

January 7, 2002

Mr. Oliver D. Kingsley  
President and CNO  
Exelon Nuclear  
Exelon Generation Company, LLC  
200 Exelon Way, KSA 3-E  
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION - NRC TRIENNIAL FIRE PROTECTION  
INSPECTION REPORT NO. 50-352/01-14, 50-353/01-14

Dear Mr. Kingsley:

On December 21, 2001, NRC completed a triennial fire protection team inspection at your Limerick Generating Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed at an exit meeting on December 21, 2001, with Mr. W. Levis and other members of the Exelon Nuclear staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's regulations and with the conditions of your license. The purpose of the inspection was to evaluate your post-fire safe shutdown capability and fire protection program. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

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Sincerely,

*/RA/*

James C. Linville, Chief  
Electrical Branch  
Division of Reactor Safety

Docket No. 50-352, 50-353  
License No. NPF-39, NPF-85

Enclosure: NRC Inspection Report 50-352/01-014, 50-353/01-014

cc w/encl:

Mr. Oliver D. Kingsley

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-352, 50-353

License No: NPF-39, NPF-85

Report No: 50-352/01-14, 50-353/01-14

Licensee: Exelon Nuclear

Facility: Limerick Generating Station, Units 1 and 2

Location: P. O. Box 2300  
Sanatoga, Pennsylvania 19464

Dates: December 10 - 21, 2001

Inspectors: R. Fuhrmeister, Sr. Reactor Inspector, Division of Reactor Safety  
A. Della Greca, Sr. Reactor Inspector, DRS  
K. Young, Reactor Inspector, DRS  
S. Kennedy, Reactor Inspector (in training), DRS  
F. Salaam, Reactor Inspector (in training), DRP

Approved By: James C. Linville, Chief  
Electrical Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000352-01-14, IR 05000353-01-14, on 12/10-12/21/2001, Exelon Nuclear, Limerick Generating Station, Units 1 & 2. Fire Protection.

The inspection was conducted by a team composed of regional specialists. The team identified one unresolved issue. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation.

A. Inspector Identified Findings

**Cornerstone: Mitigating Systems**

No findings of significance were identified.

## Report Details

### Background

This report presents the results of a triennial fire protection team inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05, "Fire Protection." The objective of the inspection was to assess whether Exelon Nuclear has implemented an adequate fire protection program and that post-fire safe shut down capabilities have been established and are being properly maintained. The following fire areas were selected for detailed review based on risk insights from the Limerick Individual Plant Evaluation for External Events:

- 13.2 kV Switchgear Area
- Unit 1 Static Inverter Room
- Auxiliary Equipment Room
- Remote Shutdown Panel Room

This inspection was a reduced scope inspection in accordance with the March 23, 2001, revision to IP 71111.05, "Fire Protection." Issues regarding equipment malfunction due to fire-induced failures of associated circuits were not inspected. Criteria for review of fire-induced circuit failures are currently the subject of a voluntary industry initiative. The definition of associated circuits of concern used was that contained in the March 22, 1982, memorandum from Mattson to Eisenhut, which clarified the requests for information made in Generic Letter 81-12.

### **1. REACTOR SAFETY** **Cornerstones: Initiating Events, Mitigating Systems**

#### 1R05 Fire Protection (71111.05)

#### .1 Programmatic Controls

##### a. Inspection Scope

During tours of the Limerick Generation Station (LGS) facility, the team observed the material condition of fire protection systems and equipment, the storage of permanent and transient combustible materials, and control of ignition sources. The team also reviewed the procedures that controlled hot-work activities and combustibles at the site. This was accomplished to verify that LGS was maintaining the fire protection systems, controlling hot-work activities, and controlling combustible materials in accordance with their fire protection program.

##### b. Findings

No findings of significance were identified.

## .2 Passive Fire Barriers

### a. Inspection Scope

During tours of the facility, the team evaluated the material condition of fire walls, fire doors, and fire barrier penetration seals to ensure that Exelon was maintaining the passive features in a state of readiness.

The team randomly selected three fire barrier penetration seals for detail inspection to verify proper installation and qualification. The team reviewed associated design drawings, test reports, and engineering analyses. The team compared the observed in-situ seal configurations to the design drawings and tested configurations. Additionally, the team compared the penetration seal ratings with the ratings of the barriers in which they were installed and observed the material condition of the selected penetration seals. This was accomplished to verify that the licensee had installed the selected penetration seals in accordance with their design and licensing bases.

### b. Findings

No findings of significance were identified.

