

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-354/86-03

Docket No. 50-354

License No. CPPR-120 Priority -- Category C

Licensor: Public Service Electric and 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: January 7-17, 1986

Inspectors:

D. Florek
D. Florek, Lead Reactor Engineer

2/18/86
date

M. Evans
M. Evans, Reactor Engineer

2/18/86
date

L. Wink
L. Wink, Reactor Engineer

2/18/86
date

Approved by:

J. E. Briggs
for P. Eselgroth, Chief, Test Programs Section

3/12/86
date

Inspection Summary: Inspection on January 7-17, 1986 (Inspection Report No. 50-354/86-03)

Areas Inspected: Routine unannounced inspection of the preoperational test program including preoperational test procedure review, test witnessing and test results evaluation; power ascension test program including the overall program and procedure review; licensee actions on previous inspection findings; independent verification and calculation; QA interfaces and tours of the facility. The inspection involved 151 hours onsite by three region based inspectors.

Results: No violations were identified.

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

DETAILS

1. Persons Contacted

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

- *V. Blenx, Assistant Project Manager
- *J. Carter, Startup Manager
- *G. Chew, Power Ascension Technical Support
 - G. Conner, Operations Manager
 - D. Cooler, Onsite Safety Review Engineer
 - R. Donges, Lead QA Engineer
- *J. Duffy, Site Engineering
- *M. Farschon, Power Ascension Manager
 - A. Giardino, Manager Station QA
- *R. Griffith, Principal QA Engineer
- *G. Jaffee, Startup Engineer
- *S. LaBruna, Assistant General Manager
 - M. Metcalf, Principal QA Engineer
 - J. Nichols, Technical Manager
- *R. Salvesen, General Manager
- *W. Schell, Power Ascension Technical Director
- *R. Schmidt, Senior Reactor Supervisor

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

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

*denotes those present at exit interview on January 17, 1986.

2. Licensee Actions on Previous Inspection Findings

(Closed) Circular (354/78-CI-13). This Circular concerns inoperability of service water pumps due to silt accumulation, low water level and ice accumulation. Inspection report 50-354/85-19 reviewed the licensee actions and concluded they were acceptable provided procedures were updated. The inspector reviewed implementing procedures MD-PM-EA-002 "Service Water Intake Bay Silt Survey" dated October 28, 1985 and OP-AB.ZZ-122, "Loss of Service Water Loop", dated July 11, 1985, licensee responses BLP 16557 dated October 9, 1984 and BLP-7304 dated September 22, 1978, and P&ID M 10855-M-09-1 Revision 7 Circulating Water. Based on review of these documents and discussions with licensee representatives this item is closed.

(Closed) Unresolved Item (354/85-30-01), Licensee to remove temporary drain fittings, conduct final drain closure and develop approved administrative controls to prevent unauthorized removal of clean out connection plugs. The inspector determined by review of procedure SA-AP.ZZ-013(Q), "Control of Temporary Modifications", that proper administrative controls exist to prevent unauthorized removal of drain plugs. Temporary drain fitting removal and drain closures are being tracked by OTR-HG-1 to permit inspector verification of the installation as construction is completed. This item is closed.

(Closed) Unresolved Item (354/85-41-02). Surveillance procedure MD-PM.KE-003(Q) for the operation of the refueling platform does not satisfy Technical Specification (TS) requirements nor specify precise tolerances/acceptance criteria. The inspector reviewed Revision 1 of MD-PM.KE-003(Q), "Refueling Platform Operational Checks." Precise tolerances had been added to the procedure in the revision. The TS surveillance requirements appeared to be satisfied by the procedure with the exception of TS Surveillances 4.9.6.2.b and 4.9.6.3.b. The inspector questioned the licensee concerning these surveillance requirements. On the spot change OSC No. P-2 was issued to incorporate the correct TS surveillance requirements into the procedure. This item is closed.

