U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket/Report No.: 50-443/92-18

Licensee: North Atlantic Energy Service Corporation

Facility: Seabrook Station, Seabrook, New Hampshire

Dates: September 8 - October 12, 1992

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OVERVIEW

The operators completed the complex series of operational tasks associated with the refueling outage in an outstanding manner. The extensive health physics technician coverage of ongoing work activities in the containment demonstrated a strong management commitment to implementing the ALARA program. The security department properly implemented security program requirements.

Programmatic controls for maintenance activities were good. The inspectors identified minor violations of station work control program requirements. The violations were not cited due the minimal safety significance and North Atlantic's initiation of prompt corrective actions.

The extent of the test director's authority to independently modify approved surveillance procedures was an unresolved item. A special test demonstrated the ability of the residual heat removal pumps to operate in parallel at minimum flow without overheating.

The document coordination report for the elimination of the reactor coolant system resistance temperature detector bypass manifold was complete and properly implemented. The safety evaluation for the temporary modification to the spent fuel pool cooling system was thorough.

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DETAILS

1.0 SUMMARY OF ACTIVITIES [94702]

1.1 NRC Activities

One resident inspector was assigned throughout the period. A second resident inspector was permanently assigned to the site on October 4, 1992. Other regional inspectors were assigned periodically throughout the period. The inspectors conducted backshift inspections on September 15, 16, 17, and 29, and deep backshift inspections on September 8, 13, 19, 27, October 3, 4 and 10.

The NRC determined that further review of audio cassette tapes containing 1990 conversations between the control room and auxiliary operators, in an attempt to identify precursors to auxiliary operator log keeping discrepancies, was not warranted. The basis for the determination is provided in Enclosure 1.

1.2 Plant Activities

The plant was in operational Mode 4, Hot Shutdown, at the beginning of the period and entered operational Mode 5, Cold Shutdown, on September 8. The plant entered Operational Mode 6, Refueling, on September 14.

2.0 OPERATIONS [71707, 71710, 92702]

2.1 Plant Tours

The inspectors conducted daily control rooms tours, observed shift turnover, and attended plan-of-the-day meetings. The inspectors reviewed plant staffing, safety tagging orders, safety system availability, and compliance with Technical Specification requirements.

The inspectors observed plant evolutions, from the main control room and locally, including plant cooldown, reactor vessel head removal, refueling cavity fill, fuel handling, and primary coolant system draindown. The control room operators maintained communications with workers outside the main control room and effectively directed activities. The inspectors reviewed the associated procedures and noted strict procedural adherence.

The inspector concluded that the operators completed the complex series of operational tasks associated with the refueling outage in an outstanding manner.

The inspector independently verified that the tags associated with master tagout 012, associated with the emergency feedwater system, were hung on the correct equipment and that the equipment was in the required position. The inspector discussed documentation inconsistencies with work control personnel, who identified and corrected the cause of the inconsistencies.

The inspector noted the use of a newly developed Self-Verification Worksheet, which was implemented to evaluate operational errors made in the plant or at the simulator. An operator making an error was required to complete a simplified root cause analysis and determine which self-verification actions could have prevented the error. The inspector determined the worksheet was a useful tool to help individuals develop self-critical thinking.

2.2 Diesel Generator Technical Specifications: NOV 92-13-01 and 92-13-02; LER 92-007 (Closed)

North Atlantic, in a letter (NYN-92123) dated September 18, 1992, responded to two notices of violations for events involving noncompliance with Technical Specification requirements for an inoperable emergency diesel generator. The inspector reviewed the response and the corresponding Licensee Event Report (LER) 92-007.

North Atlantic determined the cause of both events to be personnel errors. In the first event, an I&C technician inadequately communicated the effect of maintenance work on the operability of a containment enclosure emergency air cleanup fan. The lack of adequate procedural guidance concerning the component's operability contributed to the event. In the second event, proper verbal communications occurred during a shift turnover but the requirement to complete the required surveillance test of the operable diesel was not recorded on the shift turnover briefing sheet.

The operations manager reviewed the events with shift personnel. The Planning and Scheduling Department revised the plan-of-the-day process to ensure work activities would be scheduled during specified train weeks or would be reviewed for the affect on train operability.

North Atlantic long term corrective actions included reviewing I&C procedures for guidance on system operability; enhancing tracking of event driven surveillance requirements; training operators on disabling automatic functions for Engineered Safety Features equipment; and developing a clarification to the Technical Specifications which would list the systems that must be reviewed for operability when an emergency diesel generator is inoperable.

The inspector determined that North Atlantic's response to the violation and LER 92-07 contained accurate information and described focused corrective actions. These items are closed.

