March 27, 2000

Mr. T. C. Feigenbaum
Executive Vice President and Chief Nuclear Officer
Seabrook Station
North Atlantic Energy Service Corporation
c/o Mr. James M. Peschel
P. O. Box 300
Seabrook, NH 03874

SUBJECT: NRC INTEGRATED INSPECTION REPORT NO. 05000443/2000001

Dear Mr. Feigenbaum:

This refers to the inspection completed on February 27, 2000 at the Seabrook Nuclear Power Station. The enclosed report presents the results of this inspection.

Your staff placed an appropriate emphasis on safe plant operations during this period. Operations, maintenance, and engineering personnel performed well. Good focus was noted on the monitoring of potential challenges to plant safety systems. The inspectors identified some examples where the corrective actions for plant deficiencies including a repeat failure of a boric acid storage outlet isolation valve appeared narrowly focused. This example demonstrated the need to continue your corrective action program improvements.

In accordance with 10 CFR 2.790 of the NRC "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Sincerely,

/RA/

James C. Linville, Chief
Projects Branch 6
Division of Reactor Projects

Docket No. 50-443
License No: NPF-86

Enclosure: NRC Inspection Report No. 05000443/2000001

cc w/encl:
B. D. Kenyon, President and Chief Executive Officer
J. M. Peschel, Manager - Regulatory Programs
W. A. DiProfio, Station Director - Seabrook Station
R. E. Hickok, Nuclear Training Manager - Seabrook Station
D. E. Carriere, Director, Production Services
L. M. Cuoco, Esquire, Senior Nuclear Counsel
D. A. Smith, Manager of Regulatory Affairs, Northeast Nuclear Energy Company
W. Fogg, Director, New Hampshire Office of Emergency Management
D. McElhinney, RAC Chairman, FEMA RI, Boston, Mass
R. Backus, Esquire, Backus, Meyer and Solomon, New Hampshire
D. Brown-Couture, Director, Nuclear Safety, Massachusetts Emergency Management Agency
F. W. Getman, Jr., Vice President and Chief Executive Office, BayCorp Holdings, LTD
R. Hallisey, Director, Dept. of Public Health, Commonwealth of Massachusetts
Seacoast Anti-Pollution League
D. Tefft, Administrator, Bureau of Radiological Health, State of New Hampshire
S. Comley, Executive Director, We the People of the United States
W. Meinert, Nuclear Engineer
S. Allen, Polestar Applied Technology, Incorporated

Distribution w/encl:
H. Miller, RA/J. Wiggins, DRA
J. Linville, DRP
R. Urban, DRP
K. Jenison, DRP
M. Oprendek, DRP
Region I Docket Room (with concurrences)
PUBLIC
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector

Distribution w/encl: (VIA E-MAIL)
T. Bergman, RI EDO Coordinator
E. Adensam, PD I-3, NRR
J. Clifford, NRR
B. Pulsifer, NRR
W. Scott, NRR
J. Wilcox, NRR
D. Screnci, PAO, ORA
Inspection Program Branch, NRR (IPAS)
DOCDESK

DOCUMENT NAME: C:\seabrook 00-01.wpd
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRP		RI/DRP			
NAME	RLorson		JLinville			
DATE	**3/27/00**		**3/27/00**			

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.:	05000443
License No.:	NPF-86
Report No.:	05000443/2000001
Licensee:	North Atlantic Energy Service Corporation
Facility:	Seabrook Generating Station, Unit 1
Location:	Post Office Box 300 Seabrook, New Hampshire 03874
Dates:	January 17, 2000 - February 27, 2000
Inspectors:	Ray K. Lorson, Senior Resident Inspector Javier Brand, Resident Inspector
Approved by:	James Linville, Chief Projects Branch 6 Division of Reactor Projects

EXECUTIVE SUMMARY

Seabrook Generating Station, Unit 1
NRC Inspection Report 05000443/2000001

This inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6 week period of resident inspection.

Operations:

- The response to evaluate and correct a control room alarm which indicated an unexpected insertion of the 'C' main steam isolation valve slow speed solenoid was prompt and effective (Section O4.1).

- Operators performed routine 'B' emergency diesel generator surveillance activities well. Chemistry department personnel were properly monitoring elevated particulate levels in the 1B emergency diesel generator fuel oil storage tank. The current levels do not challenge operability of the emergency diesel generator (Section O4.2).

Maintenance:

- The repair of a nitrogen leak from an atmospheric steam dump valve was performed well. A change to the maintenance plan for establishing the component isolation boundaries caused some confusion during the system restoration. The licensee initiated a condition report to review this issue (Section M1.1).

