February 26, 2001

EA 01-024

Mr. Harold W. Keiser
Chief Nuclear Officer and President
PSEG Nuclear LLC - X04
P. O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK - NRC FIRE PROTECTION INSPECTION REPORT NO. 05000354/2001-002

Dear Mr. Keiser:

On January 26, 2001, the NRC completed a triennial fire protection team inspection at your Hope Creek Generating Station. The enclosed report documents the inspection findings which were discussed at an exit meeting on January 26, 2001, with Mr. M. Trum and other members of your 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.

The scope of this inspection was reduced in accordance with the September 22, 2000, revision to Inspection Procedure 71111.05, "Fire Protection." Specifically, the analyses of associated circuits which could cause the malfunction of post-fire safe shutdown equipment were not reviewed. The issue of appropriate criteria for evaluating associated circuits is the subject of a voluntary industry initiative. These analyses may be reviewed following the completion of the industry initiative.

Based on the results of this inspection, the inspectors identified an issue of very low safety significance (Green). The issue involved a deficiency in the procedure for shutdown of the plant from outside of the control room.

The inspectors also reviewed your January 3, 2001, response to a Non-Cited Violation (NCV) issued by the NRC on December 6, 2000, involving the failure to adhere to a Hope Creek License Condition. Specifically, the NRC concluded that you did not meet a condition of the fire protection program, in that you did not post a continuous fire watch when you degraded fire barriers which could expose multiple trains of safe shutdown equipment to a common fire. In your response, you agreed that a violation of NRC requirements occurred. However, you contended that the violation was not appropriately characterized. Specifically, you maintained that the requirements of your fire protection program were met because a continuous fire watch was not required for having multiple fire doors open. However, you do agree that a violation of your Technical Specification required procedures did occur, because the modification procedure stated that only one fire door was to be open at a time. The NRC agrees with your assessment since our inspection team concluded that having several fire doors open did not create a new fire area affecting multiple redundant trains of safe shutdown equipment. Our inspection item tracking system will be revised accordingly.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Wayne D. Lanning, Director
Division of Reactor Safety

Docket No. 05000354
License No. NPF-57

Enclosure: NRC Inspection Report 05000354/2001-002

cc w/encl:
E. Simpson, Senior Vice President and Chief Administrative Officer
M. Bezilla, Vice President - Technical Support
D. Garchow, Vice President - Operations
G. Salamon, Manager - Licensing
R. Kankus, Joint Owner Affairs
J. J. Keenan, Esquire
Consumer Advocate, Office of Consumer Advocate
F. Pompper, Chief of Police and Emergency Management Coordinator
M. Wetterhahn, Esquire
State of New Jersey
State of Delaware

Distribution w/encl:
Region I Docket Room (with concurrences)

Distribution w/encl: **(VIA E-MAIL)**
J. Schoppy, NRC Resident Inspector
H. Miller, RA
J. Wiggins, DRA
G. Meyer, DRP
C. O'Daniell, DRP
L. Prividy, DRS
W. Kane, NRR
B. Sheron, NRR
D. Dambly, OCG
D. Holody, EO, RI
R. Urban, ORA, RI
W. Borchardt, OE (OEMAIL)
R. Summers, OE (BTS)
D. Barss, NRR
J. Shea, OEDO
E. Adensam, NRR
J. Clifford, NRR
R. Ennis, NRR
J. Dixon-Herrity, OE

DOCUMENT NAME: G:\ELECTRICAL\WALKER\HCFIRE.WPD
After declaring this document "An Official Agency Record" it **will** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRS		RI/DRS		RI/DRP		RI/ORA		RI/DRS/SRA	
NAME	T Walker (RLF for)		WRuland		GMeyer		Rurban *		DO'Neal	
DATE	02/07/01		02/09/01		02/15/01		02/16/01		02/23/01	

OFFICE	RI/DRS									
NAME	WLanning									
DATE	02/22/01									

OFFICIAL RECORD COPY

*Discussed with J. Dixon-Herrity (OE). Issue of contested NCV was discussed and OE did not need to see report.

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	05000354
License No:	NPF-57
Report No:	05000354/2001-002
Licensee:	Public Service Electric and Gas Company
Facility:	Hope Creek Generating Station
Location:	Hancocks Bridge, New Jersey
Dates:	January 16 - 26, 2001
Inspectors:	T. Walker, Sr. Reactor Inspector, Division of Reactor Safety R. Fuhrmeister, Sr. Reactor Inspector L. Cheung, Sr. Reactor inspector K. Young, Reactor Inspector
Approved By:	William H. Ruland, Chief Electrical Branch Division of Reactor Safety

TABLE OF CONTENTS

SUMMARY OF FINDINGS

IR 05000354-01-02, on 01/16- 01/26/01, Public Service Electric and Gas, Hope Creek Generating Station, Fire Protection.

