U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket/Report No.: 50-443/89-21 License No.: NPF-67

Licensee: Public Service Company of New Hampshire
1000 Elm Street
Manchester, N.H. 03105

Facility: Seabrook Station, Unit No. 1, Seabrook, New Hampshire

Dates: December 11, 1989 - January 5, 1990

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Approved By: Ebe C. McCabe, Jr. 1/9/90
Ebe C. McCabe, Chief, Reactor Projects Section 3B Date

Areas Inspected: Corrective Action Plan Items, a TMI Action Plan Item, an allegation, NRC Open Items, and security issues.

Results: Corrective Action Plan implementation was found to be appropriate. NUREG 0737, Item II.B.2 was found to be adequately addressed. The allegation was found to be without substance. Two violations were closed. Security compensatory measures were found to be properly implemented.

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DETAILS

1.0 Summary

This inspection addressed issues raised in Confirmatory Action Letter 89-11. It also reviewed other issues related to readiness for safe full power operation. The inspection included review of documentation, observation of work in-progress, observation of training, and interviews. Corrective Action Plan status (Section 2), TMI Action Plan status (Section 3), allegations (Section 4), previously issued NRC violations (Section 5), and Site Security (Section 6) were inspected.

2.0 Confirmatory Action Letter Issues (92701)

In response to the problems associated with the June 22, 1989 Natural Circulation Test, NRC Region I issued Confirmatory Action Letter 89-11. Subsequently, New Hampshire Yankee (NHY) developed a Corrective Action Plan (CAP) addressing 55 specific points. The following paragraphs discuss NRC inspection of items from the CAP, using their corresponding alpha-numeric designations (e.g., 1.A-11).

a. CAP Item 1.B-9: Expand the MODE change checklist process to allow it to be used to perform the pre-test checklist for major system testing and integrated system testing.

Station Management Manual, SM 8.1, "Power Ascension Test Program," Form SM 8.1G, "Verification of Plant Material Condition," and Form SM 8.1H, "Outstanding Activity List," have been added to test procedures requiring "Specific Crew" training. A prerequisite for these procedures will be to complete these forms, which are essentially the same as those for mode changes. Each manager of major support organizations must review outstanding items and identify those which may affect test performance. Activities identified are tracked on Form SM 8.1G and must be closed prior to test performance.

A second prerequisite for test procedures requiring "Specific Crew" training requires the Test Director and the Shift Superintendent to verify that no open work requests on the systems/components identified on the System Readiness List will affect the performance or results of the test. The administrative control for the System Readiness List is presently in draft form.

The inspector reviewed Startup Test procedures and verified that the prerequisites required system readiness reviews. Test procedures, which did not require "Specific Crew" training, were also found to contain operability prerequisites for specific equipment required for test performance. The inspector found the action taken by the licensee to determine readiness of plant equipment, prior to power ascension testing, to be adequate.

This item is closed.

b. CAP Item 1.C-2: Revise the Startup Test Program to require a more comprehensive pre-test briefing prior to a test crew going on shift to ensure that the crew understands the test criteria, expected parameters, and required actions.

Station Management Manual SM 8.1, "Power Ascension Test Program," section 4.2.2 requires a pre-test briefing for all oncoming test and operations personnel prior to the oncoming crew assuming the shift. The briefing is to be conducted by the Test Director using the Pre-test Briefing Document. The Pretest Briefing Document is required to be written and submitted for SORC approval with the test procedure. Pretest Briefing Document Guidelines are provided in SM 8.1, Figure 5.3.

The licensee has improved the training on conducting pre-test briefings by including pre-test briefings by the Test Directors as part of the simulator training. The briefings are then evaluated as is the rest of the training on the simulator.

The inspector reviewed SM 8.1 with regard to pretest briefing requirements and observed briefings being conducted as part of simulator training. The inspector concluded that the licensee has taken appropriate steps to assure quality pre-test briefings during the Power Ascension Program.

