

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-423/88-15

Docket No. 50-423

License No. NPF-49

Licensee: Northeast Nuclear Energy Company
P.O. Box 270
Hartford, CT 06101-0270

Facility Name: Millstone Nuclear Power Station, Unit 3

Inspection At: Waterford, Connecticut

Inspection Conducted: August 16 - September 26, 1988

Reporting Inspector G. S. Barber, Resident Inspector

Inspectors: W. J. Raymond, Senior Resident Inspector
G. S. Barber, Resident Inspector

Approved by: E. C. McCabe, Jr.
E. C. McCabe, Chief, Reactor Projects Section 1B

10/12/88
Date

Inspection Summary: Inspection on 8/16/88 - 9/26/88

Areas Inspected: Routine onsite inspection of Plant Operations, previous inspection findings, an allegation on storage of QA resin, "A" Emergency Diesel Generator Output Breaker Trip While Loading, sticking "B" Main Feedwater Regulating Valve, Licensee Event Reports, maintenance, surveillance, and committee activities.

Results: No unsafe plant conditions were identified. Two violations (NC4 88-02-01 and NC4 88-05-01) cited in previous reports were closed. An allegation described the storage of resin in the condensate polishing facility as unsatisfactory. This allegation was unsubstantiated. However, shelf life and in-transit controls are an unresolved item (UNR 88-15-01).

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DETAILS

1.0 Persons Contacted

Inspection findings were discussed periodically with the supervisory and management personnel identified below.

- S. Scace, Station Superintendent
- C. Clement, Unit Superintendent, Unit 3
- M. Gentry, Operations Supervisor
- R. Rothgeb, Maintenance Supervisor
- K. Burton, Staff Assistant to Unit Superintendent
- J. Harris, Engineering Supervisor
- D. McDaniel, Reactor Engineer
- R. Satchatello, Health Physics Supervisor
- M. Pearson, Operations Assistant
- R. Griswold, Stores Supervisor
- R. Asafaylo, Quality Services Supervisor

2.0 Summary of Facility Activities

The plant operated at full power throughout the inspection period except for minor power reductions for surveillance testing.

3.0 Previous Inspection Findings

3.1 (Closed) NCR4 88-02-01: One of Two Required Charging Pumps was Inoperable During Entry into Mode 3

The licensee discovered at 8:20 a.m., January 30, 1988, while in Mode 3, that only one of two required charging pumps was operable. The "A" charging pump was declared inoperable when cooling water inlet and valves for its lubricating oil heat exchanger were found closed. Technical Specification (TS) 3.5.2 requires that two independent charging pumps be operable in Mode 3 and TS 3.0.4 requires that all applicable Limiting Conditions for Operation (LCO) be met without reliance on action statements prior to increasing Modes. Since Mode 3 was entered at 5:42 p.m., January 29, this was a violation.

The licensee attributed the root cause of the violation to procedure inadequacy since procedures did not require a test run of the charging pump prior to entry into Mode 3. The inspector concurred that procedure changes and other corrective action should prevent recurrence of this violation. However, the licensee's root cause determination indicated procedure inadequacy as the sole problem. Along with the procedures, operators share the responsibility of ensuring that necessary support equipment/valve lineups are available to ensure successful pump starts. OP-3260, Conduct of Operations, states this requirement. The need for

operator attentiveness during such evolutions was communicated to licensee management. The licensee reemphasized to operators the need to ensure lineups and support systems are available and adequate for the evolution in progress.

The licensee has completed a procedure change to OP3201, Plant Heatup, to require a test run of the charging pumps prior to exceeding 350 degrees F. OP3304, Charging and Letdown, was changed to danger tag any charging pump not aligned for service. These procedure changes should preclude further starts without the requisite support system. This item is closed.

3.2 (Closed) NC4 88-05-01: AFW Suction Valve Improperly Locked

During routine inspection in the Engineered Safety Features (ESF) Building at 3:30 p.m., March 4, the inspector found the demineralized water storage tank (DWST) Suction Valve for the "A" Motor-Driven Auxiliary Feedwater Pump (MDAFW) (3FWA-V2) open as required, but not properly locked. The lock had been closed on one link at one end of the chain but not at the other end. The chain could be pulled free of the hand-wheel and the valve could be operated. This violated the administrative controls for locked valves.

