

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-354/86-12

Docket No. 50-354

License No. CPPR-120

Category B

Licensee: Public Service Electric & Gas Company

80 Park Plaza

Newark, New Jersey 07101

Facility Name: Hope Creek Generating Station, Unit 1

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: February 10-21, 1986

Inspectors: L. E. Briggs
L. Briggs, Lead Reactor Engineer

3/26/86
date

L. E. Briggs
for D. Florek, Lead Reactor Engineer

3/26/86
date

L. Wink
L. Wink, Reactor Engineer

3/26/86
date

Approved by: P. Eselgroth
P. Eselgroth, Chief Test Programs Section

3/26/86
date

Inspection Summary: Inspection on February 10-21, 1986 (Inspection Report No. 50-354/86-12).

Areas Inspected: Routine, unannounced inspection by three region based inspectors of follow-ups of Inspection 50-354/86-10 findings, followup of licensee actions on previous inspection findings, preoperational test results review evaluation, power ascension test program, QA/QC interface with the preoperational test program, preoperational test witnessing, independent verification and plant tours.

Results: No violations were identified.

NOTE: For acronyms not defined refer to NUREG-0544 "Handbook of Acronyms and Initialisms."

DETAILS

1.0 Persons Contacted

Public Service Electric Gas (PSE&G) personnel and contractors

- *V. Blenx, Assistant Project Manager
- B. Butler, Startup Test Engineer
- *J. Carter, Startup Manager
- N. Champion, Lead QA Engineer
- G. Chew, Power Ascension Technical Support
- *D. Cunningham, Atlantic Electric Representative
- *R. Donges, Lead QA Engineer
- *J. Duffy, Site Engineering
- *N. Dyck, Chairman, Response Coordination Team
- M. Farshon, Power Ascension Manager
- *A. Giardino, Manager Station QA
- *W. Goebel, QA Engineer
- *R. Griffith, Principal QA Engineer
- *C. Jaffee, Startup Engineer
- *S. LaBruna, Assistant General Manager
- C. McNeill, Jr., Vice President-Nuclear
- *G. Moulton, Principal QA Engineer
- *R. Salvesen, General Manager, Hope Creek Operations
- R. Schmidt, Senior Reactor Supervisor
- W. Schell, Power Ascension Technical Director
- L. Zull, Lead STD&A Engineer

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- *D. Allsopp, Resident Inspector
- *R. Borchardt, Senior Resident Inspector
- P. Eselgroth, Chief, Test Programs Section, Division of Reactor Safety
- H. Kister, Chief, Project Branch No. 1, Division of Reactor Projects
- *J. Lyash, Resident Inspector

The inspector also contacted other members of the licensee staff including Senior Nuclear Shift Supervisors, reactor operators, test engineers and members of the technical staff.

*denotes those present at the exit interview on February 21, 1986

2.0 Followup on Inspection 50-354/86-10 Findings

During the period February 12-14, 1986, NRC concerns relative to the pre-operational test program deficiencies reported in Inspection 50-354/86-10 were discussed on site with senior licensee management. During this

period, senior licensee management identified corrective actions for these deficiencies which should improve the effectiveness of the licensee's pre-operational test program. These corrective actions, which the licensee is in the process of implementing, are as follows:

- The Test Review Board (TRB) will use checklists to ensure specific review aspects will not be overlooked.
- The TRB will conduct an additional review subsequent to Preoperational Review Committee (PORC) reviewer's comments to ensure that comments have been properly addressed and incorporated prior to final PORC approval.
- The Quality Assurance (QA) Organization will be involved with initial Startup Manager review.
- The QA Organization will increase emphasis concerning procedural quality and compliance during actual conduct of the test.
- Management of each organization involved with preoperational test procedure (PTP) results review will stress the importance of a thorough, quality minded review, instead of schedule demands.
- All parties involved in results review will be advised by memoranda of the specific details of the identified violations and the response provided during the week of February 17, 1986 with emphasis on quality of work and attention to administrative detail.

