North Atlantic

North Atlantic Energy Service Corporation
P.O. Box 300
Seabrook, NH 03874
(603) 474-9521

The Northeast Utilities System

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United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Seabrook Station
1999 Annual Environmental Operating Report

North Atlantic Energy Service Corporation (North Atlantic) submits the 1999 Annual Environmental Operating Report for Seabrook Station. The enclosed report is a summary of the implementation of the Environmental Protection Plan (EPP) for the period of January 1, 1999 to December 31, 1999. This report is submitted pursuant to the requirements of Section 5.4 of the Seabrook Station Environmental Protection Plan.

Should you have any questions regarding this report, please contact Mr. James M. Peschel, Regulatory Compliance Manager at (603) 773-7194.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.

William A. DiProfio
Station Director

cc (without enclosures):

cc: H. J. Miller, Regional Administrator
R. M. Pulsifer, NRC Project Manager, Project Directorate 1-2
R. K. Lorson, NRC Senior Resident Inspector

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Seabrook Station
Annual Environmental Operating Report
January 1, 1999 to December 31, 1999

Environmental Monitoring Program

The following provides a summary of the reports related to the Seabrook Station Environmental Monitoring Program and Water Quality Monitoring Program that were submitted to the Environmental Protection Agency (EPA) pursuant to NPDES Permit No. NH0020338.

1. North Atlantic Letter NYE-99005, "1998 Hydrological Monitoring Report," dated February 26, 1999. This letter was submitted to the EPA and demonstrated 1998 compliance with the NPDES Permit limits on the thermal component of the cooling water system discharge from Seabrook Station.

   Seabrook Station's National Pollutant Discharge Elimination System (NPDES) Permit sets thermal discharge limits during station operation. Specifically, the thermal component of the discharge cannot increase the surface temperature in the near-field jet-mixing region by more than 5° F. The jet-mixing region is the receiving waters within 300 feet of the submerged diffuser in the direction of discharge. In addition, the 5° F limit applies only to temperature rises caused by the addition of heat to the receiving waters. This temperature difference, or ΔT, is the parameter of interest in demonstrating permit compliance.

   The largest ΔT values in 1998 occurred during cold-weather months when isothermal ocean conditions exist. The maximum monthly ΔT was 2.90° F and occurred during the month of December. Negative monthly mean ΔT values occurred for the months of May through September. This is a result of thermally stratified ocean conditions when the large volume of relatively cold bottom water entrained by the discharge plume, reduces the discharge plume's temperature so that at discharge monitoring station, this mixed volume's temperature can actually be less than the temperature at the relatively warm reference station.

2. North Atlantic Letter NYE-99011, "1998 Chlorine Minimization Report," dated May 6, 1999. This letter was submitted to the EPA and demonstrated 1998 compliance with the NPDES Permit limits on the chlorine levels discharged by Seabrook Station's cooling water system.

   Seabrook Station employs continuous low-level chlorination to control biofouling in the Circulating Water and Service Water Systems as specified by Part I.A.1.a of the NPDES Permit. Section I.A.2.h of the Permit states that the "objective of this chlorination report is to continue minimizing the usage of chlorine consistent with maintaining a suitable biofouling control of the intake cooling water system and maintaining a high condenser efficiency."

Chlorine measurements of the Cooling Water System discharge (measured as total Residual Oxidant or TRO) are obtained at the Discharge Transition Structure prior to entry into the discharge tunnel. The TRO values are reported in the monthly Discharge Monitoring Reports (DMRs) to both the Environmental Protection Agency (EPA) and the New Hampshire Department of Environmental Services (NHDES). During 1998, chlorine levels discharged from Seabrook Station, measured as the Total Residual Oxidant (TRO), were below the NPDES Permit limits of 0.2 ppm daily maximum and 0.15 ppm monthly average.

3. North Atlantic Letter NYE-99013, "Seal Deterrent Barrier," dated May 25, 1999. This letter was submitted to the EPA and described North Atlantic's plans to install a seal deterrent barrier on Seabrook Station's three offshore intake structure during the summer of 1999 to preclude the entrapment of seals. The barrier was subsequently installed in August 1999 (see item 11 under Non-Routine Reports).

4. North Atlantic Letter NYE-99017, "Third Supplement to NPDES Permit Renewal Application," dated August 11, 1999. This letter was submitted to the EPA and provided supplemental information on Seabrook Station's NPDES Permit renewal application submitted in April 1998. The letter provided additional information on the input streams to the ocean discharge (Outfall 001) and requested an increased permit limit for a chemical used in the Makeup Water Treatment System which discharges to Outfall 001. The limit requested is well below aquatic toxicity limits. This supplement also contained a revision to the Clean Water Act 316(b) Certification to reflect receipt of a Letter of Authorization from the National Marine Fisheries Service for the taking of seals incidental to the operation of Seabrook Station. The mitigation, monitoring and reporting requirements are addressed in this supplement as well as the plans to install a seal deterrent barrier during the summer of 1999. A copy of this letter was provided to the NRC at the time of submittal.