The inspector reported the improper locking to the Shift Supervisor (SS), who dispatched a Senior Control Operator (SCO) on relief shift to the ESF building. The SCO properly secured the lock and accompanied the inspector during walkdown of other accessible locked major flowpath valves for the AFW and Safety Injection (SI) systems. No other inadequacies were identified. The inspector questioned whether there might be other valves without their locks properly attached. The licensee agreed to check all locked valves outside of containment.

The licensee completed checking all locked valves on safety systems outside of containment. In addition to checking the valves themselves, the licensee compared valve position on controlled drawings to those specified in the valve lineup. Locked valve lineup checks were performed on the following systems.

- A&B Auxiliary Feedwater.
- A&B High Pressure Safety Injection.
- A&B Recirculation Spray System.
- A&B Quench Spray System.
- A&B Residual Heat Removal.
- A&B Charging Pump Corling.
- A&B Boric Acid.
- A&B Diesel Fuel Oil and Lube Oil.
- A&B Service Water.

During review of completed PIR 51-88, which documented the completed locked valve checks, the inspector noted errors in the date recorded for the diesel fuel and lube oil valve lineups (listed as 2/5/88). The licensee contacted the operator and verified he had recorded the wrong date. The dates were corrected. In addition to the locked valve lineup checks performed, the licensee reminded all operators to ensure that locks are properly secured through their respective valve handwheels. The inspector routinely checks this item on plant tours and has identified no further inadequacies. This item is closed.

4.0 Plant Operational Status Reviews (71707)

The inspector reviewed plant operations from the control room and reviewed the operational status of plant safety systems to verify safe operation of the plant in accordance with the requirements of the Technical Specifications and plant operating procedures. Actions taken to meet Technical Specification requirements when equipment was inoperable were reviewed to verify the limiting conditions for operations were met. Plant logs and control room indicators were reviewed to identify changes in plant operational status since the last review and to verify that changes in the status of plant equipment was properly communicated in the logs and records. Control room instruments were observed for correlation between channels, proper functioning, and conformance with Technical Specifications. Alarm conditions in effect were reviewed with control room operators to verify proper response to off-normal conditions and to verify operators were knowledgeable of plant status. Operators were found to be cognizant of control room indications and plant status. Control room manning and shift staffing were reviewed and compared to Technical Specification requirements. No inadequacies were identified.

5.0 Allegation Follow-up - Storage of QA Resin (92701)

An anonymous letter received at the NRC Resident Office on September 7, 1988 stated that QA Category 1 resin was improperly stored at the condensate polishing facility (CPF) and should be in a "Level 1" storage area. The inspector discussed resin procurement with stores and QC personnel, reviewed administrative requirements for procurement, receipt, and storage as specified in licensee procedures ACP-QA-4.02B and 4.04 and ANSI Standard N45.2.2-1972 (as committed to in Appendix D of the Northeast Utilities Quality Assurance Program Topical Report). Inspector review determined that the CPF was a proper storage area for resin. The basis for this determination and other inspector findings are summarized below.

Inspector tours on September 7 determined that about 600 barrels (141.5 cu. ft. each) were stored on two floors of the CPF. The resins were marked with NU QC Acceptance Tags which provided the following identifying information: Klenzoid ion exchange anion and cation resin procured under Purchase Order (PO) 911632 as QA "Category 1" material for use in condensate, radwaste and

cleanup process systems; the resins were receipt inspected on site in the April - May 1988 period per material receipt inspection report (MRIR) 287-289; and a Class "C" storage level was assigned.

The CPF houses polishing systems for MP-2 and MP-3, functions as a warehouse and provides office space for Nuclear Records, Unit 2 I&C and the calibration laboratory. The CPF and other warehouse facilities onsite and at Great Neck Road (an offsite Northeast Utilities warehouse location) meet the requirements for a Level B storage area. The CPF is an enclosed, clean and dry structure with provisions for temperature control to maintain ambient temperature well within the 40 to 140 degree F range required for a Level B area. Based on discussions with station chemistry personnel, the appropriate temperature storage range for resins is about 40 to 120 degrees F, to guard against freezing or excessive heat which could affect the physical integrity of the beads. The inspector concluded that the CPF is a proper storage area for Category 1 resins. The concern that QA Category 1 resin was improperly stored was not substantiated. The discrepancies discussed below were identified during inspector follow-up of the allegation.

