

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

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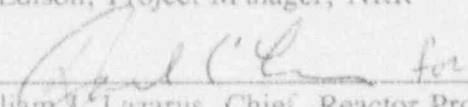
Licensee: North Atlantic Energy Service Corporation

Facility: Seabrook Station, Seabrook, New Hampshire

Dates: July 28 - September 7, 1992

Inspector: N. Dudley, Senior Resident Inspector  
G. Edison, Project Manager, NRR

Approved By:

 for  
William J. Lazarus, Chief, Reactor Projects Section 3B

9/21/92  
Date

OVERVIEW

The operators completed a successful second operating cycle and responded well to equipment failures. Lack of coordination/communication between operators errors resulted in a reactor trip from low power and an inadvertent isolation of the steam generator blowdown system during surveillance testing.

The Maintenance Department planned, coordinated, and conducted complex maintenance and surveillance testing activities to support the refueling outage. The activities were safely performed and generally well documented. The Maintenance Department planned to formalize a procedure for removal of the spent fuel pool boroflex coupon rack after the inspector questioned the quality of the associated work package.

The Health Physics Department appropriately implemented the radiological controls program. The Security Department implemented the security programs in a professional manner and responded properly to an excessively large annular opening in a security barrier.

The Engineering and Licensing Departments identified nonconforming conditions and completed required reports to the NRC. The Engineering Department developed enhanced lightning protection designs, and conservatively evaluated and managed the risks associated with the installation of the design.

The Nuclear Quality Group's monthly performance assessment surveillance was effective. The 10 CFR 50.59 process was good.

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Attachment: Temporary Modification Status

## DETAILS

### 1.0 SUMMARY OF ACTIVITIES [94702]

#### 1.1 NRC Activities

The inspector conducted backshift inspections on August 8, August 18, August 21, and September 4, and deep backshift inspections on August 1, August 15, August 22, August 30, September 5, and September 7. On July 27-31, the NRR Project Manager conducted an onsite inspection.

On July 29, the Office of Nuclear Reactor Regulation granted a Waiver of Compliance until an exigency technical specification change for surveillance testing of the manual reactor trip logic could be processed. On August 11, the NRC approved two Technical Specification amendment requests. One concerned removal of the reactor coolant system resistance temperature detector bypass manifold and the second concerned modifications to surveillance testing for the emergency diesel generators. On August 27, the NRC approved a Technical Specification amendment request to remove component lists from the Technical Specification. On September 3, the NRC approved a Technical Specification amendment request to change the acceptance criteria for main steam line safety valve setpoints to  $\pm 3\%$ .

#### 1.2 Plant Activities

The plant operated at 100% power until August 26 when the end-of-life plant coastdown began.

On September 2, certain North Atlantic employees voted to employ the Utility Workers Union of America as a bargaining representative.

On September 4, operators reduced power to below 80% to conduct main steam line safety relief valve testing.

On September 7, the operators opened the turbine generator output breaker to begin the second refueling outage.

### 2.0 PLANT OPERATIONS [71707, 92702]

#### 2.1 Plant Tours

The inspector conducted daily control room tours, observed shift turnovers, and attended plan-of-the-day meetings. The inspector reviewed plant staffing, safety tagging orders, safety system valve lineups, and compliance with Technical Specification requirements. The inspector conducted routine tours of safety related equipment, the turbine building, the waste handling building, the circulating water pump house, and the pipe chases.

The inspector noted operator response to various events such as the tripping of an instrument air compressor, the failure of a steam generator water level instrument, an increase in the seal leak off flow of a reactor coolant pump, and a steam leak on a moisture separator reheater drain tank. The inspector noted that the shift superintendents assured compliance with Technical Specification requirements and provided excellent command and control for complex work activities. The inspector concluded that operator response to equipment failures was excellent.

On August 26, steam generator blowdown was inadvertently isolated during performance of an emergency safety features system quarterly surveillance test. The main control room operator failed to provide the I&C technician all the jumper installation sheets required for the test. Due to the missing jumper, the steam generator blowdown system outboard isolation valves closed when the test was performed. The auxiliary operators restored blowdown in approximately ten minutes. The inspector noted that the isolation was a result of poor implementation of work control requirements.