3.1 Preoperational and Detailed Test Procedure Review and Verification

Scope

The Preoperational Test Procedure (PTP) and Detailed Test Procedures (DTP's) listed in Appendix A were reviewed and discussed with the System Test Engineer (STE) in preparation for test witnessing, for technical and administrative adequacy and for verification that testing is planned to adequately satisfy regulatory guidance and licensee commitments. They were also reviewed to verify licensee review and approval, proper format, test objectives, prerequisites, initial conditions, test data recording requirements and system return to normal.

Discussion

-- PTP-SB-2

Response Time Testing is accomplished by means of 14 Detailed Test Procedures (DTP's). The inspector reviewed DTP-SB-0001, DTP-SB-0004, DTP-SB-0005, DTP-SB-0006, DTP-SB-0008, DTP-SB-0009, DTP-SB-0012, DTP-SB-U013, and DTP-SB-0014. (The five remaining DTP's were previously reviewed in Inspection Report No. 50-354/85-62). The inspector compared the DTP's acceptance criteria to the acceptance criteria of GE Preoperational Test Specification 22A2271 AZ, Revision 2. All GE acceptance criteria were included in the procedures reviewed by the inspector.

Findings

No unacceptable conditions were identified within the scope of this review.

3.2 Preoperational Test Witnessing

Scope

Testing witnessed by the inspector included the observations of overall crew performance stated in Paragraph 3.0 of Inspection Report 50-354/85-18.

Portions of the following PTP's and DTP were witnessed:

- PTP-BB-3 (Part A), Standby Diesel Generator Loading, Revision 0.
- PTP-BB-3 (Part B), ECCS Integrated Initiation/Loss of Offsite Power, Revision 0.
- DTP-SB-0013, Main Steam Line Flow Response Time Test, Revision 0.

Discussion

- PTP-BB-3 (Part A)

The inspector observed sections 8.3 and 8.7 of PTP-BB-3 (Part A), Hot Automatic Start and Load Sequencing for Diesel Generators "A" and "D". For Section 8.7, the inspector independently verified the initial positions and the load shedding positions for the equipment listed in Appendix F of PTP-BB-3 (Part A). All testing observed satisfied the criteria above.

- PTP-BB-3 (Part B)

The inspector witnessed section 8.3 of PTP-BB-3 (Part B), LOCA Signal with Simultaneous Loss of Offsite Power. Testing was conducted in accordance with the criteria above with full QA coverage during the portions witnessed by the inspector.

- DTP-SB-0013

Several times during the inspection, the inspector observed the performance of step 6.3, Process Sensor (Transmitter)/Response Time Test. The inspector independently calculated time response ramp rates for Main Steam Line Flow Transmitters B21-N088A and B21-N089D. All testing observed satisfied the criteria above.

Findings

No unacceptable conditions were observed within the scope of this review.

3.3 Preoperational Test Results Evaluation Review

Scope

The completed test procedure listed below was 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-BC-1, Residual Heat Removal, Revision 0 Approved 12/27/85.

Discussion

No unresolved discrepancies or 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 (354/86-03-01). Unresolved items 354/85-18-01 and 354/85-26-01 are 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.

<u>Procedure No.</u>	<u>Short Title</u>	<u>SDR No.</u>
PTP-BC-1	RHR	BC-915, 1042, 1043, 1143, 1144, 1145, 1146, 1147, 1148. RL-736, 738.

4. Power Ascension Test Program (PATP)

4.1 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 Administrative 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 2

4.2 Overall Power Ascension Test Program (PATP)

Scope

The inspector reviewed the following procedures:

SA-AP.ZZ-001 "Preparation and Approval of Station Procedures",
Revision 4

SA-AP-ZZ-002 "Station Organization and Operating Practices,"
Revision 3

SA-AP-ZZ-014 "Station Personnel Qualification and Training",
Revision 1

SA-AP-ZZ-020 "Nonconformance Program", Revision 2

SA-AP-ZZ-032 "Revisions and Changes to Station Procedures",
Revision 2

SA-AP-ZZ-036 "Power Ascension Test Program", Revision 1

The inspector also held discussions with the Power Ascension Technical Director to review the approaches to be taken to assure adequate administration of the power ascension test program.

