U. S. NUCLEAR REGULATORY COMMISSION

REGION I

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Report No. 50-354/88-01

Docket 50-354

License NPF-57

Licensee: Public Service Electric and Gas Company

P. O. Box 236

Hancocks Bridge, NJ 08038

Facility: Hope Creek Generating Station

Conducted: January 5, 1988 - February 8, 1988

Inspectors: R. W. Borchardt, Senior Resident Inspector
D. K. Allsopp, Resident Inspector

Approved: P. Swetland 3/4/88
P. Swetland, Chief, Projects Section 2B Date

Inspection Summary:
Inspection on January 5, 1988 - February 8, 1988 (Inspection Report Number 50-354/88-01)

Areas Inspected: Routine onsite resident inspection of the following areas: followup of outstanding inspection items, operational safety verification, surveillance testing, maintenance activities, engineered safety feature system walkdown, design change packages, storage battery adequacy audit, licensee event report followup, and assurance of quality. This inspection involved 132 hours by the inspectors.

Results: One violation relating to the absence of an instrument downscale isolation function on the liquid radwaste discharge line is cited in this report (paragraph 3). Although licensee identified, this discrepancy's similarity with previous problems indicates that past corrective actions have not been totally effective.

Details

1. Persons Contacted

Within this report period, interviews and discussions were conducted with Mr. S. LaBruna and members of the licensee management and staff and various contractor personnel as necessary to support inspection activity.

2. Followup on Outstanding Inspection Items

a. (Closed) Violation (86-40-02); Unauthorized operator aids. A violation was issued relating to the use of incorrect and unauthorized operator aids in general, and specifically electrical drawings found in distribution panels. The licensee's response dated October 27, 1986 was reviewed and found to be acceptable. The licensee removed all unauthorized aids and the current plant conditions were found acceptable.

b. (Closed) Inspector Followup Item (87-11-01); Defective latch contactors for emergency diesel generator exciters. The licensee has obtained replacement contactors for all four emergency diesel generators. Replacement has been completed for 2 diesels and is scheduled during the refueling outage for the remaining 2 diesels. Further discussion of this item can be found in paragraph 5 of this report.

c. (Closed) Unresolved Item (87-17-01); Control of plant equipment. During July 1987, the licensee identified a safety related instrument root valve mispositioned and at a separate time found the control switches for the high pressure coolant injection (HPCI) system room coolers in the stop position. Both of these situations were contrary to the operability requirements of technical specifications. Based upon these events and other similar control of plant equipment concerns, the NRC determined that an enforcement conference was necessary to discuss the events in detail and the licensee's corrective actions. The enforcement conference was held on October 19, 1987 and two notices of violation were issued on December 18, 1987. The inspector reviewed the licensee's response to these violations dated January 15, 1988, and found the corrective actions to be adequate. Immediate corrective actions included:

- Operations manager held small group meetings with all operators;
- General Manager quarterly shift meetings with operators were implemented;
- Operations Department administrative procedure updates;
- Requalification training for licensed and non-licensed operators; and,

- Creation of a Nuclear Department Incident Assessment/Human Performance Evaluation/Scram Response Task Force.

Long term program changes include:

- Tagging request inquiry system (TRIS) audits of instrument root valves;

- Completion of valve labeling program;

- Reanalysis of Q/Non-Q boundary valves; and,

- Annual review during 1988 and 1989 by Nuclear Safety Review Group of corrective action effectiveness.

The continuing long term corrective actions and the general issue of plant equipment control will continue to be inspected on a routine basis.

3. Operational Safety Verification (71707, 71709, 71881)

3.1 Inspection Activities

On a daily basis throughout the report period, inspections were conducted to verify that the facility was operated safely and in conformance with regulatory requirements. The licensee's management control system was evaluated by direct observation of activities, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions for operation, and review of facility records. The licensee's compliance with the radiological protection and security programs was also verified on a periodic basis. These inspection activities included weekend and backshift inspections conducted on January 16, 18 and 19, 1988.

3.2 Inspection Findings and Significant Plant Events

The unit entered this report period at 100% power and remained at full power throughout the period with the exception of short power reductions to conduct maintenance and surveillance activities.

