

NRC Form 386  
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Surry Power Station, Units 1 & 2										DOCKET NUMBER (2) 0 5 0 0 0 2 8 0										PAGE (3) 1 OF 3	
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TITLE (4)

## Improper Routing of Appendix R Related Cables

EVENT DATE (6)			LER NUMBER (8)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)									
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES					DOCKET NUMBER(S)				
03	13	87	87	010	00	04	10	87						0 5 0 0 0				
OPERATING MODE (9) N			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)															
POWER LEVEL (10) 100% C I S I D			20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)			
			20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)			
			20.405(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vii)				X OTHER (Specify in Abstract below and in Text, NRC Form 365A) "Special Report"			
			20.405(a)(1)(iii)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(A)							
			20.405(a)(1)(iv)				50.73(a)(2)(iii)				50.73(a)(2)(viii)(B)							
			20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)							

LICENSEE CONTACT FOR THIS LER (12)

NAME R. F. Saunders, Station Manager										TELEPHONE NUMBER AREA CODE 8 0 4 3 5 7 1 - 3 1 8 4									
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE)		NO		EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
						05	30	87

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

With Unit 1 at 100% power and Unit 2 in cold shutdown, during the process of the annual update of the 10 CFR 50 Appendix 'R' Report, it was discovered that a design change package, DCP 83-39A "Diesel Generator No. 1 Power Cable Protection" had rerouted power and control cables of Emergency Diesel Generator (EDG) No. 1 through the Unit 2 Cable Vault and Tunnel. This area already contained cables associated with EDG No. 3.

This condition is not in accordance with Appendix 'R' Section III G.2 which requires separation of redundant trains of safe shutdown equipment.

An evaluation of the U-2 Cable Vault and Tunnel (CV&T) fire area was made, and it was determined that due to installed fire detection and suppression systems that no immediate action was required. An analysis to determine the optimum method to ensure the required separation is in progress. In the interim, the affected area will be inspected at least once a shift.

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PDR ADOCK 05000280  
S PDR

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Surry Power Station, Units 1 & 2	0500028087-010-00	0	1	0	0	2	OF 03

TEXT (If more space is required, use additional NRC Form 366A's) (17)

1.0 Description of the Event

On March 13, 1987, with Unit 1 at 100% power and Unit 2 in cold shutdown, it was determined that a fire in the U-2 Cable Vault and Tunnel, could disable Unit 2 safe shutdown equipment as well as EDG-1 {EIIIS-06} and EDG-3, which are the sources to the Unit No. 1 alternative safe shutdown equipment. This condition is not in compliance with 10 CFR 50 Appendix 'R' Section III G.2. The Unit No. 1 alternative safe shutdown equipment (i.e. charging pumps) are cross-connected mechanically with Unit No. 2. The Unit No. 1 equipment can only be powered from EDG-1 or EDG-3.

2.0 Safety Consequences and Implications

Evaluation of the fire detection and suppression system design revealed that a high degree of protection is provided, thereby lowering the probability of any significant damage from a U-2 CV&T fire. Also, there are no likely fire ignition sources in the U-2 CV&T, thereby lowering the probability of a fire starting.

Therefore, this condition does not constitute an unreviewed safety question, and the health and safety of the public are not affected.

3.0 Cause

This condition was caused by the relocation of the EDG-1 power and control cables through the U-2 CV&T. This rerouting was done as part of Design Change 83-39A "Diesel Generator No. 1 Power Cable Protection". DC-83-39A did not adequately determine the cable routing for EDG-3 to confirm independence from the U-2 CV&T. Appendix R Cable Block Diagrams for EDG-3, recently developed independently of DC-83-39A, indicated that there are 6 cables which are routed through the U-2 CV&T. During the process of the annual update of the 10 CFR 50 Appendix R Report, this information was assembled and the problem was discovered.

4.0 Immediate Corrective Action

Due to the high level of fire suppression (automatic CO<sub>2</sub> system) and fire detection (heat and smoke detection systems), it was determined that no immediate action was required.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Surry Power Station, Units 1 & 2	0 5 0 0 0 2 8 0	8 7	0 1 0	0 0	0 3	OF	0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

5.0 Additional Corrective Action

In order to ensure that the probability of a fire starting and developing in the U-2 CV&T is as low as possible, a fire watch will inspect the area at least once each shift.

A modification will be performed to relocate or provide a fire rated coating to the appropriate EDG cables, thereby ensuring availability of EDG-1 or EDG-3 in the event of a fire in the U-2 CV&T.

6.0 Action Taken to Prevent Recurrence

No additional actions are needed. Additional Appendix R review requirements have been implemented since DC-83-39A, which would make a similar occurrence unlikely.

7.0 Generic Implications

None.

8.0 Manufacturer/Model Number

N/A



VIRGINIA ELECTRIC AND POWER COMPANY

Surry Power Station  
P. O. Box 315  
Surry, Virginia 23883

April 10, 1987

U.S. Nuclear Regulatory Commission  
Document Control Desk  
016 Phillips Building  
Washington, D.C. 20555

Serial No: 87-007  
Docket No.: 50-280  
50-281  
License No: DPR-32  
DPR-37

Gentlemen:

Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Special Report for Surry Units 1 and 2.

REPORT NUMBER

87-010-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be reviewed by Safety Evaluation and Control.

