHICH WILL ASSURE OPERATION OF ONE CHARGING SYSTEM IN SPITE OF A FIRE IN MECHANICAL EQUIPMENT ROOM NUMBER 3.		DC-81-41/ IN COMPLIANCE. (SEE PAGE 27 OF THIS TABLE.)
3.1.26. WATER SUPPRESSION SYSTEMS		
(1) AN AUTOMATIC SPRINKLER SYSTEM WILL BE ADDED TO EACH NEW FILTER UNIT ADDED TO THE AUXILIARY BUILDING VENTILATION SYSTEM.	FPSER-79 PAGE 3-11	DC-78-S34A/ IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 2/13/81.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.26. WATER SUPPRESSION SYSTEMS (CONT.)		
(2) HEAT COLLECTOR PLATES WILL BE PROVIDED OVER THE SPRINKLER HEADS IN THE TURBINE BUILDING INSTALLED UNDER GRATING WALKWAYS AND NOT PRESENTLY EQUIPPED WITH SPECIAL HEAT COLLECTOR DEFLECTORS.	FPSER-79 PAGE 3-12	COMPLETE. IN COMPLIANCE. INSPECTED MONTHLY BY SUADM-ADM-20. ACCEPTED BY NRC LETTER DATED 2/13/80.
(3) MANUALLY ACTUATED SPRINKLER SYSTEMS WILL BE INSTALLED IN THE CEILING OF THE SERVICE BUILDING CABLE VAULT AND CABLE TUNNEL. THE SPRINKLER SYSTEM IN THE VAULT WILL BE AN OPEN HEAD, DRY PIPE SYSTEM, AND THAT IN THE CABLE TUNNEL WILL BE A CLOSED HEAD SYSTEM LOCATED OVER THE AISLE WAY OF THE TUNNEL.		DC-79-78/ IN COMPLIANCE. CHECKED BY PT 24.32 AND 24.34. ACCEPTED BY NRC LETTER DATED 2/18/80.
3.1.27. VENTILATION SYSTEM		
(1) THE VENTILATION SYSTEM WILL BE MODIFIED TO REMOVE THE CHARGING PUMP VENTILATION SYSTEM FROM THE AUXILIARY BUILDING GENERAL AREA VENTILATION SYSTEM AND PLACE IT ON A SEPARATE VENTILATION SYSTEM. THE INTAKE AND EXHAUST FOR THIS SYSTEM WILL BE DIRECTLY TO THE EXTERIOR OF THE AUXILIARY BUILDING.	FPSER-79 PAGE 3-12	DC-78-S34A/ COMPLETE. ACCEPTED BY NRC, LETTER SER 506, 5-29-80.
3.1.28. FIRE DETECTION SYSTEM POWER SUPPLY		
THE FIRE DETECTION SYSTEMS WILL BE CONNECTED TO A POWER SOURCE WHICH WILL RESTORE POWER TO THE FIRE DETECTION SYSTEMS AUTOMATICALLY FOLLOWING THE LOSS OF OFFSITE POWER.	FPSER-79 PAGE 3-12	DC-79-72/ COMPLETE. CHECKED BY PT 24.5C.
3.1.29. WATER SPRAY SHIELDS		
WATER SPRAY SHIELDS WILL BE PROVIDED FOR THE COMPONENT COOLING WATER PUMP MOTORS.	FPSER-79 PAGE 3-12	DC-79-74/ MEETS INTENT OF FPSER. IN COMPLIANCE. ACCEPTED BY NRC LETTER DATED 12/18/80.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.30. TECHNICAL SPECIFICATIONS		
(1) CHARGING PUMPS - THE LICENSEE WILL PROPOSE A TECHNICAL SPECIFICATION THAT WILL REQUIRE AT LEAST ONE CHARGING PUMP FROM THE OPPOSITE UNIT MUST BE AVAILABLE AT ALL TIMES DURING OPERATION OF EITHER UNIT.	FPSER-79 PAGE 3-12	COMPLETE. TECHNICAL SPECIFICATION 3.2.B.
(2) AUXILIARY FEEDWATER PUMPS - THE LICENSEE WILL PROPOSE A TECHNICAL SPECIFICATION THAT WILL REQUIRE A SUFFICIENT NUMBER OF AUXILIARY FEEDWATER PUMPS FROM THE OPPOSITE UNIT MUST BE AVAILABLE AT ALL TIMES DURING POWER OPERATION OF EITHER UNIT.		COMPLETE. TECHNICAL SPECIFICATION 3.6.B.
3.2.1. AUXILIARY BOILER ROOM		
(1) THE LICENSEE WILL VERIFY THAT FUEL OIL LEAKAGE IN THE AUXILIARY BOILER ROOM WILL NOT SPREAD TO OTHER PLANT AREAS VIA THE FLOOR DRAIN SYSTEM.	FPSER-79 PAGE 3-14	IN COMPLIANCE (REF LETTER SER 885, 10-31-80). ACCEPTED BY NRC LETTER DATED 12/18/80.
3.2.2. FIRE DAMPERS		
(1) THE LICENSEE WILL VERIFY THAT THE VENTILATION DUCTS IN THE MECHANICAL EQUIPMENT ROOM NO. 3 WALL SHARED WITH THE TURBINE BUILDING ARE EQUIPPED WITH THREE-HOUR FIRE-RATED DAMPERS.	FPSER-79 PAGE 3-14	COMPLETE. INSPECTED BY PT 24.38. ACCEPTED BY NRC LETTER DATED 12/18/80.
3.2.3. SAFE SHUTDOWN		
A. SAFE SHUTDOWN EVALUATION THE LICENSEE WILL REEVALUATE ALL PLANT AREAS TO DETERMINE THE POTENTIAL EFFECTS OF FIRE ON SAFE SHUTDOWN CAPABILITY. IN THIS REGARD, THE LICENSEE WILL DEMONSTRATE THAT SAFE HOT AND COLD SHUTDOWN CAN BE ACHIEVED FOR POSTULATED FIRES IN SPECIFIED AREAS.	FPSER-79 PAGE 3-14	CURRENT ANALYSIS ADDRESSES THIS COMMITMENT.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.2.3. SAFE SHUTDOWN (CONT.)		
B. ALTERNATE SHUTDOWN METHODS THE LICENSEE WILL DEVELOP AN ALTERNATE SHUTDOWN METHOD OR VERIFY THAT ALTERNATE SHUTDOWN METHODS ARE NOT REQUIRED IN THE EVENT OF FIRE DAMAGE TO THE FOLLOWING SYSTEMS AND COMPONENTS: (1) CHARGING PUMPS COMPONENT COOLING AND SERVICE WATER PUMPS AND CABLES (2) INSTRUMENT AIR SYSTEMS (3) CHARGING PUMPS AND CABLES (4) AUXILIARY FEEDWATER PUMPS AND CABLES (5) LETDOWN SYSTEM (6) REACTOR COOLANT PUMP SEAL COOLER SUBSYSTEMS (7) PRESSURIZER HEATERS (8) RESIDUAL HEAT REMOVAL SYSTEM (9) COMPONENT COOLING WATER SYSTEM (10) STEAM GENERATOR PRESSURE AND LEVEL INDICATION (11) REACTOR CONTAINMENT AIR RECIRCULATION COOLERS (12) EMERGENCY SERVICE WATER SYSTEM	FPSER-79 PAGE 3-14	CURRENT REANALYSIS ADDRESSES THIS COMMITMENT.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.1.30. TECHNICAL SPECIFICATIONS		
(1) CHARGING PUMPS - THE LICENSEE WILL PROPOSE A TECHNICAL SPECIFICATION THAT WILL REQUIRE AT LEAST ONE CHARGING PUMP FROM THE OPPOSITE UNIT MUST BE AVAILABLE AT ALL TIMES DURING OPERATION OF EITHER UNIT.	FPSER-79 PAGE 3-12	COMPLETE. TECHNICAL SPECIFICATION 3.2.B.
(2) AUXILIARY FEEDWATER PUMPS - THE LICENSEE WILL PROPOSE A TECHNICAL SPECIFICATION THAT WILL REQUIRE A SUFFICIENT NUMBER OF AUXILIARY FEEDWATER PUMPS FROM THE OPPOSITE UNIT MUST BE AVAILABLE AT ALL TIMES DURING POWER OPERATION OF EITHER UNIT.		COMPLETE. TECHNICAL SPECIFICATION 3.6.B.
3.2.1. AUXILIARY BOILER ROOM		
(1) THE LICENSEE WILL VERIFY THAT FUEL OIL LEAKAGE IN THE AUXILIARY BOILER ROOM WILL NOT SPREAD TO OTHER PLANT AREAS VIA THE FLOOR DRAIN SYSTEM.	FPSER-79 PAGE 3-14	IN COMPLIANCE (REF LETTER SER 885, 10-31-80). ACCEPTED BY NRC LETTER DATED 12/18/80.
3.2.2. FIRE DAMPERS		
(1) THE LICENSEE WILL VERIFY THAT THE VENTILATION DUCTS IN THE MECHANICAL EQUIPMENT ROOM NO. 3 WALL SHARED WITH THE TURBINE BUILDING ARE EQUIPPED WITH THREE-HOUR FIRE-RATED DAMPERS.	FPSER-79 PAGE 3-14	COMPLETE. INSPECTED BY PT 24.38. ACCEPTED BY NRC LETTER DATED 12/18/80.
3.2.3. SAFE SHUTDOWN		
A. SAFE SHUTDOWN EVALUATION THE LICENSEE WILL REEVALUATE ALL PLANT AREAS TO DETERMINE THE POTENTIAL EFFECTS OF FIRE ON SAFE SHUTDOWN CAPABILITY. IN THIS REGARD, THE LICENSEE WILL DEMONSTRATE THAT SAFE HOT AND COLD SHUTDOWN CAN BE ACHIEVED FOR POSTULATED FIRES IN SPECIFIED AREAS.	FPSER-79 PAGE 3-14	CURRENT ANALYSIS ADDRESSES THIS COMMITMENT.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
3.2.4. <u>CHARCOAL FILTER HAZARD</u>		
(1) THE LICENSEE WILL VERIFY THAT THE SAFETY-RELATED CABLES NEAR THE CONTROL ROOM EMERGENCY VENTILATION SYSTEM CHARCOAL FILTERS DO NOT SERVICE HOT SHUTDOWN EQUIPMENT AND THAT DAMAGE TO THESE CABLES COULD NOT CAUSE SPURIOUS OPENING OF THE VALVE IN THE VENTILATION SUPPLY PIPE TO THE CONTROL ROOM. THE FUNCTION OF THESE CABLES AND THE SEPARATION BETWEEN THESE CABLES AND CABLES OF THE REDUNDANT DIVISION WILL BE DESCRIBED.	FPSER-79 PAGE 3-15	IN COMPLIANCE. REF LETTER TO NRC, SER 885, 10-31-80. ACCEPTED BY NRC LETTER DATED 12/18/80.
3.2.5. <u>IN-SITU TESTING</u>		
(1) THE LICENSEE WILL EVALUATE THE FEASIBILITY OF CONDUCTING IN-SITU TESTS TO VERIFY THE ADEQUACY OF SMOKE DETECTOR DESIGNS. BENCH TESTS WILL ALSO BE CONDUCTED TO VERIFY THAT SMOKE DETECTORS WILL PROVIDE PROMPT RESPONSE AND HAVE ADEQUATE SENSITIVITY TO THE PRODUCTS OF COMBUSTION OF THE AREAS WHERE SMOKE DETECTORS ARE OR WILL BE INSTALLED. IF THE SYSTEMS ARE FOUND INADEQUATE APPROPRIATE MODIFICATIONS WILL BE MADE.	FPSER-79 PAGE 3-15	IN COMPLIANCE. ALL NEW DETECTORS HAVE BEEN BENCH TESTED. THE SMOKE DETECTION SYSTEM IS FUNCTIONALLY CHECKED IN ACCORDANCE WITH THE PERIODIC TEST PROGRAM (REF: NRC LETTER, SERIAL NO. 860, DATED 10-09-80 AND LETTER TO NRC, SERIAL NO. 477, DATED 08-13-82).
4.1.3. <u>PROCEDURE</u>		
THE LICENSEE SHOULD DEVELOP A PROCEDURE FOR THE AUXILIARY FEED-WATER SYSTEM CROSS-CONNECT.	FPSER-79 PAGE 4-3	COVERED BY PROCEDURE FCA-1.00.
4.4.13. <u>TOXIC AND CORROSIVE COMBUSTION PRODUCTS</u>		
THE FIRE BRIGADE WILL BE PROVIDED WITH AND TRAINED IN THE USE OF EMERGENCY BREATHING APPARATUS FOR MANUALLY FIGHTING FIRES INVOLVING SUCH MATERIALS.	FPSER-79 PAGE 4-22	IN COMPLIANCE. COVERED BY FIRE PLAN AND TRAINING AT CHESTERFIELD FIRE SCHOOL.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
6.0 <u>ADMINISTRATIVE CONTROLS</u>		
TRAIN FOREMEN OR SUPERVISORS WHO AUTHORIZE PERMITS FOR IGNITION SOURCE CONTROLS TO NFPA NO. 51-B, "STANDARD FOR FIRE PROTECTION IN USE OF CUTTING AND WELDING PROCESS."	FPSER-79 PAGE 6-1	COMPLETE. COVERED BY SUADM-ADM-20.
REFERENCE IN FIRE FIGHTING STRATEGIES, THE APPROPRIATE VENTILATION METHODS OF FIRE AREAS.		PLC IS UPDATING THIS.
PERFORM PRACTICE SESSIONS WHICH INCLUDE SIMULATIONS IN PLANT AREAS (WALK THROUGHS, DRY RUNS) OF THE PROPER FIRE FIGHTING METHODS FOR VARIOUS FIRES OF SIMILAR MAGNITUDES AND COMPLEXITY THAT COULD OCCUR IN A NUCLEAR POWER PLANT. THE DUPLICATION OF ACTUAL ROOM CONFIGURATIONS IN VARIOUS PLANT AREAS WILL NOT BE REQUIRED.		COVERED BY FIRE PLAN. QUARTERLY TRAINING IS CONDUCTED.
THE FOLLOWING WILL BE REVISED AS REQUIRED AND IMPLEMENTED: FIRE FIGHTING PLANS AND PROCEDURES; THE FIRE BRIGADE TRAINING PROGRAM; CONTROLS OVER COMBUSTIBLES AND IGNITION SOURCES; AND THE PREFIRE PLANS FOR FIGHTING FIRES.		COMPLETE. IN COMPLIANCE.
THE LICENSEE HAS PROPOSED A FIRE BRIGADE OF AT LEAST FIVE MEMBERS TO BE MAINTAINED ONSITE AT ALL TIMES. THE FIRE BRIGADE COMPOSITION WILL NOT INCLUDE THREE MEMBERS OF THE MINIMUM SHIFT CREW NECESSARY FOR SAFE SHUTDOWN OR ANY PERSONNEL REQUIRED FOR OTHER ESSENTIAL FUNCTIONS DURING A FIRE EMERGENCY.		IN COMPLIANCE. COVERED BY FIRE PLAN.
QUALITY ASSURANCE PROVISIONS WILL BE ESTABLISHED FOR THE DESIGN, PROCUREMENT, INSTALLATION, TESTING AND ADMINISTRATIVE CONTROLS FOR FIRE PROTECTION WITHIN THE SURRY NUCLEAR POWER STATION 10 CFR PART 50 APPENDIX B QUALITY ASSURANCE PROGRAM. EXISTING QUALITY ASSURANCE IMPLEMENTING PROCEDURES WILL BE MODIFIED TO INCLUDE AND APPLY THE QUALITY ASSURANCE CRITERIA, ADDRESSED IN BTP 9.5-1 TO A LEVEL COMMENSURATE WITH THE OBJECTIVES AND REQUIREMENTS FOR FIRE PROTECTION.		THE 18 CRITERIA OF 10 CFR 50 APPENDIX B ARE APPLIED TO THE QA PROGRAM FOR THE FIRE PROTECTION PROGRAM AT SURRY POWER STATION. THE QUALITY ASSURANCE AUDIT PROCEDURE FOR FIRE PROTECTION INCLUDES THE QUALITY ASSURANCE CRITERIA ADDRESSED IN BTP 9.5-1. REF: QA INSTRUCTION 18.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
PROVIDE SPRINKLER SYSTEM PROTECTION FOR EACH CHARCOAL FILTER.	NRC LETTER SER. #506 5-29-80 (NRC-506) ENCL. I PAGE 3	DC-78-S34A PROVIDES SPRINKLERS FOR NEW CHARCOAL FILTERS. IN COMPLIANCE.
HIGH PRESSURE CO2 INITIATION SYSTEM TO BE CHANGED TO AN ELECTRICAL SYSTEM.	VIRGINIA POWER LETTER SER. #869 10-29-80 (VIRGINIA POWER-869) ATTACH. I PARA. 3.1.16 (1)(2)	DC-78-13. IN COMPLIANCE.
A PLANT INSPECTION WILL BE CONDUCTED TO CONFIRM PROPER INSTALLATION OF CABLE TRAY COVERS.	VIRGINIA POWER-869 ATTACH. III PARA. 3.14 AND 3.1.10 PARA. 2.2	IN COMPLIANCE. INSPECTED MONTHLY BY SUADM-ADM-20.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
AT THE TIME THE CHARGING PUMP CROSS-CONNECT BECOMES OPERATIONAL, PROCEDURES WILL BE DEVELOPED AND WALK THROUGH CONDUCTED TO PROVE THE ADEQUACY OF THE SYSTEM TO CONTROL REACTOR COOLANT INVENTORY.	VIRGINIA POWER LETTER SER. 885 10-31-80 (VIRGINIA POWER-885) ATTACH. 1 PAGE 6	PROCEDURE 1-AP-46 WAS DEVELOPED FOR THE CHARGING PUMP CROSS-CONNECT. A WALK THROUGH OF THE PROCEDURE HAS BEEN DONE BY STATION OPERATIONS AND IS DOCUMENTED IN SHIFT ORDER BOOK, 10-22-85.
CABLES FROM MONITORING PANEL IN CABLE SPREADING ROOM WILL BE ROUTED TO THE CONTAINMENT VIA A PENETRATION THAT IS REMOTE AND INDEPENDENT FROM THE OUTSIDE CONTAINMENT PENETRATION VAULT.	VIRGINIA POWER-885 ATTACH. 1 PAGE 9	CURRENT REANALYSIS ADDRESSES THIS COMMITMENT.
REPLACE 2-HOUR BATTERY SUPPLIES WITH 8-HOUR BATTERY SUPPLIES FOR EMERGENCY LIGHTING.	VIRGINIA POWER LETTER SER. 304 5-19-81 (VIRGINIA POWER-304) ATTACH. 2	DC-84-24 IN COMPLIANCE.

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

COMMITMENT	SOURCE	STATUS
(1) INSTALL COLD LEG TEMPERATURE INDICATION ON REMOTE PANELS.	VIRGINIA POWER LETTER SER. 064 2-12-82 (VIRGINIA POWER-064) ATTACH. I	DC-83-37(U1) AND DC-83-38(U2) IN COMPLIANCE.
(2) INSTALL STEAM GENERATOR PRESSURE INDICATION ON REMOTE PANELS.		DC-83-35(U1) AND DC-83-36(U2) IN COMPLIANCE.
1. SOURCE RANGE NEUTRON FLUX INSTRUMENTATION TO BE ADDED TO REMOTE PANEL.	VIRGINIA POWER LETTER SER. 363 6-18-82 (VIRGINIA POWER-363) ATTACH. 1 PART D	DC-83-33(U1) AND DC-83-34(U2) IN COMPLIANCE.
2. ELECTRICALLY ISOLATE DIESEL GENERATOR CONTROL CIRCUIT TO LOCAL PANEL.		DC-83-39A(U1) AND DC-83-39B(U2) IN COMPLIANCE.
3. ASSURE COORDINATION OF 480V 225A FRAME SIZE BREAKERS.		DONE BY ELECTRICAL COORDINATION STUDY. (CHAPTER 9)
4. REPLACE MAIN BREAKERS ON VITAL BUS PANELS WITH MOLDED CASE SWITCHES.		NOT REQUIRED. REF ELECTRICAL COORDINATION STUDY (CHAPTER 9) AND MODIFICATIONS (CHAPTER 6, SECTION II.3).

TABLE 1-2

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

COMMITMENT STATUS

	COMMITMENT	SOURCE	STATUS
5.	480/120V CONTROL TRANSFORMERS OF CLASS IE MOTOR CONTROL CENTER WILL BE REPLACED WITH ENCAPSULATED TRANSFORMERS OR FUSED.	VIRGINIA POWER-363 ATTACH. 1 PART D	DC-83-45(U1) AND DC-83-46(U2) IN COMPLIANCE.
6.	ADDITIONAL PROCEDURES WILL BE WRITTEN TO COVER THE FOLLOWING AREAS:		
	A. COMPLETE LINEUP OF THE ALTERNATE METHOD OF CHARGING.		COVERED BY FCA-1.00; ATT. 7A, B, C.
	B. PROCEDURES TO REQUIRE BREAKERS ON MOVS 1700 AND 1701 TO BE OPEN WHEN REACTOR COOLANT PRESSURE REQUIRES THE VALVES TO BE CLOSED.		COVERED BY OP-1.
	C. EMERGENCY CLOSURE OF THE DECAY HEAT RELEASE VALVES.		COVERED BY FCA-1.02, 1.03, 1.06.
	D. EMERGENCY CLOSURE OF THE PRESSURIZER RELIEF VALVES.		
	E. REMOTE OPERATION OF DIESEL GENERATORS.		COVERED BY FCA-1.00; ATT. 2.
7.	CHARGING PUMP SERVICE WATER PUMP RELOCATION.		DC-81-41 (SEE PAGE 18 OF THIS TABLE) IN COMPLIANCE.
(1)	INSTALL TOTAL FLOODING HALON SYSTEMS IN THE UNIT 1 AND 2 EMERGENCY SWITCHGEAR ROOMS.	NRC LETTER OF REJECTION #043 1-19-83	DC 84-01 IN COMPLIANCE.

TABLE 1-3

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNITS 1 & 2

Appendix R Program Documents

A. 10 CFR 50 Appendix R Report (Volumes I through IV)

B. Station Appendix R Plant Shutdown Procedures, FCA-1.XX Series

C. Station Cold Shutdown Repair Procedures

1. EEMP-C-RH-135, "RHR Pump Cable Repair"
2. EEMP-C-CC-153, "CCW Pump Motor and Cable Repair"
3. EEMP-C-CC-159, "Charging Pump Cooling Water Pump Control Circuit Repair"

D. E&C Nuclear Design Control Manual Procedures

1. E&C NDCM Procedure 4.19, "Maintaining Fire Protection Program Compliance During the Design Process"
2. E&C Nuclear Standard GN-0021, "Engineering Guidelines for Appendix R"

E. Station Drawings

1. Appendix R Equipment Location Drawings, 11448-FAR Series
2. Appendix R System Flow Diagrams, 11448/11548-DAR Series
3. Appendix R Cable Block Diagrams, 11448/11548-FE-90 Series
4. Appendix R One-Line Electrical Diagrams, 11448/11548-FE-1AA

2. IDENTIFICATION OF FIRE AREAS

2.1 Objective

This chapter lists the definitions associated with fire areas at Surry, lists the fire areas associated with Appendix R and lists the equivalent fire severity for each fire area.

2.2 Definitions

Automatic Fire Detectors

An automatic fire detector is a device designed to detect the presence of fire and initiate action. Fire detectors may provide an alarm and/or actuate fire suppression systems. Automatic fire detectors are classified as the following:

(1) Heat Detector - a device which detects abnormally high temperature and/or rate-of-temperature rise.

(2) Smoke Detector - a device which detects the visible or invisible products of combustion.

(3) Flame Detector - a device which detects the infrared, ultraviolet, or visible radiation produced by a fire.

(4) Line-Type Detector - a device in which detection is continuous along a path, e.g., fixed temperature, heat sensitive cable and rate-of-rise pneumatic tubing detectors. (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Boundaries or Barriers

A continuous membrane that is either vertical or horizontal, such as a wall or floor/ceiling assembly, designed and constructed with a specified fire resistance rating or other equivalent means to limit the spread of fire and restrict the movement of smoke and hot gases.

Combustible Material

Material that does not classify as noncombustible, as defined in this report. (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Fire Area

That portion of a building or plant that is separated from other areas by fire barriers.

Fire Protection Program

The integrated effort involving components, procedures, and personnel utilized in carrying out the activities of fire protection. It includes system and facility design, fire prevention, fire detection, annunciation, confinement, suppression, administrative controls, fire brigade organization, inspection and maintenance, training, quality assurance, and testing. (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Fire Resistance Rating

The time, in minutes or hours, that materials or assemblies have successfully withstood an exposure fire in accordance with test procedures of "Standard Methods of Fire Tests of Building Construction and Materials," NFPA 251.

Fire Suppression

Control and extinguishing of fires (fire fighting). Manual fire suppression is the use of approved fire hoses and nozzles, portable extinguishers, or manually actuated fixed systems by plant personnel. Automatic fire suppression is the use of automatically actuated fixed systems such as water (sprinklers, water spray, deluge, etc.), Halon, or carbon dioxide systems. (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Fire Zones

The subdivisions of fire areas in which the fire suppression systems are designed to combat particular types of fires. (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Intervening Combustible

A combustible material that is located between redundant trains of safe shutdown equipment.

Noncombustible Material

(1) A material which when used in its existing form and under the conditions anticipated will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

(2) Material having a structural base that is noncombustible with a surface coating or layer that does not exceed 1/8 inch, and having a flame-spread rating not higher than 50 when measured using the ASTM E-84 Test, "Surface Burning Characteristics of Building Materials." (Ref. "Standard Review Plan," Rev. 3, July 1981.)

Penetration

An opening in a fire barrier such as a floor, wall or ceiling for the passage of conduit, cables, cable trays, piping, HVAC ducting, dampers, equipment, etc., which has been sealed so as to maintain a fire barrier rating.

2.3 Identification of Fire Areas

Thirty-five fire areas are identified at Surry. The 35 fire areas are listed in Table 2-1. Table 2-2 identifies the fire areas at Surry and lists the automatic detection and suppression capabilities, along with the equivalent fire severities, for each fire area. (See Chapter 8, Combustible Loading Analysis). These fire areas are illustrated in 11448-FAR series drawings.

The number of fire areas is less than in the 1977 analysis. The basis for reducing the number of fire areas from that identified in the 1977 analysis is as follows:

(a) Some of the fire area boundaries from the 1977 analysis were not needed for providing separation between redundant safe shutdown components, so these fire area boundaries were revised. The fire area boundaries were revised such that some fire areas were combined with adjacent fire areas. In other words, if one area did not contain any safe shutdown components which were redundant to the safe shutdown components located in an adjacent fire area, then the two fire areas were combined. (e.g., the Fuel and Decontamination Buildings were combined with the Auxiliary Building fire area since they did not contain any safe shutdown systems redundant to those located in the Auxiliary Building).

(b) The NRC's Generic Letter 85-01, Section 3.1.1, "Fire Area Definition," provides guidance on fire area definition. In this section, the NRC recognizes that fire areas may be revised from those identified by the licensees during their previous fire hazards analysis. The NRC also states that fire areas should be established in order to prevent damage to redundant safety systems and components. Section 3.1.1, in part, states the following:

"During the "Appendix A" reviews, some licensees performed their fire hazards analysis using these definitions, some did not. Licensees sometimes called "fire zones" "fire areas." Section III.G sets forth fire protection alternatives within a fire area. If new fire areas are identified they should be established using the BTP guidelines.

The concept of fire areas was described in BTP APCSB 9.5-1:

> ...Fire areas should be established based upon the amount of combustible material present and considering suitably chosen design basis fires so that adequate protection can be provided for safety-related systems and equipment...
>
> ...This separation is enhanced if the plant is divided into suitable fire areas since redundant safety equipment can then be placed in separate fire areas.
>
> Particular design attention should be given to the use of separate isolated fire areas for redundant cables to avoid loss of redundant safety-related cables..."

The revised fire areas established in the current Appendix R analysis are consistent with the NRC guidelines.

2.4 <u>Methodology for the Calculation of Equivalent Fire Severities</u>

An important component of a Fire Hazards Analysis is the calculation of Equivalent Fire Severities (EFS) or "Standard Fire Durations" for the fire areas being analyzed. The EFS provides a method by which areas contents can be related to the standard time-temperature curve. The primary use of EFS as applied to nuclear power plant is to provide both the utility and the NRC with a method to determine the adequacy of existing fire barriers and the need for new or additional fire protection systems.

There are a number of limitations on the use of Equivalent Fire Severity calculations. These limitations are inherent in the basis and methodology of the EFS calculations. These limitations are based on the failure of EFS calculations to adequately address such items as; ventilation vs. fuel controlled fires, fuel configuration, room configuration and ignition sources. Other limitations include the assumption of total fuel consumption, limited empirical database, and most importantly the assumption of heat rise following that of the standard time-temperature curve.

There are several steps that must be performed in order to calculate the EFS of an area. These steps and an example EFS calculation are discussed in Chapter 8, Combustible Loading Analysis (CLA).

The Equivalent Fire Severity of each fire area is listed as a quantitative value in Chapter 8, Combustible Loading Analysis. The EFS values were classified as low, moderate, or high during development of Chapter 7, Exemptions Requests, to simplify the comparison of combustible loadings in various fire areas. These classifications have been formalized as follows:

LOW	0-30 minutes EFS
MODERATE	30-90 minutes EFS
HIGH	greater than 90 minutes EFS

The EFS listing in Table 2-2 is based on these classifications.

The above classifications are very conservative when compared to the National Fire Protection Association (NFPA) Handbook, 16th Edition, page 7-113, which indicates that the British have established three classifications of fire loading defined essentially as follows:

LOW	0-100,000 Btu/ft^2 (0-75 minutes)
MODERATE	100,000-200,000 Btu/ft^2 (75-150 minutes)
HIGH	greater than 200,000 Btu/ft^2 (over 150 minutes)

2.5 Miscellaneous Passive Fire Protection Items

Several types of passive fire protection items are provided within the station in order to comply with the requirements of Appendix R for separation between redundant trains of cables or components. Passive fire protection items include the following:

(1) Three-hour-rated barriers and penetration seals between all adjacent fire areas; and

(2) Miscellaneous fire retardant coatings, radiant energy shields, and cable tray firestops at various locations between redundant trains of cables or components within the same fire area.

The requirements for these miscellaneous passive items are given by various statements in Chapters 6 and 7 of this report. Table 2-3 provides a summary listing by fire area of all locations where passive fire protection items were required to be installed.

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNITS 1 & 2

TABLE 2-1

IDENTIFICATION OF FIRE AREAS

Fire Area	Description
1 CVT-1*	Unit 1 Cable Vaults and Tunnels
2 CVT-2*	Unit 2 Cable Vaults and Tunnels
3 ESGR-1*	Unit 1 Emergency Switchgear and Relay Rooms
4 ESGR-2*	Unit 2 Emergency Switchgear and Relay Rooms
5 CR*	Main Control Room
6 EDG-1*	Emergency Diesel Generator Room 1
7 EDG-2*	Emergency Diesel Generator Room 2
8 EDG-3*	Emergency Diesel Generator Room 3
9	Not used
10	Not used
11	Not used
12 BR-2B	Battery Room 2B
13	Not used
14	Not used
15 RC-1*	Unit 1 Containment
16 RC-2*	Unit 2 Containment
17 AB*	Auxiliary, Fuel, and Decontamination Buildings
18A FOPH-1*	Fuel Oil Pump House Room 1
18B FOPH-2*	Fuel Oil Pump House Room 2
19 SG-1*	Unit 1 Safeguards Area
20 SG-2*	Unit 2 Safeguards Area
21	Not used
22	Not used
23	Not used
24 IVPH	Intake Vacuum Priming House
25	Not used

TABLE 2-1

IDENTIFICATION OF FIRE AREAS
(continued)

Fire Area	Description
26	Not used
27	Not used
28 INS*	Intake Structure
29 DVPH-1	Unit 1 Discharge Vacuum Priming House
30 DVPH-2	Unit 2 Discharge Vacuum Priming House
31 TB*	Turbine Building, including Machine Shop Building, Condensate Polishing Building, Office Building, and Service Building
32 FPH	Fire Pump House
33	Not used
34	Not used
35 BRR	Boron Recovery Room
36	Not used
37	Not used
38	Not used
39	Not used
40	Not used
41	Not used
42	Not used
43	Not used
44	Not used
45 MER-3*	Mechanical Equipment Room #3
46	Not used
47	Not used
48	Not used
49	Not used
50	Not used
51	Not used
52 HLICH-1	Unit 1 High Level Intake Control House
53 HLICH-2	Unit 2 High Level Intake Control House
54 CPSWPR*	Charging Pump Service Water Pump Room
55 TSC*	Technical Support Center
56 LF	Laundry Facility
57 SB	Security Building
58 SAB	Security Administration Building
59 SSA	Security Secondary Access Control Building
60 SA	South Annex Building
61 NAB	New Administration Building
62 PRB	Pipe Refurbishment Building
63 DINERS	Rail Dining Cars
64 BBB	Black Battery Building

* Fire area contains safe shutdown equipment

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION - UNITS 1 & 2

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
1* (CVT-1)	8 Ionization 6 Heat	Total flood CO_2, manual sprinkler system with closed head portion and open head portion	3 (see Note 1)	High
2* (CVT-2)	8 Ionization 6 Heat	Total flood CO_2, manual sprinkler system with closed head portion and open head portion	3 (see Note 1)	High

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
3* (ESGR-1)	10 Ionization	Total flooding Halon 1301 System	3 (see Note 1)	High
4* (ESGR-2)	12 Ionization	Total flooding Halon 1301 System	3 (see Note 1)	High
5* (CR)	14 Ionization	None	3 (see Note 1)	Moderate
6* (EDG-1)	2 Heat	Manual total flood CO_2	3 (see Notes 1&2)	High
7* (EDG-2)	2 Heat	Manual total flood CO_2	3 (see Notes 1&2)	High
8* (EDG-3)	2 Heat	Manual total flood CO_2	3 (see Notes 1&2)	High
9	Not used			
10	Not used			

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
11	Not used			
12 (BR-2B)	2 Ionization	None	3 (see Note 1)	Moderate
13	Not used			
14	Not used			
15* (RC-1)	11 Ionization 8 Heat	None	3	Moderate
16* (RC-2)	11 Ionization 8 Heat	None	3	Moderate
17* (AB)	7 duct 38 Ionization	Deluge system and total flood CO_2 (charcoal filter)	3 (see Notes 1&2)	Low
18A* (FOPH-1)	2 Heat	Total flood CO_2	3 (Note 2)	High

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
18B* (FOPH-2)	2 Heat	Total flood CO_2	3 (Note 2)	High
19* (SG-1)	11 Ionization	None	3 (Note 2)	Low
20* (SG-2)	12 Ionization	None	3 (Note 2)	Low
21	Not used			
22	Not used			
23	Not used			
24 (IVPH)	2 Ionization	None	Note 4	Low
28* (INS)	4 Ionization 2 Heat Detectors	Total flood CO_2 (fuel oil tank vault)	Note 4	High
29 (DVPH-1)	None	None	Note 4	Low

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
30 (DVPH-2)	None	None	Note 4	Low
31* (TB)				
Turbine Bldg. General Area	Heat Detectors (special hazards)	Automatic sprinklers (Elevation 9'6" and 27') Water spray deluge system (special hazards), and localized CO_2 (Turbine-General)	3 (see Notes 1&2)	Moderate-High
Turbine Oil Room	None	Automatic sprinklers		
Unit 1 Normal SWG Room	2 Thermal 6 Ionization	Total flood CO_2		
Unit 2 Normal SWG Room	3 Thermal 7 Ionization	Total flood CO_2		
Auxiliary Boiler Bldg.	None	Automatic sprinklers		
Mechanical Equipment Room 1	None	None		

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
Mechanical Equipment Room 2	None	None		
Administration Offices	None	None		
Health Physics Area	None	None		
Renovated Personnel Facility	None	Automatic Sprinklers		
Machine Shop	None	Automatic Sprinklers		
Condensate Polishing Building	7 Ionization	Automatic Sprinklers		
Unit 1 Cable Spreading Room	4 Thermal 5 Smoke	Total flood CO_2		
Unit 2 Cable Spreading Room	4 Thermal 5 Smoke	Total flood CO_2		
32 (FPH)	6 Ionization	None	Note 4	Moderate
33	Not used			

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
34	Not used			
35 (BRR)	2 Ionization	None	3 (Note 2)	Low
36	Not used			
37	Not used			
38	Not used			
39	Not used			
40	Not used			
41	Not used			
42	Not used			
43	Not used			
44	Not used			

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
45* (MER-3)	6 Ionization	Water spray	3	Moderate
46	Not used			
47	Not used			
48	Not used			
49	Not used			
50	Not used			
51	Not used			
52 (HLICH-1)	None	None	Note 4	Low
53 (HLICH-2)	None	None	Note 4	Low

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
54* (CPSWPR)	2 Ionization	None	3	Low
55 (TSC)*	36 Ionization 1 Thermal	None	3 (Note 2)	Low-Moderate
56 (LF)	2 Ionization 8 Photo-electric	Automatic Sprinklers	Note 4	Low
57 (SB)	7 Ionization	Halon System (Sub-floor)	Note 4	Low
58 (SAB)	2 Ionization 1 Thermal	None	Note 4	Low
59 (SSA)	(FUTURE)	(FUTURE)	(FUTURE)	(FUTURE)
60 (SA)	2 Ionization	Halon system (Records Vault)	Note 4	Moderate
61 (NAB)	(FUTURE)	(FUTURE)	(FUTURE)	(FUTURE)

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

Fire Area	Detection (See Note 3)	Suppression	Minimum Rating Fire Area Boundaries (hours)	Fire Severity (Note 5)
62 (PRB)	None	None	Note 4	Low
63 (DINERS)	None	Dry Chemical Sys for Cooking Hood	Note 4	Moderate
64 (BBB)	4 Smoke Detectors	None	Note 4	Low

* Fire area contains safe shutdown equipment

TABLE 2-2

EXISTING FIRE PROTECTION FEATURES BY FIRE AREA
(continued)

NOTES

(1) Door and/or frame unlabeled. Subject of exemption request. See Chapter 7.

(2) Fire area boundary includes access points from exterior or an exterior nonrated wall. Door assemblies not rated. No exterior exposure hazards.

(3) The number of detectors is current as of January 1, 1985. This number will be increased as additional detectors are added.

(4) Separate plant structure; fire rating not required.

(5) Fire severity classifications are determined from the quantitative values listed in Chapter 8, Combustible Loading Analysis. The classifications are as follows:

LOW	0-30 minutes Equivalent Fire Severity (EFS)
MODERATE	30-90 minutes EFS
HIGH	greater than 90 minutes EFS

VIRGINA ELECTIC AND POWER COMPANY
SURRY POWER STATION - UNITS 1 AND 2

TABLE 2-3

MISCELLANEOUS PASSIVE FIRE PROTECTION ITEMS - APPENDIX R

A. Containment

1. Radiant Energy Shield (Note 1)

a. Units 1 and 2, between RHR pump motors, elev. (-) 13 ft - 0 in.

b. Unit 1, between transmitters LT-1459A and LT-1461, elev. 18 ft - 4 in., column 10.

c. Unit 1, around transmitter PT-1449, elev. (-) 3 ft - 6 in., column 9.

d. Unit 2, around transmitter LT-2459A, elev. 18 ft - 4 in., column 5.

e. Unit 2, around transmitter LT-2487A, elev. (-) 22 ft - 6 in., column 9.

f. Units 1 and 2, inside cable penetration area - on four sides around penetration for the Appendix R communications system antenna cable.

2. Fire Retardant Coating (Note 2)

a. Unit 1, on the conduit from transmitter LT-1459A, for a distance of 20 ft away from LT-1461 (to column 11).

b. Unit 1, on the conduit from transmitter PT-1449, to a distance of 20 ft beyond RCPC-7E (to Col. 7).

c. Unit 2, on the conduit from transmitter LT-2459A, for a distance of 20 ft away from LT-2460.

d. Unit 2, on the conduit from transmitter LT-2487A to a distance of 20 ft beyond RCPC-13 (to Col. 11).

TABLE 2-3

MISCELLANEOUS PASSIVE FIRE PROTECTION ITEMS - APPENDIX R
(CONTINUED)

3. Solid Metal Cable Tray Cover

   a. Units 1 and 2, on bottom of lowest horizontal cable tray in cable penetration area, and on top of all cable trays in cable penetration area; elev. 18 ft - 4 in. between columns 6-9 (Unit 1), and 9-12 (Unit 2).

4. Cable Tray Firestops

   a. Unit 1, at the locations shown on drawing 11448-FAR-201, sheet 6.

   b. Unit 2, at the locations shown on drawing 11448-FAR-202, sheet 6.

B. Turbine Building

1. Fire Retardant Coating (Note 3)

   a. Unit 1, Turbine Building basement to Unit 1 Emergency Switchgear Room (ESR), on duct between fire damper #9 and the wall.

   b. Unit 2, Turbine Building basement to Unit 2 ESR, on duct between fire damper #10 and the wall.

   c. Unit 1, Turbine Building mezzanine to Control Room Complex, on duct between fire damper #19 and the wall.

   d. Unit 2, Turbine Building mezzanine to Control Room Complex, on duct between fire damper #20 and the wall.

C. Cable Vault and Tunnel

1. Fire Retardant Coating (Note 2)

   a. Units 1 and 2, Containment Penetration Area, on four sides around penetration for Appendix R communication system antenna cable.

TABLE 2-3

MISCELLANEOUS PASSIVE FIRE PROTECTION ITEMS - APPENDIX R
(CONTINUED)

b. Unit 1, Vault Area, on the entire routing of two conduits from elev. 27 ft 6 in. of the Auxiliary Building to the Unit 1 ESR. Conduits are for the communication system "B" repeaters.

D. Auxiliary Building

1. Cable Tray Firestops

a. On elevation 13 ft 0 in., at the locations shown on drawing 11448-FAR-205, sheet 2.

E. Fuel Oil Pumphouse

1. Penetration Seals

a. In the manhole on the south side of the pumphouse, the embedded junction boxes are filled with Dow Corning foam.

F. Emergency Switchgear Rooms

1. Fire Retardant Coating (Note 3)

a. Unit 1, on sections of the routing of two conduits from the Unit 1 cable vault to JB-COM-7 near the Auxiliary Shutdown Panel in the ESR. Conduit are for the communications system "B" repeaters. Coatings are provided where these conduits are not separated by 20 ft from conduits for the "A" repeaters.

2. Fire Retardant - Coating (Note 4)

a. Unit 2, in pipe trench, on the supply pipe from the Charging Pump Service Water System from Mechanical Equipment Room 3 to where the pipe enters the Turbine Building/Auxiliary Building Pipe Tunnel.

TABLE 2-3

MISCELLANEOUS PASSIVE FIRE PROTECTION ITEMS - APPENDIX R
(CONTINUED)

Notes:

1. Radiant Energy shields consist of a one-hour, fire-resistance-rated barrier of Thermolag, manufactured by TSI, Inc.

2. Fire Retardant Coatings consist of a one-hour, fire-resistance-rated coating of Thermolag, manufactured by TSI, Inc.

3. Fire Retardant Coatings consist of a three-hour, fire-resistance-rated coating of Thermolag, manufactured by TSI, Inc.

4. Fire Retardant Coatings consist of a three-hour, fire-resistance-rated coating, manufactured by Bio-Fire Protection, Inc.

3. SAFE SHUTDOWN SYSTEMS ANALYSIS

3.1 Objective

This chapter of the report presents the minimum subset of safe shutdown systems and equipment that would be necessary to achieve safe shutdown in the event of a serious fire. Selection of safe shutdown systems is based on the performance goals identified in Appendix R of 10 CFR 50. These performance goals, and the safe shutdown systems required to achieve them, are described in Subsection 3.6. The equipment required to operate in each safe shutdown system is presented in Table 3.1 for Unit 1 and Table 3.2 for Unit 2. Brief descriptions of the post-fire operation of each system are presented in Subsection 3.7 for background information. Definitions of the terms and acronyms being used are provided in Subsections 3.2 and 3.4 to ensure consistent interpretation. The initial conditions and assumptions, upon which the analysis is based, are provided in Subsection 3.3.

NOTE

It is necessary to clarify the relationship between the safe shutdown systems analysis of this chapter and the post-fire procedures used by the operators. Because actual fires can cause a range of damage, the post-fire procedures are written for this range of fire damage, up to the worst case fires. Therefore, the post-fire procedures are not written under the assumptions that the initial conditions of this analysis and the worst case fire have instantly occurred. Instead, the procedures are written to respond sequentially to the changing plant conditions resulting from potential fires. The procedures allow discretion on the part of the shift supervisor to use the available means and the optimum sequence of operations to achieve safe shutdown for fires of lesser magnitude than the worst case fire. However, the procedures do ultimately address the worst case fire using the minimum subset of safe shutdown systems and equipment as described in the analysis of this chapter.

3.2 Definitions

This subsection presents the definitions used in assessing the safe shutdown capability of the Surry Power Station. The terms defined in this section have their bases in industry standards and/or regulatory criteria.

3.2.1 Alternative Shutdown System

Definition

Alternative shutdown is the capability to achieve safe shutdown by rerouting, relocating, or modifying existing safe shutdown systems. Alternative shutdown systems are provided to assure the ability to achieve and maintain safe shutdown conditions independent of the equipment associated with certain fire areas.

Basis

10 CFR 50 Appendix R, Section III.G.3, Footnote 6

3.2.2 Associated Circuits of Concern

Definition

Safety-related and nonsafety-related cables that have a separation from the fire area less than that required by Section III.G.2 of Appendix R to 10 CFR 50 and have either:

(1) A common power source with the shutdown equipment and the power source is not electrically protected from the post-fire shutdown circuit of concern by coordinated circuit breakers, fuses or similar devices; or

(2) A connection to circuits of equipment whose spurious operation will adversely affect the shutdown capability, e.g., RHR/RCS isolation valves; or

(3) A common enclosure, e.g., raceway, panel, junction box, with the shutdown cables and are not electrically protected from the post-fire shutdown circuits of concern by circuit breakers, fuses or similar devices or will allow propagation of the fire into the common enclosure.

Basis

Letter to All Power Reactor Licensees with Plants Licensed Prior to January 1,1979, from Mr. D.G. Eisenhut (NRR/DL), SUBJECT: "Fire Protection Rule (45 FR 76602, November 19, 1980) - Generic Letter 81-12," dated February 20, 1981; and Clarification of Generic Letter 81-12, dated March 22, 1982.

3.2.3 Local Operation

Definition

The physical manipulation of equipment at the location of the equipment (i.e., repositioning a motor-operated valve using the handwheel).

Basis

Standard Company Definition

3.2.4 Manual Operation

Definition

The operation of electric or electro-pneumatic equipment from a central control location such as the Control Room (i.e., turning a switch in the Control Room).

Basis

Standard Company Definition

3.2.5 Operation Modes

Definition

Hot Shutdown

Reactor shut down, subcritical by an amount greater than or equal to 1.77% Δ K/K and RCS temperature greater than or equal to 547^{O}F.

Intermediate Shutdown

Reactor shut down, subcritical by an amount greater than or equal to 1.77% Δ K/K and RCS temperature between 547^{O}F and 200^{O}F.

Cold Shutdown

Reactor shut down, subcritical by at least 1% Δ K/K and RCS temperature less than or equal to 200°F.

Basis

Surry Technical Specifications, Section 1.C.2-4

3.2.6 Post-Fire Repair

Definition

The repair or replacement of equipment in order to regain system operation to achieve cold shutdown. The repair must be of sufficient quality to assure safe operation until the affected system is restored to its normal operating condition.

Basis

10 CFR 50 Appendix R

3.2.7 Safe Shutdown

Definition

For the purposes of addressing Appendix R, safe shutdown is taken to mean hot shutdown with the capability of going to cold shutdown. It is a condition which exists when the plant achieves and maintains:

(1) The reactor subcritical;

(2) The reactor coolant inventory such that adequate core cooling and RCS temperature and pressure values are within the heatup and cooldown limit; and

(3) Reactor decay heat removal at a controlled rate.

Basis

The term safe shutdown is used throughout 10 CFR 50 Appendix R as applying to both hot and cold shutdown functions. Section III.L provides a general reference to technical specifications for a definition without detailing an acceptable range for plant parameters. NRC Standard Review Plan Section 7.4 ("Systems Required for Safe Shutdown") further defines safe shutdown systems as those which must function in order to achieve and maintain a safe shutdown condition of the plant (again without specifying acceptable plant conditions). By inference, these systems include those used to maintain subcriticality and provide sufficient core cooling to achieve and maintain both hot and cold shutdown conditions. The ANS Standard for Safe Shutdown (ANS 58.11 Draft) issued in 1980 reflects the vagueness of the safe shutdown definition and presents criteria for a safe plant cooldown as that required to achieve and maintain a safe shutdown of the reactor through cold shutdown conditions.

All of these previous definitions suggest that the safe shutdown of a nuclear power plant is a condition which exists when the reactor is subcritical and adequate core cooling is maintained. It may be the achievement and maintenance of a hot (shutdown) condition, the achievement of a transition to cold shutdown (safe cooldown), or the achievement and maintenance of cold shutdown.

3.2.8 Safe Shutdown Equipment (and Circuits)

Definition

Safe shutdown equipment (and circuits) is the minimum subset of plant equipment which may be used for achieving and maintaining safe shutdown in the event of an unmitigated fire in an area.

Basis

The design of the Surry Power Station provides the operator with redundant methods of achieving safe shutdown conditions in the event of a fire. Section III.G to Appendix R recognizes this inherent redundancy and requires that at least one train of safe shutdown equipment be sufficiently protected so as to remain free of damage in order to achieve hot shutdown or be repairable to allow for the timely achievement of cold shutdown in the event of a fire.

3.2.9 Spurious Actuation (Operation)

Definition

The undesirable operation of plant components caused by electrical circuits energized or de-energized as a result of fire damage (see Section 3.8).

Basis

Generic Letter 81-12

3.3 Initial Conditions and Assumptions

In order to have a consistent basis for the systems analysis, certain initial conditions and assumptions must be established. These assumptions are not tied to any one specific regulatory requirement but are identified in order to facilitate the technical review of safe shutdown capabilities.

The initial conditions from which the analysis is developed are:

(1) Both units are operating at 100% power upon the occurrence of a fire. However, the analysis was done using the uprated power levels consistent with the current effort to increase the rated thermal power.

(2) The equipment required to be operable by the technical specifications is assumed to be operable.

(3) Operator availability will be based upon the technical specification minimum shift complement and fire brigade manpower requirements. Table 1 in the attachment to Chapter 5 lists the minimum number of operations personnel present for a normal shift, the manpower required on the fire brigade, and the subsequent number of operators available to operate the safe shutdown systems.

The assumptions upon which the analysis is based include:

(1) As a limiting condition, the loss of off-site power occurs.

(2) No additional single failures are considered other than the loss of off-site power and those directly attributable to the fire.

(3) Additional personnel will become available through emergency recall procedure EPIP-3.01 to assist in operating, maintaining, and repairing the equipment necessary to perform a reactor plant cooldown, as described in Exemption Request 15.

(4) Passive mechanical components, such as valves, heat exchangers, and piping systems, which are exposed to the fire, remain structurally intact as a pressure barrier or structural member of a system. Mechanical components which are exposed to a fire may be actively operated after the fire is extinguished if a local operational capability exists (i.e., handwheel).

(5) Minimum time for re-entry into a fire area to perform local operations will be one hour unless a specific area evaluation has been performed (i.e., Charging Pump Cubicles).

(6) In responding to spurious signals, the shutdown analysis relies extensively on manual actions. The analysis did not assume instantaneous fire-induced failures, except for high-low pressure interfaces. Also, it was not assumed that all manual actions were to be accomplished simultaneously. The shutdown procedures provide for an orderly cooldown, including correction of problems initiated by spurious signals.

(7) The fire duration and fire brigade response times will be as listed in Table 2 of the attachment to Chapter 5 and will be used to determine post-fire operator availability.

3.4 Abbreviations

AC	Alternating Current
AFW	Auxiliary Feedwater
AO	Auxiliary Operator
CCW	Component Cooling Water
CPCW	Charging Pump Cooling Water
CRDM	Control Rod Drive Mechanism
CST	Condensate Storage Tank
CW	Circulating Water
CVCS	Chemical and Volume Control System
DC	Direct Current
EDG	Emergency Diesel Generator
ECCS	Emergency Core Cooling System
ECST	Emergency Condensate Storage Tank
EMT	Emergency Make-up Tank

FCV	Flow Control Valve
HCV	Hand Control Valve
LCO	Limiting Condition of Operation
MCC	Motor Control Center
MDAFW	Motor-Driven Auxiliary Feedwater
MER3	Mechanical Equipment Room #3
MOV	Motor Operated Valve
PCV	Pressure Control Valve
PORV	Power-Operated Relief Valve(s)
PRT	Pressurizer Relief Tank
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Heat Removal System
RO	Reactor Operator
RPS	Reactor Protection System
RTD	Resistance Temperature Detectors
RWST	Refueling Water Storage Tank
SG	Steam Generator
SOV	Solenoid-Operated Valve
SRO	Senior Reactor Operator
SS	Shift Supervisor
STA	Shift Technical Advisor
SW	Service Water
TDAFW	Turbine-Driven Auxiliary Feedwater
UFSAR	Updated Final Safety Analysis Report
VCT	Volume Control Tank

3.5 Safe Shutdown Bases

The primary focus of the provisions of 10 CFR 50 Appendix R is the protection of the safe shutdown capability of the reactor in the event of a fire. To demonstrate this capability, various analytical approaches can be taken to assure that sufficient plant systems are available to perform the required plant safety functions. In general, fires in nuclear plant environments are easily confined to specific areas. Also, numerous plant systems provide inherent operational flexibility and physical diversity to achieve safe shutdown. The flexibility and physical diversity, when coupled with appropriate plant fire protection features, limit the potential for fire damage such that unaffected plant systems will be available to achieve safe shutdown. However, the exact location and specific effects of exposure fires cannot be precisely determined. Therefore, an extensive effort would be required to identify the effects of postulated fires in all potential plant locations and on all the plant systems which are used for a normal reactor shutdown and cooldown.

As a conservative alternative to such an approach, a minimum set of plant systems (safe shutdown systems) and components are identified in response to the performance goals of Appendix R. This minimum set of systems and components is analyzed to demonstrate the achievement and maintenance of safe shutdown regardless of the location of the postulated fire, while assuming a concurrent loss of off-site power. Protection for this minimum set of systems and components constitutes an adequate and conservative demonstration of the ability to achieve and maintain safe shutdown for the purposes of fire protection. Achievement of safe shutdown is also dependent on the prevention or timely termination of spurious operations. Those safe shutdown and nonsafe shutdown components whose spurious operation could prevent the achievement of safe shutdown are described in Section 3.8.

3.6 Performance Goals

This subsection presents performance goals as the criteria for achieving and maintaining safe shutdown conditions. The basis for the selection of safe shutdown systems is identified in the list of performance goals found in the regulations. Appendix R of 10 CFR 50 specifically requires that:

> During the post-fire shutdown, the reactor coolant system process variables shall be maintained within those predicted for a loss of normal ac power, the fission product boundary integrity shall not be affected...(1)

Appendix R also lists the performance goals required to achieve these results. Further clarification of the performance goals was included in the Fire Protection Rule Generic Letter 81-12(2). The performance goals used to establish the safe shutdown functions for the Surry Power Station are as follows:

(1) The reactivity control function shall be capable of achieving and maintaining cold shutdown reactivity conditions.

(2) The reactor coolant inventory control function shall be capable of maintaining the reactor coolant inventory.

(3) The reactor coolant pressure control function shall be capable of protecting the Reactor Coolant System from overpressurization.

(4) The reactor heat removal function shall be capable of achieving and maintaining decay heat removal.

(5) The process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control the above functions.

(6) The supporting functions shall be capable of providing the process cooling, lubrication, etc., necessary to permit the operation of the equipment used for safe shutdown.

(7) The equipment and systems used to achieve and maintain hot shutdown should be (a) free of fire damage; (b) capable of maintaining such a condition for an extended time period (longer than 72 hours) if the equipment required to achieve and maintain cold shutdown is not available due to fire damage; and (c) capable of being powered by an on-site emergency power system.

(8) The equipment and systems used to achieve and maintain cold shutdown should be (a) free of fire damage or (b) the fire damage to such systems should be limited such that repairs can be made and cold shutdown conditions achieved within 72 hours. Equipment and systems used prior to 72 hours after the fire should be capable of being powered by an on-site emergency power system; those used after 72 hours may be powered by either off-site power or on-site power.

These performance goals are attained by the integrated operation of the safe shutdown systems. The systems required to accomplish each of these performance goals are discussed below. Figures 3.1.a through 3.1.d depict the activities required to accomplish each performance goal.

3.6.1 Reactivity Control Function (Figure 3.1.a)

Initial reactivity control results from an automatic Reactor Protection System (RPS) trip or from operator initiation of a manual trip. The effects of fire on the RPS do not preclude the initiation of an automatic trip and control rod insertion because the system is designed to fail in the safe (scram) condition.

Following control rod insertion, hot subcritical conditions can be maintained by the addition of borated water from the refueling water storage tank (RWST). The Chemical and Volume Control System (CVCS) will be used to inject the borated water into the Reactor Coolant System (RCS) while letdown is maintained, ensuring and maintaining the required shutdown margin.

3.6.2 Reactor Coolant Inventory Control Function (Figure 3.1.b)

For the assumed fire scenario, reactor coolant make-up control can be achieved by isolation of the CVCS letdown paths and operation of the charging portion of the CVCS through the reactor coolant pump seal injection path or normal charging path.

Maintenance of RCS pressure boundary will provide adequate inventory and pressure control. Spurious opening of primary boundary isolation valves such as pressurizer and reactor vessel vent valves, pressurizer power-operated relief valves (PORVs), or residual heat removal isolation valves will be precluded or mitigated.

Control of pressurizer water level is achieved by controlling CVCS charging flow using pressurizer level indication.

3.6.3 Reactor Coolant Pressure Control Function (Figure 3.1.c)

Primary plant pressure is controlled by the charging system. Primary plant depressurization can be accomplished by steam relief from the steam generators via the atmospheric steam dump valves. If available, the pressurizer PORVs can be used to lower primary plant pressure.