On January 6, 1988, the licensee determined that the liquid radwaste discharge isolation valves would not close on a loss of detector output signal as required by the technical specifications (TS). This determination was made during performance of surveillance test IC-FT.SP-035. The radiation detection instrument channel was declared inoperable and the applicable action statement of TS 3.3.7.10-1 was entered, although the instrument channel provided accurate indication and the high level trip function was operable

throughout this period. Review of this occurrence determined that the original design logic did not include a downscale failure isolation of the liquid radwaste discharge line to the cooling tower blowdown line. In addition, the FSAR makes no mention of this isolation function. However, the version of TS issued with the operating license requires this instrument to have a circuit failure or a downscale failure isolation and this fact was not noticed during surveillance test procedure reviews. Previous instances of mismatch between TSs and the as-built plant configuration have been cited in NRC Inspection Report 50-354/87-16. As described in paragraph 10 of this report, this occurrence indicates that previous corrective actions were not fully effective. The inspector notified the licensee that the failure to satisfy the downscale trip function requirement of technical specification 3.3.7.10 was an apparent violation. (354/88-01-01)

On January 13, 1988, the licensee completed a design change to the liquid radwaste discharge line isolation logic which added a downscale failure isolation feature. Additional corrective actions included a verification that all radiological monitoring system surveillance tests satisfy TS requirements, and review of this issue with station qualified reviewers. During the review of approximately 90 procedures, one additional discrepancy was identified. This review determined that surveillance procedures for the plant vents and the filtration, recirculation, and ventilation system (FRVS) did not explicitly verify that a control room overhead annunciator alarms on a downscale failure. The isolation functions are verified, but there is no specific step in the procedure to record the proper operation of the overhead annunciators. The overhead annunciators are operational and the procedures have been revised.

4. Surveillance Testing (61726)

4.1 Inspection Activity

During this inspection period the inspector performed detailed technical procedure reviews, witnessed in-progress surveillance testing, and reviewed completed surveillance packages. The inspector verified that the surveillance tests were performed in accordance with Technical Specifications, licensee approved procedures, and NRC regulations.

The following surveillance tests were reviewed, with portions witnessed by the inspector:

- IC-CC.GS-007 Channel Calibration of "A" Hydrogen Recombiner
- IC-FT.BB-021 Functional Test of Drywell High Pressure Transmitter

- IC-CC.SM-007 Nuclear Steam Supply Shutoff System Channel Calibration

No violations were identified.

5. Maintenance Activities (62703)

5.1 Inspection Activity

During this inspection period the inspector observed selected maintenance activities on safety related equipment to ascertain that these activities were conducted in accordance with approved procedures, Technical Specifications, and appropriate industrial codes and standards.

5.2 Inspection Findings

Portions of the following activity were observed by the inspector:

Work Order	Procedure	Description
88D128104	MD-GP.ZZ-008	Troubleshoot and repair "A" diesel generator shutdown contactor

During December, 1986, the licensee was notified of a potential problem with the emergency diesel generator K1 contactor, manufactured by Basler Electric, that is associated with the generator exciter. The contactor was subject to failure due to defective O-rings on the latch mechanism of the contactor. Cracks were observed on some O-rings at the manufacturer's facility. Upon notification, the licensee inspected all of the subject O-rings and contactors. No deficiencies were identified, however replacement contactors with fully qualified O-rings were ordered for replacement.

Upon receipt of the replacement parts, the subject contactor was replaced on the "A" diesel generator. However, during return to service testing on January 26, 1988, the diesel started, attained proper speed but failed to achieve rated voltage. Initial indications were that the field failed to properly flash. The inspector witnessed the troubleshooting and repair activities conducted by controls group technicians under MD-GP.ZZ-008 "Equipment Troubleshooting". Troubleshooting efforts identified that the new latch contactor lacked a required wire which prevented the proper flashing of the generator field. The work procedure did not identify the need to transfer this wire from the old contactor unit, in order to be compatible with this design. This was corrected and the needed wire was taken from the recently removed contactor and installed. Troubleshooting and repair

activities were well coordinated and under supervisory direction. The diesel generator was successfully tested and declared operable on January 28. The licensee is evaluating the cause of the compatibility issue and its potential reportability. The inspector will follow the resolution of this problem during subsequent inspections.

No violations were identified.

6. Engineered Safety Feature (ESF) System Walkdown (71710)

6.1 Inspection Activity

The inspectors independently verified the operability of selected ESF systems by performing a walkdown of accessible portions of the system to confirm that system lineup procedures match plant drawings and the as-built configuration. This ESF system walkdown was also conducted to identify equipment conditions that might degrade performance, to determine that instrumentation is calibrated and functioning, and to verify that valves are properly positioned and locked as appropriate.