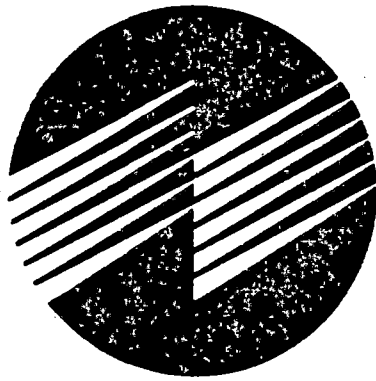
Very truly yours,

R. F. Saunders  
Station Manager

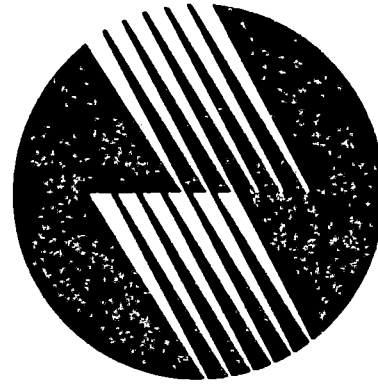
Enclosure

cc: Dr. J. Nelson Grace  
Regional Administrator  
Suite 2900  
101 Marietta Street, NW  
Atlanta, Georgia 30323

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**VIRGINIA POWER**



***VIRGINIA POWER***

**Mr. E. S. Grecheck**

**Assistant Station Manager  
Nuclear Safety and Licensing**

**May 19, 1987**  
**Enforcement Conference**

**Improper Routing of Appendix "R"**  
**Related Cables in Surry Unit 2**  
**Cable Vault and Tunnel**

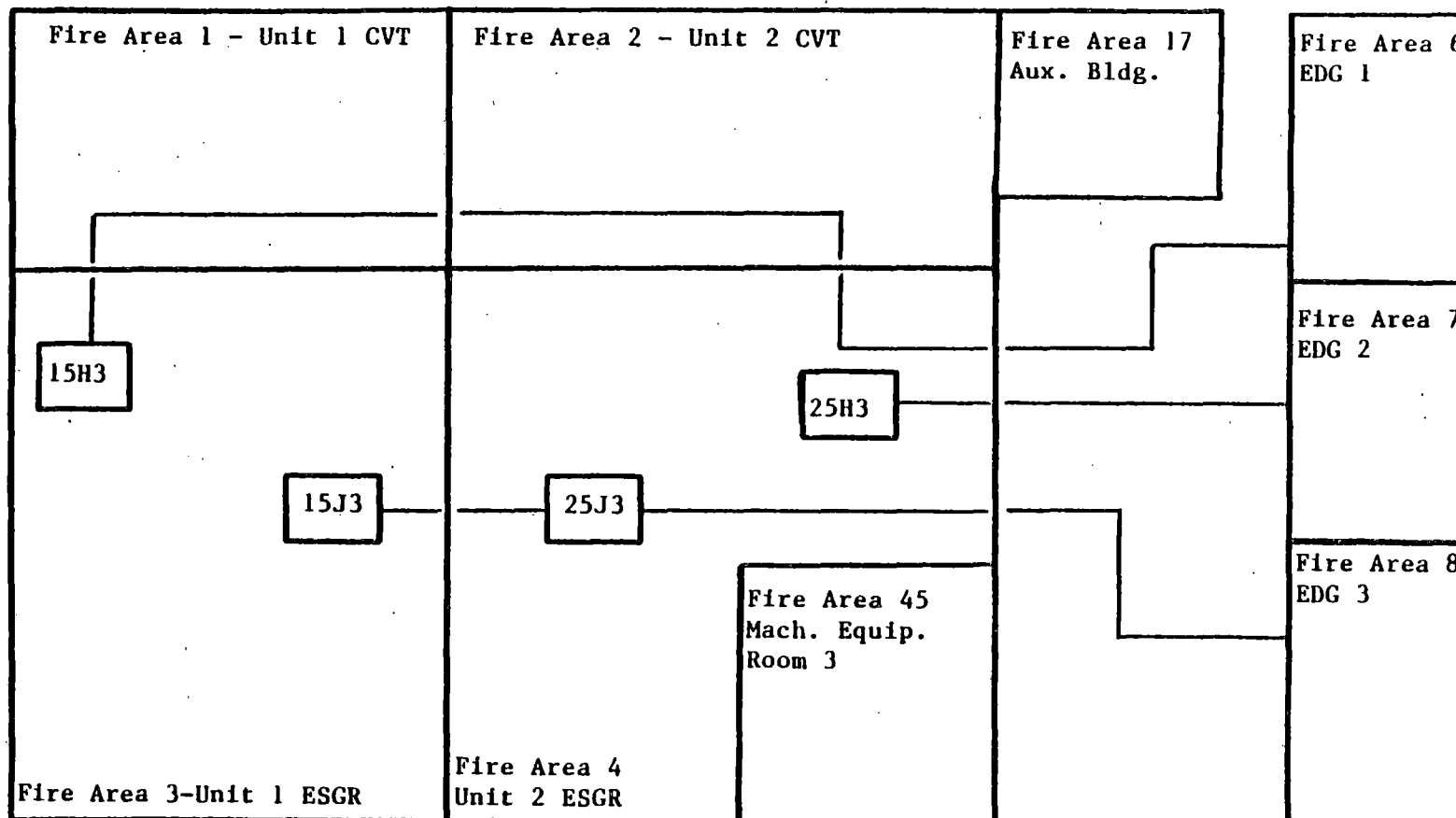
# **Agenda**

- **Overview**
- **Chronology of Events**
- **Safety Implications**
- **Corrective Actions**
- **Design Change Program**
- **Conclusions**