Makeup during initial cooldown will be throttled to meet the shrinkage rate of the RCS. During periods of temperature soaks, an alternate letdown path is used to allow continuous make-up through the RCP seals and maintain RCS pressure. The pressurizer safety valves provide overpressure protection when above 350°F. After alignment of the Residual Heat Removal (RHR) System at approximately 350°F and 450 psig, overpressure protection is provided by the RHR relief valves.

The establishment and maintenance of sufficient subcooling margin within the RCS is essential when conducting a natural circulation cooldown. If pressurizer heaters are not available, a charging pump will be used to maintain system pressure during cooldown. If depressurization is required during cooldown, then the alternate letdown path, steam relief from the steam generators, and ambient temperature losses from the RCS can be used in combination to lower RCS pressure.

3.6.4 Reactor Heat Removal Function (Figure 3.1.d)

Following a reactor trip with an assumed loss of off-site power, decay heat is initially removed by natural circulation within the RCS, heat transfer to the Main Steam (MS) System via the steam generators, and operation of the power-operated relief valves (PORVs) or the MS system code safety valves. This method of decay heat removal requires the ability to supply sufficient feedwater to a steam generator to make up for the inventory discharged as steam by the safety valves or PORVs. The feedwater flow is supplied by the Auxiliary Feedwater (AFW) System from the emergency condensate storage tank.

After reduction of reactor coolant system temperature below 350°F, the RHR system is used to establish long-term core cooling by the transfer of decay heat from the RCS to the environment via the RHR system, in conjunction with Component Cooling Water (CCW) System, and the Service Water (SW) System.

3.6.5 Process Monitoring Function

The operator requires a means to ascertain the values of various plant parameters in order to perform required system transitions and essential operator actions. Various process monitoring functions must be available to adequately support the achievement and maintenance of reactivity control, reactor coolant make-up, pressure control, and decay heat removal. Positive indication of reactor shutdown will be provided by source range nuclear instrumentation. This indication will be used to verify control rod insertion and the maintenance of an adequate shutdown margin. For the postulated fire scenario, maintenance of hot shutdown requires that pressurizer level and RCS pressure and temperature instrumentation be available. Operating personnel, monitoring RCS pressure and hot leg temperature (T_h) instrumentation, will control RCS temperature and pressure to maintain the appropriate subcooling margin. Reactor inventory control is achieved by monitoring pressurizer level instrumentation and controlling CVCS charging flow.

Maintenance of hot shutdown also requires the control of the secondary system to compensate for variations in the primary system. Steam generator level and pressure instruments are available. Steam generator level is maintained by controlling AFW system flow rate/main steam steaming rate while monitoring steam generator level indication. Emergency condensate storage tank level will be monitored via indication on the tank.

The transition from hot shutdown to cold shutdown will utilize the instrumentation discussed above for monitoring of natural circulation conditions, subcooling margin, heat removal and compliance with the plant's pressure/temperature limits as they pertain to the low temperature overpressure protection of the RCS (cold leg temperature in conjunction with RCS pressure).

3.6.6 Support Functions

Various plant systems are required to provide support to the systems selected to accomplish the previously defined safe shutdown functions. The systems which provide support functions for the postulated fire scenarios are:

(1) Emergency Power System

(2) Vital AC Power System

(3) DC Power System

(4) Component Cooling Water System

(5) Service Water System

(6) Charging Pump Cooling and Service Water Subsystems

(7) Circulating Water System

(8) Ventilation

(9) Emergency Lighting

(10) Emergency Communications

For a postulated fire with a concurrent loss of off-site power, the Emergency Power System is the sole source of ac electrical power for the safe shutdown systems. Essential components of this system are the emergency diesel generators (EDG) and supporting equipment (control power, air-start system and diesel fuel supply), the 4kV emergency switchgears, and the 480V emergency load and motor control centers. One EDG has sufficient capacity to power the required safe shutdown equipment for a single unit. The DC Power System and the Vital AC Power System are used for component control and process monitoring. Component cooling water, circulating water, service water, and charging pump cooling water are used to supply cooling water for decay heat removal and equipment cooling.

In addition, emergency lighting (see Appendix B) and emergency communications are needed for the operation of safe shutdown equipment in given plant areas. Certain ventilation systems will be used to maintain temperatures at a level permissible for operator actions.

3.6.7 <u>Hot and Cold Shutdown</u>

Portions of the following safe shutdown systems are required to achieve the performance goals listed above. These systems are divided into those required to function for hot shutdown and those required to function for the cooldown to cold shutdown. Specific portions of the following systems are required to achieve hot shutdown:

(1) Reactor Protection and Rod Control

(2) Chemical and Volume Control (Charging and Letdown Portions)

(3) Reactor Coolant

(4) Main and Auxiliary Steam

(5) Auxiliary Feedwater

(6) Emergency Power

(7) Vital AC Power and DC Power

(8) Ventilation

(9) Emergency Lighting

(10) Emergency Communications

(11) Charging Pump Service Water System

In conjunction with the above systems, portions of the following additional systems are also required to achieve cold shutdown:

(1) Residual Heat Removal

(2) Component Cooling Water

(3) Charging Pump Component Cooling Subsystem

(4) Service Water

(5) Circulating Water

3.7 Safe Shutdown Systems and Components

This subsection discusses the method used to select the safe shutdown components at Surry Power Station. These components have been selected to provide safe shutdown capability independent of a credible fire located anywhere in the plant.

For each system, plant flow diagrams, system descriptions, operating procedures, and one-line diagrams were used to identify the primary flow paths and operational characteristics that must be established to accomplish the desired safe shutdown function. The required flow paths are shown on drawings 11448-DAR-64A through 124A and 11548-DAR-64A through 89B. The support functions that are required to ensure the continued operation of each component were also identified. The components which are required to operate, in order to support safe shutdown equipment operation, have been added to the equipment list. This resulted in portions of the CW, SW, CCW, and electrical distribution system being designated as safe shutdown equipment. The area ventilation requirements for each piece of safe shutdown equipment were also analyzed. Post-fire provisions have been made to ensure adequate area cooling where required. From this information, a list of the components required for each system was compiled. These components include:

(1) Components that need to "actively" operate to achieve the system function (i.e., pump motors).

(2) Components that need to "actively" change position either by remote electrical control or local manual operation to align a system (i.e., motor-operated valves).

(3) Components that need to "passively" stay in their pre-fire positions to prevent system overpressurizations, loss of system inventories, or flow diversions (i.e., boundary valves and PORVs). Fire-induced spurious operation of these components must be prevented or terminated. (See Tables 3-3 and 3-5 for Unit 1; Tables 3-4 and 3-6 for Unit 2.)

(4) Major mechanical components that support safe shutdown (i.e., heat exchangers and storage tanks).

A minimum equipment list was generated for each system required for safe shutdown (the Component Operation Matrix, Tables 3-1.A-L for Unit 1 and Tables 3-2.A-L for Unit 2). The list includes device identification, power source, control location, normal status, and operating requirements. These lists of safe shutdown components are presented for each system along with a description of the system's capabilities. The descriptions will be for the Unit 1 systems. Unit 2 safe shutdown will be identical to Unit 1 unless noted otherwise.

3.7.1 Reactor Coolant System

The Reactor Coolant System (RCS) is the primary system used to achieve reactivity control, inventory control, pressure control, and decay heat removal. The system is a Westinghouse three-loop design capable of natural circulation heat transfer. This provides a means of decay heat removal when the reactor coolant pumps are unavailable. Natural circulation flow rates are governed by the amount of decay heat generation, component elevations, primary to secondary heat transfer, loop flow resistance, and voiding.

The analysis of safe shutdown capability during an Appendix R safe shutdown scenario shows that only a single RCS loop is needed to ensure that natural circulation is established and maintained. The primary flow path for natural circulation is shown on the Appendix R flow diagrams. The RCS components required for safe shutdown are listed in Tables 3-1.A and 3-2.A.

While in natural circulation, adequate heat transfer and coolant flow are dependent on adequate inventory in both the primary and secondary systems. Adequate primary inventory and maintenance of water level on the secondary side of the "U" tube steam generators are essential for natural circulation. Confirmation of flow while in natural circulation is accomplished through the use of loop temperature indications. These indications are T_{cold} (T_c) and T_{hot} (T_h). Subcooling within the RCS is maintained by keeping system pressure greater than the saturation pressure which coincides with the hot leg temperature. Subcooling is verified by monitoring RCS pressure and loop hot leg temperature (T_h).

Pressurizer level and primary system pressure indication are used to monitor RCS inventory. RCS inventory is controlled by regulating the primary system cooldown rate and adjusting the makeup flow rate from the Chemical Volume and Control (CVCS) system to maintain pressurizer level.

Overpressurization protection of the RCS is assured by three pressurizer code safety valves (SV-1551A,B,C). These valves are spring-loaded and self-activated with a set point pressure of 2485 psig. The combined capacity of the valves is adequate to maintain system pressure below the design limits following a complete loss of load without reactor trip, provided that the steam generator safety valves open as designed.

The pressurizer has two power-operated relief valves (PORVs) in parallel that provide overpressure protection during normal operating conditions. The valves (PCV-1455C, 1456) are air-operated globe valves. Operation of the pressurizer PORVs is not required for safe shutdown. However, the spurious operation of these valves must be prevented or terminated in order to prevent a fire-induced uncontrolled loss of RCS inventory.

3.7.2 Chemical and Volume Control System

The charging portion of the CVCS accomplishes the following safety functions:

(1) Reactivity control by injection of a soluble chemical neutron absorber (boron) into the RCS.

(2) Reactor coolant makeup control by maintaining water inventory.

(3) Reactor pressure control by charging and letdown.

Negative reactivity is provided by control rods, with boric acid addition used to compensate for the xenon decay and plant cooldown.

When the unit is at power, the quantity of boric acid retained in the refueling water storage tank (RWST) exceeds the quantity required to compensate for xenon decay and subsequent reactor cooldown. The availability of sufficient boron is required by plant technical specifications.

For the assumed post-fire scenario, make-up water to the RCS will be provided by the CVCS from the RWST.

For the assumed event, two separate and independent flow paths can be used for reactor coolant makeup and boration: the seal injection lines to the seals of the reactor coolant pumps (RCP), and the normal charging line to the loop 2 cold leg. The CVCS flow paths which are available for charging to the RCS are shown on the Appendix R flow diagrams. The equipment of the CVCS required to operate to achieve the system safety function is listed in Tables 3.1.B and 3.2.B.

For the assumed event, charging and boration will be accomplished by operating a minimum of one charging pump per unit. The pump for the affected unit will take its suction from the RWST and inject borated water to the loop 2 cold leg or the RCP seal injection lines into the RCS. Suction to the charging pump can be delivered from the RWST by locally opening one normally closed motor-operated valve (LCV-1115B or D) and isolating the volume control tank (LCV-1115E).

In addition to normally supplying borated water to the refueling cavity for refueling operations, the RWST provides borated water to all of the Emergency Core Cooling System (ECCS) pumps. The capacity of the RWST is in excess of that required for safe shutdown. The technical specification minimum volume of the RWST is 387,100 gallons of borated water at a minimum of 2000 ppm boron.

An alternate letdown path from the RCS to the RWST via the RHR System is available should the normal and excess letdown paths become inoperable due to a fire. This path is provided to ensure that a sufficient amount of borated water from the RWST is injected into the reactor vessel to maintain an adequate shutdown margin.

The availability of seal return flow is not required to achieve safe shutdown and may be locally or remotely isolated by closing MOV-1381.

The injection path from the charging pumps to the reactor coolant pump seals contains one normally open motor-operated valve (MOV-1370) and one hand-control valve (HCV-1186). The normal charging line contains one air-operated valve (FCV-1122) and two motor-operated valves (MOV-1289A,B).

Pressurizer water level is maintained by operating one charging pump and using the pressurizer level instrumentation readout available in the Control Room or at the remote monitoring panel.

There are three charging pumps per unit which can be used to inject coolant into the RCS. The charging pumps are single speed, centrifugal type pumps. The pumps can be started or stopped from the Control Room, auxiliary shutdown panel, or locally at the respective 4kV breaker. The charging pumps are powered from their respective unit's 4kV emergency buses. Charging pump 1-CH-P-1A is powered from emergency bus IH, and pump 1-CH-P-1B is powered from emergency bus IJ. Charging pump 1-CH-P-1C can be powered from either emergency bus IH or IJ. The breakers for the latter pump are electrically interlocked with cell switches to prevent the inadvertent, simultaneous closing of both breakers. At full capacity, each pump is capable of delivering 150 gpm to the RCS. The charging pump discharge headers are cross-connected between units. The cross-connect is normally isolated. The isolation valves 1-CH-728 and 2-CH-447 for the cross-connect are located outside of the cubicles for charging pumps 1-CH-P-1C and 2-CH-P-1C, respectively. The Appendix R analysis is based on reestablishing charging flow via the cross-connect within 30 minutes.

There is a minimum flow recirculation line on each centrifugal charging pump discharge header to protect the pump. The charging pumps are cooled by the Charging Pump Cooling and Service Water Subsystems. Charging pump cubicle ventilation is available either through the central area exhaust fans or the safety-related filtered exhaust fans (see Subsection 3.7.10).

3.7.3 Main Steam System

The Main Steam (MS) System is used to remove heat from the reactor.

The secondary system will be isolated by operation of the main steam trip valves. Isolation of the downstream turbine trip valves and steam dump valves will be used if the main steam trip valves cannot be shut. The MS system flow paths are shown on the Appendix R flow diagrams. The MS system components required for safe shutdown are listed in Tables 3.1.C and 3.2.C.

Steam generator level and pressure indication is available in the Control Room, the Auxiliary Shutdown Panel in the Emergency Switchgear Room, and on the Remote Monitoring Panels located in the Unit 1 Cable Spreading Room. Instrumentation for at least one steam generator is always maintained. This allows for sufficient control for reactor heat removal during natural circulation conditions. Lack of level indication could result in overfill of the steam generators, causing the main steam headers to be filled up to the main steam trip valves. Stress analysis of the affected piping and supports indicates that this condition is acceptable.

The MS system is also designed to deliver steam to the turbine of the TDAFW pump. Steam to this turbine is supplied via two parallel, air-operated valves PCV-MS102A,B upstream of the main steam trip valves. Either line is sufficient to supply steam for the AFW pump turbine, but two are provided for redundancy. The valves fail open on a loss of instrument air or power.

A bank of five code safety valves are installed on each main steam header outside the containment. The safety valves on each line are installed to protect the MS system against overpressure and to provide a combined relieving capacity greater than the normal full power steam flow rate of one steam generator. During hot shutdown conditions, the code safety valves can provide adequate decay heat removal.

A PORV is provided on each main steam line. Each of these valves (RV-MS101A,B,C) are capable of releasing sensible and decay heat to the atmosphere. The PORV can be used for plant cooldown by steam discharge to the atmosphere. These valves have a relief capacity of approximately 40 percent of the maximum steam flow of one steam generator. For the assumed fire scenario, only one PORV is needed to cool down the RCS.

Controls for the steam generator PORVs are provided in the Control Room and the auxiliary shutdown panel (see Tables 5-2a and 5-2b). Upon loss of power, the PORVs are unable to be locally operated. A manual line-up can be performed to remove steam to the atmosphere via main steam bypass valves, non-return valves, and the Auxiliary Steam System.

3.7.4 Auxiliary Feedwater System

The Auxiliary Feedwater (AFW) System is required during hot shutdown and reactor plant cooldown to support RCS decay heat removal. Secondary system (steam generator) inventory control is provided by the AFW system. The AFW system consists of one TDAFW pump and two MDAFW pumps. Each MDAFW pump is rated at 350 gpm and the TDAFW is rated at 700 gpm. The pumps have the capability of providing the rated flow against a steam generator pressure coinciding with the lowest steam generator safety valve setpoint. The AFW system flow paths are shown on the Appendix R flow diagrams. The AFW system components required for safe shutdown are listed in Tables 3.1.D and 3.2.D.

The TDAFW pump is driven by a single-stage non-condensing steam turbine. Upon opening the steam inlet valve, the turbine will be controlled by the mechanical speed governor. The AFW pump turbine has its own self-contained lube oil system utilizing a shaft-driven oil pump. The turbine oil coolers receive cooling water from the discharge of the pump. All three of the steam generators provide steam to the turbine for the AFW pump. The TDAFW pump is capable of operating down to the steam pressure which corresponds to the RCS pressure and temperature at which the Residual Heat Removal (RHR) System may be placed in service.

The MDAFW pumps are powered from the 4kV emergency buses. These pumps can be controlled from the Control Room, auxiliary shutdown panel, or locally at the 4kV breakers. All AFW pumps receive their water supply from the 110,000 gallon Emergency Condensate Storage Tank (ECST). Backup sources of water are provided from the 300,000 gallon Condensate Storage Tank (CST) or 100,000 gallon Emergency Make-Up Tank (EMT), but since these sources are not controlled by station technical specifications, they may not be available in some cases. Another backup source of water is from the fire protection system (see Chapter 10, Evaluation 6).

ECST level will be monitored via the mechanical level at the tank. Valves associated with pump suction and discharge can be locally operated.

The ECST, which is kept full at all times, has sufficient volume to maintain hot shutdown conditions for eight hours. Ample time is available post-fire for a local re-alignment of the normally closed valve that isolates the 300,000 gallon CST. If the CST is not available, then the fire main can be aligned to the suction of the AFW pumps.

3.7.5 Residual Heat Removal System

The RHR system removes residual and sensible heat from the core to reduce and maintain the temperature of the RCS following plant shutdown. The RHR system will be used for:

(1) Long-term decay heat removal

(2) Primary system overpressure protection when less than $350^{\circ}F$

The RHR system flow path is shown on the Appendix R flow diagrams. The components required for safe shutdown are shown in Tables 3.1.E and 3.2.E.

The RHR system consists of two RHR heat exchangers, two RHR pumps and the associated piping, valving, and instrumentation necessary for operational control. The RHR system is located completely inside the containment.

During cold shutdown operations, reactor coolant flows from the RCS to the RHR pumps, through the tube side of the RHR heat exchangers and back to the RCS. The heat load is transferred by the RHR heat exchangers to the component cooling water which is circulating on the shell side of the heat exchangers. The inlet line to the RHR system is located in the hot leg of RCS loop 1, while the return line is connected to the cold leg of RCS loops 2 and 3.

Two motor-operated valves (MOV-1700, 1701) in series isolate the inlet line to the RHR system from the RCS. Each of the two redundant return lines are isolated by a motor-operated valve (MOV-1720A,B) in series with a check valve.

The RHR system can be placed in operation when the pressure and temperature of the RCS are less than 450 psig and 350^{O}F, respectively. If one of the pumps and/or one of the heat exchangers is inoperative, safe operation of the plant is not affected. The time for cooldown will be within the Appendix R 72-hour limit.

A post-fire repair will be used to restore power to the RHR pump motors in the event the fire disables both pumps power supplies.

3.7.6 Component Cooling Water System

The CCW System is designed to remove residual and sensible heat from the RCS, via the RHR loop, during plant cooldown; cool the letdown flow to the CVCS during power operation; and provide cooling for various primary plant components.

The CCW system contains four CCW pumps and four CCW heat exchangers and is common to both units. The CCW flow path is shown on the Appendix R flow diagrams. The components required for safe shutdown are shown in Tables 3.1.F and 3.2.F.

During normal full power operation, one CCW pump and one CCW heat exchanger for each unit accommodate the heat removal loads for each unit. The standby pumps and heat exchangers provide 100% backup during normal operation. Two pumps and two heat exchangers are normally aligned to remove the residual and sensible heat during cooldown of a single unit.

The essential loads, other than the residual heat exchangers, are normally valved open to the supply header. The loads discharge to the suction of the CCW pump. Component cooling water is circulated continuously through the essential loads during normal operation. For safe shutdown, no isolation of nonessential loads is required as long as two pumps are available.

Each of the CCW return lines that exits the containment has an air-operated valve (TV-CC109A,B) which closes on a containment isolation signal. These valves would have to be opened to establish CCW flow to the components inside the containment.

Two of the CCW pumps are powered from the Unit 1 4kV emergency buses and the other two from the Unit 2 4kV emergency buses. A post-fire repair capability will be used to restore power to two of the CCW pumps in the event the fire damages the pump motors or the pumps normal power supplies. The CCW pumps common discharge header contains manually operated cross-connect valves. During normal operation the system is split between units.

3.7.7 Charging Pump Cooling Water and Service Water Systems

A Charging Pump Cooling Water (CPCW) System for each unit provides cooling water for the charging pump seal coolers and the charging pump lubricating oil coolers. The CPCW flow path is shown on the Appendix R flow diagrams. The components required for safe shutdown are shown in Tables 3.1.G and 3.2.G.

Either of two 100% capacity CPCW pumps circulate component cooling water within a closed loop to ensure proper cooling of the charging pump seals. The other pump remains on standby and is automatically actuated upon low pump discharge pressure. The Charging Pump Component Cooling Subsystem is required for cold shutdown. (See Chapter 10, Evaluation 10.)

Either of two 100% capacity charging pump service water pumps provides service water to the charging pump intermediate seal cooler and the lubricating oil cooler. The other pump remains on standby and is automatically actuated upon low pump discharge pressure. The charging pump service water system is required for hot shutdown.

Both sets of pumps are connected to the emergency electrical bus to ensure operation in the event of a loss of station power.

3.7.8 Circulating Water and Service Water System

The Circulating Water (CW) and Service Water (SW) Systems are required to supply cooling to certain safe shutdown components which are utilized to achieve the performance goals of

Subsection 3.4. Untreated water, supplied by the James River, is circulated by gravity through the heat exchangers that remove heat from the CCW System, Bearing Cooling Water System, and Recirculation Spray System, as well as the air conditioning and chilled water condensers.

The CW and SW systems are designed to remove the heat resulting from the simultaneous operation of various systems. The CW and SW systems flow path are shown on the Appendix R flow diagrams. The components required for safe shutdown are listed in Tables 3.1.H and 3.2.H.

Three diesel-driven emergency service water pumps, with a design capacity of 15,000 gpm each, are provided to supply water to the high level intake canal. A 4800 gallon diesel fuel-oil storage tank provides sufficient fuel to operate all three pumps for 125 hours.

Motor-operated butterfly valves are installed in the major supply and return lines to isolate components that are not normally operating and to provide the capability to alter system flow paths. Power for these valves is normally from the station power supply; however, in the event of loss of power, the emergency generators provide a back-up. An analysis has been conducted to demonstrate the effects on canal inventory if the Circulating and Service Water System MOVs are not closed. System piping configuration and equipment locations are such that suction will always be maintained for the CPSW pumps, with enough canal inventory for greater than 72 hours of operation.

The systems are sized to ensure adequate heat removal based on highest expected temperatures of cooling water, maximum loadings, and leakage allowances. The systems are monitored and operated from the Control Room. Isolation valves are incorporated in all service water lines penetrating the containment.

3.7.9 Emergency Power System

Emergency Bus Electrical Distribution

Each unit's AC Power Distribution System consists of three normal 4kV buses (A, B, and C), a single 4kV bus (G) in the intake structure, and two emergency 4kV buses (H and J). Each unit is equipped with eleven 480V load center buses. The equipment which has been selected for safe shutdown is directly or indirectly powered from the emergency buses. The 4kv emergency buses can be supplied from the diesel generators or off-site power. This ensures a reliable supply of electric power to the safe shutdown equipment. The electrical distribution system required for post-fire safe shutdown is shown on the Appendix R electrical one-line diagrams. The electrical distribution components required to function are listed in Tables 3.1.J and 3.2.J.

Emergency Diesel Generators

The emergency diesel generators are an on-site power source which can supply power to the essential safe shutdown equipment if the normal off-site power sources are unavailable. There is one 100% capacity diesel generator for each unit and another which is used as a back-up to either unit. Each diesel generator has a continuous 2000-hour rating of 2750 KW and a two-hour rating of 2850 KW. There exists the capability to provide power to all the safe shutdown equipment required to shut down a unit.

The diesel generators are located in individual rooms and are supported by completely separate auxiliary systems. Each diesel can be started by either of two redundant compressed air starting systems. The air reservoirs of each system have enough air to start the diesel three times without recharging.

The diesel engines are each fueled from day tanks located within the EDG Rooms and have enough fuel to supply a diesel for three hours of full-load operation.

The day tanks are replenished via underground fuel lines from two 20,000 gallon storage tanks. The buried storage tanks contain enough fuel oil to operate one diesel generator at full load for seven days.

There are two redundant pumps for each diesel generator to transfer fuel oil from the storage tank to the diesel generator day tank. Each set of pumps is powered from the emergency bus associated with the diesel to which the pumps supply oil to ensure a continuous supply of fuel. In addition, a 210,000 gallon above-ground fuel oil storage tank is used for transferring fuel to the buried tanks.

Diesel engine lubrication is provided by engine-driven and motor-driven lube oil pumps. The engine-driven pump has sufficient capacity to provide the required lubrication.

During EDG operation, ventilation is provided by the main diesel cooling fan. The main diesel cooling fan is located on the engine skid and is powered by a mechanical power takeoff on the diesel engine.

Diesel engine cooling is provided to dissipate the heat produced by the engine and the lube oil coolers. An engine-driven pump circulates coolant through the engine to a radiator to maintain the required temperature. The diesel generator radiator cooling system is completely self-contained within the Emergency Diesel Generator Room.

The instrumentation and control for the diesel generators are fed from the emergency motor control centers and the 125V dc system associated with the diesel. Local operation of diesel generator 1H and 2H, independent of the Control Room, is accomplished by isolating the normal diesel generator control circuits to the Control Room and using local controls, indicators, and metering (see Table 5-3a and 5-3b). Local control is provided by the emergency switch and diesel isolation switch. These actions will isolate the EDG from the control circuits in the Control Room and provide local control of:

(1) 4160V emergency supply breaker 15H3

(2) 4160V normal supply breaker 15H8

(3) Emergency generator synchronization, differential protection, field flash, exitation, governor control, regulator control, alarms, and shutdown

(4) 4160V emergency bus 1H ac metering and control circuits.

<u>Vital AC Power System</u>

The Vital AC Power System provides a highly reliable source of 120V ac for safety-related instruments and equipment, ensuring proper action when vital power is required.

<u>Unit 1 Train "A" Consists of the Following:</u>

The Vital AC Power System, Unit 1, Train A consists of two separate vital bus panels (1-I, and 1-III). One is supplied by an independent 10kVA, single-phase static inverter (1-III). The other one is supplied by an independent 10 kVA Sola regulating transformer from a 480V emergency bus. In addition to feeding vital bus 1-III, inverter 1-III supplies power to the newly installed Remote Monitoring Panel (PNL-REM) located in the Unit 1 Cable Spreading Room.

The inverter is connected to the batteries that are continuously float-charged by the battery chargers. Should the effective power source to the battery chargers fail, the inverter will be automatically fed from the station battery without disturbing the vital bus voltage or frequency.

The Sola-regulating transformer fed from the 480V ac emergency buses is provided to supply one of the vital bus panels in the event that the inverter to the other panel fails or is undergoing maintenance. For this purpose, a manual bypass switch is provided to transfer the load of vital bus panel from the inverter to the Sola-regulating transformer.

Unit 1 Train "B" Consists of the Following:

The Vital AC Power System, Unit 1, Train B consists of four separate vital panels (1-II, 1-IIA, 1-IV, and 1-IVA). They are supplied by independent static uninterruptible power supplies (UPS) 1B-1, and 1B-2 consisting each of a rectifier/battery charger, inverter, static switch, manual bypass switch, and regulating line conditioner.

The UPS's will derive their normal and bypass ac power supplies from 480V ac emergency buses. The UPS inverters are also connected to the batteries that are continuously float-charged by the UPS battery chargers. The UPS inverters are normally fed from the UPS rectifier/battery charger. Should the normal ac power source to any UPS battery charger fail, the UPS static switch will provide the vital panels with an automatic transfer from the inverter to the regulating line conditioner power (bypass). In case both ac power sources (normal and bypass) to the UPS fail, the UPS inverter will be automatically fed from their associated station battery, without disturbing the vital bus voltage or frequency.

The manual bypass switch will allow isolation of one power source (inverter or regulating line conditioner) for maintenance purposes.

Each UPS inverter is equipped with local indication of output voltage and current. Vital ac power system monitoring equipment is also provided in the Control Room.

Unit 2 Trains "A" and "B" Consists of the Following:

The Unit 2 inverters, sola regulating transformers, and UPSs are connected as discussed for the Unit 1 Vital AC Power System.

DC Power System

The DC Power System is rated at 125V and provides a highly reliable source of power for the operation of vital safety- and nonsafety-related equipment necessary for the safe operation of the station, as well as safe reactor shutdown under postulated accident conditions. The 125V dc system is an ungrounded system.

The principal equipment for the train "A" 125V dc Power System consists of two static battery chargers, one battery, and one battery distribution switchboard. The principal equipment for train "B" 125V dc Power System consists of 2 UPS rectifier/chargers, one battery, and one battery distribution switchboard. A separate battery, battery charger, and distribution switchboard are available in the Screenwell Structure.

Each battery consist of 60 series-connected cells, ungrounded and designed for continuous duty. The batteries are contained in separate missile-protected battery rooms. All rooms are located in the Service Building. The batteries are connected by separate conduit and duct routes to their respective distribution switchboards.

The 125V dc distribution switchboards 1-A and 1-B supply 125V dc power to emergency buses 1H and 1J, respectively. Each dc switchboard supplies 125V dc to its respective vital bus inverter.

Battery chargers 1A-1 and 1A-2 are powered from MCC 1H1-1; UPS (battery chargers) 1B-1 and 1B-2 are powered from MCCs 1J1-1 and 1J1-2; battery chargers 2A-1 and 2A-2 are powered from MCC 2H1-1; UPS (battery chargers) 2B-1 and 2B-2 are powered from MCC 2J1-1 and 2J1-2.

During normal operation, the 125V dc load is fed from the battery chargers with the batteries floating on the system. On loss of normal power to the battery chargers and/or UPS rectifier/chargers, the dc load is automatically fed from the station batteries. Each battery is rated and designed to operate all required loads for two hours, at which point station power or emergency generation power will be available to energize the battery chargers and/or UPS rectifier/chargers. The batteries will be required for 10 seconds between loss of station power and the availability of emergency ac power to supply the battery chargers.

The diesel generators have their own separate and independent batteries, chargers, and distribution panels.

Separate 60-cell batteries are provided for each unit to provide power to the turbine-generator emergency oil pumps. These batteries have their own chargers and distribution panels, and are located in the "Black Battery Building" near the Transformer Yard.

3.7.10 Ventilation System

Several areas of the plant require ventilation during safe shutdown operations to protect electrical equipment from heat damage and allow access for operator actions. These areas are as follows:

(1) Control Room

(2) Emergency Switchgear Rooms

(3) Auxiliary Building

(4) Mechanical Equipment Room No. 3

(5) Main Steam Valve House

(6) Cable Spreading Room (only required during certain situations)

Additionally, two areas have been evaluated and require no ventilation following an Appendix R fire scenario. These areas are the containment and the Charging Pump Service Water Pump Room. All of the areas are described below.

The ventilation equipment required for safe shutdown is listed in Tables 3-1.L and 3-2.L.

The Control Room and Emergency Switchgear Rooms are cooled by air handling units located in these rooms. The air handling units are served by three chillers and their supporting equipment, located in the Mechanical Equipment Room No. 3 (MER 3). There also exists a mechanical cross-connect from the central chilled water chillers should the chillers in MER 3 become inoperable. Each chiller is capable of supplying the normal cooling capacity of four air handlers. During an Appendix R scenario, there will always be one chiller available to supply two air handling units operating in the Control Room and one in each Emergency Switchgear Room. New isolation switches, rerouting of cable, and the addition of an emergency power source are required to ensure that ventilation will always be available to the Control Room and Emergency Switchgear Rooms (see Chapter 6, modification I-10).

The Auxiliary Building ventilation system is divided into two systems. The central exhaust system provides ventilation for the charging pump cubicles and other centrally located cubicles. The general exhaust system serves the remainder of the building. In addition, two fans are provided as part of the Category 1 filter system. The central exhaust and safety-related filtered exhaust fans are emergency powered. The general exhaust fans are not. Either the central exhaust fans or one of the safety-related filtered exhaust fans must be operating to provide adequate ventilation to the critical areas of the Auxiliary Building. One of the fan cables is required to be rerouted to meet separation requirements (see Chapter 6, Modification III-8).

The required ventilation of MER 3 and the Main Steam Valve House (MSVH) can be achieved by opening supply and exhaust dampers. The MSVH dampers can be operated remotely or locally, as the situation warrants. The MER 3 dampers are maintained open by fusible links. Through the use of these dampers and the propping open of doors, adequate cooling can be maintained in both areas.

The containment may require cooling following a fire inside containment. The containment spray pumps may be used to lower temperatures to permit personnel access to containment. For a fire outside containment, personnel will be provided with cooling suits to be used if containment entry is required and ventilation is not operable.

Ventilation in the Cable Spreading Room is only required for those situations when off-site power is available and personnel access to the remote monitoring panels is required. Personnel access to this area is required to monitor the remote monitoring panels during a fire in the Control Room, Unit 1 or 2 Emergency Switchgear Room, or Unit 1 or 2 Cable Vault/Tunnel. The ventilation fan (1-VS-F-14) for the room is powered from a nonemergency bus. If a loss of offsite power occurs, the heat load in the Cable Spreading Room is not present so ventilation is not required. If offsite power is available, the heat load will be present, but the fan will continue to operate during those fires which require an operator at the RMPs (Control Room, ESRs, or CVT).

The Charging Pump Service Water Pump Room has no ventilation equipment located within. This Room contains the two redundant CPSW pumps to those in MER 3. The temperature inside the CPSW Pump Room will be maintained at a level which will not affect the pumps.

3.7.11 Emergency Communications

A system of radio frequency personnel beepers will be used to notify operations and fire brigade personnel in the event of a fire. A portable radio system will be used for communications during and after a fire to coordinate operation of equipment. The portable radios are located in the Control Room, Security Building, Appendix R locker, and electric shop. Three new repeaters with associated antennas are required as described in Chapter 6, Modification I-3.

3.7.12 Emergency Lighting

Emergency lighting is provided in all areas needed for operation of safe shutdown equipment. Location of emergency lighting and access/egress paths for the safe shutdown equipment required are depicted on the Appendix R equipment location drawings.

Redundant Control Room lighting is provided by diesel-backed lighting panels. Power feeds are routed such that no fire outside the Control Room could affect both power supplies for the Control Room lighting (see Chapter 7, Exemption Request No. 21).

3.7.13 Process Monitoring Instrumentation

The process monitoring function must be capable of providing direct readings of the process variables necessary to control safe shutdown. The plant instruments which are essential to safe shutdown are listed in the safe shutdown equipment tables associated with each system.

There are two types of instruments which support safe shutdown:

(1) Instruments that do not require electrical power to sense and indicate the process parameters; and

(2) Instruments which use transducers/transmitters and indicating devices that do require electrical power (typically 24V dc-fed from the 125V DC/120V AC Emergency Power Systems).

3.8 Spurious Operation

3.8.1 Introduction

Spurious operation is the undesirable operation of plant components caused by electrical circuits being energized or deenergized as the result of fire damage or fire suppression effects. This subsection identifies the plant components whose fire-induced spurious operation would have a negative impact on safe shutdown. These components are further analyzed to identify ways to either prevent or terminate the spurious operation.

3.8.2 Spurious Operation That Could Affect Safe Shutdown

A review of the safe shutdown systems and equipment was conducted to identify spurious operations that could affect the ability to shutdown the plant. Active components (motor-operated valves, air-operated valves, pumps, etc.) were considered to spuriously operate. The component selection was based on:

(1) A review of systems being utilized for shutdown to identify high-low pressure interfaces of any primary coolant boundary, and

(2) A review of systems to identify which spurious operations may interrupt system operation.

System descriptions, flow diagrams, elementary diagrams, wiring diagrams, UFSAR, and selected plant procedures were utilized in this effort.

The specific components that have the potential to threaten the reactor coolant or steam generator system integrity and inventory are listed in Tables 3-3 and 3-4. The components that have the potential to impact safe shutdown system operation are listed in Tables 3-5 and 3-6.

3.8.3 Causes of Spurious Operation

The causes of spurious operation of equipment as a result of fire-induced electrical cable damage may be divided into three categories:

(1) Open Circuit

Fire-induced cable damage for this potential condition causes one or more conductors to become open circuited. The conductors may be part of the control circuit, power circuit, or both.

(2) Cable Internal Fault

Fire-induced cable damage for this potential condition could result in a fault between one or more conductors within the power or control circuit for a given piece of equipment. This fault is considered to involve only conductors within the equipment's circuits (not external) and includes faults of these conductors to ground.

(3) Hot Short

Fire-induced cable damage for this potential condition involves faults between conductors of two or more different circuits of similar voltage class. In this case, the voltage of one circuit comes in contact with and energizes ("hot" shorts) to a conductor in another circuit. Fire damage to conductor insulation of multiple cables is required to initiate this condition. If the short is of proper polarity and voltage, spurious operation of the equipment could result. Due to the extremely unlikely event of multiple hot shorts occurring with the proper polarity, phase, and voltage, hot shorts in three phase 480V ac circuits are not considered credible. Hot shorts are of concern only in dc and single phase ac circuits (see Exemption Requests 19 and 20).

Open circuit of the power conductors will not cause MOVs (with 120V ac control circuits and 480V ac motor power feeds) to change position. Similarly, the control circuit is required to be energized to move the valve operator to either the open or closed position. Open circuiting of the control circuit will not cause spurious operation of the valve. Open circuit will, however, prevent the operator from closing the valve if it is open.

The control circuit design of MOVs precludes spurious operation of the valve except for fires at the MCC/control station for the MOV. Because the MOV is located in a difference fire area from its MCC/control station, a fire at the MOV itself will not cause spurious operations of the valve. Conversely, a fire at the MCC/control station will not preclude the ability to manually terminate the spurious operation of the MOV. However, power to the MOV needs to be deenergized.

A fire-induced hot short or internal fault in certain conductors of the control circuit could cause spurious operation of a valve by completing the valve operating or closing circuit. For both MOVs and SOVs, such a spurious operation requires the power circuit, either the MCC or the 125V dc circuit breaker, to be energized.

3.8.4 Spurious Operation Corrective Actions

This subsection will evaluate each of the potential spurious operations that have been identified for Surry. Based on the criteria and assumptions of the previous section, corrective actions will be proposed to either prevent or terminate each potential spurious operation. A summary of the results for this section can be found in Tables 3-3 and 3-5 for Unit 1 and Tables 3-4 and 3-6 for Unit 2. Spurious operations that may threaten the RCS boundary at high/low pressure interfaces will be examined individually. Spurious operations that may cause a minor loss of RCS or steam generator inventory, or cause spurious operation of components that may defeat safety system operation, will be identified in the tables only.

The pressurizer PORVs (PCV-1456/1455C) are normally shut. The block valves (MOV-1535/1536) are normally open and can be shut to isolate flow through the PORVs. The PORV is operated automatically or by manual control. The PORV is designed to fail shut on loss of air or power. Flow through the PORV and block valve causes reactor coolant to be directed to the pressurizer relief tank.

It is postulated that a single fire could cause both the PORV and block valve to open, resulting in a fire-initiated loss of coolant through this high-low pressure system interface. In order to ensure that this does not occur, at least one of the two valves must be shut in the event of a fire anywhere in the plant (see Chapter 6, Modification I-4).

Valves MOV-1700/1701 are normally shut to isolate the RHR system from the Reactor Coolant System. If both valves open, reactor coolant inventory would be lost to the pressurizer relief tank through relief valves in the RHR pump suction lines. To preclude this action, station procedures require the valves to be shut and the breakers for each to be open when above RHR operating pressure. For this reason, spurious operation of MOV-1700 and MOV-1701 will not be addressed further.

Reactor coolant is normally discharged to the CVCS from the Loop 1 cold leg of the RCS; it flows through isolation valves LCV-1460A and LCV-1460B, through the regenerative heat exchanger, restricting orifices, and orifice isolation valves (HCV-1200A, B, C). After leaving the containment, coolant flows through other valves and components in the CVCS. LCV-1460A and LCV-1460B are pilot solenoid air-operated globe valves that are normally open and fail closed.

It is postulated that a single fire could cause a sufficient number of valves to open resulting in the relief valve downstream of HCV-1200A,B,C to open, discharging reactor coolant to the pressurizer relief tank. In order to ensure that this fire-initiated loss of coolant does not occur, at least LCV-1460A or LCV-1460B must be shut in the event of a fire anywhere in the plant (see Chapter 6, Modification I-5).

An alternate letdown path from the RCS is provided in the event that the normal letdown path is not available. Reactor coolant can be discharged from each or all loop cold legs concurrently (via loop drain valves HCV-1557A,B,C) and flow through the excess letdown heat exchanger. HCV-1201 and HCV-1137 are inlet and outlet control valves, respectively, for the excess letdown heat exchanger. HCV-1201, a pilot solenoid air-operated control valve, is normally closed and fails closed. HCV-1137 is an air-operated control and pressure reducing valve. Failure of the air supply or electrical failure will cause the valves to close.

It is postulated that a single fire could cause both valves to open, along with at least one loop drain valve, resulting in reactor coolant being discharged to the primary drain transfer tank, or to the pressurizer relief tank through a relief valve.

In order to ensure that this loss of coolant does not occur, either HCV-1201 or HCV-1137 must be shut in the event of a fire anywhere in the plant (see Chapter 6, Modification I-6).

The RCS is provided with two vent systems designed to mitigate the effects of accumulation of noncondensable gases in the RCS. Flow from each vent system is directed to the refueling cavity. The reactor vessel head vent system and the pressurizer head vent system are each provided with two parallel vent paths. Each path contains two series solenoid-operated valves, (SOV-RC101A-1, A-2, B-1, B-2/SOV-RC102A-1, A-2, B-1, B-2). The SOVs are designed to fail shut on loss of power. Restricting orifices are installed in each system to limit flow rate to within the capacity of a charging pump.

It is postulated that a single fire could cause two series SOVs to open, resulting in a loss of coolant from the RCS. To ensure no fire-initiated loss of coolant, at least one SOV in each path must be shut. To ensure that no net loss occurs, charging flow must be maintained if two series SOVs are opened (see Chapter 6, Modification I-7).

The analysis of the safe shutdown systems identified a number of potential spurious operations that may affect the corresponding performance goals. These spurious candidates include flow diversion, inadvertent flow path isolation, spurious tripping and spurious starts.

Should spurious actions affecting designated safe shutdown equipment occur, such actions will be terminated by one of the following:

(1) Use of equipment assigned to a redundant safety train to perform the required function;

(2) Use of a redundant component that is assigned to a different safety train to isolate or bypass the affected component;

(3) Removal of motive power from the component and manual operation; or

(4) Any combination of the above methods.

Tables 3-5 and 3-6 list the components whose spurious operations could affect safe shutdown system performance along with the methodologies used to overcome the spurious operations.

In summary, each of the spurious operations that may have a detrimental effect on safe shutdown has been analyzed and a course of action established that will prevent the plant from reaching an unrecoverable condition.

NOTE

> It is necessary to clarify the relationship between the analysis of spurious operations and the post-fire procedures used by the operators. The cables for each component that could spuriously operate were not located by fire area in this analysis, except for the high-low pressure boundary valves discussed above. Instead of analyzing these spurious operation components by fire area, the post-fire procedures identify and terminate any spurious operations as the operator sequentially responds to the changing plant conditions resulting from the range of fires up to the worst case fire. For example, if certain MOVs could spuriously operate because of fires at their MCCs/control stations, the operator will verify the required valve line-up and only if necessary take action to terminate the spurious signal and place the valve in its proper position. The intent of the analysis of spurious operations is to ensure that the operator has at least one method of terminating each potential spurious operation.

3.9 Associated Circuits of Concern

3.9.1 Objective

This subsection will detail the methodology used to identify associated circuits of concern as defined in the regulation. The methods which are utilized at Surry Power Station to preclude the deleterious effects of these associated circuits of concern are then explained in depth.

The separation and protection requirements to 10 CFR 50, Appendix R apply not only to safe shutdown circuits but also to associated circuits that could prevent operation or cause maloperation of safe shutdown systems and equipment. The identification of these associated circuits of concern was performed for Surry in accordance with NRC Generic Letter 81-12, the Staff's Clarification to Generic Letter 81-12, and Generic

Letter 83-33. Associated circuits of concern are defined as those circuits which have a physical separation less than that required by Section III.G.2 of Appendix R, and have one of the following:

(1) A common power source with the shutdown equipment and the power source is not electrically protected from the circuit of concern by coordinated breakers, fuses, or similar devices; or

(2) A connection to circuits of equipment whose spurious operation would adversely affect the shutdown capability; or

(3) A common enclosure with the shutdown cables, and

Type (1) are not electrically protected by circuit breakers, fuses or similar devices, or

Type (2) will allow propagation of the fire into the common enclosure.

3.9.2 <u>Associated Circuits by Common Power Supply</u>

Circuits and cables associated by a common power supply are simply nonsafe shutdown cables whose fire-induced failure will cause the loss of a power source (bus, distribution panel, or MCC) which is necessary to support safe shutdown. This problem could exist for power, control, or instrumentation circuits. The problem of associated circuits of concern by common power supply is resolved by ensuring adequate electrical coordination between the safe shutdown power source supply breaker and the component feeder breakers or fuses.

The electrical distribution system of Surry has been reviewed to assure that acceptable coordination and selective tripping is provided for safe shutdown circuits on the ac and dc power systems. The review was limited to the emergency Power System since there is no equipment powered from the balance of plant distribution systems which is required for, or whose loss of power could prevent, safe shutdown.

The Emergency Power System consists of:

(1) 4kV power distribution and emergency generators;

(2) 480V ac load centers and motor control centers;

(3) 120V ac vital buses and power sources; and

(4) 125V dc distribution buses, emergency batteries, and chargers.

Electrical circuit fault protection was originally designed, or has been upgraded, to provide protection for plant electric circuits via protective relaying, circuit breakers, and fuses. The design of the protective equipment is to ensure adequate protection of electrical distribution equipment from electric fault and overload conditions in the circuits. Such coordination assures that the protective device nearest to the fault operates prior to the operation of any upstream devices, and provides interruption of electrical service to a minimum amount of equipment.

The coordination review undertaken at Surry ensures that no associated circuits of concern by common power supply exist which would inhibit the achievement of safe shutdown.

3.9.3 Associated Circuits of Concern by Common Enclosure

Circuits can be associated by common enclosure in two ways. First, fire-induced damage to nonsafe shutdown cables can create circuit faults in electrically unprotected cables. Such faults can be of sufficient magnitude to create secondary fires in the cables due to the fault currents. If such secondary fires were to occur in enclosures (raceways, panels, etc.) outside the fire area of concern, these fires could impact safe shutdown cables or equipment contained within this common enclosure. The approach used at Surry to resolve this issue is to assure that any cables which share a common enclosure with safe shutdown equipment have adequate electrical protection via circuit breakers, fuses or current-limiting devices which will prevent the occurrence of electrically induced secondary fires. This eliminates the possibility that associated circuits of concern by common enclosure Type (1), as previously defined, will affect safe shutdown.

It should be noted that all plant power and control cables are rated to at least 600 volts. Therefore, cable overheating, prior to activation of the isolation device, would not be possible.

For associated circuits of concern by common enclosure Type (2), the design of the fire protection features at Surry in conjunction with field checks of intervening combustibles ensures that no such circuits exist. This second type of associated circuits by common enclosure is concerned with the issue of cable jacket fire propagation. This aspect of associated circuits can also be viewed as an intervening combustible question. The concern here is that fires will spread due to cable burning beyond the immediate area of concern and will ultimately affect safe shutdown cables which share raceways with the ignited cables. Since fire area boundaries at Surry contain appropriate cable penetration seals, this issue of fire propagation via cable jacket ignition exists only where the 20 ft separation criteria is credited in achieving compliance with Section III.G.2 requirements. A field verification was conducted whenever compliance with Section III.G.2(b) was identified in the cable separation analysis. This field check ensured that there were no intervening combustibles which could allow fire propagation from one safe shutdown train to the other. Where the presence of intervening combustibles was discovered, appropriate fire protection measures were invoked to prevent fire propagation. The NRC specifically addressed this issue of intervening combustibles in Generic Letter 83-33. Suggestions to prevent fire propagation included the combined use of IEEE-383 cable coatings, raceway covers, barriers, or fire stops where required. Associated circuits by common enclosure of this type that may appear as intervening combustibles are not a concern since one or both of the following resolutions apply:

(1) Based on field checks of intervening combustibles, fire stops will be placed between safe shutdown cable trays and conduits where a fire could propagate and damage redundant divisions; and

(2) Electrical penetrations for safe shutdown cable trays and conduits are sealed at their wall penetrations with fire stops equivalent to those required for the wall.

3.9.4 Associated Circuits Causing Spurious Operation

Circuits associated due to spurious operation are those which can, by fire-induced failures, cause safe shutdown equipment or nonsafe shutdown equipment to maloperate in a way that defeats the function of safe shutdown systems or equipment. Examples include the uncontrolled opening or closing of valves, or of circuit breakers, due to fire-induced damage to nonsafe shutdown instrument and control circuits which affect the control circuit interlocks of the components.

The analysis of spurious operations considered equipment (safe shutdown and nonsafe shutdown) which could affect safe shutdown of the plant. Therefore, the potential effects of associated circuits of concern were considered in the spurious operations analysis. The selection of potential spurious operations components was based on mechanical systems interaction consideration, not on postulated electrical fault conditions. This selection process took into account electrical faults including those which could occur from associated circuits of concern. For a detailed review of spurious operations, see Section 3.8.

3.10 Inadvertent Operation of Fire Protection Systems

3.10.1 Introduction

Appendix A to Branch Technical Position APCSB 9.5-1, Section A.5, requires that inadvertent operation of the fire suppression system should not incapacitate safety-related systems or components. This issue was evaluated and it was concluded in Section 4.3.1(7) of the Fire Protection Safety Evaluation Report (FPSER), Surry Power Station Units 1 and 2, issued 9-19-79, that the water type fire protection systems satisfy the objectives of the requirement. This conclusion was based on the provisions for curbs or drainage that exist in most areas of the plant, and the fact that there are no fixed water-type suppression systems in those areas of the plant where safety-related equipment could be damaged by water spray.

Total flooding gaseous fire suppression systems have also been evaluated for the potential for inadvertent operation. Gaseous fire suppression systems are actuated by electrical signals from a fire control panel, usually initiated by fire detectors. It is possible for a fire in one area to damage the control circuits for a fire suppression system protecting another area and cause the fire suppression system to actuate.

The possible circuit faults considered for inadvertent operation are the same as the causes of spurious operation described in Section 3.8.3:

(1) Open circuit

(2) Cable internal fault

(3) Hot short

The effect of spurious operation of gaseous fire protection systems on Appendix R safe shutdown areas is described in the following sections.

3.10.2 Halon Systems

The only areas of the plant which have safe shutdown equipment and which are protected by a Halon 1301 fire suppression system are the Unit 1 and Unit 2 Emergency Switchgear Rooms.

It is postulated that a fire in the Turbine Building or the Control Room could cause inadvertent operation to release of the Halon fire suppression systems in the Unit 1 or 2 Emergency Switchgear Rooms. It is also postulated that a fire in the Unit 2 Emergency Switchgear Room could cause a release of Halon in the Unit 1 Emergency Switchgear Room. This inadvertent release of Halon for either fire location does not damage equipment or limit personnel access into the Emergency Switchgear Rooms. The maximum Halon concentrations within the rooms will be 10%. Personnel access into this environment is possible either with or without breathing apparatus.

3.10.3 CO_2 Systems

The following areas of the plant have safe shutdown equipment and are protected by carbon dioxide (CO_2) systems: Unit 1 and Unit 2 Cable Vault/Tunnels, Fuel Oil Pumphouse Room A and Room B, Unit 1 and Unit 2 Cable Spreading Room, Auxiliary Building charcoal filters 3A and 3B, and diesel generators No. 1, No. 2, and No. 3.

It is postulated that a single fire could cause inadvertent release of CO_2 into the Unit 1 or 2 Cable Vault/Tunnel or Fuel Oil Pumphouse. This release will not damage equipment; however, breathing apparatus will be used if personnel access is required.

It is postulated that a single fire could cause inadvertent release of CO_2 into the Cable Spreading Room. Breathing apparatus will be used if personnel access is required to man the Remote Monitoring Panel.

It is postulated that a single fire could cause inadvertent release of CO_2 into the Auxiliary Building charcoal filters 3A or 3B. These filters are in the ventilation flow path for fans 1-VS-F-58A and 58B which may be used for safe shutdown. The Appendix R procedures for using these fans indicate that the associated dampers will be manually aligned to ensure the proper ventilation flow path. With the dampers properly aligned, 1-VS-F-58A or 58B will quickly dissipate the CO_2 and will maintain proper ventilation for the Auxiliary Building.

It is postulated that a single fire could cause inadvertent release of CO_2 into one of the Emergency Diesel Generator Rooms, which could make that emergency diesel generator inoperable. One spurious signal cannot cause spurious discharge of CO_2 into more than one Diesel Generator Room since each Diesel Generator Room's CO_2 circuitry is electrically separate. A summary of the fire location and corrective action is provided below:

(1) A fire in the Turbine Building could cause an inadvertent release of CO_2 into one of the three emergency diesel generators (hot short of conductors in the CO_2 control panel). Therefore, Unit 1 and 2 safe shutdown equipment will be powered from the remaining two emergency diesel generators.

(2) A fire in the Control Room could cause inadvertent release of CO_2 into one of the three Emergency Diesel Generator Rooms (i.e., hot short of manual pushbutton). A Control Room fire may also require personnel to be dispatched to the No. 1 and No. 2 emergency diesel generators to take local control. If local control is required and if an inadvertent release of CO_2 has occurred in the No. 1 or No. 2 EDG Rooms, then the unaffected diesel will be available to provide power to supply the required Units 1 and 2 safe shutdown systems.

(3) A fire in other areas would not affect the diesel generator CO_2 systems. Cable for the remote pushbutton is routed in metal conduit similar to the 125V dc circuits discussed in exemption request 20 (see Chapter 7); therefore, hot shorts are not postulated for this cable. Other CO_2 cables are not associated with that portion of the circuitry controlling CO_2 discharge.

3.11 References

(1) Code of Federal Regulations Title 10, Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

(2) Nuclear Regulatory Commission, Fire Protection Rule (45 FR 76602, November 19, 1980), Generic Letter 81-12, February 20, 1981.