## .3 Fire Detection Systems

### a. Inspection Scope

The team performed a walkdown of the selected fire areas to verify the existence and adequacy of fire detection in the selected fire areas. In addition, the team reviewed completed surveillance procedures and smoke/heat detection installation system drawings to verify the adequacy and frequency of fire detection component testing. This review was performed to ensure that the fire detection systems for the selected fire areas met their design and licensing bases.

### b. Findings

No findings of significance were identified.

## .4 Fixed Fire Suppression Systems and Equipment

### a. Inspection Scope

The team evaluated the adequacy of the automatic under floor total flooding Halon system in the Auxiliary Equipment Room and the Remote Shutdown Room and the pre-action sprinkler system in the 13 kV Switchgear Area by performing a walkdown of the systems, review of initial system discharge testing, and review of functional testing. In addition, the team verified the Halon systems and pre-action sprinkler system functionality and the adequacy of surveillance procedure testing by reviewing several completed surveillance procedures. This review was performed to verify that the selected fixed suppression systems met their design and licensing bases.

b. Findings

No findings of significance were identified.

.5 Manual Fire Suppression Capability

a. Inspection Scope

The team walked down selected standpipe systems, Carbon Dioxide (CO<sub>2</sub>) hose stations and portable fire extinguishers to determine the material condition of manual fire fighting systems. Electric fire pump flow, diesel fire pump flow, and pressure tests were also reviewed by the team to ensure the pumps were meeting design requirements. Additionally, the team reviewed recent fire main loop flow tests and a standpipe calculation to ensure adequate flow and pressure could be delivered to hose and sprinkler systems. The team reviewed the pre-fire plans for the target fire areas to verify accuracy of the plans versus the installed fire protection features in the selected fire areas.

The team inspected the fire brigade's protective ensembles, self-contained breathing apparatus (SCBA), portable communications equipment and various other fire brigade equipment to determine material condition and operational readiness of equipment for fire fighting.

b. Findings

No findings of significance were identified.

.6 Safe Shutdown Capability

a. Inspection Scope

The team reviewed the Updated Final Safety Analysis Report (UFSAR), the Fire Hazards Analysis (FHA), design basis documents (DBD), and the Safe Shutdown Analysis, to evaluate the methods and equipment used to achieve hot shutdown following postulated fires in the selected fire areas. The team further reviewed piping and instrumentation drawings (P&IDs) for post-fire safe shutdown systems to determine required components for establishing flow paths, identify equipment required to isolate flow diversion paths, and verify appropriate components were on the alternate safe shutdown equipment list. The team also performed field walk-downs to validate the equipment location determinations used in the analysis and to observe the material condition of the equipment.

The team reviewed single-line and electrical controls wiring diagrams to ensure that, in the event of a fire in the selected fire zones, power was available to the applicable post-fire safe shutdown components. The review also verified that, in the event of a control room fire, the control circuitry provided for isolation of the affected circuits and operation of the components from the remote shutdown panel (RSP). The team also reviewed the adequacy of the procedures used by the licensee to confirm operability of safe shutdown components from the RSP. This review also verified that adequate indication



existed at the RSP, periodic testing of the equipment control functions and status indication was being conducted, and that the results of selected component testing acceptably demonstrated their operability.

b. Findings

No findings of significance were identified.

.7 Safe Shutdown Analyses

a. Inspection Scope

The team reviewed Section 9.5.1 and Appendix 9A of the LGS UFSAR, and Section 4 of the LGS IPEEE to determine what fire hazards, mitigating equipment, fire detection systems and fire suppression systems existed in the target areas.

The team reviewed the LGS Safe Shutdown Analyses for the target fire areas to assess the adequacy of the methodology applied in the analysis. The team also reviewed the power and control cable routing for a sample of risk-significant post-fire safe shutdown components to determine if the cables were properly routed outside the fire areas of concern or protected against the effects of postulated fires in the area. The team also walked down certain portions of cable routing to confirm that the cables required for safe shutdown would not be impacted by the postulated fires.