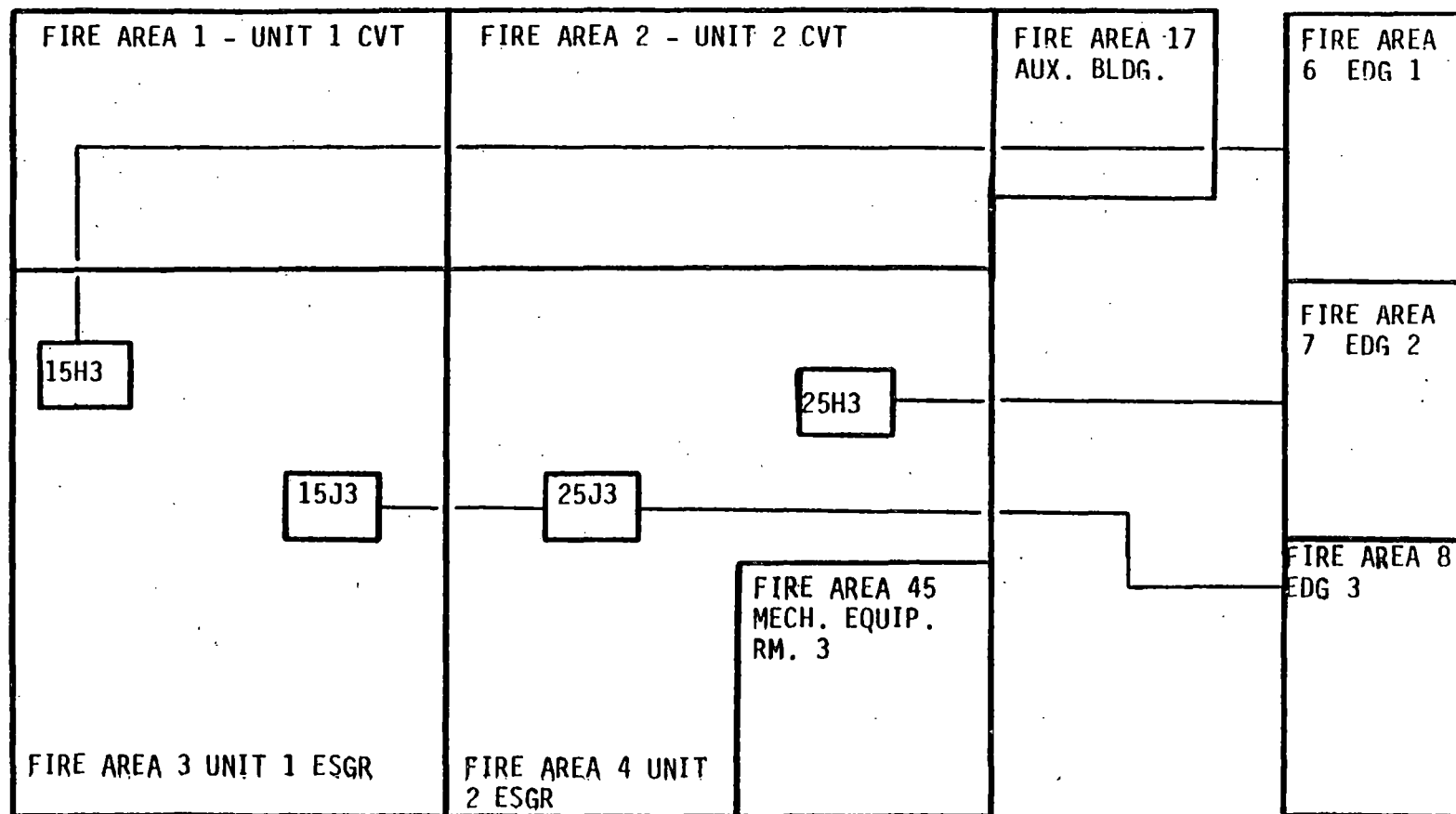


# **Overview**

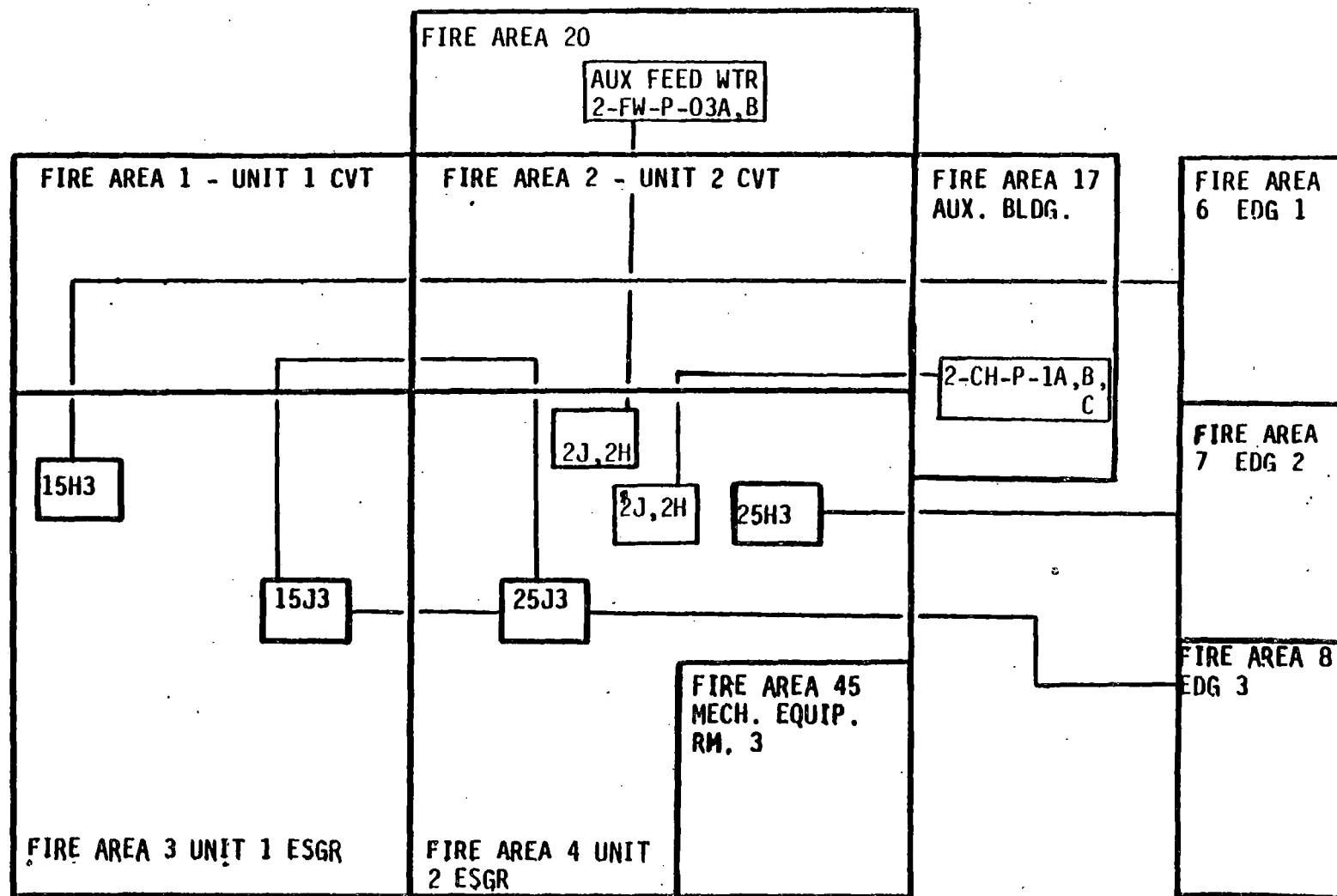
- **Design Change 83-39A  
rerouted EDG #1 cables  
through #2 CVT**
- **Recent review revealed  
EDG 3 control cables in #2  
CVT**
- **A fire in #2 CVT could  
disable cables for both EDG 1  
and EDG 3, as well as Unit 2  
safe shutdown equipment**