The inspection was conducted by a team composed of regional specialists. The significance of issues 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

- Green. The team identified a deficiency in the procedure for shutdown from outside the control room, which could have hampered the start of shutdown cooling to achieve cold shutdown. The procedure could not have been implemented as written because it did not provide instructions for securing the 'A' recirculation loop from outside of the control room.

  This finding was determined to be of very low safety significance (Green) because the procedure deficiency would not have prevented the operators from achieving cold shutdown within 72 hours. (Section 1RO5.10)

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 Public Service Electric and Gas (PSE&G) has implemented an adequate fire protection program and that post-fire safe shut down capabilities have been established and are being properly maintained. Fire areas were selected for detailed review based on risk information in the Individual Plant Evaluation for External Events. Fire areas chosen for the inspection were the Control Room (CD46), 1E Switchgear Room Channel A (CD82), the Emergency Diesel Generator (EDG) Rooms (CD28, CD29, CD30, and CD31), Electrical Access Area (AB1), and the Division II side of the Reactor Building (RB2). Within the reactor building area, the team focused on a motor control center (MCC) area, the residual heat removal (RHR) pump rooms, and the safety auxiliary cooling system (SACS) pump and heat exchanger room.

This inspection was a reduced scope inspection in accordance with the September 22, 2000, 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 facility, the team observed the material condition of fire protection systems and equipment, the storage of permanent and transient combustible materials, and the control of ignition sources. The team also reviewed the procedures that controlled hot-work activities and combustibles at the site.

b. Findings

No findings of significance were identified.

.2 Fire Barrier Penetration Seals

a. Inspection Scope

The team randomly selected three fire barrier penetration seals for detailed inspection to verify proper installation and qualification. The team reviewed associated design drawings, a Tech Sil Incorporated test report, a fire barrier and penetration seal

inspection procedure, and PSE&G's penetration seal evaluations. The team compared the observed in-situ seal configurations to the design drawings and tested configurations. The team also compared the penetration seal ratings with the ratings of the barriers in which they were installed.

b. Findings

No findings of significance were identified.

.3 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 evaluations, surveillance and functional test procedures for selected items. The NRC safety evaluations of fire protection features for Hope Creek Generating Station was also reviewed by the team. This review was performed to ensure that the selected items of the fire barrier system met the licensing and design bases.

Additionally, the team reviewed PSE&G's January 3, 2001, response to a Non-Cited Violation (NCV) involving fire protection program requirements for inoperable fire doors. On December 6, 2000, NCV 50-354/2000-10-01 was issued for failure to upgrade the compensatory measures for degraded fire barriers when the fire doors for three of the EDG rooms were simultaneously blocked open. PSE&G acknowledged that a violation had occurred; however, they stated that fire protection program requirements were met. Rather, the licensee contended, Technical Specification required procedures were not followed. The team reviewed the January 3, 2001, response, the applicable fire protection program procedures, and the associated work package documents. The team also discussed the issue with responsible licensee personnel.

b. Findings

No findings of significance were identified.

Based on review of HC.FP-AP.ZZ-0004, "Actions for Inoperable Fire Protection," and discussions with licensee personnel, the team determined that the hourly fire watch established as a compensatory measure while the EDG room fire doors were blocked open was appropriate in accordance with the fire protection program procedure, and the additional compensatory measure of a continuous fire watch was not required under the circumstances. With operable detection systems on either side of the blocked open doors, the procedure required an hourly fire watch. Although a continuous fire watch would have been required for an inoperable suppression system in an area in which redundant systems or components could be damaged, the simultaneous opening of the EDG room doors did not create such an area.

The team determined that work performed on the EDG fire doors was not completed in accordance with procedural requirements. NC.NA-AP.ZZ-0008, "Control of Design and

Configuration Change, Tests, and Experiments," requires that design change packages (DCPs) be installed in accordance with the instructions contained in the change package. DCP 80009844, which implemented the replacement of the EDG room fire doors, contained a statement in the Fire Protection Specialty Review Checklist which specified that only one room would be affected at a time. This instruction was not followed when multiple EDG room fire doors were blocked open simultaneously for painting. **(NCV 05000354/2000-010-01)**

.4 Fire Detection Systems

a. Inspection Scope

The team reviewed the adequacy of the fire detection systems in the selected plant fire areas. This included a walk-down of the systems and a review of fire detection installation drawings. Additionally the team reviewed surveillance procedures to determine the adequacy of fire detection component testing.

b. Findings

No findings of significance were identified.

.5 Fixed Fire Suppression Systems

a. Inspection Scope

The team reviewed the adequacy of the manual Halon and automatic carbon dioxide (CO_2) fire suppression systems in the control room and diesel rooms respectively. This review included recent modifications to the diesel rooms to support the CO_2 system discharge capability. This also included a walk-down of the systems and a review of the discharge and functional tests. Automatically actuated fixed sprinkler fire suppression systems were also reviewed. This review included hydraulic calculations, functional tests and field walk-downs of selected systems including the automatic sprinkler system in the electrical access area.

b. Findings

No findings of significance were identified.