Due to the issuance of Change Notice 00-020 against Inspection Procedure 71111.05, "Fire Protection," the team did not review associated circuit issues during this inspection. This change notice has suspended this review pending completion of an industry initiative in this area.

b. Findings

During review of Appendix 9A of the LGS UFSAR (The LGS Fire Hazards Analysis) and the LGS IPEEE, the team determined that Exelon relied on an assumption of a single spurious actuation of safe shutdown components during any single fire event for some plant areas. This assumption is contrary to NRC staff guidance, as documented in Generic Letter 86-10 and other public records, that multiple spurious actuations must be assumed and evaluated. This issue is the subject of an industry initiative, and remains unresolved pending generic resolution of guidance for evaluating fire induced cable faults. For the fire areas evaluated during this inspection, the team did not find any reliance on the single spurious actuation assumption. **(URI 50-352&353/01-014-01)**

.8 Operational Implementation of Post-Fire Safe Shutdown Capability

a. Inspection Scope

The team reviewed system operating procedures for post-fire shutdown systems credited in the safe shutdown analyses for the target areas. The team reviewed the

post fire shutdown guides for the target areas to verify that sufficient information was provided to the operating plant staff to perform the manual recovery actions that were required to achieve and maintain safe shutdown and to identify protected instrument channels for fires in the target areas. The team walked through selected local manual actions in the plant to evaluate accessibility for performing required actions, lighting provided to perform the actions, lighting of the access and egress paths, and tools and materials provided for performing local manual actions in the plant.

b. Findings

No findings of significance were identified.

.9 Post-Fire Safe Shutdown Emergency Lighting and Communications

a. Inspection Scope

The team observed the placement and aim of 8-hour emergency light units (ELUs) throughout the selected fire zones to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation for post-fire safe shutdown. In addition, during the alternate shutdown procedure walk through documented in Section .8, "Operational Implementation of Alternate Shutdown," the team verified that emergency lights were provided where needed.

The team reviewed surveillance procedures and vendor information for ELUs to determine if adequate surveillance testing and preventive maintenance was being accomplished to ensure operation of the 8-hour emergency lights.

The team reviewed the LGS portable radio system transponder location and discussed portable radio communication with the fire protection personnel to determine if communications could be maintained in the event of a fire at the site. Additionally, the team reviewed radio system maintenance and surveillance procedures to determine if LGS was properly maintaining the radio system.

b. Findings

No findings of significance were identified.

.10 Electrical Raceway Fire Barrier Systems

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries, fire doors, and fire dampers. Additionally, the team reviewed design and installation drawings, engineering analyses, surveillance and functional test procedures for selected items. The NRC safety evaluations of fire protection features for LGS were also reviewed by the team. Additionally, the team reviewed the design and qualification testing for the Darmatt KM-1 electrical raceway fire barriers, and performed a walkdown of installed barriers for the selected areas. This review was performed to verify that the selected items of the fire barrier system met their design and licensing bases.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA2 Identification and Resolution of Problems

.1 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team reviewed Quality Assurance audits and self-assessments of the fire protection program conducted during the previous two years. In addition, the team reviewed a sample of open action requests (ARs) and condition reports (CRs), and those closed within the past year, which had been issued for fire protection program and equipment problems identified by LGS personnel. The purpose of the reviews was to evaluate the ability of LGS to identify and correct fire protection problems.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

The inspectors presented their preliminary inspection results to Mr. W. Levin and other members of the Exelon Nuclear staff at an exit meeting on December 21, 2001.

The inspectors asked whether any materials examined during the inspection should be considered proprietary. Materials identified as proprietary were returned to Exelon at the completion of the inspection.

**PARTIAL LIST OF PERSONS CONTACTED**

Exelon Nuclear

W. Levis, V.P. - Limerick  
C. Mudrich, Director of Engineering  
W. O'Malley, Director of Operations  
J. Kraiss, Sr. Manager of Engineering Design  
J. Trecher, Sr. Manager of System Engineering  
E. Kelly, Manager of Engineering Programs  
G. Seally, Manager of Engineering Design  
C. Pragman, MAROG FP Program Manager  
S. Breedling, Nuclear Oversight  
J. Stone, Director of Work Management  
C. Bruce, Fire Protection Engineer  
D. Spamer, Senior Engineer  
R. Devlin, Fire Marshall  
R. Harding, Regulatory Assurance Engineer  
J. Mihm, Fire Protection System Engineer  
B. Langley, System Engineer

Nuclear Regulatory Commission

A. Burritt, Senior Resident inspector  
B. Welling, Resident Inspector  
J. Linville, Chief, Electrical Branch

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

50-352&353/01-014-01	URI	Reliance on an assumption of a single spurious malfunction of safe shutdown equipment for any single fire. (Section 1RO5.7)
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Closed

