U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 85-03

Docket No. 50-423

License No. CPPR-113 Priority - Category B

Licensee: Northeast Nuclear Energy Company

P. O. Box 270

Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Power Station, Unit 3

Inspection At: Waterford, Connecticut

Inspection Conducted: January 21 - 25, 1985

Inspectors: H. H. Nicholas — 3/12/85
H. H. Nicholas, Lead Reactor Engineer — date

H. F. VanKessel — 3/13/85
H. F. VanKessel, Reactor Engineer — date

Approved by: L. H. Bettenhausen — 3/21/85
L. H. Bettenhausen, Chief Test Program Section, DRS — date

Inspection Summary: Inspection on January 21 - 25, 1985 (Inspection No. 50-423/85-03)

Areas Inspected: Routine, unannounced inspection of the preoperational test program including preoperational test program requirements and implementation, test procedure reviews, test results evaluation, test witnessing, auxiliary boiler status, quality assurance and quality control, and tours of the facility. The inspection involved 70 hours on site by two NRC region-based inspectors.

Results: No items of noncompliance were identified.

Details

1. Persons Contacted

Northeast Nuclear Energy Company (NNECO)

*C. H. Clement, Maintenance Supervisor
J. Harris, Startup Supervisor
M. Hess, Assistant Startup Supervisor

Northeast Utilities Service Company (NUSCO)

*D. A. Blumenthal, QA Engineer
*J. Festa, Milestone Director
*K. W. Gray, Jr, Staff Assistant
M. Gentry, Assistant Startup Supervisor (aux.)
*E. J. LaLware, QA Engineer
T. Lyons, Milestone Director
D. Miller, Startup Manager
*V. Papadopoli, Supervisor CQA
*J. A. Rhodes, Milestone Director

Stone and Webster Engineering Corporation (SWEC)

*J. A. Capozzoli, Jr, Supervisor of Construction Services
*K. Kirkman, Assistant Superintendent Construction Services
*W. M. Matejek, Project Advisory Engineer
*P. Reilly, APE
*R. J. Rudis, Engineering Assurance Program Manager
*R. J. Scannell, Quality Assurance Program Administrator
*W. H. Vos, Senior Engineer Field Quality Control

U. S. Nuclear Regulatory Commission

*T. Rebelowski, Senior Resident Engineer
*Present in exit meeting held January 15, 1985

*denotes those present at exit interview on January 25, 1985

2.0 Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item 423/83-20-02: Establish a Preoperational Test Surveillance Program.

The inspector verified the establishment of a preoperational test surveillance program through discussions with the quality assurance manager, review of the Startup Manual (Rev. 3), review of section 3.2.13 entitled "NUSCO Construction QA and NNECO QA/QC", and review of a (random sample) of approved (and closed) Surveillance Reports covering the areas of phase 1 and 2 testing, calibration of instruments, equipment storage,

maintenance and other areas related to startup testing. The inspector had no further questions concerning the Preoperational Test Surveillance Program. This item is closed.

3. Preoperational Test Program

References

(1) MNPS Unit 3 Final Safety Analysis Report

(2) MNPS Unit 3 Project Test Program Manual

(3) MNPS Unit 3 Project Procedures Manual

(4) MNPS Unit 3 Preservice Unit Instruction Manual

(5) NNECO Administrative Control Manual

(6) NNECO Unit 3 Startup Manual

(7) NNECO Unit 3 Flushing Reference Manual

(8) NUSCO Quality Assurance Branch Procedures

(9) NUSCO Quality Assurance Program Topical Report

(10) SWEC Quality Assurance and Control Manual

(11) SWEC Quality Standards

(12) SWEC Quality Assurance Directives

(13) SWEC Test Program Manual

(14) SWEC Quality Assurance Inspection System Handbook

(15) WEC NSSS Startup Manual

(16) RG 1.68 Initial Test Programs for Water Cooled Nuclear Power Plants

(17) NUREG 1031 Safety Evaluation Report NMPS Unit 3

3.1 Test Program Requirements

Scope of Inspection

The inspector met with the Startup Manager to discuss the test program for Unit 3 and to verify that the licensee has taken the following actions:

-- Prepared a description of the Preoperational Test Program

-- Included requirements consistent with FSAR commitments in the test program.

-- Specified format and content of preoperational test procedures sufficiently to satisfy NRC guidance.