2.3 Fuel Oil Spill

A fuel oil spill occurred when an auxiliary operator transferred fuel oil from the emergency diesel generator 'B' day tank to the storage tank. The fuel oil overflowed through the storage tank flash arrester and relief valve onto the pavement outside the diesel generator building, and ran into the storm sewer. The spill response team contained and retrieved the fuel oil from the sewer before the oil reached the circulating water discharge structure and the ocean.

The inspector observed the oil spill cleanup efforts and verified that no oil reached the environment. The inspector discussed the event with operations and technical support personnel. The operators had determined, from the fuel storage tank level gauge in the main control room, that over 2000 gallons of capacity was available in the fuel oil storage tank for transferring approximately 1300 gallons of fuel oil from the day tank. However, after the spill, technical support engineers calculated the actual available capacity of the storage tank to have been approximately 1200 gallons. Due to instrument error and the density difference between the fuel oil and the calibration standard, the storage tank level gage in the main control room indicated about 100 gallons less than the actual level.

I&C technicians calibrated the storage tank level instrument using a 30 degree API gravity reference, in order to provide conservatism in meeting Technical Specifications 3.8.1.1 and 3.8.1.2, "A.C. Sources," minimum requirements for fuel storage tank volume. Technical Specification Surveillance 4.8.1.1.2 allows an API gravity of between 28 degrees and 42 degrees (40 degrees being most dense) for fuel oil. Typical deliveries of fuel oil over the past two years ranged between 30.7 degrees and 36.2 degrees.

The operations department planned to revise the operating procedure for draining the diesel generator day tanks to the storage tanks. The revised procedure would require operators to read the storage tank level using the local strapping gage which is not affected by the different densities of fuel oil.

The inspector determined that the spill response team efforts to contain and retrieve the spilled fuel oil were prompt and effective. The inspector concluded that the technical support engineer identified the cause of the spill and that the operations department planned to modify operating procedures to prevent recurrence of the spill.

3.0 RADIATION CONTROLS [71707]

The inspector toured the containment, primary auxiliary building, and the residual heat removal vaults. The inspector observed that station and contractor health physics technicians performed proper radiological controls and practices. The radiation control personnel assigned to each level of the containment provided radiological control oversight for work activities by assisting and monitoring workers. During eddy current testing activities, the health physics technicians monitored workers exposures using real time radio transmitted dosimetry equipment. The inspector determined that the health physics coverage in the containment indicated a strong management commitment to implement proper radiation work controls and the ALARA program.

The inspector reviewed radiation postings, area surveys, monitoring equipment calibration, locked high radiation areas doors, and workers donning and removing anti-contamination clothing. The inspector discussed minor discrepancies with health physics management, who aggressively resolved the discrepancies.

4.0 MAINTENANCE/SURVEILLANCE [37828, 40500, 62703, 61726]

4.1 Maintenance

The inspectors witnessed work in progress, reviewed work control documents and associated records, evaluated QA inspection and surveillance coverage, and assessed the licensee's overall program of maintenance/modification controls for the following work activities.

Emergency Diesel Generator (EDG) 'A' Inspection

For the EDG 'A' maintenance, inspection and overhaul, the inspector observed portions of the crankcase inspection and generator preventive maintenance activities. The inspector noted the establishment of a foreign material exclusion (FME) zone to control tools and other material in the work areas. The inspector reviewed the applicable sections of the station maintenance procedures MX0539.03 and MS 0539.23 to determine the technical requirements and acceptance criteria, and to evaluate the completeness of quality control inspection attributes and QA surveillance checks. The inspector observed adequate QA coverage of the work and noted the use of appropriate hold points for key procedural steps.

The inspector checked the calibration and control of maintenance and test equipment (M&TE) and questioned the omission of certain measuring devices from the M&TE list documented in the Repetitive Task Sheet. The licensee field engineer indicated that the purpose of the questioned tools was for component positioning, which the inspector confirmed had no effect on the measurements taken to validate the acceptance criteria. The inspector reviewed the EDG 'A' main bearing clearance calculations and web deflection criteria and verified proper calibration of the gauges used for clearance measurements.

EDG 'B' Inspection

Mechanics conducting maintenance procedure MS0539.23, "Emergency Diesel Generator Crankcase Inspection," determined that the crankshaft web deflection on EDG 'B' exceeded acceptable criteria. The mechanics corrected the excessive deflection by skimming the generator end bearing and aligning the generator and motor couplings to the original manufacturer field markings. The inspector verified that the mechanics properly corrected the excessive crankshaft web deflection in accordance with approved maintenance procedures.