None

## LIST OF ACRONYMS USED

AR	Action Request
CO <sub>2</sub>	Carbon Dioxide
CR	Condition Report
DBD	Design Basis Document
ELU	Emergency Light Unit
FHA	Fire Hazards Analysis
IP	Inspection Procedure
IPEEE	Individual Plant Evaluation for External Events
kV	Thousand Volts
LGS	Limerick Generating Station
NRC	Nuclear Regulatory Commission
P&ID	Piping and Instrumentation Drawing
RSP	Remote Shutdown Panel
SCBA	Self Contained Breathing Apparatus
SDP	Significance Determination Process
SER	Safety Evaluation Report
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

## LIST OF DOCUMENTS REVIEWED

### Fire Protection Program Documents

Limerick Generation Station UFSAR, Rev. 9, Appendix 9A, Fire Protection Evaluation Report  
Pre-Fire Plan F-A-336, Rev. 9, 13.2KV Switchgear Room 336 (ELEV. 217') Fire Area 2  
Pre-Fire Plan F-A-452, Rev. 6, Unit 1 Static Inverter Room 452 (ELEV. 254') Fire Area 20  
Pre-Fire Plan F-A-540, Rev. 7, Remote Shutdown Panel Room 540 (ELEV. 289') Fire Area 26  
Pre-Fire Plan F-A-542, Rev. 8, Auxiliary Equipment Room 542 (ELEV. 289') Fire Area 25  
Design Basis Document (DBD) # L-S-51, Rev. 4, Fire Protection System  
DBD # L-S-01B, Rev. 2, Miscellaneous DC Systems  
DBD # L-T-10, Rev. 10, Fire Safe Shutdown  
NUREG 0991, LGS SER, 8/30/83  
NUREG 0991, Supplement 2, 10/84  
NUREG 0991, Supplement 4,  
Technical Requirements Manual, Rev. 4, Sections 3.13, 4.13

### Piping and Instrumentation Drawings

M-22, Sh. 1, Rev. 64, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-22, Sh. 2, Rev. 58, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-22, Sh. 3, Rev. 56, P&ID Fire Protection (Unit 1)  
M-22, Sh. 4, Rev. 65, P&ID Fire Protection (Unit 2)  
M-22, Sh. 5, Rev. 58, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-22, Sh. 6, Rev. 22, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-22, Sh. 7, Rev. 18, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-22, Sh. 8, Rev. 32, P&ID Fire Protection (Instrument & Valve Schedule) (Unit 1, Unit 2 & Common)  
M-22, Sh. 9, Rev. 59, P&ID Fire Protection (Unit 1 & Common)  
M-22, Sh. 10, Rev. 61, P&ID Fire Protection (Unit 1, Unit 2 & Common)  
M-049-275, Sh. 1, Rev. 1, Fire Protection System PR-107 (Fire Area 2) Control Area Floor Evaluation 217'-0" Area 8  
M-049-276, Sh. 1, Rev. 1, Fire Protection System WP-124 (Fire Area 7) & PR-107 (Fire Area 2) Control Floor Evaluation 239'-0" Areas 3 & 8  
M-049-277, Sh. 1, Rev. 1, Pipe Support Details of Fire Protection Systems WP-124 (Fire Area 7) and PR-107 (Fire Area 2)

### Control Circuit Schematics

E-10, 5/26/82, Control Panel for PGCC Area Elev. 289'-0" Unit 1 Halon System  
E-11, Rev. 5, External Wiring Unit 1 & 2 PGCC Area  
E-14, Rev. 4, Control Panel for PGCC Auxiliary Equipment Room - Unit 1  
E-16, Rev. 0, Communication and Fire Alarm Layout Aux. Equipment Room  
E-1378, Sh. 1, Rev. 14, Riser Diagram Halon Fire Protection System  
E-1378, Sh. 2, Rev. 6, Riser Diagram Halon Fire Protection System  
E-1378, Sh. 3, Rev. 8, Riser Diagram Halon Fire Protection System  
E-1651, Rev. 15, Communication Fire Alarm Layout Turbine Enclosure Unit 1 Plan Above EL. 217'-0"

