

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-423/85-02  
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: January 9 - February 4, 1985

Inspectors: *E. C. McCabe, for* 2/21/85  
T. A. Rebelowski, Senior Resident Inspector date  
*E. C. McCabe, for* 2/21/85  
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*E. C. McCabe, for* 3/6/85  
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Approved by: *E. C. McCabe* 3/6/85  
E. C. McCabe, Chief, Reactor Projects date  
Section 3B, DRP

Inspection Summary: Inspection 50-423/85-02 (1/9/85 - 2/4/85)

Routine resident (151 hours) and region-based (26 hours) inspection of preoperational testing, previous inspection findings, control room practices, plant tours, potential significant deficiencies, flushing program activities, IE Bulletins, allegations, valve position anomalies, fuel receipt preparations, service water hydraulic testing, and a safety injection pump test anomaly.

No violations or unacceptable conditions were identified. Fifteen NRC Bulletins and two reported construction deficiencies were closed.

## DETAILS

### 1. Persons Contacted

Numerous members of Northeast Utilities and Stone and Webster (S&W) including engineers, technicians, and craftsmen were contacted.

### 2. Licensee Action on Previous Inspection Findings

(Closed) Inspector Follow Item (423/84-02-02) Spent Fuel Rack Neutron Absorption. This item was satisfactorily addressed in IE Inspection Report 423/84-03 (Paragraph 9b) which verified existence of the certification of analysis, of the certification of compliance, of lab chemical analysis, and of particle size analysis for the Bisco Boroflex attenuator. This item is hereby closed administratively.

(Closed) Unresolved Item (423/84-10-01) EDG floor drains tied to roof drains with potential for back flooding. The inspector inspected pertinent areas depicted in DWG No. 252 12-25002, 24181, and 2482. The drawings show that roof and building drains lead to yard storm sewers without ties to the floor drains. The floor drains leak to a tank and oil separator that is protected with check valves. Resident inspector walkdown checks verified drawing accuracy on a sampling basis.

(Closed) Unresolved item (423/84-10-02) The EDG enclosures have no method of dewatering cable trays. The licensee stated that a 3" standpipe has been installed to allow placement of a dewatering hose in the cable tray area. This is depicted on Drawing 25212-24181. The inspector verified this installation.

(Closed) Noncompliance (423/84-02-04) Reactor coolant inlet and outlet manholes to Steam Generator 3RCS-SG-1D were uncovered and unattended. The covers were replaced and locked. Observations of the locked covers have been made during routine tours. No abnormal conditions have been identified.

(Closed) Inspector Follow Item (423/84-03-05) The inspector reviewed Revision 2 of Generic Procedure GPIC 54.01, Isolation Cabinet-Initial Test. That revision documents the previously missing figures.

### 3. Review of Licensee Reports of Potentially Significant Deficiencies

The inspectors reviewed 11 reports of potentially significant construction deficiencies. The 9 reports where licensee action remains outstanding include:

85-00-07	85-00-04	85-00-01
85-00-06	85-00-03	84-00-18
85-00-05	85-00-02	84-00-16

One report, 84-00-17, was found not to involve a significant deficiency upon further inspection. Corrective actions and dispositions were reviewed and found to be complete for one item, 82-00-11.

Details of these reviews are included in Appendix A.

4. Flushing Program Observations

The inspector observed a flush of the Residual Heat Removal System, T3307B1F01, Revision 0, on January 14, 1985.

The procedure included acceptance criteria, prerequisites, initial conditions, special precautions, procedure steps, and restoration.

The flush observed was of RHS system piping between the refueling water storage tank and the Loop B hot leg. Flow was provided by RHS pump P1A at the normal flow rate.

The system was flushed until a flush cloth placed at a drain line indicated satisfactory system cleanliness. Then, as required by the Flush Procedures, samples were drawn for chemical and particle analysis by the laboratory for final acceptance.

No concerns were identified.

5. Status of IE Bulletins

The inspector reviewed the status of 18 Inspection and Enforcement (IE) Bulletins at Millstone 3. Of these, the following 15 are closed:

80-01	80-12	80-17	83-02
80-02	80-13	80-22	83-03
80-04	80-14	80-24	84-01
80-07	80-16	80-25	

Bulletins 80-06, 80-10, and 80-15 remain open.

Details of the inspector's reviews are attached as Appendix B.

6. Allegations Concerning Pipe Support Installations (RI-84-A-166)

In response to certain allegations received by the NRC and the licensee, the licensee initiated an investigation. The NRC reviewed the results of this investigation and performed an independent inspection. One allegation concerning Hilti bolts was substantiated in part, but it was concluded that there was no impact on safety. The specific allegations and findings are summarized below:

Allegation - Markings on 5½" Hilti bolts have been changed to indicate that they were 7" long.

