

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-354/86-01

Docket No. 50-354

License No. CPPR-120 Priority -- Category B

Licensee: Public Service Electric & Gas Company

80 Park Plaza - 17C

Newark, New Jersey 07101

Facility Name: Hope Creek Unit 1

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: January 7-24, 1986

Inspectors: C. H. Woodard 2/24/86
C. H. Woodard, Reactor Engineer date

A. Krasopoulos 2/25/86
A. Krasopoulos, Reactor Engineer date

L. S. Cheung 2/25/86
L. S. Cheung, Reactor Engineer date

Approved by: C. J. Anderson 2/28/86
C. J. Anderson, Chief, Plant Systems Section, DRS date

Inspection Summary: Inspection on January 7-24, 1986 (Report 50-354/86-01)

Areas Inspected: Routine announced inspection of licensee's actions on previous inspection findings and NRC Bulletins and Circulars and the licensee's fire detection and prevention program. The inspection involved 142 inspector-hours onsite by three region-based inspectors.

Results: No violations were identified.

DETAILS

1.0 Persons Contacted

1.1 Public Service Electric and Gas Company

- *R. Salvesen, General Manager
- *A. Giardino, Manager Quality Assurance (QA)
- *R. Griffith, Principal QAE
- *F. Cielo, Principal Engineer
- *R. Donges, Lead Engineer
- M. Masuro, Lead I&C Engineer
- M. Maradeo, Lead Engineer
- W. Waters, I&C Coordinator
- N. Dyck, Chairman, Response Coordination Team
- D. Evans, Lead QA Engineer
- T. Busch, Technical Engineer
- C. Vondra, Operation Engineer
- C. Jaffee, PS Startup Group
- A. Barnabei, QC Group Head
- *P. Eldreth, Nuclear Fire and Safety Manager
- *T. Storey, Senior Fire Protection Supervisor
- *J. Pantazes, Senior Staff Engineer
- *R. Braddick, Fire Protection Engineer

1.2 U.S. Nuclear Regulatory Commission (NRC)

- *B. Borchardt, Senior Resident Inspector
- *J. Lyash, Resident Inspector

*denotes attendees present at exit meeting.

2.0 Follow-up of Previous Inspection Findings

(Closed) IE Bulletin 77-05 and 77-05A - Failure of Certain Types of Electrical Connectors During Simulated Post LOCA Tests Inside the Containment.

The scope of this bulletin was expanded by the licensee to include all connectors in safety systems required to function to mitigate the effects of an accident which could adversely affect the ability of the system to perform its safety function. The scope was further expanded so that the examination was not limited to a LOCA or to areas within the containment.

The licensee's review of these bulletins against the points recommended by NRC is documented by Bechtel Construction Letter BLP-18243 to the licensee and by licensee internal letter dated January 11, 1986 signed by C. W. Churchman PSE&G Site Manager of Hope Creek. The licensee's letter concurs in the BLP 18243 findings and acknowledges additional environmental qualification for electrical connectors as delineated in Rockwell

Report No. 230QR000001 dated November 7, 1985 and PSE&G Generic Qualification Report EESS No. M047-PNL-003 dated November 27, 1985. The inspector reviewed these documents and determined that they adequately address the NRC issues.

This item is closed.

(Closed) IE Circular 79-CI-02 - Failure of 120V Vital Ac Power Supplies
No written response to this circular was required from the licensee.

The licensee's review of this circular against the four points recommended by NRC was documented in their internal letter dated August 8, 1980 (F. A. Christiana to E. N. Schwalje). The inspector reviewed this letter and determined that it adequately addressed the NRC issues.

This item is considered closed.

(Closed) IE Circular 77-CI-16 - Emergency Diesel Generator Electrical Trip Lockout Features

This item relates to an event that occurred at another plant in which a diesel generator output circuit breaker tripped open during a test while in the emergency mode from a cause other than those permitted by the technical specifications.