E-1652, Rev. 18, Communication Fire Alarm Layout Turbine Enclosure Unit 1 Plan Above EL.  
 239'-0" and 254'-0"  
 E-1671, Rev. 10, Unit 2 Above EL. 217'-0"  
 FP-33, Rev. 8, Power Generation Control Complex Area - Unit 1  
 FP-66, Rev. 4, Power Generation Control Complex Area - Unit 2  
 FSK-EC-1377, Sh. 54, Rev. 29, Fire Protection System PR-107 (Fire Area 2) Connection  
 Diagram Release Control Panel OOC079  
 FSK-EC-1377, Sh. 54A, Rev.29, Fire Protection System PR-107 (Fire Area 2) Connection  
 Diagram Release Control Panel OOC079  
 FSK-EC-1378, Sh. 4, Rev. 11, PGCC Ceiling Smoke Detector Wiring  
 FSK-EC-1378, Sh. 5, Rev. 6, PGCC Floor Smoke Detector Wiring  
 FSK-EC-1378, Sh. 6, Rev. 8, PGCC Floor Heat Detector Wiring  
 E-15, Single Line Meter 7 Relay Diagram - 4 kV Safeguard Power System, Unit 1  
 E-16, Single Line Meter 7 Relay Diagram - 4 kV Safeguard Power System, Unit 2  
 E-33, Single Line Meter & Relay Diagram - 125/250 Vdc System, Unit 1  
 E-34, Single Line Meter & Relay Diagram - 125/250 Vdc System, Unit 2  
 E-76, Schematic Meter & Relay Diag -13.2 kV Station Auxiliary Power System, Unit 1  
 E-77, Schematic Meter & Relay Diag -13.2 kV Station Auxiliary Power System, Unit 2  
 E-85, Schematic Meter & Relay Diag - Diesel Generators, 4 kV  
 E-102, Schematic Block Diagram RHR System  
 E-115, Schematic Block Diagram - PGCC SITS Cables  
 E-110, Schematic Block Diagram ADS and SLC Systems  
 E-156, Schematic Diagram - 101 and 201 Safeguards Transformer Breakers  
 E-160, Schematic Diagram - Safeguard Buses 101 and 201 Breakers  
 E-164, Schematic Diagram - Safeguard Buses D11 to D24  
 E-360, Schematic Diagrams - RHR Pumps  
 E-361, Schematic Diagram - RHR Service Water Pumps  
 E-371, Schematic Diagram - RHR Heat Exchanger Tube Side Inlet MOVs  
 E-372, Schematic Diagram - RHR Heat Exchanger Tube Side Outlet MOVs  
 E-591, Schematic Diagram - D11 Diesel Generator Control and Auxiliaries  
 M-71-65, Control Schematic - D11 Diesel Generator  
 FSK-M-1-PHF10C201, Remote Shutdown Panel Human Factors Enhancements

### Elementary Drawings

M-1-B21-1060-E-001 through 019 - Elementary Diagram - Auto Depressurization System  
 M-1-E11-1040-E-005 through 054 - Elementary Diagram - Residual Heat Removal System  
 828E569TN, Remote Shutdown Panel  
 828E569TR, Remote Shutdown System

Design Drawings

A-307, Sh. 1, Rev. 26, Architectural; Air/Steam/Fire & Water - Boundaries Floor Plan EL. 217'-0" Unit 1  
 A-307, Sh. 2, Rev. 8, Architectural; Air/Steam/Fire & Water - Boundaries Floor Plan EL. 217'-0" Unit 2  
 A-308, Sh. 1, Rev. 16 Architectural; Air/Steam/Fire & Water - Boundaries Floor Plan EL. 253'-0" Unit 1  
 A-309, Sh. 1, Rev. 19, Architectural; Air/Steam/Fire & Water - Boundaries Floor Plan EL. 288'-0" and 269'-0" Unit 1  
 Cable Tray Thru Fire Barrier (Wall) - Typical Installation, Rev. 6  
 Penetration Seal Design for 763-E003, Rev. 3  
 Penetration Seal Design for 763-E005, Rev. 3  
 Penetration Seal Design for 763-E006, Rev. 3  
 8031-NE-75-1, Rev. 1, BISCO Penetration Seal Details  
 737-D-VC-00029, Sheets 1 - 34, 3 hour Darmatt KM-1 Barrier 25-02 Arrangement, Sections & Details  
 737-D-VC-00038, Sheets 1 - 13, 3 hour Darmatt KM-1 Barrier 02-02 Arrangement, Sections & Details

