U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 85-38

Docket No. 50-423

License No. CPPR-113 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: July 15-19, 1985

Inspectors: for H. F. VanKessel, Reactor Engineer — 9-12-85 date

Approved by: P. W. Eselgroth, Chief, Test Programs Section, OB, DRS — 9-12-85 date

Inspection Summary: Inspection on July 15-19, 1985 (Inspection No. 50-423/85-38)

Areas Inspected: Routine unannounced inspection of the preoperational test program, including Test Assessing, Emergency Diesel Generator Status, ESF Test Status, Quality Assurance and Quality Control, independent inspection and measurements associated with: valve stroke times for ESF related valves. The inspection involved 44 hours on site by one NRC region based inspector.

DETAILS

1.0 Persons Contacted

Northeast Nuclear Energy Company (NNECo)

A. Cardillo, Startup Engineer
J. Dimarzo, Startup Engineer
E. Fries, Startup Engineer
M. Gentry, Assistant Startup Supervisor
T.Lyons, Startup Engineer
*D. Miller, Jr., Startup Manager
D. Prawdzik, Startup Engineer
*W. Rose, QA/QC Inspector
*R. Thompson, QA/QC Inspector

Northeast Utilities Service Company NUSCo)

*D. Blumenthal, QA Engineer
R. Bradley, Instrument Technician
B. Carlson, Project Engineer
*J. LaWare, Engineering Technician
*S. Orefice, Project Engineer

Stone and Webster Engineering Corporation (SWEC)

W. Matejek, Project Advisory Engineer

U.S. Nuclear Regulatory Commission (USNRC)

*R. J. Summers, Project Engineer

*Denotes presence at the exit meeting on July 19, 1985

2.0 Licensee Actions on Previous Inspection Findings

2.1 (Closed) Unresolved Item, "Vibration Induced Valve Failures" (423/85-10-01)

References:

(1) Interoffice memorandum, "IE Information Notice 83-70, Supplement 1", from N. Barrett to W. Ramsden, dated April 2, 1985

(2) Problem Report Response (SWEC) PR-P-148, "Loose anti-rotation stem clamp device on Anchor/Darling Valves, dated Sept. 19, 1984

(3) Problem Report Response (SWEC) PR-P-148, "Loose anti-rotation stem clamp device on Anchor/Darling Valves (interim response)", dated May 16, 1984

(4) Interoffice Memorandum, "Problem Report PR-P-148, Loose Anti-rotation stem clamp device on Anchor/Darling valves," W. M. Eifert to Distribution, dated November 29, 1983.

(5) Letter Anchor/Darling Valve Company, to Stone and Webster Engineering Corp., "P.O. No. 310501 Shoreham Nuclear Power Station, Unit 1," dated April 5, 1983, by J. D. Cartwright, letter attached to reference (4) above.

Discussion

The referenced correspondence shows that IE Notice 83-70 and its Supplement 1 have received adequate attention by the licensee over a two year period. While some of the problems, discovered by the Licensee in the course of the investigation, remain to be solved, the licensee's system for resolution of these remaining items appears adequate. Unresolved Item (423/85-10-01) is hereby closed.

2.2 (Closed) Unresolved Item, "Vendor action on sheared pinion keys on Limitorque SB-0-25 operators for W-EMD motor operated valves", (423/85-27-02)

References

(1) Problem Report Response (SWEC), PR-P-129 (revised), "Repetitive failures of Limitorque operator SMB-4 motor to shaft key," dated July, 1984

(2) Interoffice Memorandum, "Sheared pinion keys in Limitorque SB-0-25 Motor operators supplied on Westinghouse EMD valves", from W. M. Eifert to Distribution, dated April 12, 1984

(3) Problem Report (SWEC), PR-P-150, "Sheared pinion keys in Limitorque SB-0-25 motor operators supplied on Westinghouse EMD valves", from F. Sestak, Jr., undated.

(4) Problem Report Response (SWEC), PR-P-150, "Sheared pinion keys in Limitorque SB-0-25 motor operators supplied on Westinghouse EMD valves" dated July 25, 1984

(5) Letter from Westinghouse, Water Reactor Divisions, to NUSCo, Millstone 3, "Limitorque Motor Operators Sheared Pinion Keys", by R. L. Hoter, dated May 10, 1983

(6) Letter from NUCSo to USNRC, Region 1, "Reporting of Potential Significant Deficiencies in Design and Construction: Failure of Pinion Gear Shear Keys in Limitorque Model 8BO (SD-25)", by W. G. Council, dated June 10, 1983

Discussion

The referenced correspondence indicates that the particular problem does not apply to any of the Limitorque motor operators used at Millstone-3. Westinghouse (W), however, went one step further towards safety by replacing the pinion keys in all SB-O-series motor operators on W-EMD manufactured valves (ref. 6). The inspector has no further questions on this outstanding item. Unresolved Item (423/85-27-02) is hereby closed.