The Hope Creek diesel generator trips and start permissive functions conform to the requirements of Hope Creek technical specifications section 4.8.1.1.2.H.7. Verification of the trips and start permissives were confirmed during the pre-operational test phase by procedures PTP-KJ-1, 2, 3, 4 and will be periodically reconfirmed during the operational phases by test procedures OP-ST.KJ-001 thru 11. The licensee's emergency diesel generator trip lock-out features bypass any signal from negating a start or trip during emergency operation except for the signals which are vital and necessary for keeping the diesel generator running. These signals are engine overspeed and low lube oil pressure which will shutdown the engine and overcurrent or excessive differential current which will trip the generator output circuit breaker open.

This item is closed.

(Closed) 79-BU-23 - Potential Failure of the Emergency Diesel Generators Exciter Field Transformer

During a full load test of emergency diesel generators by Florida Power and Light Company at their Turkey Point facility, overheating of the exciter power transformers occurred due to a design error. The diesel generators were General Motors (Electromotive Division) Model EMD-999-20 equipped with Model A-20 EMD generator which utilized a GE-single phase model 9T24Y1004 exciter power transformer.

The manufacturer determined that the problem was caused by high circulating harmonic currents in the exciter transformer due to the neutral of the power generator and the neutral of the primary windings of the exciter transformer being connected. The manufacturer concluded that such connection was of no significant benefit and could lead to destruction of the transformer as a consequence of overheating. The manufacturer recommended that the neutral circuits be disconnected and the transformer primary neutral allowed to float.

IE Bulletin 79-23 directed that all licensee's determine if they had like problems with their emergency diesel generator exciters.

The inspectors confirmed the licensee evaluation that the circulating harmonic currents in the exciter power transformer windings cannot occur at Hope Creek Generating Station because of major design differences. The generator and exciter are from a different manufacturer and the design does not include a similar exciter power transformer. The emergency diesel generator is manufactured by Colt Industries; the generator is supplied by Beloit Power Systems division of Louis Allis Corporation and it is equipped with a Basler static exciter. Further the emergency diesel generators have been full load tested for 22 hours and overload tested for 2 hours during preoperational test PTP-BB-3 without incidence of exciter overheating.

This item is closed.

(Closed) IE Bulletin 79-01 - Environmental Qualification of Class IE Safety Related Electrical Equipment

The inspector reviewed Bulletin 79-01 and supplements thereto including licensee actions required. The inspector reviewed the licensee response which closes this as a bulletin item since this item is included as a licensing issue to be addressed under 10 CFR 50.49 "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants."

This item is closed.

(Closed) Violation No. 84-05-01 - Failure to Maintain Proper Tie-wrap Spacing When Fastening Electrical Cable to Trays

The licensee has performed a walkdown inspection of cable trays. The inspection verified cable tie-wrap violations in five areas as follows:

- cables supported by other cables
- cable bundles greater than 4 in. diameter.
- cable support spacing in excess of 5 ft.
- unsupported cables
- tie-wraps fasten together in series to anchor cable to cable tray rungs.

Drawings No. E-1408-0 (Q) DCN No. 36 and 42, Section 1.18 have been revised to control the above noted misapplication of cable tie-wraps and support spacing. The inspector verified implementation of the DCN by inspecting a representative sampling of licensee identified violations and by review of engineering calculation HQA-86-002 for two 8 and 9 foot vertical tray sections located behind a fire barrier and not accessible for inspection.

This item is closed.

(Closed) Violation No. 84-05-02 - Failure to Fasten Tie-wrap to Cable Tray Rung and Using the Tie-wrap to Fasten Cable to Cable

This item is closed. See basis in closure of 84-05-01

(Closed) Violation No. 85-45-02 - Pertaining to Cable Support Spacing Greater Than 5 ft.