(3) Virginia Power (E&C) Calculational Notes:

Calculational Note Number	Title
SM-263	Boration Requirements Subsequent to Appendix R Fire
SM-267	Surry Boration Requirements vs. Time Subsequent to Appendix R Fire
SM-287	Appendix R Boration Requirement with Letdown
SM-314	Boron Requirement vs. Time for Surry and North Anna
SM-350	Surry Appendix R Boration Calculation with No Alternate Letdown
SM-360	Surry Boration Requirements with Realistic Xenon Reactivity (Referenced in Chapter 7, Exemption 22)
SM-375	Minimum AFW Volume to RHR for Surry Appendix R (Referenced in Chapter 10, Evaluation 6)

TABLE 3-1.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: REACTOR COOLANT

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
SV-1551A,B,C PRESSURIZER SAFETY VALVE	MECHANICALLY ACTUATED RELIEF VALVES	N/A	N/A	
LT-1459A WIDE RANGE PRESSURIZER LEVEL	VITAL BUS INVERTER 2-III	N/A	N/A	
LT-1461 WIDE RANGE PRESSURIZER LEVEL	VITAL BUS 1-III	N/A	N/A	
PT-1449 WIDE RANGE RCS PRESSURE - LOOP 3	VITAL BUS INVERTER 2-III	N/A	N/A	
PT-1402-1 WIDE RANGE RCS PRESSURE - LOOP 2	VITAL BUS 1-II	N/A	N/A	
TE-1430 LOOP 3 WIDE RANGE COLD LEG TEMP.	VITAL BUS 1-III	N/A	N/A	
TE-1413-2 LOOP 1 WIDE RANGE HOT LEG TEMP.	VITAL BUS INVERTER 2-III	N/A	N/A	
TE-1423-2 LOOP 2 WIDE RANGE HOT LEG TEMP.	VITAL BUS INVERTER 2-III	N/A	N/A	

TABLE 3-1.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: REACTOR COOLANT (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
TE-1433-1 LOOP 3 WIDE RANGE HOT LEG TEMP.	VITAL BUS 1-III	N/A	N/A	
TE-1410A LOOP 1 WIDE RANGE COLD LEG TEMP.	VITAL BUS INVERTER 2-III	N/A	N/A	
TE-1420A LOOP 2 WIDE RANGE COLD LEG TEMP.	VITAL BUS INVERTER 2-III	N/A	N/A	

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-CH-P-1A CHARGING PUMP	4160V EMERGENCY BUS "1H"	ON NOTE 1	NOTE 2	
1-CH-P-1B CHARGING PUMP	4160V EMERGENCY BUS "1J"	OFF NOTE 1	NOTE 2	
1-CH-P-1C CHARGING PUMP	4160V EMERGENCY BUS "1J" OR "1H"	OFF NOTE 1	NOTE 2	PUMP MAY BE POWERED FROM EITHER BUS
LCV-1115B CHARGING PUMP SUCTION FROM RWST	MCC 1J1-2N	CLOSED	OPEN	
LCV-1115D CHARGING PUMP SUCTION FROM RWST	MCC 1J1-2E	CLOSED	OPEN	
LCV-1115E CHARGING PUMP SUCTION FROM VCT	MCC 1J1-2E	OPEN	CLOSED	
MOV-1267A CHARGING PUMP 1A SUCTION	MCC 1H1-2S	OPEN	OPEN NOTE 3	
MOV-1269A CHARGING PUMP 1B SUCTION	MCC 1J1-2W	OPEN	OPEN NOTE 3	
MOV-1270A CHARGING PUMP 1C SUCTION	MCC 1H1-2S	OPEN	OPEN NOTE 3	

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
MOV-1286A CHARGING PUMP 1A DISCHARGE	MCC 1H1-2S	OPEN	OPEN NOTE 3	
MOV-1286B CHARGING PUMP 1B DISCHARGE	MCC 1J1-2W	OPEN	OPEN NOTE 3	
MOV-1286C CHARGING PUMP 1C DISCHARGE	MCC 1H1-2S	OPEN	OPEN NOTE 3	
MOV-1287A CHARGING PUMP "1A" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 1H1-2S	OPEN	CLOSED	
MOV-1287B CHARGING PUMP "1B" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 1J1-2W	OPEN	CLOSED	
MOV-1287C CHARGING PUMP "1C" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 1J1-2W	OPEN	CLOSED	
MOV-1289A CHARGING PUMP DISCHARGE HEADER	MCC 1H1-2N	OPEN	OPEN	VALVE WILL BE CHECKED OPENED IF NORMAL CHARGING LINE USED

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOV-1289B CHARGING PUMP DISCHARGE HEADER	MCC 1J1-2E	OPEN	OPEN	VALVE WILL BE CHECKED OPENED IF NORMAL CHARGING LINE USED
FCV-1122 CHARGING FLOW CONTROL	VITAL BUS 1-III	CLOSED	OPEN	VALVE WILL BE FAILED OPENED IF NORMAL CHARGING LINE USED
HCV-1310A CHARGING ISOLATION TO LOOP 2 COLD LEG	DC PANEL 1-1	OPEN	OPEN	VALVE WILL BE FAILED OPENED IF NORMAL CHARGING LINE USED
MOV-1370 SEAL WATER SUPPLY ISOLATION	MCC 1H1-2N	OPEN	OPEN	VALVE WILL BE CHECKED OPEN IF SEAL INJECTION REQUIRED
HCV-1186 SEAL WATER FLOW CONTROL	VITAL BUS 1-II	OPEN	OPEN	VALVE WILL BE FAILED OPEN IF SEAL INJECTION REQUIRED
MOV-1275A CHARGING PUMP 1A RECIRCULATION FLOW	MCC 1H1-2N	OPEN	OPEN NOTE 3	
MOV-1275B CHARGING PUMP 1B RECIRCULATION FLOW	MCC 1H1-2S	OPEN	OPEN NOTE 3	
MOV-1275C CHARGING PUMP 1C RECIRCULATION FLOW	MCC 1H1-2N	OPEN	OPEN NOTE 3	

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
MOV-1373 CHARGING PUMP RECIRCULATION FLOW TO SEAL WATER HX	MCC 1J1-2W	OPEN	OPEN	
MOV-1381 SEAL WATER RETURN LINE	MCC 1J1-1	OPEN	CLOSED	
1-CS-TK-1 REFUELING WATER STORAGE TANK	N/A	N/A	N/A	
1-CS-P-1A CONTAINMENT SPRAY PUMP	480V EMERGENCY BUS 1H	OFF	ON NOTE 6	PUMP SHOULD BE USED ONLY IF NECESSARY FOR CONTAINMENT COOLING.
MOV-CS101A CONTAINMENT SPRAY PUMP 1A DISCHARGE	MCC 1H1-2S	CLOSED	OPEN NOTE 6	
MOV-CS100A CONTAINMENT SPRAY PUMP 1A SUCTION	MCC 1H1-2S	OPEN	OPEN NOTE 6	

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
1-CH-728 CHARGING PUMP CROSS-CONNECT MANUAL ISOLATION BETWEEN UNITS 1&2	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	MUST BE OPENED IN CONJUNCTION WITH 2-CH-447 TO CROSS CONNECT CHARGING
1-CH-300 SEAL WATER SUPPLY TO 1-RC-P-1C	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
1-CH-297 SEAL WATER SUPPLY TO 1-RC-P-1B	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
1-CH-294 SEAL WATER SUPPLY TO 1-RC-P-1A	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
TV-SI102A RWST CROSS CONNECT VALVES	VITAL BUSES 1-I AND 2-I	CLOSED	OPEN	MUST BE OPENED TO SUPPLY WATER FOR CHARGING
TV-SI102B RWST CROSS CONNECT VALVES	VITAL BUSES 1-II AND 2-II	CLOSED	OPEN	MUST BE OPENED TO SUPPLY WATER FOR CHARGING

TABLE 3-1.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
LCV-1460A LETDOWN LINE ISOLATION	DC PANEL 1-1	OPEN	OPEN	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
LCV-1460B LETDOWN LINE ISOLATION	DC PANEL 1-1	OPEN	OPEN	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-1200A LETDOWN ORIFICE ISOLATION	DC PANEL 1-1	CLOSED	CLOSED NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-1200B LETDOWN ORIFICE ISOLATION	DC PANEL 1-1	OPEN	OPEN NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-1200C LETDOWN ORIFICE ISOLATION	DC PANEL 1-1	CLOSED	CLOSED NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.

TABLE 3-1.8

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
HCV-1142 PURIFICATION FLOW FROM RHR SYSTEM	VITAL BUS 1-I	CLOSED	OPEN NOTE 5	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
1-CS-35 RWST COOLER 2A INLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
1-CS-36 RWST COOLER 2B INLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
1-CS-46 RWST COOLER 2A OUTLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
1-CS-47 RWST COOLER 2B OUTLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	

NOTES:
(1) ONLY ONE CHARGING PUMP IS NORMALLY RUNNING.
(2) ONE OR TWO CHARGING PUMPS MAY BE OPERATED POST-FIRE, OR A CHARGING PUMP FROM THE OTHER UNIT MAY BE USED.
(3) ONLY THE VALVE ASSOCIATED WITH THE CHARGING PUMP(S) TO BE USED NEED TO BE POSITIONED.
(4) ONE OR TWO OF THE VALVES SHOULD BE OPENED DEPENDING UPON RATE OF LETDOWN.
(5) THIS VALVE IS REQUIRED TO BE OPEN ONLY IF ALTERNATE LETDOWN PATH IS NEEDED.
(6) PUMP AND ASSOCIATED VALVES ARE REQUIRED ONLY FOLLOWING A FIRE INSIDE CONTAINMENT.

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
RV-MS101A STEAM GENERATOR "A" PORV	1-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
RV-MS101B STEAM GENERATOR "B" PORV	1-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
RV-MS101C STEAM GENERATOR "C" PORV	1-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
TV-MS101A STEAM GENERATOR "A" MAIN STEAM ISOL VALVE	DC PANELS 1-1 AND 1-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT
TV-MS101B STEAM GENERATOR "B" MAIN STEAM ISOL VALVE	DC PANELS 1-1 AND 1-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
TV-MS101C STEAM GENERATOR "C" MAIN STEAM ISOL VALVE	DC PANELS 1-1 AND 1-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT
TV-1,2,3,4 TURBINE STOP VALVE	AC PANEL 1-1	OPEN	CLOSED	
1-MS-84 STEAM GENERATOR "A" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
1-MS-116 STEAM GENERATOR "B" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
1-MS-155 STEAM GENERATOR "C" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
PCV-MS102A STEAM SUPPLY TO AFW PUMP TURBINE	DC PANEL 1-1	CLOSED	OPEN	VALVE WILL BE DEENERGIZED TO FAIL OPEN
PCV-MS102B STEAM SUPPLY TO AFW PUMP TURBINE	DC PANEL 1-2	CLOSED	OPEN	VALVE WILL BE DEENERGIZED TO FAIL OPEN
SV-MS101A-105A STEAM GENERATOR "A" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
SV-MS101B-105B STEAM GENERATOR "B" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	
SV-MS101C-105C STEAM GENERATOR "C" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	
TCV-MS105A-8A CONDENSER 1-CN-SC-1A STEAM DUMP VALVE	DC PANEL 1-2	CLOSED	CLOSED	
TCV-MS105B-8B CONDENSER 1-CN-SC-1B STEAM DUMP VALVE	DC PANEL 1-2	CLOSED	CLOSED	
PCV-AS100 AUXILIARY STEAM SUPPLY VALVE	SELF-CONTAINED PNEUMATIC	OPEN/SHUT	CLOSED	
FCV-MS104A STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 1-MS-E-1A	EHC CABINET	OPEN	CLOSED	
FCV-MS104B STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 1-MS-E-1B	EHC CABINET	OPEN	CLOSED	

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
FCV-MS104C STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 1-MS-E-1C	EHC CABINET	OPEN	CLOSED	
FCV-MS104D STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 1-MS-E-1D	EHC CABINET	OPEN	CLOSED	
LT-1477A STEAM GENERATOR "A" WIDE RANGE LEVEL	VITAL BUS INVERTER 2-III	N/A	N/A	
LT-1487A STEAM GENERATOR "B" WIDE RANGE LEVEL	VITAL BUS INVERTER 2-III	N/A	N/A	
LT-1497A STEAM GENERATOR "C" WIDE RANGE LEVEL	VITAL BUS INVERTER 2-III	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE
LT-1477 STEAM GENERATOR "A" WIDE RANGE LEVEL	VITAL BUS 1-II	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE
LT-1487 STEAM GENERATOR "B" WIDE RANGE LEVEL	VITAL BUS 1-III	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
LT-1497 STEAM GENERATOR "C" WIDE RANGE LEVEL	VITAL BUS 1-IV	N/A	N/A	
PT-1474 STEAM GENERATOR "A" PRESSURE	VITAL BUS 1-II	N/A	N/A	
PT-1485 STEAM GENERATOR "B" PRESSURE	VITAL BUS 1-III	N/A	N/A	
PT-1496 STEAM GENERATOR "C" PRESSURE	VITAL BUS 1-IV	N/A	N/A	
PT-MS137A STEAM GENERATOR A PRESSURE	VITAL BUS INVERTER 2-III	N/A	N/A	
PT-MS137B STEAM GENERATOR B PRESSURE	VITAL BUS INVERTER 2-III	N/A	N/A	
NRV-MS101A MAIN STEAM LINE "A" NONRETURN VALVE	MCC 1A1-1	CLOSED	OPEN	
NRV-MS101B MAIN STEAM LINE "B" NONRETURN VALVE	MCC 1B1-2	CLOSED	OPEN	

TABLE 3-1.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
NRV-MS101C MAIN STEAM LINE "C" NONRETURN VALVE	MCC 1C1-1	CLOSED	OPEN	
1-AS-3 AUXILIARY STEAM SUPPLY BYPASS VALVE	LOCALLY OPERATED VALVE	CLOSED	OPERATE	
1-AS-19 STEAM TO VACUUM PRIMING AIR EJECTOR 2A	LOCALLY OPERATED VALVE	CLOSED	OPERATE	VALVES WILL BE OPENED AND HOGGERS WILL BE USED IF STEAM GENERATOR PORV'S FAIL
1-AS-20 STEAM TO VACUUM PRIMING AIR EJECTOR 2B	LOCALLY OPERATED VALVE	CLOSED	OPERATE	VALVES WILL BE OPENED AND HOGGERS WILL BE USED IF STEAM GENERATOR PORV'S FAIL
1-MS-118 BLOCK VALVE FOR DECAY HEAT RELEASE VALVE	LOCALLY OPERATED VALVE	CLOSED	CLOSED	VALVE MAY BE OPENED IF THE DECAY HEAT RELEASE VALVE IS NOT DISABLED BY THE FIRE

NOTE: (1) SAFETY VALVES WILL BE RELIED ON FOR HOT SHUTDOWN DECAY HEAT REMOVAL.

TABLE 3-1.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-FW-P-2 TURBINE-DRIVEN AUXILIARY FEED-WATER PUMP	N/A	OFF	OPERATE NOTE 1	PUMP WILL BE STARTED BY FAILING OPEN PCV-MS102A OR PCV-MS102B
1-FW-P-3A MOTOR-DRIVEN AUXILIARY FEED-WATER PUMP	4160V EMERGENCY BUS "1H"	OFF	OFF NOTE 1	
1-FW-P-3B MOTOR-DRIVEN AUXILIARY FEED-WATER PUMP	4160V EMERGENCY BUS "1J"	OFF	OFF NOTE 1	
MOV-FW151E AFW DISCHARGE TO STEAM GENERATOR "A"	MCC 1H1-2S	OPEN	OPEN NOTE 2	
MOV-FW151C AFW DISCHARGE TO STEAM GENERATOR "B"	MCC 1H1-2S	OPEN	OPEN NOTE 2	
MOV-FW151A AFW DISCHARGE TO STEAM GENERATOR "C"	MCC 1H1-2S	OPEN	OPEN NOTE 2	
MOV-FW151F AFW DISCHARGE TO STEAM GENERATOR "A"	MCC 1J1-2W	OPEN	OPEN NOTE 2	

TABLE 3-1.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
MOV-FW151D AFW DISCHARGE TO STEAM GENERATOR "B"	MCC 1J1-2W	OPEN	OPEN NOTE 2	
MOV-FW151B AFW DISCHARGE TO STEAM GENERATOR "C"	MCC 1J1-2W	OPEN	OPEN NOTE 2	
MOV-FW160A AFW CROSS-CONNECT ISOLATION	MCC 2H1-2N	CLOSED	OPERATE NOTE 4	
MOV-FW160B AFW CROSS-CONNECT ISOLATION	MCC 2J1-2E	CLOSED	CLOSED NOTE 4	
1-CN-TK-1A EMERGENCY CONDEN-SATE STORAGE TANK	N/A	N/A	N/A	96,000 GALLON MINIMUM TECH SPEC LIMIT
LT-CN100 EMERGENCY CST LEVEL	N/A	N/A	N/A	
LT-CN101 EMERGENCY CST LEVEL	N/A	N/A	N/A	

TABLE 3-1.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-FW-185 FIRE MAIN TO AFW PUMPS SUCTION	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
1-FW-120 FIRE MAIN TO AFW PUMPS SUCTION	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
1-FW-119 TELL TALE LINE	LOCALLY OPERATED VALVE	OPEN	OPEN NOTE 3	
1-FW-154 AFW PUMP P-2 SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
1-FW-169 AFW PUMP P-3A SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
1-FW-184 AFW PUMP P-3B SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
1-FP-P-2 DIESEL FIRE PUMP	DIESEL-DRIVEN	OFF	OFF NOTE 3	COMMON TO BOTH UNITS

TABLE 3-1.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
1-FP-TK-1A,B FIRE PROTECTION WATER STORAGE TANKS	N/A	N/A	N/A	USED IF ALTERNATIVE SUPPLY OF AFW REQUIRED. COMMON TO BOTH UNITS.
1-FW-140 AFW PUMP P-2 DISCHARGE TO MOV HEADER	LOCALLY OPERATED VALVE	OPEN	OPERATE	
ECST LEVEL INDICATOR (FLOAT)	MECHANICAL	N/A	N/A	USED IF ECST LEVEL TRANSMITTERS ARE INOPERATIVE

NOTES: (1) ONE AFW PUMP MUST BE OPERATED FOR SAFE SHUTDOWN.
(2) ONLY THE VALVES ASSOCIATED WITH THE OPERATING AFW PUMP WOULD BE REPOSITIONED.
(3) VALVES AND/OR PUMP WOULD BE OPERATED IF ALTERNATIVE SUPPLIES OF AFW REQUIRED.
(4) ONLY ONE CROSS-CONNECT VALVE NEEDS TO BE OPENED.

TABLE 3-1.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-RH-P-1A RHR PUMP "A"	4160V EMERGENCY BUS "1H"	OFF	OPERATE NOTE 1	POST-FIRE REPAIR CAPABILITY FOR PUMP POWER CABLES
1-RH-P-1B RHR PUMP "B"	4160V EMERGENCY BUS "1J"	OFF	OPERATE NOTE 1	POST-FIRE REPAIR CAPABILITY FOR PUMP POWER CABLES
MOV-1700 RHR PUMP SUCTION ISOLATION	1H1-2S	CLOSED	OPEN	
MOV-1701 RHR PUMP SUCTION ISOLATION	1J1-2E	CLOSED	OPEN	
FCV-1605 RHR FLOW CONTROL	VITAL BUSES 1-II AND 1-III	OPEN	THROTTLE	FAILS CLOSED. VALVE MAY REQUIRE AIR BOTTLE AND JUMPERS TO OPERATE FOR RHR WARM UP
HCV-1758 RHR HX OUTLET	VITAL BUS 1-III	CLOSED	THROTTLE	FAILS OPEN. VALVE MAY REQUIRE AIR BOTTLE AND JUMPER TO OPERATE FOR RHR WARM UP
MOV-1720A RHR RETURN ISOLA-TION LOOP 2	1H1-2S	CLOSED	OPEN	
MOV-1720B RHR RETURN ISOLA-TION LOOP 3	1J1-2E	CLOSED	OPEN	

TABLE 3-1.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: RESIDUAL HEAT REMOVAL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
MOV-RH-100 RHR TO RWST ISOLATION	MCC 1B1-2	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN
1-RH-25 ISOLATION TO LETDOWN HEADER	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN
1-RH-29 ISOLATION TO RWST	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN

NOTES: (1) AT LEAST ONE RHR PUMP WILL BE OPERATED FOR FORCED COOLDOWN.

TABLE 3-1.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: COMPONENT COOLING WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-CC-P-1A COMPONENT COOLING WATER PUMP	4160V EMERGENCY BUS "1H"	ON NOTE 1	NOTE 2	POST-FIRE REPAIR CAPABILITY FOR PUMP MOTOR AND POWER CABLES. SEE CHAPTER 6, MODIFICATION III-3.
1-CC-P-1B COMPONENT COOLING WATER PUMP	4160V EMERGENCY BUS "1J"	OFF NOTE 1	NOTE 2	POST-FIRE REPAIR CAPABILITY FOR PUMP MOTOR AND POWER CABLES. SEE CHAPTER 6, MODIFICATION III-3.
TV-CC109A CCW FROM RHR HX	VITAL BUS 1-I	OPEN	OPEN	VALVE WILL BE OPENED USING AIR BOTTLE AND JUMPER
TV-CC109B CCW FROM RHR HX	VITAL BUS 1-II	OPEN	OPEN	VALVE WILL BE OPENED USING AIR BOTTLE AND JUMPER
1-CC-104 CCW FROM RHR HX 1-RH-E-1A	LOCALLY OPERATED VALVE	OPEN	OPERATE	VALVE WILL BE USED TO CONTROL CCW FLOW TO RHR HEAT EXCHANGER
1-CC-100 CCW FROM RHR HX 1-RH-E-1B	LOCALLY OPERATED VALVE	OPEN	OPERATE	VALVE WILL BE USED TO CONTROL CCW FLOW TO RHR HEAT EXCHANGER
1-CC-181 RHR HX 1A OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-185 RHR HX 1B OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-178 RHR HX 1A INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	

TABLE 3-1.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: COMPONENT COOLING WATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
1-CC-182 RHR HX 1-RH-E-1B INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-112 RHR PUMP 1B SEAL COOLER OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-116 RHR PUMP 1B SEAL COOLER INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-118 RHR PUMP 1A SEAL COOLER OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
1-CC-122 RHR PUMP 1A SEAL COOLER INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	

NOTES: (1) NORMALLY ONE CCW PUMP OPERATING.
(2) EITHER CCW PUMP COULD BE OPERATED OR ONE FROM THE OTHER UNIT.

TABLE 3-1.G

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHARGING PUMP COOLING WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-CC-P-2A CHARGING PUMP COOLING WATER PUMP	MCC 1H1-1	ON	NOTE 1	POST-FIRE REPAIR REQUIRED FOR PUMP CONTROL CIRCUIT
1-CC-P-2B CHARGING PUMP COOLING WATER PUMP	MCC 1J1-1	OFF	NOTE 1	POST-FIRE REPAIR REQUIRED FOR PUMP CONTROL CIRCUIT
1-SW-P-10A CHARGING PUMP SERVICE WATER PUMP	MCC 1H1-1	ON	NOTE 1	
1-SW-P-10B CHARGING PUMP SERVICE WATER PUMP	MCC 1J1-1	OFF	NOTE 1	
TCV-SW108A SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5A	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	
TCV-SW108B SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5B	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	

TABLE 3-1.G

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CHARGING PUMP COOLING WATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
TCV-SW108C SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5C	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	
1-SW-269 C.P.S.W. CROSS-CONNECT VALVE	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE MAY BE USED TO CROSS-CONNECT CHARGING PUMP SERVICE WATER BETWEEN UNITS 1 AND 2
2-SW-443 C.P.S.W. CROSS-CONNECT VALVE	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE MAY BE USED TO CROSS-CONNECT CHARGING PUMP SERVICE WATER BETWEEN UNITS 1 AND 2

NOTES: (1) ONE PUMP MUST BE OPERATED FOR SAFE SHUTDOWN.
(2) ONLY VALVE ASSOCIATED WITH OPERATED PUMP MUST BE REPOSITIONED.

TABLE 3-1.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CIRCULATING WATER AND SERVICE WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-SW-P-1A EMERGENCY SERVICE WATER PUMP	DIESEL-DRIVEN	ON NOTE 1	NOTE 2	COMMON TO BOTH UNITS
1-SW-P-1B EMERGENCY SERVICE WATER PUMP	DIESEL DRIVEN	OFF NOTE 1	NOTE 2	COMMON TO BOTH UNITS
1-SW-P-1C EMERGENCY SERVICE WATER PUMP	DIESEL DRIVEN	OFF	NOTE 2	COMMON TO BOTH UNITS
MOV-SW102A SERVICE WATER TO CCW HX	MCC 1H1-1	OPEN	OPEN	
MOV-SW102B SERVICE WATER TO CCW HX	MCC 1J1-1	OPEN	OPEN	
MOV-CW100A,C CONDENSER CIRCU-LATING WATER OUTLET	MCC 1J1-1	OPEN	CLOSED NOTE 3	
MOV-CW100B,D CONDENSER CIRCU-LATING WATER OUTLET	MCC 1H1-1	OPEN	CLOSED NOTE 3	
MOV-CW106A,C CONDENSER CIRCU-LATING WATER INLET	MCC 1H1-1	OPEN	CLOSED NOTE 3	

TABLE 3-1.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: CIRCULATING WATER AND SERVICE WATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOV-CW106B,D CONDENSER CIRCU-LATING WATER INLET	MCC 1J1-1	OPEN	CLOSED NOTE 3	
MOV-SW101A SERVICE WATER TO BEARING COOLING WATER HX	MCC 1H1-1	OPEN	CLOSED	
MOV-SW101B SERVICE WATER TO BEARING COOLING WATER HX	MCC 1J1-1	OPEN	CLOSED	

NOTES: (1) ONLY ONE SW PUMP NORMALLY RUNNING.
(2) ONE OF THE SW PUMPS MAY BE OPERATED POST-FIRE.
(3) EITHER INLET OR OUTLET VALVE TO BE CLOSED POST-FIRE.

TABLE 3-1.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
EDG-1 EMERGENCY DIESEL GENERATOR	AIR START SYSTEM AND DC BATTERY	OFF	OPERATING	
EDG-3 EMERGENCY DIESEL GENERATOR	AIR START SYSTEM AND DC BATTERY	OFF	OFF	
1-EE-P-1A NORMAL EDG 1 FUEL OIL PUMP	MCC 1H1-1	OFF	OPERATE NOTE 1	
1-EE-P-1C NORMAL EDG 3 FUEL OIL PUMP	MCC 1J1-1	OFF	OPERATE NOTE 1	
1-EE-P-1D BACKUP EDG 1 FUEL OIL PUMP	MCC 1H1-2	OFF	OPERATE NOTE 1	

TABLE 3-1.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
4160V EMERGENCY BUS 1H	EDG-1	ENERGIZED	ENERGIZED NOTE 2	
4160V EMERGENCY BUS 1J	EDG-3	ENERGIZED	ENERGIZED NOTE 2	
EDG-3 BREAKER 15J3	N/A	OUT	IN	THIS BREAKER IS ONLY REQUIRED IN THE CASE OF A UNIT 2 CABLE VAULT FIRE
STATION SERVICE TRANSFORMER 1H-1	4160V EMERGENCY BUS 1H	ENERGIZED	ENERGIZED NOTE 2	
STATON SERVICE TRANSFORMER 1J-1	4160V EMERGENCY BUS 1J	ENERGIZED	ENERGIZED NOTE 2	
480V EMERGENCY BUS 1H-1	STATION SERVICE TRANSFORMER 1H-1	ENERGIZED	ENERGIZED NOTE 2	
480V EMERGENCY BUS 1J-1	STATION SERVICE TRANSFORMER 1J-1	ENERGIZED	ENERGIZED NOTE 2	
MCC 1H1-1 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 1H-1	ENERGIZED	ENERGIZED NOTE 2,3	
MCC 1H1-2 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 1H-1	ENERGIZED	ENERGIZED NOTE 2,3	
MCC 1J1-1 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 1J-1	ENERGIZED	ENERGIZED NOTE 2,3	

TABLE 3-1.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
MCC 1J1-2 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 1J-1	ENERGIZED	ENERGIZED NOTE 2,3	
125V DC SWITCHBOARD 1A	MCC 1H1-1 OR BATTERY 1A	ENERGIZED	ENERGIZED NOTE 2,3	
125V DC SWITCHBOARD 1B	MCC 1J1-1, 1J1-2 OR BATTERY 1B	ENERGIZED	ENERGIZED NOTE 2,3	INCLUDES 125V DC SUB PANEL 1B
BATTERY CHARGER 1A1	MCC 1H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER 1A2	MCC 1H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER UPS 1B-1	MCC 1J1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER UPS 1B-2	MCC 1J1-2	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS INVERTER 1-II	125V SWITCHBOARD 1A	ENERGIZED	ENERGIZED NOTE 2,3	
INVERTER, UPS 1B-1	125V SWITCHBOARD 1B, MCC 1J1-1	ENERGIZED	ENERGIZED NOTE 2,3	
INVERTER, UPS 1B-2	125V SWITCHBOARD 1B, MCC 1J1-2	ENERGIZED	ENERGIZED NOTE 2,3	

TABLE 3-1.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
VITAL BUS 1-I	MCC 1H1-1 OR 125V SWITCHBOARD 1A	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 1-II	MCC 1J1-1, 1J1-2, OR 125V SWITCHBOARD 1B	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 1-III	MCC 1H1-1 OR 125V SWITCHBOARD 1A	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 1-IV	MCC 1J1-1, 1J1-2, OR 125V SWITCHBOARD 1B	ENERGIZED	ENERGIZED NOTE 2,3	
MANUAL THROWOVER SWITCH 1-III	125V SWITCHBOARD 1A OR MCC 1H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS I-IIA	MCC 1J1-1, 1J1-2, OR 125V SWITCHBOARD 1B	ENERGIZED	ENERGIZED NOTE 2,3	
TRANSFORMER 1-I	MCC 1H1-1	ENERGIZED	ENERGIZED	
VITAL BUS 1-IVA	MCC 1J1-1, 1J1-2, OR 125V SWITCHBOARD 1B	ENERGIZED	ENERGIZED NOTE 2,3	
AUXILIARY SHUTDOWN PANEL	VARIOUS	ENERGIZED	ENERGIZED	
DC PANEL 1-2 MAIN CONTROL BOARD	VITAL BUS 1-II	ENERGIZED	ENERGIZED	

TABLE 3-1.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
PNL-REM REMOTE MONITORING PANEL	VITAL BUS INVERTER 1-III OR 2-III	ENERGIZED	ENERGIZED NOTE 4	
RMP-1 ASC REMOTE MONITORING PANEL	VITAL BUS INVERTER 1-III OR 2-III	ENERGIZED	ENERGIZED NOTE 4	
HT-T-2A3 HEAT TRACING TRANSFORMER	MCC 1H1-1	ENERGIZED	ENERGIZED	
HT-T-2A3 HEAT TRACING DISTRIBUTION PANEL	HT-T-2A3	ENERGIZED	ENERGIZED	
SEMI-VITAL BUS TRANSFORMER	MCC 1J1-1	ENERGIZED	ENERGIZED	
1-SVB-1 SEMI-VITAL BUS	SVB TRANSFORMER	ENERGIZED	ENERGIZED	

NOTES:
(1) ONLY THE PUMPS ASSOCIATED WITH THE OPERATING DIESEL GENERATOR NEED TO BE RUN.
(2) IF ALL THE SWITCHGEAR FOR A UNIT IS DISABLED THEN SHUTDOWN USING THE EQUIPMENT OF THE UNAFFECTED UNIT.
(3) ONE TRAIN REQUIRED TO SUPPLY POWER TO VITAL AC AND DC DISTRIBUTION.
(4) TO BE USED IN THE EVENT THAT CONTROL ROOM INDICATION IS UNAVAILABLE.

TABLE 3-1.K

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: NEUTRON FLUX MONITORING

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
NFD-190 EXCORE NEUTRON FLUX DETECTOR	VITAL BUS 1-I	N/A	N/A	PROVIDES SOURCE AND WIDE RANGE NEUTRON FLUX INDICATION AT REMOTE MONITORING PANEL
NFD-1270 EXCORE NEUTRON FLUX DETECTOR	VITAL BUS 1-II	N/A	N/A	PROVIDES SOURCE AND WIDE RANGE NEUTRON FLUX INDICATION IN CONTROL ROOM

TABLE 3-1.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: VENTILATION

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
1-VS-AC-1 CONTROL ROOM AIR CONDITION	MCC 1H1-1	ON NOTE 1	NOTE 2	
1-VS-AC-2 CONTROL ROOM AIR CONDITION	MCC 2H1-1	OFF NOTE 1	NOTE 2	
1-VS-AC-7 EMERGENCY SWITCHGEAR ROOM AIR CONDITION	MCC 1H1-1	ON	ON	
1-VS-E-4C CONTROL AND RELAY ROOM CHILLER	MCC 2H1-1	ON	ON	
1-VS-P-2C CONTROL AND RELAY ROOM CHILLED WATER PUMP	MCC 2H1-1	ON	ON	
1-VS-P-1C CONTROL AND RELAY ROOM CONDENSER WATER PUMP	MCC 2H1-1	ON	ON	
MOV-PG107C CHILLED WATER PUMP DISCHARGE	MCC 1H1-1	OPEN	OPEN	

TABLE 3-1.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: VENTILATION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
PCV-SW100C CONDENSER WATER PUMP DISCHARGE	SELF-CONTAINED PNEUMATIC	OPEN	OPEN	
1-VS-E-3A CENTRAL CHILLED WATER CHILLERS	MCC 1B2-1 OR MCC 1J1-1 OR MCC 2H1-1	ON	ON NOTE 3	CHILLERS NEEDED ONLY IF FIRE DISABLES CONTROL AND RELAY ROOM CHILLERS.
1-VS-E-3B CENTRAL CHILLED WATER CHILLERS	MCC 1C1-2 OR MCC 2H1-1 OR MCC 1J1-1	OFF	OFF NOTE 3	CHILLERS NEEDED ONLY IF FIRE DISABLES CONTROL AND RELAY ROOM CHILLERS.
1-VS-E-1A CENTRAL CHILLER CONDENSING UNITS	MCC 1B2-1 OR MCC 1J1-1 OR MCC 2H1-1	ON	ON NOTE 3	CHILLERS NEEDED ONLY IF FIRE DISABLES CONTROL AND RELAY ROOM CHILLERS.
1-VS-E-1B CENTRAL CHILLER CONDENSING UNITS	MCC 1C1-2 OR MCC 1J1-1 OR MCC 2H1-1	OFF	OFF NOTE 3	CHILLERS NEEDED ONLY IF FIRE DISABLES CONTROL AND RELAY ROOM CHILLERS.
1-VS-F-9A AUXILIARY BUILDING EXHAUST FAN	MCC 1H1-2S	ON	NOTE 4	
1-VS-F-9B AUXILIARY BUILDING EXHAUST FAN	MCC 1J1-2W	ON	NOTE 4	
1-VS-F-58A SAFETY-RELATED FILTERED EXHAUST FAN	480V EMERGENCY BUS 1H-1 OR 2J-1	OFF	NOTE 4	MOTOR OPERATED INLET VANES PROVIDED WITH FAN

TABLE 3-1.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: VENTILATION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
1-VS-F-58B SAFETY-RELATED FILTERED EXHAUST FAN	480V EMERGENCY BUS 2H-1 OR 1J-1	OFF	NOTE 4	MOTOR OPERATED INLET VANES PROVIDED WITH FAN
AOD-VS108 SUCTION DAMPER FOR FANS 9A AND B	VITAL BUSES 1-I AND 1-II	OPEN	NOTE 5	
1-VS-F-14 CABLE SPREADING ROOM FAN	480V MCC 1B2-1	ON	OFF	FAN ONLY NEEDED IF OFF-SITE POWER IS AVAILABLE AND THE REMOTE MONITORING PANELS ARE USED.
1-VS-P-3A CENTRAL CHILLED WATER PUMP	MCC 1B2-1 OR MCC 1J1-1 OR MCC 2H1-1	ON	ON NOTE 3	
1-VS-P-3B CENTRAL CHILLED WATER PUMP	MCC 1C1-2 OR MCC 2H1-1 OR MCC 1J1-1	OFF	OFF NOTE 3	
1-VS-DMP-60A FILTER FAN 58A ISOLATION DAMPERS	LOCALLY HAND-OPERATED DAMPER	CLOSED	NOTE 5	
1-VS-DMP-60B FILTER FAN 58B ISOLATION DAMPERS	LOCALLY HAND-OPERATED DAMPER	CLOSED	NOTE 5	
1-VS-DMP-61A FILTER FAN 58A ISOLATION DAMPERS	LOCALLY HAND-OPERATED DAMPER	CLOSED	NOTE 5	
1-VS-DMP-61B FILTER FAN 58B ISOLATION DAMPERS	LOCALLY HAND-OPERATED DAMPER	CLOSED	NOTE 5	

TABLE 3-1.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: VENTILATION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
MOD-VS-58A FILTER FAN 58A DISCHARGE DAMPER	480V EMERGENCY BUS 1H-1	CLOSED	OPEN NOTE 6	
MOD-VS-58B FILTER FAN 58B DISCHARGE DAMPER	480V EMERGENCY BUS 2H-1	CLOSED	OPEN NOTE 6	DAMPER IS POWERED FROM LOCAL STARTER FOR 1-VS-F-58B
AOD-VS-107A AND B CHARGING PUMP CUBICLE ISOLATION DAMPERS	VITAL BUSES 1-I AND 1-II	CLOSED	OPEN NOTE 6	WILL FAIL CLOSED ON LOSS OF POWER WITH INSTRUMENT AIR AVAILABLE. AIR SUPPLY MUST BE ISOLATED AND AIR VENTED FROM OPERATOR TO OPEN DAMPER.
AOD-VS-101A AND B FUEL BUILDING EXHAUST DAMPERS	VITAL BUSES 1-I AND 1-II	CLOSED	CLOSED NOTE 6	WILL FAIL OPEN ON LOSS OF POWER WITH INSTRUMENT AIR AVAILABLE. AIR SUPPLY MUST BE ISOLATED AND AIR VENTED FROM OPERATOR TO CLOSE DAMPER.
AOD-VS-103A DECONTAMINATION BUILDING EXHAUST DAMPER	VITAL BUS 1-I	CLOSED	CLOSED NOTE 6	DAMPER WILL FAIL CLOSED WITH LOSS OF POWER WITH OR WITHOUT LOSS OF INSTRUMENT AIR.
AOD-VS-103B DECONTAMINATION BUILDING EXHAUST DAMPER	VITAL BUS 1-IV	CLOSED	CLOSED NOTE 6	DAMPER WILL FAIL CLOSED WITH LOSS OF POWER WITH OR WITHOUT LOSS OF INSTRUMENT AIR.
MOD-VS-100A SAFEGUARDS AREA EXHAUST DAMPER	VITAL BUS 1-I	CLOSED	CLOSED NOTE 7	

TABLE 3-1.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 1

SAFE SHUTDOWN SYSTEM: VENTILATION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOD-VS-100B SAFEGUARDS AREA EXHAUST DAMPER	VITAL BUS 1-II	CLOSED	CLOSED NOTE 7	
AOD-VS-111A AND B CONTAINMENT EXHAUST ISOLATION DAMPERS	VITAL BUSES 1-I AND 1-II	CLOSED	CLOSED	CONTAINMENT PURGE PATH IS MAINTAINED ISOLATED BY NORMALLY CLOSED MOVs. THEREFORE, POST-FIRE OPERATING CONDITION MAY BE OPEN.
MOD-VS-101A AND C CHARGING PUMP CUBICLE EXHAUST DAMPERS	VITAL BUS 1-I	OPEN	OPEN/CLOSED NOTE 6	ONLY DAMPERS ASSOCIATED WITH THE OPERATING CHARGING PUMPS NEED BE OPEN.
MOD-VS-101B CHARGING PUMP CUBICLE EXHAUST DAMPER	VITAL BUS 1-II	OPEN	OPEN/CLOSED NOTE 6	ONLY DAMPERS ASSOCIATED WITH THE OPERATING CHARGING PUMPS NEED BE OPEN.
1-VS-247 CENTRAL CHILLER CROSS-CONNECT VALVE	LOCALLY OPERATED	CLOSED	OPEN	VALVE NEEDED IF CENTRAL CHILLERS ARE USED
1-VS-251 CENTRAL CHILLER CROSS-CONNECT VALVE	LOCALLY OPERATED	CLOSED	OPEN	VALVE NEEDED IF CENTRAL CHILLERS ARE USED

NOTES:
(1) NORMALLY ONE AC UNIT FROM EACH AREA IS OPERATING ALONG WITH ASSOCIATED VALVES AND DAMPERS.
(2) EITHER AC UNIT COULD BE OPERATED OR TWO FROM THE UNAFFECTED UNIT MAY BE USED.
(3) ONE CHILLER AND ITS ASSOCIATED PUMP IS REQUIRED.
(4) BOTH 9A AND B OR EITHER 58A OR 58B FANS MUST BE OPERATIONAL DURING AND AFTER A FIRE.
(5) ONLY DAMPERS ASSOCIATED WITH FANS TO BE USED NEED BE POSITIONED.
(6) DAMPERS NEED BE POSITIONED ONLY WHEN 58A OR B FANS ARE OPERATING.
(7) 58 FANS ARE CAPABLE OF EXHAUSTING SAFEGUARDS AREA AND CHARGING PUMP CUBICLES, THEREFORE, POST-FIRE OPERATING CONDITION MAY BE OPEN.

TABLE 3-2.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: REACTOR COOLANT

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
SV-2551A,B,C PRESSURIZER SAFETY VALVE	MECHANICALLY ACTUATED RELIEF VALVES	N/A	N/A	
LT-2459A WIDE RANGE PRESSURIZER LEVEL	VITAL BUS INVERTER 1-III	N/A	N/A	
LT-2460 WIDE RANGE PRESSURIZER LEVEL	VITAL BUS 2-II	N/A	N/A	
PT-2449 WIDE RANGE RCS PRESSURE - LOOP 3	VITAL BUS INVERTER 1-III	N/A	N/A	
PT-2402-1 WIDE RANGE RCS PRESSURE - LOOP 2	VITAL BUS 2-II	N/A	N/A	
TE-2420 LOOP 2 WIDE RANGE COLD LEG TEMP.	VITAL BUS 2-II	N/A	N/A	
TE-2413-2 LOOP 1 WIDE RANGE HOT LEG TEMP.	VITAL BUS INVERTER 1-III	N/A	N/A	

TABLE 3-2.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: REACTOR COOLANT (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
TE-2433-2 LOOP 3 WIDE RANGE HOT LEG TEMP.	VITAL BUS INVERTER 1-III	N/A	N/A	
TE-2410A LOOP 1 WIDE RANGE COLD LEG TEMP.	VITAL BUS INVERTER 1-III	N/A	N/A	
TE-2430A LOOP 3 WIDE RANGE COLD LEG TEMP.	VITAL BUS INVERTER 1-III	N/A	N/A	
TE-2423-1 LOOP 2 WIDE RANGE HOT LEG TEMP.	VITAL BUS 2-II	N/A	N/A	

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
2-CH-P-1A CHARGING PUMP	4160V EMERGENCY BUS "2H"	ON NOTE 1	NOTE 2	
2-CH-P-1B CHARGING PUMP	4160V EMERGENCY BUS "2J"	OFF NOTE 1	NOTE 2	
2-CH-P-1C CHARGING PUMP	4160V EMERGENCY BUS "2J" OR "2H"	OFF NOTE 1	NOTE 2	PUMP MAY BE POWERED FROM EITHER BUS
LCV-2115B CHARGING PUMP SUCTION FROM RWST	MCC 2J1-2N	CLOSED	OPEN	
LCV-2115D CHARGING PUMP SUCTION FROM RWST	MCC 2J1-2E	CLOSED	OPEN	
LCV-2115E CHARGING PUMP SUCTION FROM VCT	MCC 2J1-2E	OPEN	CLOSED	
MOV-2267A CHARGING PUMP 1A SUCTION	MCC 2H1-2S	OPEN	OPEN NOTE 3	
MOV-2269A CHARGING PUMP 1B SUCTION	MCC 2J1-2W	OPEN	OPEN NOTE 3	
MOV-2270A CHARGING PUMP 1C SUCTION	MCC 2H1-2S	OPEN	OPEN NOTE 3	

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOV-2286A CHARGING PUMP 1A DISCHARGE	MCC 2H1-2S	OPEN	OPEN NOTE 3	
MOV-2286B CHARGING PUMP 1B DISCHARGE	MCC 2J1-2W	OPEN	OPEN NOTE 3	
MOV-2286C CHARGING PUMP 1C DISCHARGE	MCC 2H1-2S	OPEN	OPEN NOTE 3	
MOV-2287A CHARGING PUMP "1A" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 2H1-2S	OPEN	CLOSED	
MOV-2287B CHARGING PUMP "1B" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 2J1-2W	OPEN	CLOSED	
MOV-2287C CHARGING PUMP "1C" DISCHARGE TO LOOP FILL OR THE SAFETY INJECTION SYSTEM	MCC 2J1-2W	OPEN	CLOSED	
MOV-2289A CHARGING PUMP DISCHARGE HEADER	MCC 2H1-2N	OPEN	OPEN	VALVE WILL BE CHECKED OPENED IF NORMAL CHARGING LINE USED

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOV-2289B CHARGING PUMP DISCHARGE HEADER	MCC 2J1-2E	OPEN	OPEN	VALVE WILL BE CHECKED OPENED IF NORMAL CHARGING LINE USED
FCV-2122 CHARGING FLOW CONTROL	VITAL BUS 2-III	CLOSED	OPEN	VALVE WILL BE FAILED OPENED IF NORMAL CHARGING LINE USED
HCV-2310A CHARGING ISOLATION TO LOOP 2 COLD LEG	DC PANEL 2-1	OPEN	OPEN	VALVE WILL BE FAILED OPENED IF NORMAL CHARGING LINE USED
MOV-2370 SEAL WATER SUPPLY ISOLATION	MCC 2H1-2N	OPEN	OPEN	VALVE WILL BE CHECKED OPEN IF SEAL INJECTION REQUIRED
HCV-2186 SEAL WATER FLOW CONTROL	VITAL BUS 2-II	OPEN	OPEN	VALVE WILL BE FAILED OPEN IF SEAL INJECTION REQUIRED
MOV-2275A CHARGING PUMP 1A RECIRCULATION FLOW	MCC 2H1-2N	OPEN	OPEN NOTE 3	
MOV-2275B CHARGING PUMP 1B RECIRCULATION FLOW	MCC 2H1-2S	OPEN	OPEN NOTE 3	
MOV-2275C CHARGING PUMP 1C RECIRCULATION FLOW	MCC 2H1-2N	OPEN	OPEN NOTE 3	

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
MOV-2373 CHARGING PUMP RECIRCULATION FLOW TO SEAL WATER HX	MCC 2J1-2W	OPEN	OPEN	
MOV-2381 SEAL WATER RETURN LINE	MCC 2J1-1	OPEN	CLOSED	
2-CS-TK-1 REFUELING WATER STORAGE TANK	N/A	N/A	N/A	
2-CS-P-1A CONTAINMENT SPRAY PUMP	480V EMERGENCY BUS 2H	OFF	ON NOTE 6	PUMP SHOULD BE USED ONLY IF NECESSARY FOR CONTAINMENT COOLING.
MOV-CS201A CONTAINMENT SPRAY PUMP 1A DISCHARGE	MCC 2H1-2S	CLOSED	OPEN NOTE 6	
MOV-CS200A CONTAINMENT SPRAY PUMP 1A SUCTION	MCC 2H1-2S	OPEN	OPEN NOTE 6	

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
2-CH-447 CHARGING PUMP CROSS-CONNECT MANUAL ISOLATION BETWEEN UNITS 1&2	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	MUST BE OPENED IN CONJUNCTION WITH 1-CH-728 TO CROSS CONNECT CHARGING
2-CH-300 SEAL WATER SUPPLY TO 2-RC-P-1C	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
2-CH-297 SEAL WATER SUPPLY TO 2-RC-P-1B	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
2-CH-294 SEAL WATER SUPPLY TO 2-RC-P-1A	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	VALVE WILL BE USED TO CONTROL SEAL INJECTION RATE
TV-SI202A RWST CROSS CONNECT VALVES	VITAL BUSES 1-I AND 2-I	CLOSED	OPEN	MUST BE OPENED TO SUPPLY WATER FOR CHARGING
TV-SI202B RWST CROSS CONNECT VALVES	VITAL BUSES 1-II AND 2-II	CLOSED	OPEN	MUST BE OPENED TO SUPPLY WATER FOR CHARGING

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
LCV-2460A LETDOWN LINE ISOLATION	DC PANEL 2-1	OPEN	OPEN	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
LCV-2460B LETDOWN LINE ISOLATION	DC PANEL 2-1	OPEN	OPEN	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-2200A LETDOWN ORIFICE ISOLATION	DC PANEL 2-1	CLOSED	CLOSED NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-2200B LETDOWN ORIFICE ISOLATION	DC PANEL 2-1	OPEN	OPEN NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
HCV-2200C LETDOWN ORIFICE ISOLATION	DC PANEL 2-1	CLOSED	CLOSED NOTE 4	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.

TABLE 3-2.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHEMICAL AND VOLUME CONTROL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
HCV-2142 PURIFICATION FLOW FROM RHR SYSTEM	VITAL BUS 2-II	CLOSED	OPEN NOTE 5	VALVE WILL FAIL SHUT ON LOSS OF POWER. LETDOWN TO BE ESTABLISHED FOUR HOURS AFTER START OF SHUTDOWN PROCEDURE. SEE CHAPTER 6, MODIFICATION I-12; CHAPTER 7, EXEMPTIONS NO. 14 & 15.
2-CS-35 RWST COOLER 2A INLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
2-CS-36 RWST COOLER 2B INLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
2-CS-46 RWST COOLER 2A OUTLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	
2-CS-47 RWST COOLER 2B OUTLET ISOLATION	LOCALLY OPERATED VALVE	CLOSED	OPEN NOTE 5	

NOTES: (1) ONLY ONE CHARGING PUMP IS NORMALLY RUNNING.
(2) ONE OR TWO CHARGING PUMPS MAY BE OPERATED POST-FIRE, OR A CHARGING PUMP FROM THE OTHER UNIT MAY BE USED.
(3) ONLY THE VALVE ASSOCIATED WITH THE CHARGING PUMP(S) TO BE USED NEED TO BE POSITIONED.
(4) ONE OR TWO OF THE VALVES SHOULD BE OPENED DEPENDING UPON RATE OF LETDOWN.
(5) THIS VALVE IS REQUIRED TO BE OPEN ONLY IF ALTERNATE LETDOWN PATH IS NEEDED.
(6) PUMP AND ASSOCIATED VALVES ARE REQUIRED ONLY FOLLOWING A FIRE INSIDE CONTAINMENT.

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
RV-MS201A STEAM GENERATOR "A" PORV	2-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
RV-MS201B STEAM GENERATOR "B" PORV	2-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
RV-MS201C STEAM GENERATOR "C" PORV	2-SVB-1	CLOSED	CLOSED	VALVE WILL FAIL SHUT
TV-MS201A STEAM GENERATOR "A" MAIN STEAM ISOL VALVE	DC PANELS 2-1 AND 2-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT
TV-MS201B STEAM GENERATOR "B" MAIN STEAM ISOL VALVE	DC PANELS 2-1 AND 2-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
TV-MS201C STEAM GENERATOR "C" MAIN STEAM ISOL VALVE	DC PANELS 2-1 AND 2-2	OPEN	CLOSED	IF VALVE CANNOT BE CLOSED DUE TO A FIRE IN THE AUXILIARY BUILDING THEN THE TURBINE STOP VALVES AND STEAM DUMPS WILL BE SHUT
TV-1,2,3,4 TURBINE STOP VALVE	AC PANEL 2-1	OPEN	CLOSED	
2-MS-84 STEAM GENERATOR "A" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
2-MS-116 STEAM GENERATOR "B" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
2-MS-155 STEAM GENERATOR "C" MSIV BYPASS	LOCALLY HAND-OPERATED VALVE	CLOSED	OPERATE	
PCV-MS202A STEAM SUPPLY TO AFW PUMP TURBINE	DC PANEL 2-1	CLOSED	OPEN	VALVE WILL BE DEENERGIZED TO FAIL OPEN
PCV-MS202B STEAM SUPPLY TO AFW PUMP TURBINE	DC PANEL 2-2	CLOSED	OPEN	VALVE WILL BE DEENERGIZED TO FAIL OPEN
SV-MS201A-205A STEAM GENERATOR "A" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
SV-MS201B-205B STEAM GENERATOR "B" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	
SV-MS201C-205C STEAM GENERATOR "C" SAFETY VALVES	MECHANICALLY ACTUATED	CLOSED	NOTE 1	
TCV-MS205A-208A CONDENSER 2-CN-SC-1A STEAM DUMP VALVE	DC PANEL 2-2	CLOSED	CLOSED	
TCV-MS205B-208B CONDENSER 2-CN-SC-1B STEAM DUMP VALVE	DC PANEL 2-2	CLOSED	CLOSED	
PCV-AS200 AUXILIARY STEAM SUPPLY VALVE	SELF-CONTAINED PNEUMATIC	OPEN/SHUT	CLOSED	
FCV-MS204A STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 2-MS-E-1A	EHC CABINET	OPEN	CLOSED	
FCV-MS204B STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 2-MS-E-1B	EHC CABINET	OPEN	CLOSED	

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
FCV-MS204C STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 2-MS-E-1C	EHC CABINET	OPEN	CLOSED	
FCV-MS204D STEAM SUPPLY TO MOISTURE SEPARATOR REHEATER 2-MS-E-1D	EHC CABINET	OPEN	CLOSED	
LT-2477A STEAM GENERATOR "A" WIDE RANGE LEVEL	VITAL BUS INVERTER 1-III	N/A	N/A	
LT-2487A STEAM GENERATOR "B" WIDE RANGE LEVEL	VITAL BUS INVERTER 1-III	N/A	N/A	
LT-2497A STEAM GENERATOR "C" WIDE RANGE LEVEL	VITAL BUS INVERTER 1-III	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE
LT-2477 STEAM GENERATOR "A" WIDE RANGE LEVEL	VITAL BUS 2-II	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE
LT-2487 STEAM GENERATOR "B" WIDE RANGE LEVEL	VITAL BUS 2-III	N/A	N/A	NOT REQUIRED FOR CONTAINMENT FIRE

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
LT-2497 STEAM GENERATOR "C" WIDE RANGE LEVEL	VITAL BUS 2-IV	N/A	N/A	
PT-2474 STEAM GENERATOR "A" PRESSURE	VITAL BUS 2-II	N/A	N/A	
PT-2485 STEAM GENERATOR "B" PRESSURE	VITAL BUS 2-III	N/A	N/A	
PT-2496 STEAM GENERATOR "C" PRESSURE	VITAL BUS 2-IV	N/A	N/A	
PT-MS237A STEAM GENERATOR A PRESSURE	VITAL BUS INVERTER 1-III	N/A	N/A	
PT-MS237B STEAM GENERATOR B PRESSURE	VITAL BUS INVERTER 1-III	N/A	N/A	
NRV-MS201A MAIN STEAM LINE "A" NONRETURN VALVE	MCC 2A1-1	CLOSED	OPEN	
NRV-MS201B MAIN STEAM LINE "B" NONRETURN VALVE	MCC 2B1-2	CLOSED	OPEN	

TABLE 3-2.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: MAIN STEAM (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
NRV-MS201C MAIN STEAM LINE "C" NONRETURN VALVE	MCC 2C1-1	CLOSED	OPEN	
2-AS-3 AUXILIARY STEAM SUPPLY BYPASS VALVE	LOCALLY OPERATED VALVE	CLOSED	OPERATE	
2-AS-19 STEAM TO VACUUM PRIMING AIR EJECTOR 2A	LOCALLY OPERATED VALVE	CLOSED	OPERATE	VALVES WILL BE OPENED AND HOGGERS WILL BE USED IF STEAM GENERATOR PORV'S FAIL
2-AS-20 STEAM TO VACUUM PRIMING AIR EJECTOR 2B	LOCALLY OPERATED VALVE	CLOSED	OPERATE	VALVES WILL BE OPENED AND HOGGERS WILL BE USED IF STEAM GENERATOR PORV'S FAIL
2-MS-118 BLOCK VALVE FOR DECAY HEAT RELEASE VALVE	LOCALLY OPERATED VALVE	CLOSED	CLOSED	VALVE MAY BE OPENED IF THE DECAY HEAT RELEASE VALVE IS NOT DISABLED BY THE FIRE

NOTE: (1) SAFETY VALVES WILL BE RELIED ON FOR HOT SHUTDOWN DECAY HEAT REMOVAL.

TABLE 3-2.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
2-FW-P-2 TURBINE-DRIVEN AUXILIARY FEED-WATER PUMP	STEAM SUPPLIED	OFF	OPERATE NOTE 1	PUMP WILL BE STARTED BY FAILING OPEN PCV-MS202A OR PCV-MS202B
2-FW-P-3A MOTOR-DRIVEN AUXILIARY FEED-WATER PUMP	4160V EMERGENCY BUS "2H"	OFF	OFF NOTE 1	
2-FW-P-3B MOTOR-DRIVEN AUXILIARY FEED-WATER PUMP	4160V EMERGENCY BUS "2J"	OFF	OFF NOTE 1	
MOV-FW251E AFW DISCHARGE TO STEAM GENERATOR "A"	MCC 2H1-2S	OPEN	OPEN NOTE 2	
MOV-FW251C AFW DISCHARGE TO STEAM GENERATOR "B"	MCC 2H1-2S	OPEN	OPEN NOTE 2	
MOV-FW251A AFW DISCHARGE TO STEAM GENERATOR "C"	MCC 2H1-2S	OPEN	OPEN NOTE 2	
MOV-FW251F AFW DISCHARGE TO STEAM GENERATOR "A"	MCC 2J1-2W	OPEN	OPEN NOTE 2	

TABLE 3-2.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
MOV-FW251D AFW DISCHARGE TO STEAM GENERATOR "B"	MCC 2J1-2W	OPEN	OPEN NOTE 2	
MOV-FW251B AFW DISCHARGE TO STEAM GENERATOR "C"	MCC 2J1-2W	OPEN	OPEN NOTE 2	
MOV-FW260A AFW CROSS-CONNECT ISOLATION	MCC 1H1-2N	CLOSED	OPERATE NOTE 4	
MOV-FW260B AFW CROSS-CONNECT ISOLATION	MCC 1J1-2E	CLOSED	CLOSED NOTE 4	
2-CN-TK-1A EMERGENCY CONDEN-SATE STORAGE TANK	N/A	N/A	N/A	96,000 GALLON MINIMUM TECH SPEC LIMIT
LT-CN200 EMERGENCY CST LEVEL	N/A	N/A	N/A	
LT-CN201 EMERGENCY CST LEVEL	N/A	N/A	N/A	

TABLE 3-2.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
2-FW-185 FIRE MAIN TO AFW PUMPS SUCTION	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
2-FW-120 FIRE MAIN TO AFW PUMPS SUCTION	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
2-FW-119 TELL TALE LINE	LOCALLY OPERATED VALVE	OPEN	OPEN NOTE 3	
2-FW-154 AFW PUMP P-2 SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
2-FW-169 AFW PUMP P-3A SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
2-FW-184 AFW PUMP P-3B SUCTION FROM FIRE MAIN	LOCALLY OPERATED VALVE	CLOSED	CLOSED NOTE 3	
2-FW-140 AFW PUMP P-2 DISCHARGE TO MOV HEADER	LOCALLY OPERATED VALVE	OPEN	OPERATE	

TABLE 3-2.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: AUXILIARY FEEDWATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
ECST LEVEL INDICATOR (FLOAT)	MECHANICAL	N/A	N/A	USED IF ECST LEVEL TRANSMITTERS ARE INOPERATIVE

NOTES: (1) ONE AFW PUMP MUST BE OPERATED FOR SAFE SHUTDOWN.
(2) ONLY THE VALVES ASSOCIATED WITH THE OPERATING AFW PUMP WOULD BE REPOSITIONED.
(3) VALVES AND/OR PUMP WOULD BE OPERATED IF ALTERNATIVE SUPPLIES OF AFW REQUIRED.
(4) ONLY ONE CROSS-CONNECT VALVE NEEDS TO BE OPENED.

TABLE 3-2.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
2-RH-P-1A RHR PUMP "A"	4160V EMERGENCY BUS "2H"	OFF	OPERATE NOTE 1	POST-FIRE REPAIR CAPABILITY FOR PUMP POWER CABLES
2-RH-P-1B RHR PUMP "B"	4160V EMERGENCY BUS "2J"	OFF	OPERATE NOTE 1	POST-FIRE REPAIR CAPABILITY FOR PUMP POWER CABLES
MOV-2700 RHR PUMP SUCTION ISOLATION	2H1-2S	CLOSED	OPEN	
MOV-2701 RHR PUMP SUCTION ISOLATION	2J1-2E	CLOSED	OPEN	
FCV-2605 RHR FLOW CONTROL	VITAL BUSES 2-II AND 2-III	OPEN	THROTTLE	FAILS CLOSED. VALVE REQUIRES AIR BOTTLE AND JUMPERS FOR OPERATION DURING RHR WARM-UP
HCV-2758 RHR HX OUTLET	VITAL BUS 2-III	CLOSED	THROTTLE	FAILS OPEN. VALVE REQUIRES AIR BOTTLE AND JUMPERS FOR OPERATION DURING RHR WARM-UP
MOV-2720A RHR RETURN ISOLA-TION LOOP 2	2H1-2S	CLOSED	OPEN	
MOV-2720B RHR RETURN ISOLA-TION LOOP 3	2J1-2E	CLOSED	OPEN	

TABLE 3-2.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: RESIDUAL HEAT REMOVAL (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	REMARKS
MOV-RH-200 RHR TO RWST ISOLATION	MCC 2A1-1	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN
2-RH-25 ISOLATION TO LETDOWN HEADER	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN
2-RH-29 ISOLATION TO RWST	LOCALLY OPERATED VALVE	CLOSED	OPEN	VALVE WILL BE MANUALLY OPENED FOR ALTERNATE LETDOWN

NOTES: (1) AT LEAST ONE RHR PUMP WILL BE OPERATED FOR FORCED COOLDOWN.