This item is closed.

c. CAP Item 1.C-3: Revise the Startup Test Program to require that additional preparation, including simulator rehearsals when feasible, be given to test crews assigned to perform complex tests.

See Detail 2.d write-up on CAP Item 1.C-4 below.

This item is closed.

d. CAP Item 1.C-4: Revise the Power Ascension Test Program to require that test specific training be conducted within three months of the conduct of the test.

Station Management Manual SM 8.1, "Power Ascension Test Program," section 4.4, "Training for Power Ascension Tests," describes training requirements for each power ascension test procedure. Licensed Operators and Test Personnel receive one week of training on power ascension test procedures. SM 8.1 specifies that this training shall be conducted no more than three months prior to test performance. Control of personnel training qualifications and records for power ascension tests are to be controlled in ST-1, "Startup Program Administration." Supplementary additional test specific training is to be provided, prior to test conduct, to individuals performing the more complex power ascension tests.

The inspector reviewed the administrative changes made to the Power Ascension Test Program and found the changes enhance the training provided to the power ascension test personnel and to the licensed operators. Providing additional simulator training within three months of test conduct is satisfactorily controlled by the procedures and is presently being accomplished.

This item is closed.

e. CAP Item 1.D-1: Review the Startup Test Program and remaining start-up Test Procedures and revise as appropriate to incorporate the guidance in the Station Management Manual and other applicable NHY manuals, and to ensure that the test procedure format and guidance are consistent with current Station Operating Procedure guidance.

The licensee has updated the Startup Test Program and Startup Test Procedures to incorporate guidance in Station Management Manual. NRC sampling checks found the test procedure format and guidance consistent with Station Operating Procedure guidance.

The format of the test procedures reviewed was in accordance with Station Operating Procedure SM 6.2, Revision 9, which provides the standards for preparing, reviewing and approving station operating and special procedures.

Power Ascension Test Program (PATP) procedure SM 8.1, Revision 0, contains guidance to ensure that test procedures are consistent with station operating procedures. SM8.1 requires that test procedures for power ascension be reviewed and revised in accordance with procedure SM 6.2.

The inspector (1) concluded that the licensee guidance provided in Procedures SM 8.1 and SM 6.2 was acceptable and (2) reviewed several power ascension test procedures and found that they were in accordance with SM 6.2.

This item is closed.

f. CAP Item 1.D-4: Revise the Startup Test Procedures which will be used for power ascension and similar testing to make them part of the Station Operating Procedure System.

See Detail 2.e write-up on CAP Item 1.D-1 above.

This item is closed.

g. CAP Item 1.D-5: Establish a new Power Ascension Test organization which that will work closely with Operations and which has clearly defined responsibilities specifying who is responsible for all aspects of the Power Ascension Test Program.

The licensee has established a new Power Ascension Test Organization. Station Procedure SM 8.1, revision 0, was issued to outline the administration of the power Ascension Test Program. The inspector reviewed SM 8.1 and found that it adequately outlines the responsibilities of the personnel involved with the PATP. The procedure provides directions on the Program's interface with operations and other departments within the station. SM 8.1 explains the organizational setup of the PATP and the responsibilities of the various groups and members of the organization. It also outlines the proper methods of conducting tests, reviewing test results, training personnel for test performance, and writing test procedures. The inspector witnessed implementation of the PATP procedure regarding personnel training. Ongoing simulator training of test personnel was observed. This training involved the Program's management, Operations and Quality Control departments, and PATP test directors.

This item is closed.

h. CAP Item 1.D-8: Review the Power Ascension Test Program to ensure that the Power Ascension Test Program Manager provides frequent briefings to the Executive Director - Nuclear Production, Station Manager and Operations Manager on program status and upcoming evolutions to ensure management involvement.