This item is closed. See basis in closure of 84-05-01

(Closed) Open Item 85-00-05 - Potential Construction Deficiency of Tobar Pressure Transmitters

The licensee filed a report on May 20, 1985 stating that some Tobar pressure transmitters, when tested, exhibited drift greater than specified. New tests were conducted on 12 transmitters in an environment simulating actual plant conditions. The test results indicated that all transmitters functioned satisfactorily.

The licensee concluded that the previous tests (in which they identified the drift problem) were not appropriately performed. On July 2, 1985 the licensee sent a letter to NRC withdrawing the deficiency report.

The inspector reviewed pertinent documents on this subject. This item is closed.

(Closed) Construction Deficiency Item No. 85-00-11 - Inadequate Power to Class 1E Tobar Instrumentation Transmitters That Provide Plant Safety Signals to the Bailey Instrumentation Cabinets

Initial calibration of these instruments revealed that the overall circuit loop impedance was too high to provide sufficient voltage to the Tobar transmitters to provide the design full range signal current to the follower instrumentation.

A design change was made to bypass a 150 ohm current limiting resistor in each of these circuits and to install a current limiting fuse to serve the same function. This change increased the voltage across the Tobar transmitters and provided for proper calibration and operation to meet design criteria.

The inspector reviewed the deficiency, the design change, and impact of the change on the qualification of the instrumentation. Installation calibration and acceptance is complete for 14 channels with the remainder of the channels to be completed prior to fuel loading.

No deficiencies were identified.

This item is closed.

(Closed) Violation 85-03-01 - Uncapped Instruments Tubing

In Inspection Report No. 50-354/85-51, numerous uncapped instrument calibration connections on the GE transmitter racks were identified. A complete list of these uncapped connections was tabulated by the licensee in the SDR No. 2C-0053 dated November 8, 1985. The capping of these connections was completed on November 30, 1985 and documented in the resolution of SDR No. 2C-0053.

The inspector selected 12 instruments in GE Panels H21-P005 and P006 in the Reactor Building, elevation 77' and verified by direct observation that their calibration connections were properly capped.

This item is closed.

(Closed) Unresolved Item 85-61-07 - Plant Operating Procedures for Monitoring Snowfall and Snow Removal to Preclude Obstruction of the Emergency Diesel Generators Exhaust Systems

The inspector reviewed licensee plant operating procedure OP-AB.22-139(G) entitled "Acts of Nature" which was approved and implemented September 9, 1985. Paragraph 4.8 of this procedure requires that if the snowfall is greater than 12 inches, the snow accumulation in the area of the diesel generator exhaust pipes shall be monitored each hour. It requires shoveling to remove snow in the vicinity of the exhaust pipes when snow accumulation reaches 36-inches. After snowfall has subsided, it requires periodic recheck for drifting snow around the exhaust pipes. The inspector determined that the licensee procedure adequately addresses this issue.

This item is closed.

(Closed) Unresolved Item 85-24-01 Fire Hazard Analysis (FHA) Not Properly Performed on a Fire Area Concept Basis

The licensee satisfied the commitment to revise the FHA to include a clear definition of all fire areas. The revised FHA contains in table 9A a description of each fire area and all rooms within each. A list of all

safe shutdown equipment and the effects on safe shutdown from a fire or fire suppressants is also included in the analysis for each fire area. A random check on this analysis did not identify any unacceptable conditions.

This item is closed.

(Closed) Unresolved Item 85-24-04 - Incomplete Spurious Signal Analysis

The spurious signal analysis has been completed by the licensee. This analysis was performed using the majority/minority systems concept for each fire area. This concept examines the possibility and effects of spurious signals in the minority system within the fire area. For example if in a given fire area there are systems from both divisions I and II and if the majority of the equipment, cables and conduits are of division I then the minority system/division for that area is division II. The spurious signal analysis examines the effects of the fire and fire suppressants for the division II systems involved in this area since it is systems from division II likely to be used for safe shutdown, because, division II by definition, is least affected by a fire in this area. A random review by the inspector, of areas analyzed did not identify any unacceptable conditions.

This item is closed.