TABLE 3-2.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: COMPONENT COOLING WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
1-CC-P-1C COMPONENT COOLING WATER PUMP	4160V EMERGENCY BUS "2H"	ON NOTE 1	NOTE 2	POST-FIRE REPAIR CAPABILITY FOR PUMP MOTOR AND POWER CABLES. SEE CHAPTER 6, MODIFICATION III-3.
1-CC-P-1D COMPONENT COOLING WATER PUMP	4160V EMERGENCY BUS "2J"	OFF NOTE 1	NOTE 2	POST-FIRE REPAIR CAPABILITY FOR PUMP MOTOR AND POWER CABLES. SEE CHAPTER 6, MODIFICATION III-3.
TV-CC209A CCW FROM RHR HX	VITAL BUS 2-I	OPEN	OPEN	VALVE WILL BE OPENED USING AIR BOTTLE AND JUMPER
TV-CC209B CCW FROM RHR HX	VITAL BUS 2-II	OPEN	OPEN	VALVE WILL BE OPENED USING AIR BOTTLE AND JUMPER
2-CC-104 CCW FROM RHR HX 2-RH-E-1A	LOCALLY OPERATED VALVE	OPEN	OPERATE	VALVE WILL BE USED TO CONTROL CCW FLOW TO RHR HEAT EXCHANGER
2-CC-100 CCW FROM RHR HX 2-RH-E-1B	LOCALLY OPERATED VALVE	OPEN	OPERATE	VALVE WILL BE USED TO CONTROL CCW FLOW TO RHR HEAT EXCHANGER
2-CC-181 RHR HX 1A OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-185 RHR HX 1B OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-178 RHR HX 2-RH-E-1A INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	

TABLE 3-2.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: COMPONENT COOLING WATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
2-CC-147 RHR HX 2-RH-E-1B INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-112 RHR PUMP 1B SEAL COOLER OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-116 RHR PUMP 1B SEAL COOLER INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-118 RHR PUMP 1A SEAL COOLER OUTLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	
2-CC-122 RHR PUMP 1A SEAL COOLER INLET	LOCALLY OPERATED VALVE	CLOSED	OPEN	

NOTES: (1) NORMALLY ONE CCW PUMP OPERATING.
(2) EITHER CCW PUMP COULD BE OPERATED OR ONE FROM THE OTHER UNIT.

TABLE 3-2.G

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CHARGING PUMP COOLING WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
2-CC-P-2A CHARGING PUMP COOLING WATER PUMP	MCC 2H1-1	ON	NOTE 1	POST-FIRE REPAIR REQUIRED FOR PUMP CONTROL CIRCUIT
2-CC-P-2B CHARGING PUMP COOLING WATER PUMP	MCC 2J1-1	OFF	NOTE 1	POST-FIRE REPAIR REQUIRED FOR PUMP CONTROL CIRCUIT
2-SW-P-10A CHARGING PUMP SERVICE WATER PUMP	MCC 2H1-1	ON	NOTE 1	
2-SW-P-10B CHARGING PUMP SERVICE WATER PUMP	MCC 2J1-1	OFF	NOTE 1	
TCV-SW208A SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5A	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	
TCV-SW208B SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5B	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	
TCV-SW208C SERVICE WATER FROM CHARGING PUMP LUBE OIL COOLER 5C	SELF-CONTAINED PNEUMATIC	OPEN	NOTE 2	

NOTES: (1) ONE PUMP MUST BE OPERATED FOR SAFE SHUTDOWN.
(2) ONLY VALVE ASSOCIATED WITH OPERATED PUMP MUST BE REPOSITIONED.

TABLE 3-2.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CIRCULATING WATER AND SERVICE WATER

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
1-SW-P-1A EMERGENCY SERVICE WATER PUMP	DIESEL DRIVEN	ON NOTE 1	NOTE 2	COMMON TO BOTH UNITS
1-SW-P-1B EMERGENCY SERVICE WATER PUMP	DIESEL DRIVEN	OFF NOTE 1	NOTE 2	COMMON TO BOTH UNITS
1-SW-P-1C EMERGENCY SERVICE WATER PUMP	DIESEL DRIVEN	OFF	NOTE 2	COMMON TO BOTH UNITS
MOV-SW202A SERVICE WATER TO CCW HX	MCC 2H1-1	OPEN	OPEN	
MOV-SW202B SERVICE WATER TO CCW HX	MCC 2J1-1	OPEN	OPEN	
MOV-CW200A,C CONDENSER CIRCU-LATING WATER OUTLET	MCC 2J1-1	OPEN	CLOSED NOTE 3	
MOV-CW200B,D CONDENSER CIRCU-LATING WATER OUTLET	MCC 2H1-1	OPEN	CLOSED NOTE 3	
MOV-CW206A,C CONDENSER CIRCU-LATING WATER INLET	MCC 2H1-1	OPEN	CLOSED NOTE 3	

TABLE 3-2.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: CIRCULATING WATER AND SERVICE WATER (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MOV-CW206B,D CONDENSER CIRCULATING WATER INLET	MCC 2J1-1	OPEN	CLOSED NOTE 3	
MOV-SW201A SERVICE WATER TO BEARING COOLING WATER HX	MCC 2H1-1	OPEN	CLOSED	
MOV-SW201B SERVICE WATER TO BEARING COOLING WATER HX	MCC 2J1-1	OPEN	CLOSED	

NOTES:
(1) ONLY ONE SW PUMP NORMALLY RUNNING.
(2) ONE OF THE SW PUMPS MAY BE OPERATED POST-FIRE.
(3) EITHER INLET OR OUTLET VALVE TO BE CLOSED POST-FIRE.

TABLE 3-2.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
EDG-2 EMERGENCY DIESEL GENERATOR	AIR START SYSTEM AND DC BATTERY	OFF	OPERATING	
EDG-3 EMERGENCY DIESEL GENERATOR	AIR START SYSTEM AND DC BATTERY	OFF	OFF	SWING DIESEL SUPPLIES EMERGENCY POWER TO EITHER UNIT 1 OR 2
1-EE-P-1B NORMAL EDG 2 FUEL OIL PUMP	MCC 2H1-1	OFF	OPERATE NOTE 1	
1-EE-P-1E BACKUP EDG 2 FUEL OIL PUMP	MCC 2H1-2	OFF	OPERATE NOTE 1	
1-EE-P-1F BACKUP EDG 3 FUEL OIL PUMP	MCC 2J1-1	OFF	OPERATE NOTE 1	
4160V EMERGENCY BUS 2H	EDG-2	ENERGIZED	ENERGIZED NOTE 2	

TABLE 3-2.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
4160V EMERGENCY BUS 2J	EDG-3	ENERGIZED	ENERGIZED NOTE 2	
EDG-3 BREAKER 25J3	N/A	OUT	IN	THIS BREAKER MAY BE USED IN CASE OF A UNIT 1 CABLE VAULT FIRE
STATION SERVICE TRANSFORMER 2H-1	4160V EMERGENCY BUS 2H	ENERGIZED	ENERGIZED NOTE 2	
STATION SERVICE TRANSFORMER 2J-1	4160V EMERGENCY BUS 2J	ENERGIZED	ENERGIZED NOTE 2	
480V EMERGENCY BUS 2H-1	STATION SERVICE TRANSFORMER 2H-1	ENERGIZED	ENERGIZED NOTE 2	
480V EMERGENCY BUS 2J-1	STATION SERVICE TRANSFORMER 2J-1	ENERGIZED	ENERGIZED NOTE 2	
MCC 2H1-1 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 2H-1	ENERGIZED	ENERGIZED NOTE 2,3	
MCC 2H1-2 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 2H-1	ENERGIZED	ENERGIZED NOTE 2,3	
MCC 2J1-1 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 2J-1	ENERGIZED	ENERGIZED NOTE 2,3	

TABLE 3-2.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
MCC 2J1-2 480V MOTOR CONTROL CENTER	480V EMERGENCY BUS 2J-1	ENERGIZED	ENERGIZED NOTE 2,3	
125V DC SWITCHBOARD 2A	MCC 2H1-1 OR BATTERY 2A	ENERGIZED	ENERGIZED NOTE 2,3	
125V DC SWITCHBOARD 2B	MCC 2J1-1, 2J1-2 OR BATTERY 2B	ENERGIZED	ENERGIZED NOTE 2,3	INCLUDES 125V DC SUB PANEL 2B
BATTERY CHARGER 2A1	MCC 2H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER 2A2	MCC 2H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER UPS-2B-1	MCC 2J1-1	ENERGIZED	ENERGIZED NOTE 2,3	
BATTERY CHARGER UPS-2B-2	MCC 2J1-2	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS INVERTER 2-II	125V SWITCHBOARD 2A	ENERGIZED	ENERGIZED NOTE 2,3	
INVERTER UPS 2B-1	125V SWITCHBOARD 2B, MCC 2J1-1	ENERGIZED	ENERGIZED NOTE 2,3	
INVERTER UPS 2B-2	125V SWITCHBOARD 2B, MCC 2J1-2	ENERGIZED	ENERGIZED NOTE 2,3	

TABLE 3-2.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
VITAL BUS 2-I	MCC 2H1-1 OR 125V SWITCHBOARD 2A	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 2-II	MCC 2J1-1, 2J1-2 OR 125V SWITCHBOARD 2B	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 2-III	MCC 2H1-1 OR 125V SWITCHBOARD 2A	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 2-IV	MCC 2J1-1, 2J1-2 OR 125V SWITCHBOARD 2B	ENERGIZED	ENERGIZED NOTE 2,3	
MANUAL THROWOVER SWITCH 2-III	125V SWITCHBOARD 2A OR MCC 2H1-1	ENERGIZED	ENERGIZED NOTE 2,3	
VITAL BUS 2-IIA	MCC 2J1-1, 2J1-2 OR 125V SWITCHBOARD 2B	ENERGIZED	ENERGIZED NOTE 2,3	
TRANSFORMER 2-I	MCC 2H1-1	ENERGIZED	ENERGIZED	
VITAL BUS 2-IVA	MCC 2J1-1, 2J1-2 OR 125V SWITCHBOARD 2B	ENERGIZED	ENERGIZED NOTE 2,3	
AUXILIARY SHUTDOWN PANEL	VARIOUS	ENERGIZED	ENERGIZED	
DC PANEL 2-2 MAIN CONTROL BOARD	VITAL BUS 2-II	ENERGIZED	ENERGIZED	
PNL-REM REMOTE MONITORING PANEL	VITAL BUS INVERTER 1-III OR 2-III	ENERGIZED	ENERGIZED NOTE 4	

TABLE 3-2.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: ELECTRICAL DISTRIBUTION (continued)

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
RMP-1 ASC REMOTE MONITORING PANEL	VITAL BUS INVERTER 1-III OR 2-III	ENERGIZED	ENERGIZED NOTE 4	
UNSCHEDULED COMMUNICATIONS BREAKER PANEL (UCSP) TRANSFORMER	MCC 2H1-1	ENERGIZED	ENERGIZED	
UNSCHEDULED COMMUNICATIONS BREAKER PANEL (UCSP)	UCSP TRANSFORMER	ENERGIZED	ENERGIZED	

NOTES: (1) ONLY THE PUMPS ASSOCIATED WITH THE OPERATING DIESEL GENERATOR NEED TO BE RUN.
(2) IF ALL THE SWITCHGEAR FOR A UNIT IS DISABLED THEN SHUTDOWN USING THE EQUIPMENT OF THE UNAFFECTED UNIT.
(3) ONE TRAIN REQUIRED TO SUPPLY POWER TO VITAL AC AND DC DISTRIBUTION.
(4) TO BE USED IN THE EVENT THAT CONTROL ROOM INDICATION IS UNAVAILABLE.

TABLE 3-2.L

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: VENTILATION

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS		REMARKS
		PRE-FIRE NORMAL POSITION	POST-FIRE OPERATING POSITION	
2-VS-AC-8 CONTROL ROOM AIR CONDITION	MCC 2H1-1	ON. NOTE 1	NOTE 2	
2-VS-AC-9 CONTROL ROOM AIR CONDITION	MCC 1H1-1	OFF NOTE 1	NOTE 2	
2-VS-AC-6 EMERGENCY SWITCHGEAR ROOM AIR CONDITION	MCC 2H1-1	ON	ON	
MOD-VS-200A SAFEGUARDS AREA EXHAUST DAMPER	VITAL BUS 2-I	OPEN	CLOSED NOTE 4	
MOD-VS-200B SAFEGUARDS AREA EXHAUST DAMPER	VITAL BUS 2-II	OPEN	CLOSED NOTE 4	
MOD-VS-201A,B & C CHARGING PUMP CUBICLE EXHAUST DAMPERS	VITAL BUS 2-I	OPEN	OPEN/CLOSED NOTE 3	ONLY DAMPERS ASSOCIATED WITH THE OPERATING CHARGING PUMPS NEED BE OPEN.

NOTES:
(1) NORMALLY ONE AC UNIT FROM EACH AREA IS OPERATING ALONG WITH ASSOCIATED VALVES AND DAMPERS.
(2) EITHER AC UNIT COULD BE OPERATED OR TWO FROM THE UNAFFECTED UNIT MAY BE USED.
(3) DAMPERS NEED BE POSITIONED ONLY WHEN 58A OR B FANS ARE OPERATING.
(4) 58 FANS ARE CAPABLE OF EXHAUSTING SAFEGUARDS AREA AND CHARGING PUMP CUBICLES, THEREFORE, POST-FIRE CONDITION MAY BE OPEN.

TABLE 3-2.K

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

COMPONENT OPERATION MATRIX

UNIT 2

SAFE SHUTDOWN SYSTEM: NEUTRON FLUX MONITORING

COMPONENT NUMBER AND DESCRIPTION	COMPONENT POWER SOURCE	COMPONENT STATUS PRE-FIRE NORMAL POSITION	COMPONENT STATUS POST-FIRE OPERATING POSITION	REMARKS
NFD-290 EXCORE NEUTRON FLUX DETECTOR	VITAL BUS 2-I	N/A	N/A	PROVIDES SOURCE AND WIDE RANGE NEUTRON FLUX INDICATION AT REMOTE MONITORING PANEL
NFD-2270 EXCORE NEUTRON FLUX DETECTOR	VITAL BUS 2-II	N/A	N/A	PROVIDES SOURCE AND WIDE RANGE NEUTRON FLUX INDICATION IN CONTROL ROOM

TABLE 3-3

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS THAT COULD AFFECT HIGH/LOW PRESSURE BOUNDARIES

UNIT 1

POTENTIAL SPURIOUS OPERATION COMPONENT			EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION	SYSTEM			
PCV-1456	PRESSURIZER PORV	RCS	OPENING OF A PRESSURIZER PORV WOULD CAUSE AN UNCONTROLLED DEPRESSURIZATION OF THE RCS AND A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE PORV CAN BE DEENERGIZED. SHUT BLOCK VALVE IF AVAILABLE.	SEE CHAPTER 6, MODIFICATION # I-4 AND CHAPTER 7, EXEMPTION # 20.
MOV-1535	PRESSURIZER BLOCK VALVE				
PCV-1455C	PRESSURIZER PORV	RCS	OPENING OF A PRESSURIZER PORV WOULD CAUSE AN UNCONTROLLED DEPRESSURIZATION OF THE RCS AND A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE PORV CAN BE DEENERGIZED. SHUT BLOCK VALVE IF AVAILABLE.	SEE CHAPTER 6, MODIFICATION # I-4 AND CHAPTER 7, EXEMPTION # 20.
MOV-1536	PRESSURIZER BLOCK VALVE				
MOV-1700	RHR SUCTION ISOLATION	RHR	THE SIMULTANEOUS OPENING OF THIS VALVE AND MOV-1701 WOULD RESULT IN A BREACH OF THE RCS BOUNDARY AND A SUBSEQUENT LOCA.	THE SPURIOUS OPENING OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 8C ON MCC 1H1-2S.	THIS VALVE MAY BE LOCALLY OPERATED TO ALIGN THE RHR SYSTEM FOR OPERATION.
MOV-1701	RHR SUCTION ISOLATION	RHR	THE SIMULTANEOUS OPENING OF THIS VALVE AND MOV-1700 WOULD RESULT IN A BREACH OF THE RCS BOUNDARY AND A SUBSEQUENT LOCA.	THE SPURIOUS OPENING OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 10B ON MCC 1J1-2E.	THIS VALVE MAY BE LOCALLY OPERATED TO ALIGN THE RHR SYSTEM FOR OPERATION.
LCV-1460A AND B HCV-1200A, B AND C	LETDOWN ISOLATION VALVES	CVCS	THE COINCIDENT SPURIOUS OPENING OF AT LEAST THREE OF THESE VALVES WILL CAUSE A DISCHARGE OF REACTOR COOLANT AND DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT LCV-1460A CAN BE DEENERGIZED.	LCV-1460A AND B FAIL SHUT. SEE CHAPTER 6, MODIFICATION # I-5 AND CHAPTER 7, EXEMPTION # 20.

TABLE 3-3

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS THAT COULD AFFECT HIGH/LOW PRESSURE BOUNDARIES

UNIT 1

POTENTIAL SPURIOUS OPERATION COMPONENT			EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION	SYSTEM			
HCV-1557A, B AND C HCV-1201 HCV-1137	EXCESS LETDOWN ISOLATION VALVES	CVCS	THE COINCIDENT SPURIOUS OPENING OF AT LEAST THREE OF THESE VALVES WILL CAUSE A DISCHARGE OF REACTOR COOLANT AND DEPRESSURIZATION.	AN ADDITIONAL ISOLATION SWITCH IN THE EMERGENCY SWITCHGEAR ROOM WILL ENSURE THAT HCV-1137 CAN BE DEENERGIZED.	BOTH VALVES FAIL SHUT. SEE CHAPTER 6, MODIFICATION # I-6 AND CHAPTER 7, EXEMPTION REQUEST # 19.
SOV-RC100A-1 AND SOV-RC100A-2	REACTOR VESSEL HEAD VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC100B-1 AND SOV-RC100B-2	REACTOR VESSEL HEAD VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC101A-1 AND SOV-RC101A-2	PRESSURIZER VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY AND SYSTEM DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC101B-1 AND SOV-RC101B-2	PRESSURIZER VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY AND SYSTEM DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.

TABLE 3-4

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS THAT COULD AFFECT HIGH/LOW PRESSURE BOUNDARIES

UNIT 2

POTENTIAL SPURIOUS OPERATION COMPONENT			EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION	SYSTEM			
PCV-2456	PRESSURIZER PORV	RCS	OPENING OF A PRESSURIZER PORV WOULD CAUSE AN UNCONTROLLED DEPRESSURIZATION OF THE RCS AND A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE PORV CAN BE DEENERGIZED. SHUT BLOCK VALVE IF AVAILABLE.	SEE CHAPTER 6, MODIFICATION # I-4 AND CHAPTER 7, EXEMPTION # 20.
MOV-2535	PRESSURIZER BLOCK VALVE				
PCV-2455C	PRESSURIZER PORV	RCS	OPENING OF A PRESSURIZER PORV WOULD CAUSE AN UNCONTROLLED DEPRESSURIZATION OF THE RCS AND A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE PORV CAN BE DEENERGIZED. SHUT BLOCK VALVE IF AVAILABLE.	SEE CHAPTER 6, MODIFICATION # I-4 AND CHAPTER 7, EXEMPTION # 20.
MOV-2536	PRESSURIZER BLOCK VALVE				
MOV-2700	RHR SUCTION ISOLATION	RHR	THE SIMULTANEOUS OPENING OF THIS VALVE AND MOV-2701 WOULD RESULT IN A BREACH OF THE RCS BOUNDARY AND A SUBSEQUENT LOCA.	THE SPURIOUS OPENING OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 8D ON MCC 2H1-2S.	THIS VALVE MAY BE LOCALLY OPERATED TO ALIGN THE RHR SYSTEM FOR OPERATION.
MOV-2701	RHR SUCTION ISOLATION	RHR	THE SIMULTANEOUS OPENING OF THIS VALVE AND MOV-2700 WOULD RESULT IN A BREACH OF THE RCS BOUNDARY AND A SUBSEQUENT LOCA.	THE SPURIOUS OPENING OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 10A ON MCC 2J1-2E.	THIS VALVE MAY BE LOCALLY OPERATED TO ALIGN THE RHR SYSTEM FOR OPERATION.
LCV-2460A AND B HCV-2200A, B AND C	LETDOWN ISOLATION VALVES	CVCS	THE COINCIDENT SPURIOUS OPENING OF AT LEAST THREE OF THESE VALVES WILL CAUSE A DISCHARGE OF REACTOR COOLANT AND DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT LCV-2460A CAN BE DEENERGIZED.	LCV-2460A AND B FAIL SHUT. SEE CHAPTER 6, MODIFICATION # I-5 AND CHAPTER 7, EXEMPTION # 20.

TABLE 3-4

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS THAT COULD AFFECT HIGH/LOW PRESSURE BOUNDARIES

UNIT 2

POTENTIAL SPURIOUS OPERATION COMPONENT			EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION	SYSTEM			
HCV-2557A, B AND C HCV-2201 HCV-2137	EXCESS LETDOWN ISOLATION VALVES	CVCS	THE COINCIDENT SPURIOUS OPENING OF AT LEAST THREE OF THESE VALVES WILL CAUSE A DISCHARGE OF REACTOR COOLANT AND DEPRESSURIZATION.	AN ADDITIONAL ISOLATION SWITCH IN THE EMERGENCY SWITCHGEAR ROOM WILL ENSURE THAT HCV-2137 CAN BE DEENERGIZED.	BOTH VALVES FAIL SHUT. SEE CHAPTER 6, MODIFICATION # I-6 AND CHAPTER 7, EXEMPTION REQUEST # 19.
SOV-RC200A-1 AND SOV-RC200A-2	REACTOR VESSEL HEAD VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC200B-1 AND SOV-RC200B-2	REACTOR VESSEL HEAD VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC201A-1 AND SOV-RC201A-2	PRESSURIZER VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY AND SYSTEM DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT THE SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.
SOV-RC201B-1 AND SOV-RC201B-2	PRESSURIZER VENTS	RCS	SIMULTANEOUS OPENING OF THESE TWO VALVES WILL CAUSE A LOSS OF RCS INVENTORY AND SYSTEM DEPRESSURIZATION.	ISOLATION SWITCHES IN THE CONTROL ROOM AND THE EMERGENCY SWITCHGEAR ROOM ENSURE THAT SOVs CAN BE DEENERGIZED.	SEE CHAPTER 6, MODIFICATION # I-7 AND CHAPTER 7, EXEMPTION REQUEST # 20.

TABLE 3-5.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: REACTOR COOLANT SYSTEM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-1590	LOOP 1 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 1.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 9C ON MCC 1H1-2S.	DONE BY PROCEDURE OP-1
MOV-1591	LOOP 1 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 1.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 9B ON MCC 1H1-2S.	DONE BY PROCEDURE OP-1
MOV-1592	LOOP 2 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 2.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 5C ON MCC 1H1-2W.	DONE BY PROCEDURE OP-1
MOV-1593	LOOP 2 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 2.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 6C ON MCC 1H1-2W.	DONE BY PROCEDURE OP-1
MOV-1594	LOOP 3 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 3.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 11C ON MCC 1H1-2S.	DONE BY PROCEDURE OP-1
MOV-1595	LOOP 3 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 3.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 11B ON MCC 1H1-2S.	DONE BY PROCEDURE OP-1

TABLE 3-5.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
LCV-1115B AND D	CHARGING PUMP SUCTION ISO-LATION TO RWST	CLOSURE OF BOTH VALVES WILL ISOLATE THE RWST FROM THE CHARGING PUMP SUCTION	UTILIZE THE VCT (IF AVAILABLE) UNTIL ONE OF THE VALVES CAN BE LOCALLY OPENED OR USE THE CHARG-ING PUMP CROSS-CONNECT	
MOV-1267A MOV-1269A MOV-1270A	CHARGING PUMP SUCTION	CLOSURE OF EACH VALVE WOULD PREVENT CHARGING VIA THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND THE CONROL ROOM
MOV-1286A, B AND C	CHARGING PUMP DISCHARGE	CLOSURE OF EACH VALVE WOULD PREVENT CHARGING VIA THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND THE CONROL ROOM
MOV-1275A, B AND C	CHARGING PUMP RECIRCULATION FLOW	CLOSURE OF EACH VALVE WOULD TERMINATE RECIRCULATION FLOW FOR THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND THE CONROL ROOM

TABLE 3-5.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-1373	CHARGING PUMP RECIRCULATION FLOW HEADER	CLOSURE OF THIS VALVE WILL ISOLATE RECIRCULATION FLOW FOR ALL UNIT 1 CHARGING PUMPS	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND THE CONROL ROOM
MOV-1289 A AND B	CHARGING PUMP DISCHARGE HEADER MOV	CLOSURE OF EITHER VALVE WILL PREVENT CHARGING THROUGH THE NORMAL PATH	LOCALLY OPEN VALVE(S) OR USE RCP SEAL INJECTION CHARGING PATH	
HCV-1310A	CHARGING ISO-LATION VALVE TO LOOP 2 COLD LEG	CLOSURE WILL PREVENT CHARG-ING THROUGH THE NORMAL PATH	LOCALLY OPEN BYPASS VALVE OR USE THE RCP SEAL INJECTION CHARGING PATH	VALVE FAILS OPEN
FCV-1122	CHARGING FLOW CONTROL VALVE	CLOSURE WILL PREVENT CHARG-ING THROUGH THE NORMAL PATH	LOCALLY OPEN BYPASS VALVE OR USE THE RCP SEAL INJECTION CHARGING PATH	VALVE FAILS OPEN
MOV-1370	SEAL WATER SUPPLY ISO-LATION VALVE	CLOSURE WILL PREVENT CHARG-ING THROUGH THE RCP SEALS	DEENERGIZED AND LOCALLY OPEN VALVE	CLOSURE OF THIS VALVE WILL ISOLATE RCP SEAL WATER INJECTION. VALVE CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
HCV-1186	SEAL WATER FLOW CONTROL VALVE	CLOSURE WILL PREVENT CHARG-ING THROUGH THE RCP SEALS	LOCALLY OPEN VALVE BY VENTING AIR FROM THE OPERATOR	VALVE FAILS OPEN

TABLE 3-5.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
LCV-1115E	CHARGING PUMP SUCTION FROM VCT	OPENING OF THIS VALVE WHILE USING THE RWST COULD AFFECT CHARGING PUMP OPERATION	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	
1-CH-P-1A 1-CH-P-1B 1-CH-P-1C	CHARGING PUMPS	ONE CHARGING PUMP PER UNIT IS REQUIRED FOR SAFE SHUT-DOWN. INCORRECT NUMBER OF PUMPS OPERATING WOULD AFFECT SAFE SHUTDOWN	DE-ENERGIZE ANY ADDITIONAL PUMPS OPERATING. START ANY PUMPS REQUIRED OR UTILIZE THE CHARGING PUMP CROSS-CONNECT	
MOV-1867 C AND D	SAFETY INJECTION TO RCS	SPURIOUS OPENING OF EITHER VALVE WILL ALIGN A CHARGING FLOW PATH INTO THE RCS. THIS COULD CAUSE AN EXCESSIVE CHARGING RATE	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	THESE VALVES ALL OPEN ON SIS. VALVES WILL SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-1869 A AND B	HOT LEG IN-JECTION ISO-LATION VALVES	OPENING OF EITHER VALVE WILL CAUSE CHARGING PUMP INJECTION INTO THE RCS	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	LOCKED CLOSED
MOV-1842	COLD LEG IN-JECTION ISO-LATION VALVES	OPENING WILL CAUSE CHARGING PUMP INJECTION INTO THE RCS	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	BREAKERS OPEN

TABLE 3-5.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
1-CS-P-1 A AND B	CONTAINMENT SPRAY PUMPS	SPURIOUS STARTING OF CONTAINMENT SPRAY PUMPS DOES NOT SIGNIFICANTLY DEPLETE RWST INVENTORY DUE TO MINIMUM TECHNICAL SPECIFICATION VOLUME	VERIFY POSITION AND DE-ENERGIZE AS REQUIRED	
TV-SI102 A, B	RWST CROSS-CONNECT	CLOSING OF VALVE WILL CAUSE LOSS OF CHARGING	DE-ENERGIZE TO FAIL OPEN	ONLY CONCERNED IF CROSS-CONNECT IS NEEDED
MOV-1287A, B AND C	CHARGING PUMP DISCHARGE TO RECIRCULATION	OPENING OF VALVES WILL DECREASE CHARGING PUMP DISCHARGE FLOW RATE	VERIFY VALVES CLOSED AND SHUT LOCALLY IF REQUIRED. SHUT FCV-1160 OR HCV-1556A, B, OR C IF REQUIRED.	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
HCV-1311	AUXILIARY SPRAY VALVE	SPURIOUS OPENING OF THIS VALVE WOULD CAUSE A RAPID PRESSURE REDUCTION IN THE RCS	SPURIOUS OPENING WILL BE PREVENTED/TERMINATED BY OPENING BREAKER # 3 ON DC PNL 1-1.	VALVE FAILS CLOSED
MOV-CS102A,B	REFUELING WATER CHEM ADD TANK DISCHARGE	SPURIOUS OPENING OF EITHER VALVE COULD RESULT IN ADDITION OF CAUSTIC TO CONTAINMENT SPRAY	VERIFY VALVES CLOSED WHEN CONTAINMENT SPRAY IS USED	CONTAINMENT SPRAY ONLY USED FOR FIRE IN CONTAINMENT. SPURIOUS OPERATION NOT A CONCERN FOR CONTAINMENT FIRE. MOV-CS103A,B,C OR D MUST ALSO OPEN.

TABLE 3-5.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: MAIN STEAM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
PCV-MS102 A AND B	TDAFW PUMP STEAM ADMISSION VALVE	SPURIOUS OPENING OF EITHER VALVE WILL START THE TDAFW PUMP. SPURIOUS CLOSING OF BOTH VALVES WILL PREVENT TDAFW PUMP OPERATION	THE VALVES CAN BE DE-ENERGIZED TO PROVIDE STEAM TO THE PUMP TURBINE. IF THE PUMP SPURIOUSLY STARTS WHEN NOT NEEDED THEN ISOLATE THE PUMP DISCHARGE TO PREVENT FLOW TO THE STEAM GENERATORS	VALVES FAIL OPEN
TV-BD100 A, B, C, D, E AND F	STEAM GENERATOR BLOWDOWN VALVES	THE SIMULTANEOUS OPENING OF TWO VALVES IN SERIES WOULD CAUSE A LOSS OF STEAM GENERATOR INVENTORY	DEENERGIZE VALVES TO FAIL SHUT	VALVES FAIL CLOSED
HCV-MS104	DECAY HEAT RELEASE VALVE	OPENING WOULD CAUSE A LOSS OF SG INVENTORY AND RCS COOLDOWN	SPURIOUS OPENING WILL BE PREVENTED BY DEENERGIZING CIRCUIT NO. 6 ON 1SVB 1	
TCV-MS105A,B TCV-MS106A,B TCV-MS107A,B TCV-MS108A,B PCV-AS100 FCV-MS104 A, B, C, D TV-1, 2, 3, 4	STEAM TO CONDENSER, AUXILIARY STEAM SYSTEM, MOISTURE SEPARATOR REHEATERS, AND TURBINE	SPURIOUS OPENING OF VALVES WOULD CAUSE LOSS OF SG INVENTORY	DEENERGIZE VALVES TO FAIL CLOSE	ONLY CONCERNED IF MAIN STEAM TRIP VALVES CANNOT BE CLOSED
RV-MS101A, B AND C	STEAM GENERATOR PORVS	OPENING WOULD CAUSE AN EXCESSIVE LOSS OF SG INVENTORY AND A RAPID RCS COOLDOWN	ISOLATION SWITCHES IN THE EMERGENCY SWITCHGEAR ROOM AND THE CABLE VAULT/TUNNEL ENSURE THAT THE STEAM GENERATOR PORVS CAN BE DEENERGIZED	SEE CHAPTER 6, MODIFICATION I-8 AND CHAPTER 7, EXEMPTION #19

TABLE 3-5.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: MAIN STEAM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
TV-MS101A, B AND C	MAIN STEAM TRIP VALVES	OPENING OF VALVES COULD CAUSE A RAPID DEPRESSURIZATION OF THE STEAM GENERATORS	SPURIOUS OPERATION IS PREVENTED BY THE VALVE DESIGN WITH A DELTA/P GREATER THAN 4 PSID	AN ADDITIONAL SOV WITH SEPARATE ROUTING AND POWER SOURCE FOR ISOLATION PURPOSES HAS BEEN INSTALLED PER CHAPTER 6, MODIFICATION I-9. IN ADDITION, DOWNSTREAM VALVES CAN BE SHUT TO PRECLUDE ANY SPURIOUS OPERATIONS.

TABLE 3-5.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: AUXILIARY FEED WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-FW151 A, B, C, D, E, F	AFW MOV HEADER	SPURIOUS CLOSURE OF ONE VALVE WILL NOT ISOLATE THE RESPECTIVE STEAM GENERATOR FROM THE AFW MOV HEADER	NONE REQUIRED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND ESGR.
1-FW-P-3A AND 3B	MOTOR DRIVEN AUXILIARY FEED WATER PUMP(S)	SPURIOUS STARTING OR STOPPING MAY AFFECT THE CONTROL OF STEAM GENERATOR LEVEL	IF MOTOR DRIVEN PUMP OPERATION IS NOT REQUIRED THEN OPEN THE RESPECTIVE PUMPS POWER SUPPLY BREAKER AND USE THE TDAFW PUMP	
MOV-FW260 A, B	AFW CROSS-CONNECT	SPURIOUS OPENING CAUSES AFW TO CROSS-CONNECT WHICH MIGHT AFFECT MAKE-UP	VERIFY VALVE POSITION AND LOCALLY CLOSE IF REQUIRED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM

TABLE 3-5.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: RESIDUAL HEAT REMOVAL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
FCV-1605	HEAT EXCHANGER BYPASS VALVE	SPURIOUS OPERATION WOULD AFFECT RHR FLOW AND RCS COOLDOWN RATES	DEENERGIZE VALVE TO FAIL CLOSE IF AFFECTED BY SPURIOUS OPERATION	ONLY REQUIRED DURING RHR SYSTEM OPERATION
HCV-1758	HEAT EXCHANGER OUTLET VALVE	SPURIOUS OPERATION WOULD AFFECT RHR FLOW AND RCS COOLDOWN RATES	DEENERGIZE VALVE TO FAIL OPEN IF AFFECTED BY SPURIOUS OPERATION	ONLY REQUIRED DURING RHR SYSTEM OPERATION
1-RH-P-1A 1-RH-P-1B	RHR PUMPS	NO EFFECT ON SAFE SHUTDOWN	A TRANSFER SWITCH IN THE EMERGENCY SWITCHGEAR ROOM ENSURES CONTROL OF THE PUMPS AT ALL TIMES	SEE CHAPTER 6, MODIFICATION I-13
MOV-1720A, B	RHR DISCHARGE ISOLATION	OPENING THIS VALVE MAY OVERPRESSURIZE THE RHR SYSTEM	SPURIOUS OPENING OF THESE VALVES IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKERS 1C ON MCC 1H1-2S AND 10A ON MCC 1J1-2E	BREAKERS KEPT OPEN BY PROCEDURE OP-1; IN-LINE CHECK VALVES EXIST

TABLE 3-5.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: COMPONENT COOLING WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
1-CC-P-1 A AND B	COMPONENT COOLING WATER PUMPS	ONE PUMP PER UNIT IS REQUIRED FOR SAFE SHUTDOWN	START ANY OTHER PUMP IF AVAILABLE. A TRANSFER SWITCH IN THE EMERGENCY SWITCHGEAR ROOM ENSURES CONTROL OF PUMPS AT ALL TIMES.	A COLD SHUTDOWN REPAIR WILL BE PERFORMED IF FIRE DAMAGE OCCURS - SEE CHAPTER 6, MODIFICATION I-13
TV-CC109 A AND B	CCW FROM RHR HEAT EXCHANGER	CLOSURE OF BOTH VALVES WILL CAUSE A LOSS OF COOLING TO THE RHR HEAT EXCHANGERS	VERIFY VALVE POSITION AND LOCALLY OPEN IF REQUIRED	VALVES WILL BE LOCALLY OPENED USING AIR BOTTLE AND JUMPER

TABLE 3-5.G

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CHARGING PUMP COOLING WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
1-SW-P-10A,B 1-CC-P-2A,B	CHARGING PUMP COOLING AND SERVICE WATER PUMPS	SPURIOUS STOPPING OF THESE PUMPS WOULD CAUSE LOSS OF COOLING TO CHARGING PUMPS	START STANDBY PUMP TO VERIFY ONE PUMP OF THE PAIR IS OPERATING	CHARGING SYSTEM MAY HAVE TO BE CROSS-CONNECTED IF ONE OF EACH PAIR CANNOT BE OPERATED

TABLE 3-5.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: CIRCULATING AND SERVICE WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-SW102A MOV-SW102B	SERVICE WATER SUPPLY TO COMPONENT COOLING WATER HEAT EXCHANGER	CLOSURE OF ONE VALVE WILL ISOLATE SERVICE WATER TO ITS RESPECTIVE HEAT EX-CHANGER	MANUALLY OPEN OR ALIGN HEAT EXCHANGER TO REDUNDANT HEADER	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-SW103A, B, C AND D	SERVICE WATER TO RECIRCU-LATION SPRAY HX	SPURIOUS OPENING OF ONE VALVE WILL REDUCE FLOW TO OTHER SW LOADS	VERIFY VALVE POSITION AND DE-ENERGIZE TO CLOSED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-SW101A MOV-SW101B	SERVICE WATER TO BEARING COOLING WATER HX	SPURIOUS OPENING OF ONE VALVE WILL REDUCE FLOW TO OTHER SW LOADS	CLOSE AND DE-ENERGIZE BOTH VALVES	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-CW100 A, B, C, D MOV-CW106 A, B, C, D	CONDENSER INLET AND OUTLET VALVES	OPENING OF INLET OR OUTLET VALVES WOULD REDUCE FLOW TO THE CCW HX	VERIFY VALVE POSITION AND DE-ENERGIZE TO CLOSED	ONE VALVE IN EACH PAIR MUST BE SHUT TO ISOLATE FLOW THROUGH THE CONDENSER. VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM

TABLE 3-5.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: VENTILATION

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
AOD-VS-101A AND B	FUEL BLDG EXHAUST	SPURIOUS OPENING OF THESE DAMPERS WOULD DECREASE VENTILATION FLOW FOR THE CHARGING PUMP CUBICLES	CLOSE DAMPERS AND DEENERGIZE BY OPENING BREAKERS 19 ON VB1-I AND 33 ON VB1-II, ISOLATE AIR SUPPLY AND VENT AIR FROM OPERATORS IF INSTRUMENT AIR AVAILABLE.	FAILS CLOSED
AOD-VS-103A AND B	DECONTAMINATION BLDG EXHAUST	SPURIOUS OPENING OF THESE DAMPERS WOULD DECREASE VENTILATION FLOW FOR THE CHARGING PUMP CUBICLES	CLOSE DAMPERS AND DEENERGIZE BY OPENING BREAKERS 23 ON VB1-I AND 24 ON VB1-IV	FAILS CLOSED
AOD-VS-107A AND B	CHARGING PUMP CUBICLE EXHAUST TO FANS F-58A OR B	SPURIOUS CLOSING OF THESE DAMPERS WOULD ISOLATE VENTILATION FOR THE CHARGING PUMP CUBICLES	OPEN DAMPER AND DEENERGIZE BY OPENING BREAKERS 19 ON VB1-I AND 33 ON VB1-II, ISOLATE AIR SUPPLY AND VENT AIR FROM OPERATORS IF INSTRUMENT AIR AVAILABLE.	NOT REQUIRED IF OPERATING FANS F-9A OR B
AOD-VS-108	CHARGING PUMP CUBICLE EXHAUST TO FANS F-9A AND B	SPURIOUS CLOSING OF THESE DAMPERS WOULD ISOLATE VENTILATION FOR THE CHARGING PUMP CUBICLES	OPEN DAMPER USING HANDWHEEL. DEENERGIZE BY OPENING BREAKER 19 ON VB1-I AND 33 ON VB1-II, ISOLATE AIR SUPPLY AND VENT AIR FROM OPERATORS IF INSTRUMENT AIR AVAILABLE.	NOT REQUIRED IF OPERATING FANS F-58A OR B

TABLE 3-5.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 1

SYSTEM: VENTILATION

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOD-VS-101A B AND C	APPLICABLE CHARGING PUMP DAMPER	SPURIOUS CLOSING OF THE ASSOCIATED DAMPER WOULD ISOLATE VENTILATION TO THE CHARGING PUMP CUBICLE	VERIFY MOD ASSOCIATED WITH OPERATING CHARGING PUMP IS OPEN. OPEN LOCALLY IF REQUIRED.	

TABLE 3-6.A

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: REACTOR COOLANT SYSTEM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-2590	LOOP 1 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 1.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 9C ON MCC 2H1-2S.	DONE BY PROCEDURE OP-1
MOV-2591	LOOP 1 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 1.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 9B ON MCC 2H1-2S.	DONE BY PROCEDURE OP-1
MOV-2592	LOOP 2 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 2.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 5C ON MCC 2J1-2W.	DONE BY PROCEDURE OP-1
MOV-2593	LOOP 2 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 2.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 6C ON MCC 2J1-2W.	DONE BY PROCEDURE OP-1
MOV-2594	LOOP 3 INLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 3.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 11C ON MCC 2H1-2S.	DONE BY PROCEDURE OP-1
MOV-2595	LOOP 3 OUTLET ISOLATION	CLOSURE OF THIS VALVE WOULD PREVENT THE REMOVAL OF DECAY HEAT VIA LOOP 3.	THE SPURIOUS CLOSURE OF THIS VALVE IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKER 11B ON MCC 2H1-2S.	DONE BY PROCEDURE OP-1

TABLE 3-6.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
LCV-2115B AND D	CHARGING PUMP SUCTION ISOLATION TO RWST	CLOSURE OF BOTH VALVES WILL ISOLATE THE RWST FROM THE CHARGING PUMP SUCTION	UTILIZE THE VCT (IF AVAILABLE) UNTIL ONE OF THE VALVES CAN BE LOCALLY OPENED OR USE THE CHARGING PUMP CROSS-CONNECT	
MOV-2267A MOV-2269A MOV-2270A	CHARGING PUMP SUCTION	CLOSURE OF EACH VALVE WOULD PREVENT CHARGING VIA THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
MOV-2286A, B AND C	CHARGING PUMP DISCHARGE	CLOSURE OF EACH VALVE WOULD PREVENT CHARGING VIA THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM

TABLE 3-6.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-2275A, B AND C	CHARGING PUMP RECIRCULATION FLOW	CLOSURE OF EACH VALVE WOULD TERMINATE RECIRCULATION FLOW FOR THE ASSOCIATED PUMP	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
MOV-2373	CHARGING PUMP RECIRCULATION FLOW HEADER	CLOSURE OF THIS VALVE WILL ISOLATE RECIRCULATION FLOW FOR ALL UNIT 2 CHARGING PUMPS	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
MOV-2289 A AND B	CHARGING PUMP DISCHARGE HEADER MOV	CLOSURE OF EITHER VALVE WILL PREVENT CHARGING THROUGH THE NORMAL PATH	LOCALLY OPEN VALVE(S) OR USE RCP SEAL INJECTION CHARGING PATH	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
HCV-2310A	CHARGING ISOLATION VALVE TO LOOP 2 COLD LEG	CLOSURE WILL PREVENT CHARGING THROUGH THE NORMAL PATH	LOCALLY OPEN BYPASS VALVE OR USE THE RCP SEAL INJECTION CHARGING PATH	VALVE FAILS OPEN
FCV-2122	CHARGING FLOW CONTROL VALVE	CLOSURE WILL PREVENT CHARGING THROUGH THE NORMAL PATH	LOCALLY OPEN BYPASS VALVE OR USE THE RCP SEAL INJECTION CHARGING PATH	VALVE FAILS OPEN
MOV-2370	SEAL WATER SUPPLY ISOLATION VALVE	CLOSURE WILL PREVENT CHARGING THROUGH THE RCP SEALS	DEENERGIZED AND LOCALLY OPEN VALVE	CLOSURE OF THIS VALVE WILL ISOLATE RCP SEAL WATER INJECTION. VALVE CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN CV/T AND CONTROL ROOM

TABLE 3-6.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
HCV-2186	SEAL WATER FLOW CONTROL VALVE	CLOSURE WILL PREVENT CHARGING THROUGH THE RCP SEALS	LOCALLY OPEN VALVE BY VENTING AIR FROM THE OPERATOR	VALVE FAILS OPEN
LCV-2115E	CHARGING PUMP SUCTION FROM VCT	OPENING OF THIS VALVE WHILE USING THE RWST COULD AFFECT CHARGING PUMP OPERATION	A VALVE LINE-UP VERIFICATION WILL BE PERFORMED PRIOR TO CHARGING PUMP OPERATION	
2-CH-P-1A 2-CH-P-1B 2-CH-P-1C	CHARGING PUMPS	ONE CHARGING PUMP PER UNIT IS REQUIRED FOR SAFE SHUTDOWN. INCORRECT NUMBER OF PUMPS OPERATING WOULD AFFECT SAFE SHUTDOWN	DE-ENERGIZE ANY ADDITIONAL PUMPS OPERATING. START ANY PUMPS REQUIRED OR UTILIZE THE CHARGING PUMP CROSS-CONNECT	
MOV-2867 C AND D	SAFETY INJECTION TO RCS	SPURIOUS OPENING OF EITHER VALVE WILL ALIGN A CHARGING FLOW PATH INTO THE RCS. THIS COULD CAUSE AN EXCESSIVE CHARGING RATE	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	THESE VALVES ALL OPEN ON SIS; VALVES CAN SPURIOUSLY OPERATE FOR FIRES IN CV/T AND CONTROL ROOM
MOV-2869 A AND B	HOT LEG INJECTION ISOLATION VALVES	OPENING OF EITHER VALVE WILL CAUSE CHARGING PUMP INJECTION INTO THE RCS	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	LOCKED CLOSED
MOV-2842	COLD LEG INJECTION ISOLATION VALVES	OPENING WILL CAUSE CHARGING PUMP INJECTION INTO THE RCS	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	BREAKERS OPEN

TABLE 3-6.B

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CHEMICAL AND VOLUME CONTROL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
2-CS-P-1 A AND B	CONTAINMENT SPRAY PUMPS	SPURIOUS STARTING OF CONTAINMENT SPRAY PUMPS DOES NOT SIGNIFICANTLY DEPLETE RWST INVENTORY DUE TO MINIMUM TECHNICAL SPECIFICATION VOLUME	VERIFY POSITION AND DE-ENERGIZE AS REQUIRED	
TV-SI202 A, B	RWST CROSS-CONNECT	CLOSING OF VALVE WILL CAUSE LOSS OF CHARGING	DE-ENERGIZE TO FAIL OPEN	ONLY CONCERNED IF CROSS-CONNECT IS NEEDED
MOV-2287A, B AND C	CHARGING PUMP DISCHARGE TO RECIRCULATION	OPENING OF VALVES WILL DECREASE CHARGING PUMP DISCHARGE FLOW RATE	VERIFY VALVES CLOSED AND SHUT LOCALLY IF REQUIRED. SHUT FCV-2160 OR HCV-2556A, B, OR C IF REQUIRED.	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM
HCV-2311	AUXILIARY SPRAY VALVE	SPURIOUS OPENING OF THIS VALVE WOULD CAUSE A RAPID PRESSURE REDUCTION IN THE RCS	SPURIOUS OPENING WILL BE PREVENTED/TERMINATED BY OPENING BREAKER # 3 ON DC PNL 2-1.	VALVE FAILS CLOSED
MOV-CS202A,B	REFUELING WATER CHEM ADD TANK DISCHARGE	SPURIOUS OPENING OF EITHER VALVE COULD RESULT IN ADDITION OF CAUSTIC TO CONTAINMENT SPRAY	VERIFY VALVES CLOSED WHEN CONTAINMENT SPRAY IS USED	CONTAINMENT SPRAY ONLY USED FOR FIRE IN CONTAINMENT. SPURIOUS OPERATION NOT A CONCERN FOR CONTAINMENT FIRE. MOV-CS203A,B,C OR D MUST ALSO OPEN.

TABLE 3-6.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: MAIN STEAM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
PCV-MS202 A AND B	TDAFW PUMP STEAM ADMISSION VALVE	SPURIOUS OPENING OF EITHER VALVE WILL START THE TDAFW PUMP. SPURIOUS CLOSING OF BOTH VALVES WILL PREVENT TDAFW PUMP OPERATION	THE VALVES CAN BE DE-ENERGIZED TO PROVIDE STEAM TO THE PUMP TURBINE. IF THE PUMP SPURIOUSLY STARTS WHEN NOT NEEDED THEN ISOLATE THE PUMP DISCHARGE TO PREVENT FLOW TO THE STEAM GENERATORS	VALVES FAIL OPEN
TV-BD200 A, B, C, D, E AND F	STEAM GENERATOR BLOWDOWN VALVES	THE SIMULTANEOUS OPENING OF TWO VALVES IN SERIES WOULD CAUSE A LOSS OF STEAM GENERATOR INVENTORY	DEENERGIZE VALVES TO FAIL SHUT	VALVES FAIL CLOSED

TABLE 3-6.C

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: MAIN STEAM

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
HCV-MS204	DECAY HEAT RELEASE VALVE	OPENING WOULD CAUSE A LOSS OF SG INVENTORY AND RCS COOLDOWN	SPURIOUS OPENING WILL BE PREVENTED BY DEENERGIZING CIRCUIT NO. 6 ON 2SVB 1	
TCV-MS205A,B TCV-MS206A,B TCV-MS207A,B TCV-MS208A,B PCV-AS200 FCV-MS204 A, B, C, D TV-1, 2, 3, 4	STEAM TO CONDENSER, AUXILIARY STEAM SYSTEM, MOISTURE SEPARATOR REHEATERS, AND TURBINE	SPURIOUS OPENING OF VALVES WOULD CAUSE LOSS OF SG INVENTORY	DEENERGIZE VALVES TO FAIL CLOSE	ONLY CONCERNED IF MAIN STEAM TRIP VALVES CANNOT BE CLOSED
RV-MS201A, B AND C	STEAM GENERATOR PORVS	OPENING WOULD CAUSE AN EXCESSIVE LOSS OF SG INVENTORY AND A RAPID RCS COOLDOWN	ISOLATION SWITCHES IN THE EMERGENCY SWITCHGEAR ROOM AND THE CABLE VAULT/TUNNEL ENSURE THAT THE STEAM GENERATOR PORVS CAN BE DEENERGIZED	SEE CHAPTER 6, MODIFICATION I-8 AND CHAPTER 7, EXEMPTION #19
TV-MS201A, B AND C	MAIN STEAM TRIP VALVES	OPENING OF VALVES COULD CAUSE A RAPID DEPRESSURIZATION OF THE STEAM GENERATORS	SPURIOUS OPERATION IS PREVENTED BY THE VALVE DESIGN WITH A DELTA/P GREATER THAN 4 PSID	AN ADDITIONAL SOV WITH SEPARATE ROUTING AND POWER SOURCE FOR ISOLATION PURPOSES HAS BEEN INSTALLED PER CHAPTER 6, MODIFICATION I-9. IN ADDITION, DOWNSTREAM VALVES CAN BE SHUT TO PRECLUDE SPURIOUS OPERATION.

TABLE 3-6.D

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: AUXILIARY FEED WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-FW251 A, B, C, D, E, F	AFW MOV HEADER	SPURIOUS CLOSURE OF ONE VALVE WILL NOT ISOLATE THE RESPECTIVE STEAM GENERATOR FROM THE AFW MOV HEADER	NONE REQUIRED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T, ESGR, AND CONTROL ROOM
2-FW-P-3A AND 3B	MOTOR DRIVEN AUXILIARY FEED WATER PUMP(S)	SPURIOUS STARTING OR STOPPING MAY AFFECT THE CONTROL OF STEAM GENERATOR LEVEL	IF MOTOR DRIVEN PUMP OPERATION IS NOT REQUIRED THEN OPEN THE RESPECTIVE PUMPS POWER SUPPLY BREAKER AND USE THE TDAFW PUMP	
MOV-FW160 A, B	AFW CROSS-CONNECT	SPURIOUS OPENING CAUSES AFW TO CROSS-CONNECT WHICH MIGHT AFFECT MAKE-UP	VERIFY VALVE POSITION AND LOCALLY CLOSE IF REQUIRED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE CV/T AND CONTROL ROOM

TABLE 3-6.E

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: RESIDUAL HEAT REMOVAL

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
FCV-2605	HEAT EXCHANGER BYPASS VALVE	SPURIOUS OPERATION WOULD AFFECT RHR FLOW AND RCS COOLDOWN RATES	DEENERGIZE VALVE TO FAIL CLOSE IF AFFECTED BY SPURIOUS OPERATION	ONLY REQUIRED DURING RHR SYSTEM OPERATION
HCV-2758	HEAT EXCHANGER OUTLET VALVE	SPURIOUS OPERATION WOULD AFFECT RHR FLOW AND RCS COOLDOWN RATES	DEENERGIZE VALVE TO FAIL OPEN IF AFFECTED BY SPURIOUS OPERATION	ONLY REQUIRED DURING RHR SYSTEM OPERATION
2-RH-P-1A 2-RH-P-1B	RHR PUMPS	NO EFFECT ON SAFE SHUTDOWN	A TRANSFER SWITCH IN THE EMERGENCY SWITCHGEAR ROOM ENSURES CONTROL OF THE PUMPS AT ALL TIMES	SEE CHAPTER 6, MODIFICATION I-13
MOV-2720A, B	RHR DISCHARGE ISOLATION	OPENING THIS VALVE MAY OVERPRESSURIZE THE RHR SYSTEM	SPURIOUS OPENING OF THESE VALVES IS PREVENTED BY THE PRE-FIRE OPENING OF BREAKERS 1C ON MCC 2H1-2S AND 10B ON MCC 2J1-2E	BREAKERS KEPT OPEN BY PROCEDURE OP-1; IN-LINE CHECK VALVES EXIST

TABLE 3-6.F

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: COMPONENT COOLING WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
2-CC-P-1 A AND B	COMPONENT COOLING WATER PUMPS	ONE PUMP PER UNIT IS REQUIRED FOR SAFE SHUTDOWN	START ANY OTHER PUMP IF AVAILABLE-A TRANSFER SWITCH IN THE EMERGENCY SWITCHGEAR ROOM ENSURES CONTROL OF PUMPS AT ALL TIMES.	A COLD SHUTDOWN REPAIR WILL BE PERFORMED IF FIRE DAMAGE OCCURS - SEE CHAPTER 6, MODIFICATION I-13
TV-CC209 A AND B	CCW FROM RHR HEAT EXCHANGER	CLOSURE OF BOTH VALVES WILL CAUSE A LOSS OF COOLING TO THE RHR HEAT EXCHANGERS	VERIFY VALVE POSITION AND LOCALLY OPEN IF REQUIRED	VALVES WILL BE LOCALLY OPENED USING AIR BOTTLE AND JUMPER

TABLE 3-6.G

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CHARGING PUMP COOLING WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
2-SW-P-10A,B 2-CC-P-2A,B	CHARGING PUMP COOLING AND SERVICE WATER PUMPS	SPURIOUS STOPPING OF THESE PUMPS WOULD CAUSE LOSS OF COOLING TO CHARGING PUMPS	START STANDBY PUMP TO VERIFY ONE PUMP OF THE PAIR IS OPERATING	CHARGING SYSTEM MAY HAVE TO BE CROSS-CONNECTED IF ONE OF EACH PAIR CANNOT BE OPERATED

TABLE 3-6.H

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: CIRCULATING AND SERVICE WATER

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOV-SW203A, B, C AND D	SERVICE WATER TO RECIRCU-LATION SPRAY HX	SPURIOUS OPENING OF ONE VALVE WILL REDUCE FLOW TO OTHER SW LOADS	VERIFY VALVE POSITION AND DE-ENERGIZE TO CLOSED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-SW201A MOV-SW201B	SERVICE WATER TO BEARING COOLING WATER HX	SPURIOUS OPENING OF ONE VALVE WILL REDUCE FLOW TO OTHER SW LOADS	CLOSE AND DE-ENERGIZE BOTH VALVES	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-CW200 A, B, C, D MOV-CW206 A, B, C, D	CONDENSER INLET AND OUTLET VALVES	OPENING OF INLET OR OUTLET VALVES WOULD REDUCE FLOW TO THE CCW HX	VERIFY VALVE POSITION AND DE-ENERGIZE TO CLOSED	ONE VALVE IN EACH PAIR MUST BE SHUT TO ISOLATE FLOW THROUGH THE CONDENSER. VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM
MOV-SW202A AND B	CHILLED WATER CONDENSORS ISOLATIONS	SPURIOUS OPENING OF ONE VALVE WILL REDUCE FLOW TO OTHER SW LOADS	VERIFY VALVE POSITION AND CLOSE LOCALLY IF REQUIRED	VALVES CAN ONLY SPURIOUSLY OPERATE FOR FIRES IN THE ESGR AND CONTROL ROOM

TABLE 3-6.J

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

POTENTIAL SPURIOUS OPERATIONS WHICH COULD AFFECT SYSTEM OPERATION

UNIT 2

SYSTEM: VENTILATION

POTENTIAL SPURIOUS OPERATION COMPONENT		EFFECT OF SPURIOUS OPERATION	RESOLUTION	REMARKS
MARK NO.	DESCRIPTION			
MOD-VS-201A B AND C	APPLICABLE CHARGING PUMP DAMPER	SPURIOUS CLOSING OF THE ASSOCIATED DAMPER WOULD ISOLATE VENTILATION TO THE CHARGING PUMP CUBICLE	VERIFY MOD ASSOCIATED WITH OPERATING CHARGING PUMP IS OPEN. OPEN LOCALLY IF REQUIRED.	