The Power Ascension Test Program ensures that the PATP Manager provides frequent briefings to the Executive Director - Nuclear production, Station Manager and Operations Manager on program status and upcoming evolutions to ensure management involvement in the power ascension program. Related instructions are provided in PATP Procedure SM 8.1, Revision 0. Section 4.1.1 of the procedure describes the responsibilities of the program Manager and also specifies that the Manager will provide frequent briefings to associated personnel. The inspector reviewed program Procedure SM 8.1 and found that it adequately provides for keeping the licensee's upper management abreast of program situations.

This item is closed.

i. CAP Item 1.D-10: Perform a safety evaluation of the Power Ascension Test Program procedures to verify that the conduct of the tests within the test parameters will not involve an unreviewed safety question.

To further assure that testing within the test parameters during the power Ascension Test Program will not involve an unreviewed safety question, the licensee is having Yankee Nuclear Services Division (YNSD) perform independent engineering reviews of all Power Ascension test procedures. After performing these reviews, YNSD transmits engineering evaluations to the Station. The purpose of the reviews is to ensure that the procedures' test objectives will be achieved

and that Regulatory Guide 1.68 and the commitments of the FSAR will be met. This review also evaluates the potential for unplanned trips or ESFAS actuation. The 10 CFR 50.59 applicability determination developed by the station is also reviewed for concurrence or improvement. YNSD then makes recommendations for improvements in the procedures, if any are deemed necessary. These YNSD comments are reviewed and discussed at the station and incorporated into the procedures prior to Station Operations Review Committee (SORC) approval. If a procedure has already been SORC approved, the procedure is revised (per Procedure SM 6.2) to incorporate YNPD's comments and taken through the SORC process again.

The inspector reviewed the engineering evaluations of ST-22 (Natural Circulation Test) and ST-24 (Automatic Reactor Control). These evaluations showed an in-depth technical review by YNSD. This additional and independent review and evaluation increases the assurance that testing within test parameters will not involve an unreviewed safety question.

This item is closed.

j. CAP Item 2.A-7: Revise the Post-Trip Review Procedure and the Event Evaluation Procedure to require that the Human Performance Evaluation System be utilized in the ultimate evaluation and resolution of unplanned reactor trips.

The licensee has made changes to the Post-Trip Review Procedure and to the Event Evaluation Procedure to include Human Performance Evaluation into the procedures.

The Human Performance and Evaluation System Coordinator is notified any time there is a Reactor Trip or ESF actuation. Post-Trip Review Procedure Step 7.4.1a requires human performance issues to be addressed prior to authorizing restart. The Event Evaluation and Reduction Program has been expanded to require an event evaluation and preliminary recommendations to be made prior to restart after trips which occur during the Power Ascension Program.

The inspector reviewed the changes made to assure human factors issues are addressed following reactor trips and found the action taken to be adequate.

This item is closed.

k. CAP Item 2.B-1: Issue letters of reprimand to the Operations chain of command management personnel who were present in the Control Room during the Natural Circulation Test, the personnel who were spoken to

by the NRC inspectors regarding the 17% pressurizer level trip criterion during the test, and the onshift operators and startup engineers who had the authority and responsibility to prevent the procedure violation.

The inspector reviewed eight letters of reprimand which were issued. All were dated July 11 or July 12, 1989. Each letter was signed by the appropriate manager and discussed the appropriateness of the reprimand action and the specific bases for the conclusion that the reprimand was necessary. Also discussed in the letters were expectations for improvement in each individual's future performance. The inspector interviewed licensee personnel and received confirmation that the letters were officially placed in the individual personnel files.

This item is closed.

l. CAP Item 2.B-4: Establish management personnel policy and briefing that focuses on the obligation to be cognizant of safety and operational limits associated with operations and test activities observed in the Control Room.