(Closed) Unresolved Item 85-24-05 - Fixed Fire Suppression for the Control Console Pit in the Main Control Room

The licensee added a Halon suppression system in the control room console pit to allay the NRC concern about the lack of fixed fire suppression in this area. The inspector walked down this system and determined that it is acceptable.

The review of the system included a visual examination of the piping, discharge nozzles and piping supports. The inspector also reviewed the test data and test results for the agent (Halon) concentration and duration of concentration. This system has also been reviewed and accepted by NRR.

No unacceptable conditions were identified. This item is closed.

(Closed) Unresolved Item 85-24-06 - Fire Resistance of Metal Security Panels in the Main Control Room

The inspector reviewed the documentation submitted by the licensee that substantiate the fire resistance of the metal security panels. The construction of these panels is similar to the construction of fire rated doors. This configuration has been reviewed and accepted by NRR.

This item is resolved.

(Closed) Unresolved Item 85-24-07 - Cable Penetration Seals

The concern that a fire initiated failure of the cable trays and supports will cause a failure of the penetration seals in the fire barriers was addressed by the licensee. By letter dated August 27, 1985 (R. Mittle to W. Buttler) the licensee provided the results of a structural analysis on cable tray supports. This analysis was based on a worst case fire scenario. NRR has reviewed this analysis, and concluded that because of the conservative assumptions made in conjunction with this analysis, the early response of the fire brigade and the presence of automatic suppression in most fire areas, this concern has been adequately resolved.

(Closed) Unresolved Item 85-24-10 Incomplete Sprinkler Systems

The inspector reviewed the modifications implemented by the licensee to complete the sprinkler systems identified in the above referenced unresolved item. No unacceptable conditions were identified.

The inspector also reviewed an audit report on the status of fire suppression system performed by an independent consultant. This audit was performed to assess the fire protection system conformance with the applicable NFPA standards and also evaluate the adequacy of the fire protection systems. The inspector's review included the responses planned by the licensee, addressing the audit finding.

No unacceptable conditions were identified.

This item is closed.

(Closed) Unresolved Item 85-24-11 - Fire Detection System Audit

The NRC concerns for the Hope Creek fire detection system capability were: (a) some detection systems may not meet the NFPA requirement (b) detection in some areas is marginal and therefore additional detectors are required and (c) the FSAR should include a list of all safety-related areas that lack detection and the appropriate technical justification for this lack of detection.

The licensee responded to item (a) above by performing an audit of the fire detection systems. This audit was performed by an independent consultant. The inspector reviewed this audit and also the responses to the audit findings planned by the licensee, and did not identify any unacceptable conditions.

The licensee provided additional fire detectors in areas where detection capability was marginal thus satisfying the NRC concern identified in item

(b) above. The licensee also revised the FSAR to include both a list of all safety related areas that lack fire detection along with the technical justification. The inspector did not identify any unacceptable conditions.

This item is closed.

(Closed) Unresolved Item 85-24-12 - Protection from Fire Exposure for the HVAC Control Panels for Diesel Generators

The licensee installed partial height walls to protect one HVAC control panel (IBC 483) for the Diesel Generator from an exposure fire.

The licensee also amended FSAR section 9A.6.5.1.e to reflect the addition of these walls.

No unacceptable conditions were identified. This item is closed.

(Closed) Unresolved Item 85-24-13 - Room Temperature Monitoring for Loss of HVAC Equipment

The licensee added room thermometers in rooms 5510, Control Room; 3576, Remote Shutdown Panel Room; 5302, Control Equipment Room; 5605, 1E Panel Room and 5448, 1E Inverter Room to monitor the room ambient temperature, in the event of loss of the HVAC systems during a fire. The licensee made provisions in the emergency procedures, to monitor the temperature of the rooms affected by the loss of HVAC.

No unacceptable conditions were identified. This item is closed.