- The corrective actions for repetitive binding problems identified during surveillance testing of the boric acid tanks outlet isolation valves appeared narrowly focused on the immediate repairs. The licensee subsequently initiated a cause and failure investigation to prevent future problems with these valves (Section M2.1).

Engineering:

- The licensee has established a good program for continued monitoring of previously identified air voids in the residual heat removal (RHR) pump suction piping. This has resulted in the proper identification of a changing air void condition within the system piping. The licensee concluded that the RHR system remained operable in this condition (Section E2.1).

- No cold weather issues were identified that prevented a safety system from functioning. However, several cold weather issues, including some repeat issues, highlighted a need to enhance the cold weather preparations program. The licensee planned to conduct benchmarking, and to improve the program as needed (Section E2.2).

Plant Support:

- Some performance problems involving corrective actions, radiation worker knowledge, and work controls, were noted that contributed to the recent radioactive water spill and to the contamination of two workers during a previous maintenance activity. The licensee initiated a condition report to review these issues (Section R2.1).

- The licensee's review following a fitness for duty test failure did not include a review of the work activities that the individual had performed. The licensee planned to implement a plan change to require this type of review following future fitness for duty test failures (Section S1.1).

TABLE OF CONTENTS

Report Details

Summary of Plant Status

The plant was operated at approximately 100% power for the duration of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, routine operations were performed in accordance with station procedures and plant evolutions were completed in a deliberate manner with clear communications and effective oversight by shift supervision. Control room logs accurately reflected plant activities and observed shift turnovers were comprehensive and thoroughly addressed questions posed by the oncoming crew. Control room operators displayed good questioning perspectives prior to releasing work activities for field implementation. The inspectors found that operators were knowledgeable of plant and system status.

O2 Operational Status of Facilities and Equipment

a. Inspection Scope (71707, 62707)

The inspectors routinely conducted independent plant tours and walkdowns of selected portions of safety-related systems during the inspection report period. These activities consisted of the verification that system configurations, power supplies, process parameters, support system availability, and current system operational status were consistent with Technical Specification (TS) requirements and UFSAR descriptions. Additionally, system, component, and general area material conditions and housekeeping status were noted. The inspectors did not identify any plant conditions that would have affected safety system operability. The inspectors identified some minor material deficiencies that were appropriately addressed by the licensee.

O4 Operator Knowledge and Performance

O4.1 Response to ‘C’ MSIV “Slow Speed” Solenoid Inserted Indication

a. Inspection Scope

The inspector reviewed the licensee’s response to the receipt of a control room alarm on February 11, that indicated insertion of the ‘C’ main steam isolation valve (MSIV) slow speed solenoid valve.

b. Observations and Findings

The MSIVs perform a safety function to shut to prevent excessive steam flow from the associated SG in the event of a main steam line break downstream of the MSIV. Hydraulic pressure which provides the motive force used to open the MSIV is vented to a reservoir to allow nitrogen pressure to close the MSIV. The time required to close the MSIV is dependent upon the rate at which the hydraulic fluid is returned to the reservoir. Two flow restricting solenoid valves (i.e. one fast speed, and one slow speed) are installed to control the closing time. Only the fast speed solenoid valve is inserted during a safety-related closure of the MSIV. Insertion of the slow speed solenoid valve would prevent the MSIV valve from meeting the required closure time.

In response to the alarm the operators promptly declared the 'C' MSIV inoperable and entered TS 3.7.1.5 which required that the MSIV be returned to an operable status within 4 hours. The licensee performed initial troubleshooting and attributed the alarm to an indication problem. The inspector agreed with the licensee's conclusion after visually observing that the slow speed solenoid was not actually inserted. The system engineer (SE) reviewed the MSIV control logic and determined that the indication problem would not affect the ability of the MSIV to shut in fast speed. The licensee then appropriately exited the TS action statement.

Instrument and controls (I&C) technicians performed follow-up troubleshooting and determined that the indication problem was caused by a faulty limit switch. The I&C technicians replaced and retested the limit switch satisfactorily.

c. Conclusion

The licensee responded promptly and effectively to evaluate and correct a control room alarm which indicated an unexpected insertion of the 'C' main steam isolation valve slow speed solenoid.