5.1 Improper PO Specifications

Purchase Order No. 911632 dated 1/12/88 (repeat requisition) stipulates that the resins be handled, shipped and stored per ANSI N45.2.2 Level D controls, which is improper since this would allow outdoor storage and not provide adequate protection from the environment or temperature control. This matter was discussed with stores personnel who stated actions would be taken to correct the purchase specification.

The QC inspector who performed the receipt inspection for the shipment assigned a Level C storage area (even though no Level C storage facilities exist onsite) since Level D was specified in the PO and storage under conditions at or better than the specification is acceptable per the standards. Level C was also specified to allow for outdoor transport of the resins from the Great Neck Road facility. The NRC inspector stated that Level C storage would not be acceptable for resins during cold winter months if stored outside while in transit. The licensee acknowledged the inspector's comments.

5.2 Shelf Life Controls

ACP 4.06B, Degradable Material Control Program, specifies on page 7 of Figure 7.1 that resins are degradable materials that require the application of shelf life controls. The inspector noted that shelf life controls were not applied to resins procured under PO 911632, in that no shelf life specifications were included in the procuring documents, and no tagging per ACP 4.06B was provided upon receipt of the materials.

Review of this finding with stores personnel indicated that the shelf life control program, initiated in mid-1987, should have been applied to the February 88 purchase order. Failure to do so indicated that review failed to apply the required controls when the PO was processed, and at receipt inspection when the materials were received on site. Inspector interviews with procurement personnel and the QC inspector responsible for the receipt inspections found that they were familiar with the shelf life program, but that the requirements were not applied in this case due to an oversight. A contributing factor to the oversight was the receipt of the resins at the point of storage (CPF or Great Neck facility) instead of at the normal off load area in the main warehouse.

This matter was discussed with stores personnel who stated the vendor would be contacted to obtain a cure date for the resin and that the materials would be tagged to apply shelf life controls. The inspector noted that resin shelf life is typically two years or longer under proper storage conditions.

The inspector concluded that a programmatic concern may exist but is not shown by a sample of one purchase order. Inspector concerns were discussed with stores supervisory personnel and the Quality Services Supervisor. The licensee acknowledged the inspector's concerns and stated that consideration would be given to an audit of the degradable materials program. This item is unresolved pending determination of the shelf life of the resin in question, completion of other licensee actions (including in-transit controls), and further NRC review of the shelf life control program (UNR 88-15-01).

6.0 "A" Emergency Diesel Generator Output Breaker Trip While Loading

On September 6, at 6:23 a.m., the "A" Emergency Diesel Generator (EDG) output breaker tripped during an attempt to load the engine. The "A" EDG was initially paralleled to the system at 6:12 a.m. The operator attempted to increase load in a controlled manner, but had trouble adjusting to the large swings in load that occurred each time the speed/load switch was operated. Within approximately 1 minute from the time the output breaker was closed, and subsequent to adjusting the speed/load changer to compensate for a sudden large power increase, the output breaker tripped and the engine shut down on reverse power.

The identified possible causes of the power swings were:

- Unit/Parallel Relay (UPR) de-energized while the EDG was operated in parallel with site power.
- Malfunction of the mechanical governor.
- Malfunction of the electrical governor, including the motor-operated potentiometer (MOP) that determines the electric governor load/speed setting.

-- A mechanical or electrical disruption in an external component that provides an input to the mechanical or electrical governor.

The licensee identified the UPR relay and its associated circuit as the most likely cause. Changing load significantly with minor adjustments to the MOP was symptomatic of the "Unit" mode of speed/load control while in parallel with the site electrical system (grid). The control switch was confirmed to be in "Parallel" and an electrical check of the UPR circuit was performed. No circuit malfunction was discovered. The "A" EDG was then started and paralleled to the site electrical system. Governor response to the load/speed changer was satisfactory. The EDG was operated at full load in accordance with the surveillance procedure without any indication of governor control problems. At 11:48 a.m., on September 6, the "A" EDG was returned to an operable status.

Further investigation was conducted. A review was made of all maintenance performed on "A" EDG during the month prior to its failure (August 1988). Operators, mechanics, and electricians associated with either the failure or maintenance performed prior to the failure were interviewed by the licensee. Also, a manufacturer's representative from Colt Industries was consulted. No definitive cause was identified. A second test run of "A" EDG was performed on September 7 with the Governor responding correctly to all load/speed change demands.