Surry Power Station  
Emergency Diesel Generator  
Main Leads Prior to DC-83-39  
Simplified Cable Block Diagram



SURRY POWER STATION  
EMERGENCY DIESEL GENERATOR  
EXISTING MAIN LEADS  
SIMPLIFIED CABLE BLOCK DIAGRAM



SURRY POWER STATION

SIMPLIFIED CABLE BLOCK DIAGRAM

# **Chronology**

- 8/83**      **CYGNA Engineering begins work on previously committed design change on Diesel Generator Control Isolation**
- 10/83**     **Need for Appendix R re-review identified Stone & Webster (SWECC) starts work**
- 12/83**     **Overall Appendix R review coordination assigned to Engineering, Planning and Management, Inc**

# **Chronology**

**2/84-**

**9/84**

**Design change 83-39A engineering in progress.**

**Need for power cable relocation identified.**

**Package reviewed by EPM for Appendix R compliance.**

**12/84**

**DCP 83-39A installation completed**

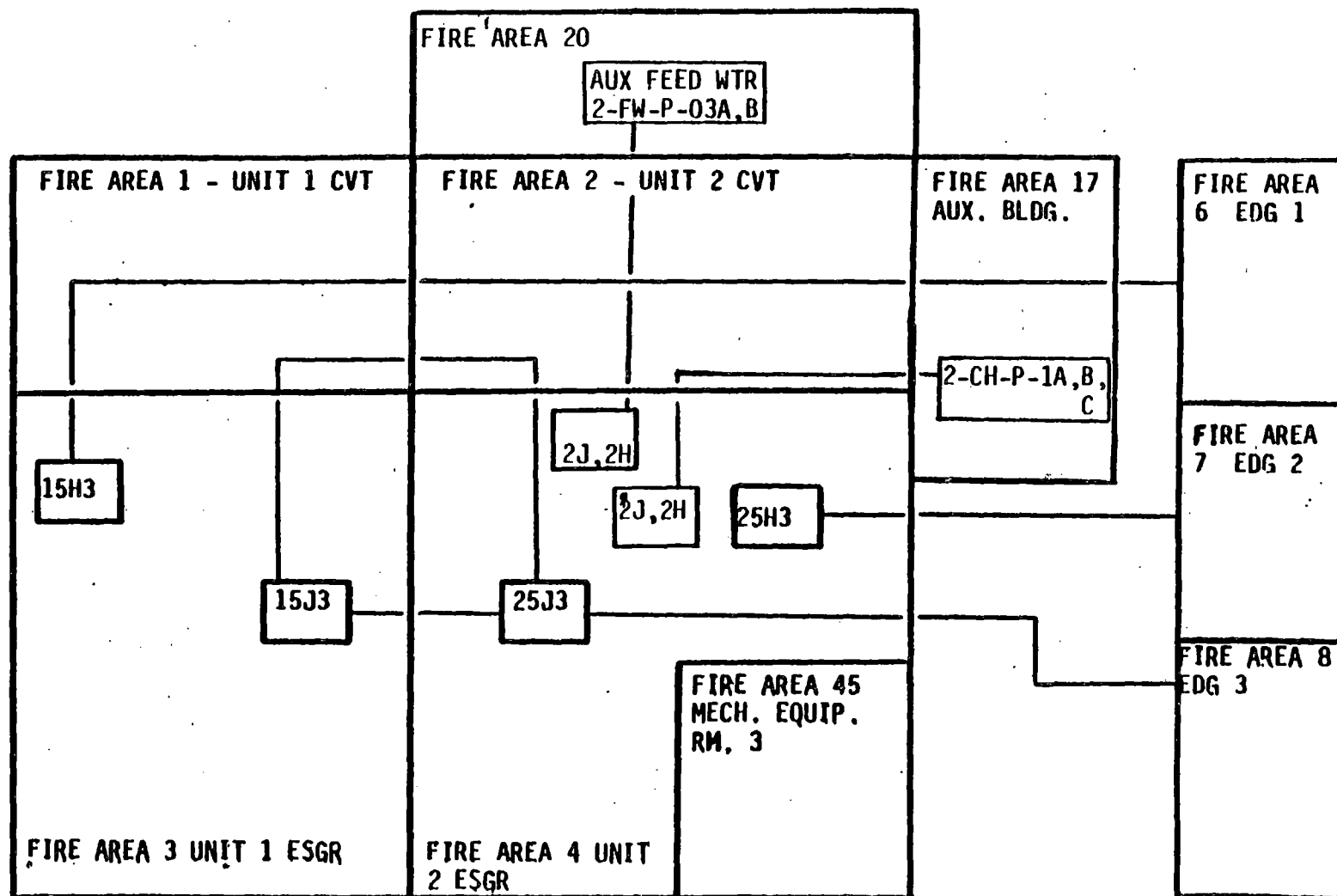
# **Chronology**

- 10/85      Appendix R Design Guidelines,  
Std GN-0021 issued**
- 11/85      Lack of cable block diagrams for  
EDG 3 indentified**
- 3/86        Cable block diagrams for EDG 3  
issued**
- 3/87        Deviation discovered during annual  
Appendix R Report update**
- 4/87        Special Report 87-010-00 issued to  
NRC**

