U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-423/84-26

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: November 26-30, December 3-5, 10-12, 1984

Inspectors: L E Bugge 1/24/85
for H. H. Nicholas, Lead Reactor Engineer date

for L E Bugge 1/24/85
H. F. VanKessel, Reactor Engineer date

Approved by: L H Bettenhausen 1/25/85
L. H. Bettenhausen, Chief, date
Test Program Section

Inspection Summary: Inspection on November 26-30, December 3-5, 10-12, 1984
Report No. 50-423/84-26

Areas Inspected: Routine, announced inspection of the preoperational test program including preoperational test program requirements and implementation, test procedure reviews, test results evaluation, steam generator hydrostatic testing, quality assurance and quality control, and, tours of the facility. The inspection involved 134 hours on site by two NRC region-based inspectors.

Results: No items of non-compliance were identified.

DETAILS

1.0 Persons Contacted

Northeast Nuclear Energy Company

R. Cikatz, QC Engineer
*J. Crockett, Superintendent Unit 3
E. Fries, Milestone Coordinator
*J. Harris, Manager Startup Services
M. Hess, Assistant Startup Supervisor
*D. Miller, Jr. Startup Engineer
B. Pinkowitz, Startup Engineer
S. Sudigala, Assistant Startup Supervisor

Northeast Utilities Service Company (NUSCO)

*D. Blumenthal, QA Engineer
*E. LaWare, QA Surveillance Group Leader
*R. Lefebvre, Project Staff Engineer
*R. Viviano, Assistant Project Engineer

Stone and Webster Engineering Corporation (SWEC)

P. Laferriere, Field QC Inspector
D. Leubner, Startup Engineer
R. Martel, Startup Engineer
T. McNatt, Startup Engineer
J. Metzger, Startup Engineer
M. Stofer, Construction Supervisor
P. Vanden Bosch, Field QC

Westinghouse Electric Corporation (WEC)

F. Aranjo, Lumberman ANI Inspector for Westinghouse
J. Dolan, Site Manager
C. Pederson, Engineer
D. Volts, Pensacola QA Inspector
B. York, Engineer

Hartford Steam Boiler

B. Braden, ANI Inspector
R. Smith, ANI Inspector

U.S. Nuclear Regulatory Commission

D. Lipinski, Resident Inspector
*T. Rebelowski, Senior Resident Inspector

*Denotes those present at exit interview on December 12, 1984.

2.0 Preoperational Test Program

References

References for the preoperational test program are documented in Inspection Report No. 423/84-17.

2.1 Test Program Requirements and Implementtion

Scope

Due to the Millstone Unit 3 project realignment which took place as of October 1, 1984, a new startup manager has been designated to head the startup test program. The test program requirements and their implementation were discussed with the startup manager. Other areas discussed included testing status; procedure status; preparations for steam generator secondary side hydrostatic testing; preparations for emergency diesel generator testing; preparations for reactor pressure vessel hydrostatic testing; and, quality assurance and quality control interface and involvement during the test program.

Findings

Review of documents and discussions with startup personnel revealed no discrepancies in these areas. The startup manager was knowledgeable of the test program and its implementation. The inspector will review and discuss the nine areas of the test program requirements and their implementation, with the new startup manager, on subsequent inspections.

2.2 Test Procedure Reviews

Scope

The approved test procedures listed in Attachment A were reviewed for technical and administrative adequacy and for verification that adequate testing is planned to satisfy regulatory guidance and licensee commitments. The criteria used for review are listed in Inspection Report No. 423/84-17.

Findings

As a result of the review of these test procedures, the inspector ascertained that the procedures are consistent with regulatory requirements, guidance and licensee commitments. No discrepancies or unacceptable conditions were identified. The inspector had no further questions on these procedures.

2.3 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 for evaluating completed preoperational tests in order to assure their technical and administrative adequacy. The criteria used for review are listed in Inspection Report No. 423/84-17.

Findings

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

3.0 Steam Generator Secondary Side Hydrostatic Tests

3.1 References

(1) ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition and Addenda through June 30, 1973.

(2) Stone and Webster Engineering Corporation (SWEC) Quality Assurance and Control Manual, ASME Section III.

(3) SWEC Project Specification No. 2280-000-968 Field Fabrication and Erection of Piping.

(4) SWEC Quality Standard 12.1 Revision 8, SWEC Calibration Program.