A memorandum was issued November 10, 1989 by the Executive Director - Nuclear Production promulgating the policy regarding performance of New Hampshire Yankee Line Management when they visit the Control Room. Managers in the Operations chain of command are encouraged to spend time in the plant and the Control Room. When in the "horseshoe area" of the Control Room, it is their responsibility to be knowledgeable of safety and operational limits of evolutions in progress in order to provide appropriate guidance and direction to the operating crew if required. In those cases where it is not possible for them to become familiar with a special evolution prior to entering the "horseshoe area," they are required to inform the Unit shift Supervisor (USS) or Shift Superintendent (SS) that they are there as an observer. When outside the "horseshoe area" they are understood to be acting as observers only, unless they inform the USS or SS otherwise. All line managers were briefed regarding this policy when it was implemented. This policy, which was found acceptable during this inspection, is to be included in the next revision of the Production Management Manual.

This item is closed.

m. CAP Item 2.B-5: Conduct operating philosophy and event analysis seminars for production management and licensed personnel.

The inspector observed an event analysis seminar on December 15, 1989. The seminar was led by the Executive Director - Nuclear Production. Participants were an operating crew consisting of licensed operators, startup personnel, and system engineers. The seminar reviewed two case studies of events at licensed reactors: the 1985 loss

of feedwater at Davis-Besse and the Natural Circulation Test at Seabrook. The crew review of the sequence of events in both cases pointed out problems and their probable causes. It was reiterated several times that the purpose of these case studies was to identify problems and possible solutions, not to lay blame. The session concluded with a discussion of the procedural compliance policy and effectiveness of the training being performed, whether or not it addressed identified problems from the June 22 event. NRC review concluded that such seminars provide valid training which met NHY CAP commitments and was acceptable.

This item is closed.

n. CAP Item 2.B-6: Rotate additional station operations managers through the INPO Senior Plant Management Course.

New Hampshire Yankee (NHY) plans to send one additional person to the National Academy for Nuclear Training course titled Senior Nuclear Plant Management Course to be conducted in 1990. By the same letter, NHY requested slots be allocated for 2 more Seabrook management personnel in future courses. NRC review concluded that this planning acceptably fulfilled the NHY CAP commitment and was acceptable.

This item is closed.

3.0 TMI Action Plan Requirements (2515/65)

NUREG 0737, "Clarification of TMI Action Plan Requirements," forwarded the post-TMI requirements which had been approved for implementation by the Commission to operating power reactor licensees and applicants for operating licenses. During the inspection period the inspector reviewed the New Hampshire Yankee (NHY) response to the requirements of Clarification Item II.B.2, "Design Review of Plant Shielding and Environmental Qualification of Equipment for Spaces/Systems Which May Be Used in Post Accident Operations." This item required licensees to perform a radiation and shielding design review of the spaces around systems that may, as a result of an accident, contain highly radioactive materials, and to provide for adequate access to vital areas and protection of safety equipment during post accident operation of these systems.

The inspector initially discussed the matter with the NHY Health Physics Department supervisor and was informed that the required radiation and shielding review had been performed and was documented in the "Seabrook Station Post-Accident Dose Engineering Manual." A copy of the manual was provided to the inspector, and upon review, it was determined that the manual addressed the majority of the requirements stated in Item II.B.2. The manual describes the post-accident radiation environment for Seabrook Station, including accident dose rate zone maps and post-accident dose rates and time-integrated doses for various pipe/equipment configurations. Also contained in the manual are several chapters describing the methodology and bases used to generate these zone maps and dose tables. Through

discussions with the Health Physics supervisor and inspection of the "Post-Accident Dose Engineering Manual," the inspector determined that the guidelines provided in NUREG 0737, Item II.B.2, had been used by NHY in their post-accident radiation and shielding reviews. All required source terms, vital areas, systems, and dose rate criteria were found to be properly addressed by the licensee. The one area required by Item II.B.2 to be reviewed but not addressed by the "Post-Accident Dose Engineering Manual" is radiation qualification of safety-related equipment. To ensure that this area had been addressed, the inspector interviewed the NHY Equipment Qualification (EQ) Program supervisor and was provided access to the licensee EQ files and reports. Through inspection of Qualification Evaluation Worksheets and qualification reports of equipment important to safety, the inspector determined that the proper source terms had been considered and that all required safety-related equipment had been qualified per Item II.B.2.