# **Safety Implications**

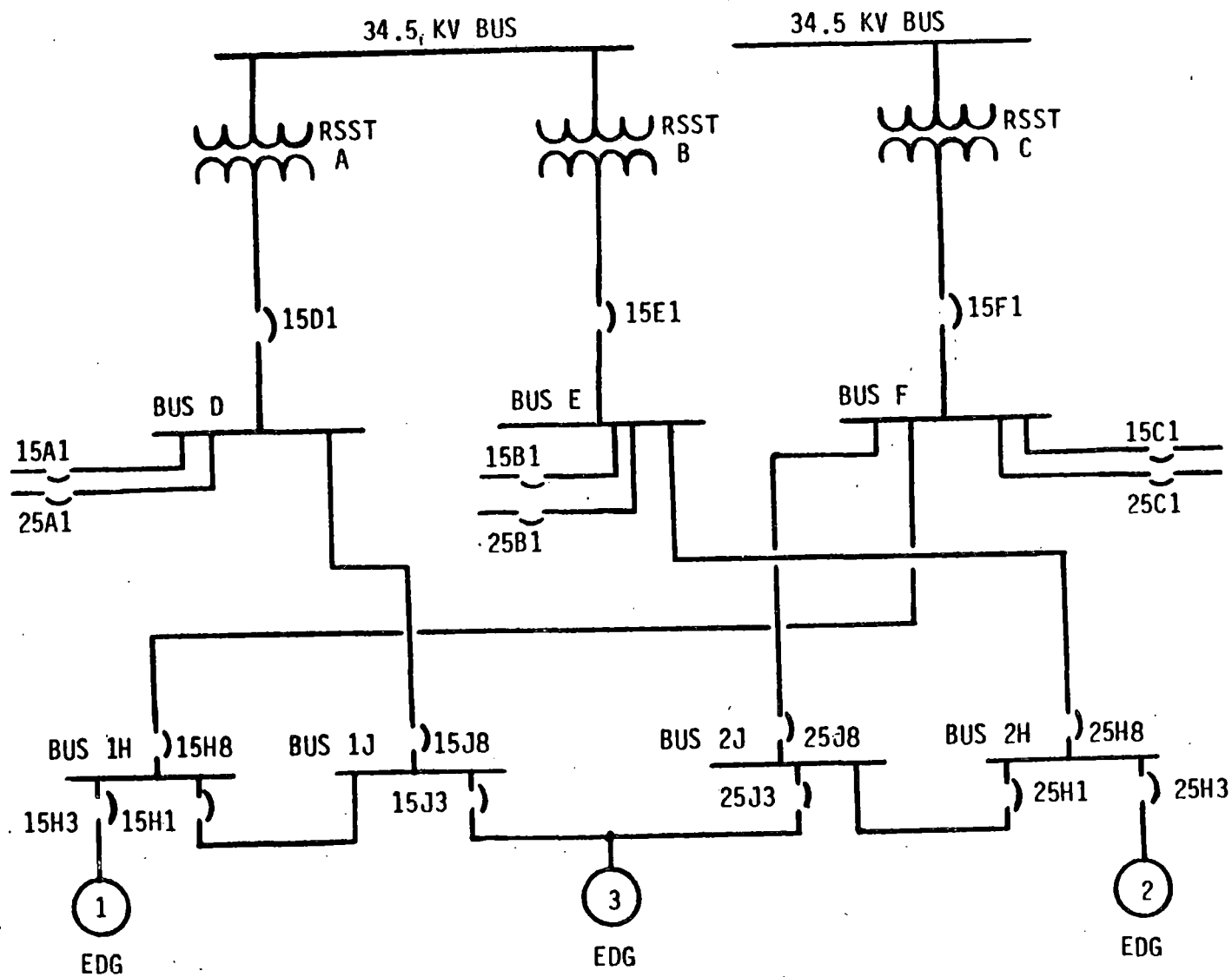
- **Fire Scenario — Unit 2 CVT**
- **Loss of Power Sources**