.6 Manual Fire Suppression Equipment

a. Inspection Scope

The team walked down selected standpipe systems and portable 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 that the pumps were meeting design requirements. Additionally, the team reviewed recent fire main loop flow tests to ensure adequate flow could be delivered to hose and sprinkler systems.

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 operational readiness for fire fighting.

b. Findings

No findings of significance were identified.

.7 Post-Fire Safe Shutdown Emergency Lights

a. Inspection Scope

The team observed the placement and aim of emergency light units (ELUs) throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation for post-fire safe shutdown.

The team reviewed preventive maintenance procedures, surveillance procedures, functional testing procedures, and a vendor manual to determine if adequate surveillance testing was being accomplished to ensure operation of the emergency lights. These documents included ELU inspections, ELU battery testing, and an engineering evaluation that established trending of ELU failures under PSE&G's maintenance rule program.

b. Findings

No findings of significance were identified.

.8 Communications

a. Inspection Scope

The team reviewed PSE&G's communication plan, portable radio system transponder location, and discussed portable radio communication procedures with a fire brigade leader to determine if communications could be maintained in the event of a fire at the site. Additionally, the team reviewed radio system maintenance to determine if PSE&G was properly maintaining the radio system.

b. Findings

No findings of significance were identified.

.9 Safe Shutdown Capability

a. Inspection Scope

The team reviewed the Updated Final Safety Analysis Report (UFSAR), Appendix 9A, "Fire Hazards Analysis," and NC.DE-PS.ZZ-0001(Q), Appendix 7, "Technical Standard - Hope Creek Safe Shutdown Analysis," to evaluate the methods and equipment used to achieve hot shutdown and cold shutdown following postulated fires in the control room, the 1E switchgear room, the emergency diesel generator room, the electrical access area and portions of the reactor building. 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 safe shutdown equipment list. The team also performed field walk-downs to validate the equipment location determinations used in the analysis.

The team reviewed electrical drawings for the components controlled from the remote shutdown panel (RSP) and associated control circuits to ensure that proper isolation was provided for alternate shutdown capability for fires in the control room. The team conducted field walk-downs to evaluate the protection of the equipment from the effects of fires. The team also reviewed remote shutdown panel operability test procedures to determine if the licensee was appropriately testing the transfer switch functions.

b. Findings

No findings of significance were identified.

.10 Operational Implementation of Safe Shutdown Capability

a. Inspection Scope

Post-fire shutdown procedures (alarm response procedures, abnormal procedures, integrated operating procedures, and system operating procedures) for the selected areas were reviewed to determine if appropriate information is provided to plant staff to perform required recovery actions to achieve safe shutdown. The team walked down, with a licensed operator, performance of HC.OP-IO.ZZ-0008, "Shutdown from Outside Control Room." The team also reviewed training lesson plans and scenario guides for post-fire and alternative shutdown procedures, discussed the procedures with licensed operators, and evaluated the accessibility of the alternative shutdown operating stations and the accessibility of required manual action locations. The team evaluated communications, lighting and fire hazards in vicinity of equipment requiring operator actions, and along the access and egress paths.

The team reviewed pre-fire plans for the selected areas to determine if appropriate information is provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact safe shutdown. The team also reviewed recent fire drill critiques and fire drill training scenarios to determine the adequacy of the drills.

b. Findings

The team identified a deficiency in the procedure for shutdown from outside the control room which could have hampered the start of shutdown cooling to achieve cold shutdown. The safety significance of this finding was very low because the procedure deficiency would not have prevented the operators from achieving cold shutdown within 72 hours.

During the walk-down of the integrated operating procedure for shutdown of the plant from outside of the control room, the team identified steps in the procedure that could not be performed as written. IO-008 contained a note at the beginning of the attachment for placing the 'B' loop of RHR in shutdown cooling operation that stated, "Prior to S/D Cooling operation, all Recirculation Pumps shall be off with their respective discharge valves closed." A subsequent step, immediately prior to starting the 'B' RHR pump, stated, "Ensure Reactor Recirculation Pump AP201 is stopped prior to placing B RHR pump BP202 into Shutdown Cooling." Placing the non-1E transfer switch on the RSP to the emergency position at the start of the procedure would cause the 'B' recirculation pump discharge valve to close which would cause the 'B' recirculation pump to trip. However, the procedure did not provide a method for closing the 'A' recirculation pump discharge valve or tripping the 'A' recirculation pump from outside of the control room.

The team concluded that the operators would be able to use the procedure to achieve cold shutdown within 72 hours after a fire in the control room as required. The licensee contacted General Electric and determined that securing the opposite recirculation loop was not critical for establishing adequate shutdown cooling flow through the core. However, the inability to trip the 'A' recirculation pump or close the discharge valve would have complicated the operators' efforts.