6.2 Inspection Findings

The "A" emergency diesel generator was inspected and conditions were found to be acceptable. No conditions adverse to system operability were observed nor were any minor discrepancies identified that were not previously noted by the licensee.

No violations were identified.

7. Design Change Packages (37700, 37701)

A inspection was conducted of various design change packages (DCP) scheduled for completion during the first refueling outage. These DCPs were reviewed for compliance with the Technical Specifications, 10CFR50.59 "Changes, Tests and Experiments" and station administrative procedures. The following DCPs were reviewed:

DCP 4EC-1006 - Installation of interlocks in the residual heat removal (RHR) system suction and test return valves to prevent inadvertent opening and preclude draining of the reactor vessel to the suppression pool when the shutdown cooling mode of RHR is placed in service.

DCP 4EO-1089 - Replacement of Marathon 1600 terminal blocks with Raychem splices in 19 Limitorque motor operated valves.

DCP 4HC-0116 - Replacement of 22 Tobar transmitters with Rosemount 1153 transmitters.

The progress of these and additional DCPs will be reviewed by the inspector during the refueling outage. The DCPs reviewed were found to be acceptable.

No violations were identified.

8. Storage Battery Adequacy Audit (Region I Temporary Instruction 87-07)

An audit of the adequacy of wet cell storage batteries was conducted during this inspection period and will continue for several additional periods. This inspection will be conducted utilizing Region I Temporary Instruction 87-07, various Regulatory Guides, the Safety Analysis Report, the Safety Evaluation Report, and the Technical Specifications. Licensee records, procedures and actual in plant conditions will also be inspected. In an effort to obtain background information efficiently, the licensee was provided with a written request for information. The written request for information is provided as attachment 1 to this inspection report.

There are eight 1E batteries installed at Hope Creek. Six provide power at 125 volt DC and are divided into four independent channels. Two batteries associated with high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) supply power at 250 volts DC. Basic information relating to each of the 8 Class 1E batteries is provided below:

1AD411/1BD411/1CD411/1DD411

1E Channel	A, B, C, D
Voltage	125 Volts DC
8 Hour rate	1800 amp-hour
Qualified/Design Seismic life	20 years
Qualified/Design electrical life	20 years
Age	Manufactured June, 1983
Time in Service (as of 2/88)	4 years
Plans for replacement	None at present time

1DD421

1E Channel	A
Voltage	250 Volts DC
8 Hour rate	825 amp-hour
Qualified/Design Seismic life	20 years
Qualified/Design electrical life	20 years
Age	Manufactured July, 1983
Time in Service (as of 2/88)	4 years
Plans for replacement	None at present time

1OD431

1E Channel	B
Voltage	250 Volts DC
8 Hour rate	330 amp-hour
Qualified/Design Seismic life	20 years
Qualified/Design electrical life	20 years
Age	Manufactured July, 1983
Time in Service (as of 2/88)	4 years
Plans for replacement	None at present time

1CD447/1DD447

1E Channel	C, D
Voltage	125 Volts DC
8 Hour rate	577 amp-hour
Qualified/Design Seismic life	20 years
Qualified/Design electrical life	20 years
Age	Manufactured June, 1983
Time in Service (as of 2/88)	4 years
Plans for replacement	None at present time

9. Licensee Event Report Followup (90712, 92700)

The licensee submitted the following event reports during the inspection period. These event reports and periodical reports were reviewed for accuracy and timely submission. The asterisked reports received additional followup by the inspector for corrective action implementation. The (+) items identify events which are detailed in the inspector's preceding monthly report.

Monthly Operating Report for December, 1987

Special Report 87-010-01	North Plant Vent Sample Pump Inoperable for More Than 72 Hours - Equipment Failure
*+ LER 87-051-00	Reactor Scram Caused by a Spurious Spike in a Main Steam Line Radiation Monitor - Equipment Deficiency
LER 87-052-00	Reactor Water Cleanup System Isolation When Pressurizing The "B" Filter/Demineralizer (F/D) Due to F/D Inlet Design Deficiency
* LER 88-001-00	Failure of the Liquid and Gaseous Radwaste Discharge Monitors to Pass Functional Tests - Design and Procedure Deficiencies

LER 87-051 describes a reactor scram from 100% power which occurred during surveillance testing. A half scram signal was already present from surveillance tests in progress when the "D" main steam line (MSL) radiation monitor drawer was withdrawn for testing. This drawer contained a faulty cable attachment which created a short to ground voltage spike when the drawer was withdrawn. Since the "C" and "D" MSL radiation monitor drawers share a common ground, this voltage spike caused the "C" channel to initiate a high radiation trip signal which completed the scram logic.