Through discussions with NHY personnel and through inspection of licensee documentation, the inspector concluded that all requirements of NUREG 0737, Item II.B.2, had been met by the licensee. This item is closed.

4.0 Allegation RI-89-A-0146 on Procedure Inadequacies (71707)

The NRC Region I office received an allegation in the beginning of the inspection period concerning procedure inaccuracies at Seabrook Station. Specifically, the alleger stated that a breakdown in the accuracy of procedures had occurred during the transition from the use of symbols in procedures to the strict use of text. The alleger also stated that procedures lacked complete information such as leaving procedure cross-references blank, and specified two procedures that did so.

Inspector follow-up found that the procedure numbers provided by the alleger did not exist at Seabrook. Procedure numbering at the site is different than that referred to by the alleger. The inspector reviewed certain procedures whose numerical designations resembled those specified by the alleger, but no deficiencies of the type alleged were identified.

Beginning in early 1986, operating procedures at Seabrook have been inspected in accordance with the NRC manual chapter governing inspection of operating reactors. Initial review had questioned some procedure aspects (e.g., reference usage), but overall procedure adequacy has not been a concern. To address NRC concerns, NHY established a continuing Procedure Consistency Review Program in 1986. NRC inspection of procedures, including procedural consistency and overall quality, have since identified acceptable corrective actions, no unresolved safety concerns, and overall acceptability of station procedures.

To further assess whether problems exist in this area, the inspector reviewed a sampling of operating, maintenance, chemistry and radiological control, and emergency operating procedures. The inspector identified no problems described by the alleger. Two typographical errors with no

safety significance were found. The procedures reviewed were adequately written. As additional follow-up, the inspecto: discussed the matter with the NHY Production Services Manager (who supervises the Records Management Department), the reactor engineer who had supervised the Procedure Consistency Review Program over the past three years, several operating crew Shift Superintendents, and the Assistant Operations Department Manager. The inspector determined that the Operations Department was the only department on site that had a dedicated effort to convert symbols to text in their procedures, and that neither the Procedure Consistency Review Program, the operating crews, nor operations management had identified any problems with the conversion process. The personnel interviewed by the inspector cited one typographical error that had been identified and corrected by the normal, in-place procedure review process and, in addition, explained that the "greater than" and "less than" symbology had been removed from Emergency Operating Procedure E.0, Attachment 1, in order to avoid any misunderstanding by the operators who use that procedure. Both of these corrections/changes to procedures were licensee-identified and accomplished months prior to the submission of the allegation. The inspector found the interviewed personnel aware of and familiar with the guidelines and rules for procedure writing and correction as delineated in station administrative procedures OP-11.2, "Operating Procedures Writer's Guide," and SM-6.2, "Station Operating Procedures."

The inspector reviewed various station procedures and discussed the issues of symbol-to-text conversion and incomplete information in station procedures with licensee personnel in light of the received allegation. That effort identified no deficiency described by the alleger. This allegation was unsubstantiated.

5.0 Licensee Action on Previous NRC Open Items (92702)

a. (Closed) Violation (89-82-01), Failure to Follow Startup Test Procedures. New Hampshire Yankee (NHY) undertook a number of actions to address this violation. These actions are described in, and were implemented as part of, the Corrective Action Plan. Actions taken in response to this violation included shift meetings to review the procedure compliance policy, issuance of a memorandum by the NHY President to all Seabrook site staff re-emphasizing the requirement to follow procedures, revising the Startup Test Program Description to include it in the Power Ascension Test Program, and strengthening its requirements for equipment status verification and pre-test briefings, replacement of the Startup Test Department with a Power Ascension Test Program organization that has more clearly defined and documented interfaces with the Operations department, revising the remaining Startup Test Procedures to include the changes implemented in the programs and to provide additional guidance on terminating tests and exiting test procedures, and providing crew training on PATP test procedures in the simulator. CAL 89-11 is being separately processed for closure and, upon completion of that action, this violation is also closed.