Engineering Evaluations/Modifications/Safety Evaluations/Change Requests

LEAF-0001, Rev. 0, Smoke Detector Engineering Analysis for Fire Areas 1, 2 and 7  
 LEAF-0002, Rev. 1, Limerick Generating Station Suppression System Evaluation  
 LEAF-0003, Rev. 1, IPEEE Fire Risk Operator Actions Limerick Generating Station  
 LEAF-0011, Rev. 0, Fire Area 2, 13.2KV Switchgear Room, Localized Suppression  
 LEAF-0022, Rev. 0, Qualification of 3 - hour Darmatt KM-1 Fire Barrier System 02-02 is Consistent with The NRC's GL 86-10, Supplement 1  
 LEAF-0028, Rev. 0, Qualification of 3 - hour Darmatt KM-1 Fire Barrier System 25-02 is Consistent with The NRC's GL 86-10, Supplement 1  
 LEAF-0072, Rev. 0, Classification of Combustible Loading Into Low, Moderate and High Ranges  
 LEAF-0073, Rev. 0, Fire Detection Survey  
 ECR LG 98-02309-001, MOD P808-1, -2 Engineering Evaluation  
 ECR LG 99-00485-000, MOD P00736S-1 & 2 New Sprinkler Systems (T-Lag Resolution)  
 ECR LG 99-00484-000, MOD P00736S-1 & 2 New Sprinkler Systems (T-Lag Resolution)  
 ECR LG 93-00926-002, Replacement of Diesel Driven Fire Pump  
 ECR LG 94-07214-001, 4kV Ground Truck Anchoring Required

Work Orders

C0186041 02 01	C0192941 04 01	C0199229 12 01	R0862366 11 01
R0873974 01 01	R0532781	R0534302	R0570065
R0604621	R0642847	R0711162	R0750621
R0808592			



### Calculations

M-22-09, Rev. 2, Fire Protection Hydraulic Calculation  
 M-22-17, Rev. 3, Fire Pump Curve Based on PECO Tests  
 M-22-18, Rev. 0, Halon Concentration in The Remote Shutdown Panel Room  
 M-049-00279, Rev. 1, Hydraulic Calculation for Fire Area 2 (PR-107)  
 LF-0011, Rev. 0, Hose Station Hydraulic Analysis  
 6900E.02, Safeguard Auxiliary System - Phase OC Relays Selection & Coordination  
 6900E.04, Safeguard Auxiliary System - Ground OC Relays Selection & Coordination  
 6900E.09, Diesel Generator Protective Relay Setting  
 6900E.11, Load Center Circuit Breaker - Overcurrent Trip Devices

### Procedures

AG-CG-12, Rev. 1, Hot Work Guideline  
 AG-CG-12-1, Rev. 0, Hot Work Permit  
 AG-CG-12-2, Rev 0, Hot Work Permit Special Precautions  
 AG-CG-12-3, Rev. 0, Hot Work Permit Process Flow  
 AG-CG-12.1-1, Rev. 4, Actions for Fire System Impairments  
 AG-CG-12.2, Rev. 3, Control of Combustible and Flammable Materials  
 AG-CG-12.2-1, Rev. 1, Transient Combustible Materials  
 AG-CG-12.2-2, Rev. 0, Flammable and Combustible Liquids  
 AG-CG-12.2-3, Rev. 0, Flammable Compressed Gases  
 AG-CG-12.2-4, Rev. 0, Liquefied Petroleum Gas (LPG/Propane)  
 AG-CG-12.2-5, Rev. 0, Oxygen/Acetylene Gas Welding and Cutting Rigs  
 AG-CG-12.2-6, Rev. 0, Motor Vehicle Control  
 AG-CG-12.2-7, Rev. 0, Filter Media Such as Resins, High Efficiency Particulate Air (HEPA) Filters, Charcoal, and Bulk Charcoal  
 CC-AA-211, Rev. 0, Fire Protection Program  
 G0000315, Rev. 5, Emergency Equipment Inventory - [OSC & Main Control Room] Data Sheets  
 RT-2-085-600-0, Rev. 7, Functional Test of Alternate Shutdown Communication System  
 RT-6-000-994-0, Rev. 2, Verification of Operator Qualifications  
 RT-6-108-300-0, Rev. 8, Appendix R Emergency Lighting Unit (ELU) Operability Verification  
 RT-6-108-300-1, Rev. 10, Appendix R Emergency Lighting Unit (ELU) Operability Verification  
 RT-6-108-300-2, Rev. 9, Appendix R Emergency Lighting Unit (ELU) Operability Verification  
 RT-7-EPP-311-0, Rev. 4, Emergency Response Facility (ERF) Monthly Communications Test  
 S22.1.H, Rev. 18, Placing Backup Diesel Driven Fire Pump (10P402), Jockey Pump (10P400) & Batch Plant Well Pump in Service  
 S22.8.H, Rev. 13, Inoperable Fire Protection Equipment Actions  
 ST-6-022-551-0, Rev. 1, Fire Drill  
 RT-6-000-900-0, Rev. 11, Inspection of Safe Shutdown Equipment  
 S41.7,B, Rev. 4, Use of SRVs and Suppression Pool Cooling as an Alternate Shutdown Cooling Method  
 S49.1.A, Rev. 16, Normal RCIC Line-up for Automatic Operation  
 S49.7.A, Rev. 5, Transfer of RCIC from Pressure Control Mode to Injection Mode and Back  
 S51.8.A, Rev. 32, Suppression Pool Cooling Operation (Startup and Shutdown) and Level Control