O4.2 'B' EDG Monthly Surveillance Test

a. Inspection Scope

On February 18, the inspector observed the operators perform monthly 'B' emergency diesel generator (EDG) surveillance testing per operations procedure, OX 1426.05, "DG 1B Monthly Operability Surveillance".

b. Observations and Findings

The operators conducted a good pre-test brief which included a review of related operating experience. The test was performed well. The inspector noted good communications, supervisory oversight, and procedural adherence. All components actuated properly and in accordance with the test acceptance criteria.

The inspector questioned the operators regarding the status of a recently identified licensee issue involving elevated particulate levels in the 'B' EDG fuel oil tank. The operators were not aware of the issue and contacted the chemistry department for assistance. The chemistry technician reported that the 1B EDG particulate levels were well below (1.2 parts per million (ppm) the TS operability limit (10 ppm). Chemistry department personnel were trending this reading and developed a plan to reduce the fuel oil tank particulate levels by filtration if necessary. Operations management stated that the operators' awareness of this issue met expectations since the particulate levels were well below the EDG operability limits, and also since another station department (i.e chemistry) was actively reviewing the issue.

c. Conclusion

Operators performed routine 'B' emergency diesel generator surveillance activities well. Chemistry department personnel were properly monitoring elevated particulate levels in the 1B emergency diesel generator fuel oil storage tank. The current levels do not challenge operability of the emergency diesel generator.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Atmospheric Steam Dump Valve (ASDV-V3001), Nitrogen Leak Repair

a. Inspection Scope

On January 27, the inspector observed the repair of a nitrogen leak from one of the four atmospheric steam dump valves (ASDV) (V-3001). The licensee identified the leak during a nitrogen backup system performance monitoring activity. The inspector attended the pre-job brief, observed field activities, and reviewed applicable documentation including the on-line maintenance assessment form.

b. Observations and Findings

An ASDV is installed on each of the four main steam headers to provide a redundant method for decay heat removal when the main condenser is not available as a heat sink. The ASDVs are air actuated, and are provided with a safety-related nitrogen backup supply. The valves also provide a method for mitigating an main steam line over-pressure condition.

Operations and assessment personnel provided good support for this maintenance activity. Although the maintenance activity had been categorized as having very low risk significance, the licensee developed compensatory measures to minimize any potential plant impact. For example, the licensee ensured that no other major plant evolutions were performed in conjunction with this work activity, since one of the two steam supplies to the turbine driven emergency feedwater (EFW) pump would be unavailable.

The technician conducted a good pre-job brief. However, the inspector noted that prior to the maintenance activity, the steam supply valve to the turbine driven EFW pump (MS-V-393) was gagged. This had not been discussed during the pre-job brief nor had it been included on the applicable maintenance planning documentation (i.e. tagging clearance, work order or the on-line maintenance assessment form). The inspector questioned whether adequate controls had been established to control the gagging of MS-V-393.

The inspector discussed this concern with the field operator and the work control group supervisor. The field operator indicated that the decision to gag the valve was made after completion of the formal maintenance planning activities. The purpose was to ensure that the valve would remain closed to preclude an inadvertent steam generator blowdown system isolation should valve V-393 fail to the open position during the maintenance activity. The work control group supervisor stated that the valve gag was controlled by entering the condition in the operations log and the miscellaneous components log. The inspector noted that this control method caused the on-coming shift supervisor confusion regarding the maintenance isolation boundaries. The licensee initiated a condition report (CR) to review this issue.

c. Conclusion

The maintenance activities to repair a nitrogen leak from an atmospheric steam dump valves were performed well. A change to the maintenance plan for establishing the component isolation boundaries caused some confusion during the system restoration. The licensee initiated a condition report to review this issue.

M2.1 Boric Acid Tanks Outlet Valves CS-V410 and CS-V 416

a. Inspection Scope

The inspector reviewed the licensee's response to the surveillance test failures on February 10, of the boric acid tanks outlet isolation valves (CS-V 410 and 416). The inspector interviewed personnel, reviewed documentation, and performed field observations.

b. Observations and Findings

Technical Specification 3.1.2.2 requires that at least two out of the three available boration flow paths be maintained operable while the plant is operating in Modes 1, 2 or 3 (i.e. full power operation to hot-standby). One flow path is via the boric acid transfer tanks and other two are from the refueling water storage tank (RWST). The licensee recently placed valves CS-V-410 and 416 in the in-service test (IST) program since the valves may require operation in order to establish a boration flow path from one of the two boric acid transfer (BAT) pumps. The inspector determined that the failure of the subject valves to manually stroke as required had minimal significance since at least two boron flow paths remained operable.