5. North Atlantic Letter NYE-99022, "1999 Environmental Studies Program Mid-Year," dated September 1, 1999. This letter was submitted to the EPA as required by Part I.A.11.e. of Seabrook Station's NPDES Permit and summarized the Biological, Hydrological and Chlorination Monitoring Program results.

   North Atlantic stated that that after nine years of commercial operation, the Environmental Monitoring Program continues to demonstrate that Seabrook Station has not had a deleterious impact on the balanced indigenous populations in the coastal waters of New Hampshire.

6. North Atlantic Letter NYE-99026, "Unusual Pollock Impingement," dated October 27, 1999. This letter was submitted to the EPA and reported a large number of pollock impinged at Seabrook Station between the last week of July and the end of September 1999. During this period, an estimated 9,891 pollock were impinged, which was more than the total number impinged from 1994 through 1998

(5,330). Most of the pollock impinged in this 1999 period were between 120 and 170 mm (about five to seven inches) total length which would probably make them young-of-the-year (YOY) that were spawned in the winter of 1998-1999.

North Atlantic stated there is no simple explanation for the large number of pollock impinged from July to September 1999. Catch per unit effort of pollock in otter trawl samples for this period was virtually identical between 1998 (0.47/trawl) and 1999 (0.43/trawl). However, Seabrook Station's Environmental Monitoring Program contractor, Normandeau Associates, observed large numbers of small pollock swimming around the offshore intake structures during the installation of the Seal Deterrent Barrier in August 1999. It should be recognized that there are significant fluctuations in the numerical abundances of many species of highly fecund (prolific) fish species, such as pollock, and the pollock impingment event may be a reflection of a strong year-class of juvenile pollock. It is useful to put the number of pollock impinged into perspective using adult equivalency methodology. The impingement of 9,891 juvenile pollock represents 1,494 age one pollock.

7. North Atlantic Letter NYE-99027, "1998 Environmental Monitoring Report," dated November 19, 1999. This letter was submitted to the EPA and provided the results of the 1998 Environmental Monitoring Program. Environmental monitoring for Seabrook Station began in the early 1970's, about 20 years before the plant went into full power operation in 1990 and has continued during the nine years of plant operations. Major elements of the program include:

   - Water Quality (temperature, salinity, dissolved oxygen)
   - Zooplankton (bivalve larvae, macrozooplankton)
   - Fish (impingement, entrainment, otter trawl, beach seine)
   - Macrobenthos (subtidal algae, macrofauna)
   - Epibenthic crustacea (lobsters, crabs)
   - Soft-shell clam
   - Seals (in-plant and offshore monitoring)

   The report concluded that after nine years of operation, Seabrook Station has not impacted the balanced indigenous populations in the Hampton-Seabrook area.

EPP Non-Compliance and Corrective Actions

None.

Changes in Station Design or Operation, Tests and Experiments Involving a Potentially Unreviewed Environmental Question

None.

Non-Routine Reports

1. North Atlantic letter LIC-99118, "Seal Entrapment – February 26, 1999," dated March 12, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of a seal in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

2. North Atlantic Letter NYE-99007, "Sanitary Waste Discharge Report," dated March 17, 1999. This submittal to the EPA reported a small unintended sanitary waste discharge which occurred on March 10, 1999. This report was made pursuant to Part II.D.1.e of Seabrook Station's NPDES Permit.

   The discharge occurred as a result of a leak in an underground two-inch sanitary line located at the southwest corner of Seabrook Station's Warehouse #1. The discharge reached the surface of the ground and entered a nearby catch basin which discharges to the Seabrook Station's ocean outfall (Outfall 001) via the on-site storm drain system. The discharge occurred intermittently over about a two hour period, during which time approximately six discharges of about ten gallons each, occurred. Repairs to the leaking pipe were effected by isolating flow to the pipe, removing about six inches of piping around the leaking area and replacing it with a new fitting.

   North Atlantic stated that there were no adverse environmental consequences associated with this discharge for two reasons. The volume of the sanitary discharge was small. Upon reaching the on-site Discharge Transition Structure, the small discharge volume is mixed with approximately 450,000 gallons per minute of ocean cooling water containing a small concentration of residual chlorine. The discharge is ultimately released to Seabrook Station's ocean outfall which is located one mile offshore. At the ocean discharge another dilution, estimated to be a factor of ten, occurs within a short distance of the discharge nozzles.