Due to the realignment of the crankshaft, the diesel generator stator air gap did not meet procedural acceptance criteria. The inspector verified that the acceptance criteria were based on the diesel generator manufacturer's technical manual and that mechanics properly adjusted the air gap.

EDG 'A' Modification

The inspector examined the status of the EDG 'A' exhaust system modification, governed by design coordination report, (DCR) 92-007. This modification included installation of a new exhaust manifold to correct previous leakage conditions, to reduce the number of expansion bellows in the line and allow access to the bellows joints without affecting the air start or cooling water connections to the diesel generator. The inspector checked the modified manifold and support installation located on the EDG skid and verified adequate procedural controls for the coordination of insulation work and other EDG supporting maintenance activities. The inspector reviewed the work package for the appropriate post-modification testing and evidence of QC involvement in hold point inspections and surveillance activities. The inspector also reviewed the weld traveler documents and procedures associated with the field welding of the exhaust manifold support installation.

The inspector noted that one of the four weld traveler sheets involved with manifold support installation had not been completed. Discussion with cognizant licensee engineering and QA personnel revealed that the questioned field welds had been replaced by shop welded connections supplied by the vendor of the exhaust manifold piping. However, the work control documents were not revised to reflect this change. Furthermore, for two of the four weld traveler sheets, the welding process had been changed from a gas tungsten arc weld (GTAW) procedure to a shielded metal arc weld (SMAW) procedure. While this revision was documented on the affected weld travelers, there was no evidence of the QC review for such a weld traveler change, as is programmatically described in the licensee's welding and material control procedure, MA 5.2. Additionally, the newly referenced SMAW welding procedure, YA-WP-6S, had not been included in the work package located at the field location where the exhaust manifold support welds were installed. These work control discrepancies did not comply with program requirements. (see the summary)

The inspector discussed the above field welding work control discrepancies with licensee QA personnel. In conjunction with the ongoing surveillance of the EDG A modifications, a licensee QA representative documented the questioned items as findings on surveillance report, QASR 92-00264. The inspector identified no deficient hardware conditions associated with these findings. QA followup of the issues was appropriate from the standpoint of work control review and record completeness.

During the review of DCR 92-007, the inspector noted that certain ASME section III (safety class 3) pipe supports were being modified by attachment to non-nuclear safety, seismic category I (NNS-1A) supports. Discussion with licensee personnel revealed that this modification would be deferred to a subsequent refueling outage. The acceptability of this ASME support re-design is contingent upon the classification of the NNS-1A supports as "intervening elements" in the safety-related support load path, as allowed by the ASME Code through the application of Code Case N-199 and a revision to section III, subsection NF, subsequent to the original construction code, i.e., 1977 edition with winter 1977 addenda.

The inspector determined that since the NNS-1A supports were seismically designed and have been analyzed to carry the additional loads, the use of the nonsafety supports as "intervening elements" was an appropriate classification from a design standpoint. However, since the NNS-1A supports had originally been installed and inspected to a different QA program (i.e., QAS-5) than that applied to safety-related ASME supports, the inspector questioned whether equivalency had been established for the utilization of non-safety welds, bolts, and structural members to support safety-related loads.

In response to the inspector's questions, licensee engineering personnel performed an analysis comparing ASME III, Class 3, subsection NF component supports to ANSI B31.1, NNS-1A supports. Various criteria were compared to include material, welding and NDE requirements, as well as personnel and welding qualifications, visual inspection standards and configuration controls. The inspector reviewed the results of this engineering analysis and determined that sufficient evidence of the construction quality of the NNS-1A supports existed to establish equivalency to safety-related support functions.

Service Water (SW) Pump Reassembly

With respect to the SW pump P-110A rework and inspection activities to replace the pump columns, shafts and couplings, the inspector witnessed the installation of the pump discharge head, upper column and motor. The inspector evaluated bolt torque criteria with regard to the governing maintenance procedure, MS0523.05, as well as the Johnston Pump Company vendor manual (foreign print 53040) and the original construction specifications, revised by engineering change authorization, (ECA) 73/4793A. The inspector also reviewed the Johnston vertical pump design specification, 238-2, and checked material replacement requirements and welding repairs to the base metal of the first and second stage pump impellers. For the motor re-installation work, the inspector observed Raychem heat shrink tubing installation over the terminal leads, as governed by maintenance procedure, MS0514.08.

For all of the witnessed service water pump P-110A reassembly work, the inspector noted good work controls and timely QC inspection activities which utilized appropriate acceptance criteria. Good communications between the crew setting the pump columns, the crane operator, and the divers in the cooling tower basin were observed. The inspector noted proper control of retagged parts from the Seabrook Unit 2 cooling tower pumps, as well as procured replacement spare parts.