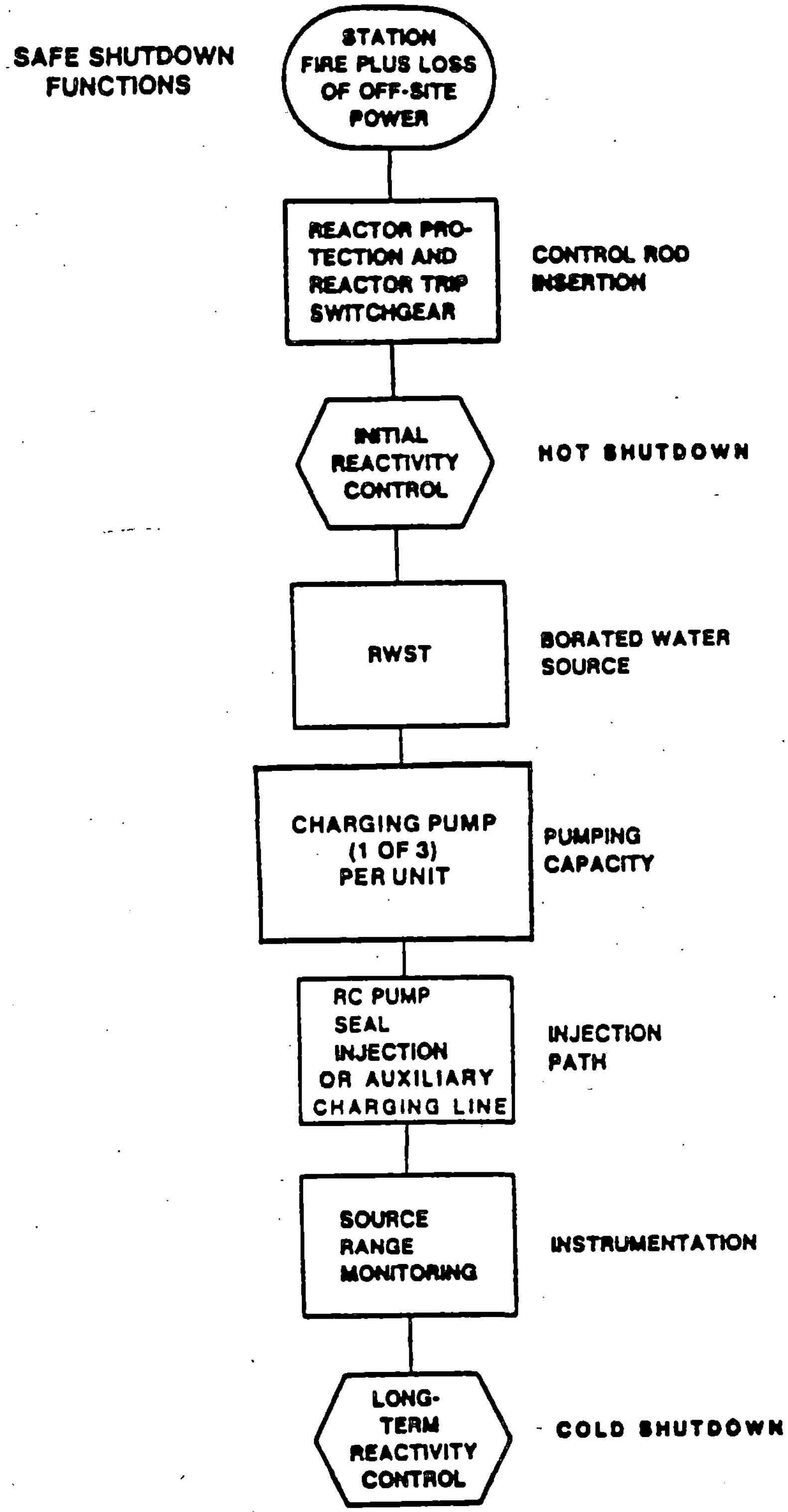


FIGURE 3.1.a

REACTIVITY CONTROL FUNCTION

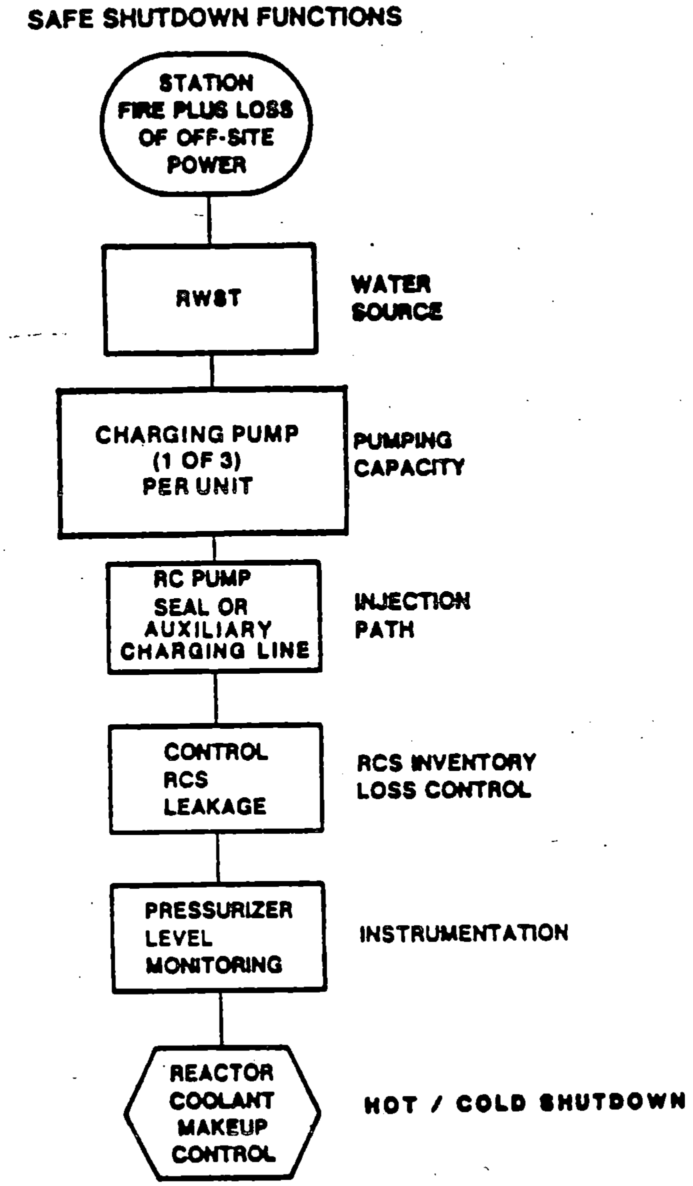


FIGURE 3.1.b

RCS INVENTORY CONTROL FUNCTION

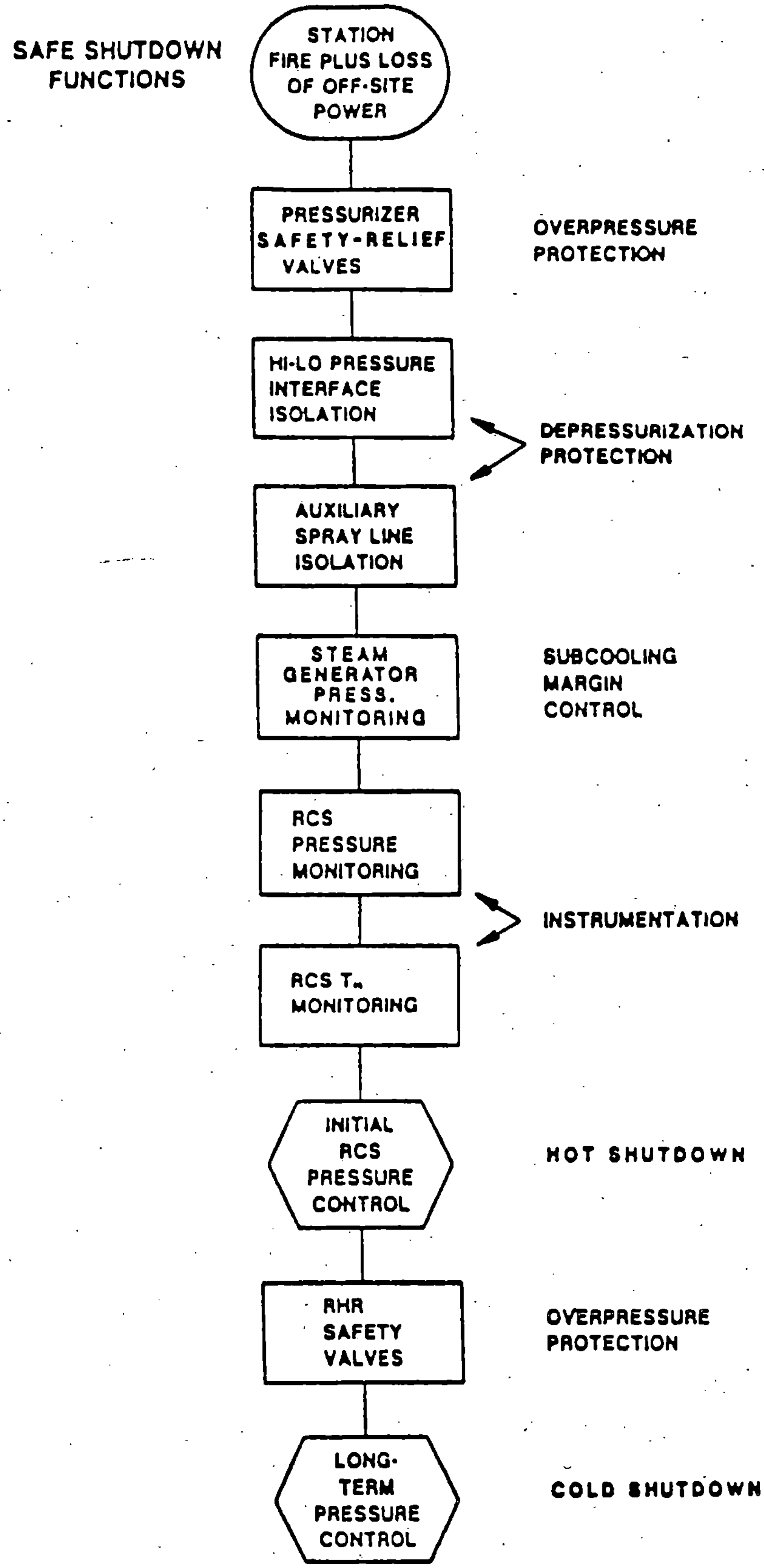


FIGURE 3.1.c

RCS PRESSURE CONTROL FUNCTION

84-0030-2/P095

SAFE SHUTDOWN FUNCTIONS

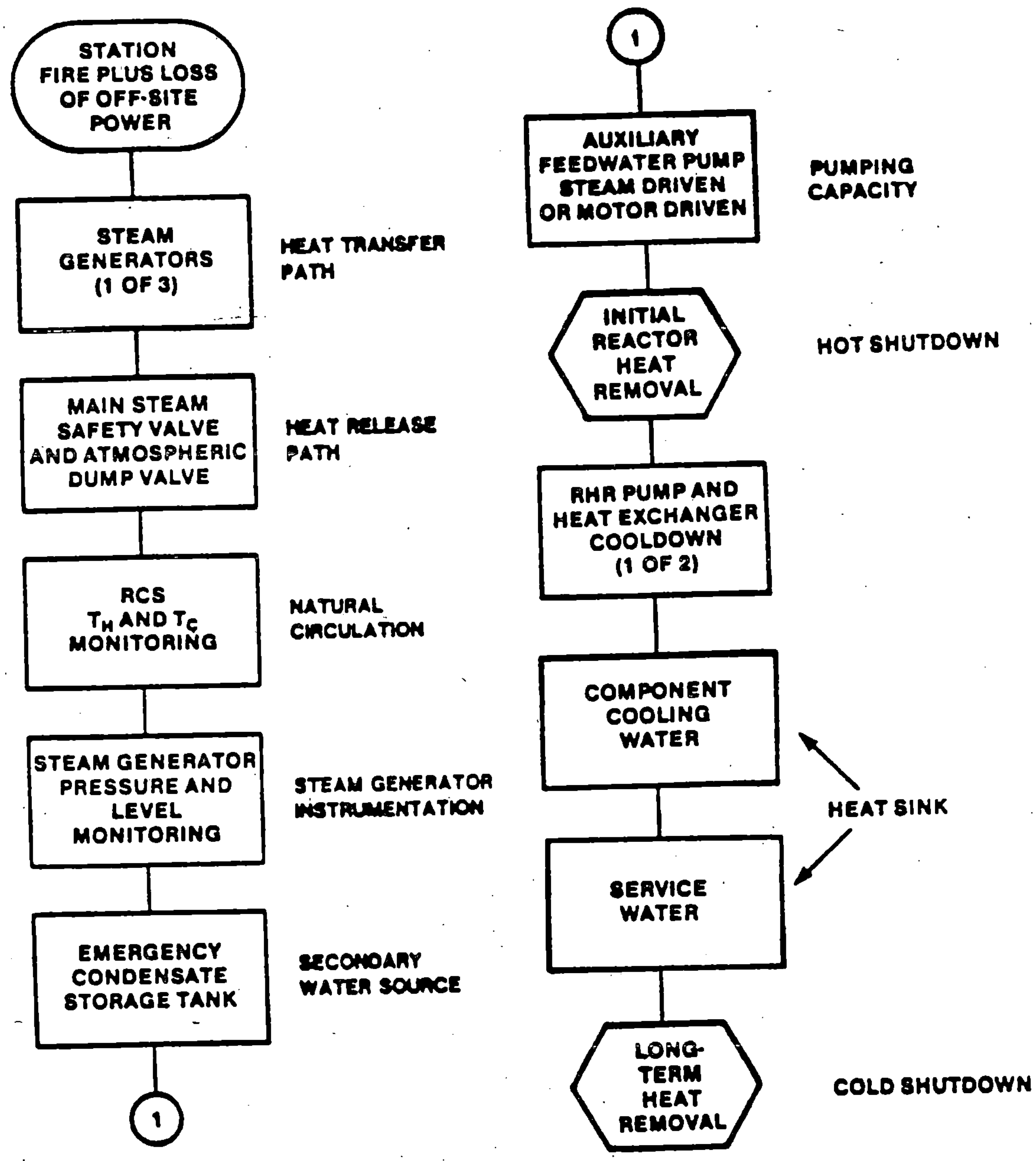


FIGURE 3.1.d

REACTOR HEAT REMOVAL

84-0030-2/P095

4. APPENDIX R SECTION III.G COMPLIANCE SUMMARY

4.1 Objective

This chapter identifies the analysis methodology used to ensure compliance with 10 CFR 50 Appendix R Section III.G. The following compliance methods have been considered in meeting the objectives of Section III.G:

(1) Design basis protective features as specified in Section III.G.2

(2) Alternative shutdown capability per Section III.G.3

(3) Exemptions granted under 10 CFR 50.12

This chapter also describes the general method for meeting the performance goals of the shutdown functions for each fire area requiring alternative shutdown. Chapter 5 presents a detailed description of the alternative shutdown systems, operations, and repairs that are necessary to achieve post-fire safe shutdown.

4.2 Cable Separation Analysis Methodology

The purpose of the cable separation analysis is to determine if there are any fire areas where a fire could cause loss of the redundant means of accomplishing a safe shutdown function. The analysis methodology presented in this section details the steps which were taken to ensure compliance with the requirements of 10 CFR 50 Appendix R Section III.G. Figure 4-1 graphically depicts this methodology.

There are four types of input data required to perform a cable separation analysis. These are: the list of safe shutdown components, the fire area locations and boundaries, the cable and conduit routing information, and the separation criteria.

The list of safe shutdown equipment presented in Table 3-1 contains the equipment which is required to operate to achieve safe shutdown. Specific equipment in Table 3-1 may not require electric motive and/or control power to accomplish its respective performance goal. For this equipment, post-fire repair or manual operation can be utilized in the event of a loss of power or control circuits. Post-fire repairs are only used to achieve cold shutdown. Therefore, a cable separation analysis need only be performed for those safe shutdown components which:

(1) Need to actively operate in a timely manner in order to achieve the required safety function, and

(2) Require electric motive power in order to operate, or

(3) Require electric control power in order to provide remote operation.

The components on the safe shutdown equipment list which require routing based on the above criteria are listed in Table 4-1.

The operation of each safe shutdown component which is required to have a cable separation analysis (i.e., the cables must be traced and routed on drawings) is reviewed. The objective of the review is to identify any equipment or control circuits that are required to support the safety function of the component. For example, a flow control valve must operate in conjunction with a pump in order to accomplish a safety function, then the cables of both components must be analyzed together in order to guarantee fulfillment of the function. Motor heater, annunciator, and computer cables are not included in the cable separation analysis. These devices are connected to the circuit through contact closures derived from instruments, relays, or circuit breakers. Since these cables are not electrically tied to the primary circuit, failure of cables to these devices will not affect the primary circuit operation. Elementary diagrams and electrical one-line diagrams are used to determine circuit designations of components. When the investigation leads back to a power distribution bus or panel, that panel is added to the safe shutdown equipment list. Cable block diagrams were developed to summarize the cable separation analysis.

The cable location of the component under investigation and its redundant component are determined in exactly the same manner. The circuit designation was determined from electrical one-line diagrams and elementary diagrams. This information was used in conjunction with wiring diagrams to identify the individual cable numbers. The cable numbers are used with the cable schedule to identify the routing paths of each cable. The cable schedule gives the origin, destination, and routing of each cable. The cable routing was then traced out on the area conduit plans or separate cable block diagrams to determine the location by fire area of the cables. Color-coded mark-ups of the conduit plans or cable block diagrams were used to show the relative positions of the respective safe shutdown trains. These plans, and in some cases field checks, were then used to evaluate the component routings against the separation requirements of Section III.G. Redundant safe shutdown cables within the same embedded duct bank were reviewed and were found to be adequately separated by concrete barriers internal to the duct banks.

Table 4-1 summarizes the results of the cable separation analysis. Documentation of the detailed separation analysis is available for review at the Surry Power Station. Table 4-1 lists the components of the normal shutdown systems and the alternate shutdown systems, and the fire areas in which the equipment, power and control cables are located. The fire areas that are not listed in Table 4-1 do not contain any safe shutdown equipment or cables. Table 4-1 is used to verify compliance with the requirements of Section III.G of Appendix R.

4.3 Section III.G Compliance Status

Table 4-2 provides the status of compliance with Section III.G for those fire areas containing safe shutdown equipment and cables. Fire areas that do not contain any safe shutdown equipment and cables are not listed in Table 4-2.

The systems required to achieve hot shutdown and cold shutdown in the event of a fire in a given fire area are listed. The compliance of process monitoring instrumentation is not listed separately as a system in Table 4-2, but is included within the related systems (e.g., pressurizer level is part of the RCS and steam generator pressure is part of the main steam system). Table 4-2 indicates whether compliance with Section III.G of Appendix R is achieved or an exemption request is required.

4.4 Fire Areas Requiring Alternative Shutdown

As shown in Table 4-2, alternative shutdown is required in the following 12 fire areas:

(1) Fire Area 1, Unit 1, Cable Vault and Tunnel

(2) Fire Area 2, Unit 2, Cable Vault and Tunnel

(3) Fire Area 3, Unit 1, Emergency Switchgear and Relay Room

(4) Fire Area 4, Unit 2, Emergency Switchgear and Relay Room

(5) Fire Area 5, Main Control Room

(6) Fire Area 15, Unit 1, Reactor Containment

(7) Fire Area 16, Unit 2, Reactor Containment

(8) Fire Area 17, Auxiliary, Fuel, and Decontamination Buildings

(9) Fire Area 19, Unit 1 Safeguards Area

(10) Fire Area 20, Unit 2 Safeguards Area

(11) Fire Area 45, Mechanical Equipment Room No. 3

(12) Fire Area 54, Charging Pump Service Water Pump Room

The following subsections describe the general method of achieving safe shutdown for each of the 12 fire areas requiring alternative shutdown capability in accordance with Section III.G.3 of Appendix R. The discussions below are for Unit 1 fire areas, but are equally applicable to Unit 2. The potential consequence of a fire in these areas is discussed and the equipment necessary to perform each shutdown function of Section III.L is also discussed.

It is noted that the subsections below only discuss the safe shutdown method for alternative shutdown fire areas. For example, the Turbine Building is not an alternative shutdown fire area, as shown in Table 4-2.S. The Turbine Building, Fire Area 31, achieves compliance with Section III.G.2 of Appendix R. Section III.G.3, Alternative Shutdown, is not required to be invoked for this fire area. Accordingly, the Turbine Building is not described in Section 4.4, Fire Areas Requiring Alternative Shutdown.

4.4.1 Fire Areas 1 and 2; Units 1 and 2 Cable Vault and Tunnel (CV&T)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area could result in the loss of power and control cables for the following Unit 1 Chemical and Volume Control System equipment:

(1) LCV-1115D Charging Pump Suction from RWST

(2) 1-CH-P-1A Charging Pump
1-CH-P-1B Charging Pump
1-CH-P-1C Charging Pump

(3) 1-CC-P-2A Charging Pump Cooling Water Pump
1-CC-P-2B Charging Pump Cooling Water Pump

Conformance with Section III.G.3 is achieved by the following method:

The Chemical and Volume Control System has been designed with a Unit 1 to Unit 2 cross-connect from the charging pump discharges. The Unit 2 charging pumps can be used to supply reactor makeup to Unit 1. An independent RWST is available in Unit 2 to supply charging pump suction.

The steam generator PORVs would be lost by a fire in this area. Initial operator action would be to isolate RV-MS101A, B and C and assure the valves are closed. Initially, the steam generator code safety valves would release decay heat to the atmosphere for hot shutdown. Subsequently, a manual valve line-up would be performed to release decay heat via the Auxiliary Steam System.

Reactor Reactivity Control

Reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area could result in the loss of power and control cables for the following Auxiliary Feedwater System equipment:

(1) 1-FW-P-3A Unit 1 Motor-Driven Auxiliary Feedwater Pump

(2) 1-FW-P-3B Unit 1 Motor-Driven Auxiliary Feedwater Pump

(3) MOV-FW-260A Auxiliary Feedwater Unit 1/Unit 2 Cross-Connect

Conformance with Section III.G.3 is achieved by the following method:

A 100% capacity turbine-driven auxiliary feedwater pump is available on loss of the two motor-driven pumps. Pump discharge will be controlled locally at the pump by controlling pump speed through a mechanical governor.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup capability, as described above, through the use of the charging pumps and letdown valves.

Support Systems

A fire in the Unit 1 Cable Vault and Tunnel area could result in the loss of control cables for the No. 1 and No. 3 Emergency Diesel Generator.

Conformance with Section III.G.3 is achieved by the following method:

> Sufficient equipment powered from Unit 2 emergency buses can be used for shutdown of Unit 1. Unit 2 emergency buses will be powered from No. 2 Emergency Diesel Generator.

A fire in the Unit 2 Cable Vault and Tunnel could result in loss of power feeds and control cables for the No. 1 Emergency Diesel Generator to the Unit 1 emergency buses.

Conformance with Section III.G.3 is achieved by the following method:

> Sufficient equipment powered from Unit 1 emergency buses can be used for shutdown of Unit 2. Unit 1 emergency buses will be powered from No. 3 Emergency Diesel Generator.

A fire in either cable vault and tunnel could cause the emergency communications to its respective containment to be damaged. A spare antenna and cable are available to reestablish communications when needed (for letdown).

Certain ventilation equipment could be damaged due to a fire in this area. However, sufficient equipment exists outside the area to achieve post-fire safe shutdown.

Process Monitoring

A fire in this area would result in a loss of all Unit 1 Control Room process monitoring indication. Conformance with Section III.G.3 is achieved by the following method:

> Two independent process monitoring panels in the Unit 1 Cable Spreading Room, the Remote Monitoring Panels, contain the following indication:

(1) Pressurizer Level and RCS Pressure

(2) Steam Generator A, B and C Level

(3) Steam Generator A, B and C Pressure

(4) Reactor Coolant Loop 1 T_h and T_c

(5) Reactor Coolant Loop 2 T_h and T_c

(6) Source Range and Wide Range Neutron Flux Indication

Power to the Remote Monitoring Panels is provided from either unit to ensure that separate power feeds will be available for any fire scenario (see Chapter 6, Modification I-11).

4.4.2 Fire Areas 3 and 4; Unit 1 and 2 Emergency Switchgear and Relay Rooms (ESGR)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area could result in the loss of power and control cables for the following Unit 1 Chemical and Volume Control System equipment:

(1) LCV-1115D Charging Pump Suction from RWST

(2) 1-CH-P-1A Charging Pump
1-CH-P-1B Charging Pump
1-CH-P-1C Charging Pump

(3) 1-CC-P-2A Charging Pump Cooling Water Pump
1-CC-P-2B Charging Pump Cooling Water Pump

(4) 1-SW-P-10A Charging Pump Service Water Pump
1-SW-P-10B Charging Pump Service Water Pump

Conformance with Section III.G.3 is achieved by the following method:

The Chemical and Volume Control System has been designed with a Unit 1 to Unit 2 cross-connect from the charging pump discharges. The Unit 2 charging pumps can be used to supply reactor makeup to Unit 1. An independent RWST is available in Unit 2 to supply charging pump suction.

Reactor Reactivity Control

Reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area could result in the loss of power and control cables for the following Auxiliary Feedwater System equipment:

(1) 1-FW-P-3A Unit 1 Motor-Driven Auxiliary Feedwater Pump

(2) 1-FW-P-3B Unit 1 Motor-Driven Auxiliary Feedwater Pump

(3) MOV-FW-260A Auxiliary Feedwater Unit 1/Unit 2 Cross-Connect

Conformance with Section III.G.3 is achieved by the following method:

A 100% capacity turbine-driven auxiliary feedwater pump is available on loss of the two motor-driven pumps. Pump discharge will be controlled locally at the pump by controlling pump speed through a mechanical governor.

The steam generator PORVs would be lost by a fire in this area. Initial operator action would be to isolate RV-MS101A, B and C and assure the valves are closed. Initially, the steam generator code safety valves would release decay heat to the atmosphere for hot shutdown. Subsequently, a manual valve line-up would be performed to release decay heat via the Auxiliary Steam System.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup capability, as described above, through the use of the charging pumps and letdown valves.

Support Systems

A fire in the Unit 1 Emergency Switchgear Room could result in the loss of power supply and control cables for the Nos. 1 and 3 Emergency Diesel Generators.

Conformance with Section III.G.3 is achieved by the following method:

> Sufficient equipment powered from Unit 2 emergency buses can be used for shutdown of Unit 1. Unit 2 emergency buses will be powered from No. 2 Emergency Diesel Generator.

A fire in the Unit 2 Emergency Switchgear Room could result in the loss of power supply and control cables for the Nos. 2 and 3 Emergency Diesel Generators.

Conformance with Section III.G.3 is achieved by the following method:

> Sufficient equipment powered from Unit 1 emergency buses can be used for shutdown of Unit 2. Unit 1 emergency buses will be powered from No. 1 Emergency Diesel Generator.

A fire in these areas may also result in a loss of ESGR ventilation systems. To provide proper ventilation, chiller 1-VS-E-4C and associated pumps with Control Room air handlers 1-VS-AC-2 and 2-VS-AC-8, as well as Unit 2 ESGR air handler 2-VS-AC-6, will be used. If chiller 1-VS-E-4C is out of service, then one central chiller and chilled water pump can be transferred to Unit 2 emergency power and be operated.

A fire in this area may damage the emergency communications systems required for safe shutdown. However, adequate protection exists such that Appendix R requirements are met.

<u>Process Monitoring</u>

A fire in this area would result in a loss of all Unit 1 Control Room process monitoring indication. The 125V dc panels and cables that provide power to the Remote Monitoring Panel from Unit 1 would also be lost. Conformance with Section III.G.3 is achieved by the following method:

> Two independent process monitoring panels in the Unit 1 Cable Spreading Room, the Remote Monitoring Panels, contain the following indication:
>
> (1) Pressurizer Level and RCS Pressure
>
> (2) Steam Generator A, B and C Level
>
> (3) Steam Generator A, B and C Pressure

(4) Reactor Coolant Loop 1 T_h and T_c

(5) Reactor Coolant Loop 2 T_h and T_c

(6) Source Range and Wide Range Neutron Flux Indication

Power to the Remote Monitoring Panel is provided from either unit to ensure that separate power feeds will be available for any fire scenario (see Chapter 6, Modification I-11).

4.4.3 Fire Area 5, Main Control Room (CR)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area could result in the loss of control cables and switches for the following equipment:

(1) 1-CH-P-1A, 1B, 1C Unit 1 Charging Pumps

(2) 2-CH-P-1A, 1B, 1C Unit 2 Charging Pumps

(3) 1-CC-P-2A, 2B Unit 1 Charging Pump Cooling Water Pumps

(4) 2-CC-P-2A, 2B Unit 2 Charging Pump Cooling Water Pumps

(5) 1-SW-P-10A, 10B Unit 1 Charging Pump Service Water Pumps

(6) 2-SW-P-10A, 10B Unit 2 Charging Pump Service Water Pumps

(7) LCV-1115D Unit 1 Charging Pump Suction from RWST

(8) LCV-2115D Unit 2 Charging Pump Suction from RWST

Conformance with Section III.G.3 is achieved by the following method:

(1) The control of the charging pumps will be transferred to the Auxiliary Shutdown Panel located in Unit 1 and Unit 2 Emergency Switchgear Rooms. The transfer switches are located at the respective Auxiliary Shutdown Panels.

(2) Operator action is used to deenergize the dc control power to the Unit 1 and 2 charging pump cooling water pumps and operate the breakers manually at their respective 480V switchgear as follows:

(1) 1-CC-P-2A Breaker No. 5C (MCC 1H1-1)
(2) 1-CC-P-2B Breaker No. 4D (MCC 1J1-1)
(3) 2-CC-P-2A Breaker No. 1C (MCC 2H1-1
(4) 2-CC-P-2B Breaker No. 4E (MCC 2J1-1)

(3) Operator action is used to deenergize the breakers 5A (MCC 1J1-2E) and 5A (MCC 2J1-2E), respectively, for MOV-1115D and MOV-2115D. The operator can now manually open the valve.

(4) The charging pump service water pumps will be controlled locally at their respective motor control centers as follows:

(1) 1-SW-P-10A Breaker No. 1D (MCC 1H1-1)
(2) 1-SW-P-10B Breaker No. 4B (MCC 1J1-1)
(3) 2-SW-P-10A Breaker No. 1E (MCC 2H1-1)
(4) 2-SW-P-10B Breaker No. 6E (MCC 2J1-1)

Reactor Reactivity Control

Reactor reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area could result in the loss of control cables and switches for the following Unit 1 and 2 Auxiliary Feedwater System equipment:

(1) 1-FW-P-3A, 3B and 2-FW-P-3A, 3B Units 1 and 2 Motor-Driven Auxiliary Feedwater Pumps

(2) MOV-FW-160A and 260A Units 1 and 2 Auxiliary Feedwater Cross-Connect Valves

Conformance with Section III.G.3 is achieved by the following method:

(1) Control of the motor-driven auxiliary feedwater pumps will be transferred to the Auxiliary Shutdown Panels located in Unit 1 and 2 Emergency Switchgear Rooms. The transfer switches are located at the respective Auxiliary Shutdown Panels.

(2) Operator action is used to deenergize the breakers 3B (MCC 2H1-2N) and 1A (MCC 1H1-2N), respectively, for MOV-FW-160A and MOV-FW-260A. The operator can now manually open the valve.

The steam generator PORVs would be lost by a fire in this area. Initial operator action would be to isolate RV-MS101A, B and C and assure the valves are closed. Initially, the steam generator code safety valves would release decay heat to the atmosphere for hot shutdown. Subsequently, a manual valve line-up would be performed to release decay heat via the Auxiliary Steam System.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup capability, as described above, through the use of the charging pumps and letdown valves.

Support Systems

A fire in this area could result in a loss of control to the Emergency Diesel Generators No. 1 (EDG1) and No. 2 (EDG2). A modification is required for conformance with Section III.G.3 to ensure that faults, induced by a Control Room fire, could not prevent operation of the emergency diesels. Control Room isolation of the No. 1 and No. 2 Emergency Diesel Generators is accomplished by an operator changing the position of the new diesel isolation switch located on control panels 1DIP-DGRH and 2DIP-DGRH located in EDG1 and EDG2 Diesel Generator Rooms, respectively (see Chapter 6, Modification II-2).

A fire in this area may also cause a loss of Control Room ventilation. To restore Control Room ventilation, local control of 1-VS-AC-7, 2-VS-AC-6, 1-VS-P-1C, 2C, and 1-VS-E-4C will be taken at their MCC.

A fire in this area will not affect the emergency communications because sufficient equipment exists outside of the fire area.

Process Monitoring

A fire in this area would result in a loss of all Control Room process monitoring indication. Conformance with Section III.G.3 is achieved by the following method:

Two independent process monitoring panels in the Unit 1 Cable Spreading Room, the Remote Monitoring Panels, contain the following indication:

(1) Pressurizer Level and RCS Pressure

(2) Steam Generator A, B and C Level

(3) Steam Generator A, B and C Pressure

(4) Reactor Coolant Loop 1 T_h and T_c

(5) Reactor Coolant Loop 2 T_h and T_c

(6) Source Range and Wide Range Neutron Flux Indication

Power to the Remote Monitoring Panel (ASC RMP-1) is required as described in Modification I-11 of Chapter 6 of this report, to ensure that separate power feeds will be available for any fire scenario.

4.4.4 Fire Areas 15 and 16; Units 1 and 2 Reactor Containments

Consequence of Fire

The consequence of a fire in this fire area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area could result in a loss of power to HCV-1310. Loss of power to this valve will cause it to fail in the open position, thus ensuring that the normal flowpath will be maintained. An alternate flow path is available through the RCP seals.

Reactor Reactivity Control

A fire in this area may cause a loss of power or air supply to LCV-1460A and B, HCV-1200A, B, C and HCV-1142 in the alternate letdown path. As an alternate to remote operations, operators will re-enter the fire area and operate these valves locally. Compliance with Section III.G.3 of Appendix R is achieved (see Chapter 7, Exemption Request 15).

Decay Heat Removal

A fire in this area may damage the AFW discharge header valves. Loss of power to these normally open valves will cause them to fail as is, which is the desired position.

A fire in this area may damage the RHR pump cables. Since the RHR pumps are required for cold shutdown only, these cables will be repaired as required following a fire in the containment. A fire in this area may damage the CCW inlet valves to the RHR heat exchangers and certain RHR warm-up valves. As these valves are required for cold shutdown only, these valves will be repaired as required.

Reactor Pressure Control

Reactor pressure control is ensured by maintenance of the makeup and letdown capability through the use of the charging pumps and alternate letdown path.

Support Systems

A fire in this area may cause a loss of containment ventilation; however, ventilation is not required here for safe shutdown. Containment cooling for personnel access can be accomplished by use of the containment spray system in 10-15 minute intervals, if required. A fire in this area may cause loss of containment communications. However, a spare antenna and cable are available should the existing antenna fail.

Process Monitoring

A fire in this area may damage several process monitoring functions. These functions are discussed below:

(1) Pressurizer Level - A fire in the pressurizer cubicle is the only case in which pressurizer level indication may not be maintained. A modification is required to install a radiant energy shield between the trains, thus maintaining at least one train of indication either on the Remote Monitoring Panels or in the Control Room (Modification I-1 of Chapter 6).

(2) Reactor Coolant Pressure - The transmitter locations and cable routing for the reactor coolant pressure instruments are such that separation is always greater than 20 feet. However, portions of the cabling do not meet the 20-foot separation requirement. A modification is required to install a radiant energy shield between the trains to meet Appendix R requirements for Unit 2 (Modification I-1 of Chapter 6).

(3) Reactor Coolant Temperature - Instrument and cable routing for reactor coolant temperature are such that, following installation of new hot leg instruments for the Remote Monitoring Panels, adequate separation will exist to ensure that at least one hot and one cold leg instrument are available regardless of the location of any fire within the containment (Modification I-2 of Chapter 6).

(4) Steam Generator Level - New cable and conduit for existing steam generator level transmitters is required to be installed and routed to meet Appendix R separation requirements. This ensures that at least one of the three steam generator level indications will always be available (Modification I-1 of Chapter 6).

(5) Steam Generator Pressure - Two new steam generator pressure transmitters and cables were installed such that Appendix R separation requirements have been met. In addition, steam generator pressure instruments and cables are located completely outside of this fire area.

(6) Excore Neutron Flux - The cable routing for the excore neutron flux detectors does not meet the separation requirements of Appendix R in the containment in-core instrument tunnel. An exemption from the requirements of Appendix R has been requested (see Chapter 7, Exemption Request 2).

4.4.5 Fire Area 17, Auxiliary, Fuel, and Decontamination Building (AB)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area could result in the loss of equipment and/or power and control cables for the following Unit 1 and 2 Chemical and Volume Control System equipment:

(1) LCV-1115D, 2115D

(2) 1-CH-P-1A, 1B, 1C
2-CH-P-1A, 1B, 1C

(3) 1-CC-P-2A, 2B

(4) 2-CC-P-2A, 2B

Conformance with Section III.G.3 is achieved by the following method:

The Unit 1 and 2 charging pump discharge headers are cross-connected so that the loss of the charging pumps for one unit will not adversely affect shutdown of that unit. The charging pump discharge headers of each unit are connected via a line containing a normally closed manual valve. In the event of a fire which disables all charging pumps of one unit, the two normally closed cross-connect valves are manually opened by an operator who reenters the fire area and the remaining unaffected pumps of the other unit are used to supply both units. An engineering evaluation has confirmed that reentry into the fire area for manual operation of the cross-connect valves is an acceptable method for safe shutdown because of:

- o the low combustible loading in the area of the valves;
- o the Auxiliary Building detector additions (Modification III-2 of Chapter 6); and
- o the existing separation between the access paths to the cross-connect valves and power cables to the charging pumps.

As required by Section III.G.2(b), the two redundant trains (Unit 1 charging pumps and cables and Unit 2 charging pumps and cables) are separated by a minimum of 20 feet with no intervening combustibles. Only two pumps are required for safe shutdown, one for each unit. No fire can disable more than two of the remaining four charging pumps.

The charging pump suction valves (LCV-1115D and LCV-2115D), in the lines from the refueling water storage tank, may be lost due to a fire outside the charging pump cubicles. These valves are normally closed and would be required to be open to perform a cooldown. However, the opposite unit's charging pumps could be used for both units since they are cross-connected on the discharge side. The cabling for the Unit 1 valve (LCV-1115D) and the Unit 2 valve (LCV-2115D) is routed in opposite sides of the Auxiliary Building and is separated by greater than 20 feet with no intervening combustibles. These valves can be locally operated.

The RWST is equipped with the ability to be cross-connected with the opposite unit's RWST should additional makeup be needed.

<u>Reactor Reactivity Control</u>

Reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area could damage all the SOVs that operate the main steam trip valves (TV-MS101 A, B, C). However, the turbine could be tripped via the main steam trip bypass and associated down stream valves.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup and letdown capability, as described above, through the use of the charging pumps and alternate letdown path.

Support Systems

A fire in this area could result in the loss of equipment and/or power and control cables for the Unit 1 and 2 component cooling water pumps. This system is a cold shutdown system, therefore, sufficient time exists to replace the cables and motors for two pumps while the plant remains in hot standby. Normally open component cooling water valves TV-CC109A and B, CCW return from the RHR heat exchangers, will fail shut upon loss of power. As these valves are only required for cold shutdown, adequate time exists for an operator to locally open these valves using an air bottle and jumper.

For hot shutdown purposes, existing ventilation systems will be used although local operation of fan specific dampers will be required. Modifications were performed to ensure power will be available to the required fans (see Chapter 6, Modification III-8). For cold shutdown, portable fans and flexible ducting are required to ventilate the CCW pump area and the penetration area.

A fire in this area may damage certain emergency communications equipment and cables. However, sufficient redundancy of communications equipment is available outside this area for post-fire safe shutdown operations (see Chapter 6, Modification I-3).

Process Monitoring

A fire in this area does not affect this function because process monitoring indication is available in the Control Room.

4.4.6 Fire Areas 19 and 20; Units 1 and 2 Safeguards Area (SG)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area does not affect reactor makeup capability.

Reactor Reactivity Control

A fire in this area does not affect reactor reactivity control.

Decay Heat Removal

A fire in this area could result in the loss of power and control cables for the following Auxiliary System equipment:

(1) 1-FW-P-3A, 3B Motor-Driven Auxiliary Feedwater Pumps

(2) 1-FW-P-2 Turbine-Driven Auxiliary Feedwater Pump

(3) MOV-FW-260A Auxiliary Feedwater Cross-Connect Valve

(4) RV-MS101A, B, C Steam Generator A, B and C PORVs

Conformance with Section III.G.3 is achieved by the following method:

The Unit 1 and Unit 2 Auxiliary Feedwater Systems are cross-connected by cross-connect valves MOV-FW-260A and MOV-FW-160A, Units 1 and 2 respectively. A fire in Unit 1 Auxiliary Feedwater Pump House would allow system cross-connect via opening MOV-FW-160A and using the Unit 2 motor-driven auxiliary feedwater pumps and the Unit 2 turbine-driven auxiliary feedwater pump to bring both units to cold shutdown.

The steam generator PORVs would be lost by a fire in this area. Initial operator action would be to isolate RV-MS101A, B and C and assure that the valves shut. Initially, the steam generator code safety valves would release decay heat to the atmosphere for hot shutdown. Subsequently, a manual valve line-up would be performed to release decay heat to atmosphere via the Auxiliary Steam System.

Reactor Pressure Control

A fire in this area does not affect reactor pressure control.

Support Systems

Ventilation systems in this area may be lost during the postulated fire. By manually opening one supply and one exhaust damper as well as propping open the door, adequate ventilation will be provided for the area.

Process Monitoring

A fire in this area could cause the loss of all three steam generator pressure transmitters. Conformance with Section III.G.3 is achieved by the following method:

Alternate steam generator pressure transmitters for steam generators A and B are installed inside the Unit 1 Containment with readout available at the Remote Monitoring Panel.

4.4.7 Fire Area 45, Mechanical Equipment Room No. 3 (MER-3)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area does not affect the reactor makeup capability. However, cooling to the charging pumps is discussed in Support Systems below.

Reactor Reactivity Control

Reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area does not affect decay heat removal.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup capability, as described above, through the use of the charging pumps and letdown valves.

Support Systems

A fire in this area could result in the loss of power and control cables for the following Unit 1 and 2 Charging Pump Cooling Water System equipment:

(1) 1-SW-P-10B

(2) 2-SW-P-10A

(3) 2-SW-P-10B

Conformance with Section III.G.3 is achieved by the following method:

> One charging pump service water pump has sufficient capacity to supply cooling water to the two charging pumps required to bring Units 1 and 2 to cold shutdown. A fire in this area will leave 1-SW-P-10A available to supply service water to the Unit 1 charging pump intermediate seal and lube oil coolers. Unit 1 Charging System would then be used to bring Units 1 and 2 to cold shutdown.

A fire in this area may cause a loss of Control Room and ESGR chillers and pumps. To provide ventilation cooling to the Control Room or ESGRs, the central chilled water system cross-connect will be opened. In addition, one central chiller and one chilled water pump will be transferred to a Unit 1 emergency feed.

A fire in this area could result in damage to cables required for operation of diesel generators no. 2 and 3. However, diesel generator no. 1 will be available to provide power to the required safe shutdown systems (see Chapter 6, Modification III-1).

Process Monitoring

A fire in this area does not affect any process monitoring.

4.4.8 Fire Area 54, Charging Pump Service Water Pump Room (CPSWPR)

Consequence of Fire

The consequence of a fire in this area will be discussed for each shutdown function.

Reactor Makeup

A fire in this area does not affect reactor makeup capability. However, cooling to the charging pumps is discussed in Support Systems below.

Reactor Reactivity Control

Reactivity control is assured by maintenance of the makeup capability, as described above, because borated water from the RWST is the source of water to the charging pumps.

Decay Heat Removal

A fire in this area does not affect decay heat removal.

Reactor Pressure Control

Reactor pressure control is assured by maintenance of the makeup capability, as described above, through the use of the charging pumps and letdown valves.

Support Systems

A fire in this area could result in the loss of power and control cables for the following Unit 1 and 2 Charging Pump Cooling Water System equipment:

(1) 1-SW-P-10A

(2) 1-SW-P-10B

(3) 2-SW-P-10A

Conformance with Section III.G.3 is achieved by the following method:

One charging pump service water pump has sufficient capacity to supply cooling water to the two charging pumps required to bring Units 1 and 2 to cold shutdown. A fire in this area will leave 2-SW-P-10B available to supply service water to the Unit 2 charging pump intermediate seal and lube oil coolers. Unit 2 Charging System would then be used to bring Units 1 and 2 to cold shutdown.

Process Monitoring

A fire in this area does not affect any process monitoring.

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION (FIRE AREA →)	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
1-FW-P-3A	MOTOR DRIVEN AUX FEEDWATER PUMP	C	C*	P,C E		E,C	P,C						C*			E,C		C,E		
1-FW-P-3B	MOTOR DRIVEN AUX FEEDWATER PUMP	C		P,C E	E C*	E,C			P,C							E,C		E,C	C*	
2-FW-P-3A	MOTOR DRIVEN AUX FEEDWATER PUMP		C		P,C E	E,C		P,C									E,C	E,C	C*	
2-FW-P-3B	MOTOR DRIVEN AUX FEEDWATER PUMP	C*	C	C, E*	P,C E	E,C			P,C								E,C	E,C	C*	
MOV-FW160A	AFW CROSS CONNECT VALVE		P,C E		C,E	E,C		P,C									E,C		C*	
MOV-FW260A	AFW CROSS CONNECT VALVE	P,C E	C*	C,E		E,C	P,C						C*			E,C				
MOV-FW160B	AFW CROSS CONNECT VALVE	C*	E,C P	C, E*	E,C	E,C			P,C								E,C		C*	
MOV-FW260B	AFW CROSS CONNECT VALVE	E,C P		E,C	E C*	E,C		P,C								E,C			C*	
1-CH-P-1A	CHARGING PUMP	C	C*	P,C E		E,C	P,C						E,C							
1-CH-P-1B	CHARGING PUMP	C		P,C E	E C*	E,C			P,C				E,C						C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
1-CH-P-1C	CHARGING PUMP	C	C*	P,C E		E,C	P,C						E,C							
2-CH-P-1A	CHARGING PUMP		C		P,C E	E,C		P,C					E,C						C*	
2-CH-P-1B	CHARGING PUMP	C*	C	E, C*	P,C E	E,C			P,C				E,C						C*	
2-CH-P-1C	CHARGING PUMP		C		P,C E	E,C		P,C					E,C						C*	
LCV-1115D	CHARGING PUMP SUCTION FROM RWST	P,C E		C E*	E C*				P,C				E,C						C*	
LCV-2115D	CHARGING PUMP SUCTION FROM RWST	C*	P,C E	C, E*	C E*	E,C			P,C				E,C						C*	
1-CC-P-2A	CHARGING PUMP COOLING WATER PUMP	C	C*	P,C E		E,C	P,C						E,C							
1-CC-P-2B	CHARGING PUMP COOLING WATER PUMP	C		P,C E	E C*	E,C			P,C				E,C						C*	
2-CC-P-2A	CHARGING PUMP COOLING WATER PUMP		C		P,C E	E,C		P,C					E,C						C*	
2-CC-P-2B	CHARGING PUMP COOLING WATER PUMP	C*	C	C, E*	P,C E	E,C			P,C				E,C						C*	
1-SW-P-10A	CHARGING PUMP SERVICE WATER PUMP	C*	C*	P,C E		E,C	P,C						C*					C		E,C
1-SW-P-10B	CHARGING PUMP SERVICE WATER PUMP	C*		P,C E	E C*	E,C			P,C									C	E,C	C

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
2-SW-P-10A	CHARGING PUMP SERVICE WATER PUMP				P,C E	E,C		P,C											C*	E,C
2-SW-P-10B	CHARGING PUMP SERVICE WATER PUMP	C*		C, E*	P,C E	E,C			P,C										E,C	
1-EE-P-1A	EMERGENCY DG FUEL OIL TRANSFER PUMP	C	C	P,C E			E,C P						C	E,C						
1-EE-P-1B	EMERGENCY DG FUEL OIL TRANSFER PUMP				P,C E			E,C						E,C					C	
1-EE-P-1C	EMERGENCY DG FUEL OIL TRANSFER PUMP	C*		P,C E	C				E,C P					E,C					C	
1-EE-P-1D	EMERGENCY DG FUEL OIL TRANSFER PUMP	P,C E	C	C E*			E,C P						C		E,C					
1-EE-P-1E	EMERGENCY DG FUEL OIL TRANSFER PUMP		P,C E		C E*			E,C P							E,C				C	
1-EE-P-1F	EMERGENCY DG FUEL OIL TRANSFER PUMP	C*		P,C E	P,C E				E,C P						E,C				C	
NFD-190	EXCORE NEUTRON FLUX UNIT 1	C	C	C,P E	E,C P	C,E	P,C	P,C			E,C		C					E,C P	C*	
NFD-1270	EXCORE NEUTRON FLUX UNIT 1	C		C,P E	E C*	E,C			P,C		E,C								C*	
NFD-290	EXCORE NEUTRON FLUX UNIT 2	C	C	E,C P	C,P E	C,E	P,C	P,C				E,C	C					E,C P	C*	
NFD-2270	EXCORE NEUTRON FLUX UNIT 2	C*	C	E C*	C,E	P,C E			P,C			E,C							C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
LT-1461	PRESSURIZER LEVEL UNIT 1	C	C*	E,C P		E,P C	P,C				E,C		C*							
LT-1459A	PRESSURIZER LEVEL UNIT 1	C*		E,P C	P,C E	P,C E			P,C		E,C		C					E,C	C*	
LT-1477	STEAM GENERATOR LEVEL UNIT 1	C		E,C P	E C*	P,C E			P,C		E,C								C*	
LT-1477A	STEAM GENERATOR LEVEL UNIT 1	C*		C,P E	P,C E	C,P E			P,C		E,C		C					E,C	C*	
LT-1487	STEAM GENERATOR LEVEL UNIT 1	C		E,C P	P C*	P,C E			P,C		E,C								C*	
LT-1487A	STEAM GENERATOR LEVEL UNIT 1	C*		E,P C	P,C E	C,P E			P,C		E,C		C					E,C	C*	
LT-1497	STEAM GENERATOR LEVEL UNIT 1	C		E,C P	E C*	P,C E			P,C		E,C								C*	
LT-1497A	STEAM GENERATOR LEVEL UNIT 1	C*		E,P C	P,C E	P,C E			P,C		E,C		C					E,C	C*	
PT-MS137A	STEAM GENERATOR PRESSURE UNIT 1	C	C	E,P C	P,C E		P,C	P,C			E,C		C					E,C P	C*	
PT-MS137B	STEAM GENERATOR PRESSURE UNIT 1	C	C	E,P C	P,C E		P,C	P,C			E,C		C					E,C P	C*	
PT-1474	STEAM GENERATOR PRESSURE UNIT 1	C	C*	E,P C		E,P C	P,C						C*			E,C				
PT-1485	STEAM GENERATOR PRESSURE UNIT 1	C	C*	E,P C		E,P C	P,C						C*			E,C				

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
PT-1402-1	RCS PRESSURE UNIT 1	C		E,C P	E C*	E,C P			P,C		E,C								C*	
PT-1449	RCS PRESSURE UNIT 1	C*		C,P E	P,C E	C,P E			P,C		E,C		C					E,C	C*	
TE-1413-2	HOT LEG TEMPERATURE	C*		C,E P	P,C E	P,C E			P,C		E,C		C					E,C	C*	
TE-1423-2	HOT LEG TEMPERATURE	C*		P,C E	P,C E	P,C E			P,C		E,C		C					E,C	C*	
TE-1433-1	HOT LEG TEMPERATURE	C	C*	C,E		E,C P	P,C				E,C		C*							
LT-2460	PRESSURIZER LEVEL UNIT 2	C*	C	C, E*	E,C	E,C P			P,C			E,C							C*	
LT-2459A	PRESSURIZER LEVEL UNIT 2	C*		P,C E	E,C P	P,C E			P,C			E,C	C					E,C	C*	
LT-2477	STEAM GENERATOR LEVEL UNIT 2	C*	C	E C* P	E,C P	P,C E			P,C			E,C							C*	
LT-2477A	STEAM GENERATOR LEVEL UNIT 2	C*		P,C E	P,C E	P,C E			P,C			E,C	C					E,C	C*	
LT-2487	STEAM GENERATOR LEVEL UNIT 2		C		E,C P	P,C E		P,C				E,C							C*	
LT-2487A	STEAM GENERATOR LEVEL UNIT 2	C*		P,C E	P,C E	P,C E			P,C			E,C	C					E,C	C*	
LT-2497	STEAM GENERATOR LEVEL UNIT 2	C*	C	E C*	E,C P	P,C E			P,C			E,C							C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
LT-2497A	STEAM GENERATOR LEVEL UNIT 2	C*		P,C E	P,C E	P,C E			P,C			E,C	C					E,C	C*	
PT-MS237A	STEAM GENERATOR PRESSURE UNIT 2	C	C	P,C E	P,C E		P,C	P,C				E,C	C					E,C P	C*	
PT-MS237B	STEAM GENERATOR PRESSURE UNIT 2	C	C	P,C E	P,C E		P,C	P,C				E,C	C					E,C P	C*	
PT-2474	STEAM GENERATOR PRESSURE UNIT 2		C		P,C E	C,E		P,C									E,C		C*	
PT-2496	STEAM GENERATOR PRESSURE UNIT 2		C		P,C E	C,E		P,C									E,C		C*	
PT-2402-1	RCS PRESSURE	C*	C	E C*	E,C P	E,C P			P,C			E,C							C*	
PT-2449	RCS PRESSURE	C*		P,C E	P,C E	P,C E			P,C			E,C	C					E,C	C*	
TE-2413-2	HOT LEG TEMPERATURE	C*		P,C E	P,C E	P,C E			P,C			E,C	C					E,C	C*	
TE-2423-1	HOT LEG TEMPERATURE	C*	C	C E*	C,E	P,C E			P,C			E,C							C*	
TE-2433-2	HOT LEG TEMPERATURE	C*		P,C E	C,E P	P,C E			P,C			E,C	C					E,C	C*	
1-VS-P-1A	CONDENSER WATER PUMP	C*	C*	P,C E	C	E,C	P,C						C*						E,C	
1-VS-P-1B	CONDENSER WATER PUMP	C*		P,C E	C,E	E,C			P,C										E,C	

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
1-VS-P-1C	CONDENSER WATER PUMP				P,C E	E,C		P,C											E,C	
1-VS-P-2A	CHILLED WATER PUMP	C*	C*	P,C E	C	E,C	P,C						C*						E,C	
1-VS-P-2B	CHILLED WATER PUMP	C*		P,C E	C,E	E,C			P,C										E,C	
1-VS-P-2C	CHILLED WATER PUMP				P,C E	E,C		P,C											E,C	
1-VS-E-4A	CHILLER	C*	C*	P,C E	C	E,C	P,C						C*						E,C	
MOV-PG107C	CONTROL/RELAY ROOM CHILL WATER PUMP DISCHARGE VALVE				P,C E	E,C		P,C											E,C	
1-VS-F-58A	HIGH HEAD FAN	E,C		P,C E	P,C E	E,C	P,C		P,C				E,C						C*	
1-VS-F-58B	HIGH HEAD FAN	C	E,C	P,C E	P,C E	E,C		P,C	P,C				E,C						C*	
1-VS-F-9A	CENTRAL EXHAUST FAN	P,C E	C*	C, E*		E,C	P,C						E,C							
1-VS-F-9B	CENTRAL EXHAUST FAN	P,C E		C,E	E C*	E,C			P,C				E,C						C*	
1-VS-AC-2	CONTROL ROOM AIR HANDLER			C	P,C E	E,C		P,C											C*	
1-VS-AC-6	UNIT 1 ESR AIR HANDLER			E,C	P,C E	E,C		P,C											C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
1-VS-AC-7	UNIT 1 ESR AIR HANDLER	C*	C*	E,C P	C	E,C	P,C						C*							
1-VS-E-4B	CHILLER	C*		P,C E	C,E	E,C			P,C										E,C	
1-VS-E-4C	CHILLER				P,C E	E,C		P,C											E,C	
1-VS-AC-1	CONTROL ROOM AIR HANDLER	C*	C*	P,C E	C,E	E,C	P,C						C*							
2-VS-AC-9	CONTROL ROOM AIR HANDLER	C	C	P,C E	C	E,C	P,C						C*							
2-VS-AC-6	UNIT 2 ESR AIR HANDLER				E,C P	E,C		P,C											C*	
2-VS-AC-7	UNIT 2 ESR AIR HANDLER	C*	C*	P,C E	E,C	E,C	P,C						C*							
2-VS-AC-8	CONTROL ROOM AIR HANDLER				P,C E	E,C		P,C											C*	
1-VS-F-14 (NOTE 2)	CABLE SPREADING ROOM VENTILATING FAN																	E,P C		
1-REPEATER-AE	EMERGENCY COMMUNICATION SYSTEM	C	C	C,E	E,C P	C,E		P,C			C	C						E,P C	C*	
1-REPEATER-A	EMERGENCY COMMUNICATION SYSTEM	C	C	C,E	E,C P	C,E		P,C			C	C						E,P C	C*	
2-REPEATER-B	EMERGENCY COMMUNICATION SYSTEM	C	C*	C,E P			P,C						C,E P							

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
2-REPEATER-BE	EMERGENCY COMMUNICATION SYSTEM	C	C*	C,E P			P,C						C,E P							
1-VS-P-3A	CENTRAL CHILLED WATER PUMP	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
1-VS-P-3B	CENTRAL CHILLED WATER PUMP	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
1-VS-E-3A	CENTRAL CHILLED WATER SYS CHILLER	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
1-VS-E-3B	CENTRAL CHILLED WATER SYS CHILLER	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
1-VS-E-1A	CONDENSING UNIT	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
1-VS-E-1B	CONDENSING UNIT	C	C	E,C P	E,C P			P,C	P,C									E,C P	C*	
FCV-MS104A B,C,D	MOISTURE SEPARATOR REHEATER INLET VALVES			C		E,C P												E,C P		
FCV-MS204A B,C,D	MOISTURE SEPARATOR REHEATER INLET VALVES				C	E,C P												E,C P		
EP-MS101A	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS101A	E,C		E,C P	E C*	E,C P			P,C							E,C			C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
EP-MS101B	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS101B	E,C		E,C P	E C*	E,C P			P,C							E,C			C*	
EP-MS101C	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS101C	E,C		E,C P	C, E*	E,C P			P,C							E,C			C*	
SOV-TCV-408A (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS105A	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408B (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS105B	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408C (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS106A	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408D (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS106B	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408E (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS107A	C		E,C	E C*	E,C P			P,C									E,C	C*	

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-TCV-408F (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS107B	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408G (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS108A	C		E,C	E C*	E,C P			P,C									E,C	C*	
SOV-TCV-408H (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS108B	C		E,C	E C*	E,C P			P,C									E,C	C*	
20-AST-1	TURBINE TRIP SOLENOID VALVE UNIT 1	C	C*	E,C P	C,E	C,E	P,C						C*					C,E P		
20-AST-2	TURBINE TRIP SOLENOID VALVE UNIT 1	C	C*	E,C P	C,E	C,E	P,C						C*					C,E P		
20-ET	TURBINE TRIP SOLENOID VALVE UNIT 1	C	C*	E,C P	C,E	C,E	P,C						C*					C,E P		
SOV-MS101AA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101A	C	C*	C,E		E,C P	P,C						E,C			E,C				
SOV-MS101AB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101A	C		C,E	C E*	E,C P			P,C				E,C			E,C			C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-MS101BA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101B	C	C*	C,E		E,C P	P,C						E,C			E,C				
SOV-MS101BB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101B	C		C,E	C E*	E,C P			P,C				E,C			E,C			C*	
SOV-MS101CA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101C	C	C*	C,E		E,C P	P,C						E,C			E,C				
SOV-TCV-408E (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS207A	C*		E C*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408F (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS207B	C*		E C*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408G (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS208A	C*		E C*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408H (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE - TCV-MS208B	C*		E C*	E,C	E,C P			P,C									E,C	C*	
20-AST-1	TURBINE TRIP SOLENOID VALVE UNIT 2	C	C	E,C	P,C E	E,C		P,C										E,C P	C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
20-AST-2	TURBINE TRIP SOLENOID VALVE UNIT 2	C	C	E,C	P,C E	E,C		P,C										E,C P	C*	
20-ET	TURBINE TRIP SOLENOID VALVE UNIT 2	C	C	E,C	P,C E	E,C		P,C										E,C P	C*	
SOV-MS201AA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201A		C		E,C	E,C P		P,C					E,C				E,C		C*	
SOV-MS101CB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101C	C		C,E	C E*	E,C P			P,C				E,C			E,C			C*	
EP-MS201A	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS201A	C*	C,E	C E*	C,E	E,C P			P,C								E,C		C*	
EP-MS201B	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS201B	C*	C,E	C E*	C,E	E,C P			P,C								E,C		C*	
EP-MS201C	I/P CONVERTER - MAIN STEAM POWER OPERATED ATMOSPHERIC RELIEF VALVE - RV-MS201C	C*	C,E	C E*	C,E	E,C P			P,C								E,C		C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-TCV-408A (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE TCV-MS205A	C*		C E*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408B (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE TCV-MS205B	C*		C E*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408C (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE TCV-MS206A	C*		C E*	E,C	E,C P			P,C									E,C	C*	
SOV-TCV-408D (20A), (20B), (20C)	SOLENOID VALVE - MAIN STEAM DUMP VALVE TCV-MS206B	C*		C E*	E,C	E,C P			P,C									E,C	C*	
SOV-MS201AB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201A	C*	C	E C*	E,C	E,C P			P,C				E,C				E,C		C*	
SOV-MS201BA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201B		C		E,C	E,C P		P,C					E,C				E,C		C*	
SOV-MS201BB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201B	C*	C	E C*	E,C	E,C P			P,C				E,C				E,C		C*	
SOV-MS201CA	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201C		C		E,C	E,C P		P,C					E,C				E,C		C*	

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-MS201CB	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201C	C*	C	E C*	E,C	E,C P			P,C				E,C				E,C		C*	
SOV-MS101AC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101A	C	C*	E,C		E,C P	P,C						E,C			E,C				
SOV-MS101BC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101B	C	C*	E,C		E,C P	P,C						E,C			E,C				
SOV-MS101CC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101C	C	C*	E,C		E,C P	P,C						E,C			E,C				
SOV-MS101AD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101A	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	
SOV-MS101BD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101B	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	
SOV-MS101CD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101C	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	
SOV-MS101AE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101A	C	C*	E,C			P,C						E,C P							

TABLE 4-1

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION	FIRE AREA 1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-MS101BE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101B	C	C*	E,C			P,C						E,C P							
SOV-MS101CE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS101C	C	C*	E,C			P,C						E,C P							
SOV-MS201AC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201A		C		E,C	E,C P		P,C					E,C				E,C		C*	
SOV-MS201BC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201B		C		E,C	E,C P		P,C					E,C				E,C		C*	
SOV-MS201CC	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201C		C		E,C	E,C P		P,C					E,C				E,C		C*	
SOV-MS201AD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201A	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	
SOV-MS201BD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201B	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	
SOV-MS201CD	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201C	C*		E C*	E C*	E,C P			P,C				E,C					C	C*	

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
SOV-MS201AE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201A	C*	C	E C* P	E,C P				P,C				E,C P						C*	
SOV-MS201BE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201B	C*	C	E C* P	E,C P				P,C				E,C P						C*	
SOV-MS201CE	SOLENOID VALVE - MAIN STEAM ISOLATION VALVE - TV-MS201C	C*	C	E C* P	E,C P				P,C				E,C P						C*	
TE-1410A	COLD LEG TRAIN B	C	C	E,C P	E,C P		P,C	P,C			E,C		C					E,C P	C*	
TE-1420A	COLD LEG TRAIN B	C	C	E,C P	E,C P		P,C	P,C			E,C		C					E,C P	C*	
TE-1430	COLD LEG TRAIN B	C	C*	E,C P		E,C P	P,C				E,C		C*							
LP1C1	LIGHTING PANEL 1C1	C	C*	C,E P		E,C	P,C						C*					E,C P		
LP2C1	LIGHTING PANEL 2C1		C		E,C P	E,C		P,C										E,C P	C*	
LP1EC1	EMERGENCY LIGHTING PANEL 1EC1	C	C*	E,C P		E,C	P,C						C*					E,C P		
LP2EC1	EMERGENCY LIGHTING PANEL 2EC1				E,C P	E,C		P,C											C*	

CABLE AND EQUIPMENT SEPARATION

EQUIPMENT	DESCRIPTION / FIRE AREA	1	2	3	4	5	6	7	8	12	15	16	17	18A	18B	19	20	31	45	54
TE-2410A	COLD LEG TRAIN B	C	C	E,C P	E,C P		P,C	P,C				E,C	C					E,C P	C*	
TE-2430A	COLD LEG TRAIN B	C	C	E,C P	E,C P		P,C	P,C				E,C	C					E,C P	C*	
TE-2420	COLD LEG TRAIN A	C*	C	E C*	E,C	E,C P			P,C			E,C							C*	
EDG #1	EMERG. DIESEL GEN. #1 (4160V BUS 1H)	C	C	E,C		E,C	P,C						C					E,C		
EDG #2	EMERG. DIESEL GEN. #2 (4160V BUS 2H)				E,C	E,C		P,C										E,C	C	
EDG #3 (NOTES 1,3)	EMERG. DIESEL GEN. #3 (4160V BUS 1J)	C		E,C	E,C	E,C			P,C									E,C	C	
EDG #3 (NOTES 1,3)	EMERG. DIESEL GEN. #3 (4160V BUS 2J)	C		E,C	E,C	E,C			P,C									E,C	C	
PNL-REM	APP. "R" UNIT 1 FEED-REMOTE MON. PANEL	C	C	E,C P			P,C						C*					E,C		
PNL-REM	APP. "R" UNIT 2 FEED-REMOTE MON. PANEL		C		E,C P			P,C										E,C	C*	

NOTES:

* = INDICATES CABLE FOR DIESEL GENERATOR ONLY.
E = EQUIPMENT
P = POWER SUPPLY
C = CABLES (POWER, CONTROL AND INST.)