The team determined that the procedure weakness could have impacted plant safety during an event either delaying the start of shutdown cooling while the procedure deficiency was resolved or could lead the operators to implement alternate shutdown cooling (flow through the SRVs with low pressure ECCS injection), a less preferred method of decay heat removal. This finding was determined to be of very low safety significance (Green) in accordance with the SDP because the procedure deficiency would not have prevented the operators from achieving cold shutdown within 72 hours. **(FIN 05000354/2001-002-01)**

.11 Safe Shutdown Circuit Analyses

a. Inspection Scope

The team reviewed the Hope Creek Fire Hazard Analysis (FHA) to assess the adequacy of the methodology applied in the analysis. The team also reviewed the power and control cable routing for selected 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 the postulated fires. 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.

The team reviewed electrical fuse and circuit breaker coordination studies to ensure that equipment needed for post-fire safe shutdown would not be impacted due to a lack of coordination. The team also reviewed testing, overhaul and preventive maintenance procedures for medium voltage circuit breakers to determine if the licensee was appropriately maintaining them in a state of readiness. These procedures were reviewed to determine if the circuit breakers that provide electrical power and provide protection to post-fire safe shutdown components could operate when called upon.

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

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 the fire impairments log, Quality Assurance Audit and Surveillance Reports for the years 1999 and 2000, and selected notifications (corrective action items) for fire protection and post-fire safe shutdown equipment to evaluate the effectiveness of PSEG's corrective actions and the prioritization for resolving fire protection related deficiencies. The team's review was conducted to determine to determine if PSE&G was identifying fire protection program deficiencies and implementing appropriate corrective actions.

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. M. Trum and other members of the Public Service Electric and Gas staff at an exit meeting on January 26, 2001.

The inspectors asked whether any materials examined during the inspection should be considered proprietary. None of the information reviewed during the inspection was identified as proprietary.

(1) NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html

(2) SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Public Service Electric and Gas Company

R. Braddick, Control Room Supervisor
W. Buirch, Supervisor, Fire Protection Operations
V. Fregonese, Design Engineering Manager
D. McHugh, Design Engineering Supervisor
L. Rajkowski, HC System Engineering Supervisor
M. Reeser, Fire Protection Engineer
B. Thomas, Licensing Engineer
M. Trum, Vice President, Nuclear Reliability
F. Yeich, Acting, Superintendent Loss Prevention

Nuclear Regulatory Commission

J. Linville, Acting Deputy Director, DRS
W. Ruland, Chief, Electrical Engineering Branch
J. Schoppy, Senior Resident Inspector
C. Cahill, Resident Inspector

Other

D. Vann, Nuclear Engineer, NJ DEP

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

FIN 050000354/2001-002-01	Shutdown outside control room procedure could not be performed as written.

Closed

None

Discussed

NCV 050000354/2000-010-01	Failure to properly implement fire protection program requirements for inoperable fire doors

(2) SUPPLEMENTAL INFORMATION (cont.)

LIST OF ACRONYMS USED

CO_2	Carbon Dioxide
DCP	Design Change Package
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
ELU	Emergency Light Unit
FHA	Fire Hazards Analysis
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
P&ID	Piping and Instrumentation Drawing
PSE&G	Public Service Electric and Gas Co.
QA	Quality Assurance
RHR	Residual Heat Removal
RSP	Remote Shutdown Panel
SACS	Safety Auxiliary Cooling System
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
S/D	Shutdown
SRV	Safety Relief Valve
UFSAR	Updated Final Safety Analysis Report

(3) LIST OF DOCUMENTS REVIEWED

Piping and Instrumentation Drawings

M-080-0(Q), “Condensate & Refueling Water Storage & Transfer”
M-10-1(Q), “Service Water”
M-11-1(Q), “Safety Auxiliaries Cooling - Reactor Building”
M-22-0(Q), “Fire Protection Fire-Water”
M-41-1(Q), “Nuclear Boiler”
M-43-1(Q), “Reactor Recirculation”
M-49-1(Q), “Reactor Core Isolation Cooling”
M-50-1(Q), “RCIC Pump Turbine”
M-51-1(Q), “Residual Heat Removal”
M-55-1(Q), “High Pressure Coolant Injection”
M-56-1(Q), “HPCI Pump Turbine”

Control Circuit Schematics

E-6604-0(Q), “Remote Shutdown Panel 10C399 Scheme Dwg. Index”
E-0085-0(Q), “Electrical Schematic Diagram Class Ie 4.16KV Sta Pwr Sys Swgr Diesel Gen Circuit Brkr (1)52-40207"
E-6603-0(Q), “Remote Shutdown Panel Transfer Switch Contact Utilization”
E-0219-0(Q), “Electrical Schematic Diagram RHR Pump Seal & Motor Brg Clg Wtr Sply Sol Vlv ISV-2520B”
E-0217-0(Q), “Electrical Schematic Diagram 4.16KV Circuit Breaker Control Safety Auxiliaries Cooling Pump”
E-0006-1(Q), ”Single Line Meter and Relay Diagram, 4.16 kV Class 1E Power System, Sheets 1 & 2”