In addition, corrective actions being taken to correct the identified violations, in particular the functional testing of acoustic monitors and rewitnessing of required mandatory witness points will be reviewed during a subsequent NRC inspection. Also, the effectiveness of the licensee's modified PTP results review program will be evaluated during routine NRC results evaluation review inspections.

3.0 Licensee Actions on Previous Inspection Findings

- (Closed) Circular (354/80-CI-21), this circular deals with the duties and responsibilities of the Senior Reactor Operator (SRO) during refueling operations. This item was also reviewed in inspection report 50-354/86-10. The inspector reviewed SA-AP.ZZ-049 "Conduct of Fuel Handling and Core Alterations," Revision 1 dated February 7, 1986 and verified that the duties and responsibilities of the refueling SRO were specified. This item is closed.

- (Open) Circular (354/77-CI-12), this circular deals with steps and measures to be considered to prevent fuel assemblies from being dropped during refueling. The inspector reviewed letter CB-77-246 dated November 2, 1977, RE-FR.ZZ-001 "Fuel Handling Controls," Revision 2, OP-FT.KE-001 "Functional Test of Refuel Platform" Revision 0, MD-PM.KE-002 "Refuel Platform Crane Preventive Maintenance," Revision 0, MD-PM.KE-003 "Refueling Platform Operational Check" Revision 1, OP-ST-KE-001 "Refuel Interlock Operability Functional Check" Revision 0, and OP-IO.ZZ.009 "Refueling Operations," Revision 0. These procedures were found to satisfy the items in the circular except for the following which the licensee indicated would be satisfied.

The licensee will add steps in the daily log OP-DL.ZZ-026 to conduct shiftwise and daily inspections of selected refueling equipment critical components such as cables, fasteners, hoists and brakes when the equipment is in use. The licensee will revise OP-ST.KE-001 to assure that the interlocks 2, 6, 11 and 16 of FSAR table 7.3-3 are included as part of the interlocks verified to be operable. This item will remain open pending the satisfactory completion of the above.

- (Closed) Circular (354/78-CI-11), Recirculation M-G Set Overspeed Stops. The inspector reviewed the following licensee procedures:
 - TE-SU.BB.352(Q), Recirculation System Maximum Flow Limit Verification,
 - IC-FT.BB-031(Q) and (IC-FT.BB-032(Q)), Reactor Recirculation System - (Channel A, (Channel B) Positioner S001A (S001B) MG Set A(B) Scoop Tube Electrical and Mechanical Stop, and,
 - RE-SO.RJ-006(Q), Verification of NSSS Computer Constants and OD-12 Operation.

The inspector determined that appropriate measures had been taken by the licensee to satisfy the circular's guidance. The inspector discussed setting of the Recirculation MG Set mechanical overspeed stops during scheduled startup testing. The GE representative was familiar with possible MG set loss of speed control problems and the need to maintain low mechanical overspeed stop settings to limit the consequences of such events. This item is closed.

4.0 Preoperational Test Results Evaluation Review

4.1 Scope

The completed test procedures below were reviewed during this inspection to verify that adequate testing had been conducted to satisfy regulatory guidance, licensee commitments and FSAR requirements and to verify that uniform criteria are being applied for evaluation of completed test results in order to assure technical and administrative adequacy.

The inspector reviewed the test results and verified the licensee's evaluation of test results by review of test changes, test exceptions, test deficiencies, "As-Run" copy of test procedures, acceptance criteria, performance verification, recording conduct of test, QC inspection records, restoration of system to normal after test, independent verification of critical steps or parameters, identification of personnel conducting and evaluating test data, and verification that the test results have been approved.

- PTP-SV-1, Remote Shutdown Panel, Revision 0, Results PORC Approved January 31, 1986;
- PTP-GU-1, Filtration, Recirculation and Ventilation System (FRVS), Revision 0, Results PORC Approved January 28, 1986; and
- PTP-SM-2, Nuclear Steam Supply Shutoff and Primary Containment Isolation Systems Equipment Actuation, Revision 0, Results Approved January 28, 1986.