The inspector interviewed the craft, foreman, field engineering, and QC personnel, and verified good job knowledge and acceptable work control interface and coordination activities. After setting the pump discharge head just prior to the completion of one work shift, the mechanics taped the stuffing box and discharge pipe flange openings to preclude foreign material entry into the pump internals. This was accomplished not because of any procedural requirement, but because the work supervisor demonstrated the proper attention to work control details.

SW Check Valve Inspection

The inspector witnessed the disassembly, inspection and cleaning of a SW cooling tower pump discharge check valve, SW-V-53. The inspector reviewed the work request the applicable sections of maintenance procedure, MS0519.77, regarding the disassembly, repair and reassembly of TRW Mission duo-check valves. The inspector also reviewed the TRW Mission vendor manual (foreign print 93638) and the vendor drawing (foreign print 90635) for valve SW-V-53. From these documents, the inspector determined original valve material specifications for certain internal parts and checked these specifications against the replacement parts indicated in the work request scope. For the check valve hinge pin, a material substitution was noted. The inspector verified licensee authorization of this revision, (DRR 88-004), was in accordance with specification 248-48 provisions. The inspector also reviewed the warehouse procurement documents for both the check valve hinge pin and a spring bearing and discussed the quality criteria with licensee inventory/stores personnel.

The inspector examined the Post Maintenance Test Sheet for the check valve re-installation and noted reference to an operational surveillance procedure, OX1416.05, to validate minimum flow requirements for SW system and valve operability in accordance with the Technical Specifications. The Test Sheet specified leak testing of the valve, however, in accordance with procedure MA 6.5, the Test Sheet did not require backseat testing of the valve. The inspector reviewed the Check Valve Performance Monitoring Program procedures, MA 8.4 and ES 1850.001, and noted that the latter procedure indicated a "closed" valve test requirement for valve SW-V-53.

Discussion with the cognizant technical support engineer revealed that the procedure was in error in this regard, and the inspector confirmed that the safety-related function of the check valve was not contingent upon backseat leakage or testing. The technical support engineer who wrote procedure ES1850.001 indicated that a procedure revision would be initiated to correct the identified error. The inspector observed the presence of QC personnel during check valve SW-V-53 cleaning activities and noted hold points for inspection of the reassembly and system installation steps. The inspector confirmed proper, procedurally directed, protection of the Belzona lining on the SW pipe internal surface and flanges. The inspector reviewed the final Duo Check Valve Disassembly Inspection Record for valve SW-V-53 and verified that the documentation of component measurements and inspection results were consistent with the valve conditions observed by the inspector.

Safety Related Motor Operated Valves

The inspector observed motor operated valve (MOV) diagnostic testing of service water valve SW-V-22 per maintenance procedure MS 0524.13A, "Butterfly MOV's - Limit Switch Verification Using Strain Gauge Measurements." The procedure was comprehensive and easy to follow. The technicians were well trained on the operation of the equipment and interpretation of the data. The procedure provided acceptance criteria for the "as found" test data and the technicians properly referenced the criteria.

The inspector reviewed the tagout for work on safety injection valve SI-V-111 and concluded the valve was properly isolated and controlled. The inspector observed the repacking of valve SI-V-111. The work request called for the valve to be repacked per maintenance procedure MS 0519.43, "Disassembly, Inspect, Repair and Reassembly Of Westinghouse Gate Valves." Step 8.8 referred to maintenance procedure MS 0519.21, "Valve Packing and Adjustment." However, procedure MS 0519.21 was not available at the job site when contractor personnel disassembled the packing gland and removed the old packing. This did not comply with program requirements. (see the summary)

The inspector informed the contractor supervisor who stopped the job. After the responsible system engineer provided the correct procedure and identified the proper graphite packing configuration the job continued. The inspector observed the subsequent packing installation and noted no further discrepancies.

The inspector observed the "as left" MOV diagnostic testing of valve SI-V-89 following torque switch replacement. The maintenance personnel determined that the strain gage had been damaged following the "as found" testing. The technicians discussed the situation with the supervisor and decided that the strain gauge should be replaced. The technicians properly processed the scope change to the procedure, installed the new strain gage and successfully collected the "as left" data.

The inspector observed the disassembly of valve SI-V-199 to repair seat leakage per maintenance procedure MS 0519.37, "Yarway Rigid Backseat Valve Maintenance." The valve disc had a slight burr, which was removed by machining. The retest on SI-V-199 was satisfactory.

Primary Component Cooling Water Pump Maintenance

The inspector observed portions of the work associated with overhauling the train 'B' primary component cooling water (PCCW) pumps, reviewed the work packages, and held discussions with maintenance workers and supervisors. Mechanics conducted the work in accordance with maintenance procedures MS00523.20 "Ingersall Rand Primary Component Cooling Pump Maintenance."

