

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-423/85-25  
Docket No. 50-423  
License No. CPPR-113 Category B

Licensee: Northeast Nuclear Energy Company  
P. O. Box 270  
Hartford, Connecticut 06161

Facility Name: Millstone Nuclear Power Station, Unit 3

Inspection At: Waterford, Connecticut

Inspection Conducted: June 24-27, and July 8-11, 1985

Inspectors: *H. F. Van Kessel*  
H. F. Van Kessel, Reactor Engineer

8-15-85  
date

Approved by: *P. W. Eselgroth*  
P. W. Eselgroth, Chief, Test Program  
Section DRS

8-16-85  
date

Inspection Summary: Inspection on June 24-27 and July 8-11, 1985 (Inspection No. 50-423/85-25).

Areas Inspected: Routine, unannounced inspection of the preoperational test program including test procedure reviews, test witnessing, Emergency Diesel Generators (EDG) status, quality assurance and quality control, and the identification of new EDG components: The inspection involved 82 hours on site by one NRC region based inspector.

Results: No items of non-compliance were identified.

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## DETAILS

### 1. Persons Contacted

#### Northeast Nuclear Energy Company (NNECO)

P. Brown, Startup Engineer  
J. Chunis, Startup Engineer  
C. Clement, Maintenance Supervisor  
E. Fries, Startup Engineer  
M. Gentry, Assistant Startup Supervisor  
R. Grebasch, Startup Engineer  
N. Hulme, Startup Engineer  
S. Jonash, Startup Engineer  
W. Loweth, Startup Engineer  
D. Miller, Jr., Startup Manager  
T. Lyons, Startup Engineer  
D. Scace, Startup Engineer  
R. Montgomery, Sr., QA Technician  
J. Short, Assistant Maintenance Supervisor  
\*S. Sudigala, Assistant Startup Supervisor

#### Northeast Utilities Service Company (NUSCO)

D. Blumenthal, NQA Engineer  
\*K. Gray, Jr., NQA Staff Assistant  
\*L. Nadeau, A. P. Engineer

#### Stone and Webster Engineering Corporation (SWEC)

W. Lamb, Sr. Engineer  
W. Matejek, Project Advisory Engineer

#### U.S. Nuclear Regulatory Commission (USNRC)

\*T. Rebelowski, Senior Resident Inspector

\*Denotes presence at exit interview on July 1, 1985.

### 2. Licensee Actions on Previous Inspection Findings

#### 2.1 (Open) Unresolved Item Vibration Induced Valve Failures (423/85-10-01)

Some records on this item were produced by NNECO's maintenance department. These records indicate that NUSCO responded to IE Notice 83-70 and its amendment No. 1 (See Inspection report 432/85-10). Further backup documentation will be provided by NNECO. The inspector will review this information during the next inspection.

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

Two generic items have been added by the licensee to the problem matrix, i.e.

- (1) Wrong Description on Control Switch Label
- (2) Reach Rod Position Indicator Not Installed

Item (1) lists only one affected valve but item (2) lists numerous valves. For further background on this item refer to inspection reports 423/85-10, 24, and 27. The inspector will continue to follow the licensee's corrective actions on this item.

## 3. Preoperational Test Program

### 3.1 Test Procedure Review

#### Scope

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

#### Discussion

Although many of the phase-2 test procedures were available prior to the test in preliminary or final draft form, the revision 0 of these test procedures was not available to the NRC at the required time before the performance of the test. Since many ESF related tests were scheduled for execution in the near future, the inspector concentrated on the review of these procedures in the second week of this inspection. The procedures were examined for management review and approval, procedure format, clarity of stated test objectives, prerequisites, environmental conditions, acceptance criteria and their sources, 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. The inspector had some questions on the fuel oil consumption calculations, and its independent verification, for the EDG-A Licensing Test, T3346AP003. These questions were answered satisfactorily. It was noted by the inspector that none of the procedures included QC hold points. This is consistent with the QC/QA approach taken by the licensee for the startup program. The licensee relies heavily on in process QA surveillances, performed during the preoperational tests, to achieve quality results.