(5) Quality Assurance Program Manual for Millstone Nuclear Power Station Unit 3

The systems are filled with demineralized water and, after the fill, are maintained within water chemistry limits. The steam generator vessel is heated to a minimum temperature of 120°F and a maximum temperature of 180°F at test pressure for initial conditions. The steam generator hydrostatic test, secondary side, is performed at 125 percent (1482 PSIG) of its design pressure rating of 1185 PSIG. The pressure for the secondary side hydrostatic test shall be 1482 PSIG minimum at the highest physical point and 1570 PSIG maximum at the lowest physical point of the steam generator. The test pressure is maintained for a minimum of ten minutes.

3.3 Scope of Test

A visual examination of all weld joints, weld connections and regions of high stress shall indicate no leakage, except for temporary connection gaskets and blind flanges installed for the purpose of this test. The system shall be inspected at the design pressure rating of 1184 PSIG minimum at the steam generator high point.

3.4 Test Performance

(1) The hydrostatic testing of each steam generator consisted of filling the steam generator and all associated piping to the main steam isolation valve;

(2) Initial heatup of the hydrostatic test water was by heating water from the condensate storage tank with auxiliary boiler steam. This water was treated chemically. The steam generator and main steam piping were then filled with the heated water to the main steam isolation valve;

(3) Once the steam generator was full and vented at all high points, the condensate pumps supplied heated water from the condensate storage tank to the hydrolaser pumps;

(4) With the steam generator temperature above the minimum for pressurization, the hydrostatic test was begun with pressure plateau of 100 PSIG, 500 PSIG, 1000 PSIG and a final hydrostatic test pressure at a minimum of 1482 PSIG at the high point and a maximum of 1570 PSIG at the low point for a minimum of 10 minutes. The average temperature at these pressure plateau was 155°F;

(5) After completion of the 1482 PSIG high point hold for a minimum of 10 minutes, the pressure was reduced to 1185 PSIG and held there until leak inspection of all welds and mechanical fittings within the test boundary was performed;

(6) Steam generator coolant and hydrostatic test coolant was above the specified minimum temperature;

(7) Required supporting systems were functional;

(8) All welded joints, mechanical connections and primary side hot and cold leg plenum chambers were opened and uncovered;

(9) All temporary instrumentation had been installed and calibrated; and,

(10) Communications had been established between all stations and inspection teams.

3.6 Crew Performance

The inspector observed the following:

(1) The latest revision of the hydrostatic test procedure was available and in use by crew members;

(2) The minimum crew requirements had been met;

(3) Briefings had been conducted with the crews and inspection teams;

(4) All test prerequisites were met;

(5) Appropriate systems, as needed, were in service;

(6) Special test equipment and instrumentation required by the procedure was calibrated, in service, and manned by test personnel;

(7) Testing was being performed as required by the procedure;

(8) Crew actions were correct and timely during the performance of the test, and,

(9) All data was collected for final analysis, by the cognizant test personnel.

3.7 Test Witnessing

By direct observation, the inspector witnessed the following:

(1) The manning and conduct of the test at the test control station, the low physical point of each steam generator, the high physical point of each steam generator, the temperature monitoring panel, and the hydrolaser pump station;

(2) The water sampling station and sampling results for water quality;

(3) Steam generator temperature between 120°F and 180°F;

(4) Steam generator pressure at 100 PSIG and 155°F;

(5) Steam generator pressure at 500 PSIG and 155°F;

(6) Steam generator pressure at 1000 PSIG and 155°F;

(7) Steam generator shell, tube sheet, lower head area, upper head area, main steam line to main steam isolation valve, permanent steam generator instrumentation piping, test control station, upper head station, lower head station, temperature monitoring station and hydrolaster pump station, while at 1000 PSIG and 155°F;

(8) Attaining and holding pressure at 1482 PSIG high point pressure with temperature at 155°F for a minimum of 10 minutes as read on high point pressure gauge at upper head station;

(9) Depressurizing to 1185 PSIG and holding; detailed inspection of all welds and mechanical joints;

(10) Hydrotest inspection team in their respective areas of the steam generator and associated piping;

(11) Accompanying inspection teams and inspecting welds on piping, steam generators shell, upper and lower heads, tube sheet areas of primary hot leg and cold leg plenum chambers, and steam generator instrumentation, and;

(12) Use of heatup rates as well as pressure increase and decrease rates.

3.8 Preliminary Test Results

(1) Initial hydro test of steam generator "A" showed one tube leak. A retest of steam generator "A" after tube repair showed no tube leaks and was successful;

(2) Initial hydro test of steam generator "B" showed nine tube leaks. A retest of steam generator "B" after tube repair showed only one tube leak. This tube is being repaired at this time and a retest of steam generator "B" will be scheduled for a later date.