One work package contained two controlled copies of the same procedure. A change had been made to the procedure and a new controlled copy had been issued, but the original procedures was not removed from the work package which did not comply with program requirements. (see the summary)

The inspector verified the mechanics were using the most recent procedure revision and discussed the issue with the maintenance manager. The mechanics clearly documented work activities and component wear. The work package contained ignition source permits, rigging directions, and retest requirements. The mechanics maintained appropriate cleanliness standards. The inspector concluded that the work was well controlled and performed by knowledgeable craftsmen.

Summary

Overall, the inspectors determined that the programmatic controls for maintenance activities were good. The inspectors witnessed good housekeeping practices, timely QC coverage of critical work steps, and generally well planned procedural control of the work activities. The inspectors concluded properly trained maintenance personnel conducted activities in a safe manner.

The inspectors identified several examples were program requirements for maintaining work packages were not followed. Welders did not document the review and approval of a substitute weld procedure on the EDG 'A' exhaust manifold. The substitute weld procedure was not at the work site when the welder performed the work. The procedure for repacking safety injection valve SI-V-111 was not at the work site when contractors removed the packing. Mechanics did not remove a superseded controlled copy of the procedure for overhauling a primary component cooling water pump from the work package. In all cases the safety significance of the NRC identified program violations were minimal. The technical decisions were appropriate and the maintenance work was performed correctly. North Atlantic implemented immediate corrective actions and commenced long term evaluations.

The inspector determined the identified failures to comply with station procedural control requirements constituted violations. The violations were not cited because the criteria specified in section V.A. of the Enforcement Policy was satisfied.

4.2 Surveillance

Plant operations and technical support engineers performed surveillance test EX 1804.038, "SI Low Pressure Accumulator Blowdown/SI Check Valve Stroke Test". The surveillance verified a full stroke of the safety injection (SI) accumulator discharge check valves and loop check valves by performing a low pressure blowdown of the SI accumulators. The surveillance satisfied the inservice testing requirements of station technical specification 4.0.5. The inspector observed testing in the reactor containment building and the main control room. Well trained, knowledgeable personnel successfully completed the test.

During observation of control room activities associated with this testing, the inspector noted that several steps in the surveillance procedure had been signed off as non-applicable (N/A). Another procedural step was modified to eliminate the requirement to time the stroke of a valve when it was repositioned, since the timing of the valve stroke was planned later in the outage. The inspector questioned the test director concerning station policy in regards to procedure modifications. The test director stated that the station management manual, chapter 2 "Policies," section 5.8.3 "Deviations," permitted these actions. A review of the procedure by the inspector identified that the procedure allowed N/A's for certain steps, but did not appear to permit step modification. The inspector questioned whether a station operations review committee (SORC) approved procedure could be modified by one supervisory person with no review. The SORC review of the completed surveillance test procedure determined that the procedure modifications were acceptable and were in accordance with station procedures. The Station Procedure Development Group supervisor initiated a revision to Chapter 2 of the Station Management Manual to clarify what modifications could be made to SORC approved procedures.

The inspector reviewed and observed portions of surveillance procedure EX 1804.039, "ECCS Check Valve Full Flow Verification," which demonstrated full-stroke of check valves as required by ASME Section XI subsection IWV. The test director in the main control room effectively coordinated two local check valve monitoring teams, motor operated valve testing teams, and operators performing post maintenance retests. The inspector noted good communications between the test director and the main control room operators. The operators successfully completed the surveillance.

The inspector concluded that these complex surveillances were well coordinated by knowledgeable engineers.

4.3 Improper Filling of Diesel Generator Jacket Cooling System

After draining the emergency diesel generator 'A' jacket cooling system, mechanics refilled the system with glycol stored in 55 gallon barrels. The last barrel used contained dirty fuel oil which contaminated the cooling system. Maintenance workers and technical support engineers drained and flushed the jacket cooling system until system cleanliness was restored.

The inspector held discussions with maintenance supervisors and inspected the labeling on the 55 gallon barrels. The barrel containing fuel oil was poorly marked and was not segregated from the barrels of glycol. In addition, the mechanics failed to verify the contents of the barrels prior to use. North Atlantic determined that the cause of the event was personnel error and that existing programs and procedures should have prevented the event. The maintenance manager discussed, with the workers involved and all the mechanical maintenance supervisors, the importance of maintaining focus on job quality and specifically the need to verify the contents of barrels prior to use. The maintenance manager directed the mechanical maintenance supervisors to clearly mark barrels of both oil and glycol, to segregate the barrels, and to remove barrels that were not in use.