1. ROUTING FOR EMERGENCY DIESEL GENERATOR NO. 3 4160V BUS 1J AND BUS 2J ARE SHOWN SEPARATELY.
2. CABLE LOCATIONS BASED ON REVIEW OF DRAWINGS 11448-FE-51A, FE-51H, AND LSK-20-2.
3. CABLE ROUTING FOR EDG #3 BASED ON PROPOSED MODIFICATION III.14 (CHAPTER 6). THIS TABLE MAY REQUIRE REVISION BASED ON FINAL MODIFICATION.

ATTACHMENT TO TABLE 4-1

Fire Area	
1	Unit 1 Cable Vault/Tunnel
2	Unit 2 Cable Vault/Tunnel
3	Unit 1 Emergency Switchgear and Relay Room
4	Unit 2 Emergency Switchgear and Relay Room
5	Control Room
6	Emergency Diesel Generator Room No. 1
7	Emergency Diesel Generator Room No. 2
8	Emergency Diesel Generator Room No. 3
12	Battery Room 2B
15	Unit 1 Reactor Containment
16	Unit 2 Reactor Containment
17	Auxiliary, Fuel, and Decontamination Buildings
18A	Fuel Oil Pump House - Room 1
18B	Fuel Oil Pump House - Room 2
19	Unit 1 Safeguards Area
20	Unit 2 Safeguards Area
31	Turbine Building
45	Mechanical Equipment Room No. 3
54	Charging Pump Cooling Water Pump Room

FIRE AREA EVALUATION MATRIX

FIRE AREA 1 Unit 1 Cable Vault and Tunnel

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	NO				YES
Chemical and Volume Control	NO	NO				YES
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	NO	YES (2)				
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)				
Component Cooling Water	NO	YES (NOTE 3)				
Service Water	YES					
Charging Pump Cooling Water	NO	NO				YES

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUESTS: EXEMPTIONS #12 AND 16 REQUESTED FOR FIRE BARRIER RATING. EXEMPTION #6 REQUESTED FOR FIRE DOORS.
(2) - A REPAIR MAY BE REQUIRED TO ESTABLISH COMMUNICATIONS INSIDE UNIT 1 CONTAINMENT.
(3) - A REPAIR MAY BE REQUIRED TO ONE CCW PUMP IF ONE OF THE UNIT 2 CCW PUMPS IS OUT OF SERVICE.

TABLE 4-2.B

FIRE AREA EVALUATION MATRIX

FIRE AREA 2 Unit 2 Cable Vault and Tunnel

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE: 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE: 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE: 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	NO				YES
Chemical and Volume Control	NO	NO				YES
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	NO	YES (2)				
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)				
Component Cooling Water	NO	YES (NOTE 3)				
Service Water	YES					
Charging Pump Cooling Water	NO	NO				YES

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTIONS #12 AND 16 REQUESTED FOR FIRE BARRIER RATING. EXEMPTION #6 REQUESTED FOR FIRE DOORS.
(2) - A REPAIR MAY BE REQUIRED TO ESTABLISH COMMUNICATIONS INSIDE UNIT 1 CONTAINMENT.
(3) - A REPAIR MAY BE REQUIRED TO ONE CCW PUMP IF ONE OF THE UNIT 1 CCW PUMPS IS OUT OF SERVICE.

TABLE 4-2.C

FIRE AREA EVALUATION MATRIX

FIRE AREA <u>3 Unit 1 Emergency Switchgear Room</u>

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	NO				YES
Chemical and Volume Control	NO	NO				YES
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	NO	NO				YES
Ventilation	NO	NO				YES
Communications	NO	NO	YES			
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)				
Component Cooling Water	NO	YES (NOTE 2)				
Service Water	NO	YES				
Charging Pump Cooling Water	NO	NO				YES

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - <u>EXEMPTION REQUEST</u>: EXEMPTION #6 REQUESTED FOR FIRE DOORS.
(2) - A REPAIR MAY BE REQUIRED TO ONE CCW PUMP IF ONE OF THE UNIT 2 CCW PUMPS IS OUT OF SERVICE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 4 Unit 2 Emergency Switchgear Room

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	NO				YES
Chemical and Volume Control	NO	NO				YES
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	NO	NO				YES
Ventilation	NO	NO				YES
Communications	NO	YES				
Charging Pump Service Water	NO	NO		YES		
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)				
Component Cooling Water	NO	YES (NOTE 2)				
Service Water	NO	YES				
Charging Pump Cooling Water	NO	NO				YES

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTIONS #6, 7, 8 REQUESTED FOR FIRE DOORS. EXEMPTIONS #11 AND 13 REQUESTED FOR FIRE BARRIER RATING.
(2) - A REPAIR MAY BE REQUIRED TO ONE CCW PUMP IF ONE OF THE UNIT 1 CCW PUMPS IS OUT OF SERVICE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 5 Unit 1 and 2 Control Room

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant - Unit 1	NO	NO				YES
Reactor Coolant - Unit 2	NO	NO				YES
Chemical and Volume Control-Unit 1	NO	NO				YES
Chemical and Volume Control-Unit 2	NO	NO				YES
Auxiliary Feedwater - Unit 1	NO	NO				YES
Auxiliary Feedwater - Unit 2	NO	NO				YES
Main Steam - Unit 1	NO	NO				YES
Main Steam - Unit 2	NO	NO				YES
Emergency Electrical - Unit 1	NO	NO				YES
Emergency Electrical - Unit 2	NO	NO				YES
Ventilation	NO	NO				YES
Communications	NO	YES				
Charging Pump Service Water - Unit 1	NO	NO				YES
Charging Pump Service Water - Unit 2	NO	NO				YES

FIRE AREA EVALUATION MATRIX

FIRE AREA 5 Unit 1 and 2 Control Room (Continued)

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
COLD SHUTDOWN						
Residual Heat Removal - Unit 1	NO	NO				YES
Residual Heat Removal - Unit 2	NO	NO				YES
Component Cooling Water - Unit 1	NO	NO				YES
Component Cooling Water - Unit 2	NO	NO				YES
Service Water - Unit 1	NO	NO				YES
Service Water - Unit 2	NO	NO				YES
Charging Pump Cooling Water - Unit 1	NO	NO				YES (REPAIRS)
Charging Pump Cooling Water - Unit 2	NO	NO				YES (REPAIRS)

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION GRANTED FOR NO AUTOMATIC SUPPRESSION IN THE CONTROL ROOM (SEE TABLE 1-1). EXEMPTIONS #6 AND 8 REQUESTED FOR FIRE DOORS. EXEMPTION #11 REQUESTED FOR FIRE BARRIER RATING. EXEMPTION #21 REQUESTED FOR EMERGENCY LIGHTING SUPPLIED BY DIESEL GENERATORS.

FIRE AREA EVALUATION MATRIX

FIRE AREA 6 Diesel Generator Room No. 1

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE: 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE: 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE: 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Chemical and Volume Control	NO	YES				
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	NO	YES				
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	NO	YES				
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal'	NO	YES				
Component Cooling Water	NO	YES				
Service Water	NO	YES				
Charging Pump Cooling Water	NO	YES				

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #6 AND 10 REQUESTED FOR FIRE DOORS.

FIRE AREA EVALUATION MATRIX

FIRE AREA 7 Diesel Generator Room No. 2

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Chemical and Volume Control	NO	YES				
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	NO	YES				
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	NO	YES				
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	NO	YES				
Component Cooling Water	NO	YES				
Service Water	NO	YES				
Charging Pump Cooling Water	NO	YES				

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #6 AND 10 REQUESTED FOR FIRE DOORS.

FIRE AREA EVALUATION MATRIX

FIRE AREA 8 Diesel Generator Room No. 3

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Chemical and Volume Control	NO	YES				
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	NO	YES				
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	NO	YES				
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	NO	YES				
Component Cooling Water	NO	YES				
Service Water	NO	YES				
Charging Pump Cooling Water	NO	YES				

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #6 AND 10 REQUESTED FOR FIRE DOORS.

FIRE AREA EVALUATION MATRIX

FIRE AREA 12 Battery Room 2B

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Chemical and Volume Control	NO	YES				
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	YES					
Emergency Electrical	NO	YES				
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	NO	YES				

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #9 REQUESTED FOR FIRE DOOR.

TABLE 4-2.K

FIRE AREA EVALUATION MATRIX

FIRE AREA 15 Reactor Containment

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	NO	NO	YES		YES (1)	
Chemical and Volume Control	NO	NO				YES (2)
Auxiliary Feedwater	NO	YES (3)				
Main and Auxiliary Steam	NO	NO			YES (1)	
Emergency Electrical	YES					
Ventilation	YES					
Communications	NO	NO (REPAIR)				
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)	YES			
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:
* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #2 REQUESTED FOR EXCORE DETECTION SEPARATION. EXEMPTION #17 REQUESTED FOR PROCESS VARIABLE SEPARATION.
(2) - EXEMPTION REQUEST: EXEMPTIONS #14 AND 15 REQUESTED FOR EMERGENCY LIGHTING AND LETDOWN VALVE OPERATION, RESPECTIVELY.
(3) - AFW DISCHARGE VALVES ARE PASSIVE COMPONENTS THAT ARE NORMALLY OPEN AND WILL BE DEENERGIZED POST-FIRE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 16 Unit 2 Reactor Containment

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	NO	YES		YES (1)	
Chemical and Volume Control	NO	NO				YES (2)
Auxiliary Feedwater	NO	YES (3)				
Main and Auxiliary Steam	NO	NO			YES (1)	
Emergency Electrical	YES					
Ventilation	YES					
Communications	NO	NO (REPAIR)				
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	NO	NO (REPAIRS)	YES			
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:
* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #2 REQUESTED FOR EXCORE DETECTION SEPARATION. EXEMPTION #17 REQUESTED FOR PROCESS VARIABLE SEPARATION.
(2) - EXEMPTION REQUEST: EXEMPTIONS #14 AND 15 REQUESTED FOR EMERGENCY LIGHTING AND LETDOWN VALVE OPERATION, RESPECTIVELY.
(3) - AFW DISCHARGE VALVES ARE PASSIVE COMPONENTS THAT ARE NORMALLY OPEN AND WILL BE DEENERGIZED POST-FIRE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 17 Auxiliary Building, Fuel Building, and Decontamination Building

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Reactor Coolant	NO	YES				
Chemical and Volume Control-Unit 1	NO	NO	YES (3)			YES (2)
Chemical and Volume Control-Unit 2	NO	NO	YES (3)			YES (2)
Auxiliary Feedwater - Unit 1	YES					
Auxiliary Feedwater - Unit 2	YES					
Main Steam - Unit 1	NO	YES				
Main Steam - Unit 2	NO	YES				
Emergency Electrical - Unit 1	YES					
Emergency Electrical - Unit 2	YES					
Ventilation	NO				YES	
Communications	NO	YES				
Charging Pump Service Water - Unit 1	NO	NO		YES		
Charging Pump Service Water - Unit 2	NO	NO		YES		

FIRE AREA EVALUATION MATRIX

FIRE AREA 17 Auxiliary Building, Fuel Building, and Decontamination Building (Continued)

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
COLD SHUTDOWN						
Residual Heat Removal - Unit 1	YES					
Residual Heat Removal - Unit 2	YES					
Component Cooling Water - Unit 1	NO	NO (REPAIRS)				
Component Cooling Water - Unit 2	NO	NO (REPAIRS)				
Service Water - Unit 1	YES					
Service Water - Unit 2	YES					
Charging Pump Cooling Water - Unit 1	NO	NO				YES (1,4)
Charging Pump Cooling Water - Unit 2	NO	NO				YES (1,4)

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTIONS #1 AND 18 REQUESTED FROM FULL AREA SUPPRESSION AND DETECTION. EXEMPTIONS #13 AND 16 REQUESTED FOR FIRE BARRIER RATING. EXEMPTION #6 REQUESTED FOR FIRE DOORS.
(2) - REENTRY INTO THE AUXILIARY BUILDING IS REQUIRED TO MANUALLY ALIGN THE CHARGING PUMP CROSS-CONNECT VALVES TO ACHIEVE HOT SHUTDOWN. AN ENGINEERING EVALUATION ON THIS SUBJECT HAS BEEN PERFORMED AND IS AVAILABLE IN VOLUME 4 OF THIS REPORT.
(3) - UNIT 1 CHARGING PUMP CUBICLES ARE SEPARATED FROM UNIT 2 CHARGING PUMP CUBICLES BY A THREE-HOUR BARRIER.
(4) - THE CHARGING PUMP CROSS-CONNECT VALVES WILL BE MANUALLY ALIGNED TO ACHIEVE COLD SHUTDOWN USING THE OPPOSITE UNIT'S CHARGING PUMPS AND CHARGING PUMP COOLING WATER PUMPS.

FIRE AREA EVALUATION MATRIX

FIRE AREA 18A Fuel Oil Pump House Room 1

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	YES					
Main and Auxiliary Steam	YES					
Emergency Electrical	NO	YES				
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #25 REQUESTED FOR FIRE BARRIER IN ADJACENT MANHOLE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 18B Fuel Oil Pump House Room 2

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	YES					
Main and Auxiliary Steam	YES					
Emergency Electrical	NO	YES				
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #25 REQUESTED FOR FIRE BARRIER IN ADJACENT MANHOLE.

FIRE AREA EVALUATION MATRIX

FIRE AREA 19 Unit 1 Safeguards Area

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE: 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE: 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE: 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	YES					
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #4 REQUESTED FROM FIXED FIRE SUPPRESSION.

FIRE AREA EVALUATION MATRIX

FIRE AREA 20 Unit 2 Safeguards Area

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	NO	NO				YES
Main and Auxiliary Steam	NO	NO				YES
Emergency Electrical	YES					
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	YES					
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #4 REQUESTED FROM FIXED FIRE SUPPRESSION.

FIRE AREA EVALUATION MATRIX

FIRE AREA 31 Turbine Building

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE			III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
			3 HR (OR RADIANT ENERGY SHIELD*)	1 HR+SUP+DET (OR SUP+DET*)	20'+SUP+DET +NIC (OR 20'+NIC*)	
HOT SHUTDOWN						
Reactor Coolant	NO	YES				
Chemical and Volume Control	YES					
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	NO	YES				
Emergency Electrical	YES					
Ventilation	NO	YES				
Communications	NO	YES				
Charging Pump Service Water	NO	NO		YES		
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	NO	YES				
Charging Pump Cooling Water	NO	YES				

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #3 REQUESTED FOR DETECTION. EXEMPTIONS #6, 7, 9, AND 10 REQUESTED FOR FIRE DOORS. EXEMPTION #13 REQUESTED FOR FIRE BARRIER.

FIRE AREA EVALUATION MATRIX

FIRE AREA 45 Mechanical Equipment Room No. 3

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE: 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE: 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE: 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	NO	YES				
Main and Auxiliary Steam	YES					
Emergency Electrical	NO	YES				
Ventilation	NO	YES				
Communications	YES					
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES
(1) - EXEMPTION REQUEST: EXEMPTION #5 REQUESTED FOR FIXED SUPPRESSION.

TABLE 4-2.U HAS BEEN INTENTIONALLY DELETED

TABLE 4-2.V HAS BEEN INTENTIONALLY DELETED

FIRE AREA EVALUATION MATRIX

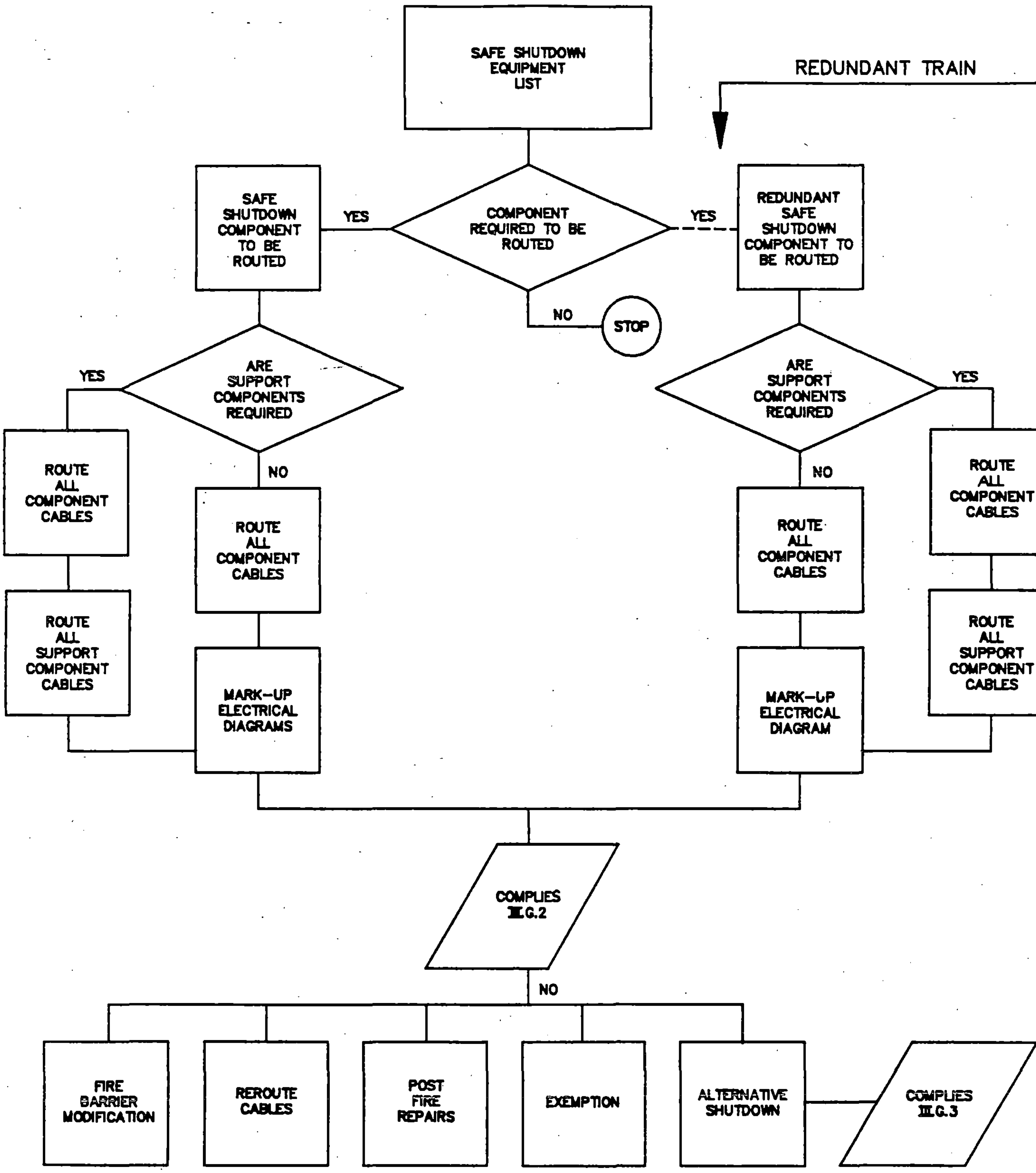
FIRE AREA 54 Charging Pump Service Water Pump Room

SYSTEMS	COMPLETE SYSTEM OUTSIDE THE AREA	SUFFICIENT EQUIPMENT (1 TRAIN) OUTSIDE THE AREA	III.G.2 COMPLIANCE 3 HR (OR RADIANT ENERGY SHIELD*)	III.G.2 COMPLIANCE 1 HR+SUP+DET (OR SUP+DET*)	III.G.2 COMPLIANCE 20'+SUP+DET +NIC (OR 20'+NIC*)	III.G.3 COMPLIANCE, ALTERNATIVE SHUTDOWN REQUIRED
HOT SHUTDOWN						
Reactor Coolant	YES					
Chemical and Volume Control	YES					
Auxiliary Feedwater	YES					
Main and Auxiliary Steam	YES					
Emergency Electrical	YES					
Ventilation	YES					
Communications	YES					
Charging Pump Service Water	NO	YES				
COLD SHUTDOWN						
Residual Heat Removal	YES					
Component Cooling Water	YES					
Service Water	YES					
Charging Pump Cooling Water	YES					

NOTES:

* - IN CONTAINMENT ONLY
NIC - NO INTERVENING COMBUSTIBLES

CABLE SEPARATION ANALYSIS



VIRGINIA POWER SURRY POWER STATION UNITS 1 & 2	CABLE SEPARATION ANALYSIS	FIGURE NO. 4.1 CAD NO. SU1FIG41

5. POST-FIRE SAFE SHUTDOWN

5.1 Objective

This chapter of the report describes the means of achieving the safe shutdown performance goals for fires in specific areas of the plant. It will demonstrate the achievement of safe shutdown within the constraints of the available manpower and time limitations based on a worst case fire scenario. The timeline concept will be used to detail the integrated use of alternative shutdown controls, manual operations and post-fire repairs in the achievement of hot and cold shutdown.

5.2 Introduction to Post-Fire Safe Shutdown

As defined in Chapter 3, the term "safe shutdown" is used to describe the unique actions which are required to safely shut down the plant. The goal of the Appendix R analysis at Surry was to ensure the survival of at least one train of safe shutdown equipment from a fire anywhere in the plant. The result of this analysis has been the verification of an independent means to achieve safe shutdown for each fire area in accordance with Section III.G.1 or proposed modifications in accordance with Sections III.G.2 or III.G.3. In other words, for a fire in any given area of the plant there exists equipment which would survive the fire in that area which is sufficient to achieve safe shutdown.

The safe shutdown system at Surry takes advantage of the physical redundancy and diversity inherent in nuclear power plant design. Corrective actions are taken where this redundancy and diversity does not comply with the technical requirements of Appendix R. These actions can either take the form of fire barrier enhancements to achieve compliance with the regulation, or the design of an alternative means of achieving safe shutdown for the specific area. Modifications have been proposed where it is feasible to protect the safe shutdown capability via the installation or modification of fire barriers. Chapter 6 details these modifications. Where the installation or modification of fire barriers is not a viable means of compliance, an alternative means of achieving safe shutdown has been proposed. The alternative means of achieving safe shutdown is detailed in this section.

The safe shutdown capability for each fire area is designed to achieve the performance goals stated in Chapter 3. The achievement of the safe shutdown performance goals is accomplished by utilizing the following methodologies:

(1) Adequate Separation - One redundant train of safe shutdown equipment remaining free of fire damage.

(2) Alternative Shutdown Capability - Modifying, rerouting or relocating existing systems to be independent of an area.

(3) Local Operation - The manual "hands on" manipulation of a component.

(4) Post-Fire Repair - The regaining of system operation via temporary post-fire modification.

These safe shutdown methodologies will be used singularly or in combination with one another to provide a means of achieving safe shutdown independent of a given fire area.

It is necessary to verify the operational feasibility of this safe shutdown system because of the reliance on physically separated Auxiliary Shutdown Panels, Remote Monitoring Panels, manual operator actions, and post-fire repairs. This verification requires the demonstration of adequate manpower levels, sufficient response times and sequencing, and detailed procedures for coordinating the operations and repairs.

5.3 Post-Fire Safe Shutdown Features

This subsection describes the major features of the safe shutdown system. Included in this description are the locations and capabilities of the auxiliary control and monitoring panels, and the basis for manual operation of components and the proposed post-fire repairs.

5.3.1 Remote Monitoring Panels

Alternative shutdown capability has been provided for the primary system process monitoring parameters that need to be monitored for safe shutdown. The Remote Monitoring Panels located in the Unit 1 Cable Spreading Room provide the indications listed in Table 5-1 for each unit. The instrument loops that are used for the Remote Monitoring Panels are independent of the normal instrument circuit routing to the Control Room. The power source for the instrumentation can be supplied from either unit and is therefore independent of the normal instrument power supplies (see Chapter 6, Modification I-11). The Remote Monitoring Panels have been designed to provide alternative shutdown capability for the primary and secondary process monitoring variables independent of the Cable Vault and Tunnel, Emergency Switchgear Room, and Control Room.

5.3.2 Auxiliary Shutdown Panel

The Auxiliary Shutdown Panel, located in the Emergency Switchgear Room of each unit, is an alternate means of bringing the plant to a hot shutdown condition. In the case of the Control Room becoming inaccessible due to a fire, the plant may be safely controlled and monitored from the Auxiliary Shutdown Panel for an extended period of time. A list of instruments and controls included on these panels is given in (Tables 5-2a and 5-2b.

5.3.3 Local Diesel Generator Control

Emergency Diesel Generator 1 is provided with local control isolation independent of the Control Room. The Control Panels are located in the Emergency Diesel Generator Room and in the Emergency Switchgear Room. The control panels provide isolation from the Control Room along with local control, indication, and metering capabilities for the Emergency Diesel Generator and the 4.16kV emergency bus breakers (see Table 5-3a and 5-3b).

5.3.4 Unit Cross-Connect Capability

The Service Water (SW) and Component Cooling Water (CCW) Systems are common to both units. During normal operation the static head of water in the intake canal provides SW to each unit. Three diesel-powered emergency service water pumps supply makeup to the canal and are shared by both units. For post-fire situations affecting the intake canal level, the emergency service water pumps would be used to supply makeup water to the intake canal. The service water system supplies flow to the component cooling heat exchangers of both units.

The CCW system is cross-connected on the discharge side of the heat exchangers. Two of the four CCW pumps are powered from each unit. For a fire anywhere but in the Auxiliary Building or Control Room, two of the pumps would be available from the other unit to supply cooling to both the affected and unaffected unit. For a fire in the Control Room, local operation of the pump breakers will be used to supply power to the pumps. A post-fire repair will be used for a fire in the Auxiliary Building which damages the power cables of the pump.

The discharge header of the charging pumps and the auxiliary feedwater pumps are cross-connected such that the pumps of either unit can supply makeup flow to the other unit. The RWST is cross-connected to provide additional makeup, if needed.

5.3.5 Local Operations

The local operation of mechanical equipment, as allowed by Appendix R and clarified in the Mattson-Vollmer letter[1], can be used to achieve both hot and cold shutdown. The only restrictions on local operation of equipment are that the equipment be accessible and the operation be achievable prior to reaching an unrecoverable plant condition. In addition, written procedures must be in effect to conduct an orderly transfer of control between the local control stations and the Control Room.

Local operation of CVCS, AFW, RHR, SW, and CCW systems has been proposed as an alternative to remote control from the Control Room. Local operation of the components in these systems will be used in the event of fire damage that disables the motive power, control, or instrumentation circuits of the components.

Local operation of several air-operated valves will be regained via the post-fire connection of air bottles and jumpers to reposition the valves.

5.3.6 Post-Fire Repair

A post-fire repair capability for cold shutdown has been proposed to re-establish power to one RHR and two CCW pumps in the event of fire-induced damage to the power cables of redundant pumps. Cables of adequate capacity with the proper terminations will be available on-site along with written procedures to accomplish either repair. Also, a repair procedure has been developed for the CPCW pumps to permit control from their respective Emergency Switchgear Rooms.

5.3.7 Emergency Lighting

As part of the Appendix R reanalysis effort, illumination duration testing and "walkability" testing has been performed on all areas requiring access and egress to safe shutdown components to enable operation of the components. As a result of this testing, modifications are required to achieve compliance with 10 CFR 50 Appendix R, Section III.J as described in Chapter 6, Modification II-1. It should be noted that exemptions have been requested in several areas regarding emergency lighting (see Chapter 7, Exemption Request Nos. 14 and 21).

5.3.8 Communications

The emergency communications system has been reviewed as part of the recent Appendix R reanalysis. As a result of this review, modifications are required that upgrade the capability of the system to allow communications between areas required for safe shutdown. Radio communications can be established through the use of handsets and a centrally located repeater and antenna upon the loss of Gai-Tronics. In addition, a paging system will be available for use by on-shift operators and fire brigade members. These modifications are discussed in Chapter 6 (Modification I-3) of this report.

5.3.9 Ventilation

The ventilation requirements for safe shutdown equipment were reviewed. As a result of this review, a modification is required to reroute the cable for one of the charging pump cubicle supply fans such that separation requirements comply with Appendix R. Additional modifications are required to ensure Control Room and Emergency Switchgear Room ventilation at all times. See Chapter 6 (Modification I-10) of this report for more detail.

5.4 Description of Post-Fire Safe Shutdown

In order to demonstrate that there are sufficient manpower resources and response time to operate the systems and equipment required for safe shutdown, a worst case fire scenario is included as an example in Attachment 1 to Chapter 5.

NOTE

> It must be emphasized that this description of the worst case scenario is not intended to prescribe mandatory operator actions. The intent of this scenario is to demonstrate compliance with Appendix R regulation for a worst case fire. Because actual fires can cause a range of damage, the post-fire procedures are written for this range of fire damage, up to the worst case fire, and allow discretion on the part of the Shift Supervisor to use the available means and the optimum sequence of operations to achieve safe shutdown for fires of lesser magnitude than the worst case fire.

REFERENCES

(1) Memorandum to Mr. R. H. Vollmer from Dr. R. J. Mattson, SUBJECT: "Position Statement on Allowable Repairs for Alternative Shutdown and on the Appendix R Requirement for Time Required to Achieve Cold Shutdown," dated July 2, 1982.

TABLE 5-1

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNITS 1 AND 2
SAFE SHUTDOWN EQUIPMENT

REMOTE MONITORING PANELS

1) Panel PNL-REM (located in the Unit 1 Cable Spreading Room) contains the following Unit 1 equipment, and similar equipment for Unit 2:

a)	PI-MS137A	Steam Generator A Pressure
b)	PI-MS137B	Steam Generator B Pressure
c)	TI-1410A	Loop 1 Cold Leg Temperature
d)	TI-1420A	Loop 2 Cold Leg Temperature
e)	NFI-190	Source Range Neutron Flux
f)	NFI-1270	Wide Range Neutron Flux

2) Panel ASC RMP-1 (located in the Unit 1 Cable Spreading Room) contains the following Unit 1 equipment, and similar equipment for Unit 2:

a)	PI-1449	Reactor Coolant System Pressure
b)	LI-1459A	Pressurizer Level
c)	LI-1477A	Steam Generator A Level
d)	LI-1487A	Steam Generator B Level
e)	LI-1497A	Steam Generator C Level
f)	TI-1413-2	Reactor Coolant Hot Leg Temperature
g)	TI-1423-2	Reactor Coolant Hot Leg Temperature

The Remote Monitoring Panels are common to both units. Selector switches are provided to align either Unit 1 or Unit 2 instrument transmitter outputs to the panel's common meters.

Power is supplied by vital bus inverters 1-III and 2-III.

TABLE 5-2a

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1
SAFE SHUTDOWN EQUIPMENT

AUXILIARY SHUTDOWN PANEL

1) The following equipment control circuits at the Auxiliary Shutdown Panel (located in the Emergency Switchgear Room) are electrically isolated from the Control Room by local transfer switches:

a)	1-CH-P-1A	Charging Pump A
b)	1-CH-P-1B	Charging Pump B
c)	1-CH-P-1C	Charging Pump C
d)	1-FW-P-3A	Aux. Feedwater M.D. Pump A
e)	1-FW-P-3B	Aux. Feedwater M.D. Pump B
f)	1-FW-P-2	Aux. Feedwater T.D. Pump
g)	1-CH-P-2A	Boric Acid Transfer Pump A
h)	1-CH-P-2B	Boric Acid Transfer Pump B
i)	MOV-FW151A,B	Aux. Feedwater Discharge to SG C
j)	MOV-FW151C,D	Aux. Feedwater Discharge to SG B
k)	MOV-FW151E,F	Aux. Feedwater Discharge to SG A
l)	LI-1497B	Steam Generator "C" Wide Range Level Indication
m)	LI-1487B	Steam Generator "B" Wide Range Level Indication
n)	LI-1477B	Steam Generator "A" Wide Range Level Indication
o)	PI-MS-101C	Main Steam Header "C" Pressure Indication
p)	PI-MS-101B	Main Steam Header "B" Pressure Indication
q)	PI-MS-101A	Main Steam Header "A" Pressure Indication
r)	PI-1464B	Main Steam Pressure Indicator
s)	PI-1444A	Pressurizer Pressure Indicator
t)	FI-1222B	Charging Flow Indicator
u)	LI-1459B	Pressurizer Wide Range Level Indication
v)	1-14H2A1/ 1-14J9A1	Pressurizer Heaters (Backup Groups)

TABLE 5-2a (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1
SAFE SHUTDOWN EQUIPMENT

AUXILIARY SHUTDOWN PANEL

2) The balance of the equipment control circuits and all of the indications at the Auxiliary Shutdown Panel are not electrically isolated from the Control Room. However, other means exist for proper control of this equipment should the above mentioned circuitry become damaged by a fire.

a)	MOV-1350	Boric Acid Filter Discharge to Charging Pump Suction
b)	HCV-MS104	Decay Heat Release Valve
c)	FCV-1122	Charging Flow Control Valve

TABLE 5-2b

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2
SAFE SHUTDOWN EQUIPMENT

AUXILIARY SHUTDOWN PANEL

1) The following equipment control circuits at the Auxiliary Shutdown Panel (located in the Emergency Switchgear Room) are electrically isolated from the Control Room by local transfer switches:

a)	2-CH-P-1A	Charging Pump A
b)	2-CH-P-1B	Charging Pump B
c)	2-CH-P-1C	Charging Pump C
d)	2-FW-P-3A	Aux. Feedwater M.D. Pump A
e)	2-FW-P-3B	Aux. Feedwater M.D. Pump B
f)	2-FW-P-2	Aux. Feedwater T.D. Pump
g)	2-CH-P-2A	Boric Acid Transfer Pump A
h)	2-CH-P-2B	Boric Acid Transfer Pump B
i)	MOV-FW251A,B	Aux. Feedwater Discharge to SG C
j)	MOV-FW251C,D	Aux. Feedwater Discharge to SG B
k)	MOV-FW251E,F	Aux. Feedwater Discharge to SG A
l)	LI-2497B	Steam Generator "C" Wide Range Level Indication
m)	LI-2487B	Steam Generator "B" Wide Range Level Indication
n)	LI-2477B	Steam Generator "A" Wide Range Level Indication
o)	PI-MS-201C	Main Steam Header "C" Pressure Indication
p)	PI-MS-201B	Main Steam Header "B" Pressure Indication
q)	PI-MS-201A	Main Steam Header "A" Pressure Indication
r)	PI-2464B	Main Steam Pressure Indicator
s)	PI-2444A	Pressurizer Pressure Indicator
t)	FI-2222B	Charging Flow Indicator
u)	LI-2459B	Pressurizer Wide Range Level Indication
v)	2-14H2A1/ 2-14J9A1	Pressurizer Heaters (Backup Groups)

TABLE 5-2b (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2
SAFE SHUTDOWN EQUIPMENT

AUXILIARY SHUTDOWN PANEL

2) The balance of the equipment control circuits and all of the indications at the Auxiliary Shutdown Panel are not electrically isolated from the Control Room. However, other means exist for proper control of this equipment should the above mentioned circuitry become damaged by a fire.

a)	MOV-2350	Boric Acid Filter Discharge to Charging Pump Suction
b)	HCV-MS204	Decay Heat Release Valve
c)	FCV-2122	Charging Flow Control Valve

TABLE 5-3a

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1
SAFE SHUTDOWN EQUIPMENT

DIESEL GENERATOR LOCAL CONTROL
DIESEL ISOLATION CONTROL PANELS

I) Panel 1DIP-ESRH (located in Emergency Switchgear Room) contains the following equipment:

1) Emergency Generator 1H Differential Relay
2) Emergency Generator 1H Differential Lockout Relay
3) Auxiliary Relay
4) Current Transducer
5) Excore Flux Monitor Power Supply Transfer Switch

II) Panel 1DIP-DGRH (located in Emergency Diesel Generator Room No. 1) will be used to locally start and operate emergency diesel generator train 1H. The local panel contains the following emergency diesel generator indications and controls:

1) Emergency Generator 1H Incoming Voltmeter
2) Emergency Generator 1H Syncroscope
3) Emergency Generator 1H Running Voltmeter
4) 4.16kV Emergency Bus 1H Voltmeter Switch
5) 4.16kV Emergency Bus 1H Voltmeter
6) 4.16kV Emergency Bus 1H MW Meter
7) 4.16kV Emergency Bus 1H MVAR Meter
8) 4.16kV Emergency Bus 1H Frequency Meter
9) Emergency Generator 1H Diesel Isolation Switch Lockout Relay
10) Emergency Generator 1H Diesel Isolation Switch
11) Emergency Generator 1H Governor Raise/Lower Switch
12) Emergency Generator 1H Voltage Raise/Lower Switch
13) Emergency Generator 1H Fast Start Defeat Switch
14) 4.16kV Emergency Bus 1H Emergency Supply Breaker 15H3 Synchronizing Switch
15) 4.16kV Emergency Bus 1H Emergency Supply Breaker 15H3 Control Switch
16) 4.16kV Emergency Bus 1H Normal Supply Breaker 15H8 Synchronizing Switch
17) 4.16kV Emergency Bus 1H Normal Supply Breaker 15H8 Control Switch

TABLE 5-3a (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1
SAFE SHUTDOWN EQUIPMENT

DIESEL GENERATOR LOCAL CONTROL
DIESEL ISOLATION CONTROL PANELS

18) Emergency Generator 1H Field Flash Switch
19) 4.16kV Emergency Bus 1H Normal Supply Breaker 15H8 Ammeter
20) 4.16kV Emergency Bus 1H Emergency Supply Breaker 15H3 Ammeter

III) Panel 1DIP-DGRJ (located in the Emergency Diesel Generator Room No. 3) will be used to locally start and operate the swing diesel generator. The local panel contains the following emergency diesel generator indications and controls:

1) Emergency Generator 3, Incoming Voltmeter
2) Emergency Generator 3, Synchroscope
3) Emergency Generator 3, Running Voltmeter
4) 4.16kV Emergency Bus 1J/2J Frequency Meter
5) 4.16kV Emergency Bus 1J/2J Bus Voltmeter
6) Emergency Generator 3, Unit 1, Diesel Isolation Switch
7) Emergency Generator 3, Unit 1, Diesel Isolation Switch Lockout Relay
8) Emergency Generator 3, Unit 1, Voltage Raise/Lower Switch
9) 4.16kV Emergency Bus 1J, Emergency Supply Breaker 15J3, Synchronizing Switch
10) 4.16kV Emergency Bus 1J, Emergency Supply Breaker 15J3, Control Switch
11) 4.16kV Emergency Bus 1J, Normal Supply Breaker 15J8, Synchronizing Switch
12) 4.16kV Emergency Bus 1J, Normal Supply Breaker 15J8, Control Switch
13) 4.16kV Emergency Bus 1J/2J MW Meter
14) 4.16kV Emergency Bus 1J/2J MVAR Meter
15) Emergency Generator 3, Unit 1, Governor Raise/Lower Switch
16) 4.16kV Emergency Bus 1J/2J Bus Voltmeter Switch
17) Unit 1/2 Selector Switch
18) 4.16kV Emergency Bus 1J Emergency Supply Breaker 15J3 Normal/Bypass Switch

TABLE 5-3a (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1
SAFE SHUTDOWN EQUIPMENT

DIESEL GENERATOR LOCAL CONTROL
DIESEL ISOLATION CONTROL PANELS

19) 4.16kV Emergency Bus 2J Emergency Supply Breaker 25J3 Normal/Bypass Switch
20) Emergency Generator 3, Unit 2, Diesel Isolation Switch
21) Emergency Generator 3, Unit 2, Isolation Switch Lockout Relay
22) Emergency Generator 3, Unit 2, Voltage Raise/Lower Switch
23) 4.16kV Emergency Bus 2J Emergency Supply Breaker 25J3 Synchronizing Switch
24) 4.16kV Emergency Bus 2J Emergency Supply Breaker 25J3 Control Switch
25) 4.16kV Emergency Bus 2J Normal Supply Breaker 25J8 Synchronizing Switch
26) 4.16kV Emergency Bus 2J Normal Supply Breaker 25J8 Control Switch
27) Emergency Generator 3, Unit 1, Fast Start Defeat Switch
28) Emergency Generator 3, Unit 2, Fast Start Defeat Switch
29) Emergency Generator 3, Unit 2, Governor Raise/Lower Switch
30) 4.16kV Emergency Bus 1J Normal Supply Breaker 15J8 Ammeter
31) 4.16kV Emergency Bus 1J Emergency Supply Breaker 15J3 Ammeter
32) 4.16kV Emergency Bus 2J Normal Supply Breaker 25J8 Ammeter
33) 4.16kV Emergency Bus 2J Emergency Supply Breaker 25J3 Ammeter
34) Emergency Generator 3, Unit 1, Field Flash Switch
35) Emergency Generator 3, Unit 2, Field Flash Switch

TABLE 5-3b

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2
SAFE SHUTDOWN EQUIPMENT

DIESEL GENERATOR LOCAL CONTROL
DIESEL ISOLATION CONTROL PANELS

I) Panel 2DIP-ESRH (located in Emergency Switchgear Room) contains the following equipment:

1) Emergency Generator 2H Differential Relay
2) Emergency Generator 2H Differential Lockout Relay
3) Auxiliary Relay
4) Current Transducer
5) Excore Flux Monitor Power Supply Transfer Switch

II) Panel 2DIP-DGRH (located in Emergency Diesel Generator Room No. 2) will be used to locally start and operate emergency diesel generator train 2H. The local panel contains the following emergency diesel generator indications and controls:

1) Emergency Generator 2H Incoming Voltmeter
2) Emergency Generator 2H Syncroscope
3) Emergency Generator 2H Running Voltmeter
4) 4.16kV Emergency Bus 2H Voltmeter Switch
5) 4.16kV Emergency Bus 2H Voltmeter
6) 4.16kV Emergency Bus 2H MW Meter
7) 4.16kV Emergency Bus 2H MVAR Meter
8) 4.16kV Emergency Bus 2H Frequency Meter
9) Emergency Generator 2H Diesel Isolation Switch Lockout Relay
10) Emergency Generator 2H Diesel Isolation Switch
11) Emergency Generator 2H Governor Raise/Lower Switch
12) Emergency Generator 2H Voltage Raise/Lower Switch
13) Emergency Generator 2H Fast Start Defeat Switch
14) 4.16kV Emergency Bus 2H Emergency Supply Breaker 25H3 Synchronizing Switch
15) 4.16kV Emergency Bus 2H Emergency Supply Breaker 25H3 Control Switch
16) 4.16kV Emergency Bus 2H Normal Supply Breaker 25H8 Synchronizing Switch
17) 4.16kV Emergency Bus 2H Normal Supply Breaker 25H8 Control Switch

TABLE 5-3b (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2
SAFE SHUTDOWN EQUIPMENT

DIESEL GENERATOR LOCAL CONTROL
DIESEL ISOLATION CONTROL PANELS

18) Emergency Generator 2H Field Flash Switch
19) 4.16kV Emergency Bus 2H Normal Supply Breaker 25H8 Ammeter
20) 4.16kV Emergency Bus 2H Emergency Supply Breaker 25H3 Ammeter

ATTACHMENT 1
TO
CHAPTER 5

WORST CASE FIRE SCENARIO

ATTACHMENT
TO
CHAPTER 5

WORST CASE FIRE SCENARIO

1. Introduction

In this example, a timeline concept will be used to graphically depict the integrated operation of the post-fire safe shutdown equipment. The timeline will be based on the estimated number of discrete operations which need to be performed and their expected durations. These post-fire operations will be sequenced in an order which prevents the reactor plant from reaching an unrecoverable condition.

The number of operator actions, along with their locations and durations, is dependent on the location of the fire. The conservative approach is to base the timeline on a worst case fire scenario which would require the largest number of diverse operator actions. This worst case scenario will then be analyzed in its entirety, from ignition of the fire to the achievement of safe shutdown, to determine the number of operations required. These operations will be evaluated against the required system response times and post-fire operator availability.

The result will be a definitive post-fire timeline which will demonstrate:

(1) The timely achievement of hot shutdown with the operators available;

(2) The achievement of cold shutdown within the required 72 hours; and

(3) The termination of spurious operations prior to reaching unrecoverable plant conditions.

2. Worst Case Fire Scenario

The physical configuration of the Surry Power Station can be divided into four general types of areas. These generalized areas are:

(1) Inside the reactor containment (unit specific).

(2) Outside the reactor containment (common to both units). This includes portions of the Auxiliary Building and Turbine Building.

(3) Outside the reactor containment (unit specific) such as the Cable Vault and Tunnel, Emergency Switchgear Rooms, and Main Steam Valve House.

(4) Control Room (common to both units).

Each of these general areas was reviewed in detail to determine the ramifications of a major fire. The results of the review showed that the fire that would put the most severe constraints on the achievement of hot shutdown would be in either the Unit 2 Emergency Switchgear Room or the Cable Vault and Tunnel. While this fire would only affect the operation of one unit, it would place in jeopardy the control and indication functions available in the Control Room, would prevent the use of the Auxiliary Shutdown Panel, and would require the most extensive use of local shutdown capability. It is assumed that the other unit, while unaffected by the fire, would be manually shut down by the operators or automatically shut down on a loss of off-site power. This worst case fire scenario requires a number of local operations to terminate spurious operations and operate the systems required for hot shutdown, as well as the manning of physically diverse safe shutdown control locations. Due to the limited number of operators available to achieve hot shutdown, this worst case fire scenario will be used to demonstrate the adequacy of the proposed safe shutdown systems to achieve hot shutdown.

Appendix R requires the achievement of cold shutdown within 72 hours. This extended time span coupled with the increased availability of station operators changes the criteria used to determine a worst case fire scenario for cold shutdown. Each of the general fire areas listed above was reviewed to determine which fire area could sustain the greatest damage to cold shutdown equipment or cabling. The safe shutdown systems which have been selected to achieve hot shutdown are capable of reducing the plant temperature and pressure down to the RHR system operational levels. The only additional systems required for cold shutdown are the RHR system and the CCW system. Therefore, the fire with the most severe impact on cold shutdown is one which would affect either the RHR or CCW system. The postulated fire locations which would have the greatest impact on these two systems are the two areas considered above, Unit 2 Emergency Switchgear Room and the Cable Vault and Tunnel, along with the Reactor Containment and Auxiliary Building. A severe fire in one of these four areas could severely affect the normal instrumentation, power and control circuits required for RHR or CCW system operation. This would require extensive local operations and post-fire repairs, some inside containment, to regain the operation of these systems.

The effects of a fire in the Control Room were closely evaluated. It was determined that while a fire in this location would be a severe test of the safe shutdown capability, it would not be the most limiting fire. Due to the close proximity of the control panels in the Control Room, a severe fire could be postulated that would affect the capability of both units and require personnel evacuation of the area. The achievement of hot shutdown for a fire in the Control Room would be accomplished by operation of the safe shutdown systems from the Auxiliary Shutdown Panel or at the switchgear of each unit. These panels and switchgear are located in the respective unit's Emergency Switchgear Room and provide indication and control of the equipment required for hot shutdown (see Tables 5-2a and 5-2b). Local control of emergency diesel generator 1 would be accomplished from the local control cabinets in the Emergency Diesel Generator Room and the Emergency Switchgear Room. Process monitoring indications would be monitored at the Remote Monitoring Panel. The safe shutdown equipment that can be operated from these panels is sufficient to achieve hot shutdown. The subsequent achievement of cold shutdown would be accomplished by local operation of the safe shutdown equipment that is located outside of the area.

Manpower Availability

The availability of personnel to operate the safe shutdown equipment subsequent to a fire is based on the minimum shift crew composition allowed by the technical specifications. The minimum number of personnel who can be assigned to both units is eight (see Table 1). This is the lowest possible number of personnel for any combination of Unit 1 and Unit 2 operating modes where at least one of the units is operating. Section 6.1.B.7 of the Surry Technical Specifications specifies that the fire brigade "excludes personnel in Table 6.1-1 of the minimum shift crew necessary for safe shutdown of the plant and any personnel required for other essential functions during a fire emergency." This leaves eight personnel available to operate equipment necessary to achieve safe hot shutdown. The operator actions will be based on the assumption that four of the operators, including the shift supervisor, remain in the Control Room. They will be used to control the unaffected unit and to coordinate the post-fire safe shutdown activities of the affected unit. The remaining four operators will be dispatched to the various alternative shutdown control locations. Prior to the implementation of the Emergency Action Plan, no credit is taken for maintenance, instrumentation and control, or other nonlicensed personnel who are not required to be on-site at all times. The expected response to a severe fire at the Surry Station would be to implement EPIP-3.01, "Callout of Emergency Response Personnel." This would provide a minimum of 10-20 additional personnel within one and a half to two hours of the initiation of the fire. These additional personnel would be used to align an alternate letdown path (see Exemption Request 15), and to supplement the shift operators to achieve cold shutdown.

Fire Duration

The fire duration and fire brigade response times will be as listed in Table 2. These times are considered to be a conservative estimate of the time required to extinguish the fire and conclude fire brigade activities. These times are based on the low combustible loadings typical of nuclear power plant environments along with the existing manual and automatic suppression capabilities.

3. Operations Required to Achieve Hot Shutdown

This subsection describes the operations required to achieve hot shutdown. Utilizing the systems and components identified in Chapter 3 and the previously discussed assumptions and constraints, the post-fire scenario has been depicted on an operator-by-operator basis. The actions required by each operator are depicted in a chronological fashion to describe the integrated operation of the alternative shutdown system. The local control stations to be used, along with the functions to be performed at each, are specified. Post-fire operational timelines are presented to depict the expected sequence and duration of the required tasks for each operator (see Figures 1 and 3). The actual sequence of post-fire activities will be determined by the shift supervisor. As noted previously, these timelines are intended to demonstrate compliance with Appendix R for worst case fires and are not intended to prescribe mandatory actions for fires of lesser magnitude.

Based on the location and effects of the fires, the Shift Supervisor may elect to delay some activities (starting the diesel generator) and expedite others (isolating spurious operations).

The fire location which will be used as the basis for the operator timelines will be in the Unit 2 Emergency Switchgear Room. This fire will cause the loss of both the 4kV and 480V emergency switchgear for Unit 2 as well as Emergency Diesel Generators 2 and 3. The fire will also disable the Unit 2 process monitoring indications in the Control Room and will preclude access to the unit's Auxiliary Shutdown Panel. A simultaneous loss of off-site power will be assumed as a limiting condition.