Engineering Evaluations/Modifications/Safety Evaluations/Change Requests

H-1-ZZ-MEE-1013, “One Hour Rated Gypsum Board Penetration Seals in 2 and 3 hour Fire Rated Barriers”
H-1-KC-PEE-1357, “Diesel Generator Room CO_2 Boundary Upgrades”
H-1-BCXX-NEE-0323
DCP-4EC-3644, Attachment 6, “Special Test Procedure”
ECA 80009844, “HC Emergency Diesel Generator CO2 Related Room Upgrades”

Calculations

E-26, “Breaker to Fuse Coordination for Appendix R,” Revision 2, dated March 4, 1996
E-7.6(Q), “Diesel Generator Protective Relaying,” Revision 0, dated November 20, 1984
E-7.9(Q), “250 VDC SWGR RCIC MCC Feeder,” Revision 0, dated May 17, 1985

Procedures

NC.DE-PS.ZZ-0001(Q), “Programmatic Standard - Fire Protection”
HC.DE-PS.ZZ-0021(F), “Hope Creek Penetration Seal Program”
NC,NA-AP.ZZ-0025(Q), “Operational Fire Protection Program”
ND.FP-AP.ZZ-0001(Q), “Fire Protection Organization, Duties, and Staffing”
NC.FP-AP.ZZ-0009(Q), “Fire Protection Training Program”

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

ND.FP-AP.ZZ-0005(Q), “Fire Protection Surveillance and Periodic Test Program”
HC.FP-AP.ZZ-0004(Q), “Actions for Inoperable Fire Protection - Hope Creek Station”
FRH-II-412, Rev. 3, “RCIC Pump and Turbine Room, RHR Pump and Heat Exchanger Rooms and Electrical Equipment Room EL 54'”
FRH-II-422, Rev. 2, “RHR Heat Exchanger Room and MCC Area EL 77'”
FRH-II-431, Rev. 3, “MCC Area EL 102'”
FRH-II-432, Rev. 2, “‘B’ SACS Heat Exchanger and Pump Room EL 102'”
FRH-II-521, Rev. 4, “H&V Equipment Rooms EL 77'”
FRH-II-523, Rev. 4, “Auxiliary Building Corridor & Wing Areas EL 77'”
FRH-II-531, Rev. 5, “Diesel Generator Rooms EL 102'”
FRH-II-533, Rev. 5 and Rev. 6, “Electrical Access Area EL 102'”
FRH-II-541, Rev. 5, “Class 1E Switchgear Rooms EL 130'0”"
FRH-II-552, Rev. 5, “Control Room and Electrical Access Area EL 137'”
FRH-II-561, Rev. 5, “Control Equipment, HVAC Inverter and Battery Rooms EL 163'6”"
HC.FP-EO.ZZ-0001(Z), “Hope Creek Control Room Fire Response”
HC.OP-IO.ZZ-0004(Q), “Shutdown from Rated Power to Cold Shutdown”
HC.OP-AB.ZZ-0000(Q), “Reactor Scram”
HC.OP-EO.ZZ-0101(Q), “RPV Control”
HC.OP-EO.ZZ-0102(Q), “Primary Containment Control”
HC.OP-AB.ZZ-0130(Q), “Control Room Evacuation”
HC.OP-IO.ZZ-0008(Q), “Shutdown from Outside Control Room”
HC.OP-AB.ZZ-0129(Q),“High Radiation, Smoke or Toxic Gases in the Control Room Air Supply”
HC.OP-AR.QK-0001(F), “Fire Protection Status Panel 10C671 Alarm Summary”
HC.OP-AR.QK-0002(F), “Fire Protection Status Panel 10C671 Alarm Responses”
HC.OP-AB.ZZ-0135(Q), “Station Blackout/Loss of Offsite Power/Diesel Generator Malfunction”
HC.OP-AB.ZZ-0171(Q), “Loss of 4.16KV Bus A402 - B Channel”
HC.OP-SO.BB-0002(Q), “Reactor Recirculation System Operation”
HC.OP-SO.BC-0002(Q), “Decay Heat Removal Operation”
HC.OP-AB.ZZ-0142(Q), “Loss of Shutdown Cooling”
HC.OP-AB.ZZ-0124(Q), “Safety Auxiliaries Cooling System Malfunction”
HC.OP-AB.ZZ-0154(Q), “Loss of HVAC”
HC.OP-AB.ZZ-0136(Q), “Loss of 120 VAC Inverter”
HC.OP-AB.ZZ-0148(Q), “Turbine Auxiliaries Cooling System Malfunction”
HC.OP-ST.SV-0002(Q), “Remote Shutdown Control Operability - 18 Months RSP Transfer with ‘A’ Shutdown Cooling in Service”
HC.OP-ST.SV-0003(Q), “Remote Shutdown Control Operability - 18 Months RSP Transfer with ‘B’ Shutdown Cooling in Service”
HC.OP-ST.SV-0004(Q), “Remote Shutdown Control Operability - 18 Months RSP Transfer with No Shutdown Cooling in Service”
HC.FP-ST.QK-0029(F), “Class 1 Fire Detection Functional Test”
HC.FP-ST.QK-0030(F), “Supervised Circuit Operability Test”
HC.FP-ST.QK-0069(F), “Class 1 In-Duct Smoke Detector Functional Test”
HC.FP-ST.QK-0090(F), “Service Water Intake Structure Incipient Fire Detector System Functional Test”
HC.FP-SV.KC-0003(F), “Class 1 Fire Water Flow Path Verification”
HC.FP-SV.KC-0022(F), “Class 1 Fire Hose Station Visual Inspection”
HC.FP-SV.KC-0023(F), “Class 1 Fire Hose Station Detailed Inspection”
HC.FP-ST.KC-0004(F), “Class 1 Fire Suppression Water System Flush”
HC.FP-ST.KC-0007(F), “Class 1 Fire System Valve Cycling”