Valve CS V-410 failed its previous surveillance test on December 30, 1999. The valve passed the required surveillance test on January 7, 2000, after it was lubricated and

stroked several times in the open and closed directions. Collectively, these valves have failed three out of the last four surveillance tests. The inspector questioned whether the corrective actions (i.e. minor valve lubrication, and packing gland inspections) for the recent failures were narrowly focused given the recent poor performance of these valves. The licensee subsequently initiated a cause and failure investigation for the valve failures.

The inspector also identified a deficiency involving the operation of the valve inconsistent with the vendor guidelines. Specifically, the operator used a handwheel wrench to assist in operation of the valves contrary to the vendor guidance. Site engineering is reviewing this issue.

c. Conclusion

The corrective actions for repetitive binding problems identified during surveillance testing of the boric acid tanks outlet isolation valves appeared narrowly focused on the immediate repairs. The licensee subsequently initiated a cause and failure investigation to prevent future problems with these valves.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Evaluation of an Air Pocket Identified in the Residual Heat Removal Pump Suction Piping

a. Inspection Scope

The inspector reviewed the licensee's response to the increased volume of an air pocket in the 'B' residual heat removal (RHR) pump suction piping that had been initially identified during surveillance testing on January 21. The inspector also observed calibration checks on the ultrasonic testing (UT) equipment performed by a qualified Level III nondestructive examination (NDE) technician.

b. Observations and Findings

Evaluation of air pocket

The licensee first identified the presence of two small air pockets in the 'B' RHR suction piping on November 8, 1999, during UT surveillance testing to demonstrate that the emergency core cooling system (ECCS) piping was full of water. The licensee performed an engineering evaluation and determined that the small air pockets would not affect the system operability, and indicated that the air pockets may have been introduced during the repair of the 'B' RHR train check valve during the last refueling outage. This issue was discussed in NRC Inspection Report 99-08.

The UT test is designed to provide an early indication of the presence of potentially

undesirable gases which can lead to system problems such as reduced flow, pump vibration, and water hammer. Industry experience has identified several sources or mechanisms for gas intrusion into the ECCS which have resulted in the failure of safety-related pumps. The measured air pocket volumes in the RHR system have been trending down since the initial identification which tended to confirm the licensee's assumption that the air had been introduced during an outage maintenance activity. However, a recent UT tests performed immediately after a scheduled pump run, identified an increased air volume in the 'B' RHR pump suction line, and also identified a new air pocket in the 'A" RHR pump suction line.

The inspector questioned whether the newly identified condition was bounded by the licensee's original engineering evaluation. The licensee initiated a CR and attributed the increased air volume to stripping of air during the pump surveillance testing. A design engineer indicated that the volume of the increased air voids was bounded by the original assessment and that no operability concern existed. The inspector noted that the air volumes were small and agreed with the licensee's operability assessment. The inspector noted, however, that the licensee was slow to consider whether the new information regarding the air introduction mechanism would impact the original evaluation.

c. Conclusion

The licensee has established a good program for continued monitoring of previously identified air voids in the residual heat removal (RHR) pump suction piping. This has resulted in the proper identification of a changing air void condition within the system piping. The licensee concluded that the RHR system remained operable in this condition.

E2.2 Cold Weather Preparations

a. Inspection Scope

The inspector interviewed the SE, performed a field walkdown of equipment installed to mitigate cold weather conditions, and reviewed several recent CRs initiated for plant problems caused by recent cold weather conditions.

b. Observations and Findings

The inspector reviewed approximately twelve cold weather related CRs generated during this period. The inspector did not identify any cold weather related plant problems that would have prevented a safety system from performing its safety function. However, the inspector noted that some of the cold weather events such as the loss of the primary auxiliary building heating system (CR 00-0245) challenged plant operators or appeared to be repeat issues. The licensee performed an event evaluation for CR 00-0245 and attributed the event to ineffective corrective action for previous cold weather events, along with fragmented program ownership of the cold weather protection activities.

The inspector performed a field walkdown with the SE responsible for co-ordinating the

Station's cold weather preparation activities, and observed that equipment had been installed in several locations to mitigate the cold weather conditions. The inspector noted, while interviewing the SE, that the licensee had not established a formal program which integrated the different requirements and activities to be performed in preparation for cold weather. The inspector determined that this observation was similar to licensee event team finding, and noted that the licensee planned (CR 99-0016) to perform industry benchmarking and to enhance the cold weather program.

c. Conclusions

No cold weather issues were identified that prevented a safety system from functioning. However, several cold weather issues, including some repeat issues, highlighted a need to enhance the cold weather preparations program. The licensee planned to conduct benchmarking, and to improve the program as needed.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments (71750)

The inspectors frequently toured the radiological controlled area (RCA) during the period and observed radiological work practices. The radiological controls technicians were observed to be attentive and provided high quality assistance to plant workers. Generally, plant workers were observed to be following proper radiological work practices including the use of dosimetry and protective equipment. Personnel briefings conducted prior to job activities routinely emphasized precautions and instructions to limit exposure.