The inspector concluded that the maintenance department had identified the cause of the event and taken appropriate actions to prevent recurrence.

4.4 Inattentive Workers in Containment

During a routine tour in the containment, the inspector noted two foreign material exclusion (FME) area monitors who appeared to be inattentive. The inspector informed a health physics technician, assured the monitors were awake, and discussed the issue with the mechanical maintenance manager. The mechanical maintenance manager relieved the FME monitors immediately, investigated the incident, and took appropriate disciplinary actions.

Utility supervisors had discussed discontinuing the FME monitor coverage prior to the incident since no work was being conducted in the area. The mechanical maintenance manager initiated a review of the entire FME program including possible guidelines for stationing and retiring FME monitors. The inspector concluded that the mechanical maintenance manager responsibly dealt with the issue of inattentive workers.

5.0 SECURITY [71707]

The inspector toured the protected area, observed security guards on patrol, evaluated protected area lighting, and monitored personnel access control for the containment. The security force provided compensatory measures for vital area boundaries that were temporarily breached during maintenance activities. The security force assured the additional lighting installed around temporary trailers and equipment laydown areas met program requirements. The security guards used a new computer system to track personnel entries and exits from the containment. The inspector noted no deficiencies and concluded that the security department was properly implementing security program requirements.

6.0 ENGINEERING/TECHNICAL SUPPORT [37700,92701]

6.1 Potential for Dead Heading of RHR Pumps - Unresolved Item 91-06-01 (Closed)

NRC Bulletin 88-04, "Potential Safety-Related Pump Loss," identified the possibility that during parallel pump interaction, a strong pump could dead head a weak pump during minimum flow operation. NRC Inspection Report 50-443/91-06 identified that the licensee could not document the ability of the residual heat removal (RHR) pumps to operate in parallel at minimum flow.

The inspector witnessed the performance of procedure ES92-1-5, "RHR Weak Pump/Strong Pump Verification Test." The test demonstrated the ability of RHR pumps to operate in parallel on recirculation flow without adverse interaction between the pumps. This procedure involved operating the RHR pumps in minimum flow for twenty minutes with the cross-connect valve open. Every two minutes the performance of the pumps were monitored for signs of pump interaction, such as unstable suction and discharge pressures, unstable running current, flow through the cross-connect line, and pump noise. From the control room, the inspector verified that the procedure was closely followed. The inspector observed that pump running current and pump discharge pressure were stable for both pumps. From the RHR pump vaults, the inspector observed no abnormal pump noise, no flow in the cross-connect line, and stable suction and discharge pressures.

The inspector verified that the acceptance criteria for the test were met. The inspector observed good detailed communications between the control room and the equipment vaults. The licensee's preparation and pre-test briefing was good. This unresolved item is closed.

When reviewing the final data, the inspector noted that RHR pump 'A' discharge pressure gauge, RH-PI-614, in the control room indicated 20 psig higher than the local test gauge. The I&C department calibrated the gauge. The "as found" readings on RH-PI-614 were out of tolerance and the I&C technicians adjusted the instrument.

6.2 Resistance Temperature Detector (RTD) Bypass Manifold Removal

The inspector reviewed the design coordination report (DCR) 90-003, for the resistance temperature detector (RTD) bypass manifold elimination modification. This modification replaced the RTD bypass manifold piping with thermowell mounted fast response RTD's installed in the coolant legs. For each loop, two of the three hot leg flow scoops were modified to accept thermowells. The third scoop was capped and a third thermowell was installed through a new penetration in the hot leg piping. The new penetration was formed by utilizing a metal disintegration machining process. The cold leg tap was also modified to accept a thermowell. The crossover leg connection for the bypass line was capped. Signals from the three hot leg RTDs and the one cold leg RTD were transmitted to the control room and provided inputs to the existing reactor protection functions.

North Atlantic contracted Westinghouse to provide mechanical installation services for the RTD bypass elimination design. The inspector audited Westinghouse RTD bypass elimination mechanical installation procedure MPII2.7.2NAH and interviewed a Westinghouse supervisor regarding the scope, criteria and prerequisites of the installation procedure.

The inspector noted that field changes to the Westinghouse's installation procedure were documented in the Westinghouse master procedure copy and were processed in accordance with station procedure SM 6.2 "Station Operating Procedures". The inspector verified that the Quality Assurance surveillance checkpoints for Work Request 92W002799, loop 'A' installation, were incorporated into the Westinghouse procedure in accordance with maintenance procedure MA 3.1, "Work Request." The inspector determined that the QC surveillance checkpoints were technically adequate.