Based on the investigation to date, the licensee concluded that the most likely cause was intermittent sticking contacts or relays associated with the UPR circuit. Other malfunctions would have been expected to cause permanent failures. An air bubble in the mechanical governor oil system could cause an intermittent problem, but the licensee concluded this was unlikely since it has been at least nine months since the governor oil has been changed (the most likely time that air bubbles would form). The fact that the governor responded in the correct direction (increase in load for an increase in signal and vice-versa), albeit too rapidly to prevent a reverse power trip, was further indication the UPR circuit was at fault. Subsequent starts will be videotaped to attempt to determine the cause of any unusual power swings. The inspector had no further questions at this time.

7.0 Sticking "B" Main Feedwater Regulating Valve

The licensee placed the "B" main feedwater regulating valve (FRV) (3FWS*FCV520, COPEX-VULCAN Model 12" 900LB) in Manual on August 17 to mitigate a sticking problem. The "B" main feed water regulating bypass valve (BV) was placed in automatic to compensate for Steam Generator (SG) level oscillation of +/- 2% over the past month.

The "B" FRV was first discovered stuck (on August 8) about 0.5 inches below its 100% power position during stroking of the "B" bypass valve. Since the "B" FRV was not responding smoothly to the demand signal, the bypass valve was being stroked open in manual to exercise the "B" FRV in automatic. Over a fifteen minute period the bypass valve was moved from 0% to 100% open. As

the bypass valve was being opened, the "B" FRV demand signal went from about 80% open to 20% open (with a normally functioning valve, the demand signal would have been expected to decrease from 80% to about 70%) and the valve stem moved in the closed direction about 0.5". Steam generator level increased slightly during testing but remained under control. After the "B" bypass was fully open, the operator started to manually close it. The "B" FRV did not move and SG water level started to decrease forcing the operator to restore level. When the demand signal reached 80% open the "B" FRV became "unstuck" and jerked open. The operator manually shut the bypass valve and stabilized "B" SG level before returning the "B" FRV to automatic. The "B" FRV has live-load packing and inspection of the "B" FRV stem showed a worn area that will require replacement during the next plant shutdown. The "B" FRV remained in automatic and the licensee has decided that the "B" bypass valve will no longer be stroked for preventive maintenance.

The licensee contacted the Westinghouse Site Services Manager (WSSM) to discuss the ramifications of continued operation. The WSSM proposed that the licensee implement one of two options. The first was to place the "B" bypass valve in automatic and shut the "B" FRV in manual to the point where the bypass valve is 60-70% open and controlling in automatic. This option required the gain setting for the nuclear instrumentation (NI) feed forward signal to be set to zero. The bypass valve could cope with a 5 to 10% power transient without operator action. Larger power transients would require operator action to prevent a plant trip. The second option required adjusting the "B" FRV Moore booster relay to make it more responsive to the control signal from the positioner. This adjustment is made by using an internal bypass valve. If the air signal from the positioner can bypass the booster relay's diaphragm without building up a differential pressure, the booster will never actuate. For small signals the air will bypass around the booster and for larger signals the booster will function to pass a large volume of air. By screwing the needle bypass adjustment screw in 1/8 of a turn (CW) the bypass flow path will become slightly more restricted and the booster relay will actuate on a smaller input signal.

The booster relay will not give a higher final pressure, but will insure the final demand pressure is reached quicker, i.e. it is a volume booster, not a pressure booster. If the "B" FRV is sticking, this added volume may assist it in more rapidly un-sticking. This option was less desirable because of its effect on SG level.

The licensee implemented option one on August 17 by placing the "B" FRV in manual and the "B" bypass valve in automatic. The inspector reviewed the licensee's implementation of option one under bypass/jumper No. 388-58. The inspector noted that the bypass/jumper removed the NI feed forward signal to the "B" bypass valve (3FWS*LV560). This jumper also requires the resetting the NI gain to 4.8% valve lift per % power prior to low power operation. The bypass jumper signal also documented the resolution of the following: 1) NI signal isolation such that gain adjustments will not affect the Solid State

Protection System (SSPS); 2) the ability to isolate feedwater on a feedwater isolation (FWI) signal; 3) operator awareness of B bypass valve control limitations as listed by the WSSM.