2.3 (Open) Unresolved Item, "Valve Position Indication Problems", (423/85-02-01)

Reference

(1) Status report (SWEC) "Valve Position indication Problems", dated July 17, 1985

Discussion

The individual valve position indication problems are being resolved by the licensee. All of the identified problems are tracked by Design Deficiency Report (DDR), Unsats (UNS), Engineering and Design Change Request (E&DCR), etc, including the two new generic items: (6) "Wrong description on control switch label" and (7) "Reach rod position indicator not installed". The number of valves with incomplete information is being reduced. The inspector will continue to follow the licensee's corrective actions on this unresolved item.

3.0 Preoperational Test Program

3.1 Test witnessing

Scope

The inspector witnessed selected steps of the following Engineered Safety Feature (ESF) and Hot Functional Test (HFT) related tests:

- Low Pressure Safety Injection (T3307AP001)
- High Pressure Safety Injection (T3308-P002)
- Service Water (T3326-P)
- Safety Injection Accumulator Test (T3307 AP003)

Test witnessing by the inspector included observations of:

- Overall crew performance
- Use of latest revised and approved procedure available and in use by test personnel
- Designation of one person in charge of conducting the tests
- Availability of sufficient test personnel to perform the tests
- Coverage of test prerequisites
- Use of acceptance criteria to evaluate test results
- Verification that plant supporting systems are in service
- Service status of calibrated special test equipment required by the test procedure
- Adherence to the test requirements of the test procedure during the test
- 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 during the test (see Section 5)

Discussion

The inspector witnessed steps 7.1.22 through 7.1.34 of procedure T 3307 AP001, Rev 0, "Low Pressure Safety Injection (LPSI)". The objectives of this partial test are to verify the proper functioning of various control circuits of the LPSI system as observed on the main control boards in the control room. The inspector noted that verification of valve closure in the field had been eliminated in

procedure change No. 35. The test engineer explained that these steps had been eliminated because the phase-1 tests for these valves had all been done, corrections had been made, and the valves were known to function well. Change No. 35 is expected to be approved by the Joint Test Group in the near future. Disapproval would mean repetition of the test. It was also noted by the inspector that the test engineer was adhering strictly to the administrative requirements. He assigned a number of "Unsats" and DDRs.

The inspector witnessed the opening and closing of remotely operated valves in accordance with procedure T3308P002, Rev.0, "High Pressure Safety Injection, i.e. steps 7.10.4/5 and 7.11.1/2.

The inspector verified the open/close times of these steps to be 10.04, 10.02, 9.5 and 9.0 seconds respectively. The inspector also observed the opening and closing of valves 3SIH* MV8801 A and B (Steps 7.96.5 and 7) and 3SIH*CV 8871 and 8823 (Steps 7.99.26 and 14) upon receiving a simulated ESF signal. Annunciator 2-33 did not come on and GPII annunciator did not flash as required. "Unsats" were filled out against these failures. It was noted by the inspector that the valve open/close time table, shown under the acceptance criteria in the procedure, indicated a different time of closure for MV8821 A and B, (i.e, 10 and 60 seconds, respectively). After further checking, the test engineer determined that this was a typographical error in the table. Both values for opening and closing of these two valves should be 10 seconds. Appropriate action was taken to ensure that the table of the procedure would be corrected.

In the course of conducting the test of procedure T3308P002, several wire lifts or jumpers had to be installed temporarily to obtain the desired simulation ESF signals. The inspector closely followed the installation of these temporary changes in accordance with a subroutine procedure, and their subsequent removal to restore initial conditions. The test engineer had good control over these restoration steps.

The inspector witnessed testing of the logic of control circuits for the Service Water System, in connection with the ESF tests as performed in accordance with steps 7.1.20 through 56 of procedure T3326-P, Rev. 0. Simulation signals were introduced at the EDG Loading Sequencer of train B to get the pump to start (step 7.1.20). Jumper installation was accomplished in accordance with the signal simulation procedures on form PU-590, Rev 0.