(3) Initial hydro test of steam generator "C" showed one tube leak. A retest of steam generator "C" after tube repair showed no tube leaks and was successful.

(4) Initial hydro test of steam generator "D" showed no tube leaks and was successful.

3.9 Independent Measurements

The inspector made independent measurements and calculations in the areas of temperature, pressure, time, flow, and rates of change in parameters. Test results observed by the inspector indicated that acceptance criteria had been met for the 10 minute hold pressure of 1482 psig for each steam generator.

3.10 Findings

The inspector established by records review, by independent calculations and measurements, by direct observations, and by test witnessing, that testing was conducted in accordance with approved procedures. The inspector independently verified the acceptability of the test results, and evaluated the performance of the licensee personnel involved in the test.

No items of noncompliance were identified.

4.0 Quality Assurance and Quality Control

4.1 References

References for quality assurance and quality control are documented in Inspection Report No. 423/84-24.

4.2 Discussion

Quality assurance and quality control support was provided for the steam generator secondary side hydrostatic tests witnessed by the NRC inspector during this inspection period. Quality assurance coverage was represented by Westinghouse, Northeast Nuclear Energy Company and Northeast Utilities Service Company personnel; quality control coverage was represented by Stone and Webster Engineering Corporation field quality control personnel; with authorized nuclear inspectors (ANI) representing Hartford Steam Boiler Insurance and Westinghouse Electric Corporation.

4.3 Findings

The inspector verified the adequacy of the QA-QC coverage during the steam generator hydrostatic tests by direct observations at the hydrostatic stations, discussions with the personnel, and walkdowns with the inspection teams. Coverage of the tests was adequate. No discrepancies were observed by the inspector.

5.0 Plant Tours

The inspector made several tours of the facility including the containment, turbine building, auxiliary building, service building, control building, engineered safety features building, auxiliary boiler area and hydrogen recombiner building.

Particular attention in observation was given to all areas associated with and supporting the steam generator secondary side hydrostatic tests including work in progress, housekeeping, cleanliness controls and storage and protection of components, piping and systems.

No items of noncompliance were identified and no unacceptable conditions were noted.

6.0 Exit Interview

At the conclusion of the site inspection on December 12, 1984, 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) T3323-AA001
Revision 0, Approved November 7, 1984
Electro Hydraulic Control

(2) T3324-EA
Revision 0, Approved November 7, 1984
Generator Alterrex Excitation

(3) T3330-CP
Revision 0, Approved November 19, 1984
Reactor Plant Chilled Water System

(4) 3-INT-2001 Computer Programs Test Appendix 3J8
Revision 0, Approved October 29, 1984
Hourly Data Log.

(5) 3-INT-2001 Computer Programs Test Appendix 3J20
Revision 0, Approved November 11, 1984
Reactor Coolant System Flow

(6) 3-INT-2001 Computer Programs Test Appendix 3R7
Revision 0, Approved November 9, 1984
Xenon Prediction Test Case

(7) 3-INT-2001 Computer Programs Test Appendix 3R9
Revision 0, Approved November 11, 1984
Xenon Follow Test Case

(8) 3-INT-2001 Computer Programs Test Appendix 3R11
Revision 0, Approved November 9, 1984
Estimated Critical Position Test Case

(9) 3-INT-2001 Computer Programs Test Appendix 3R12,
Revision 0, Approved November 9, 1984
Shutdown Margin

(10) T3323-AA002
Revision 0, Approved November 26, 1984
Turbine/Generator Systems Layup

(11) T3316-AP002
Revision 0, Approved November 20, 1984
Main Steam Generator Secondary Side Hydrostatic Test

(12) T3346-AP001
Revision 0,
Draft Copy Emergency Diesel Generator A-Mechanical

(13) T3346-AP002
Revision 0,
Draft Copy Emergency Diesel Generator B- Mechanical

Attachment B

Test Results Evaluation

(1) T3344-BA046
Revision 0, Approved August 26, 1984
480V MCC Bus 32-2D
Test Results Approved November 26, 1984

(2) T3323-BA001
Revision 0, Approved March 7, 1984
Lube Oil Purification
Test Results Approved October 9, 1984

(3) T3344-BA)48
Revision 0, August 26, 1983
480V MCC Bus 32-3L
Test Results Approved November 26, 1984