The as-found grounding of the radiation monitor cabinets was compared with the system vendor drawings and discrepancies were identified. After consultation with the instrumentation vendor, it was determined that the as-found configuration of the MSL radiation monitoring grounding is adequate but not optimum. Spurious grounds could cause unwanted partial trip signals but would not prevent the trip function if required. Although the vendor determined that spikes such as the one which caused this scram are not a safety concern, the licensee will evaluate the grounding configuration for possible improvement.

LER 88-01 details a design deficiency with the liquid radwaste discharge monitor which was detected during surveillance testing. The design deficiency was that valves which isolate the liquid radioactive waste discharge line to the cooling tower blowdown line did not shut when a radioactive waste monitor downscale failure was simulated. As corrective action, the licensee completed a design change which added the automatic discharge line isolation feature in response to a downscale failure of the liquid radioactive waste discharge monitor. Additional details of this event are discussed in paragraph 3.2 of this inspection report.

10. Assurance of Quality

During June, 1987, the licensee discovered two discrepancies between the requirements of technical specifications and the plant procedures and equipment in place. These discrepancies are detailed in the following LERs:

87-25 Non-conservative liquid effluent sampling frequency due to inconsistency between technical specification requirements and procedural requirements.

87-26 Technical Specification Violation - MOV thermal overloads installed without bypass capability due to inadequate technical specification and design reviews.

As part of the corrective actions for these discrepancies all departments were directed to review tabular style technical specifications against surveillance procedures to ensure consistency. This review was completed with no additional discrepancies identified.

On January 6, 1988, the licensee identified that an instrument downscale failure isolation function of the liquid radwaste discharge line to the cooling tower blowdown line was not operational and in fact was never included in the system logic. Additional details on this discrepancy were discussed in paragraph 3 of this report. The discovery of this discrepancy indicates that the corrective actions resulting from the previous problems noted above were not fully effective.

11. Exit Interview

The inspectors met with Mr. S. LaBruna and other licensee personnel periodically and at the end of the inspection report to summarize the scope and findings of their inspection activities.

Based on Region I review and discussions with the licensee, it was determined that this report does not contain information considered to be proprietary.

ATTACHMENT 1

STORAGE BATTERY INSPECTION SAMPLE

The following identifies the wet cell battery inspection sample. It may be provided to the licensee for more efficient identification of data relevant to assessing compliance with the current licensing basis.

1. General Battery Information

Document the below information for batteries which carry vital loads.

(1) Qualified, or design, seismic life.

(2) Qualified, or design, electrical life.

(3) Age.

(4) Time in service.

(5) Plans for replacement.

2. Previous Licensee Actions

Identify actions taken on the following IE Information Notices: 83-11, Possible Seismic Vulnerability of Old Lead Storage Batteries; 84-83, Various Battery Problems; 85-74, Station Battery Problems; and 86-37, Degradation of Station Batteries.

3. Seismic Lifetime and Qualification

For batteries supplying vital loads, identify the following information.

(1) Licensee and/or manufacturer's establishment of seismic lifetime. This maybe through documentation allowing verification by competent personnel other than the qualifiers and containing design specifications, the qualification method, results, and justifications (ref: IEEE 535-1986).

(2) Seismic qualification maintenance. Identify how the criteria for assuring that the battery and rack will maintain seismic qualification are defined, available, and used for periodic inspections and cell replacements. Identify the criteria for determination of seismic end of life based upon the in-service condition of the battery.

4. Electrical Sizing and Qualification

For batteries supplying vital loads, identify the following information.

(1) Confirmation that the battery size is sufficient to handle the load profile with a suitable margin.

(2) The means of tracking and control of battery loads such that the batteries and their replacements will have sufficient capacity throughout design life, if worst case electrolyte temperature and other worst case conditions exist when the battery is called upon to perform its design function.