## 2.2 Reactor Trip

After tripping the main turbine generator at 10% reactor power, the operators began preparations for conducting main turbine overspeed testing. While establishing conditions for resetting the main turbine, the operators unintentionally allowed reactor power to decrease to approximately 7%. The Shift superintendent directed the operators to increase reactor power to 15% to enhance steam generator water level control. The feedwater control operator, who was augmenting the normal shift complement, was maintaining steam generator water levels with the feedwater regulating valves (FWRV) and the FWRV bypass valves in manual control.

The operators increased reactor power, causing a level swell ... the steam generators and an increase in steam generator water levels. Also, FWRV controller output indication failed to mid-scale providing inaccurate indications to the operators. The Unit Shift Supervisor assigned a second feedwater control operator to assist with steam generator water level control due to the recognized problems with controlling level. The water level increase in steam generator D caused a high steam generator level feedwater isolation. Before the operators could restore feedwater flow, the water level decrease in steam generator C caused a reactor trip.

The Unit Shift Supervisor followed the emergency procedures and stabilized the plant. The Event Evaluation Team identified several contributors to performance weaknesses including operator experience, training, and crew communication. The Team was developing recommendations for their final report at the end of this inspection period.

The inspector concluded that safety significance of the trip was small and that the Event Evaluation Team's analysis provided an excellent critique of the event which concluded that the reactor trip was preventable.

### 2.3 Entry Into Abnormal Procedures

On August 29, the Shift Superintendent made a non-emergency report to the NRC, based on the operation of the control building air handling (CBA) system outside design basis during a fire that occurred on July 3, 1992. The Technical Support engineer reviewing the event noted that the operators had closed the west air intake of the CBA system in response to the fire. Initially, engineers determined that isolation of the west air intake without first placing the CBA system in the filter recirculation mode had caused both trains of the CBA system to be inoperable for a total of 49 minutes.

Further analysis revealed that the existing design basis document was incorrect in stating that closure of either CBA intake valve rendered both trains of CBA inoperable. With one intake valve closed, the CBA system can perform all its design functions and meet all Technical Specification surveillance requirements. North Atlantic concluded that the CBA system had been operable during the July 3, 1992 event.

The inspector observed a portion of the Station Operations Review Committee subcommittee meeting that reviewed the draft report of the event. The Operations, Licensing, and Technical Support representatives agreed that the operators should have entered the abnormal procedure for the CBA system. The representatives discussed how the operators should have known to enter the abnormal procedure and what actions were needed to correct the deficiencies. A final review of the recommended corrective actions will be performed by SORC.

The inspector noted that the issues discussed by the SORC subcommittee are similar to issues raised by the Probabilistic Risk Assessment Team concerning the operators' ability to access the appropriate operating procedure for abnormal plant conditions. The inspector concluded that North Atlantic had identified an operational error and had constructively developed recommended corrective actions to address suspected root causes.

### 2.3 Management of Overtime

The inspector reviewed North Atlantic's response to the Notice of Violation on the management of overtime and the subsequent implementation of corrective actions in NRC Inspection Report 50-443/92-13.

The NRC met with the Executive Director of Nuclear Production and his staff on July 29, 1992, to discuss the routine approval for exceeding overtime guidelines and the Operations Department's shift schedule. The Operations Department presented details of the present operating shift schedule and the basis for the schedule. The schedule minimized the number of weekends that shift workers were required to work, but resulted in workers working 64 hours in one seven day period. The Station Manager noted that routine approval had been granted for exceeding overtime guideline to accommodate worker preference for working 7:00 a.m. to

7:00 p.m. shifts versus 11:00 a.m. to 11:00 p.m. shifts during weekends. The Station Manager committed to eliminate routine approvals for exceeding the overtime guidelines. The NRC had no further questions.