Finding - The licensee measured the length of 507 installed Hilti bolts by ultrasonic test examination. Of these, 3 were found to be  $1\frac{1}{2}$ " shorter than indicated by the identification stamp. The licensee evaluated the effect of the shorter Hilti bolts and concluded: "the reduction of embedment depth due to use of an anchor approximately  $1\frac{1}{2}$ " shorter than originally intended would have not detrimental effect on the licensed design." This conclusion was based on the calculated shear cone area required to resist the forces that cause anchor slippage. Anchor slippage was determined to be the mode of failure by pullout tests performed for Millstone 3.

FQC performed a review to determine if any installed 7" Hilti bolts had been rejected because of embedment depth and subsequently accepted "as is" by Engineering. It was determined that 238 instances had occurred. These 238 Hilti bolts were then ultrasonically tested and the embedment depths were found to be greater than the minimum embedment depth determined by calculation. The inspector had no further questions on this item.

Allegation - Welds on pressurizer head pipe supports did not receive adequate QC.

Finding - The inspector reviewed the QC inspection documentation for welds in the specific area described by the allegor. No discrepancies were identified. In general, the licensee's QA/QC program has been the subject or numerous NRC inspections and has been found to be effective. For example, NRC Region I Pipe Support Inspection 84-14 found no pipe support deficiencies. Such inspection is continuing and welding and NDE work activities and completed work will be one area reviewed by the CAT Team Inspection scheduled for February and March 1985. Based upon specific inspection having failed to corroborate this allegation and upon the continued NRC inspection coverage of welding adequacy, the inspector had no further questions on this item.

Allegation - Hilti bolts were not properly anchored but were spot welded to the support plate in order to get the required torque on the nuts.

Finding - No specific locations could be given by the allegor. During plant tours NRC inspectors have frequently checked supports that have not yet been grouted for indications of spot welded Hilti bolts. This has been previously documented in Inspection 84-20. No unacceptable conditions or practices were noted. The inspector had no further questions on this item.

## 7. Valve Position Indication

### a. References

- E&DCR T-P-01976, "Butterfly Valve Position Indication," initiated 11/12/84.
- DDR-185, attached to E&DCR T-P-1976, originated by S. Oretia on 10/26/84.

- DDR-247, Operation of SWP-MOV 130A in reverse, initiated by D. Prawdzik, 1/10/85.
- Memorandum M. Gentry to D. Miller, transmitting reference 1.1 above.
- Phase 1 Test Procedure No. T3307B1F01, Revision C, completed check list, Change No.1, Item 6.17 (Flushing Phase 1 Test), partial completion of check list 1-11 and 12-85.

b. Generic Valve Concerns

Problems have been encountered, during Phase 1 and 2 testing, with local valve position indication on different valves (manual and motor operated). These problems can be categorized as follows:

- (1) The valve position arrow on manually operated butterfly valves made by Henry Pratt is not securely attached to the valve shaft by the supplied set screw, allowing the arrow to slip on the shaft. Position indication is thereby uncertain.
- (2) Reverse installation of position indicator pointer. The pointer is perpendicular to the pipe axis when the valve is open, contrary to the normal convention which has this position of the pointer indicate the valve to be closed.
- (3) Raised lettering on valve body for the open and closed positions 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. This is contrary to the normal convention.
- (5) There is no position indication labelling for the position pointer.

c. Examples

The set screw slippage problem is addressed in E&DCR T-P-1976 (ref. 1.1). The hardness of the materials is such that the set screw cannot "bite" into the shaft enough to prevent it from slipping. The proposed solution is to drill a hole in the valve shaft to receive the set screw with the hole depth sufficient to provide the full shear resistance of the cross section of the set screw.

Reference 1.5 provides 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 was not clear what the disposition of this item is. Problems (4) and (5) exist for SWP\*MOV130A. It is not clear what other valves there are with the same problems.

d. Discussion

It is sound practice to assure that valve position indication (VPI) is consistent and in accordance with normal practice (VPI pointers pointing along the pipe axis for open valves, counterclockwise handwheel rotation functioning to open valves). Doing so provides a human engineering safeguard against valve mispositioning and against misreading of valve positions. The licensee has initiated action to identify VPI inconsistencies. This item is unresolved (423/85-02-01) pending licensee action to assure that VPI conditions are consistent with the importance to safety of proper positioning of Millstone 3 valves.

8. Fuel Receipt Pre-Inspection

The licensee's planned receipt, inspection, and storage of new fuel were discussed with the licensee and Westinghouse. Areas discussed were:

Fuel assembly anomaly in numbering of rack elevation readings of corner-cell funnels. This item was satisfactorily resolved by licensee correction of the records of the numbers.

Security of fuel onsite is to be reviewed by a regional specialist (IE Inspection Report 423/85-09).

Procedure OP 3211A, Draft C will receive NRC pre-operational review. Definition of the qualification of personnel to handle fuel and the activation of radiation monitoring equipment in the fuel building without remote indication in the control room were discussed and remain open for further inspector review. A review of projected items to be completed prior to fuel receipt remains to be completed by NRC. The licensee application for Special Nuclear Material license appears to limit the time for NRR review. These concerns will be reviewed during a subsequent inspection (IFI 423/85-02-02).