The licensee satisfactorily addressed the concerns as follows: 1) the resetting of the gain will not affect the SSPS because this control circuitry is isolated from the protection circuitry; 2) FWI will be provided by automatic closure of the feedwater containment isolation valve (3FWS*CTV41B) and by main feedwater pump trip independent of either "B" bypass or "B" FRV closure; 3) Operators have been briefed on the need to take action on a large power transient and will attempt to control SG level in the normal band. The inspector had no further questions in this area.

8.0 Licensee Event Reports (90712)

Licensee Event Reports (LERs) submitted during the report period were reviewed to assess LER accuracy, the adequacy of corrective actions, compliance with 10 CFR 50.73 reporting requirements and to determine if there were generic implications or if further information was required. Selected corrective actions were reviewed for implementation and thoroughness. The LERs reviewed were:

-- LER 88-19-00, Unexpected Control Building Isolation Due to Personnel Error

At 12:15 a.m. on June 11, a component in the "A" Train control building ventilation inlet radiation monitor failed. As part of the restoration, the radiation monitor setpoints were entered at the control room console. While reading the setpoints from a table, a control room operator inadvertently read the high radiation rate trip setpoint value from an adjacent line in the table and entered it as the Radiation Engineering Conversion Factor (RECF). Entry of the incorrect RECF caused the indicated radiation level to exceed the alarm setpoint, initiating the CBI. Control building ventilation was immediately placed in filtered recirculation and the correct RECF was installed. The licensee verified inlet radiation was at normal background levels using the "B" Train radiation monitor and all monitor setpoints were checked. To prevent recurrence, the licensee will momentarily disable and restore Engineered Safety Features while radiation monitor setpoints are entered. Engineered Safety Features will be verified re-enabled following setpoint entry. The inspector had no further questions on this LER.

-- LER 88-20-00, Improper Bypass Breaker Surveillance Due to Administrative Error (NV4 88-15-01)

At 10:00 a.m. on July 18, the licensee identified that the reactor trip bypass breaker Technical Specification (TS) surveillance test frequency was inadequate. On May 14, the "A" train bypass breaker was placed in service without verification of shunt trip operability within the preceding 31 days as required by Plant Technical Specifications. No immediate actions were required of plant operators since redundant equipment

in the opposite train provided plant protection. The cause of the event was inadequate administrative review of the trip actuating device operational test frequency portion of Plant Technical Specifications. The Preventive Maintenance Surveillance schedule for reactor trip bypass breaker local manual shunt trip operability has been updated to reflect the proper frequency.

This licensee-identified item was evaluated as being of low safety significance, appropriately reported and corrected, and not a result of inadequate corrective action on a prior violation. Therefore, no Notice of Violation was issued.

9.0 Maintenance (62703)

The inspector observed and reviewed selected portions of preventive and corrective maintenance to verify compliance with regulations, use of administrative and maintenance procedures, compliance with codes and standards, proper QA/QC involvement, use of bypass jumpers and safety tags, personnel protection, and equipment alignment and retest. The following activity was included:

- Repair of Flux Map System, on 9/22/88
- Repair of the A Emergency DG, on 9/6/88

No inadequacies were identified.

10.0 Surveillance (61726)

The inspector observed portions of surveillance tests to assess performance in accordance with approved procedures and Limiting Conditions of Operation, removal and restoration of equipment, and deficiency review and resolution. The following test was reviewed:

- Flux Map, dated 9/22/88

No inadequacies were noted.

11.0 Committee Activities

The inspector reviewed the minutes for Plant Operations Review Committee (PORC) meetings 3-87-205 dated 12/14/87, 3-88-46 dated 2/11/88, 3-88-99 dated 5/10/88, 3-88-103 dated 5/19/88, 3-88-104 dated 5/23/88 and 3-88-109 dated 6/2/88. The inspector noted from the written records that committee administrative requirements were met for the meetings and that the committees discharged their functions in accordance with regulatory requirements. No inadequacies were identified.

12.0 Management Meetings

Periodic meetings were held with station management to discuss inspection findings during the inspection period. A summary of findings was also discussed at the conclusion of the inspection. No proprietary information was covered within the scope of the inspection. No written material was given to the licensee during the inspection period.