During routine plant tours, the inspector noted an increased awareness of the need to manage overtime. The Operations Department developed a computer program for tracking overtime. Managers in the Maintenance, Health Physics, and Chemistry Departments planned to complete outage activities without exceeding overtime guidelines.

The inspector concluded that the corrective actions taken in response to the Notice of Violation were effective. Item 92-05-01 was therefore closed.

### **3.0 RADIOLOGICAL CONTROLS [71707]**

The inspector conducted tours of the Radiologically Controlled Area (RCA) to verify that radiation protection requirements and practices were implemented. Areas reviewed during the tours included radiation postings and surveys, radiation monitoring equipment calibration, contamination control practices, locked high radiation doors, and radiation work permits. The inspector noted no deficiencies in the areas reviewed. Based on these tours and observations, the inspector concluded that the Health Physics Department was appropriately implementing their radiological controls program.

### **4.0 MAINTENANCE/SURVEILLANCE [61726, 62703, 71707]**

#### **4.1 Maintenance**

The inspector attended the maintenance supervisor's morning meetings, observed maintenance during plant tours, and reviewed work packages at the job sites. Maintenance was well planned with active supervisory involvement; work packages were complete and generally of high quality.

The inspector reviewed the work package for Work Request (WR) 92-1506, that provided directions for removing, and inspecting boroflex coupons from the refueling pool. The inspector observed the removal of the coupons and held discussions with station personnel concerning the work package.

A reactor engineer coordinated the coupon removal by briefing the workers on the conduct of the evolution and by providing directions during the evolution. An individual appropriately maintained a "foreign material exclusion area." Health Physics technicians provided radiological control coverage, and Quality Assurance inspector observed the work. The Operations Department refueling bridge hoist operator and the Maintenance Department overhead crane operator successfully transferred the coupon holder between the hoist and crane several times. The inspector determined that this evolution was safely performed, with good supervision.

The inspector determined that the work package for WR 92-1506 met the program requirements contained in the Seabrook Station Maintenance Manual Chapter MA 3.1, "Work Request." However, the inspector noted that the work package contained documentation, such as the planning check list, which did not accurately reflect all the planning effort. The description of work/precautions on the work request was handwritten and annotated based on reviews by health physics, reactor engineering, and quality assurance personnel. The Maintenance Department committed to formalize the portion of the description of work which provided directions for removal of the coupon rack from the spent fuel pool.

A planning and scheduling engineer reviewed the work package and noted that a copy of the procedure referenced on WR 92-1506 was not controlled. The planning and scheduling engineer committed to require planners to verify that a controlled copy of referenced procedures were included in each work package. The inspector concluded that North Atlantic was taking appropriate actions to improve the quality of the work package.

#### 4.2 Steam Generator Safety Valve Surveillance

On September 5, 1992, the inspector reviewed test procedure EX 1804.041, "Main Steam Safety Valve in Place Setpoint Verification," and the associated Lesson Plan. The inspector attended crew briefings, observed the performance of the testing at the safety relief valves and in the main control room, and verified the prerequisite steam generator radioactivity chemistry samples met regulatory limits.

The Test Coordinator conducted the shift briefing which Operations, Maintenance, Quality Assurance, and Technical Support personnel attended. The Senior Line Manager assigned responsibility for the test conducted the final briefing. The briefings were well organized, informative, and stimulated discussions.

Furmanite technicians performed the safety valve testing using the Trevitest System. The Trevitest system applied a lifting force to the safety valve spindle. The technicians used the system header pressure, and the additional lifting force required to lift the safety valve, to calculate the lift setpoint. The technicians attached the device to the valve at a time and increased the lifting force until the relief valve lifted. The relief valves immediately reseated, with minimal release of steam.

Initially, the Test Coordinator planned to test five valves. However, one valve did not lift at the expected setpoint and the Shift Superintendent (SS) declared the valve inoperable. The SS correctly prevented testing safety valves in the same steam header as the inoperable valve until the high flux reactor trip setpoints were reduced to 65% reactor power in accordance with Technical Specification requirements. Eventually, the Furmanite technicians tested all twenty steam generator safety valves. The Test Coordinator determined that two valves were inoperable, and needed to be removed from the steam system for repairs and testing.