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

HC.FP-ST.KC-0008(F), “Fire Main Flow Test”
HC.FP-ST.KC-0016(F), “Pre-Action Sprinkler System Functional Test and Inspection”
HC.FP-ST.KC-0017(F), “Pre-Action Sprinkler System Functional Test and Inspection”
HC.FP-ST.KC-0060(F), “Pre-Action Sprinkler System 1PS4 Functional Test and Inspection”
HC.FP-ST.KC-0034(F), “Wet Pipe Sprinkler System 0WS6 Functional Test and Inspection”
HC.FP-ST.KC-0015(F), “Class 1 Water Spray/Deluge System Functional Test and Inspection”
HC.FP-ST.KC-0018(F), “Triennial Deluge Sprinkler System Air Flow Test”
HC.FP-ST.KC-0061(F), “Deluge System 1D28 Functional Test and Inspection”
HC.FP-ST.KC-0024(F), “Class 1 Fire Hose Station Flow Verification”
HC.FP-ST.KC-0025(F), “Class 1 Fire Hose Station Hydrostatic Test”
HC.FP-SV.KC-0019(F), “Class 1 CO2 System (17 Ton) Valve Lineup”
HC.FP-SV.KC-0068(F), “Class 1 CO2 Fore System Supervised Valve Lineup”
HC.FP-ST.KC-0021(F), “CO2 Systems Operability and Partial Discharge Test”
HC.FP-ST.KC-0048(F), “Halon System Air Flow Test”
HC.FP-SV.KC-0066(F), “Control Room Halon Storage Cylinders Volume Check”
HC.FP-ST.QB-0039(F), “Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Test and Inspection”
HC.FP-PM.QB-0039(F), “Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Inspection and Preventive Maintenance Procedure”
HC.FP-ST.QB-0070(F), “Standby Self Contained 8 Hour Battery Powered Emergency Light - 8 Hour Functional Test”
HC.FP-ST.KC-0002(F), “Electric Motor Driven Fire Pump Operability Test”
HC.FP-ST.KC-0009(F), “Diesel Driven Fire Pump Operability Test”
HC.FP-ST.KC-0006(F), “Fire Pump Capacity Test”
HC.FP-SV.ZZ-0026(F), “Fire Barrier Penetration Seal Inspection”
HC.FP-SV.ZZ-0028(F), “Class 1 Fire Damper Visual Inspection”
HC.FP-SV.ZZ-0049(F), “Ventilation and Bus Duct Fire Wrap Inspection”
HC.FP-SV.ZZ-0055(F), “Structural Steel Fireproofing Inspection”
HC.FP-SV.ZZ-0056(F), “Fire Barrier Inspection”
HC.FP-SV.ZZ-0058(F),“Daily Inspection of Class 1 Fire Doors and Inspection of Safety Related Rooms for Transient Combustibles”
HC.FP-SV.ZZ-0078(F), “Drywall Fire Barrier Inspection”
HC.FP-SV.ZZ-0027(F), “Class 1 Fire Door Inspection and Operability Test”
HC.FP-ST.ZZ-0031(F), “Class 1 Damper Functional Test”
HC.MD-ST.ZZ-0011(Q), “Low Voltage Molded Case Circuit Breaker Overcurrent Trip Testing”
HC.MD-ST.ZZ-0006(Q), “Low Voltage Type AKR Air Circuit Breaker Inspection and Preventive Maintenance”
HC.MD-CM.PG-0001(Q), “Low Voltage Breaker Overhaul and Rework (AKR-30/50)
HC.MD-CM.PG-0002(Z), “Low Voltage Breaker Overhaul and Repair (AKR-75)
HC.MD-PM.PG-0002(Z), “AKR 75 480 Volt Breaker Cleaning and PM”
HC.MD-PM.PB-0002(Q), “4.16KV Breaker Time Response”