(3) The provisions for consideration of the effect of jumpered out cells upon the ability of a battery to perform under worst case conditions.

5. Battery Ventilation and Protection From Ignition Hazards

For batteries carrying vital loads, identify the following.

(1) The provisions for assuring adequacy battery ventilation during normal operation, outages, charging, and discharge.

(2) Adequacy of checks of battery ventilation flow.

(3) Adequacy of controls over battery ventilation impediments such as enclosing the battery space or its ventilation with plastic sheeting, or any other ventilation obstructions, during outages and other periods.

(4) Adequacy of hydrogen detection equipment and its calibration and use, or of the technical justification for not using such equipment.

(5) Knowledge of the hydrogen hazard on the part of plant management, operating shift management, and personnel who access the battery spaces.

(6) Prohibition of hot work and smoking in battery spaces, including checking the spaces for the residue of such activity.

(7) Assurance that battery cells are secured, with post-to-case and top-to-jar seals tight. Thermometers should not be left in cells after temperatures are measured. Caps on the filler openings should be properly secured when not required to be off. (Cells should be vented only through the flash arrestors.)

(8) The means of assuring proper elimination of water-carrying pipes (e.g., HVAC lines) from battery spaces, especially those which may carry salt water.

(9) The means of positive control over the quality of water added to the batteries to assure that the manufacturer's recommendations or an appropriate licensee standard are met or exceeded.

(10) The assurance of elimination of combustibles, and loose equipment and conductors, from battery spaces.

6. Electrolyte Temperature Control

For batteries supplying vital loads, identify the adequacy of the following.

(1) Avoidance of localized heat sources such as direct sunlight, radiators, steam pipes, and space heaters.

(2) That the location/arrangement provides for no more than a 5F difference in cell temperature, as confirmed by measurements representative of operating conditions. If this is not the case, then the licensee and manufacturer should have identified the consequent impact on expected battery and individual cell capacity and life, and surveillance procedures should reflect the additional allowable temperature variation.

7. Charging

For batteries carrying vital loads, identify the adequacy of the following.

(1) Provision for a freshening charge after more than 3 months of being on open circuit, unless determined by the manufacturer to be unnecessary to assure rated capacity throughout life.

(2) Accomplishment of equalizing charges at 18 month intervals, and when the corrected specified gravity (SG) of an individual cell is more than 10 point (0.010) below the average of all the cells, and when the average corrected SG of all cells drop more than 10 points below the average installation value, and if any cell voltage is below 2.13V. (Specific manufacturer's provisions and assessment may allow the non-performance of some of these recommended charges, or may provide different criteria.)

(3) Control over battery water quality such that specified purify is confirmed before addition, that water added just prior to charging is added only to bring the electrolyte up to the prescribed minimum (to prevent overflow during charging), and that water added after and between charges not bring the level above the prescribed maximum (unless manufacturer's instructions provide for other water addition measures).

(4) That routine float and final end of charge SGs not be taken before 72 hours of float operation after completion of the charge and the last water addition, unless the manufacturer's instructions provided otherwise. (The need is for measurement of representative cell levels and average them.)

(5) Establishment and maintenance of float voltage on accordance with the manufacturer's instructions.

(6) Assurance that single-cell charger use does not violate Class 1E independence from non-class 1E equipment.

8. Performance Tests and Replacement Criteria

For batteries carrying vital loads, identify the following.

(1) Initial acceptance testing which demonstrates the ability of the batteries to meet the manufacturer's rating.

(2) Service testing which demonstrates the ability to carry the load profile with an appropriate margin for worst case conditions, including end of life loss of capacity under the worst case electrolyte temperature.

(3) Accomplishment of a performance test (capacity test discharge) within the first two years of service and at 5 year intervals until signs of degradation are evident or 85% of the qualified service life is reached.

(4) Annual performance testing of batteries which show signs of degradation or which have reached 85% of the qualified service life is reached.

(5) End of electrical life criteria which consider the rapid end of life drop-off in capacity, worst case state of charge during float service, worst case electrolyte temperature, current DC loads, and the time needed to replace the battery while it can still handle worst case conditions.

9. Other Safety-Significant Wet Cell Batteries

For safety-significant wet cell batteries not used for vital loads, show how the maintenance program periodically determines the ability to perform the design function and provides for timely replacement of batteries and for maintaining associated equipment (e.g , chargers).