Discussion

By review of the licensee's documents and discussions with the Startup Manager and members of his staff, the inspector identified the assignment of responsibilities for the areas of:

-- Flushing and Cleaning of NSSS and Auxiliary System piping and components

-- Hydrostatic tests of piping and components for systems containing pressurized fluids

-- Instrument calibration

-- System Turnover from the Constructor to Startup

-- Functional demonstration of equipment performance in all modes throughout its operating range, including applicable flow tests

-- Electrical, mechanical, and I & C testing

Discussions included the identification of tests to be performed and their sequencing. For each of the identified tests the following information was included in each of the test procedures: Objectives; acceptance criteria; references; pre-requisites; initial conditions; precautions; special equipment; definition of detailed steps for each test procedure; checklists; restoration of system to normal conditions after completion of the tests.

Findings

The inspector verified that the licensee has prepared a description of the Startup test program. General areas of testing have been identified and assignment of responsibilities have been made. The licensee has prepared a detailed network of all activities of the startup program. The network logic includes the sequencing of all of these activities to achieve the standard milestones of the test program. The organization recently has been realigned to promote the achievement of these milestones to the milestone schedule targets as established by NUSCO Management. Milestone Directors have been appointed for each important milestone. These organizational changes will be incorporated in the Startup Manual.

The licensee's test program has requirements for testing that are consistent with FSAR commitments.

The inspector had no further comments or questions in this area at this time.

3.2 Test Procedure Review and Verification

Scope

The approved test procedures listed in ATTACHMENT A were reviewed for technical and administrative adequacy and to verify that test planning satisfies regulatory guidance and licensee commitments.

Discussion

The procedures were examined for: management review and approval; procedure format, clarity of stated test objectives; prerequisites; environmental conditions; acceptance criteria; source of acceptance criteria; references; initial conditions; attainment of test objectives; test performance documentation and verification; degree of detail for test instructions; restoration of system to normal after testing; identification of test personnel; evaluation of test data, independent verification of critical steps or parameters, and quality control and assurance involvement.

Findings

The review indicated that the procedures are consistent with regulatory requirements, guidance, and with the Licensee's commitments. No discrepancies or unacceptable conditions were identified. The inspector had no further questions on these procedures.

3.3 Test Results Evaluation

Scope

The completed test procedures listed in ATTACHMENT B were reviewed to verify that adequate testing was accomplished in order to satisfy regulatory guidance and licensee commitments and to ascertain whether uniform criteria were being applied in the evaluation of completed pre-operational tests in order to assure their technical and administrative adequacy.

Discussion

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 procedure; acceptance criteria; performance verification; recording of the conduct of tests, QC inspection records; restoration of system to normal after the test; independent verification of critical steps or parameters; identification of personnel conducting and evaluating test data; and verification that the test results heave been approved.

Findings

No discrepancies or unacceptable conditions were noted in the review of these procedures.

3.4 Test Witnessing

Emergency Diesel Generator Set - B

Scope of Inspection

The inspector witnessed portions of the ongoing testing of the Emergency Diesel Generator, Set B. Test personnel were using preoperational test procedure T3346 - AP 002, Rev. 0, approved December 13, 1984, "Emergency Diesel Generator B - Mechanical" and operating procedure OP3346A, Rev. 0, approved December 13, 1984, "Emergency Diesel Generator"

The objectives of this test are as follows:

(1) To verify that the alarm and shutdown circuits function as designed.

(2) To provide a run-in at no load for the diesel engine.

(3) To verify that the starting and stopping controls operate properly.

(4) To verify that each air receiver tank can start the engine 5 times without being recharged.

(5) To provide a run-in at load and confirm diesel reliability.

Discussion

The inspector witnessed these portions of Emergency Diesel - B, testing by:

(1) The engine can be started, stopped and controlled remotely.

(2) Engine can be started, stopped, and controlled locally.

(3) Engine can be stopped with the manual stop lever.

(4) Several energizations and de-energizations of alarm circuits and logic sequences.

(5) One air receiver tank has sufficient capacity for a minimum of 5 engine starts without re-charging.

(6) One air compressor is capable of recharging its receiver from 375 to 425 psig within 30 minutes.

Test witnessing by the inspectors included observations of:

- Overall crew performance.
- Use of latest, revised and approved procedure available and in use by the test personnel.
- Designation of one person in charge of conducting the tests.
- Availability of sufficient test personnel to perform the tests.
- Coverage of test pre-requisites.
- Use of acceptance criteria to evaluate test results.
- Verification that plant supporting systems are in service.
- In service status of calibrated special test equipment required by the test procedure.
- Adherence to the test requirements of the test procedure during the tests.
- Timely and correct actions by test personnel during the performance of the tests.
- Data collection for final analysis by proper personnel.

The inspector made independent measurements and calculations during the tests including start and stop times and system parameters.