It had been observed in previous reviews of procedures by the inspector that the restoration sections at the end of the procedures tend to be rather general. The licensee explained that they prefer to include restoration steps immediately following the completion of the steps requiring temporary changes to the system. The inspector agreed that this approach would be acceptable but that it may not be followed consistently by all procedure writers. Special attention will be given by the inspector to such restoration steps in future reviews of procedures and, also, during testing.

### Findings

No violations, deviations, or non-compliances were identified by the inspector.

## 3.2 Test Witnessing

### Scope

The inspector witnessed selected steps of the following ESF and HFT related tests:

- Charging Letdown and Purification System (T3304AP001)
- Auxiliary Feedwater Pumps (T3322-1M01)
- Diesel Generator B-Mechanical (T3346AP002)

Test Witnessing by the inspector included observation 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
- 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 (see Section 5).

#### Discussion

Test steps following step 7.2.27 of phase 2 test procedure T3304AP001, Rev. 0 were witnessed by the inspector. The objectives of this partial test are to verify the proper functioning of the control circuits for valve 3CHS\*MV8112. The inspector observed the proper functioning of all pertinent instruments on the main control board (MCB) including annunciators 2049 MB2E2-6 and 2044MB2E5-6. Correct responses were obtained from the computer display in the MCB as the test went through the test steps.

The inspector witnessed a partial test on the Auxiliary Feedwater Pump 3FWA-1B conducted in accordance with test procedure T3322-1M01, Rev. 0. The objective of this test was to determine if the bearing failure problem, experienced on 3FWA-1A pump, would repeat itself on the B pump and also, to determine pump performance in the system as installed. An ultrasonic flow meter (Controlotron, System 480) was installed temporarily to obtain accurate flow measurements. Some problems were experienced in obtaining flow measurements above 500 gpm. As a result, it was not possible to get the necessary data to verify the full pump test curve as supplied by the vendor. The flow rate data obtained below 500 gpm, however, indicated acceptable agreement with the test curve. The inspector made independent calculations to verify the test curve points obtained during the test. The inspector will check on the accuracy of the data obtained with the Controlotron on other tests, in a future inspection. The bearing failure problems of the A pump did not repeat itself on the B pump. This bearing failure on the A pump (outboard motor bearing) was diagnosed to be caused by an incorrect coupling gap which forced the bearing against the shaft shoulder.

The inspector witnessed two attempts to run Emergency Diesel Generator (EDG) B for 24 hours without trips or interruptions. Test procedure T3346AP002, Rev. 0 was used for this test. During this test the EDG is subject to the full set of trips provided by the vendor to protect the EDG. Most of these trips are bypassed when the EDG is on regular standby operation to perform its ESF function. The first attempt was started after midnight on July 8, but a trip of

unknown origin (no first out intelligence available) interrupted the 24 hours run. The inspector witnessed the full load dump of step 7.10.8 and checked the recovery for voltage and frequency as indicated on the main control board. Recovery was well within the limits of acceptance. The inspector also witnessed the partial load dump of steps 7.11.1.1 to 3. The Turbine Plant Component Cooling Water Pump was used to initiate the partial load dump. Frequency response to the load change peaked at 60.4 cycles. Recovery was rapid and within the limits of acceptance. A relay (3A) was installed after the trip to obtain a first-out signal on a future trip. The EDG-B was restarted on July 9 at approximately 15:00 hours. Another trip was experienced in the morning of July 10. This time the trip could be identified via the temporary first out circuit. It was low jacket water pressure. The inspector discussed this trip event with the responsible test engineer. There is a temperature control valve in the jacket water system which adjusts the bypass flow rate on the lube oil cooler to control its outlet temperature. Any such action will cause pressure changes in the jacket water system. Sometimes the pressure transient following valve change is sufficient to cause the low jacket water pressure trip. Vendor approval was pursued for changing the set point sufficiently to avoid the trip on future runs. Startup Management will insist on a 24 hour run without any trips prior to the ESF tests.

### 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.

### 3.3 EDG Status

The fuel oil system contamination problems appear to be under control. A program of intensive flushing and cleaning is starting to yield good results as evidenced by the successful runs on EDG-B (see paragraph 3.2 above). While the two runs witnessed did not complete the desired 24 hours, the EDG ran for more than 24 hours without any fuel pump or injector failures.