S51.8.B, Rev. 47, Shutdown Cooling/Reactor Coolant Circulation Operation Startup and Shutdown

M-C-700-230, 480 Volt ABB/ITE Load Center Breaker Maintenance

M-C-700-232, Testing and Control of 60V Class Molded Case Breaker & Setpoints

M-092-012, 2.3 kV and 4 kV Power Circuit Breaker Ovehaul

M-200-002, 2.3 kV and 4 kV Power Circuit Breaker Ovehaul

ST-2-088-320-0, Remote Shutdown System RCIC Operability Test

ST-2-088-320-1, Remote Shutdown System ESW AND RHRSW Operability Test

ST-2-088-321-1, Remote Shutdown System RHR Operability Test

ST-2-088-322-1, Remote Shutdown System Safety Relief Valves RHR Operability Test

ST-2-088-323-1, Remote Shutdown System Safeguard Breaker Operability Test

ST-2-088-324-1, Remote Shutdown System RHR Operability Test

ST-2-088-325-1, Remote Shutdown System RCIC Operability Test

1FSSG-3002, Rev. 2, Fire Area 002 Fire Guide

2FSSG-3002, Rev. 1, Fire Area 002 Fire Guide

1FSSG-3020, Rev. 4, Fire Area 020 Fire Guide

2FSSG-3020, Rev. 2, Fire Area 020 Fire Guide

1FSSG-3025, Rev. 4, Fire Area 025 Fire Guide

2FSSG-3025, Rev. 4, Fire Area 025 Fire Guide

1FSSG-3026, Rev. 2, Fire Area 026 Fire Guide

2FSSG-3026, Rev. 2, Fire Area 026 Fire Guide

### Training Documents

Annual 32 Hour Fire Brigade Refresher Training Program Course Outline, 12/23/99

Initial 40 Hour Fire Brigade Training Program Course Outline, 2/28/00

PIMS Individual Fire Brigade Qualification Report

Second Quarter Fire Drill/Quarterly Meeting

Fire Drill / Second Quarter 2001 - MCR Briefing

### Audits and Self-Assessments

Fire Protection & Post Fire Safe Shutdown Preparatory Self Assessment, Conducted 9/10/01

Thru 11/9/01, Approved 11/27/01

Nuclear Oversight Continuous Assessment Report CAR-LG-01-01, Conducted 1/01 - 3/01,

Approved 5/2/01

Nuclear Oversight Continuous Assessment Report NOSA-LG-01-02, Conducted 5/01 - 6/01,

Approved 7/23/01

Nuclear Oversight Continuous Assessment Report NOSA-LG-01-02, Conducted 7/01 - 9/01,

Approved 10/23/01

Corrective Action Program Documents

A1284614	A1161757	A1187823	A1238719
A1281701	A1328163	A1322730	PEP I0012467
PEP I0012698	PEP I0012868	PEP I0012870	CR 00060332
CR00060963	CR 00061035	CR00061138	CR 00061138
CR 00081623	CR 00081224	CR 00061277	CR 00078702
CR 00080531	CR 00061147	CR 00061234	CR 00060334
CR 00060502	CR 00060761	CR 00060821	CR 00061221
CR 00077470	CR 00079571	CR 00061275	CR 00060408