9. Service Water System

Service water system analysis indicated that sections of higher elevation piping supplying control building air conditioning water chillers drain under shutdown conditions, with a possibility of water hammer during restart. This was verified during testing. The inspector reviewed licensee recommendations for changing operating logic for MOV's, for low speed bus (pump) transfer to prevent vapor gap, and the analysis of check valve slam effect with restrictions on stroke timing of the MOV's. Other analysis has indicated that an orifice bypass could correct the problem by introducing an air cushion. This item is unresolved pending completion of testing to verify elimination of water hammer transients (412/85-02-03).

10. Plant Tours

During the report period the following tours and observations were made by the resident inspectors.

- Toured containment, screen house, service and auxiliary building with special attention to general material condition, housekeeping and fire protection. Results satisfactory.
- Toured fence line separating construction and operating sites. Results satisfactory.
- Toured future combined Technical Support Center (TSC) for Millstone 1, 2, and 3. Construction and furnishing are in final stages. Provisions for exterior and interior communications were discussed with representatives of the station services engineering department. These include both voice telephone and computer data link equipment. The inspector walked down the safety-related ventilation system for the TSC and concluded that the present quality of workmanship was acceptable to the extent that could be determined by visual inspection.
- Witnessed the reinstallation of auxiliary feedwater pump P1A and the cleanup of the pump casing of AFW pump P1B. Noted that the gasket for the pump casing was being fabricated rather than precut. The gasket material was found acceptable.
- Examined, with a region-based inspector, the placement of electrical terminal clamping fixtures in the diesel generator room and found the clamps were not firmly securing the incoming lines. This is addressed in region-based specialist Report 423/85-01.
- Witnessed SIH/P1A pump run. This run was to determine bypass and total flow capacity. Three leaking flanges were noted and corrected. The system had been pressure tested (which allows flange leakage during test) previously. The inspector's concern is that, although a leakage test will be performed to verify maximum leakage, the future introduction of borated water into a system with undetected leaky flanges could cause flange attachment bolt deterioration. Adequacy of procedural controls and practices governing establishment of leak tightness of mechanical joints will be further examined (IFI 423/85-02-04).

In addition, permanent instrument tubing was disconnected without proper tube end protection (covering) from introduction of foreign material. The licensee took acceptable action to protect these minor openings.

The Control Room had no indication of valve positions or lineups other than confirmation by telephone that the system was in proper lineup. This concern was identified to the test director. Further review will be performed during the preoperational test program. Detail 11 of this report also addresses this item.

- The inspector reviewed the results of an uncontrolled lowering of an outside crane boom on January 19. Minor damage to the crane and to the temporary electrical shop was incurred. The operator sustained severe injuries to both legs. There was no impact or affect on nuclear safety-related equipment. The inspector had no further questions on this item.

#### 11. Preoperational System Testing

The licensee, during the performance of the Safety Injection System Flow Balance Test T 3308-P001, identified no flow at the B-SI pump minimum flow valve. The pump was run for less than four minutes.

A review of the problem identified that the B-SI pump minimum flow valve was shut. Results of the investigation by the licensee determined that personnel error was the major contributor to the incident. The licensee does not attribute the event to the mispositioned valve problem identified in Paragraph 7 of this report.

##### a. Licensee Initial Corrective Action

- (1) The licensee rotated the pump by hand and found no unusual condition. The vendor was consulted and the pump was run at intermittent intervals over a twenty-four hour period with satisfactory results.
- (2) This event was reviewed with the operators to reinforce the need to confirm all actions required to verify lineup. In addition, prior to the start of the pump, suction and discharge flow paths will be verified.

##### b. Review of Event

The inspector attributed the event to a number of items such as:

- (1) Lack of indication of valve position in the control room.
- (2) Lack of control room information as to flows (disconnected flow meters).
- (3) Relinquishing valve positioning and verification control to other than operating staff personnel.
- (4) Motor operated valves that are manually operated may not provide visual confirmation of valve positions (stem movement not evident, no position indication available).
- (5) Possible fatigue of the test personnel who were on twelve hour shifts with this event taking place during the tenth or eleventh hour of the shift.



c. Additional Licensee Corrective Action

- (1) Operations personnel have been re-instructed on their responsibilities and control of testing has been re-emphasized.
- (2) Remote indication of test parameters (flow, pressure) in the control room is to be available to permit the operators to recognize test conditions.
- (3) Personnel positioning valves have received additional training on this subject.

The licensee has not instituted double valve verification of safety systems during testing, but is continuing to monitor preoperational tests to reduce the occurrence of this type of event. The inspector will review the effectiveness of licensee corrective actions during a subsequent inspection. Also, further inspector evaluation will be made of the possible interrelationship between long work hours and valve positioning errors (IFI 423/85-02-05).

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. The unresolved items disclosed during the inspection are discussed in Paragraphs 7 and 9.

13. Management Meetings

At periodic intervals during the course of this inspection, meetings were held with senior plant management to discuss the scope and findings of this inspection. No proprietary information was identified as being in the inspection coverage.