The inspectors checked on the progress of the dual lube oil filter design effort. Management apparently has decided to proceed with the installation of this design.

The inspector observed that the location of the fuel oil filters at the fuel oil pump level (approximately nine feet above floor level), and in proximity to the generators, presents a fire hazard. This hazard was highlighted by the recently experienced crack in a fuel

oil piping tee close to the filter. The fuel oozed out of the crack rather than sprayed. A fuel spray could have aimed directly at the open generator enclosure and start a fire or cause an explosion. It is anticipated that both EDGs will be available for the ESF test (with loss of normal power), 3-INT-2004.

#### Findings

The licensee's corrective action with respect to the fire hazard represented by the EDG's fuel oil filter location will be followed by the inspector under Unresolved Item (423/85-25-01).

### 3.4 ESF Status

It is anticipated by startup management that the ESF tests, 3INT-2003 and 2004 can be started in early August. The items presently on the critical path are the HVAC systems, including SLCRS and Auxiliary Building HVAC (HVR-A), Service Water (T3326-P), and Reactor Plant Component Cooling System (T3330AP). The schedule for these tests is adjusted daily based on the progress of these critical path items.

## 4. 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 in attachment B. All of these surveillances are associated with preoperational tests of the Emergency Diesel Generators (EDGs) by request of the inspector. The review indicated good coverage of the tests for the EDGs.

### Findings

No violations or non-compliances were noted in the review of the surveillance reports.

## 5. Independent Inspection and Measurements

### Scope

With reference to Criterion VIII of 10 CFR 50, Appendix B, the inspector pursued the identification and control of the Nugent fuel oil filters of

the Emergency Diesel Generators. These filters were completely replaced recently, including the filter housing, with filters of a modified design. The objective of this inspection was to verify that the identification of the new filter components was maintained throughout purchasing, storage, and installation.

The inspector took independent measurements during the Auxiliary Feedwater Pump B test performed in accordance with procedure T3322-1M01, Rev. 0.

#### Discussion

The work order initiating the filter change was identified via the Plant Maintenance Management System (PMMS). The associated record was MRIR 385-085. With help of this MRIR number and the specification number it was possible to retrieve the NNECO purchase order number (901721) assigned to Fairbanks Morse Engineering Division COLT Industries to supply the replacement filter 3EGF\*FLTIB. Shipping papers were then retrieved indicating that some modifications were made to the filter to comply with regulatory requirements. Identification numbers were also found. What remains to be done is to positively identify the modified filter components by individual serial number (on the component) or via the applicable design drawing revision. The inspector will follow this item to completion on a future inspection.

Independent readings were taken by the inspector of the inlet and outlet pressure of the Auxiliary Feedwater Pump B during the phase-1 test (T3522-1M01) as indicated on calibrated test gauges. The inspector compared these readings with those recorded by the test engineer and found them to be correct. The inspector also verified the correctness of the TDH (total Differential Head) calculations made by the test engineer through repetition of the calculations. The resulting test points in all cases fell on the manufacturer's test curve (gpm versus feet of water). Test points for the full length of the curve could not be obtained because the Controlotron flow meter, a digital instrument, could not produce readings above 500 gpm.

#### Findings

Proper entries had been made in the PMMS for the replacement of the filters. These entries made it possible to retrieve the purchasing documents and to identify what was bought and delivered. No violations or non-compliances were identified for the accomplished part of the filter inspection nor for the Auxiliary Feedwater Pump test curve verification efforts.

#### 6. Technical Specifications (TS) Versus As Built Plant

The inspector assisted the NRC team, on site during the second week of this inspection, in accomplishing the subject comparison. The inspector will continue to assist this team in the week following this inspection period.