The inspector concluded that the testing was well planned and the Shift Supervisor provided the requisite oversight. The Test Coordinator provided excellent briefings and maintained excellent command and control of the activities. Good teamwork existed between departments. The inspector noted that the in-place testing of the safety valves (a new initiative at Seabrook) appeared to provide accurate test results eliminating the need for removing and transporting the safety valves to a valve testing facility.

## **5.0 SECURITY [71707, 92701]**

### **5.1 Plant Tours**

The inspector toured the protected area, observed security guards on patrol, evacuated protected area lighting, and monitored activities in the central alarm station and secondary alarm station. Security personnel initiated appropriate compensatory actions for a security door that would not properly latch. Security guards properly operated access control equipment and properly controlled personnel access.

Through discussions with Security Department personnel, the inspector determined that random and pre-badging fitness-for-duty tests appropriately identified alcohol and drug failures. The Security Department dispositioned the FFD test failures in accordance with program requirements. The inspector determined that security personnel were knowledgeable of job responsibilities and performed duties effectively. The inspector concluded that the Security Department was implementing security program requirements in a professional manner.

### **5.2 Security Barrier: Unresolved Item 92-13-03 (Closed)**

The Security Department immediately implemented compensatory actions when the inspector observed a vital barrier which contained an excessively large annular opening. The Engineering Department developed and the Maintenance Department installed a design modification for the annular opening. The inspector measured the resulting clearances and verified that the opening conformed to security guidelines.

NRC Inspection Report No. 50-443/86-56 issued in January 1987, identified an unresolved item concerning a temporary security barrier in the same area. Design Coordination Report (DCR) No. 0711, issued in February 1987, provided the details for installing a permanent security barrier. The unresolved item was closed in NRC Inspection Report No. 50-443/87-12. The inspector reviewed the completed DCR, including sketch No. 86-D-0711-L-S-002, and the quality assurance signature for verifying the proper installation of the barrier. The inspector measured the annular opening after the plant was shutdown (and the piping which penetrated the opening had cooled) and determined that, in shutdown conditions, the original annular opening conformed to the DCR installation requirements.

The inspector concluded that the security barrier was properly installed for cold pipe conditions, and that North Atlantic's response to the recently identified security problem was appropriate. This item was therefore closed.



## 6.0 ENGINEERING, TECHNICAL SUPPORT [37700, 71707]

### 6.1 Lightning Protection

North Atlantic identified that a braided ground strap suspended above all three offsite power lines in the 345 KV termination yard had been installed to provide lightning protection. The inspector initially reviewed this issue in NRC Inspection Report 50-443/92-11, and subsequently reviewed Design Coordination Request (DCR) 92-035 which provided an enhanced lightning protection design.

Engineering and Yankee Atomic Electric Co. engineers reviewed the design for the lightning protection structures and verified that the poles and braided strap were installed in accordance with the approved design. The engineers determined that advances in metallurgy allowed the same level of lightning protection to be provided by two towers instead of the ground strap. The engineers determined that the new design, which eliminated the ground strap above the offsite electrical lines, was an enhancement. The Licensing Department planned to update the Final Safety Analysis Report when the design modification was completed. The safety analysis for the new design, included in DCR 92-035, concluded that the failure of a single structure in the new design could affect only one offsite power line.

North Atlantic planned to remove the braided strap during the second refueling outage when all fuel was removed from the reactor. A 50 kW temporary diesel generator was installed to provide backup power to the spent fuel cooling pump during the removal of the ground strap. Footings for the two towers were scheduled to be poured near the end of the refueling outage when the plant enters Operational Mode 3, Hot Standby. North Atlantic planned to erect the new poles when they arrive onsite in November 1992. The Station Operations Review Committee planned to review a safety analysis which evaluated the increased risk of reduced lightning protection between the time the strap was removed and the new poles were erected. Engineering's preliminary evaluation indicated that the risk was acceptable due to the low probability of severe lightning storms.