The inspector verified that administrative measures were established to assure that test procedures are current prior to use, test personnel are knowledgeable, controls exist for test procedure changes, interruption in tests are controlled, proper test coordination, documentation of unusual events and test deficiencies, tests are scheduled, test results are reviewed, test acceptance criteria are defined, retest after test deficiencies and appropriate review.

The inspector also held discussions with the Senior Reactor Supervisor, Onsite Safety Review Engineer and QA personnel to determine their involvement with the power ascension test program.

Discussion

Administrative Program

The licensee administrative program was determined to satisfy the above attributes. The licensee administrative program utilizes features from other recent startup program and also utilizes normal station administrative controls where practicable. The licensee has not yet provided formal detailed administrative training to the startup test engineers and will not do so until a later date, closer to the actual need for this training. This will be reviewed by the inspector in a subsequent inspection.

Reactor Engineering

Based on discussions with the Senior Reactor Supervisor, the planned manning for reactor engineering is one supervisor and three engineers, two of which are currently on staff. Based on these discussions and review of Form SA-AP-ZZ-0141 Verification of Qualification for Position Hope Creek Operation for the Senior Reactor Supervisor, the current positions, including the supervisor, are filled with persons with no practical BWR reactor engineering experience. The supervisor has one year practical

experience at Salem and the other two engineers have experience at research reactors. The inspector questioned the practical experience level of reactor engineering personnel and was informed that the licensee is in the process of hiring a person for reactor engineering who has extensive practical BWR reactor engineering experience. The inspector indicated that lack of practical BWR reactor engineering experience is not consistent with the intent of ANSI/ANS 3.1-1981 "Selection, Qualification and Training of Personnel for Nuclear Power Plants". Pending the hiring of personnel with practical BWR reactor engineering experience and reviewing the duties, background and responsibilities of the individual or individuals who provide this experience, this will be identified as an unresolved item (354/86-03-02).

Onsite Safety Review

Based on discussions with the Onsite Safety Review Engineer, this independent review group plans to conduct independent reviews of several of the power ascension testing activities. Onsite Safety Review plans for Power Ascension Testing dated December 20, 1985 was reviewed. Independent oversight review of testing activities of major integrated tests as well as individual system tests will be performed. No unacceptable conditions were identified.

QA involvement in PATP

Based on discussions with the Manager Station QA Hope Creek and Startup QA Supervisor, review of Nuclear Quality Assurance Department Manual GM-9-1 and GM9-QAP 5-1.1 "Surveillance of Phase III Startup Test Program", Revision 0 dated July 1, 1985, QA has and will be involved in the power ascension testing program (PATP).

QA has reviewed the PATP procedures. Checklists and discussions with principal QA staff reviewers on the scope of the review were found to be acceptable. QA plans to provide coverage on all shifts to conduct surveillance activities on PATP tests. QA is providing practical training to QA staff engineering on fuel loading activities as well as training on the Hope Creek simulator on PATP tests. Completed startup test results will also be reviewed in accordance with the administrative procedure for PATP testing. No unacceptable conditions were noted in the QA plans for PATP activities.

4.3 Startup Test Procedure Review

Procedure Review Scope

The licensee's Power Ascension Test Program (PATP) test procedures of Appendix B were reviewed for their conformance to the requirements and guidelines of the references listed in Section 4.1 and for the following attributes:

- Appropriate management review and approval has been accomplished.
- Appropriate committee review has been accomplished.
- Procedure is in the proper format.
- Test objectives are clearly stated and consistent with the FSAR.
- Appropriate references are listed.
- Appropriate prerequisites and precautions have been included.
- Initial test conditions are specified.
- Acceptance criteria are clearly stated.
- Provisions have been made to identify test equipment utilized.
- Provisions have been made to identify personnel performing the test.
- The procedure is technically adequate and workable.
- Temporary jumpers, installations and lifted leads are properly restored.
- Provisions have been made for recording, evaluating and approving test data.
- Provisions have been made to identify test deficiencies and exceptions and to document their resolutions.