Test Reports

1P-13.5, Rev. 0, Preoperational Test Report - Fire Protection Halon System, 9/20/84  
 2P-13.5, Rev. 0, Preoperational Test Report - Fire Protection Halon System, 1/10/88  
 Fire Endurance Test on Silicone Foam Penetration Seal in Masonry Floor Design FC-270, 12/78  
 BISCO Fire Test 748-255, Three Hour Fire Test of Multiple Penetrants Sealed with 9" of SF-20 and 1" Ceramic Board, 8/17/90  
 BISCO Fire Test 748-134, BISCO Product Equivalency Fire Test Utilizing BISCO SF-20 & BISCO SE-FOAM, 5/14/84  
 8031-FSC-198-68-2, Gamma Irradiation Damage Tests BISCO Foam Samples, 5/77  
 Doc. # 831-D-VC-00005, Rev. A, Test Report on 3 Hour Fire Test & 5 Minute Hose Stream Test on Slab 3  
 Doc. # 831-D-VC-00006, Rev. A, Test Report On 3 Hour Fire Test & 5 Minute Hose Stream Test on Slab 4  
 Doc. # 831-D-VC-00007, Rev. A, Test Report On 3 Hour Fire Test & 5 Minute Hose Stream Test on Slab 5  
 Doc. # 831-D-VC-00015, Rev. A, Test Report for a 3 Hour Fire Test on Darmatt KM1 to ASTM E-119 NRC GL 86-10, Supplement 1  
 SDOC 831-D-VC-00032, Rev. 0, Report on a 3 Hour Fire and 5 Minute Water Hose Stream Test on 3/4" & 5" Diameter Generic Conduit Insulated with Darmatt KM-1 Test Date 20 Dec. 1995  
 SDOC 831-D-VC-00033, Rev. 0, Report on The 3 Hour Fire & 5 Minute Water Hose Stream Testing on Darmatt KM-1 Fire Protection System for Protecting Generic 3/4", 2" NB Conduit Loops and 12"x4"x90" Steel Solid Cable Tray  
 SDOC 831-D-VC-00044, Rev. 0, Report on the 3 Hour Fire Test/5 Minute Water Hose Test on Darmatt KM1 Fire Protection System for Protecting 3/4" & 4" Diameter RIGID Steel Conduits at Braidwood and Byron NPS  
 BBC Test K-82089-K1 Report - Design Characteristics Two Type MC-15 CTs

Completed Tests/Surveillances

RT-2-085-600-0, Rev. 7, Functional Test of Alternate Shutdown Communication System, Completed 2/10/01

RT-2-108-300-0, Rev. 3, Appendix R ELU 8 Hour Capacity Verification Test, Completed 10/19/01

RT-2-108-300-1, Rev. 2, Appendix R ELU 8 Hour Capacity Verification Test, Completed 8/7/01

RT-2-108-300-2, Rev. 2, Appendix R ELU 8 Hour Capacity Verification Test, Completed 8/20/01

ST-2-022-600-0, Rev. 18, Fire Detection - Heat Detection Instrumentation Channel Functional Test and Supervisory Circuit Operability Test, Zones 2, 3, 4, 5, and 6, Completed 1/16/01

ST-2-022-602-1, Rev. 15, Fire Detection - Heat/Smoke Detection Instrumentation Channel Functional Test and Supervisory Circuit Operability Test, Zone 20, 21, Completed 6/7/00

ST-2-022-604-0, Rev. 11, Fire Detection - Heat/Smoke Detection Instrumentation Channel Functional Test and Supervisory Circuit Operability Test, Zone 26, Completed 6/7/00 & 5/29/01

ST-2-022-651-1, Rev. 5, Fire Detection - Heat Detection Instrumentation Channel Functional Test and Supervisory Circuit Operability Test, Zone 25, Completed 6/7/00 & 5/29/01

ST-2-022-651-2, Rev. 4, Fire Detection - Heat Detection Instrumentation Channel Functional Test and Supervisory Circuit Operability Test, Zone 25, Completed 5/30/00 & 5/31/01

ST-2-022-730-0, Rev. 0, FSWS Air Nozzle Flow Test, Completed 10/24/01

ST-6-022-250-0, Rev. 1, Underground Fire Main Flow Test, Completed 2/2/01

ST-6-022-252-0, Rev. 21, Diesel Fire Pump Flow Test, Completed 12/7/01

ST-6-022-453-0, Rev. 7, Halon System Lineup Verification, Completed 7/10/01 & 8/6/01

ST-6-022-453-1, Rev. 7, Main Halon System Lineup Verification, Completed 7/23/01 & 8/20/01

ST-6-022-453-2, Rev. 7, Main Halon System Lineup Verification, Completed 7/23/01 & 8/20/01

ST-7-022-250-0, Rev. 5, Underground Fire Main Flow Test, Completed 11/13/01

ST-7-022-252-0, Rev. 4, Motor Driven Fire Pump Characteristic Curve Test, Comp. 3/25/01 & 9/30/99

ST-7-022-253-0, Rev. 3, Diesel Driven Fire Pump Characteristic Curve Test, Comp. 9/25/00 & 6/3/99

Miscellaneous Documents

Vendor Information, Lightguard (Emergency Light Units)

Fire Impairment Log, 12/11/01

Response to RAI on IPEEE, dated June 28, 1996

Safe and Alternative Shutdown Component Information Sheets

Specification NE-294, Section 7.5, Rev. 2 - Effects of Open Circuits on CT Secondaries