The inspector concluded that North Atlantic developed an enhanced lightning protection design, and conservatively evaluated and managed the risks associated with the installation of the enhanced design.

### 6.2 Extension of the Radiological Controlled Area

In preparation for the outage, North Atlantic erected a Weather Protection Walkway from the Health Physics Contractor Control Point Trailer to the Radiological Control Area access/egress vestibule. The walkway and trailer are nonsafety-related, nonseismic temporary facilities which will be utilized only during outages. The walkway and portions of the trailer will become a temporary extension to the Radiological Controlled Area.

The inspector reviewed the Engineering Department's 10CFR50.59 evaluation which determined the modification did not require a change to the operating license. The evaluation considered electrical power, ventilation, structural, fire protection and radiation protection concerns. The safety evaluation, using conservative assumptions for the contamination levels of protective cooling stored in the trailer, calculated that the maximum potential offsite dose was less than 0.1% of the Technical Specification quarterly limit for an unmonitored release pathway.

The safety evaluation committed to ensuring the integrity of the trailer and walkway included; installing a fire detection system which alarms in the control room; conducting routine fire patrols of the exterior of the walkway; performing daily contamination and weekly radiation surveys; and drawing air samples in the trailer and walkway. North Atlantic planned to remove the walkway following the outage.

The inspector toured the trailer and walkway, confirmed the fire detection system was installed, and held discussions with North Atlantic engineers concerning the security aspects of the walkway. The inspector concluded that North Atlantic had performed an adequate safety evaluation and had implemented the commitments documented in the safety evaluation.

### 6.3 Nonconforming Conditions

The Engineering and Licensing Department identified two nonconforming conditions during reviews associated with the Design Basis Document and the Individual Plant Examination for External Events. The inspector reviewed the Station Information Reports and the Event Notifications related to the nonconforming conditions.

#### Service Water Roof Drains

Engineering personnel, during an as-built walkdown, determined that the service water pumphouse roof did not conform to the description contained in the Final Safety Analysis Report (FSAR). The roof was designed with a three and a half foot high parapet around its perimeter. The design included openings in the parapet at ten foot intervals at a height of approximately fifteen inches to provide drainage if the normal roof surface drains were blocked. The engineers found that the openings had been covered with roofing material during initial construction and were incapable of performing their intended function.

Maintenance workers uncovered the openings. The engineers verified that the normal roof surface drains had not been blocked, and performed a preliminary assessment which demonstrated that the roof was capable of carrying a load of water impounded to the top of the parapet. North Atlantic made the appropriate ENS report for a nonconforming condition that alone could have prevented the fulfillment of the safety function of a structure needed to remove residual heat.

### Tornado Doors

Engineers, during a Design Basis Document review, identified six doors which were not designed to withstand the differential pressure of the design basis tornado as defined in the FSAR. The doors were designed to withstand the Seabrook Station site specific design basis tornado, which is less severe than the FSAR design basis tornado. The engineers determined the doors were operable and planned to update the FSAR to include the revised design basis tornado. North Atlantic made the appropriate ENS report to the NRC.

The inspector concluded that the Engineering Department reviews were effective in identifying nonconforming conditions. North Atlantic corrected the identified conditions and completed required reports.

## **7.0 SAFETY ASSESSMENT/QUALITY VERIFICATION [40500, 92702]**

### **7.1 Auxiliary Operator Log Discrepancies**

The inspector reviewed Licensee Event Report (LER) 92-003 and LER supplement 92-003-01. The LER reported six missed Technical Specification Surveillance requirements caused by auxiliary operator log discrepancies. The inspector had evaluated North Atlantic's corrective actions in NRC Inspection Reports 50-443/92-05, 92-08, and 92-09. The inspector determined the LER and supplement were accurate and comprehensive.