Discussion

Initial Fuel Loading

The inspector reviewed the approved fuel loading test procedures (TE-SU.KE-031, 032 and 033) in detail and verified that they were in substantial conformance with the Regulatory Guide and FSAR commitments and that they would provide a technically adequate basis for safely conducting the initial fuel loading.

Several instances were identified in which the procedures did not fully address the guidance contained in the Regulatory Guide. The inspector discussed these areas with the Power Ascension Group Technical Coordinator and agreement was reached in all areas. The licensee will include the following items in Revision 1 of TE-SU.KE-032 currently in preparation:

- Limits on boron concentration in the reactor vessel and spent fuel storage pool will be established and verified prior to commencing fuel loading.
- Explicit criteria will be established for the initiation of emergency boration and containment evacuation.
- Expanded guidance will be provided on appropriate actions if the I/M plots indicate criticality will be achieved prior to the completion of the next fuel loading increment.
- Signoffs will be provided to explicitly verify that the minimum fuel loading crew is available and that technical specification requirements for Operational Condition 5 are satisfied.

The inspector will review the revised procedures during a subsequent routine inspection to ensure that these items have been incorporated.

Initial Criticality/Full Core Shutdown Margin Demonstration

The inspector reviewed the approved startup test procedure, TE-SU.ZZ-041, Full Core Shutdown Margin Demonstration in detail. This procedure encompasses initial criticality and demonstrates conformance to the technical specification limits for shutdown margin and reactivity anomalies. The inspector determined that the procedure did not totally meet the standards established in the Regulatory Guide and ANSI Standard and would not ensure that the initial approach to criticality is conducted in a deliberate and orderly manner.

The following deficiencies were identified:

1. Prerequisite/initial conditions did not specify initial plant status (operational condition per Technical Specification definitions), did not completely address conformance to technical specifications and did not completely specify the required status of the reactor protection system and emergency shutdown system.
2. A prediction of control rod positions at criticality was not made.

3. Precautions and limitations did not identify the additional protective features provided by removal of the "Shorting Links", did not identify the reduced setpoints in the SRM circuitry, did not identify operator actions on high startup rate/short period and did not place limits on control rod withdrawal if criticality is not achieved within predetermined limits.
4. The method used to assess conformance with the acceptance criterion for reactivity anomalies was not technically correct.

The inspector met with the Power Ascension Manager, the Power Ascension Technical Director, the plant Technical Engineer and the Reactor Engineer to discuss the identified deficiencies. The licensee agreed to revise TE-SU.ZZ-041 to insure that the deficiencies identified above are corrected and that conformance with the Regulatory Guide and ANSI standard is achieved.

At the exit meeting on January 17, 1986 the inspector informed the licensee that the above problems are considered an unresolved item. However, in a telephone conversation on February 24, 1986 the NRC informed the licensee that the above items are contrary to 10 CFR 50 Appendix B Criterion XI and are being considered a violation (354/86-03-03). 10 CFR 50 Appendix B Criterion requires in part that "test procedures incorporate requirements and acceptance limits contained in applicable design documents and assure that all prerequisites for the test have been met." Regulatory Guide 1.68 "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 2 which is endorsed by the licensee's FSAR, indicates in Appendix C that for initial criticality procedures, "a critical control rod position should be predicted for anomaly determination, all systems should be aligned and in proper operation, and that technical specification requirements must be met" and generally applicable for all test procedures "that special precautions needed to ensure a reliable test should be highlighted and clearly described in the test procedure." The startup test procedure TE-SU.ZZ-041 did not satisfy these requirements.

In a subsequent inspection (50-354/86-12) the inspector observed portions of licensee actions to correct the above problems and to preclude reoccurrence by use of a Technical Review Board to provide an additional in-depth review of startup test procedures.

Control Rod Drive System

The inspector reviewed in detail the six startup test procedures (BF-series) which encompass the planned testing of the control rod drive system. The inspector verified that these tests were in conformance with the Regulatory Guide and FSAR commitments and that sufficient testing was planned to insure system operability over the full range of operating conditions.