3. North Atlantic Letter LIC-99140, "Seal Entrapment – March 10, 1999," dated March 24, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of a seal in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

4. North Atlantic Letter LIC-99177, "Seal Entrapments – April 7 and 8, 1999," dated April 22, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of two seals in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

5. North Atlantic Letter LIC-99213, "Seal Entrapment – May 17, 1999," dated May 24, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of a seal in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

6. North Atlantic Letter LIC-99301, "Seal Entrapment – July 2, 1999," dated July 30, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of a seal in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

7. North Atlantic Letter NYE-99021, "July 1999 Discharge Monitoring Reports," dated August 16, 1999. This letter was submitted to the EPA and reported the only NPDES Permit exceedence for the 1999 operating period.

   An exceedence of the NPDES Permit maximum daily chlorine limit of 0.2 mg/L occurred on July 26, 1999 when a level of 0.34 mg/L was measured and reported in the July Discharge Monitoring Reports.

   The exceedence occurred as a result of a failure to shutdown the chlorination system when the influent chlorine strainer was cleaned. Seabrook Station procedures have been updated to preclude recurrence of this event.

   As a result of this condition, chlorine flow was diverted into the Intake Transition Structure (ITS). This "elevated" chlorine level along with the existing chlorine in the intake tunnel caused the exceedence. The chlorine exceedence is conservatively estimated to have occurred for less than two hours.

   The following information was provided to the EPA and discusses why this chlorine exceedence did not have a significant impact to the environment. The Seabrook Station Chemistry Department conducted a study in 1993 to determine the decomposition/demand of chlorine in the Circulating Water System discharge tunnel between the onsite Discharge Transition Structure (DTS)—which is the NPDES Permit compliance sample point—and the offshore Discharge Diffuser nozzles (DDN). Prior to this study it was postulated that the residual chlorine measured in the DTS undergoes substantial decomposition and some biological consumption during the three-mile transit to the discharge diffuser nozzles.

   The study was performed by taking chlorine samples at the DTS and the discharge diffuser (DDN) and comparing the difference to determine the decomposition/consumption. To ensure representative samples were collected from the DDN, samples were taken by Seabrook Station Environmental Monitoring Program divers using sample bottles held directly in the discharge stream.

The results of the study showed that substantial reduction of chlorine occurs between the DTS and the point at the discharge diffuser nozzles where the Circulating Water System discharges into the ocean. The study sample results showed that the DTS chlorine level was 0.12 mg/L while the DDN chlorine level was measured at <0.05 mg/L (less than the detection limit). It was also noted that a 10:1 dilution occurs as soon as the discharge water mixes with the ambient ocean water at the lip of the diffuser.

8. North Atlantic Letter LIC-99333, "Seal Entrapment – July 26, 1999," dated August 24, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of a seal in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

9. North Atlantic Letter LIC-99347, "Seal Entrapments – August 11, 1999," dated September 10, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of two seals in the cooling water system. A copy of this letter was provided to the NRC at the time of submittal.

10. North Atlantic Letter LIC-99371, "Seal Entrapment – September 2, 1999," dated September 30, 1999. This report was submitted to the National Marine Fisheries Service and provided notification of the entrapment of two seals in the cooling water system. The state of decomposition indicated that the seal was entrapped at least four weeks prior to recovery, which was before installation of the seal deterrent barriers was completed. A copy of this letter was provided to the NRC at the time of submittal.

11. North Atlantic Letter LIC-99481, "Response to National Marine Fisheries Service on Seal Impact Mitigation Measures," dated December 22, 1999. This letter was submitted to the National Marine Fisheries Service (NMFS) and provided an update on the status of the Seal Deterrent Barrier installed in August 1999. This letter was submitted in accordance with Paragraph 5(a) of the NMFS Letter of Authorization to take a small number of seals incidental to intake Cooling Water System operations. The letter stated that the requirements of the NMFS Letter of Authorization had been met since no seals had been entrapped since the barrier was installed.

    The letter explained that North Atlantic completed installation of Seal Deterrent Barriers on all three of Seabrook Station's offshore intake structures on August 18, 1999. The deterrent barriers were attached to the existing cooling water system intake structure bars and consist of pre-fabricated panels made out of the same copper-nickel alloy as the existing vertical intake bars. The barrier panels reduce the vertical bar spacing on each intake from about 14.5 inches to about 4-5 inches.

No seals have been entrapped since the installation was completed. This time frame corresponds with the peak seal entrapment period (late summer to mid-fall). As a result, North Atlantic stated that the Seal Deterrent Barrier is a fully effective mitigation measure for precluding the entrapment of seals into Seabrook Station's offshore intake structures.

A copy of this letter was provided to the NRC at the time of submittal.