The inspector reviewed the status of the auxiliary operator performance concerns action plan which was submitted to the NRC by North Atlantic in a letter (NYN-92116) dated August 18, 1992. Of the twenty-five recommendations contained in the report, thirteen dealt with training enhancements, five concerned procedure enhancements, three involved team building activities and four concerned evaluation of design, management, or job performance enhancements. Four recommendations had been implemented. Most recommendations were scheduled to be completed prior to December 31, 1992, with all recommendations scheduled for completion by May 31, 1993.

The inspector reviewed the Nuclear Quality Group (NQG) monthly quality assurance surveillance, 013-02-001, which included accountability checks of production personnel and observations of individuals conducting tasks. The surveillance, which included review of security computer key card access data and logs, found no discrepancies in personal accountability. One surveillance finding concerned a newly qualified Health Physics technician who had not physically verified that a locked high radiation door was secured. The NQG closed the finding based on the availability of adequate procedural guidance and the determination that the lack of worker knowledge was an isolated case. The inspector concluded that the completion of the monthly NQG performance assessment surveillance was effective in identifying and correcting performance deficiencies.

## 7.2 Audit of 10 CFR 50.59 Process

The NRC Project Manager reviewed four design change/modification change requests. These changes were included in the licensee's submittal of 10 CFR 50.59 summaries to the NRC. Approved procedures controlled the changes. The changes were approved by onsite and offsite review organizations and followed the guidance in Nuclear Safety Analysis Center (NSAC)-125 regarding screening and safety evaluation. Licensing engineers prepared appropriate Final Safety Analysis Report (FSAR) changes to describe the changes implemented as a result of FSAR change requests 91-043 and 91-047.

The Project Manager reviewed temporary changes to assure that there was not a long-term or rapidly increasing trend which may indicate a short-term approach to maintenance. The project manager determined that the licensee had procedures for tracking temporary modifications (TMODs) and temporary setpoint changes (TSPTs), and maintained an updated log of the status of these items in the control room. The tracking system included requests for circuit jumpers and lifted leads and was well organized and maintained. The temporary change requests were reviewed every 90 days for currency. There were only three open temporary setpoint requests. The temporary modifications log contained 80 open temporary change requests 14 of which were at least 5 years old. One year ago the number of open temporary modifications was smaller, and only 10 were at least 5 years old.

While good progress was made in 1988-90 towards reducing the number of open TMODs, that progress ended when the plant began commercial operation. North Atlantic management is aware that the net number of open TMODs has been slowly growing for about two years as indicated in the attached status graphs. The Project Manager did not consider the backlog to be a significant problem because the modifications have all been reviewed for safety significance, and the increasing trend is gradual and has existed for only two years.

During the period March 15, 1992 to July 26, 1992, 69 change documents (excluding procedures changes) were reviewed by the onsite review committee. All received screening via New Hampshire Yankee Manual Procedure 11210, 10 CFR 50.59, Evaluations, to determine whether a safety evaluation was needed per 10 CFR 50.59. The onsite review committee determined that 17 of these change documents did not require a safety evaluation for some or all of the changes within the scope of the document. The Project Manager selected 4 of the 17, reviewed the licensee's screening rationale, and concluded that the licensee's determination, that 10 CFR 50.59 safety analysis was not needed, was appropriate.

The Project Manager reviewed training records that indicated about 375 employees had completed the licensee's training course related to the 10CFR50.59 evaluation process, with 101 of the employees completing the training in the past three years. Those completing the training included much of the technical support staff, engineering and licensing staff, and the offsite review committee.

## 8.0 MEETINGS

The scope and findings of the inspection were discussed periodically throughout the inspection period. A summary of the inspection findings was provided to the Station Manager and his staff at the conclusion of the inspection period on September 9, 1992.

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

<u>DATE</u>	<u>SUBJECT</u>	<u>REPORT NO.</u>	<u>INSPECTOR</u>
August 14	Environmental Monitoring	92-17	L. Peluso
August 21	PRA	92-80	J. Beall
September 4	Radiological Controls	92-19	D. Chawaga

ATTACHMENT

TEMPORARY MODIFICATION AND TEMPORARY SETPOINT  
STATUS - 2/7/92