The inspector had several questions on these procedures. During discussions with the Power Ascension Group Technical Coordinator, the questions were adequately addressed. The licensee agreed to revise the procedure to assure that the four rods selected for monitoring during planned scrams of the PATP utilize all the previous rod testing performed up through rated pressure testing to select the four rods. This will be reviewed in a subsequent inspection.

Neutron Monitoring System

The inspector reviewed in detail three startup test procedures (SE-series) which will be used in conjunction with the initial criticality to demonstrate operability of the neutron monitoring system (source and intermediate ranges). The inspector verified that these tests were in conformance with the Regulatory Guide and FSAR commitments.

The inspector had several minor questions on these procedures which were adequately addressed during discussions with the Power Ascension Group Technical Coordinator. The inspector noted that due to a reduced SRM rod block setpoint during the initial criticality the possibility existed for misinterpretation of the acceptance criteria in TE-SU.SE-101, SRM/IRM Overlap. The Technical Coordinator acknowledged this possibility and indicated that this would be clarified in Revision 1 to the procedure which was in process.

Findings

Within the scope of this inspection, one violation was identified.

5.0 Independent Verification and Calculations

The inspector performed the independent calculations and independently verified equipment positions as discussed in Paragraph 3.2.

Findings

No violations were identified.

6.0 QA Interfaces

The inspector reviewed QA involvement in the Power Ascension Test Program as described in section 4.2 and observed QA coverage of preoperational tests as described in section 3.2.

Findings

No unacceptable conditions were noted.

7.0 Plant Tours

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

Findings

No unacceptable conditions were observed.

8.0 Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance or deviations. Unresolved items disclosed during the inspection are discussed in Sections 3.3 and 4.2.

9.0 Exit Interview

At the conclusion of the site inspection on January 17, 1986, an exit meeting was conducted with the licensee's senior site representatives (denoted in paragraph 1). The findings were identified and discussed. At no time during this inspection did the inspector provide written inspection findings to the licensee. The licensee did not identify that any proprietary information was contained in the scope of this inspection.

ATTACHMENT A

PTP-SB-2, Response Time Testing, Revision 0.

DTP-SB-0001, Recirculation Pump Trip Breaker Interrupt Time, Revision 0.

DTP-SB-0004, RRCS (ATWS) Recirculation Pump Breaker Response Time Test, Revision 0.

DTP-SB-0005, Main Steam Line Pressure Low Response Time Test, Revision 0.

DTP-SB-0006, Drywell High Pressure Scram Response Time Test, Revision 0.

DTP-SB-0008, Reactor Vessel High Steam Dome Pressure Scram, Revision 0.

DTP-SB-0009, Main Steam Log Rad Monitors/RPS Trip Logic Response Time, Revision 0.

DTP-SB-0012, RPS/Average Power Range Monitor Response Time, Revision 0.

DTP-SB-0013, Main Steam Line Flow Response Time Test, Revision 0.

DTP-SB-0014, Main Steam Reactor Level Response Time Test, Revision 0.

ATTACHMENT B

Startup Test Procedures

- TE-SU.KE-031, Fuel Loading Preparation, Revision 0.
- TE-SU.KE-032, Fuel Loading, Revision 0.
- TE-SU.KE-033, Full Core Verification, Revision 0.
- TE-SU.ZZ-041, Full Core Shutdown Margin Demonstration, Revision 0.
- TE-SU.BF-051, CRD Functional Tests, Revision 0.
- TE-SU.BF-052, Scram Testing of Selected Rods, Revision 0.
- TE-SU.BF-053, CRD Friction and Scram Tests, Revision 0.
- TE-SU.BF-054, Scram Tests During Planned Scrams, Revision 0.
- TE-SU.BF-055, CRD Friction and Scram Tests at Rated Pressure, Revision 0.
- TE-SU.BF-056, CRD Functional Checks and Scram Tests, Revision 0.
- TE-SU.SE-061, SRM S/N Ratio and Minimum Count Rate Determination, Revision 0.
- TE-SU.SE-062, SRM Response to Rod Withdrawal, Revision 0.
- TE-SU.SE-101, SRM/IRM Overlap, Revision 0.