Findings

Test results observed by the inspector indicated that acceptance criteria had been met for those portions of the test that had been witnessed. No items of noncompliance were identified and no unacceptable conditions were noted.

3.5 Auxiliary Boiler Status

The inspector discussed the current status of the auxiliary boilers and their role in the test program with the licensee's representatives.

Auxiliary Boiler A was determined to be available for service up to 50% load with atomizing air. The atomizing steam modifications have not been implemented as yet. When Auxiliary Boiler B can operate at 100% capacity with its new atomizing steam modification, the new modification will also be applied to Auxiliary Boiler A. The atomizing steam modification on Auxiliary Boiler B has been completed. The new and reworked components of this system are being tested. The atomizing controls will be reset

after which the boiler will be shutdown to insulate the atomizing steam lines.

The inspector will follow up on final testing of the auxiliary boilers on a subsequent inspection.

4. Quality Assurance and Quality Control for Startup Test Program

Scope

The inspector determined the involvement of the Licensee's QA/QC organization with the Startup test program through:

- Discussions with the Licensee
- Review of the Startup Manual
- Review of QA Program Manual
- Review of Quality Assurance Branch Procedures
- Review of available surveillance/inspection reports for implementation of the QA/QC program

Discussion:

The Startup Manual, Section (3.2.13), is entitled "NUSCO Construction QA and NNECO QA/QC". This identifies the NUSCO Construction Quality Assurance Branch as the project party with primary responsibility for the performance of verification activities associated with pre-operational and startup tests in compliance with applicable regulatory requirements, codes, specifications standards and procedures. NNECO QA/QC Department shares the responsibility for conducting verification activities, as they apply to startup testing, using the "monitor technique". NNECO & QA/AC's activities, however, are subject to the authority of NUSCO's Construction QA Branch.

Discussions with the NUSCO QA Branch confirmed the above delineation of the responsibilities and scope of the QA/QC program for startup testing. The program consists of many surveillances timed to give broad QA coverage of the pre-operational test program. This monitoring program includes in-process verifications, test witnessing, checks on instrument calibration, receiving and storage of test equipment, etc. The procedure used for this surveillance work is NQA-2.10, entitled "Performance, Reporting, and Follow-Up of Surveillance Activities." The charter for this QA program can be found in chapter 10 of the NUSCO Quality Assurance Program Manual - Topical Report.

The inspector reviewed the 6 approved Surveillance Reports listed in Attachment C. They were reviewed for the type of surveillance performed, proper logging and the results of the surveillance.

These surveillances included maintenance items, housekeeping, calibration of instruments, flushing of piping, and startup testing.

Findings

No discrepancies were noted in the review of surveillance sheets and no violations were observed. Additional surveillance reports will be reviewed on subsequent inspections.

5. Valve Position Indication Problems

Scope of Inspection

It had been brought to the attention of the Senior Resident Inspector that problems had been experienced with local valve position indication for certain types of valves during phase 1 and 2 testing. The inspector reviewed available information on the problems to determine what actions the Licensee was planning in order to eliminate these problems.

Discussion

The licensee provided preliminary information on the experienced problems. Through review of this information and through discussions with members of the startup group it was determined that there were at least five specific problems with valve position indication as follows:

(1) The valve position arrow on manually operated Henry Pratt butterfly valves, is not securely attached to valve shaft by the supplied set screw, allowing the arrow to slip on the shaft therefore, position indication is uncertain.

(2) Reverse installation of position indicator pointer. Pointer is perpendicular to pipe axis when valve is open, contrary to the normal convention where this position of the pointer would indicate the valve to be closed.

(3) Raised lettering on valve body for open and closed position of the valve is reversed. When the valve is fully closed the pointer points to the open position and vice versa.

(4) Handwheel of valve operates in reverse. When the handwheel is turned counter clockwise, the valve closes contrary to the normal convention where the valve would open.

(5) There is no position indication plate installed to function with the position pointer.

Most of the above problems were encountered during the phase 1 & 2 testing. The first problem, the set screw slippage problem, is addressed in E & DCR-T-P.1976. The hardness of the materials of set screw and valve shaft are such that the setscrew cannot "bite" into

the shaft sufficiently to prevent it from slipping. The proposed solution to this problem is to drill a hole in the valve shaft to receive the set screw to a depth sufficient to provide the full shear resistance of its cross section. The preliminary information from the Licensee provided a listing of valves which have valve problems (1) through (5). Problem (2), the reverse installation of the position indicating pointer, is addressed in DDR-247 in relation to SWP*MOV130A. It is not clear what the disposition of this item is. The same information from the Licensee also identifies problem (4) and (5) to exist for SWP*MOV130A but it is not clear what other valves there are with the same problems.