7.0 SAFETY ASSESSMENT/QUALITY VERIFICATION [40500]

7.1 Spent Fuel Pool Cooling Temporary Modification

North Atlantic successfully installed and utilized a temporary modification (TM) to the spent fuel pool cooling (SFC) system. SFC system maintenance limited the system operation to one heat exchanger and de-energized the power supply to the SFC pump 'B'. The temporary modification installed an alternate power source for the 'B' pump and also analyzed two pump parallel operation through one SFC heat exchanger. Although one pump and one heat exchanger could maintain the spent fuel pool temperature within design specification, the temporary modification allowed two pump operation which maintained a lower operating temperature for the spent fuel cleanup subsystem demineralizes and also provided added cooling margin.

The inspector reviewed the TM package which concluded that an unreviewed safety question did not exist. The safety evaluation was thorough, technically sound, and contained all supporting information. Operation with two SFC pumps in parallel through one heat exchanger produced approximately 2100 gpm which was within the design specifications of one heat exchanger. The temporary power source for the 'B' pump met safety related construction criteria and was provided with circuit protection. The inspector reviewed operating procedure OS1014.02, "Spent Fuel Pool System Operating Procedure," and verified it contained instructions for parallel pump operations through spent fuel pool heat exchanger.

The inspector assessed that the approach North Atlantic took in maintaining both spent fuel pool cooling pumps available during system maintenance reflected a good safety perspective. The safety evaluation was thorough and addressed all aspects of the temporary modification.

7.2 NRC Information Notice 92-04 - Potter & Brumfield Model MDR Rotary Relay Failures

Information Notice (IN) 92-04 issued on January 6, 1992, alerted all licensees of failures experienced with MDR series Potter & Brumfield rotary relays. The major failure mechanism of MDR relays was mechanical binding of the rotor caused by organic deposition of contaminants and corrosion particles on the relay rotor shaft. A secondary failure mechanism was intermittent continuity of the electrical contacts.

The inspector reviewed NRC Information Notice 92-04 and held discussions with the responsible technical support engineer. Seabrook has approximately 150 Potter & Brumfield Model MDR rotary relays. The safety related relays are located in the main control room solid state protection system cabinets. Approximately 50 of the relays are normally energized. The licensee had tested the MDR relays quarterly. The inspector verified that a sample of completed surveillance tests were accurate and technically adequate.

Two MDR relays have failed. One MDR relay failed during the initial plant first startup when direct current (D/C) was accidentally applied to the relay. During the present refueling outage, MDR relay (K744) failed to close on demand. The licensee was conducting a root cause analysis of the latest failure. Due to the small number of relay failures, the licensee has not developed any preventive or corrective maintenance programs for the MDR relays.

The inspector concluded that North Atlantic had reviewed the applicability of NRC Information Notice 92-04 and was evaluating the root cause of the latest failure.

7.3 Radiation Embrittlement: Generic Letter 88-11 (Closed)

In a letter (NYN-88155), dated November 30, 1988, the licensee responded to Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations." The licensee anticipated submitting changes to Technical Specification

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The inspector concluded that North Atlantic had reviewed the applicability of NRC Information Notice 92-04 and was evaluating the root cause of the latest failure.

7.3 Radiation Embrittlement: Generic Letter 88-11 (Closed)

In a letter (NYN-88155), dated November 30, 1988, the licensee responded to Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations." The licensee anticipated submitting changes to Technical Specification

3.4.9, "Pressure/Temperature Limits" prior to the beginning of the second refueling outage. The NRC reviewed the licensee's response and closed out Generic Letter 88-11 in a letter to the licensee dated February 4, 1992.

On August 17, 1992, North Atlantic submitted a letter (NYN-92111) which transmitted License Amendment Request 92-06. The requested changes to the Technical Specifications proposed revising the reactor coolant system pressure/temperature limits based upon information in NRC Regulatory Guide 1.99, Revision 2. The same day, North Atlantic submitted a letter (NYN-92112) which transmitted revised reference temperature values for pressurized thermal shock events.

Based on the acceptability of NHY's response to Generic Letter 88-11 and the submittal of requested changes to Technical Specification, this item is closed.

8.0 MEETINGS [71707]

The scope and findings of the inspection were discussed periodically throughout the inspection period. An oral summary of the inspection findings was provided to the Station Manager and his staff at the conclusion of the inspection period.

Region-based inspectors conducted the following exit meetings during this time period.

DATE	SUBJECT	REPORT NO.	INSPECTOR
Sept. 11	Pre-outage ISI	92-20	P. Patniak
Oct. 9	Radiological Controls	92-22	D. Chawaga

ENCLOSURE

HISTORICAL SUMMARY OF SEABROOK CONTROL ROOM RADIO BROADCAST TAPES

On April 30, 1992, following a public press conference at the Seabrook Science and Nature Center, Mr. Fred Anderson, Jr., suggested to the Chairman of the NRC that conversations between the Control Room and Auxiliary Operators (AOs), which he recorded on audio cassette tapes and provided to the NRC in 1990, contained precursors to recently identified auxiliary operator logkeeping discrepancies.