Unit 1 will not be directly affected by the fire in the Unit 2 Emergency Switchgear Room. Due to the severity of the fire, it will be assumed that the shift supervisor will direct the Unit 1 reactor to be shut down as a precautionary measure if there is no loss of off-site power. If there is a loss of off-site power as assumed, then the Unit 1 reactor will be automatically shut down by the Reactor Protection System.

Unit 1 will be maintained in hot shutdown until such time as there are sufficient personnel available to accomplish a normal cooldown.

Shift Supervisor

As the individual designated to be in charge of shift operations, the shift supervisor determines the proper response to a fire located within the station. The anticipated response to a severe fire in the Unit 2 Emergency Switchgear Room would be in accordance with 1-AP-48, "Fire Protection-Operations Response." This requires the shift supervisor to announce the receipt of a fire alarm over the station paging system or by radio, and to notify the fire brigade. Due to the ramifications of a severe fire in this area, it is expected that the shift supervisor would direct the reactor to be shut down and the turbine tripped per EP-1.00, "Reactor-Trip/Safety Injection." Due to the location of the fire and the potential for loss of safe shutdown system operation from the Control Room, the shift supervisor will direct the manning of the alternative shutdown control stations.

Two operators will be used to maintain the unaffected unit in hot shutdown. The senior reactor operator (SRO) and one of the reactor operators (RO-1) will be designated to do this. The two Unit 1 operators will also verify that the Unit 1 EDG has started on the loss of off-site power. They will ensure that the Unit 1 emergency service water, auxiliary feedwater pumps, charging pump cooling water pumps, charging pump service water pumps, and charging pumps are running in sufficient numbers to supply the Unit 2 loads through the respective system cross-connects.

The shift supervisor will remain in the Control Room to coordinate the activities of both units. He will retain with him one of the other reactor operators (RO-2) to assist him with coordinating the emergency plan implementation. The shift technical advisor will also remain in the Control Room to advise the shift supervisor. The remainder of the operations personnel will be used to man the alternative shutdown stations and terminate potential spurious operations. They will be dispatched as follows:

(1) Reactor Operator (RO-3) - will be sent to monitor Unit 2 primary and secondary system parameters at the Remote Monitoring Panel.

(2) Auxiliary Operator (AO-1) - will be sent to operate the turbine-driven auxiliary feedwater pump.

(3) Auxiliary Operator (AO-2) - will be sent to align the Charging Pump Discharge Header Cross-Connect per the Attachment in FCA-1.00.

(4) Auxiliary Operator (AO-3) - will be sent to perform predetermined actions to terminate/prevent potential spurious operations.

The shift supervisor will then coordinate the actions of the operators controlling Unit 2 at the alternative shutdown stations and the operators controlling Unit 1 from the Control Room. The shift supervisor will also interface with the fire brigade to determine the extent of the fire-induced damage.

Personnel responding to the emergency callout will report to the shift supervisor who will then dispatch them as the situation warrants.

Reactor Operator (RO-3)

Reactor operator RO-3 will be sent directly to the Remote Monitoring Panels in the Unit 1 Cable Spreading Room. He will then ensure that the panels are being supplied power from the unaffected unit and that the indications on the panels are selected to the affected unit. This will provide the operator with the indications listed in Table 5-1. RO-3 will establish communications with the shift supervisor in the Control Room and relay to him the Unit 2 primary and secondary system variables. The indications available on the Remote Monitoring Panels will be used to:

(1) Provide indication of potential spurious operations.

(2) Monitor primary system inventory and regulate charging rate.

(3) Monitor reactor neutron flux to ensure reactor shutdown.

(4) Control steam generator steaming and feeding rates.

(5) Control the primary system cooldown rates and system pressure.

(6) Monitor natural circulation flow in the RCS.

The operator at the Remote Monitoring Panels will be the primary source of information for the shift supervisor. It is on this information that the operational control of the safe shutdown systems will be based. RO-3 will have no other function than the monitoring of these primary and secondary process monitoring variables.

Auxiliary Operator (AO-1)

The achievement of hot shutdown is dependent on the maintenance of an adequate secondary heat sink. Auxiliary feedwater flow, to at least one steam generator, must be established in order to maintain the ability to remove decay heat from the core. Loss of the Emergency Switchgear Room precludes the use of either motor-driven auxiliary feedwater pump. This means that an operator must proceed to the turbine-driven auxiliary feedwater pump (TDAFW) and control flow locally. (NOTE: There also exists the ability to cross-connect the Auxiliary Feedwater System.)

The TDAFW pump 2-FW-P-2 is started by opening either PCV-MS202A or PCV-MS202B in the Main Steam Valve House. Although these valves will fail open on loss of power, they can also be opened by deenergizing the control circuits to SOV-MS202A and SOV-MS202B. Deenergizing the solenoid valves will cause the TDAFW pump isolation valves to fail open and the pump to start. The solenoid valves can be deenergized by opening circuit nos. 9 and 7 on dc panels 2-1 and 2-2, respectively, in the Control Room. When steam is admitted to the turbine, the pump will come up to speed on the mechanical governor. Normally open valves in the pump discharge provide a recirculation path back to the condensate storage tank.

Auxiliary operator AO-1 will maintain steam generator levels by locally throttling 2-FW-140 at the discharge of the TDAFW pump. The shift supervisor, who is in communication with RO-3 at the Remote Monitoring Panel, will direct AO-1 to increase or decrease the flow to the steam generators based on the level indications available at the Remote Monitoring Panel. In this manner, adequate steam generator inventory can be maintained to ensure decay heat removal.

Auxiliary operator AO-1 will monitor the emergency condensate storage tank (2-CN-TK-1A) level via the mechanical level at the tank. If the emergency condensate storage tank cannot be refilled from the condensate storage tank, then an alternate supply of water must be used. The Emergency Makeup System and the firemain are the alternate source of water.

<u>Auxiliary Operator (AO-2)</u>

The establishment of reactor coolant makeup control is essential to the achievement of hot shutdown. The control of Reactor Coolant System (RCS) inventory and pressure is required to establish natural circulation flow and prevent boiling in the reactor core. The fire in the Unit 2 Emergency Switchgear Room has the potential to disable the power supplies for all three charging pumps. The re-establishment of RCS makeup to Unit 2 will be via the charging pump cross-connect. This will be accomplished per the attachment in Procedure FCA-1.00.

The shift supervisor will dispatch AO-2 to perform the cross-connect. These actions will be coordinated with the Unit 1 operators who have control of the Unit 1 charging pumps and associated valves. AO-2 will proceed to the Auxiliary Building and perform the required steps to align the affected unit via the cross-tie.

Simultaneous with this procedure, the shift supervisor will have the Unit 1 operators perform the following operations from the Control Room:

(1) Isolate letdown from Unit 1.

(2) Raise Unit 1 pressurizer level.

(3) Open MOV-1115B and MOV-1115D to align the RWST to the Unit 1 charging pump suction.

(4) Emergency borate Unit 2 from Unit 1.

When the Unit 2 pressurizer level has been raised, AO-2 will close FCV-2122 to isolate charging. If component cooling water flow to the reactor coolant pump seals cannot be positively verified, then charging flow to the affected unit will be maintained continuously to provide cooling to the pump seals. If necessary, the operator in the Auxiliary Building can control the charging rate through the seals by throttling the position of 2-CH-294, 297, and 300.

Utilizing the pressurizer level and RCS pressure indications on the Remote Monitoring Panel being relayed by RO-3, the shift supervisor will coordinate the actions of the Unit 1 operators in the Control Room and AO-2 in the Auxiliary Building to control RCS makeup to the affected unit.

Auxiliary Operator (AO-3)

The achievement of hot shutdown is accomplished by the timely operation of the safe shutdown systems. In addition, the spurious operations that could adversely affect safe shutdown must be prevented or terminated. Some of the spurious operations that have been identified in Tables 3-3 and 3-5, and have not been prevented by pre-fire actions, will be the responsibility of AO-3. In addition to terminating spurious operations, the operator will de-energize selected circuits to align or isolate several system flow paths.

The shift supervisor will dispatch AO-3 to perform a predetermined set of actions. These actions will prevent or terminate those spurious operations that could prevent achieving safe hot shutdown and will align certain portions of the safe shutdown system flow paths. In general, the spurious activities that could affect hot shutdown are those which could cause an uncontrolled release of primary or secondary system inventory. The component whose spurious operation could cause a loss of system inventory, along with the actions necessary to prevent or terminate the spurious operation, are presented in Table 3. This table also details the circuits required to be deenergized to align or isolate system flow paths. The sequencing of these operations will be determined by the shift supervisor, based on the system indications relayed to him from the Remote Monitoring Panel.

Once the fire has been extinguished and the plant is in a stable condition, the shift supervisor may elect to check out the control circuits for these components, and to selectively reenergize them to regain their use for cold shutdown. For the basis of this timeline analysis, it will be assumed that these circuits have been damaged by the fire and rendered useless.

Once these actions have been completed, AO-3 will be available to the shift supervisor to assist with other operations.

Summary of Activities Required to Achieve Hot Shutdown

The activities performed by the shift supervisor, senior reactor operator, three reactor operators, and three auxiliary operators have accomplished the performance goals required to achieve hot shutdown. The end result of their activities has been to establish the following:

(1) Unit 1 (Unaffected Unit)

 (a) Reactor shut down and in hot standby

 (b) Emergency diesel generator supplying electric loads

 (c) SW and CCW supplying cooling to both units

 (d) Charging pumps supplying makeup to Unit 2 RCS

(2) Unit 2 (Affected Unit)

 (a) Reactor shut down

 (b) Decay heat being removed from the core

 (c) Primary system inventory being maintained via charging cross-connect

 (d) Steam generators providing a heat sink for decay heat

 (e) Primary and secondary system parameters being monitored

 (f) Spurious operations that could affect hot shutdown being prevented or terminated

It is estimated to take 45 to 50 minutes to achieve stable hot shutdown conditions. The affected unit can then be safely maintained in hot shutdown while the operators investigate the extent of the fire damage and determine the appropriate course of action to be taken.

As previously stated, it is expected that the fire would be extinguished in approximately thirty minutes, and the fire brigade released in about one hour. Any operators (above the minimum shift complement) who had been assigned to the fire brigade, along with the personnel responding to the emergency recall, would be available to assist in determining the extent of the damage.

When the extent of the damage has been determined, and a sufficient number of operators are available, the affected unit will be cooled down. Off-site personnel will be utilized to align an alternate letdown path for the purpose of maintaining RCS pressure. This function will not be required until approximately four hours into the scenario (see Exemption Request 15). Unit 1 will be left in hot shutdown until system and operator availability will allow a normal reactor plant cooldown.

The operations necessary to achieve hot shutdown have been depicted on an operator-by-operator basis, as shown in Figure 1. This approach has been used to demonstrate the integrated operation of the various safe shutdown control stations within the constraints of the available manpower. This has demonstrated that hot shutdown can be safely achieved within the time available and with the minimum number of operators on-site. The regulatory and logistical requirements to achieve cold shutdown allow for much more flexibility: the time to achieve cold shutdown is 72 hours; there is essentially unlimited manpower; there is no concurrent fire; the occurrence of spurious operations has terminated, and equipment repairs are allowed as a means of regaining system operation. Because of this, the level of detail presented in the hot shutdown timelines is not required to demonstrate the achievement of cold shutdown. The actions required to achieve cold shutdown will be depicted on a systems interaction level as opposed to the component level.

The following subsection will describe the achievement of cold shutdown given the worst case conditions that can be encountered to operate each of the required systems.

4. Operations Required to Achieve Cold Shutdown

The systems that have been used to achieve hot shutdown have the capability of cooling down the plant to the temperature and pressure range of RHR system operation. In addition to the hot shutdown systems, the only additional systems required to achieve cold shutdown are the RHR and CCW systems.

The cooldown from hot shutdown to cold shutdown can be accomplished by operation of the steam generator PORVs. These valves will be used to release steam to the atmosphere. If the PORVs are inoperable, then a manual valve line-up can be performed to release steam via the Auxiliary Steam System and the vacuum priming air ejectors. This steam release will cool down the associated steam generator and primary coolant loop which will establish a natural circulation flow in the RCS. Steam generator makeup will be via the turbine-driven auxiliary feedwater pump being controlled locally in the Main Steam Valve House. RCS pressure will be controlled by locally aligning the required letdown valves, and charging via the cross-connect. Charging flow to the RCS will be used to make up for the contraction due to the cooldown. This will also supply the necessary boration to ensure the reactor stays subcritical. Natural circulation flow, RCS temperature and cooldown rate, subcooling margin, and steam generator level will be monitored at the Remote Monitoring Panel. During the cooldown process, the necessary repairs and system lineups will be performed to establish CCW flow to the RHR heat exchangers and pump seal coolers, and align the RHR system for operation. The required actions to accomplish this are described below.

Component Cooling Water System Operation

The Component Cooling Water (CCW) System must be locally aligned to supply cooling water to the RHR heat exchangers and pump seal coolers located inside containment. RHR heat exchanger 2-RH-E-1B will be used to take advantage of its common discharge with the RHR pump seal coolers. To align this flow path, 2-CC-185, 2-RH-E-1B outlet, and TV-CC209B containment isolation valve, must be opened. 2-CC-185 is located inside the containment and will be locally operated. TV-CC209B will be opened with an air bottle and jumper repair capability. Manual valves 2-CC-100 and -104, located outside the containment on the discharge side of the heat exchangers, will be used to control CCW flow to 2-RH-E-1A and 2-RH-E-1B. The adjusting of the CCW flow through the RHR heat exchanger will be used to regulate the RCS cooldown rate. The Unit 1 CCW pumps, 1-CC-P-1A and 1-CC-P-1B, will be used to supply the necessary CCW flow to both units.

It is possible that a fire in the Auxiliary Building could damage the pump motors and power cables to the CCW pumps. A post-fire repair to the power cables and the pump motors will be performed as required (see Figure 5). Materials are in stock with proper procedures in place if such a fire occurs.

Service water flow to the CCW heat exchangers will be locally verified prior to initiating RHR system operation. CCW heat exchanger SW inlet valves MOV-SW102A and MOV-SW102B will be checked open to ensure cooling water to the heat exchangers.

Residual Heat Removal System

The RHR system will be used to cool down the reactor from 350°F to below 200°F and to provide long-term decay heat removal. The RHR system will be prepared for operation during the reactor plant cooldown to 350°F.

The post-fire operational status of the RHR system will be determined and corrective actions taken accordingly. Because of the close proximity of the RHR pump power cables, a single fire may destroy the power feeds to both pumps. A post-fire repair procedure will be used to connect a new cable to one of the RHR pumps to regain operation (see Figure 4). The RHR system valve positions will be checked and the correct lineup for RHR system warmup will be established. The RHR pump(s) will then be run to warm up and pressurize the system. When the initial conditions for RHR system operation have been met, the RHR system will be placed in service. These conditions are:

(1) RCS temperature less than 350°F.

(2) RCS pressure less than 450 psig.

(3) RHR and RCS temperature and pressure approximately equal.

(4) SW and CCW systems available to remove residual heat.

When these conditions are satisfied, the RHR pumps will be stopped and the RHR system inlet and outlet valves will be locally opened. The inlet valves MOV-1700 and MOV-1701 will be fully opened. To limit the RHR system flow rate, only one of the outlet valves, MOV-1720A or MOV-1720B, will be opened. The pump will then be started to commence RHR system forced cooldown.

The rate of cooldown will be monitored using RCS temperature indication. The cooldown rate will be controlled by throttling the CCW valves on the outlet side of the RHR heat exchangers.

In summary, the activities performed by the additional personnel have accomplished the performance goals required to achieve cold shutdown within the 72-hour limit. The results of these actions are as follows:

(1) Natural circulation established,

(2) Necessary repairs completed, and

(3) Cooldown from 350^{o} to 200^{o} in progress.

A timeline illustrating the achievement of cold shutdown is shown in Figure 2.

ATTACHMENT 1

TABLE 1

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNITS 1 AND 2

MINIMUM SHIFT CREW COMPOSITION (1)

POSITION	ONE UNIT OPERATING	TWO UNITS OPERATING	TWO UNITS IN COLD SHUTDOWN OR REFUELING
Shift Supervisor (SS)	1	1	1
Senior Reactor Operator(SRO)	1	1	None
Reactor Operator (RO)	3	3	2
Auxiliary Operator (AO)	4 (3)	4 (3)	4 (3)
Shift Technical Advisor(STA)	1 (2)	1 (2)	None
TOTALS	9	9	7

(1) Technical Specification - Surry Power Station Unit 1 and 2, Section 6 "Administrative Controls," Table 6.1-1, P. 6.1-4.

(2) The Shift Technical Advisor is not included as part of the minimum shift crew composition.

(3) The number of auxiliary operators is now administratively controlled at four (one greater than the minimum technical specifications requirement) until the technical specifications are changed.

ATTACHMENT 1

TABLE 2

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION

CRITICAL FIRE SCENARIO TIME FRAME

Latest Start Times	Event
0	Fire initiates.
1 minute	Confirmed indication received in Control Room. Shift Supervisor determines response necessary. Fire brigade notified.
2 minutes	Reactor trip and steam generator isolation occurs. Loss of off-site power may occur.
10 minutes	Fire brigade arrives on scene and deploys fire fighting equipment.
25 minutes	Fire suppressed.
30 minutes	Fire reported out. Restoration of fire equipment begins.
1 hour	Fire watch posted and fire equipment restored. Plant operators (if any) detached from brigade.

ATTACHMENT 1

TABLE 3

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION - UNIT 2

SUMMARY OF THE POST-FIRE ACTIONS REQUIRED TO TERMINATE/PREVENT SPURIOUS OPERATIONS AND ALIGN SYSTEM FLOW PATHS

Distribution Panel/Location	Circuit Number	Component	Reason for Circuit Deenergization	Remarks
DC PNL 2-1 125V dc Distribution Panel Control Room	5	PCV-2455C Pressurizer PORV	Valve will be failed closed to conserve RCS inventory	
	2	HCV-2310A Charging Isolation to Loop 2 Cold Leg	Fail valve open to align charging flow path	Required if RCP seal injection flow path not required
	9	PCV-MS202A TDAFW Pump Steam Admission Valve	Valve failed open to start TDAFW pump	Perform only if TDAFW pump to be used
	7	LCV-2460B Letdown Isolation Valve	Isolate the normal letdown path and conserve RCS inventory	
	6	LCV-2460A Letdown Isolation Valve	Isolate the normal letdown path and conserve RCS inventory	
	3	HCV-2311 Auxiliary Spray Valve	Fail valve closed to isolate auxiliary spray and prevent RCS pressure reduction	Only a concern if a charging pump is running
	10	HCV-2201 Excess Letdown Isolation Valve	Isolate the excess letdown path and conserve RCS inventory	
	19	SOV-RC200A-1,2 Reactor Vessel Head Vent System	Fail valves closed to prevent depressurization	
		SOV-RC201A-1,2 Pressurizer Vent System	Fail valves closed to prevent depressurization	

ATTACHMENT 1

TABLE 3 (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2

SUMMARY OF THE POST-FIRE ACTIONS REQUIRED TO TERMINATE/PREVENT SPURIOUS OPERATIONS AND ALIGN SYSTEM FLOW PATHS

Distribution Panel/Location	Circuit Number	Component	Reason for Circuit Deenergization	Remarks
DC PNL 2-2 125V dc Distribution Panel Control Room	8	PCV-2456 Pressurizer PORV	Valve will be failed closed to conserve RCS inventory	
	7	PCV-MS202B TDAFW Pump Steam Admission Valve	Valve failed open to start TDAFW pump	Perform only if TDAFW pump to be used
	4	TCV-MS205A,B TCV-MS206A,B TCV-MS207A,B TCV-MS208A,B Condenser Steam Dumps	Valves will be failed closed to prevent uncontrolled loss of SG inventory and overpressurization of condenser	Note 2
	18	SOV-RC200B-1,2 Reactor Vessel Head Vent System	Fail valves closed to prevent depressurization	
		SOV-RC201B-1,2 Pressurizer Vent System	Fail valves closed to prevent depressurization	
2-SVB-1 Semi-Vital Bus Control Room	6 7	RV-MS201A,B,C Steam Generator PORVs	Prevent spurious opening of SG PORVs and loss of SG inventory	
VB 2-III 120V ac Vital Bus Control Room	4	FCV-2122 Charging Flow Control Valve	Fail valve open to align charging flow path	Required if RCP seal injection flow path not required
	15	HCV-2137 Excess Letdown	Fail valve closed to isolate the excess letdown flow path	

ATTACHMENT 1

TABLE 3 (continued)

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 2

SUMMARY OF THE POST-FIRE ACTIONS REQUIRED TO TERMINATE/PREVENT SPURIOUS OPERATIONS AND ALIGN SYSTEM FLOW PATHS

Distribution Panel/Location	Circuit Number	Component	Reason for Circuit Deenergization	Remarks
VB 2-II 120V ac Vital Bus Control Room	19	HCV-2186 RCP Seal Water Flow Control	Valve failed open to ensure charging flow to RCP seals	Only required if normal CH path or CCW not available
		TV-BD-200B SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1
	21	TV-BD-200D SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1
		TV-BD-200F SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1
VB 2-I 120V ac Vital Bus Control Room	15	TV-BD-200A SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1
		TV-BD-200C SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1
		TV-BD-200E SG Blowdown	Valve failed closed to prevent uncontrolled loss of SG inventory	Note 1

NOTES:

(1) The coincident opening of at least three valves is required to cause a loss of SG inventory.

ATTACHMENT 1

TABLE 4

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION - UNIT 1 AND 2

NOTES FOR FIGURES 1 AND 2
POST-FIRE SAFE SHUTDOWN ACTIVITIES

(1) The Unit 2 reactor will be manually tripped and the turbine secured per EP-1.00 by the operators due to the severity of a fire in the Unit 2 Emergency Switchgear Room. In the event that off-site power is lost coincident with the fire (a limiting condition required by Appendix R), both units will trip automatically.

(2) The fire duration and fire brigade response times will be in accordance with Table 2.

(3) Based on the severity of the fire, the Shift Supervisor will initiate the Site Emergency Plan.

(4) Reactor Operator RO-3 at the Auxiliary Monitoring Panel will monitor the indications listed in Table 5-1. This information will be relayed to the Shift Supervisor in the Control Room.

(5) The termination of spurious operations by Auxiliary Operator AO-3 is detailed in Table 3.

(6) The restoration of RCS make-up to Unit 2 will be accomplished in accordance with the Attachment in FCA 1.00, "Charging/SI Pump Cross-Connect." The Shift Supervisor will coordinate the actions of Auxiliary Operator AO-2 and the Unit 1 operators to restore charging flow to Unit 2.

(7) The turbine-driven auxiliary feedwater pump will be started by Auxiliary Operator AO-3 by deenergizing the power supplies to PCV-MS102A and PCV-MS102B.

(8) Due to the loss of the Unit 2 Emergency Switchgear Room, all CCW and SW flow will be provided by the Unit 1-powered CCW pumps and the SW pumps which are common to both units.

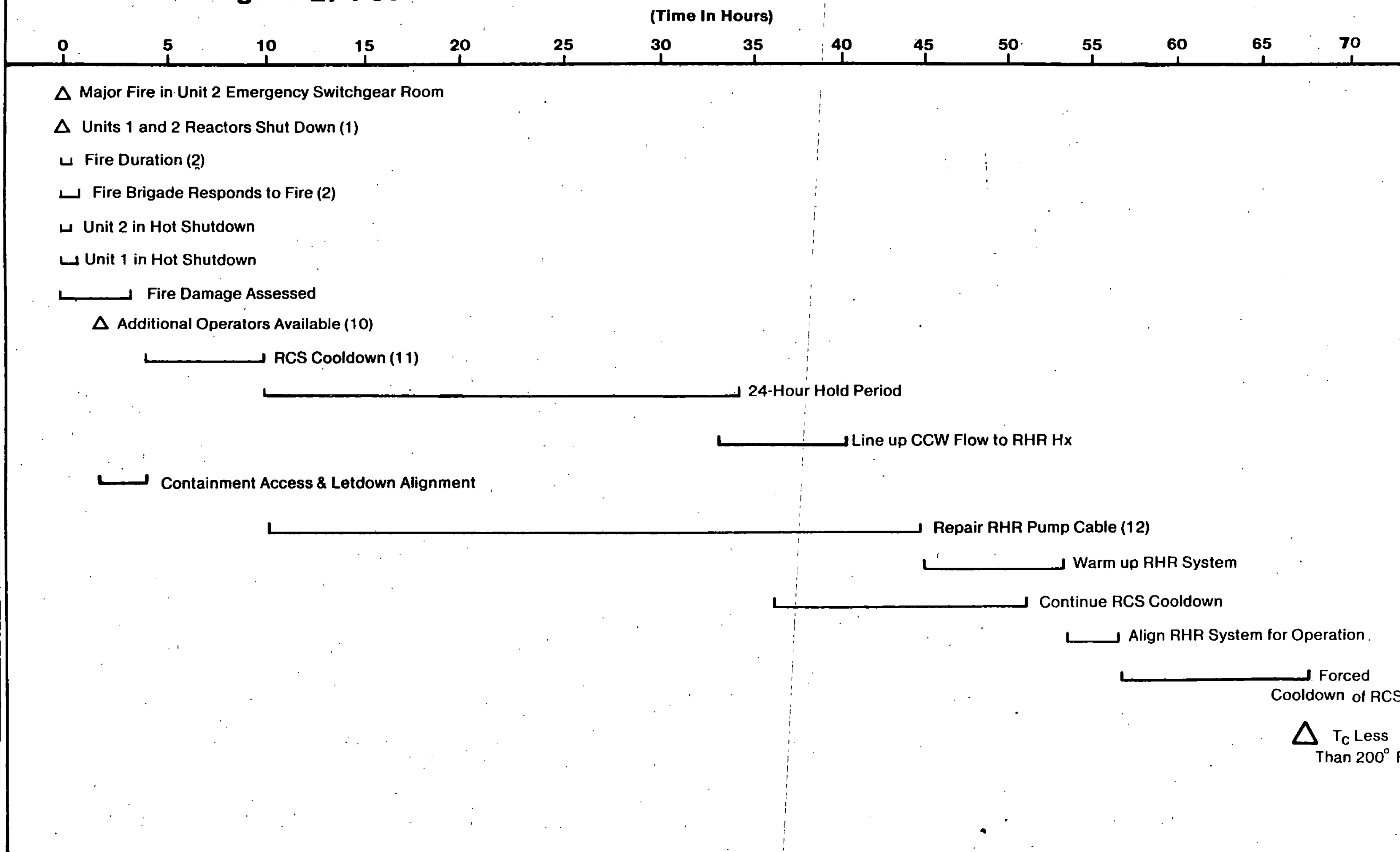
(9) Unit 1 will be maintained in hot shutdown until sufficient operators become available to effect a normal reactor plant cooldown. This cooldown may be delayed until off-site power is restored and RCPs can be operated.

(10) Additional operators will become available in approximately 1-1/2 to 2 hours due to the implementation of EPIP-3.01, "Callout of Emergency Personnel" as discussed in Exemption Request 15.

(11) A natural circulation cooldown will be performed to reduce RCS temperature down to the allowable RHR system temperature if RCPs are not available.

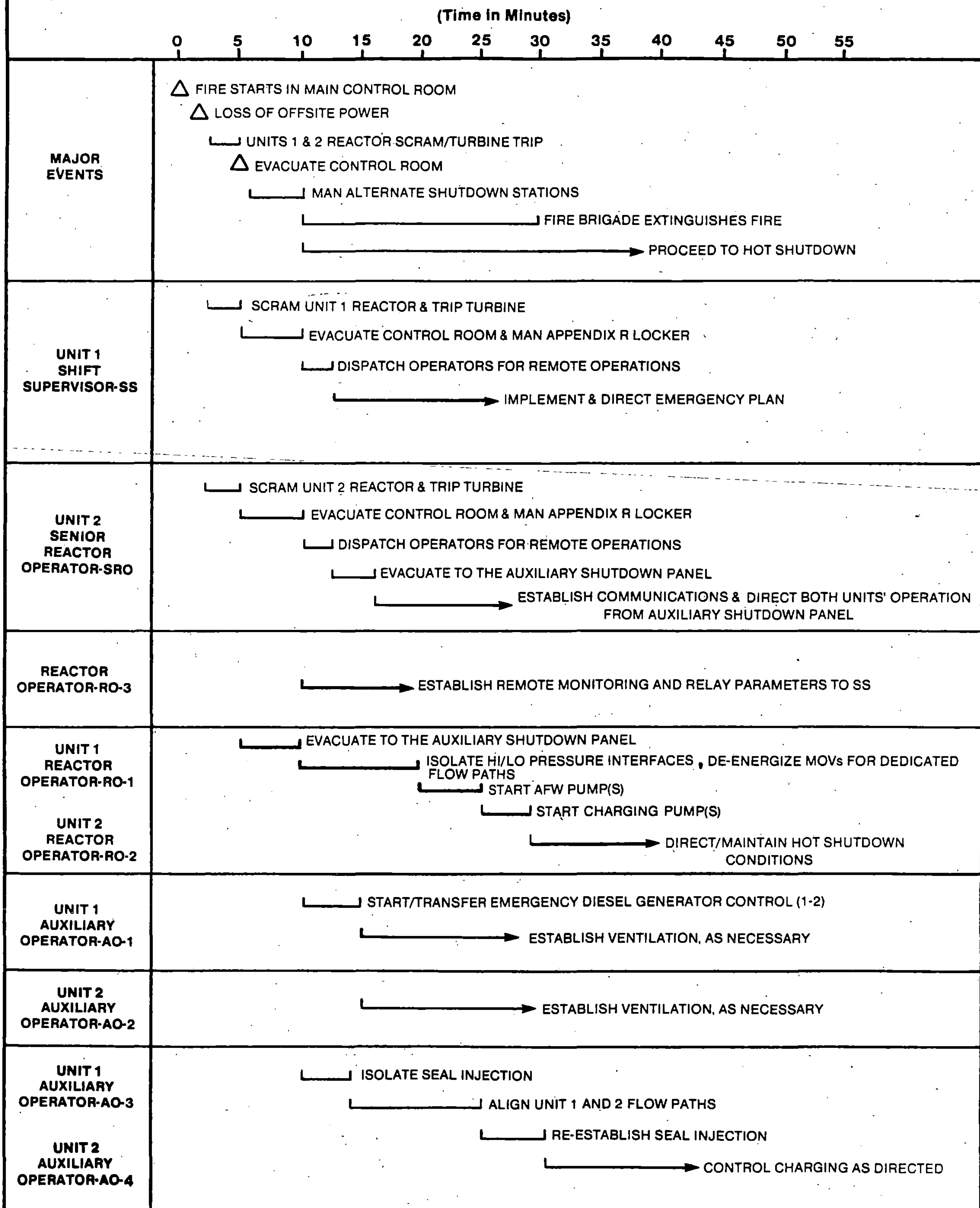
(12) Repair procedures will be used to restore power to the RHR pump motors if the normal power supplies have been disabled by the fire.

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION
Unit 2 Emergency Switchgear Room Fire
Figure 2. Post-Fire Safe Shutdown Activities to Achieve Cold Shutdown

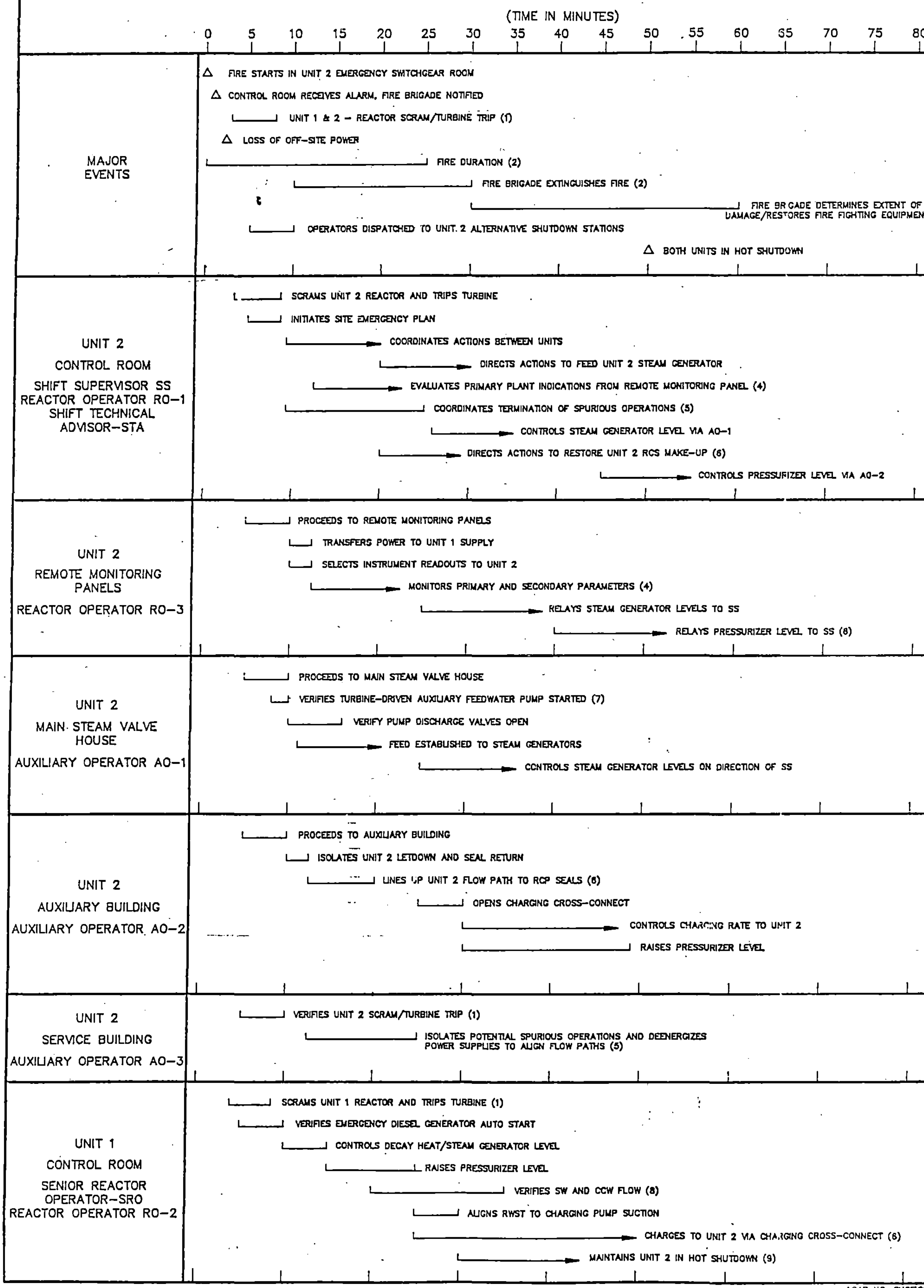


VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION
CONTROL ROOM FIRE

Figure 3. Post-Fire Safe Shutdown Activities To Achieve Hot Shutdown



VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION
UNIT 2 EMERGENCY SWITCHGEAR ROOM FIRE
FIGURE 1. POST-FIRE SAFE SHUTDOWN ACTIVITIES TO ACHIEVE HOT SHUTDOWN



REVISION 4 4/87

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION

10 CFR 50 APPENDIX R REPORT - APPENDIX A

Summary Comparison of the 1984 Appendix R
Reanalysis and the 1980-1982 Post-Fire
Safe Shutdown Review

10 CFR 50 APPENDIX R REPORT - APPENDIX A

Summary Comparison of the 1984 Appendix R Reanalysis and the 1980-1982 Post-Fire Safe Shutdown Review

Table of Contents

INTRODUCTION TO TABLES 1, 2, 3, AND 4

The attached tables are a comparison of the 1980-1982 Post-Fire Safe Shutdown Review and the 1984 Appendix R reanalysis. The 1980-1982 Post-Fire Safe Shutdown Review was sent to the NRC by Virginia Electric and Power Company letters of October 31, 1980 and June 18, 1982 (Serial Numbers 885 and 363, respectively). It is noted that other correspondence on this subject was submitted in this time period.

The format of the four tables varies in the following manner. Tables 1 and 4 use a format of summarizing in the left-hand column statements from the Company's 1980-1982 review, and summarizing in the right-hand column the changes based on the 1984 reanalysis. Tables 2 and 3 use a format of summarizing in the left-hand column the NRC requests for information, and summarizing in the right-hand column the major differences between the 1980-1982 and the 1984 analyses.

A brief description of the attached tables is given below:

- Table 1: Summary Comparison of Post-Fire Safe Shutdown Systems

  In the left-hand column of Table 1, the post-fire safe shutdown systems used in the 1980-1982 review are listed by safe shutdown function. These systems were described by the Company in Attachment 1 of the letter of October 31, 1980 and in Attachment 1 of the letter of June 18, 1982. The right-hand column of Table 1 shows the systems that are used in the 1984 reanalysis.

- Table 2: Summary Comparison by NRC Plant-Specific Request

  In the left-hand column of Table 2, the NRC requests are listed that are specific to Surry. These requests are from the NRC letter of April 12, 1982. The responses to these requests were described in Parts A and B of the Company's letter of June 18, 1982. The right-hand column of Table 2 gives a summary of the major differences between the 1980-1982 and the 1984 analyses.

- o Table 3: Summary Comparison by NRC Generic Request

  In the left-hand column of Table 3, the NRC requests are listed that are generic. These requests are from the NRC Generic Letter 81-12 and its clarifications. The responses to these requests were described in the Company's letters of October 31, 1980 and June 18, 1982. The right-hand column of Table 3 gives a summary of the major differences between the 1980-1982 and the 1984 analyses.

- o Table 4: Summary Comparison of Virginia Electric and Power Company Commitments

  Specific commitments were made by the Company in the June 18, 1982 (Part D) letter to the NRC. These commitments are listed in the left-hand column of Table 4. The right-hand column of Table 4 gives a summary of the major differences in the commitments between the 1980-1982 and the 1984 analyses.

Because the 1980-1982 review is considered the "Base Case," only the major changes from the 1980-1982 review, as determined by the 1984 reanalysis, are given in the right-hand columns of the tables. It must be emphasized that these tables are not intended to show a cable-by-cable or line-by-line comparison between the 1980-1982 review and the 1984 reanalysis. These tables are a summary comparison, or overview, of changes. For detailed information, the reader is referred to the 1980-1982 review and the 1984 reanalysis.

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION

TABLE 1

SUMMARY COMPARISON OF POST-FIRE SAFE SHUTDOWN SYSTEMS

1980-1982 POST-FIRE SAFE SHUTDOWN SYSTEMS (REF: VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #885 DATED 10/31/80; VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #363 DATED 6/18/82)	1984 POST-FIRE SAFE SHUTDOWN SYSTEMS (REF: 1984 APPENDIX R REANALYSIS)
(1) SYSTEMS REQUIRED FOR THE REACTIVITY CONTROL FUNCTION: (A) ROD CONTROL SYSTEM (B) CHEMICAL AND VOLUME CONTROL SYSTEM (C) CHARGING PUMP COOLING WATER SYSTEM (D) CHARGING PUMP SERVICE WATER SYSTEM (E) SERVICE WATER SYSTEM	NO CHANGES FROM THE 1980-1982 REVIEW WITH THE EXCEPTION OF THE SERVICE WATER SYSTEM AND THE CHARGING PUMP SERVICE WATER SYSTEM WHICH ARE NO LONGER NEEDED FOR THIS FUNCTION DUE TO MODIFICATION III-6 DESCRIBED IN CHAPTER 6 OF THE 1984 REANALYSIS REPORT.
(2) SYSTEMS REQUIRED FOR THE REACTOR COOLANT MAKEUP FUNCTION: (A) CHEMICAL AND VOLUME CONTROL SYSTEM (B) CHARGING PUMP COOLING WATER SYSTEM (C) CHARGING PUMP SERVICE WATER SYSTEM (D) SERVICE WATER SYSTEM	SEE COMMENTS FROM (1) ABOVE.
(3) SYSTEMS REQUIRED FOR THE REACTOR HEAT REMOVAL FUNCTION: (A) AUXILIARY FEEDWATER SYSTEM (B) MAIN STEAM SYSTEM (C) SERVICE WATER SYSTEM (D) RESIDUAL HEAT REMOVAL SYSTEM* (E) COMPONENT COOLING WATER SYSTEM* (F) PRESSURIZER HEATERS* * COLD SHUTDOWN ONLY	IN THE 1980-1982 REVIEW, ONE METHOD OF MAINTAINING SYSTEM PRESSURE WAS TO REPAIR PRESSURIZER HEATER CABLES. CREDIT WILL NOT BE TAKEN FOR THE HEATERS IN THE 1984 REVIEW. IN ADDITION, SEVERAL ADDITIONAL MANUAL ACTIONS HAVE BEEN IDENTIFIED IN ORDER TO OPERATE THE SAME SYSTEMS. AN ALTERNATIVE LETDOWN PATH MAY BE USED IF THE NORMAL AND EXCESS LETDOWN PATHS ARE NOT AVAILABLE (AS DESCRIBED IN CHAPTER 3 OF THE 1984 REANALYSIS REPORT).

1980-1982 POST-FIRE SAFE SHUTDOWN SYSTEMS (REF: VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #885 DATED 10/31/80; VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #363 DATED 6/18/82)	1984 POST-FIRE SAFE SHUTDOWN SYSTEMS (REF: 1984 APPENDIX R REANALYSIS)
(4) INSTRUMENTATION REQUIRED FOR THE PROCESS MONITORING FUNCTION. DIRECT READINGS OF THE FOLLOWING PROCESS VARIABLES ARE OR WILL BE AVAILABLE AT THE REMOTE MONITORING PANEL: (A) RCS PRESSURE (B) PRESSURIZER LEVEL (C) REACTOR COOLANT HOT LEG TEMPERATURE (D) REACTOR COOLANT COLD LEG TEMPERATURE (E) STEAM GENERATOR LEVEL (F) STEAM GENERATOR PRESSURE (G) SOURCE RANGE NEUTRON FLUX	NO CHANGES FROM THE 1980-1982 REVIEW WITH THE FOLLOWING TWO EXCEPTIONS. THE EMERGENCY CONDENSATE STORAGE TANK LEVEL IS REQUIRED FOR HOT AND COLD SHUTDOWN AND RHR PUMP DISCHARGE TEMPERATURE IS REQUIRED FOR COLD SHUTDOWN.
(5) SYSTEMS REQUIRED FOR SUPPORT FUNCTIONS: (A) EMERGENCY DISTRIBUTION SYSTEM (B) CHARGING PUMP COOLING WATER SYSTEM (C) CHARGING PUMP SERVICE WATER SYSTEM (D) SERVICE WATER SYSTEM (E) COMPONENT COOLING WATER SYSTEM (F) CONTAINMENT INSTRUMENT AIR SYSTEM OR STATION INSTRUMENT AIR SYSTEM	ADDITIONAL SYSTEMS REQUIRED FOR SUPPORTING FUNCTIONS HAVE BEEN FORMALLY INCLUDED: EMERGENCY LIGHTING, EMERGENCY COMMUNICATIONS, AND VENTILATION SYSTEMS FOR CERTAIN FIRE AREAS. THESE SYSTEMS WERE NOT SPECIFICALLY IDENTIFIED IN THE 1980-1982 REVIEW AS SYSTEMS REQUIRED FOR SUPPORTING FUNCTIONS. THESE SYSTEMS HAVE BEEN FULLY EVALUATED IN THE 1984 REVIEW. THE CHARGING PUMP SERVICE WATER SYSTEM IS NO LONGER REQUIRED AS DISCUSSED IN (1) ABOVE. INSTRUMENT AIR SYSTEMS ARE NO LONGER REQUIRED SINCE AN ALTERNATIVE PROCEDURE MAY BE USED FOR OPERATING THE REQUIRED AIR-OPERATED VALVES.

TABLE 2

SUMMARY COMPARISON BY NRC PLANT-SPECIFIC REQUEST

NRC PLANT-SPECIFIC REQUESTS FOR ADDITIONAL INFORMATION (REF: NRC LETTER TO VIRGINIA ELECTRIC AND POWER COMPANY OF APRIL 12, 1982, ENCLOSURE 1)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
1. PROVIDE A POINT BY POINT RESPONSE WITH RESPECT TO THE INTERACTIONS OF ASSOCIATED CIRCUITS AS OUTLINED IN ENCLOSURE 2 OF THE FEBRUARY 20, 1981 LETTER (INCLUDING ALL REQUESTED TABLES).	SEE TABLE 3.
2. STATE CONFIRMATION THAT THE RELOCATED CHARGING PUMP SERVICE WATER PUMPS AND THE ASSOCIATED PIPING WILL BE INSTALLED TO THE SAME LEVEL OF CAPABILITY AS BEFORE RELOCATION.	THIS REQUEST IS NO LONGER APPLICABLE DUE TO MODIFICATION III-6 DESCRIBED IN CHAPTER 6 OF THE 1984 REANALYSIS REPORT.

TABLE 3

SUMMARY COMPARISON BY NRC GENERIC REQUEST

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(1) IDENTIFY THOSE AREAS OF THE PLANT THAT WILL NOT MEET THE REQUIREMENTS OF SECTION III.G.2 OF APPENDIX R AND, THUS ALTERNATIVE SHUTDOWN WILL BE PROVIDED. ADDITIONALLY, PROVIDE A STATEMENT THAT ALL OTHER AREAS OF THE PLANT ARE OR WILL BE IN COMPLIANCE WITH SECTION III.G.2 OF APPENDIX R.	A DETAILED REVIEW OF POST-FIRE MANUAL ACTIONS HAS RESULTED IN THE ADDITION OF TWO NEW ALTERNATE SHUTDOWN FIRE AREAS: - TURBINE BUILDING - MECHANICAL EQUIPMENT ROOM NO. 3 THE AUXILIARY BUILDING HAS BEEN REDEFINED FROM TWO FIRE ZONES TO ONE FIRE AREA.
(a) LIST THE SYSTEM(S) OR PORTIONS THEREOF USED TO PROVIDE THE NORMAL SHUTDOWN CAPABILITY ASSUMING LOSS OF OFF-SITE POWER.	REFER TO TABLE 1 WHICH LISTS THESE SYSTEMS.
(b) FOR THOSE SYSTEMS IDENTIFIED IN "a" FOR WHICH ALTERNATE OR DEDICATED SHUTDOWN CAPABILITY MUST BE PROVIDED, LIST THE EQUIPMENT AND COMPONENTS OF THE NORMAL SHUTDOWN SYSTEM IN THE FIRE AREA AND IDENTIFY THE FUNCTIONS OF THE CIRCUITS OF THE NORMAL SHUTDOWN SYSTEM IN THE FIRE AREA (POWER TO WHAT EQUIPMENT, CONTROL OF WHAT COMPONENTS AND INSTRUMENTATION). (continued on page 2)	THE METHODOLOGY FOR PERFORMING THE CABLE SEPARATION ANALYSIS IS BASICALLY THE SAME FOR THE 1980-1982 REVIEW AND THE 1984 REANALYSIS. HOWEVER, IN THE 1984 REANALYSIS, THE NUMBER OF FIRE AREAS REQUIRING ALTERNATIVE SHUTDOWN AND THE LEVEL OF DETAIL OF THE CABLE AND EQUIPMENT SEPARATION ANALYSIS HAVE INCREASED.

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(b) continued DESCRIBE THE SYSTEM(S) OR PORTIONS THEREOF USED TO PROVIDE THE ALTERNATIVE SHUTDOWN CAPABILITY FOR THE FIRE AREA AND PROVIDE A TABLE THAT LISTS THE EQUIPMENT AND COMPONENTS OF THE ALTERNATIVE SHUT-DOWN SYSTEM FOR THE FIRE AREA. FOR THE ALTERNATIVE SYSTEM, IDENTIFY THE FUNCTION OF THE NEW CIRCUITS BEING PROVIDED, THE LOCATION (FIRE ZONE) OF THE ALTERNATIVE SHUTDOWN EQUIPMENT AND/OR CIRCUITS THAT BYPASS THE FIRE AREA AND VERIFY THAT THE ALTERNATIVE SHUTDOWN EQUIPMENT AND/OR CIRCUITS ARE SEPARATED FROM THE FIRE AREA IN ACCORDANCE WITH SECTION III.G.2.	CHANGES ARE ON PREVIOUS PAGE
(c) PROVIDE DRAWINGS OF THE ALTERNATIVE SHUTDOWN SYSTEM(S) WHICH HIGHLIGHT ANY CONNECTIONS TO THE NORMAL SHUTDOWN SYSTEMS (P&IDs FOR PIPING AND COMPONENTS, AND ELEMENTARY WIRING DIAGRAMS). SHOW THE ELECTRICAL LOCATION OF ALL BREAKERS FOR POWER CABLES, AND ISOLATION DEVICES OF CONTROL AND INSTRUMENTATION CIRCUITS FOR THE ALTERNATIVE SHUTDOWN SYSTEMS FOR THAT FIRE AREA.	DRAWINGS SUBMITTED IN THE 1980-1982 REVIEW ARE GENERALLY STILL APPLICABLE; HOWEVER, CURRENT ISSUES OF ALL DRAWINGS ARE AVAILABLE AT THE SITE. DRAWINGS TO SUPPORT NEW MODIFICATIONS OR NEW ALTERNATIVE SHUTDOWN PROCEDURES ARE OR WILL BE AVAILABLE AT THE SITE.
(d) VERIFY THAT CHANGES TO SAFETY SYSTEMS WILL NOT DEGRADE SAFETY SYSTEMS; (E.G., NEW ISOLATION SWITCHES AND CONTROL SWITCHES SHOULD MEET DESIGN CRITERIA AND STANDARDS IN THE FSAR FOR ELECTRICAL EQUIPMENT IN THE SYSTEM THAT THE SWITCH IS TO BE INSTALLED; CABINETS THAT THE SWITCHES ARE TO BE MOUNTED IN SHOULD ALSO MEET THE SAME CRITERIA (FSAR) AS OTHER SAFETY-RELATED CABINETS AND PANELS; TO AVOID INADVERTENT ISOLATION FROM THE CONTROL ROOM, THE ISOLATION SWITCHES SHOULD BE KEYLOCKED OR ALARMED IN THE CONTROL ROOM IF IN THE "LOCAL" OR "ISO-LATED" POSITION; PERIODIC CHECKS SHOULD (continued on page 3)	NO CHANGE FROM THE 1980-1982 REVIEW WITH THE FOLLOWING EXCEPTION. THE ISOLATION SWITCHES ARE NOT INDIVIDUALLY ALARMED IN THE CONTROL ROOM WHEN IN THE LOCAL POSITION. HOWEVER, THE AUXILIARY SHUTDOWN PANEL IS PROVIDED WITH A KEYLOCKED DOOR WHICH ALARMS IN THE CONTROL ROOM WHEN THE DOOR IS OPENED.

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(d) continued BE MADE TO VERIFY THAT THE SWITCH IS IN THE PROPER POSITION FOR NORMAL OPERATION; AND A SINGLE TRANSFER SWITCH OR OTHER NEW DEVICE SHOULD NOT BE A SOURCE OF A FAILURE THAT CAUSES LOSS OF REDUNDANT SAFETY SYSTEMS).	
(e) VERIFY THAT LICENSEE PROCEDURES HAVE BEEN OR WILL BE DEVELOPED WHICH DESCRIBE TASKS TO BE PERFORMED TO EFFECT THE SHUTDOWN METHOD. PROVIDE A SUMMARY OF THESE PROCEDURES OUTLINING OPERATOR ACTIONS.	NO CHANGE FROM THE 1980-1982 REVIEW. ADDITIONAL PROCEDURES WILL BE DEVELOPED FOR THE REQUIRED POST-FIRE OPERATIONS. THESE INCLUDE THE PROCEDURES FOR THE MODIFICATIONS COMMITTED TO IN THE 1980-1982 REVIEW, AND FOR THE REQUIRED ACTIONS IDENTIFIED DURING THE 1984 REANALYSIS.
(f) VERIFY THAT THE MANPOWER REQUIRED TO PERFORM THE SHUTDOWN FUNCTIONS USING THE PROCEDURES OF (e) AS WELL AS TO PROVIDE FIRE BRIGADE MEMBERS TO FIGHT THE FIRE IS AVAILABLE AS REQUIRED BY THE FIRE BRIGADE TECHNICAL SPECIFICATIONS.	BOTH THE 1980-1982 REVIEW AND THE 1984 REANALYSIS VERIFIED THAT THE REQUIRED MANPOWER IS AVAILABLE. THE 1984 REANALYSIS IS MORE COMPREHENSIVE IN ITS EVALUATION OF OPERATOR ACTIONS.
(g) PROVIDE A COMMITMENT TO PERFORM ADEQUATE ACCEPTANCE TESTS OF THE ALTERNATIVE SHUTDOWN CAPABILITY. THESE TESTS SHOULD VERIFY THAT: EQUIPMENT OPERATES FROM THE LOCAL CONTROL STATION WHEN THE TRANSFER OR ISOLATION SWITCH IS PLACED IN THE "LOCAL" POSITION AND THAT THE EQUIPMENT CANNOT BE OPERATED FROM THE CONTROL ROOM AND THAT EQUIPMENT OPERATES FROM THE CONTROL ROOM BUT CANNOT BE OPERATED AT THE LOCAL CONTROL STATION WHEN THE TRANSFER ISOLATION SWITCH IS IN THE "REMOTE" POSITION.	NO CHANGE FROM THE 1980-1982 REVIEW.

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(h) PROVIDE TECHNICAL SPECIFICATIONS OF THE SURVEILLANCE REQUIREMENTS AND LIMITING CONDITIONS FOR OPERATION FOR THAT EQUIPMENT NOT ALREADY COVERED BY EXISTING TECHNICAL SPECIFICATIONS. FOR EXAMPLE, IF NEW ISOLATION AND CONTROL SWITCHES ARE ADDED TO A SHUTDOWN SYSTEM, THE EXISTING TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENTS SHOULD BE SUPPLEMENTED TO VERIFY SYSTEM/EQUIPMENT FUNCTION FROM THE ALTERNATE SHUTDOWN STATION CONSISTENT WITH THE GUIDELINES OF REGULATORY GUIDE 1.22 AND IEEE 338. CREDIT MAY BE TAKEN FOR EXISTING TESTS USING GROUP OVERLAPPING TEST CONCEPTS.	NO CHANGE FROM THE 1980-1982 REVIEW. TECHNICAL SPECIFICATIONS WILL BE SUBMITTED WHERE REQUIRED.
(i) FOR NEW EQUIPMENT COMPRISING THE ALTERNATIVE SHUTDOWN CAPABILITY, VERIFY THAT THE SYSTEMS AVAILABLE ARE ADEQUATE TO PERFORM THE NECESSARY SHUTDOWN FUNCTION. THE FUNCTIONS REQUIRED SHOULD BE BASED ON PREVIOUS ANALYSES, IF POSSIBLE (E.G., IN THE FSAR), SUCH AS A LOSS OF NORMAL AC POWER OR SHUTDOWN ON GROUP 1 ISOLATION (BWR). THE EQUIPMENT REQUIRED FOR THE ALTERNATIVE CAPABILITY SHOULD BE THE SAME OR EQUIVALENT TO THAT RELIED ON IN THE ABOVE ANALYSIS.	NO CHANGE FROM THE 1980-1982 REVIEW WITH THE FOLLOWING EXCEPTION. INDICATIONS ON THE AUXILIARY SHUTDOWN PANEL ARE NOT ISOLATED BY ISOLATION SWITCHES, BUT INDICATION IS AVAILABLE AT OTHER LOCATIONS.
(j) VERIFY THAT REPAIR PROCEDURES FOR COLD SHUTDOWN SYSTEMS ARE DEVELOPED AND MATERIAL FOR REPAIRS IS MAINTAINED ON SITE. PROVIDE A SUMMARY OF THESE PROCEDURES AND A LIST OF THE MATERIAL NEEDED FOR REPAIRS.	NO CHANGE FROM THE 1980-1982 REVIEW WITH THE FOLLOWING EXCEPTIONS. REPAIRS ARE NO LONGER REQUIRED FOR THE PRESSURIZER HEATER CABLES BECAUSE THE HEATERS ARE NOT NECESSARY TO ACHIEVE COLD SHUTDOWN. REPAIRS WILL BE REQUIRED FOR THE COMPONENT COOLING WATER PUMPS AND CABLES.