Problem (3), the reverse raised letter problem, is experienced by 3 RHS*HCV607. The same valve also has problem (2), the reverse installation of the pointer (or indicator plate).

Findings

Further information is to be developed by the Licensee to determine the full extent of this problem. It was agreed, and discussed in the exit meeting, that the Licensee will develop a matrix that will identify what valve model and make is affected by which specified valve position indication problem. Once a problem has been determined to affect a certain valve, the licensee will identify other valves in Unit 3 of the same make, type, and model which also may have this problem. It will then be possible to get an overview of the problem. This valve position indication problem will be an unresolved item identified in the Senior Resident Inspector's report. The SRI will follow this item to its early resolution.

6. Plant Tours

The inspector made several tours of the facility including the containment structure, turbine building, auxiliary building, service building, control buidling, emergency safety features building, emergency diesel generator building, battery rooms, control room fuel oil transfer tank pits, auxiliary boiler area, circulating and service water pump house and hydrogen recombiner building.

Particular attention was given to auxiliary boiler repair and testing, the emregency diesel generator testing, and work in progress. Items of inspection included housekeeping, cleanliness controls, and in situ storage and protection of components, piping and systems. No items of noncorpliance were observed during these tours.

7. Exit Interview

At the conclusion of the site inspection on January 25, 1985, an exit meeting was conducted with the licensee's senior site representatives (denoted in paragraph 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.

Attachment A

Test Procedure Review

(1) T3307 - AP003 Revision 0, Approved January 7, 1985, "Safety Injection Accumulator Tests".

(2) T3304 - AP002 Revision 0, Approved January 8, 1985, "Charging Pump Flow Balance".

(3) T3330-EP Revision 0, Approved January 10, 1985, "Safety Injection Pumps Cooling System".

(4) T3332-AP002 Revision 0, Approved December 20, 1984. "Cold Shotdown Integrated Air System Test".

(5) T3318-A Revision 0, Approved December 17, 1984, "Extraction Steam".

(6) T3313-EP Revision 0, Approved December 21, 1984, "Containment Purge Air System".

(7) T3346-AP001 Revision 0, Approved December 13, 1984, "Emergency Diesel Generator A-Mechanical".

(8) T3346-AP002 Revision 0, Approved December 13, 1984, "Emergency Diesel Generator B-Mechanical".

(9) 3-INT-2001, "Computer Programs Test", Appendix 3T3 Revision 0, Approved December 21, 1984, "Engineered Safeguards System Actuation With Loss of Power".

(10) 3-INT-2001, Computer Programs Test, Appendix 3R4 Revision 0, Approved December 28, 1984, "Reactivity Parameters."

(11) 3-INT-2001 Computer Programs Test, Appendix 3A8 Revision 1, Approved December 15, 1984, "Condenser Vacuum Differential Alarm"

(12) 3-INT-2001 Computer Programs Test, Appendix 3A6, Revision 0, Approved December 15, 1984, "Pressurizer Spray Differential Alarm"

(13) 3-INT-2001, Computer Programs Test, Appendix 3A3, Revision 1, Approved December 17, 1984," Low Pressure Turbine Steam Inlet Delta T Alarm".

Attachment B

Test Results Evaluation

(1) T3415-P003, Revision 0, Approved September 30, 1983, "Isolator Cabinet Group CE SBG"; Test results approved February 3, 1984

(2) T3349-A002, Revision 0, Approved July 29, 1983, "Computer Power Supply"; Test results approved August 8, 1984

Attachment C

QA Surveillance Reports

(1) PC-3085, dated November 10, 1984, Startup Testing - Maintenance, Emergency Diesel Generator - Rocker Arm Cover Modification", Surveillance approved November 16, 1984

(2) PC-3070, dated November 13, 1984, Startup Testing Administrative; Regulatory Guide requirement for preoperational and startup test procedures be approved 60 days prior to test performance; Surveillance approved November 13, 1984

(3) TC-3101, dated November 13, 1984, Startup Testing - Mechanical, "Housekeeping - EDG Fuel OIL Tank Vault," Surveillance approved November 25, 1984

(4) TC-3128, dated November 26, 1984, Startup Testing - I and C, "Calibration of Main Steam Instruments - Control Room," Surveillance approved December 8, 1984

(5) TC-3125, dated November 29, 1984, Startup Testing - Flushes, "Flush of Fire Protection Headers in Auxiliary Building"; Surveillance approved November 30, 1984

(6) TC-3081, dated November 12, 1984, Startup Testing - Electrical, "Startup Testing of Solid State Protection System"; Surveillance approved November 13, 1984