R2.1 Radioactive Liquid Spill

a. Inspection Scope

The inspector evaluated the issues associated with a radioactive water spill which occurred on February 22, in the waste processing building during re-circulation of the 'A' resin sluice tank.

b. Observations and Findings

The leak was from an analog element used to measure the pH of the resin sluice tank. The probe consists of a plastic insertion assembly which passes through the body of a probe/port isolation valve. By design, the probe must be withdrawn from the valve in order to close the valve. System integrity is maintained by two O-rings until the isolation valve is closed. Approximately 3 to 10 gallons of contaminated water (> 300,000 dpm/100 cm2) leaked onto the floor and into a floor drain, and contaminated an approximate a 10 square-foot area. The airborne activity was about 80% of the derived air concentration (DAC) for Cobalt 60 (Co-60) during the initial clean up and

decontamination of the room.

After two decontamination attempts, the area contamination levels dropped to between 10,000 to 80,000 dpm/100 cm2. No workers were contaminated during or after the spill. The licensee planned to completely decontaminate the area. The general dose rates in the room (2 to 4 mrem/hr) did not change after the spill. However, a catch container which had been placed in the area to catch the initial leakage reached 50 mrem/hr. The subject probe has not been used for pH monitoring for years, and the licensee has since removed the probe from service and closed the isolation valve.

The inspector noted some performance problems involving corrective actions, knowledge of the radiation workers, and work controls which contributed to this event and a previous event where two workers were contaminated during a maintenance activity. The licensee initiated CR 00-1125 to review these issues which included:

- The work control package issued on 2/4/00, to close the probe isolation valve did not provide adequate guidance to withdraw the probe prior to closing the valve. This may have contributed to the increased leakage identified on February 22. Additionally, the work package did not provide guidance to the workers that the system was contaminated. This contributed to two workers becoming contaminated after cleaning a drip of system water on the floor, without protective clothing.

- No actions were implemented after the licensee learned that workers attempted to close the valve with the pH probe inserted which would have been expected to cause damage to the probe. Two separate CRs issued to report the contamination of the two workers and the attempt to close the valve without removing the probe were closed without discussing the work control issue noted above.

- The radiation workers involved in the clean-up discussed above became contaminated while removing from the probe without wearing appropriate protective clothing.

c. Conclusion

Some performance problems involving corrective actions, radiation worker knowledge, and work controls, were noted that contributed to the recent radioactive water spill and to the contamination of two workers during a previous maintenance activity. The licensee initiated a condition report to review these issues.

S1 Conduct of Security and Safeguards Activities

S1.1 General Comment (71707, 71750)

The inspectors observed security force performance during inspection activities. Protected area access controls were found to be properly implemented during random observations. Proper escort control of visitors was observed. Security officers were alert and attentive to their duties.

Generally, the licensee responded well to several fitness for duty test failures that occurred during the period. However, the inspector identified a deficiency in that the licensee had not performed a review of work activities performed by a worker involved with a safety related system after the worker failed a fitness for duty test. The licensee is implementing a plan change to require a review of work activities for any type of fitness for duty failure.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the licensee management on February 7, 2000, following the conclusion of the inspection period. The licensee acknowledged the inspectors findings.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

W. Diprofio, Unit Director
J. Grillo, Assistant Station Director
G. StPierre, Operations Manager
B. Seymour, Security Manager
T. Nichols, Technical Support Manager
D. Sherwin, Maintenance Manager

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observation
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Closed: None

Discussed: None

PARTIAL LIST OF ACRONYMS USED

ASDV	Atmospheric Steam Dump Valve
CR	Condition Report
CS	Charging System
dpm	Disintegrations per Minute
DAC	Derived Air Concentration
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
gpd	gallons per day
gpm	gallons per minute
IST	In-service Testing
LCO	Limiting Condition for Operation
MS	Main Steam
OE	Operating Experience
psig	pounds per square inch gauge
RHR	Residual Heat Removal
SG	Steam generator
TDEFW	Turbine Driven Emergency Feedwater Pump
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
WR	Work request