Background

On January 9 and 15, 1990, prior to full power licensing of Seabrook, letters had been received by the NRC from Mr. Anderson that detailed specific concerns with plant equipment and personnel performance. The concerns resulted from his review of radio transmissions of control room communications with AOs in the plant.

NRC Followup

Shortly after receipt of Mr. Anderson's letters, three teams of inspectors knowledgeable of plant safety, safeguards, and operational issues were assembled to listen to a randomly selected sample of 21 tapes in their entirety. The teams were directed to specifically identify any issues which could affect the issuance of a full power license including evidence of intentional wrongdoing. The inspectors determined that the tapes consisted of recordings of radio transmissions, some originating from the site, and some originating from other sources who were not Seabrook Station employees. Those transmissions originating at the site were routine communications between operations and security personnel involving the day-to-day operation of the facility. The tapes contained only the control room half of the conversation, and lacked the AOs' responses. All of the transmissions were from the period before the full power operating license was issued. The teams' reviews identified no safety, security, or wrongdoing issues, and provided high confidence that there was no significant likelihood for safety or security issues being recorded on the remaining tapes.

The NRC staff performed follow-up inspections at the site from January 9 through February 3, 1990, and issued Inspection Report 50-443/90-82 on February 7, 1990. The inspection report documented the review of the tapes and the subsequent inspections. No violations were identified; however, three areas for improvement were identified: 1) training in housekeeping and equipment venting, 2) addressing root causes of personnel injuries, and 3) training in communications formality.

Initial Licensee Review

On May 24, 1990, New Hampshire Yankee (NHY) issued a report summarizing its review of the transcripts of all the tapes and the disposition of 608 communications which were initially screened for further analyses for nuclear safety or security implications. The NRC staff reviewed

the report and a sample of the 608 communications. The staff found no evidence of unsafe plant operations nor adverse security implications. The NRC documented the inspection results in Inspection Report 50-443/90-12.

Second Licensee Review

NHY informed the NRC that, after the April 1992 press conference, the NHY Employee Allegation Resolution (EAR) Program Manager supervised a second review of the tape transcripts and documented the results of the review in a May 20, 1992, letter to the NHY Director of Quality Services. The EAR Program Manager reportedly determined that all transmissions were commensurate with normal plant activities and provided no precursors to AO log keeping discrepancies. The NRC staff reviewed the letter and determined that the licensee appeared to have conducted an adequate review.

NRC Assessment

After the April 1992 press conference, the NRC staff independently evaluated the likelihood that communications contained on the tapes would indicate that some AOs were inaccurately logging their shift activities. The NRC staff concluded that the identification of precursors to logkeeping deficiencies from only the control room half of communications would be unlikely. The NRC staff is aware that one transmission regarding AO tours, described on the third page of the Attachment to the January 8, 1990, letter to W. Russell, consisted of the control room notifying an AO that he need not make a tour of the residual heat removal system vaults, because a control room operator would be going there and would check the equipment for him. This transmission indicated tours were being conducted by the AOs and monitored by the control room personnel, but provided no indication of the adequacy of the AO's log. It should be recognized that it is extremely unlikely that a complete review of the tapes would identify any AO log falsification.

The staff evaluated whether further review of the 1990 tapes was warranted. There are 205 ninety minute tapes of communications between the Seabrook control room and auxiliary operators in the plant, now in the form of transcripts, which record only the control room side of the conversation. A comprehensive review to identify examples or precursors of log falsification would require a comparative review of taped conversations, contemporaneous logs and associated security access records. The NRC's previous independent review, which was a randomly selected sample designed to provide reasonable assurance in the resulting conclusion, identified no safety, security or wrongdoing issue. The licensee's previous review of all the tape transcripts found no evidence of unsafe plant operations nor adverse security implications. The licensee identified the Auxiliary Operator Log Falsification issue while implementing their program of routine performance monitoring, informed the NRC, and appropriately expanded their review and took corrective action. Finally, following the press conference during which the assertion was made, the licensee, again reviewed the taped transcripts for information related to log falsification, reportedly with negative results.

Conclusion

The staff review it highly unlikely that examining one half of the two-way conversations on these tapes would disclose any indication of log falsification by auxiliary operators. Therefore, based on the previous reviews by NRC staff, and little or no additional expected safety benefit, the NRC has concluded that further expenditure of limited NRC resources to review these tapes is not warranted.