4.2 Discussion

PTP-SV-1

The inspector noted that four test exceptions associated with SV-1, Remote Shutdown Panel, identified that RHR valves BC-HV-F009 and BC-HV-F022 had logic which permitted the valves to open at high pressure and required closure at low pressure. This is the opposite to that required for these valves. They should not be permitted to be open at high pressure. The inspector inquired if previous preoperational "yellow line" testing had failed to discover this error. The inspector reviewed RHR Electrical Schematic Diagrams E-6108-0 Revision 4 and Revision 7 and TPR-BCE-246 and TPR-BCE-118 and verified that testing was performed as required. However, the drawing utilized to perform the "yellow line" test contained the logic error which was properly discovered through the preop test SV-1. No test deficiencies were noted. Open test exceptions are included in the SDR list below.

PTP-SM-2

Sixty six (66) test exceptions were identified of which fifteen (15) remain open. These open test exceptions are included in the SDR listing below with the exception of SDR-SM-0086 which is discussed in the following paragraph.

SDR-SM-0086 involves the failure of the arming collars of the Nuclear Steam Supply Shutoff System (NSSSS) manual initiation pushbuttons (B21H-528A, B, C and D) to function properly. The NSSSS manual initiation pushbuttons were designed to require the rotation of the arming collar to enable the pushbutton. During the preoperational test it was discovered that the pushbutton function was active when the arming collar was in either the armed or disarmed position. The test engineer determined that a Field Change Request (FCR-J50136) had modified these switches to remove a "redundant" wire to the 2B contacts and that this change had inadvertently defeated the function of the arming collar. A new Field Change Request (FCR-J50397) was then issued to return the switches to their original configuration. Since the required rework has the potential for invalidating previous testing of these switches, the adequacy of the NSSS Manual Initiation Pushbuttons to perform their intended function will remain an unresolved item (354/86-12-01) pending rework of the switches per FCR-J50397; retesting of the switches; and NRC review of the scope and results of the retest to insure proper operation of the manual initiation function.

PTP-GU-1

During review of PTP-GU-1 the inspector had several questions concerning performance of this procedure. These questions were discussed with the system test engineer (STE). All questions except one were satisfactorily answered. One question concerned test exception (TE) 55, which stated that fan AV206 tripped on low flow. The inspector questioned how subsequent data, which required the fan to be running, had been taken and dated the same day. The STE informed the inspector that the original sheet of TEs which included TE55 had been lost or damaged such that a new page was written. The new page did not identify the fact that the low flow switch had been disabled to allow the fan to run. The STE noted that similar testing had been conducted on BV206 under exception No. 61. This TE did state that the low flow switch had been disabled, but did not specify the method, to allow testing to continue. During further discussion the inspector asked the method by which the two low flow switches were disabled. The STE, although not positive, thought a lead had been lifted. The inspector noted that modification of the procedure in both cases required a change notice or an on-the-spot (OTS) change and that if leads had been lifted a QA mandatory witness point (MWP) for each low flow switch should have been added to verify system restoration in accordance with Startup Administrative Procedure (SAP) No. 24. SAP-24 is somewhat confusing in the use of TE's since it states that a TE is to be initiated to correct procedure errors, etc. (Paragraph 7.5.2.7.c). SAP-24 also requires an OTS or change notice to be issued to modify the procedure or clear a T.E. The inspector noted that the changes

did not violate the intent of the procedure since proper damper positioning was being tested in both cases. However, Administrative requirements had been circumvented and two MWP's may have been bypassed if leads had been lifted. The inspector considered this to be a further example of the findings identified in Inspection Report 50-354/86-10. However, the inspector also noted that the PORC approval date of January 28, 1986 was prior to the licensee's implementation of corrective action as discussed in Paragraph 2 of this report. The above was discussed in detail with the licensee prior to and during the exit meeting.

This item is unresolved (354/86-12-02) pending QA verification of system restoration and evaluation and resolution of the possibly bypassed MWP's and subsequent NRC review.