7. Exit Interview

At the conclusion of the site inspection on July 11, 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

\*Released for Performance

<u>Proc. No.</u>	<u>Rev. No.</u>	<u>Date*</u>	<u>Title</u>
T3301F002	0	5-10-85	Reactor Coolant System
T3306P	0	2-01-85	Containment Recirc. Spray
T3307BP002	0	1-17-85	Residual Heat Removal
T3308P002	0	1-31-85	High Pressure Safety Inspection
T3309P001	0	2-11-85	Quench Spray
T3311BA	0	1-14-85	Turbine Plant Sampling
T3316AP001	0	4-09-85	Main Steam
T3319AP	0	3-14-85	Condensate
T3324AA	0	7-23-85	Main Generator Protection
T3330AP	0	1-15-85	RP Component Cooling
T3330BA	0	10-04-85	TP Component Cooling
T3331BA	0	9-18-84	Aux. Steam & Condensate System
T3339AA	0	11-05-84	Chemical Feed-Condensate
T3346AP003	0	10-15-84	EDG-A Licensing Test
T3346AP004	0	10-15-84	EDG-B Licensing Test
T3349P001	0	5-01-85	Plant Computer
- APP. A01		5-01-85	Plant Computer
- APP. B01		5-01-85	Plant Computer
- APP. C01		5-01-85	Plant Computer
- APP. D01		5-01-85	Plant Computer
- APP. E01		5-01-85	Plant Computer
- APP. H01		5-01-85	Plant Computer
- APP. I01		5-01-85	Plant Computer
- APP. J01		5-01-85	Plant Computer
- APP. K01		5-01-85	Plant Computer
3INT2001	0	11-15-83	Computer Programs Test
- APP. 3J6			
3INT2006	0	6-03-84	Turbine Building Hot Functional Test
3INT3000	0	(Draft)	Pre-Core Hot Functional Test
-APP. 3007			

Attachment B

Review of NUSCO-QA Surveillance Reports

<u>Report No.</u>	<u>Proc. No.</u>	<u>Procedure Title or Subject</u>	<u>Disc.</u>
TC-3255	T3405LT01	EDG Loading Safeguards	I&C
TC-3224	T3346AP002	EDG-B, Mechanical, Phase 2	Mech.
TC-3268	T3346AP002	EDG-B, Mechanical, Phase 2	Mech.
TC-3266	T3346A1M04	Diesel Generator Water Cooling Valves	Mech.
TC-3226	T3346AP002	EDG-B, Mechanical - Phase 2	Mech.
TC-3215	ACP-4.01	Housekeeping (EDG-Bldg)	
TC-3112	T3346A1E08	Phase-1 El. Tests EDG	Electr.
TC-3110	T3346A1E11	Phase-1 El. Tests EDG	Electr.
TC-3109	T3346A1E08	Phase-1 El. Tests EDG	Electr.
TC-3108	T3346A1E09	Phase-1 El. Tests EDG	Electr.
TC-3107	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3106	T3346A1E11	Phase-1 El. Tests EDG	Electr.
TC-3084	T3346A1E09	Phase-1 El. Tests EDG	Electr.
TC-3040	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3032A	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3032	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3031A	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3031	T3346A1E10	Phase-1 El. Tests EDG	Electr.
TC-3023	T3346A1E09	Phase-1 El. Tests EDG	Electr.
TC-3016	T3346A1E11	Phase-1 El. Tests EDG	Electr.
TC-2997	T3346A1E11	Phase-1 El. Tests EDG	Electr.
TC-2978	T3346A1E05	Phase-1 Mech. Tests EDG	Mech.
TC-2951	T3346B1E01	Phase-1 El. Tests EDG	Electr.
TC-2912	T3346B1F01	Phase-1 Mech. Tests EDG	Mech.
TC-2994	T3346B1M02	Phase-1 Mech. Tests EDG	Mech.
TC-2854	T3346A1M02	Phase-1 Mech. Tests EDG	Mech.
TC-2867	T3346A1E01	Phase-1 El. Tests EDG	Electr.
TC-2866	T3346A1I03	Phase-1 I&C Tests EDG	I&C
TC-2866	T3346A1I03	Phase-1 Instr. Test EDG	I&C
TC-3281	T3405-1I01	EDG Loading Sequences	I&C
TC-3268A	T3346AP002	EDG-B, Mech. Phase 2 Test	Mech.