(Closed) Unresolved Item 85-24-14 - Emergency Lighting Enhancement for Two Locations

The licensee provided additional emergency lights in the corridor leading to the stairway at elevation 137' on the path to the diesel generator rooms and also in the room housing the Reactor Protection System Breaker Panels 10 C410 and 10 C411. The addition of these lights satisfies the staff's concern.

This item is closed.

(Closed) Bulletins 75-04,-04A and-04B - Cable Fire at Browns Ferry

The bulletins listed above were issued by NRC after a fire, initiated by construction activities, damaged cables at the Browns Ferry Nuclear Plant and threatened an orderly plant shutdown. These bulletins do not apply to the Hope Creek Nuclear Generating Station since they were intended for operating plants. Since the issuance of these bulletins, more comprehensive guidance was developed and issued to licensees. In particular Branch Technical Position (BTP) 9.5-1 "Guidelines for Fire Protection for Nuclear Plants" which contains the applicable recommendations from NUREG-0050, "Recommendations Related to Browns Ferry Fire" presents guidelines accept-

able to the NRC for implementing General Design Criterion 3 "Fire Protection" of Appendix A to 10 CFR 50. The licensee's Fire Protection Program is being reviewed using these guidelines and the requirements of Appendix R to 10 CFR 50. The BTP and Appendix R guidelines parallel and supersede the requirements contained in the bulletins.

This item is closed.

(Closed) Unresolved Item 84-00-19 - Ruskin Fire Dampers

This item is closed because it is being followed up by Unresolved Item 85-24-08 titled "Ruskin Fire Damper Closure Under Air Flow Conditions".

This item is closed.

3.0 Fire Protection/Prevention Program

The inspector reviewed several documents in the following areas of the program to verify that the licensee had developed and implemented adequate procedures consistent with the Fire Hazard Analysis (FHA), Final Safety Analysis Report (FSAR), and Technical Specifications (TS). The documents reviewed, the scope of review, and the inspection findings for each area of the program are described in the following sections.

3.1 Program Administration and Organization

The inspector reviewed the following licensee documents:

- Draft Technical Specifications, Section 6, Administrative Controls
- Station Fire Protection Program, Procedure SA-AP.ZZ-025(Q)
Revision 3

The scope of review was to ascertain that:

- a. Personnel were designated for implementing the program at site; and
- b. Qualifications were delineated for personnel designated to implement the program.

No unacceptable conditions were identified.

3.2 Administrative Controls of Combustibles

The inspector reviewed the following licensee document:

- Station Fire Protection Program, Procedure SA-AP.ZZ-025 (Q)
Revision 3

The scope of this review was to verify that the licensee had developed administrative controls which included:

- a. Special authorization for the use of combustible, flammable or explosive hazardous material in safety-related areas;
- b. Prohibition on the storage of combustible, flammable or explosive hazardous material in safety-related areas;
- c. The removal of all wastes, debris, rags, oil spills or other combustible materials resulting from the work activity or at the end of each work shift, whichever is sooner;
- d. All wood used in safety-related areas to be treated with flame retardant;
- e. Periodic inspection for accumulation of combustibles;
- f. Transient combustibles to be restricted and controlled in safety-related areas; and
- g. Housekeeping to be properly maintained in areas containing safety-related equipment and components.

No unacceptable conditions were identified.

3.3 Administrative Control of Ignition Sources

The inspector reviewed the following licensee document:

- Station Fire Inspection Program, Procedure, SA-AP.ZZ-025(Q),
Revision 3

The scope of the review was to verify that the licensee had developed administrative controls which included:

- a. Requirements for special authorization (work permit) for activities involving welding, cutting, or grinding, open flame or other ignition sources and that they are properly safeguarded in areas containing safety-related equipment and components; and
- b. Prohibition on smoking in safety-related areas, except where "smoking permitted" areas had been specifically designated by plant management.

No unacceptable conditions were identified.

3.4 Equipment Maintenance Inspection and Tests

The inspector reviewed the following randomly selected documents to determine whether the licensee had developed adequate procedures which established maintenance, inspection, and testing requirements for the plant fire protection equipment.