Again, as under procedure T3308-P002, the inspector closely followed the restoration steps which, in this procedure, followed immediately after accomplishing the subtask. The test engineer closely followed the requirements of the administrative procedures with respect to the verification of "Unsats", DDR's completion of form PU-590, observance of most recent test changes, etc.

The time for the interlock action upon opening of motor operated valve MV-4 (step 7.1.22) was obtained two ways. The first method was to check the time at the main control board, the other method checked the time at the relay location. The times were 10.0 and 12.04 seconds, respectively. The most conservative number (12.04) was noted in the procedure check list. It was noted by the test engineers that test change 13 forgot to put restoration steps in. The test engineer will make another test change to have these steps included. For Step 7.1.26 the intent is to assure that manual cross connects with the other train (A) are closed to prevent water movements to the other train. This check had been requested by the test engineer but the procedure as written will not accomplish that objective. Another test change will be necessary.

Some problems were experienced with test change No. 4 in the conduct of step 7.1.30, 7.1.33 and 7.1.39, step 7.1.39. In step 7.1.39, a breaker did not close as expected. DDR541 was written to take care of the problem. The test was interrupted at this point to determine why the test steps did not track the existing logic of the control circuit as shown on logic diagram LSK9-10A (dwg No. 12179). The test was continued at step 7.1.40. The inspector noted that the test engineer re-established start conditions for the test as required after a test interruption. The performance of steps 7.1.40 and up established that the logics of LSK9-10A were satisfied.

It was noted by the inspector that the logics of the A and C pump were different from those of the B and D pump with respect to local operation. The ESF signal will not come through to the set of pumps put in the local mode of operation. This departure from normal logic was introduced via a design modification intended to satisfy the fire protection requirements of Appendix R. These changes in ESF logic appear to be acceptable.

Several "Unsats" were identified in the course of conducting step 7.1.40 through 56.

For the partial test performed per procedure T3307AP003, Rev 0, the inspector witnessed steps 7.2.1 through 10. These steps involved, amongst others, the determination of the closure time for valves CV8825, 8890A, 8880, and 8890B which were 3.3, 3.7, 5.2 and 3.3 seconds, respectively.

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 non-compliance were identified.

3.2 Emergency Diesel Generator (EDG) Status

Fuel oil system flushing on EDG-A continued. Vendor requirements on the 24 hour full load and overload (10%) test runs for EDG-B were satisfied. The licensee, however, wants to perform a 24 hour test run (per procedure T3346 AP004) on EDG-B, prior to the ESF tests, without EDG trips. Such trips had been experienced in 3 prior attempts as witnessed by the inspector. Low jacket water pressure was diagnosed to be the cause of at least two of these trips. Remedial action was thought to be easy to accomplish and, hence, the next attempt is expected to be successful. Unfortunately, EDG-B received a batch of lubricating oil contaminated with pieces of rubber. Cleaning of the lube oil system was in progress. After the cleaning operation EDG-B should be ready for the 24 hour run.

3.3 ESF Status

It is presently anticipated by startup management that the ESF tests 3 INT-2003 and 3INT2004 can be started in early August (2 days later than the current date for the previous inspection report 85-25). The same critical path items as reported in 423/85-25 persist. Further slippages in this schedule are anticipated.

4.0 QA/QC Interface

Scope

Since there are no hold points defined in any of the preoperational test procedures and there is no direct, in process, NUSCO quality control involvement, the inspector will closely follow the surveillance program executed by NUSCO-QA. For additional background on NUSCO-QA involvement, see inspection report 423/85-03.

Discussion

The inspector reviewed the NUSCo Quality Assurance Surveillance Reports listed below.

These surveillances are associated with the preoperational test of systems involved with the ESF tests 3INT2003 and 4 as pre-requisites. These surveillances are:

- TC-3431, dated 3-11-85, "Containment B SI Accumulator", test procedure T3307AP003.

- TC-3416, dated 3-6-85, "Low Pressure Safety Injection System", test procedure T3307AP001

TC3416 shows NUSCO QA involvement in the process of developing test procedure changes. The problem identified by QA and the test engineer involves the lack of adjustment in the total developed head calculations for pumps for the position of the test gauges relative to the pump center line. For most cases, these gauges are not located at the pump centerline. Follow-up on this item appears to be adequate.

Findings

No violations or non-compliances were noted in the review of the NUSCO QA Surveillance reports mentioned above.