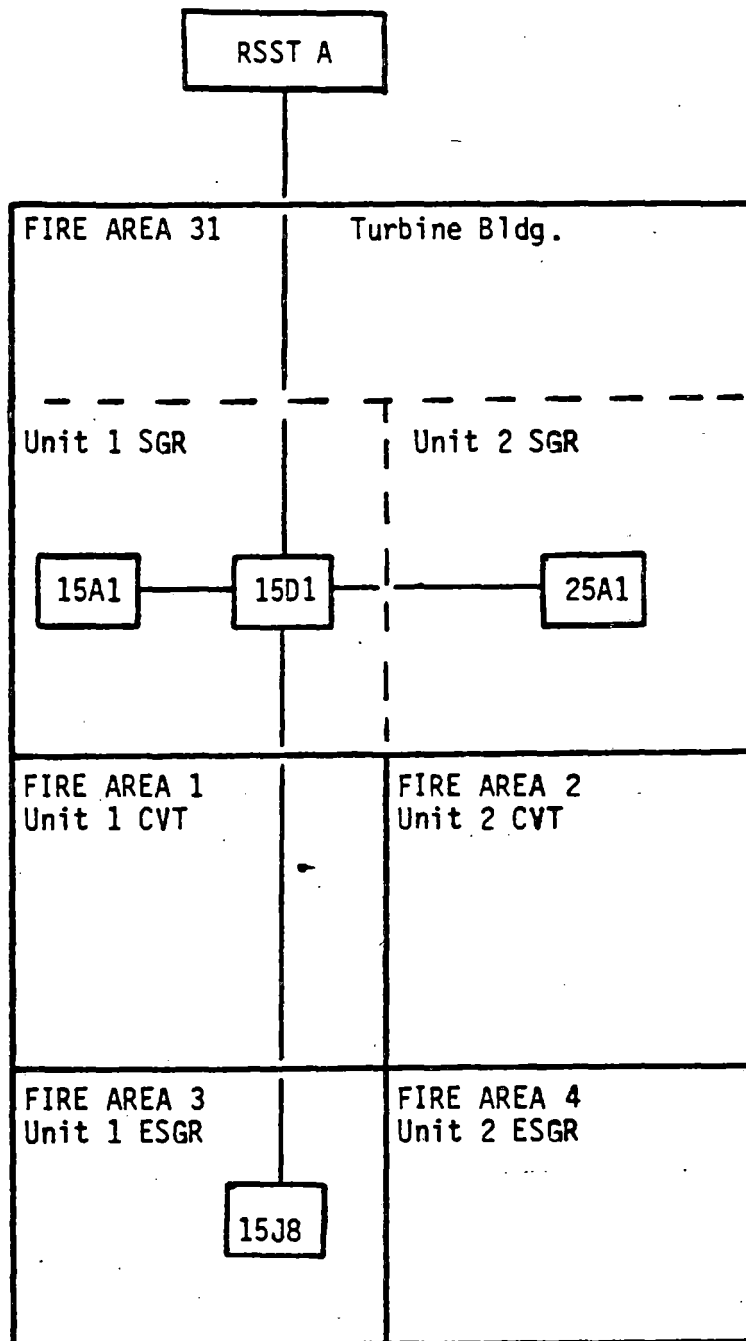


SURRY POWER STATION

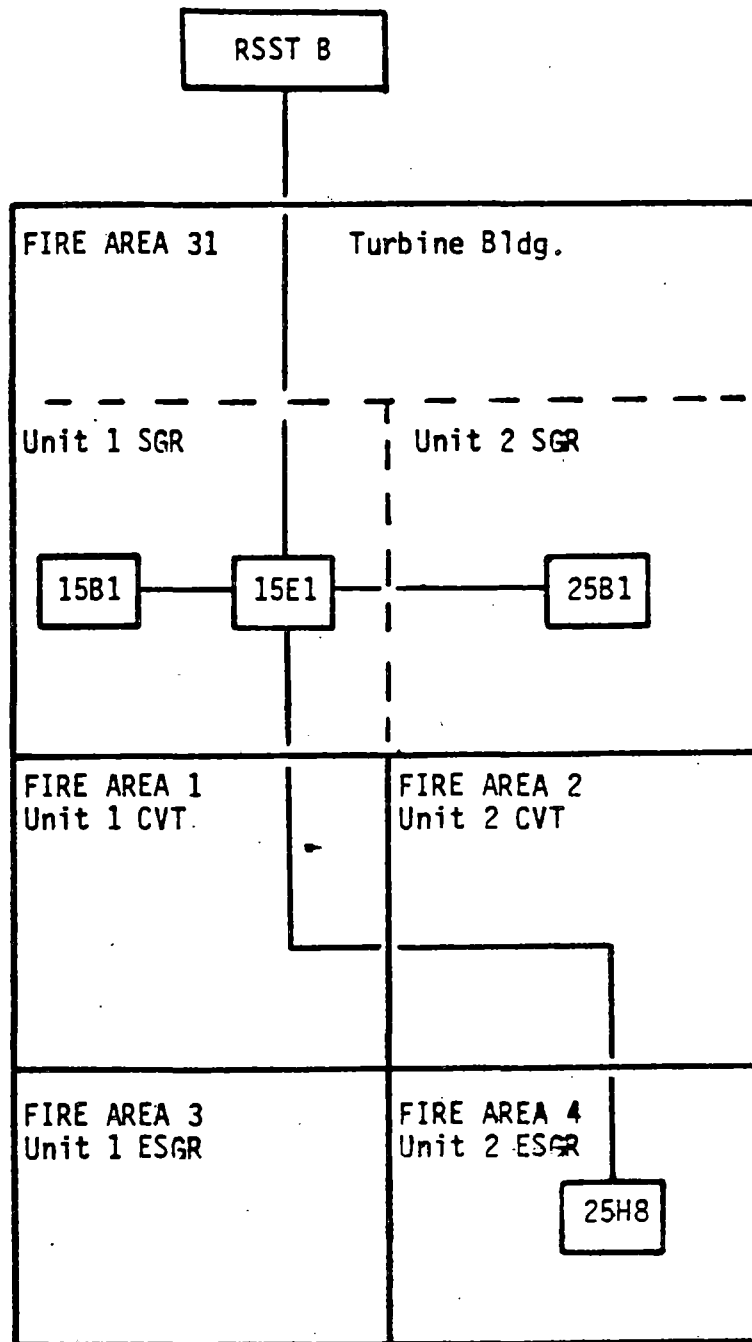
SIMPLIFIED CABLE BLOCK DIAGRAM



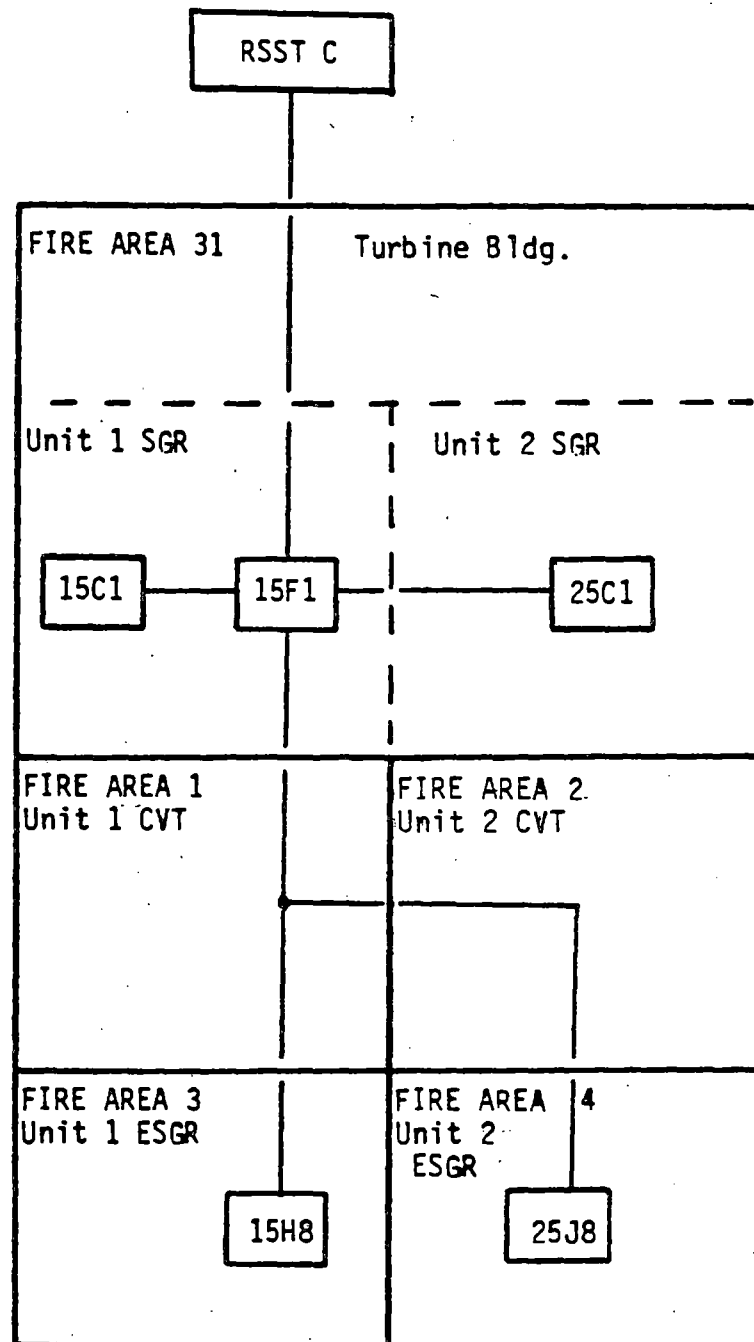
SURRY POWER STATION  
SIMPLIFIED ELECTRICAL ONE-LINE



SURRY POWER STATION  
 OFFSITE SOURCE - UNIT 1 - 1J  
 SIMPLIFIED CABLE BLOCK DIAGRAM -  
 POWER CABLES



SURRY POWER STATION  
OFFSITE SOURCE - UNIT 2 - 2H  
SIMPLIFIED CABLE BLOCK DIAGRAM -  
POWER CABLES



SURRY POWER STATION

OFFSITE SOURCE - UNIT 1 - 1H

- UNIT 2 - 2J