4.3 Findings

No violations were identified in the above review. However, several open test exceptions require resolution by the licensee. The inspector routinely assigns an unresolved item number to open test exceptions that are desired to be tracked. The following open test exceptions identified in previous NRC reports along with those open test exceptions identified in the above review are being consolidated into one unresolved item (354/86-12-03). Unresolved item 354/86-10-04 is closed.

<u>Procedure No.</u>	<u>Short Title</u>	<u>SDR No.</u>
PTP-AN-2	Demin. Wtr Storage & Transfer	AN-0039
PTP-PK-1	125 VDC Class IE	PK-0117, 0119 and 0120
PTP-PJ-1	250 VDC Class IE	PJ-0026, 0033 and 0129.
PTP-BC-1	RHR	BC-915, 1042, 1043, 1143, 1144, 1146, 1147, 1148. RL-736, 738.

<u>Procedure No.</u>	<u>Short Title</u>	<u>SDR No.</u>
PTP-SV-1	Remote Shutdown Panel	BB-1011 and 1019; BC-1046, 1080, 1141 and 1142; BD-411, 482 and 496; EG-562, 577, 665 and 666; FC-17; GJ-129, 185 and 195; RL-942, 944 and 950; SV-36, 39, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55 and 57; ZZ-996
PTP-SM-2	NSSS and PCIS Equipment Actuation	AB-0470, BB-1011 and 1019, BG-0367, GS-0459, HB-829, KL-259 RJ-129, SK-113, SM-0096, 0100, 0101, 0102, 0106, 0107, 0108 and 0109
PTP-GU-1	FRVS	GU-528, 529, 558, 574, 576, 572, 530, 575, 573, 577, 574, 568, 556 and 581

5.0 Power Ascension Test Program (PATP)

5.1. References

- Regulatory Guide 1.68, Revision 2, August 1978, "Initial Test Programs for Water-Cooled Nuclear Power Plants"

- ANSI N18.7 - 1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"
- Hope Creek Generating Station (HCGS) Technical Specifications, Proof and Review Copy
- HCGS Final Safety Analysis Report (FSAR), Chapter 14, "Initial Test Program"
- HCGS Safety Evaluation Report, Chapter 14, "Initial Test Program"
- Station Administration Procedure, SA-AP.ZZ-036, Revision 1, "Phase III Startup Test Program"
- Specification NEBO 23A4137, Revision 0, "Hope Creek Startup Test Specification"
- HCGS Power Ascension Test Matrix, Revision 3

5.2 Overall Power Ascension Test Program (PATP)

Discussion

The inspector held discussions with the Power Ascension Test Director and discussed activities that have been utilized to improve the quality of the PATP procedures. The licensee has begun to utilize a Technical Review Board (TRB) concept to assure proper integration of the PATP procedures. The TRB reviews the procedure and holds discussions with the test procedure writer to assure that FSAR commitments and Regulatory Guide commitments are satisfied, that the test procedure is consistent with the GE Test Specification and technical specifications and that it properly interfaces with the station administrative and technical procedures. The inspector witnessed a portion of the TRB review of the Fuel Loading Procedures and observed that the above attributes were being verified by the TRB. The TRB was observed to be quite probing in their questions and appeared to be doing a thorough review.

The licensee representative also discussed the in-process changes being made to the initial criticality procedures to address NRC inspector concerns identified in inspection report 50-354/86-03. The licensee also utilized the TRB to review this procedure. The licensee will have issued a revision to the initial criticality procedure by the next inspection.

5.3 Fuel Channel Adapter Plates

The inspector held discussions with the licensee and contractor personnel and performed field observations of the fuel channel adapter plates on one of the two spare fuel channels. During the discussions, the purpose and analysis of the fuel channel adapter plates were discussed. The licensee also summarized the analysis and testing performed in letter GP-86-40 dated February 13, 1986, at the request of the inspector.