5. Independent Inspection and Measurements Scope

In parallel with the Tech. Spec. team efforts (Inspection Report 50-423/85-37) in the area of valve open/close time requirements, the inspector independently surveyed the actual values of open/close times for the valves pertinent to the team's comparison efforts.

Discussion

The Tech. Spec. team had discovered some anomalies in open/close times of valves when comparing the values appearing in the FSAR table 6.2.65 with those of the Technical Specifications (table 6.2-2). The inspector was in the position to witness and independently measure the stroking of some valves pertinent to the team's findings. In addition, the inspector witnessed and surveyed the stroking of other valves pertinent to the team's efforts. The results of the inspector's efforts are summarized in a table in Attachment A. The table identifies the valve stroke times measured independently by the inspector.

Findings

The inspector identified no violations, deviations, or other noncompliances within the scope of this independent inspection.

6.0 Technical Specification Team (TS Team) Assistance

The inspector assisted the NRC's TS team during their second week at the site for the TS inspection. The inspector prepared the table in Attachment A in anticipation of the TS team's needs for the comparison effort on the valve stroke times identified in tables of the FSAR and the T.S. (see Section 5 above for details.)

The inspector participated in the exit interview conducted by the T.S. Team on July 19, 1985. A separate inspection report will be produced for the TS Team inspection (423/85-37).

7.0 Exit Interview

At the conclusion of the site inspection on July 19, an exit meeting was conducted with the Licensee's Senior representative: (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.

6.0 Technical Specification Team (TS Team) Assistance

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ATTACHMENT A

SAFETY INJECTION HIGH (SIH) SYSTEM VALVE OPEN/CLOSURE TIME

TYPE OPER	VALVE NO.	DESCRIPTION	OPEN/CLOSURE TIMES FOR VALVES, SEC. FSAR	APP. A TABLE 2.4	T3308 - P002 OPEN	CLOSE	TEST CHG #4
MO	3STH*MV8806	Rust Supply	Table 6.5	≤10/≤10	10.0	10.0	Yes
MO	MV8801A	Charg. Pump SI Header Isolation	-/10	≤60/≤60	10.0	8.8	Yes
MO	MV8801B	"A" Safety Inj. Pump to Hot Leg Inj.	-/10	≤60/≤60	9.5	8.02	Yes
MO	MV8802A	SI Pump to Hot Leg Inj.	-/10	≤60/≤60	10.0	10.0	Yes
MO	MV8802B	LP SI Charg.	-/10	≤60/≤60	10.0	9.2	Yes
MO	MV8807A	Suction Cross Connect	None	≤10/≤10	10.0	10.0	Yes
≠MO	MV8807B	Suction Cross Connect	None	≤10/≤10	10.01Δ	0.0	Yes
≠MO	MV8835	SI Cold Leg Master Isolation	-/10.0	≤60/≤60	10.0	9.0	Yes
AO	CV8824	Test Line Iso. SI to 1/3 Hot Leg	None	NA/≤10	--	3.2	N/A
AO	CV8843	Charg.Pump Hdr. Cld.	NA/10.0	NA/≤10	--	3.2	N/A
AO	CV8823	Test Line Isol. SI to Cold Leg Inj.	NA/10.0	NA/≤10	--	2.0	N/A
MO	MV8920	"B" SI Pump Miniflow Iso.	None	≤22.6/ ≤22.6	20.08	18.08	Yes
≠MO	MV8821A	"A" Safety Inj. Pump to Cold Leg Inj.	None	≤10/≤10	10.0	9.0	Yes
≠MO	MV8821B	"B" Safety Inj. Pump to Cold Leg Inj.	None	≤60/≤60	10.0	9.4	Yes
MO	MV8923A	"A" Safety Inj. Pump Suction Isol.	None	≤10/≤10	10.0	10.0	Yes
MO	MV8923B	"B" Safety Inj. Pump Suction Isol.	None	≤10/≤10	10.0	10.02Δ	Yes

TYPE OPER	VALVE NO.	DESCRIPTION	FSAR	APP. A TABLE 2.4	T3308 - P002 OPEN	CLOSE	TEST CHG #4
ΔMO	MV8924	LPSI Chargng	None	≤10/≤10	9.06	7.02	Yes

Change No. 4 is to allow separate sign-off and verification of functional and/or valve response timing.

≠Independent measurement by HFV
Δ UNSAT 4472 for exceeding 10.0, Was cleared by JTG.
X Questioned by Mr. Beckman of TS Team