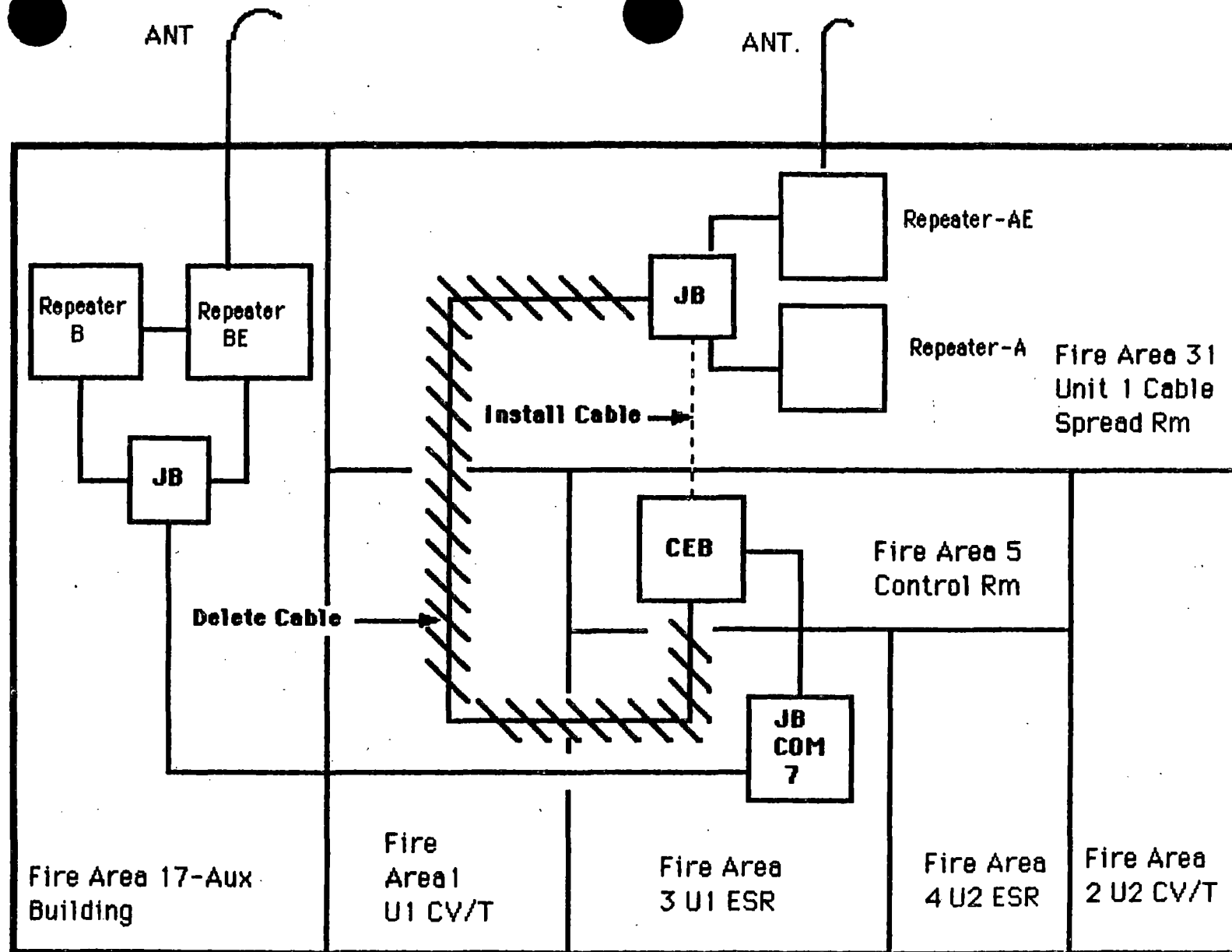
SIMPLIFIED CABLE BLOCK DIAGRAM -

POWER CABLES

# **Corrective Actions**

## **Short Term**

- **Immediate Evaluation**
  - **Special Report**
- **Compensatory Measures**
  - **Two fixed fire detection systems**
  - **Two fixed fire suppression systems**
  - **Periodic fire watch**
- **Additional Reviews**
  - **North Anna DCP's**
  - **CYGNA DCP's**
  - **Appendix R annual review completed**
  - **One other discrepancy noted:**  
**communications cable**