The purpose of the adapter plates is to maintain the bundles vertical in the core due to the use of the C lattice core design and D lattice top guide design. The licensee performed sizing analysis, loose parts analysis, scramability analysis, weld and crevice corrosion testing, and assessment of seismic capability and flow induced vibration. In addition, the fuel channel adapter has been demonstrated operationally at an overseas plant. During fuel inspections at the end of the third cycle, the channels were visually examined with no observed wear or corrosion of the adapter plates.

The licensee response satisfied the inspector and he had no additional questions at this time.

6.0 QA Interface with the Preoperational Test Program

The inspector reviewed several randomly selected Quality Assurance Surveillance Reports (QASR) dealing with the licensee's preoperational test program. The reports were reviewed to verify direct QA/QC monitoring of activities affecting the quality of testing of plant equipment and components. The following QASR's were reviewed.

- QASR-6904, Surveillance of cooling water flow to drywell cooler BP-400, conducted to complete SDR-GT-0254. The QC inspector witnessed proper setting of valve position and desired flow on January 5, 1986.
- QASR-6914, Surveillance of final air balance of Auxiliary Building (Diesel Generator Area) HVAC, completed on January 7, 1986. The QC inspector witnessed various flow measurements performed under Test Package Release (TPR) GMM-0059 which included General Test Instruction (GTI)-25M-ZZ02. No discrepancies were noted by the QC inspector.
- QASR-6915, Surveillance of Part A of PTP.BB-3 (Loss of Power), conducted on January 7, 1986. the QC inspector noted that the B diesel generator trip was listed as TE #3. It was also noted that OTS changes were not also being listed as TE's as required. This surveillance was cleared by a response from the STD Principal Test Engineer on January 10, 1986.

- QASR-6924, Surveillance of PTP-BD-1, RCIC, retest No. 14 conducted on January 7, 1986. Testing was conducted to verify receipt of the RCIC turbine trouble alarm in the control room. No deficiencies were noted.
- QASR-7094, Surveillance of PTP-SA-1, Redundant Reactivity Control System, conducted on January 13, 1986. During this surveillance the QC inspector witnessed 37 mandatory witness points with no discrepancies noted.

6.1 Findings

No unacceptable conditions were noted during the above review.

7.0 Preoperational Test Witnessing

The inspector observed test equipment being connected and setup by the STE in accordance with Detailed Test Procedure (DTP) - SB-0009, Main Steam Line (MSL) High Radiation Trip. This test was being conducted to measure response time of the MSL High Radiation Trip of the Reactor Protection System (PTP-SB-1). Testing was not accomplished during the time of observation due to noise pickup in the test equipment cables.

The test signal needed was in the low picoampere range and very susceptible to low level noise signals. The test engineer seemed knowledgeable of the system and during a subsequent discussion the inspector learned that a different test equipment arrangement would be required to complete the testing.

7.1 Findings

The testing was being conducted in accordance with the procedure. A review of the completed portion of the procedure did not identify any unacceptable conditions.

8.0 Independent verification

During the reviews discussed in paragraphs 4 and 5.4 of this report the inspectors independently verified that testing conducted and analysis performed satisfied the referenced acceptance criteria.

9.0 Plant Tours

The inspector made several tours of various areas of the facility to observe work in progress, housekeeping, cleanliness controls and status of construction and preoperational test activities.

9.1 Findings

No violations were observed.

10.0 Unresolved Items

Unresolved items are matters about which more information is required in order to determine whether they are acceptable, an item of noncompliance or a deviation. Unresolved items identified during this inspection are discussed in Paragraphs 4.2 and 4.3. of this report.

11.0 Exit Interview

At the conclusion of the site inspection on February 21, 1986, an exit interview was conducted with the licensee's senior site representatives (denoted in Section 1). The findings were identified and previous inspection items were discussed.

At no time during this inspection was written material provided to the licensee by the inspector. Based on the NRC Region I review of this report and discussions held with licensee representatives during this inspection, it was determined that this report does not contain information subject to 10 CFR 2.790 restrictions.