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

Training Documents

Fire Drill Scenario, 4/11/00, Hope Creek - 130 EDG Control Room and SWGR
Fire Drill Scenario, 9/13/99, Hope Creek EDG Ventilation Room Elevation 77 - Rm # 5209
Fire Drill Scenario, 10/13/99, Hope Creek D/C Elevation 146 Inverter Room
Lesson Plan 0302-000.00H-00112H-04, “Shutdown From Outside Control Room OP-IO.ZZ-008"
Lesson Plan 302H-000.00H-000230-04, “Remote Shutdown System”
Scenario Guide SG-198, “Loss of CRIDS/Control Room Evacuation/RSP Operations”
Scenario Guide SG-150, “Fire/Loss of High Pressure Feedwater”

Corrective Action Program Documents

QA Assessment Monitoring Feedback QA-2000-0032
QA Assessment Monitoring Feedback QA-2000-0339
QA Assessment Monitoring Feedback QA-2000-0351
QA Assessment Monitoring Feedback QA-2000-0494
QA Assessment Monitoring Feedback QA-2000-0165
QA Assessment Report 2000-0146
QA Assessment Report 2000-0061
QA Assessment Report 2000-0245
NBU QA Assessment Report 99-0033
NBU QA Assessment Report 99-0070
NBU QA Assessment Report 99-0071
NBU QA Assessment Report 99-0120
NBU QA Assessment Report 99-0126
NBU QA Assessment Report 99-0152
NBU QA Assessment Report 99-0160
Test Report TS-TP-0084, “Penetration ‘C’ Bus Duct Seal”
Notification 20028756
Notification 20031553
Notification 20029734
Notification 20022981
Notification 20025333
Notification 20037073
Notification 20037074
Notification 20037624
Notification 20017678
Notification 20020210
Notification 20019854
Notification 20025607
Notification 20028581
Notification 20031984
Notification 20049007
Notification 20049340
Notification 20049395
Notification 20049594
Notification 20049595
Notification 20049625

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

Notification 20053817
Notification 20053925
Notification 20053941
Notification 20054166
Notification 20054387
Order 70003160
Order 80006201
Order 70006032
Order 70004498
Order 70006080

Miscellaneous Documents

IPEEE Section 4 - Internal Fires Analysis
- Fire Scenario Analysis Worksheet, Rm 510/5511 - Control Room
- Fire Scenario Analysis for Compartment 5416/5417 - iE Switchgear Room Channel A
- Fire Scenario Analysis for Compartment 5304 - Diesel Generator Room D
- Fire Scenario Analysis for Compartment 5305 - Diesel Generator Room B
- Fire Scenario Analysis for Compartment 5306 - Diesel Generator Room C
- Fire Scenario Analysis for Compartment 5307 - Diesel Generator Room A
- Fire Scenario Analysis for Compartment 5339 - Electrical Access Area
- Fire Scenario Analysis for Compartment 4107 - RHR Pump DP202 Room
- Fire Scenario Analysis for Compartment 4109/4206/4208 - RHR Pump & HX Room BP202
- Fire Scenario Analysis for Compartment 4303 - MCC Area
- Fire Scenario Analysis for Compartment 4307 - Division II SACS Area
- Fire Scenario Analysis for Compartment 4101/4201 -Torus Water Cleanup Pump Room/MCC Room
- Fire Scenario Analysis for Compartment 4315/4317/4320/4322 - Corridor/CRD Master Control Area/CRD Hydraulic Control Units Area/Personnel and Equipment Access Area
- Fire Scenario Analysis for Compartment 4202 - CRD Pump Area 2 Room

Letter dated May 13, 1986, regarding Fire Protection Program Technical Specification Deletion
Letter, dated Nov. 21, 1985, “Non-Segregated Phase Bus Duct Internal Penetration Seals Hope CreekGeneration Station”
Operability Determination, 1/19/2001, Applicable Tech Specs 3.8.1.1
- PSE&G Fire Test, “Three Fire Test of Various Penetration and Penetration Seal Configuration”
- Vendor Manual FC168-5-1F, 9/12/84, “Halophane —19 12 Volt DC Power Pack for Automatic Emergency Lighting”

Miscellaneous Drawings

P-0055-0, “Equipment Location Control & D/G Area EL 137' & EL 146' & EL 150'”
P-0054-0, “Equipment Location Control & D/G Area EL 124' & EL 130'”
P-0053-0, “Equipment Location Control & D/G Area EL 102'”
P-0043-1, “Equipment Location Reactor Building Unit 1 EL 102'”
P-0042-1, “Equipment Location Reactor Building Unit 1 EL 77'”
P-0041-1, “Equipment Location Reactor Building Unit 1 EL 54'”
M-5001, “Fire Protection & Detection EL 54'”
M-5002, “Fire Protection & Detection EL 77'”