- * Technical Specification Related Fire Hose Station Visual Inspection HCGS, Procedure M10-SHT-022 Revision 0
- * Fire Water System Valve Cycling Surveillance, HCGS, Procedure M10-SHT-007, Revision 0
- * Weekly Diesel Driven Fire Pump Operability Test, HCGS, Procedure M10-SHT-009, Revision 0.
- Semi-Annual Fire Detection Functional Test, HCGS, Procedure M10-SHT-024, Revision 0
- * Monthly Electric Motor Driven Fire Pump Operability Test M10-SHT-002, Revision 0.

The inspector also reviewed the computerized master matrix list of procedures to determine whether adequate procedures exist to perform the surveillances required by the Technical Specifications.

In addition to reviewing the above documents, the inspector reviewed the maintenance/inspection/test records of the items (marked with an asterisk), to verify compliance with Technical Specifications and established procedures.

No unacceptable conditions were identified except as follows:

Functional Testing of Fire Dampers

The inspector observed that the licensee did not perform functional testing of the fire dampers after the original acceptance test. The NFPA Standard No. 90.A, Appendix B provides maintenance recommendations to functionally test the fire dampers. The licensee agreed to periodically perform functional tests of 10% of all dampers every 18 months. The details of the damper test program will be developed within six months from initial criticality.

This is an unresolved item pending review of the test program and procedures developed by the licensee. (50-354/86-01-01)

3.5 Fire Brigade Training

3.5.1 Procedure Review

The inspector reviewed miscellaneous licensee procedures to verify that the licensee had developed administrative procedures. This included:

- a. Requirements for announced and unannounced drills;
- b. Requirements for fire brigade training and retraining at prescribed frequencies;
- c. Requirements for at least one drill per year to be performed on a "back shift" for each brigade;
- d. Requirements for maintenance of training records.

No unacceptable conditions were identified, except as follows:

Convenient Usage of Fire Fighting Strategies

The inspector observed that the fire fighting strategies are contained in volumes that may be unwieldy to use effectively in a fire situation. Also some information contained therein may not be of use to the fire fighters when combatting a fire. The licensee agreed to review this concern and streamline the procedures.

This item is unresolved pending review of the actions taken by the licensee (50-354/86-01-02)

3.5.2 Records Review

The inspector reviewed training records of fire brigade members for calendar years 1985 and 1986 to ascertain that: they had attended the required quarterly training; participated in a quarterly drill; and received the annual hands-on fire extinguishment practice.

The inspector observed that the matrix for tracking the training received by the fire fighters should be expanded for each fire fighter to include all of the dates and locations of drills. The licensee agreed with the inspectors observation and committed to improve the fire fighters training tracking system.

3.6 Facility Tour

The inspector examined fire protection water systems, including: fire pumps, fire water piping and distribution systems, post indicator valves, hydrants and the contents of the hose houses. The inspector toured accessible vital and nonvital plant areas and examined fire detection and alarm systems, automatic and manual fixed suppression systems, interior hose stations, fire barrier penetration seals, and fire doors. The

inspector observed general plant housekeeping conditions and randomly checked tags of portable extinguishers for evidence of periodic inspections. No deterioration of equipment was noted. The inspection tags attached to extinguishers indicated that monthly inspections were performed.

No unacceptable conditions were identified.

4.0 Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, violations or deviations. Unresolved items disclosed during the inspection are discussed in Sections 3.4 and 3.5.

5.0 Exit Interview

The inspectors met with licensee management representatives (see Section 1.0 for attendees) at the conclusion of the inspection on January 24, 1986. The inspectors summarized the scope and findings of the inspection at that time. The inspectors also confirmed with the licensee that the report will not contain any proprietary information. The licensee agreed that the inspection report maybe placed in the Public Document Room without prior licensee review for proprietary information. (10 CFR 2.790)

At no time during this inspection was written material provided to the licensee by the inspectors.