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(1a) FOR EACH FIRE AREA WHERE AN ALTERNATIVE OR DEDICATED SHUTDOWN METHOD, IN ACCORDANCE WITH SECTION III.G.3 OF APPENDIX R IS PROVIDED, THE FOLLOWING INFORMATION IS REQUIRED TO DEMONSTRATE THAT ASSOCIATED CIRCUITS WILL NOT PREVENT OPERATION OR CAUSE MALOPERATION OF THE ALTERNATIVE OR DEDICATED SHUTDOWN METHOD. PROVIDE A TABLE THAT LISTS ALL THE POWER CABLES IN THE FIRE AREA THAT CONNECT TO THE SAME POWER SUPPLY OF THE ALTERNATIVE OR DEDICATED SHUTDOWN METHOD AND THE FUNCTION OF EACH POWER CABLE LISTED (I.E., POWER FOR RHR PUMP).	THE METHODOLOGY FOR PERFORMING THE ANALYSIS OF ASSOCIATED CIRCUITS BY COMMON POWER SUPPLY IS THE SAME IN THE 1980-1982 REVIEW AND THE 1984 REANALYSIS. IN THE 1984 REANALYSIS THE SCOPE OF THE ELECTRICAL BREAKER COORDINATION STUDY AND THE NUMBER OF FIRE AREAS REQUIRING ALTERNATIVE SHUTDOWN HAVE INCREASED. DRAWINGS AND BREAKER COORDINATION STUDIES WILL BE AVAILABLE AT THE SITE TO DEMONSTRATE THAT ASSOCIATED CIRCUITS WILL NOT PREVENT OR CAUSE MALOPERATION OF ALTERNATIVE SHUTDOWN METHODS.
(b) PROVIDE A TABLE THAT LISTS ALL THE CABLES IN THE FIRE AREA THAT WERE CONSIDERED FOR POSSIBLE SPURIOUS OPERATION WHICH WOULD ADVERSELY AFFECT SHUTDOWN AND THE FUNCTION OF EACH CABLE LISTED.	THE METHODOLOGY AND ASSUMPTIONS USED BY THE COMPANY IN ITS ANALYSIS OF SPURIOUS OPERATIONS HAVE CHANGED SINCE THE 1980-1982 REPORT. THE RESULTS OF THAT REANALYSIS WILL BE INCLUDED IN THE SUBMITTAL OF THE 1984 REANALYSIS.
(c) PROVIDE A TABLE THAT LISTS ALL THE CABLES IN THE FIRE AREA THAT SHARE A COMMON ENCLOSURE WITH CIRCUITS OF THE ALTERNATIVE OR DEDICATED SHUTDOWN SYSTEMS AND THE FUNCTION OF EACH CABLE LISTED.	REFER TO ITEM (b), ON PAGE 4
(d) SHOW THAT FIRE-INDUCED FAILURES (HOT SHORTS, OPEN CIRCUITS OR SHORTS TO GROUND) OF EACH OF THE CABLES LISTED IN a, b AND c WILL NOT PREVENT OPERATION OR CAUSE MALOPERATION OF THE ALTERNATIVE OR DEDICATED SHUTDOWN METHOD.	REFER TO ITEM (b), ON PAGE 4

NRC GENERIC REQUESTS FOR ADDITIONAL INFORMATION (REF: GENERIC LETTER 81-12 AND CLARIFICATIONS)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
(e) FOR EACH CABLE LISTED IN a, b AND c WHERE NEW ELECTRICAL ISOLATION HAS BEEN PROVIDED OR MODIFICATION TO EXISTING ELECTRICAL ISOLATION HAS BEEN MADE, PROVIDE DETAILED ELECTRICAL SCHEMATIC DRAWINGS THAT SHOW HOW EACH CABLE IS ISOLATED FROM THE FIRE AREA.	REFER TO ITEM (b), ON PAGE 4

TABLE 4

SUMMARY COMPARISON OF VIRGINIA ELECTRIC AND POWER COMPANY COMMITMENTS

COMPANY COMMITMENTS (REF: VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #363 DATED 6/18/82)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
1. ADDITIONAL INSTRUMENTATION WILL BE ADDED TO THE REMOTE MONITORING PANEL. THE CIRCUITS FOR THIS INSTRUMENTATION WILL BE ROUTED THROUGH SEPARATE FIRE AREAS FROM THE NORMAL INSTRUMENTATION.	
a) STEAM GENERATOR PRESSURE	NO CHANGE FROM THE 1982 REVIEW.
b) REACTOR COOLANT COLD LEG TEMPERATURE	NO CHANGE FROM THE 1982 REVIEW.
c) SOURCE RANGE NEUTRON FLUX	NO CHANGE FROM THE 1982 REVIEW.
2. DIESEL GENERATOR CONTROL CIRCUIT TO LOCAL PANEL WILL BE ELECTRICALLY ISOLATED SO THAT A FIRE IN ANY OTHER AREA OF THE PLANT WILL NOT AFFECT ITS OPERATION.	NO CHANGE FROM THE 1982 REVIEW.
3. ASSURE COORDINATION OF THE 480V 225A FRAME SIZE BREAKERS.	NO CHANGE FROM THE 1982 REVIEW.
4. MAIN BREAKERS ON THE VITAL BUS PANELS WILL BE REPLACED WITH MOLDED CASE SWITCHES.	THE 1984 APPENDIX R REANALYSIS HAS DETERMINED THAT CURRENT BREAKERS ARE SATISFACTORY. SEE CHAPTER 6, MODIFICATION II-3, OF THE 1984 REPORT.

COMPANY COMMITMENTS (REF: VIRGINIA ELECTRIC AND POWER COMPANY LETTER SERIAL #363 DATED 6/18/82)	CHANGES FROM THE 1980-1982 POST-FIRE SAFE SHUTDOWN REVIEW BASED ON 1984 APPENDIX R REANALYSIS
5. 480/120V CONTROL TRANSFORMERS OF CLASS IE MOTOR CONTROL CENTER WILL BE REPLACED WITH ENCAPSULATED TRANSFORMERS OR FUSED.	NO CHANGE FROM THE 1982 REVIEW.
6. ADDITIONAL PROCEDURES WILL BE WRITTEN TO COVER THE FOLLOWING AREAS:	
a) COMPLETE LINEUP OF THE ALTERNATE METHOD OF CHARGING.	NO CHANGE FROM THE 1982 REVIEW.
b) PROCEDURES TO REQUIRE BREAKERS ON MOVs 1700 AND 1701 TO BE OPEN WHEN REACTOR COOLANT PRESSURE REQUIRES THE VALVES TO BE CLOSED.	NO CHANGE FROM THE 1982 REVIEW.
c) EMERGENCY CLOSURE OF THE DECAY HEAT RELEASE VALVES.	THE METHODOLOGY AND ASSUMPTIONS USED BY THE COMPANY IN ITS ANALYSIS OF SPURIOUS OPERATIONS HAVE CHANGED SINCE THE 1982 REVIEW. IN THE 1984 REANALYSIS, A PROCEDURE FOR THE EMERGENCY CLOSURE OF THE DECAY HEAT RELEASE VALVES, 1-HCV-MS-104 AND 2 HCV-MS-201, IS NO LONGER REQUIRED BECAUSE THE UPSTREAM BLOCK VALVES FOR THE DECAY HEAT RELEASE VALVES WILL BE CHANGED TO NORMALLY SHUT.
d) EMERGENCY CLOSURE OF THE PRESSURIZER RELIEF VALVES.	THE METHODOLOGY AND ASSUMPTIONS USED BY THE COMPANY IN ITS ANALYSIS OF SPURIOUS OPERATIONS HAVE CHANGED SINCE THE 1982 REVIEW. THE RESULTS OF THE 1984 REANALYSIS REQUIRE A HARDWARE MODIFICATION AND A CHANGE TO THE PROCEDURE FOR THE EMERGENCY CLOSURE OF THE PRESSURIZER POWER OPERATED RELIEF VALVES.
e) REMOTE OPERATION OF DIESEL GENERATORS.	NO CHANGE FROM THE 1982 REVIEW.
7. CHARGING PUMP SERVICE WATER PUMP RELOCATION IN THE TURBINE BUILDING.	NO CHANGE FROM THE 1982 REVIEW. HOWEVER, THIS SYSTEM WILL BE ABANDONED WHEN MODIFICATION III-6, DESCRIBED IN CHAPTER 6, IS COMPLETED.

APPENDIX B

COMPLIANCE WITH
APPENDIX R, SECTION III.J, EMERGENCY LIGHTING
AND
APPENDIX R, SECTION III.O, OIL COLLECTION SYSTEM
FOR REACTOR COOLANT PUMP

1. Emergency Lighting

Appendix R, Section III.J states that "Emergency lighting units with at least an eight-hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto."

Emergency lighting was reviewed to verify that compliance with Appendix R was achieved. The following method of review was used:

(1) Safe shutdown equipment was identified.

(2) Lighting drawings were reviewed to verify location of the emergency lighting in reference to the safe shutdown equipment.

(3) Field walkdowns were performed to verify battery ratings.

(4) A test procedure was developed and a test was performed to verify the illuminating capability and positioning of the emergency lighting.

The information obtained from these reviews and tests was used in analyzing the existing emergency lighting system and identifying areas where additional lighting was required.

The illumination level criteria used in the design of the system modifications were based on the IES standards of 1/2 footcandle for low hazard access/egress paths, 2 footcandles for high access/egress paths and 10 footcandles for areas which require operator action for reading of instrumentation or operation of safe shutdown equipment.

Additional emergency lighting units were installed by DCP 84-24 to supplement the existing system.

Although the actual illumination levels were not retested to confirm that the illumination level design criteria were met after the modifications were completed, the intent of the emergency lighting system and compliance to Section III.J were verified by actual tests to confirm the ability of personnel to walk down the safe shutdown routes, to read vital instrumentation, and to perform the necessary operations.

2. Reactor Coolant Pump Oil Collection System

Appendix R, Section III.O requires each reactor coolant pump to be equipped with an oil collection system. The requirements can be summarized as follows:

(1) The system shall be designed, engineered, and installed so that failure will not lead to fire during normal or design basis accident conditions and that there is reasonable assurance that the system will withstand the safe shutdown earthquake.

(2) The system shall be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage points to be protected shall include lift pump and piping, overflow lines, lube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and lube oil reservoirs where such features exist.

(3) Leakage shall be collected and drained to a vented closed container that can hold the entire lube oil system inventory. A flame arrestor is required in the vent if the flash point characteristics of the oil present the hazard of fire flashback.

(4) The drain line shall be large enough to accommodate the largest potential oil leak.

A design review was performed using the original Design Change Package 79-76, associated 5251-M-2000 series drawings by NUS Corp., and associated field changes for installation of the reactor coolant pump oil collection system. The results of the design review are as follows and indicate that Surry meets the requirements of Appendix R, Section III.O.

Requirement 1

The Final Design Change Package states that the system is designed for seismic and deadweight loading conditions, and that the oil collection enclosures, piping, and drain tank are seismically supported to prevent them from falling on safety-related equipment during a safe shutdown earthquake. A review of the Final Design Testing section shows that the oil collection system was checked to ensure that it satisfactorily accommodates differential movement of the reactor coolant system from cold to hot conditions.

One of the components of the reactor coolant pump oil collection system is a "window kit." This component has been evaluated regarding the seismic design requirements. The evaluation is included in this Appendix to the 10 CFR 50 Appendix R report.

Requirement 2

The Final Design section of the Design Change Package states that the design change collects and temporarily stores any lube oil which leaks out of the reactor coolant pump motor lube oil system. The collection system consists of leakproof pans under oil-bearing components that may leak, with covers to contain oil from leaks in pressurized lines and to keep foreign matter out of the drain. The oil-bearing components that are provided with oil collection enclosures are:

(1) Oil lift pump and associated pressurized lines (see 5251-M-2009 and 5251-M-2014)

(2) Oil cooler and associated pressurized lines (see 5251-M-2008 and 5251-M-2013)

(3) Upper oil level indicators (see 5251-M-2007 and 5251-M-2012)

(4) Lower oil level indicators (see 5251-M-2010 and 5251-M-2015)

(5) Drip pan for the lower oil reservoir (see 5251-M-2011 and 5251-M-2016)

(6) Oil fill and drain points

(7) All flanged oil-bearing connections

Requirement 3

Each reactor coolant pump motor has its own oil collection system, including collection tank, as discussed in the Design Change Package. Each oil collection enclosure is connected to a header which drains the oil to a tank below the enclosures. The tank has a vent with a flame arrestor. Each oil collection tank has a 265 gallon capacity.

Requirement 4

Each oil collection enclosure is provided with a 2-inch drain line. The 2-inch drain lines feed a 3-inch drain header to the oil collection tank. The largest mechanical joints in the oil system are the flanges on the lube oil cooler. Complete failure of the gasket in one of the flanged joints would cause a leak equivalent to a 3-inch pipe. The drain system will accommodate such a leak.

EVALUATION OF WINDOW KITS ON
REACTOR COOLANT PUMP OIL COLLECTION SYSTEMS
SURRY POWER STATION

One of the components of the reactor coolant pump oil collection system is a "window kit" installed for easy viewing of the oil level indicators. Tenera Corp., in their Appendix R Overview Report, stated that these window kits may need evaluation regarding the seismic requirements of Section III.O of Appendix R. (See "Surry Fire Protection Overview Program" report submitted by Tenera Corp., dated 5/30/86). The following evaluation concludes that the window unit complies with Section III.O of Appendix R.

The following items were reviewed:

a) Section III.O of Appendix R. This section requires that there be "reasonable assurance that the system will withstand the Safe Shutdown Earthquake".

b) The final design section of DC-79-76, Reactor Coolant Pump Oil Collection System. The following statement is made under the design basis:

"4.3 The oil collection enclosures, piping, and drain tank are seismically supported to prevent them from falling on safety-related equipment during a safe shutdown earthquake".

c) NUS Corporation fabrication drawings for the oil collection system enclosures. The predominant material for the enclosures is 16 gauge, type 304 stainless steel. Some of the fastening materials are type 316 stainless steel. The only other materials specified are as follows:

Window Kit, 9" x 5 1/2", Hoffman A-PWK95NF
Access Door, 10" x 8", Hoffman A-1008, CHNFSS

Catalog cuts for these two devices are attached. They are used on enclosures for the upper and lower oil level indicators, and for the oil lift pump. The window kit consists of 1/4" thick clear polycarbonate material in a heavy gauge, type 304 stainless steel frame with an oil resistant gasket. The access door consists of a type 304 stainless steel box with hinged stainless steel cover and oil-resistant gasket.

The seismic calculations were not filed with the Design Change package in Records Management, so the analysis for specific components on the oil collection system could not be reviewed. However, the Design change package states that seismic calculations were done.

The window is made of polycarbonate material which is very durable and has a high impact strength. This material is frequently used as a safety shield.

The window is firmly fastened to the frame by bolt, and the frame is firmly fastened to the enclosure by bolts.

The window is attached on the surface of a flat panel of the enclosure, rather than being attached at a joint between components, so there is no load on the window. It is expected that during a seismic event, the window will be subjected to vibration, but tension across the window will be minimized since it is not attached at a joint.

Based on the above items, it is concluded that the window unit complies with Section III.O of Appendix R. There is "reasonable assurance" that the window will withstand the safe shutdown earthquake.

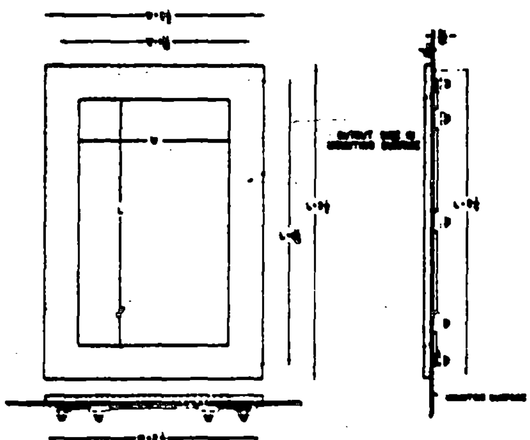
ATTACHMENT I TO APPENDIX B

closures, ... bulletins A-51, A-52, C-5, etc. These kits are easily installed in the field by making a cutout in the enclosure, and attaching the window and frame in place. The frame is made from heavy gauge steel and has a gray prime finish. The window is ¼" clear acrylic material. Oil-resistant gasketing insures a water-tight seal all around the window and frame. All mounting hardware is furnished. Special sizes, materials, finishes, etc. can be provided on special order.

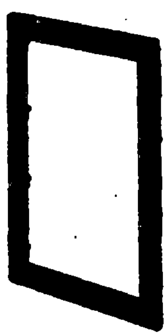
STANDARD SIZES

Catalog Number	Window Size L x W
A-PWK53NF	5 x 3
A-PWK96NF	9 x 5½
A-PWK133NF	13 x 3
A-PWK138NF	13 x 5
A-PWK175NF	17 x 5½
A-PWK1711NF	17 x 11
A-PWK2315NF	23 x 15
A-PWK2919NF	29 x 19
A-PWK3523NF	35 x 23

IMPORTANT NOTE: When determining if a window kit will fit in a door or cover, be sure to allow for gaskets, gasket retainers, door stiffeners, print pockets, door handles, latch rods, and other parts attached to the door or cover.



STAINLESS STEEL WINDOW KITS

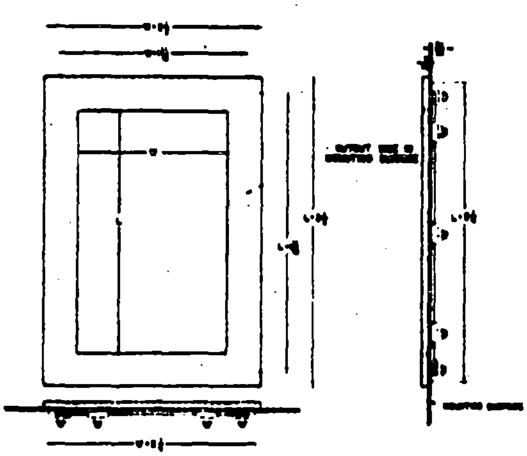


Designed for use on NEMA Type 4, Type 4X, Type 12, and Type 13 enclosures where corrosion is a problem. The window is ¼" clear polycarbonate material. These kits are easily installed in the field by making a cut-out in the enclosure, and attaching the window and frame in place. The frame is made of heavy gauge Type 304 stainless steel and has a brushed finish. Oil-resistant gasketing insures a water-tight seal all around the window and frame. All mounting hardware is provided in stainless steel. Special sizes can be provided on special order.

STANDARD SIZES

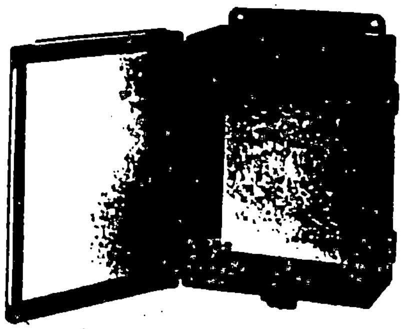
Catalog Number	Window Size L x W
*A-PWK53NFSS	5 x 3
*A-PWK96NFSS	9 x 5½
*A-PWK138NFSS	13 x 8
*A-PWK1711NFSS	17 x 11
*A-PWK2315NFSS	23 x 15
*A-PWK2919NFSS	29 x 19

IMPORTANT NOTE: When determining if a window kit will fit in a door or cover, be sure to allow for gaskets, gasket retainers, door stiffeners, print pockets, door handles, latch rods, and other parts attached to the door or cover.
*NEW CATALOG ITEMS.

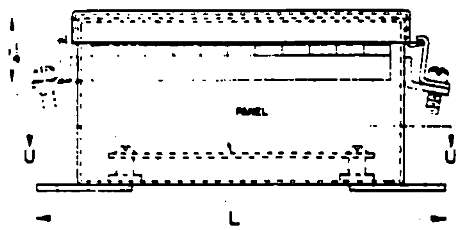


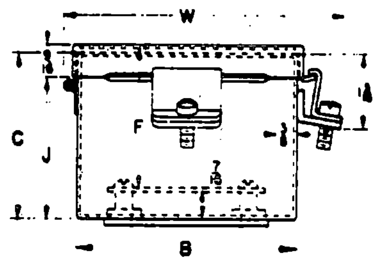
ATTACHMENT II TO APPENDIX B

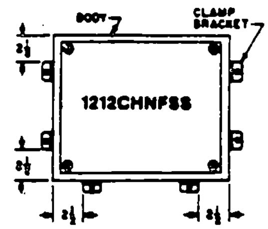
"CHNFSS" STAINLESS STEEL NEMA TYPE 4X, CONTINUOUS HINGE, CLAMP COVER BOXES

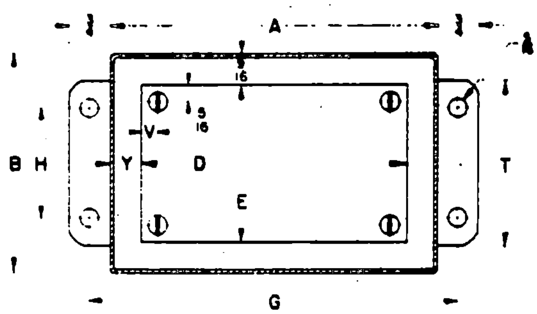


Designed for use in areas which may be regularly hosed down or are otherwise very wet. Suitable for use outdoors, or in dairies, breweries, and similar installations. Also designed for use in areas where serious corrosion problems exist. Fabricated from 14 gauge stainless steel (Type 304) and have external screw clamps on three sides of the cover. The screw clamps are quick and easy to operate and have no loose parts. The solid oil-resistant gasket is attached to the cover with oil-resistant adhesive. All seams are continuously welded and there are no holes or knockouts. External feet are furnished for mounting. These boxes are unpainted, the cover surface is ground smooth. Weldnuts are provided for mounting the optional panels and terminal kits which must be ordered separately. When ordering special "CHNFSS" boxes, be sure to specify which side is to be hinged. Conform to NEMA Type 4, Type 4X, Type 12, and Type 13. Conform to JIC standard EGP-1-1967. All boxes are listed by Underwriters Laboratories, Inc. Conform to European Standard IEC 529, IP66.









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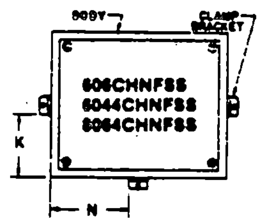

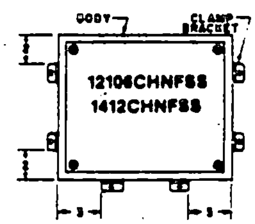

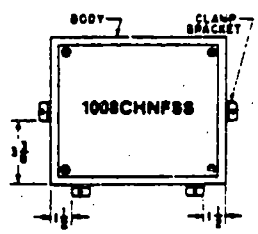

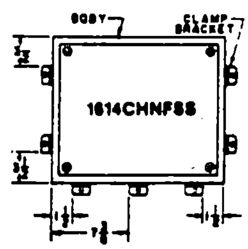

NOTE:
1. Panels are 14 gauge steel.
2. Panel screws are #10-32 pan head.

STANDARD SIZES

Box Catalog Number	Gauge	Box Size A x B x C	*Stainless Steel Panel Catalog Number	*Steel Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	T	V	Y
A-6044CHNFSS	14	6 x 4 x 4	A-6P4SS	A-6P4	4 7/8 x 2 7/8	6 3/4 x 2	7 1/2 x 4 11/16	3 1/2	3 9/16	3	5/16	9/16
A-606CHNFSS	14	6 x 6 x 4	A-6P6SS	A-6P6	4 7/8 x 4 7/8	6 3/4 x 4	7 1/2 x 6 11/16	3 1/2	3 9/16	5	5/16	9/16
A-8064CHNFSS	14	8 x 6 x 4	A-8P6SS	A-8P6	6 3/4 x 4 7/8	8 3/4 x 4	9 1/2 x 6 11/16	3 1/2	3 9/16	5	1/4	1/2
A-1008CHNFSS	14	10 x 8 x 4	A-10P8SS	A-10P8	8 3/4 x 6 7/8	10 3/4 x 6	11 1/2 x 8 11/16	3 1/2	3 9/16	7	1/4	1/2
A-12106CHNFSS	14	12 x 10 x 6	A-12P10SS	A-12P10	10 3/4 x 8 7/8	12 3/4 x 8	13 1/2 x 10 11/16	5 1/2	5 9/16	9	1/4	1/2
A-1212CHNFSS	14	12 x 12 x 6	A-12P12SS	A-12P12	10 3/4 x 10 7/8	12 3/4 x 10	13 1/2 x 12 11/16	5 1/2	5 9/16	11	1/4	1/2
A-1412CHNFSS	14	14 x 12 x 6	A-14P12SS	A-14P12	12 3/4 x 10 7/8	14 3/4 x 10	15 1/2 x 12 11/16	5 1/2	5 9/16	11	1/4	1/2
A-1614CHNFSS	14	16 x 14 x 6	A-16P14SS	A-16P14	14 3/4 x 12 7/8	16 3/4 x 12	17 1/2 x 14 11/16	5 1/2	5 9/16	13	1/4	1/2

*Panels must be ordered separately.

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10 CFR 50 APPENDIX R REPORT
SURRY POWER STATION - UNITS 1 AND 2

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I. DESCRIPTION OF MODIFICATIONS REQUIRED FOR ALTERNATIVE SHUTDOWN

As part of the recent Appendix R reanalysis effort, the modifications discussed on the following pages which are required for alternative shutdown (Section III.G.3 of Appendix R) have been identified and are being formally reported to the NRC.

NOTE A:

Virginia Electric and Power Company will utilize either one of the following two compensatory measures for all uncompleted modifications in the Emergency Switchgear Room (ESR): (a) a continuous fire watch, or (b) instructions for utilizing the manual Halon fire suppression system installed in each unit's ESR. The instructions require the following:

(1) Upon receipt of an alarm from the smoke detection system in the ESR, the Control Room operator would immediately dispatch an operator or fire brigade member to the ESR to determine the validity of the alarm.

(2) This individual will report back to the Control Room within approximately five minutes of being dispatched, and the Halon system will be discharged if necessary.

1. INSTRUMENT CABLE ROUTING IN THE CONTAINMENT - UNITS 1 AND 2

For pressurizer level indication, reactor coolant system pressure indication, and steam generator level indication, the respective two redundant trains do not meet the separation requirement of Section III.G of Appendix R within the containment. This modification will ensure that at least one train which provides indication at the remote monitoring panel is separated by at least 20 ft. within the containment from the train which provides indication in the Control Room. The remote monitoring panel was previously installed to provide alternative shutdown capability (Section III.G of Appendix R). The modifications are as follows:

A. The modification for pressurizer level indication will consist of installing a radiant energy shield between the redundant transmitters and installing new cables and conduit for each unit such that the 20 ft. separation between trains is maintained.

B. For RCS pressure indication, new cables and conduit will be routed to meet the 20 ft. separation requirement. Portions of the new runs will be protected with a radiant energy shield (one hour fire wrap) as needed.

C. For steam generator level, the modification will consist of installing new cable and conduit to provide adequate distance separation for indication for at least one of the three steam generators for each unit.

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-22 and during the 1985 refueling outage for Unit 2 by DC-84-23.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measures are not applicable since this modification is being completed in accordance with the schedule allowed by 10 CFR 50.48.

For Unit 2, although the schedule allowed by 10 CFR 50.48 has expired, a compensatory measure is not practical inside containment because the Appendix R reanalysis effort has recently identified the need for this modification inside containment and because the containment is normally inaccessible.

2. REACTOR COOLANT SYSTEM HOT LEG TEMPERATURE WIDE RANGE INDICATION - UNITS 1 AND 2

The temperature element which currently provides hot leg temperature indication at the Remote Monitoring Panel in the Unit 1 Cable Spreading Room is in the hot leg RTD manifold of the reactor coolant system. This will not provide accurate hot leg temperature indication during a natural circulation cooldown. A modification to provide temperature indication directly off the reactor coolant hot leg loop at the Remote Monitoring Panel will be installed. The modification will take hot leg indication from at least one of the three loops for each unit.

The modification will use spare elements from dual element RTDs which will be installed as part of an equipment qualification modification. New cables and conduits will be routed inside containment such that 20 ft. separation between trains is met. The redundant train provides indication in the Control Room. Existing cables and conduit from the Fuel Building penetration to the Remote Monitoring Panel will be used for the new hot leg temperature indication. New instrumentation will be installed at the Remote Monitoring Panel to provide wide range temperature indication.

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-20 and during the 1985 refueling outage for Unit 2 by DC-84-21.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measures are not applicable since this modification is being completed in accordance with the schedule allowed by 10 CFR 50.48.

For Unit 2, although the schedule allowed by 10 CFR 50.48 has expired, a compensatory measure is not practical inside containment because the Appendix R reanalysis effort has recently identified the need for this modification inside containment and because the containment is normally inaccessible.

3. EMERGENCY COMMUNICATIONS UPGRADE AND ADDITION OF PAGING SYSTEM - UNITS 1 AND 2

As part of the Appendix R reanalysis effort, the emergency communications system was reviewed. Radio communication is presently provided through the use of handsets and a centrally located repeater and antenna. Normal paging and station-wide notification is provided by the existing Gai-Tronics page-party system. A fire in the Control Room, Emergency Switchgear Room, or Cable Spreading Room may disable the repeater system and the Gai-Tronics page-party system for portions of the plant.

The proposed modification will be to upgrade the communication system by providing three additional repeaters and three additional antenna, including one antenna inside each Containment, to ensure adequate redundancy and equipment in the event of a fire. The "B" repeaters and equipment will be located in separate fire areas from the "A" repeaters.

The modification will include a paging function. The operator can initiate a paging signal to hand-held pagers. The pagers will be issued to on-shift operators and fire brigade members and will be used to notify the operators and fire brigade of a fire or other emergency.

These modifications will assure that for any postulated fire location adequate communication and notification ability will be available to areas and personnel required for safe shutdown.

SCHEDULE: This modification was completed by November 1, 1985 by DC-84-63, EWR-84-262, and EWR-84-356.

STATUS: Construction complete.

COMPENSATORY MEASURE: For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned. The Cable Spreading Room is provided with automatic fire detection and fire suppression (CO_2) systems. A temporary antenna has been installed in a separate fire area from the existing antenna.

4. PRESSURIZER PORV ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort and review of spurious operations, the high/low pressure boundary interface at the pressurizer PORV and block valves was reviewed.

The pressurizer PORVs are normally shut; the block valves are normally open and can be shut to isolate flow through the PORVs. These valves are located inside the containment. It may be postulated that a single fire in the Containment, Cable Vault/Tunnel, Emergency Switchgear Room, or Control Room could cause both the PORVs to operate spuriously and disable the block valves in an open position, resulting in a fire-initiated loss of coolant.

This proposed modification is to install power cables for each PORV in dedicated conduits from the PORV to circuit isolation switches located in the Emergency Switchgear Room and in the Control Room. (See Exemption 20.)

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-56 and during the 1985 refueling outage for Unit 2 by DC-84-57.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measure are not applicable since this modification is completed in accordance with the schedule allowed in 10 CFR 50.48.

For Unit 2, although the schedule allowed by 10 CFR 50.48 has expired, a compensatory measure is not practical inside containment because the Appendix R reanalysis effort has recently identified the need for this modification inside containment and because the containment is normally inaccessible. Compensatory measures for outside containment are as follows. For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned. There are automatic fire detection and suppression (CO_2) systems installed in the Cable Vault/Tunnel.

5. CVCS NORMAL LETDOWN ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort and review of spurious operations, the high/low pressure boundary interface in the normal reactor coolant letdown path was reviewed.

Reactor coolant is normally discharged from the loop 1 cold leg through isolation valves. These valves are pilot solenoid operated globe valves which are normally open and fail closed. In order to ensure that a fire-initiated loss of coolant does not occur, at least one valve must be shut. It may be postulated that a single fire in the Containment, Cable Vault/Tunnel, Emergency Switchgear Room, or Control Room could cause both valves to open spuriously.

This proposed modification is to install power and control cables for one valve in dedicated conduit from the valve to circuit isolation switches located in the Emergency Switchgear and the Control Room. (See exemption request 20.)

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-56 and during the 1985 refueling outage for Unit 2 by DC-84-57.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measures are not applicable since this modification is completed in accordance with the schedule allowed in 10 CFR 50.48.

For Unit 2, although the schedule allowed by 10 CFR 50.48 has expired, a compensatory measures is not practical inside containment because the Appendix R reanalysis effort has recently identified the need for this modification inside containment and because the containment is normally inaccessible. Compensatory measures for outside containment are as follows. For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned. There are automatic fire detection and suppression (CO_2) systems installed in the Cable Vault/Tunnel.

6. CVCS EXCESS LETDOWN ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort and review of spurious operations, the high/low pressure boundary interface in the alternate letdown path from the reactor coolant system was reviewed.

Reactor coolant discharged from the loops flows through the excess letdown heat exchanger. The inlet valve is a pilot solenoid air operated control valve that is normally closed and fails closed. The outlet control valve is an air operated control and pressure reducing valve. Failure of the air supply or electrical supply will cause the valve to close.

It is postulated that a single fire in the Control Room, or the Emergency Switchgear Room could cause both valves to open, resulting in a fire induced loss of coolant.

This proposed change will add an isolation switch in the 4 to 20 ma signal circuit for the instrument loop. The cable carrying the 4-20 ma signal to the valve is inherently protected from hot shorts causing spurious operations. The circuit may be deenergized either by the existing switch in the Control Room, or by the new switch which will be added in the Emergency Switchgear Room.

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-56 and during the 1985 refueling outage for Unit 2 by DC-84-57.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measures are not applicable since this modification is being completed in accordance with the schedule allowed by 10 CFR 50.48.

For Unit 2, compensatory measures are as follows. For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned.

7. REACTOR VESSEL HEAD VENT AND PRESSURIZER VENT ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort and review of spurious operations, the vent flow paths from the RCS were reviewed. The reactor vessel head vent system and pressurizer head vent system are each provided with two parallel vent paths. Each path contains two series solenoid operated valves (SOV) which fail shut on loss of power. Restricting orifices are installed in each system to limit flow rate to within the capacity of a charging pump. A fire inside containment cannot disrupt the charging system, therefore no modifications are proposed for inside containment.

It is postulated that a single fire, in the Cable Vault/Tunnel, Emergency Switchgear Room or Control Room, could cause two series SOVs to open, resulting in a loss of coolant from the reactor coolant system. To ensure that a SOV is closed in each vent path, the circuit needs to be interrupted and conductors open.

This proposed modification is to install power cables for one valve from each of the series valve pairs in dedicated conduit outside the containment from the containment penetration to circuit isolation switches in the Control Room and the Emergency Switchgear Room (See exemption request 20).

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-56 and during the 1985 refueling outage for Unit 2 by DC-84-57.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For Unit 1, compensatory measures are not applicable since this modification is being completed in accordance with the schedule allowed by 10 CFR 50.48.

For Unit 2, compensatory measures are as follows. For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned. There are automatic fire detection and suppression (CO_2) systems installed in the Cable Vault/Tunnel.

8. STEAM GENERATOR PORV ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort, spurious operation of the steam generator PORVs was reviewed. It is postulated that a single fire in the Control Room or

Emergency Switchgear Room could cause at least one steam generator PORV to open, resulting in a loss of steam generator inventory.

The proposed modification will provide an isolation switch in the control circuit of each steam generator PORV. The control circuit consists of a 4 to 20 ma signal. The cable carrying the 4-20 ma signal is inherently protected from hot shorts causing spurious operation (see exemption request 19). The circuit may be deenergized either by the existing switch in the Emergency Switchgear Room or by a new switch which will be added in the Cable Vault/Tunnel.

SCHEDULE: This modification was completed during the fall 1985 maintenance outage for Unit 1 by DC-84-64 and during the 1985 refueling outage for Unit 2 by DC-84-65.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned.

Procedures were in place to isolate the steam generator PORVs when fire threatens cables in the Emergency Switchgear Rooms or Control Room. These measures, including the procedures, were in place for both units prior to start-up from the Unit 1 1984 refueling outage.

9. MAIN STEAM SYSTEM ISOLATION - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort and review of spurious operations, the main steam isolation valves (MSIVs) were reviewed. The MSIVs provide main steam isolation between the steam generators and the turbine. Venting of the instrument air through operation of solenoid operated valves (SOVs) assures closure of the MSIVs. A single fire in the Control Room, Emergency Switchgear Room or the Cable Vault/Tunnel could both cause the MSIVs to fail open and cause the steam generator PORVs to operate spuriously. The ability to assure the closure of the MSIV will preclude the loss of steam generator inventory as a result of a spurious operation of a valve downstream of the MSIVs.

This proposed modification will provide an additional SOV in series with the two existing SOVs for control of each MSIV. Cable to the new SOVs will be routed in such a manner as to meet the requirements of Appendix R and power will be supplied from a different station battery than those supplying the existing SOVs.

SCHEDULE: This modification was completed during the fall 1985 maintenance outage for Unit 1 by DC-84-64 and during the 1985 refueling outage for Unit 2 by DC-84-65.

NOTE: A schedular exemption request had been submitted for this item (Ref. Company letter to NRC, Serial No. 85-621, dated 9-10-85).

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continually manned. There are automatic fire detection and suppression (CO_2) systems installed in the Cable Vault/Tunnel areas. Procedures were in place to shut the MSIVs when fire threatens cables in the Emergency Switchgear Room, Cable Vault/Tunnel or Control Room. These measures, including the procedures, were in place for both Units 1 and 2 prior to its startup from the Unit 1 1984 refueling outage.

10. CONTROL ROOM AND EMERGENCY SWITCHGEAR ROOM VENTILATION MODIFICATIONS - UNITS 1 AND 2

As part of the reanalysis for Appendix R, the existing ventilation and ambient temperature in the Control Room (CR) and Emergency Switchgear Room (ESR) were reviewed.

Since all the chillers for the Control Room and Emergency Switchgear Room (ESR) normal air conditioning systems are located in Mechanical Equipment Room No. 3, it may be postulated that a fire in one fire area could disable the ventilation systems for the CR and ESR. There is an existing mechanical cross-connection to other chillers which may be used to provide cooling for the CR and ESR.

This modification includes routing a power feed to one of the other chillers from an emergency power source; providing isolation switches for certain HVAC equipment; and rerouting certain cable to provide separation in accordance with Appendix R.

SCHEDULE: This modification was completed during the 1986 refueling outage for Unit 2 by DC-84-66 (Ref. Company letter to NRC, Serial No. 85-622, dated 9-10-85).

STATUS: Construction complete.

COMPENSATORY MEASURES: For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. A fire watch was in place for Mechanical Equipment Room No. 3. The Control Room is continuously manned.

11. REMOTE MONITORING PANEL POWER SUPPLY SEPARATION - UNITS 1 AND 2

As part of the reanalysis for Appendix R, the power supply routings for both the original and the new Remote Monitoring Panels (RMPs) were reviewed. Note: The original RMP has indications for Reactor Coolant System Hot Leg Temperature, Pressurizer Level, Pressurizer Pressure, and Steam Generator

Level. The new RMP has indications for Reactor Coolant System Cold Leg Temperature, Steam Generator Pressure, and Source Range Neutron Flux. The following two modifications will be made:

(a) This modification will provide two power cables to the new RMP from different power supplies, separated in accordance with Appendix R requirements. In addition, the new power sources will have breaker coordination between their main and branch breakers.

(b) The power supply cables for the original RMP are routed together in the Main Control Room and Unit 1 Emergency Switchgear Room. This modification will provide new power supplies for the original RMP. The power supply cables to the original RMP will be paralleled from the new RMP.

SCHEDULE: (a) This modification was completed prior to start-up from the 1984 refueling outage for Unit 1 by DC-84-08.

(b) This modification was completed by spring 1985 by DC-84-08 (Ref. Company letter to NRC, Serial No. 85-180, dated 4-4-85).

STATUS: (a) Complete

(b) Complete

COMPENSATORY MEASURES: (a & b) For the Emergency Switchgear Room either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. The Control Room is continuously manned.

12. AIR-OPERATED VALVE MODIFICATION - UNITS 1 AND 2

In order to ensure adequate inventory control and boration of the reactor coolant system, the Appendix R shutdown procedures will be based on establishing a letdown path. A fire in the Reactor Containment, Cable Vault/Tunnel, Emergency Switchgear Room, or Control Room has the potential to damage the cables associated with the redundant letdown valves. An alternative letdown path may be established by manually aligning and blocking open certain valves. The alternative letdown path does not need to be established until several hours after the start of the shutdown procedure.

Some of the required valves are air-operated valves (AOVs). If the fire has damaged the instrument air supply to these AOVs, they may be locally operated using a portable air bottle. However, this would require the use of repairs. A minor modification is necessary to facilitate quick connection of the portable air bottle without the use of repairs.

SCHEDULE: This modification was completed during the 1986 Refueling Outage for Unit 1 by DC-84-77 and was completed during the 1985 Refueling Outage for Unit 2 by DC-84-78.

NOTE: A schedular exemption request had been submitted for this item (Company letter to NRC, Serial No. 85-516, dated 7-19-85).

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: As an interim measure, a procedure was developed for using portable air bottles to locally operate the AOVs. This procedure was in place prior to start-up from the 1984 refueling outage for Unit 1 and the 1985 refueling outage for Unit 2.

13. 4kV PUMP MOTOR CONTROL ISOLATION - UNITS 1 AND 2

It may be postulated that a fire in the Control Room could render the 4kV pumps in the residual heat removal, charging pump service water, and component cooling water systems inoperable. This modification will provide a transfer switch for each of the affected pumps which will isolate the control circuit from the Control Room. The transfer switches will be located in the Emergency Switchgear Room.

SCHEDULE: This modification was completed during the 1986 refueling outage for Unit 1 by DC-84-75. This modification was completed during the 1985 refueling outage for Unit 2 by DC-84-75.

NOTE: A schedular exemption request had been submitted for this item (Company letter to NRC, Serial No. 85-621, dated 9-10-85).

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: No dedicated fire watch is required because the Control Room is the only area of concern and it is constantly manned.

II. DESCRIPTION OF PREVIOUSLY IDENTIFIED MODIFICATIONS WHICH HAVE BEEN REVISED AS A RESULT OF THE REANALYSIS

As part of the recent Appendix R reanalysis effort, the modifications discussed on the following pages have been revised and are being formally reported to the NRC.

1. EMERGENCY LIGHTING UPGRADE - UNITS 1 AND 2

As part of the recent Appendix R reanalysis effort, the emergency lighting system was reviewed with respect to the more detailed review for safe shutdown equipment locations and operator actions required for safe shutdown. It was determined that the system will be upgraded to ensure compliance with Appendix R, Section III.J, such that adequate illumination will be provided for all safe shutdown equipment areas and access paths to the equipment (see exemption request 14).

SCHEDULE: This modification was completed by 12-15-85 by DC-84-24 and EWR-86-190A-E. (Company letter to NRC, Serial No. 85-200, dated 4-15-85.)

STATUS: Construction complete.

COMPENSATORY MEASURE: Portable lanterns were available in the Appendix R locker for emergency use.

2. DIESEL GENERATOR CONTROL CIRCUIT ISOLATION - UNITS 1 AND 2

The Company had previously committed (per Attachment to Company letter No. 363, dated 6/18/82) to modify Diesel Generator Control Circuits to provide the capability for complete isolation from the Control Room. Previous discussions about this commitment did not state for which Diesel Generator this modification would be provided. The Appendix R reanalysis has determined that modification of one train for each unit is sufficient to meet the requirements of Appendix R. Therefore, Diesel No. 3 will not be modified. Intended installation activity for this modification continues for Diesel No. 1 (Unit 1) and Diesel No. 2 (Unit 2).

SCHEDULE: The modification for Diesel No. 1 was completed during the 1984 refueling outage for Unit 1 by DC-84-39A. The modification for Diesel No. 2 was completed during the 1985 refueling outage for Unit 2 by DC-84-39B. This schedule is unchanged from previous commitment.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: Not applicable since this modification is being completed in accordance with the schedule allowed by 10 CFR 50.48.

3. MAIN BREAKERS ON THE VITAL BUS PANELS - UNITS 1 AND 2

The Company previously committed (Attachment to Company letter No. 363, dated 6/18/82) to replace the main breakers on the Vital Bus Panels with molded case switches. This modification was proposed since electrical coordination between the branch breakers and the main breaker on the vital bus could not be assured. The current Appendix R reanalysis has determined that the subject breakers do have satisfactory electrical coordination. Therefore, this modification is not necessary and will not be completed.

SCHEDULE: Not applicable.

STATUS: Not applicable.

COMPENSATORY MEASURE: Not applicable.

III. DESCRIPTION OF OTHER MODIFICATIONS

As part of the recent Appendix R reanalysis effort, the additional modifications discussed on the following pages have been identified and are being implemented.

1. DIESEL GENERATOR NO. 1 POWER CABLE PROTECTION

There presently exists the potential that fire could damage cables required for operation of all three Emergency Diesel Generators at Surry Power Station. This potential exists in the Unit 2 Emergency Switchgear Room and Mechanical Equipment Room No. 3.

To eliminate this potential, those cables required for operation of Emergency Diesel Generator No. 1 will be rerouted out of the common fire areas. The No. 1 generator supplies back-up power to the Surry Unit 1 "Safety-Related" H Distribution System. The rerouting of the cables will be via an electrical duct bank. The underground duct bank will be installed between the No. 1 Generator Room and the Unit 2 Liquid Waste Tank Area in the Auxiliary Building.

The cables will be installed in rigid conduit starting in the Liquid Waste Test Tank Area. Sleeves will be drilled between that area and the Unit 2 Cable Tunnel. In the Unit 2 Cable Tunnel, cables will be routed in existing cable trays or newly installed conduits, through the Unit 1 and 2 Cable Tunnels to the Unit 1 Emergency Switchgear Room.

After rerouting these cables, Emergency Diesel Generator No. 1 will be available to provide power to supply the required shutdown systems in the event of a fire in the previously identified locations.

SCHEDULE: The installation of the duct bank and conduits was completed during the 1984 Surry Unit 1 refueling outage by DC-84-39A.

STATUS: Construction complete.

COMPENSATORY MEASURE: For the Emergency Switchgear Room, either a fire watch was in place or instructions were provided for utilizing the manual Halon system as stated in Note A, Page I-1. A fire watch was in place for the Mechanical Equipment Room No. 3.

2. ADDITION OF SMOKE DETECTORS AND FIRE STOPS IN THE AUXILIARY BUILDING - UNITS 1 AND 2

The charging pump component cooling pumps are located in the Auxiliary Building elevation 2 ft. 0 in. There are presently no ceiling-mounted smoke detectors at this elevation. A modification will consist of installing two smoke detectors over each unit's pumps to ensure early warning of a fire.

A cable tray runs perpendicular to the Unit 1 and 2 charging pump power cables at the 13 ft. 0 in. elevation of the Auxiliary Building. The modification will consist of installing an appropriate fire stop and/or solid tray covers which would adequately prevent against any damage to the charging pump power feeds and eliminate the cable tray from being considered an intervening combustible.

SCHEDULE: The smoke detectors and fire stops were installed during the 1984 refueling outage of Surry Unit 1 by EWR-84-223, EWR-84-223A and 223B, and EWR-84-281.

STATUS: Construction complete.

COMPENSATORY MEASURE: A continuous fire watch was established in the Auxiliary Building for surveillance of the applicable portions of elevations 2 ft. 0 in. and 13 ft. 0 in.

3. COMPONENT COOLING WATER PUMP MOTOR AND CABLE REPAIR PROCEDURES - UNITS 1 AND 2

The component cooling water pumps are needed to bring the units to cold shutdown condition. In case of any fire damage to the pump motors or cables which results in less than two pumps available, a post-fire repair will be implemented as allowed by Section III.G.1 of Appendix R to 10 CFR 50. The reactor units may be maintained in hot shutdown as repairs are made to two of the four pumps.

Two spare pump motors and sufficient cable will be stocked for this purpose. These items plus any others such as pump-motor couplings will be reserved in the warehouse. A post-fire repair procedure will be developed which will accomplish the repair within the time frame given by Appendix R, Section III.G.1.

<u>SCHEDULE</u>: The repair procedure and a positioning of the required materials was completed during the 1985 refueling outage for Unit 2 by EWR-84-279.

<u>STATUS</u>: Development completed.

<u>COMPENSATORY MEASURES</u>: A continuous fire watch was established in the Auxiliary Building for surveillance of the applicable portions of elevations 2 ft. 0 in. and 13 ft. 0 in.

4. <u>CHARGING PUMP SERVICE WATER SYSTEM PIPE REPLACEMENT - UNITS 1 AND 2</u>

As part of the reanalysis for Appendix R, the charging pump cooling water configuration was reviewed. Currently, charging pump cooling water is supplied by the charging pump service water (CPSW) system.

The CPSW pumps are located in two Pump Rooms which are separate fire areas; however, much of the CPSW system piping is fiberglass reinforced plastic piping and is routed through the Auxiliary Building, Turbine/Auxiliary Building Pipe Tunnel and the Unit 2 Emergency Switchgear Room without separation. Since fiberglass piping may be susceptible to fire damage, a modification is needed.

This modification will consist of installing a three-hour fire barrier around the piping from the Unit 2 Emergency Switchgear Room to the Turbine/Auxiliary Building Pipe Tunnel. The three-hour barrier will enclose all four CPSW pump discharge lines, providing separation from fire exposure in the Unit 2 Emergency Switchgear Room. The remaining fiberglass CPSW supply piping will be replaced with copper-nickel piping. The fiberglass piping within the Turbine/Auxiliary Building pipe tunnel will be removed.

SCHEDULE: This modification was completed during the 1986 refueling outages for Units 1 and 2, respectively, by DC-84-67.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: The Company utilized either one of the following two compensatory measures for all uncompleted modifications in the Emergency Switchgear Room (ESR): (a) a continuous fire watch, or (b) instructions for utilizing the manual Halon fire suppression system installed in each unit's ESR. The instructions require the following:

(1) Upon receipt of an alarm from the smoke detection system in the ESR, the Control Room operator would immediately dispatch an operator or fire brigade member to the ESR to determine the validity of the alarm.

(2) This individual will report back to the Control Room within approximately five minutes of being dispatched, and the Halon system will be discharged if necessary.

A continuous fire watch was posted in the Auxiliary Building elevations 2 ft. and 13 ft.

5. RADIANT ENERGY SHIELD FOR RESIDUAL HEAT REMOVAL PUMPS - UNITS 1 AND 2

The review of the residual heat removal (RHR) system and the fire protection system inside containment of both Unit 1 and 2 indicates that the requirements of Section III.G of Appendix R to 10 CFR 50 are not met for the RHR pumps. A modification will be implemented to provide a radiant energy shield between the two pump motors for each unit as allowed by Section III.G.2 (f). The Appendix R evaluation is based on implementing a post-fire repair of the RHR pump cables to allow cold shutdown.

The radiant energy shield will be mounted between the RHR pumps. The shield will form a noncombustible line of sight barrier between the RHR pump motors. The shield will consist of a fire proof panel and supporting steel. The radiant energy shield will be seismically supported to prevent damage to safety-related equipment in the area following a seismic event. The shield material will remain stable in the DBA environment and maintain the fire resistance rating for the normal containment environment.

SCHEDULE: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-42 and during the 1985 refueling outage for Unit 2 by DC-84-43.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: The Appendix R reanalysis effort has recently identified the need for this modification inside the containment. Because the RHR pumps are located in the normally inaccessible containment, a compensatory measure is not practical.

In lieu of a compensatory measure, the Company has concluded that an adequate level of protection existed for the interim period until this modification was installed. The technical bases for this conclusion are summarized as follows:

(1) The combustible loading in the vicinity of the pumps is negligible;

(2) Damage to the pumps themselves from an exposure fire is not of concern because the pumps are of typical heavy material construction, combined with the low fuel loading in the area and the approximately 13 ft. separation distance from centerline to centerline; and

(3) A dry hose standpipe is available inside containment for fire fighting purposes.

6. Withdrawn; Modification III.4 is being done in lieu of the installation of a charging pump cooling water heat exchanger. Upon completion of Modification III.4, the fiberglass charging pump service water supply piping will have been replaced or protected, thereby, eliminating the need for the charging pump cooling water heat exchanger.

7. REPLACE LOAD CENTER FUSES - UNITS 1 AND 2

As part of the Appendix R reanalysis effort, an electrical distribution system coordination study was completed. As a result of the study,a concern was identified with certain fuses in 480V emergency motor control centers (MCCs). The 480V emergency MCCs are located outside containment in the Cable Vault/Tunnel and Emergency Switchgear Rooms.

The control circuits for the MCCs receive 125V dc power from the station 125V dc distribution system. The control circuits contain 30A fuses. For certain of these 30A fuses, coordination cannot be obtained in all cases with the supply breaker on the 125V dc distribution system feeding these circuits. The modification will replace these fuses with other fuses which do provide coordination in all cases.

SCHEDULE: This modification was completed during the 1986 refueling outage for Unit 1 by DC-84-85 and during the 1985 refueling outage for Unit 2 by DC-84-86.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: Compensatory measures are not practical for all areas; the most direct route to compliance is replacement of fuses by the schedule identified above. However, compensatory measures as previously described were provided for the Emergency Switchgear Room and the Cable Vault/Tunnel where the MCCs are located.

8. AUXILIARY BUILDING VENTILATION MODIFICATION - UNITS 1 AND 2

As part of the reanalysis for Appendix R, the existing ventilation and potential temperatures in the Auxiliary Building were reviewed.

There are two sets of supply fans that may be used for ventilation of the charging pump cubicles. One set of fans is supplied from a Unit 1 emergency power source. The other set is supplied from both a Unit 1 and Unit 2 emergency power source, but the cable from the Unit 2 source is routed through the Unit 1 Cable Vault/Tunnel, and is routed close to the Unit 1 cables within the Auxiliary Building.

This modification will include rerouting the cable from the Unit 2 power source for one fan such that it is adequately separated from the Unit 1 cable for another fan (see exemption request 18). If there are any cable trays which are intervening combustibles, fire stops will be provided. Additionally, means will be provided for starting the Unit 2 fan and for powering the outlet damper MOD-VS-58B from the local starter in the Auxiliary Building.

SCHEDULE: This modification was completed prior to start-up from the 1985 refueling outage for Unit 2 by DC-84-68.

STATUS: Construction complete.

COMPENSATORY MEASURES: The Cable Vault/Tunnel is provided with automatic fire detection and fire suppression (CO_2) systems. A continuous fire watch was established in the Auxiliary Building for surveillance of all elevations.

9. INSTALLATION OF CONTAINMENT CABLE TRAY BOTTOM COVERS AND FIRE STOPS - UNITS 1 AND 2

Instrumentation cable inside containment is required for redundant shutdown trains. The cable routing inside containment is such that separation of redundant systems is or will be greater than 20 ft. (see modification Item I-1), but in some cases there are intervening combustibles (cable trays routed around the containment - see exemption request 17).

The proposed modification is to install cable tray bottom covers and fire stops for certain portions of cable trays to provide adequate protection.

SCHEDULE: This modification was completed during the 1985 fall maintenance outage/1986 refueling outage by EWR-84-322A and 84-322B (Ref. Company letter to NRC, Serial No. 85-516, dated 7-19-85). The Unit 2 modification was completed during the 1985 refueling outage by EWR-85-050, 85-050A, 86-001.

STATUS: Unit 1 construction complete.
Unit 2 construction complete.

COMPENSATORY MEASURE: A compensatory measure is not practical inside containment because the Appendix R reanalysis effort has recently identified the need for this modification inside containment and because the containment is normally inaccessible and because transient combustibles inside containment are negligible.

10. FUEL OIL PUMP CONDUIT SEPARATION IN MANHOLES - UNITS 1 AND 2

As part of the reanalysis for Appendix R, the existing routing of power cable conduits for the Emergency Diesel Generators fuel oil pumps I-EE-P-1A, I-EE-P-1B, and 1-EE-P-1C were reviewed. It was determined that adequate separation of these conduits does not exist in the electrical manhole located in the north yard near the fuel oil pumphouse.

The modification to provide separation of these conduits within the manhole will consist of sealing these conduits using Dow-Corning Silicon RTV Foam.

SCHEDULE: This modification was completed during the Unit 1 1984 refueling outage by EWR-84-274.

STATUS: Construction completed.

COMPENSATORY MEASURE: Not applicable since the modification is complete.

11. <u>INSTALLATION OF FIRESTOPS IN PENETRATIONS BETWEEN THE AUXILIARY BUILDING AND SAFEGUARDS - UNITS 1 AND 2</u>

There are several pipe penetrations between the 2 ft. elevation of the Auxiliary Building and the basement of the Unit 1 and Unit 2 Safeguards areas. These are separate fire areas and must be separated by a three-hour barrier.

The proposed modification is to construct a maronite barrier on each side of the existing concrete wall. The remaining area between the fire resistant barriers will be filled with Dow Corning Silicone Foam to a thickness that will provide a minimum of three-hour separation.

<u>SCHEDULE</u>: This modification was completed prior to start-up from the 1985 Unit 2 refueling outage by EWR-84-370 and EWR-84-370A.

<u>STATUS</u>: Construction completed.

<u>COMPENSATORY MEASURE</u>: A fire watch was established in the Auxiliary Building to monitor all elevations.

12. <u>REPLACEMENT OF CONTROL ROOM/TURBINE BUILDING FIRE DOOR AND FRAME</u>

There is a door and frame assembly between the Control Room and the Turbine Building. These are separate fire areas and must be separated by a three-hour barrier.

The proposed modification is to replace the assembly with a labelled door and frame that will provide a minimum of three-hour separation.

<u>SCHEDULE</u>: This modification was completed by 10-1-86 by EWR-85-349, EWR-85-349A, and EWR-85-134.

<u>STATUS</u>: Construction complete.

<u>COMPENSATORY MEASURE</u>: An existing nonrated door, as well as a missile door, was in place to provide adequate protection until the labeled door and frame were installed.

13. <u>ADDITION OF HALON SYSTEM TO THE EMERGENCY SWITCHGEAR ROOM - UNIT 1 AND 2</u>

On January 19, 1983, Virginia Electric and Power Company was denied an exemption from a fixed fire suppression system in the Emergency Switchgear Rooms. This modification will install a total flooding, manual, Halon 1301 system in each unit's Emergency Switchgear Room, in accordance with the requirements of NFPA 12A, "Halon 1301 Fire Extinguishing Systems."

<u>SCHEDULE</u>: This modification was completed during the 1984 refueling outage for Unit 1 by DC-84-01 and during the 1985 refueling outage for Unit 2 by DC-84-01.

<u>STATUS</u>: Unit 1 construction complete.
Unit 2 construction complete.

<u>COMPENSATORY MEASURE</u>: A fire watch was in place in each unit's Emergency Switchgear Room until both systems were operational.

14. <u>DIESEL GENERATOR NO. 3 CABLE REROUTING</u>

There presently exists the potential to damage cables required for operation of No. 1 and No. 3 Emergency Diesel Generators and also damage cables for Unit 2 safe shutdown equipment. This potential exists in the Unit 2 Cable Vault and Tunnel.

To eliminate this potential, those cables required for operation of Emergency Diesel Generator No. 3 will be rerouted out of the Unit 2 Cable Vault and Tunnel. Diesel Generator No. 3 was chosen because its cables could be relocated more easily than rerouting or providing a fire-rated coating for the Emergency Diesel Generator No. 1 cables.

Diesel Generator No. 3 supplies power to the Units 1 and 2 safety-related electrical distribution system, bus 1J and bus 2J.

After rerouting of these cables, Emergency Diesel Generator NO. 3 will be available to provide power to supply the required Units 1 and 2 shutdown systems in the event of a fire in the Unit 2 Cable Vault and Tunnel.

SCHEDULE: This modification is scheduled to be completed during the next (1988) refueling outages for each unit.

STATUS: Engineering in progress.

COMPENSATORY MEASURE: There are existing automatic fire detection systems (smoke and heat) and an automatic fire suppression system (CO_2) installed in the Unit 2 Cable Vault and Tunnel.

In addition, station procedures require a flame permit and a fire watch for any welding or cutting operations in the area. These fire protection systems and procedures provide a high degree of protection from a fire starting or developing. In addition to these provisions, a fire watch will inspect the area at least once each shift to help prevent conditions that could lead to fire.