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

M-5003, “Fire Protection & Detection EL 102'”
M-5004, “Fire Protection & Detection EL 120' & EL 132'”
M-5005, “Fire Protection & Detection EL 137" & EL 145'”
M-5006, “Fire Protection & Detection EL 155'-3" & EL 163'-6"”
M-5007, “Fire Protection & Detection EL 171', EL 178' & EL 201'”
M-5008, “Fire Protection & Detection Section A-A & B-B”
M-5009, “Fire Protection & Detection Section C-C & D-D”
M-5010, “Fire Protection & Detection Section E-E & F-F”
M-5013, “Fire Protection & Detection Aux Boiler, Circ Wtr Structure & Fire Pump House”
M-5101, “BTP CMEB 9.5-1 Fire Barriers EL 54'”
M-5102, “BTP CMEB 9.5-1 Fire Barriers EL 77'”
M-5103, “BTP CMEB 9.5-1 Fire Barriers EL 102'”
M-5106, “BTP CMEB 9.5-1 Fire Barriers EL 153' & 162'”
M-5107, “BTP CMEB 9.5-1 Fire Barriers EL 171', 178' & 201'”
M-5108, “BTP CMEB 9.5-1 Fire Barriers Miscellaneous Floor Plans”
M-5112, “Fire Area Boundaries EL 54'”
M-5113, “Fire Area Boundaries EL 77'”
M-5114, “Fire Area Boundaries EL 102'”
M-5115, “Fire Area Boundaries EL 120' & 132'”
M-5116, “Fire Area Boundaries EL 137', 145', 146' & 150'”
M-5117, “Fire Area Boundaries EL 153' & 162'”
M-5118, “Fire Area Boundaries EL 171' & 201'”
M-5119, “Fire Area Boundaries Miscellaneous Floor Plans”
E-1451-1, “Lighting and Telephone Plan Reactor Building Unit 1 EL 54'”
E-1453-1, “Lighting and Telephone Plan Reactor Building Unit 1 EL 77'”
E-1455-1, “Lighting and Telephone Plan Reactor Building Unit 1 EL 102'”
E-1425-1, “Lighting and Telephone Plan Aux Bldg - Cont. & D/G Area EL 54'”
E-1427-0, “Lighting and Telephone Plan Aux Bldg - Cont. & D/G Area EL 77'”
E-1437-0, “Lighting and Telephone Plan Diesel Generator Area EL 178'”
E-1532-1, “Raceway Plan, Reactor Building, Area 13, Plan El 77',” Sheet 1, Revision 30
E-1572, “Reactor Building Area 21, Plan at El 77'”
E-1655-1, “Auxiliary Building Control Area 25 Plan at El 137',” Revision 33
E-1672-1, “Auxiliary Building D/G Area 27 Plan at El 77',” Revision 19
E-1673, “Auxiliary Building D/G Area 27 Plan at El 102',” Revision 31
E-1675-1, “Auxiliary Building D/G Area 27 Plan at El 130',” Revision 32
E-1682-1, “Auxiliary Building D/G Area 28 Plan at El 77',” Revision 25
E-1683, “Auxiliary Building D/G Area 28 Plan at El 102',” Revision 33
E-1685-1, “Auxiliary Building D/G Area 28 Plan at El 130',” Revision 29
E-2108-0, Sheet 1, Revision 1, “Cable Block Diagram, Residual Heat Removal System, Suction Cooling Outbd. Isol. Valve”
E-2108-0, Sheet 2, Revision 5, “Cable Block Diagram, Residual Heat Removal System, RHR System Inboard Isolation Valves”
E-2108-0, Sheet 4, Revision 1, “Cable Block Diagram, Residual Heat Removal System, RHR System Outbd. Isol. Valves”
E-2108-0, Sheet 2, Revision 2, “Cable Block Diagram, Residual Heat Removal System, RHR Shell Side Bypass Valve”
E-2234-0, Sheet 11, Revision 2, “Cable Block Diagram, Residual Heat Removal System, RHR Pump Minimum Flow Bypass Valve”
A-0866-0, Rev. 18, “Penetration Seals Details Fire and Air”
NP62-01, Rev. 0, “Detail E-19 Silicone Elastomer Type Bus Duct Penetration Seals”

(3) LIST OF DOCUMENTS REVIEWED (Cont.)

J-4010-0, Sheet 4, Revision 7, “Loop Diagram, Service Water System
J-4049-C, “RCIC Loop Diagram”
J-J-220-1, “Instrument Location Drawing, Reactor Building Area 22, Plan at El 54'”