b. (Closed) Violation (89-82-02), Inadequate Corrective Action, Natural Circulation Test. Actions taken by NHY to address this violation included including the Startup Test Program in the Power Ascension Test Program with strengthened requirements for comprehensive pre-test briefings; additional guidance on terminating tests and exiting test procedures; simulator training of operating crews on test procedures; more clearly defined authority, responsibility, and interfaces for operations and testing personnel; relieving the Vice President - Nuclear Production and replacing him with an Executive Director - Nuclear Production; requiring Event Evaluation Reports to be complete prior to recommending restart if a reactor trip occurs during testing; and making the human performance evaluation system a part of the post-trip review. CAL 89-11 is being separately processed for closure and, upon completion of that action, this violation is also closed.

c. (Open) Unresolved Item (89-07-01), Emergency Feedwater Pump Turbine (EFWPT) Control Valve Leakage. NHY has taken the following actions in order to resolve the problem of steam leaking through the EFWPT control valves and causing cycling of the downstream check valves:

Engineering evaluation 89-021 has been performed to determine the effects of leakage past the steam supply control valves.

The steam supply control valves were replaced under Design Change Request (DCR) 89-041. The replacement valves were designed and manufactured to the codes and standards applicable to the original valves. The differences in style are to provide improved reliability and reduce maintenance. The replacement valves are considered by NHY to be better suited to operate under the anticipated system conditions.

A drain trap has been installed on each steam supply header between the isolation valve (MS-V-393/394) and the downstream check valve (MS-94/96) to help prevent check valve cycling (the MS-V-393/394 replacement valves were ordered to the lowest achievable seat leakage criteria, but an absolutely steam tight condition is not expected). Each steam trap arrangement includes a normally open maintenance isolation valve, a flow restricting orifice, and a 'Bestobell' steam trap.

Check valves 94 and 96 were disassembled and inspected for damage. Valve 94 was found to be damaged and was refurbished. Valve 96 was found to be excessively degraded and was cut out and replaced. Post-maintenance testing is to be performed under Special Test STP-121, "Turbine Driven Emergency Feedwater Pump Start Verification Test."

The inspector reviewed the response to the unresolved item, the Engineering Evaluation, the DCR, and the work requests used to refurbish/replace the check valves. Discussions were also held with personnel

in the NHY Engineering organization. The inspector conducted an independent walkdown of the installed drain/trap arrangement and the new steam supply control valves. This item remains open pending completion of the testing under STP-121.

d. (Open) Unresolved Item (89-07-02), RHR Check Valves RH-15, 29, 30, and 31 Leakage. The following corrective actions have been taken regarding the resolution of the RHR Check Valve leakage problem:

A "Request for Engineering Services" (RES) was issued and NHY consulted the check valve supplier.

All four check valves were disassembled and refurbished. The valve seats were lapped and proper seating was verified using the "Blue Dye Testing" method.

NHY reviewed pressure isolation valves in other systems connected to the Reactor Coolant System to determine if similar seat leakage conditions could be encountered.

NHY has committed to performing post-maintenance testing on these valves by subjecting them to the same conditions under which the leakage had originally occurred (low differential pressure).

The inspector reviewed the Engineering Evaluation (89-025) and discussed its contents with members of the station engineering group. The work documents used for refurbishing the leaking valves were reviewed to determine what work was performed, and what post-work testing is appropriate. In addition to the required seat leakage and In-Service tests, NHY plans to perform a leak rate test under conditions duplicating those which originally resulted in the leakage problem (low differential pressure). This item remains open pending successful completion of post-maintenance testing.

6.0 Security (81052)

Short term compensatory measures and long-term upgrades of the plant security barriers have been reviewed by regional security specialists in NRC Region I Inspection Report 50-443/89-13.

The inspector verified that the short term compensatory actions to which NHY committed were in place and that additional compensatory actions were planned if a full power license is issued, and had no further questions.