Surry Power Station  
Appendix "R" Communications System  
Simplified Block Diagram

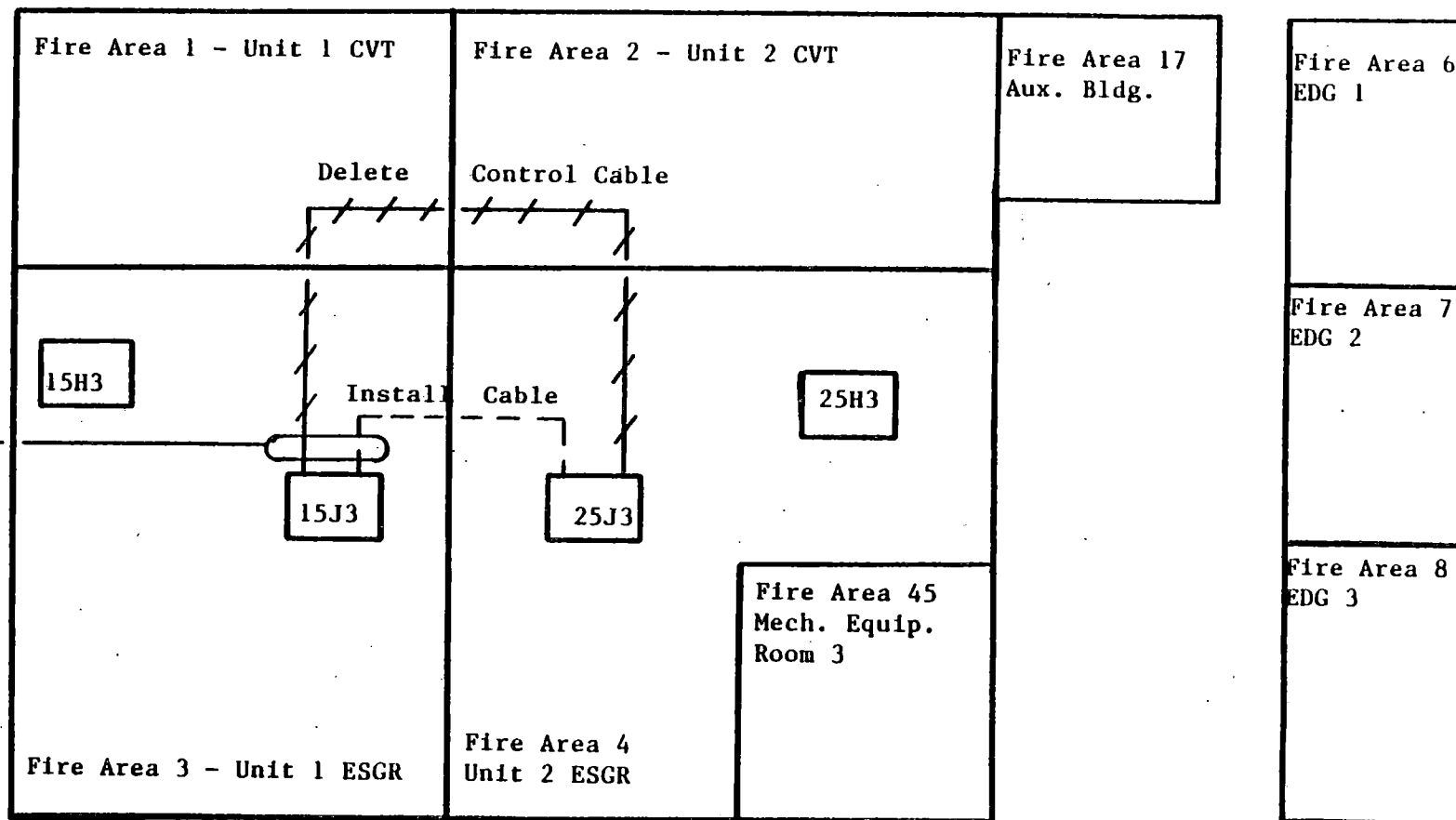
# **Corrective Actions**

## **Long Term**

- **Relocate EDG 3 control cables out of cable vaults to emergency switchgear rooms**
- **Tie-ins require outage on each unit**



Proposed  
EDG 3  
Modification



Surry Power Station  
Emergency Diesel Generator 3  
Proposed Modification  
Simplified Cable Block Diagram

# **Design Change Program**

- **Contributions to Design  
Control Problems with DC  
83-39A**
- **Current Program for Appendix R  
Design Control**

# **Contributions to Design Control Problems DC 83-39A**

- **Multiple A/E's**
- **Reanalysis in progress  
concurrently**
- **Detailed review criteria and  
procedures developed later**

# **Current Design Control for Appendix R**

- **DCP Standard STD-GN-0021 for Appendix R reviews**
  - **Appendix R checklist**
- **Cable block diagrams maintained as controlled station documents**
- **Annual review and update of Appendix R Report**
- **Appendix R review expertise now internal to Virginia Power**
- **Majority of engineering performed by Virginia Power**

# Conclusions

- **Licensee identified and promptly reported**
- **Problem with DC 83-39A resulted from inadequate review**
- **Multiple Design Changes by multiple A/E's, concurrent with Appendix R reanalysis, contributed to the review problems**

# **Conclusions**

- **Current procedures require a rigorous internal review against Appendix R requirements**
- **Short term compensatory actions in place**
- **Cable relocation engineering in progress**
- **Review to determine other similar situations complete**