

**North  
Atlantic**

North Atlantic Energy Service Corporation  
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The Northeast Utilities System

July 30, 1997

Docket No. 50-443  
NYN-97089

United States Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

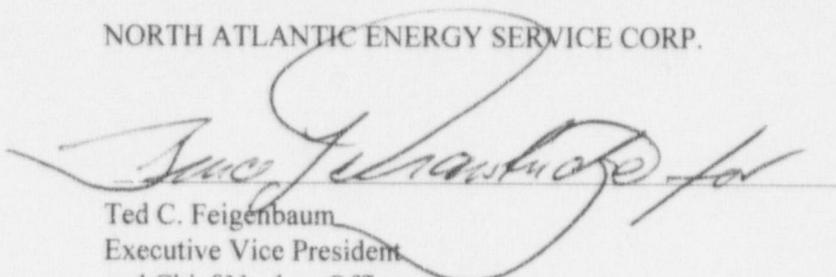
Seabrook Station  
120-Day Response to Generic Letter 97-01

This letter provides North Atlantic Energy Service Corporation's (North Atlantic) 120-day response to Generic Letter (GL) 97-01, "Degradation of Control Rod Drive Mechanism Nozzle And Other Vessel Closure Head Penetrations." The response includes a description of the Seabrook Station program for ensuring the timely inspection of PWR control rod drive mechanism (CRDM) and other closure head penetrations.

Should you have any questions regarding this response, please contact Mr. Terry L. Harpster, Director of Licensing Services, at (603) 773-7765.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.

  
Ted C. Feigenbaum  
Executive Vice President  
and Chief Nuclear Officer

050096

cc: Hubert J. Miller, Region I Administrator  
Albert W. De Agazio, Sr. Project Manager  
F. Paul Bonnett, NRC Senior Resident Inspector

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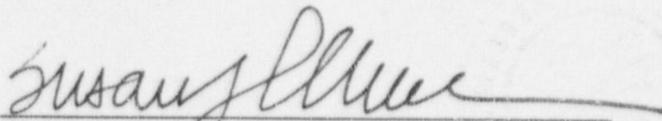
A075/11

STATE OF NEW HAMPSHIRE

Rockingham, ss.

July 30, 1997

Then personally appeared before me, the above-named Bruce L. Drawbridge, Director - Services, North Atlantic Energy Service Corporation, that he is duly authorized to execute and file the foregoing information in the name and on the behalf of North Atlantic Energy Service Corporation and that the statements therein are true to the best of his knowledge and belief.

A handwritten signature in cursive script, appearing to read "Susan J. Messer", written over a horizontal line.

Susan J. Messer, Notary Public

My Commission Expires: December 22, 1998

ENCLOSURE TO NYN-97089

**Response to USNRC Generic Letter 97-01**  
**“Degradation of Control Rod Drive Mechanism Nozzle And Other Vessel**  
**Closure Head Penetrations”**

**Introduction**

Generic Letter 97-01 (GL), Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations, was issued to request licensees to describe their program for ensuring the timely inspection of PWR control rod drive mechanism (CRDM) and other closure head penetrations. This response provides requested information for Seabrook Station.

Prior to the issuance of the GL, North Atlantic participated with the Westinghouse Owners Group (WOG), the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI) to understand the operational experience, identify technical issues, cause factors, relative importance, and solutions related to the CRDM nozzles and other vessel head penetrations (VHP). One of these tasks was the development of safety evaluations that characterized the initiation of damage, propagation and consequences. These safety evaluations are contained in WCAP 13565 and are applicable to Seabrook Station. The NRC reviewed the safety evaluations and issued a safety evaluation report (SER) to NEI on November 19, 1993. The safety evaluations and the SER establish the basis for Seabrook Station's continued operation.

**Response to Requested Information Item 1.1:**

“1.1 A description of all inspections of CRDM nozzle and other VHPs performed to the date of this generic letter, including the results of these inspections.”

**Response:**

Visual inspection walkdowns for boric acid are performed in accordance with Generic Letter 88-05 during the beginning of each refueling outage. Prior to plant startup following each refueling outage, a system leakage test and visual examination (VT-2) is conducted on the reactor vessel pressure retaining boundary in accordance with ASME Section XI, Subsection IWB, Examination Category B-P. A surface examination (PT) was performed on two peripheral CRDM housings in accordance with ASME Section XI, Subsection IWB, Examination Category B-O on September 19, 1992, during Seabrook Station's second refueling outage.

These walkdowns and examinations have not identified any boric acid buildup or leakage that would indicate leakage of primary coolant through a cracked reactor vessel head penetration.

**Response to Requested Information Item 1.2 through 1.4:**

“1.2 If a plan has been developed to periodically inspect the CRDM nozzle and other VHPs:

- a) Provide the schedule for first, and subsequent, inspections of the CRDM nozzle and other VHPs, including the technical basis for this schedule.

- b) Provide the scope for the CRDM nozzle and of the VHP inspections, including the total number of penetrations (and how many will be inspected), which penetrations have thermal sleeves, which are spares, and which are instrument or other penetrations.
- 1.3 If a plan has not been developed to periodically inspect the CRDM nozzle and other VHPs, provide the analysis that supports why no augmented inspection is necessary.
  - 1.4 In light of the degradation of CRDM nozzle and other VHPs described above, provide the analysis that supports the selected course of action as listed in either 1.2 or 1.3, above. In particular, provide a description of all relevant data and/or tests used to develop crack initiation and crack growth models, the methods and data used to validate these models, the plant-specific inputs to these models, and how these models substantiate the susceptibility evaluation. Also, if an integrated industry inspection program is being relied on, provide a detailed description of this program."

Response: North Atlantic is a participant in the WOG/NEI Reactor Pressure Vessel (RPV) head penetration integrated inspection program. This integrated program includes volumetric inspections of head penetrations that have been performed and additional volumetric inspections that will be performed. Presently, the integrated industry inspection program proposes inspections of two Combustion Engineering design plants and two Babcox & Wilcox design plants over the next three years. Westinghouse design plants are likely to be included in the integrated industry inspection efforts within the next few months.

North Atlantic believes that the number of plants that have been or will be inspected is sufficient to demonstrate the adequacy of the WOG/NEI integrated inspection program. The need and schedule for re-inspection will be based on an evaluation of the inspection results from the WOG/NEI integrated inspection program. The plant performing re-inspections will keep the NRC staff informed of its future re-inspection plans.

WCAP 14901 "Background and Methodology for Evaluation of Reactor Vessel Closure Head Penetration Integrity for the Westinghouse Owners Group" provides the information relative to items 1.2, 1.3, and 1.4. Sections 1.2 and 1.3 of WCAP 14901 contain the historical data on inspections performed to date. Sections 2.0 through 4.0 provide a description of the models used in performing the evaluations. WCAP 14901 will be submitted separately by the WOG.

In addition to the WOG integrated inspection program, the three PWR owners groups, the Electric Power Research Institute, and the Nuclear Energy Institute are cooperatively working to compile information on the estimated operating time from January 1, 1997, needed to initiate and propagate a crack 75% through wall in a vessel penetration. This information will be evaluated to determine if an adequate number of plants performed inspections or are planning to perform inspections. This evaluation will be completed by the end of 1997 and provided to the NRC by the WOG.

**Response to Requested Information Item 2:**

- "2 Provide a description of any resin bead intrusions, as described in IN 96-11, that have exceeded the current EPRI PWR Primary Water Chemistry Guidelines recommendation for primary water sulfate levels, including the following information:
  - 2.1 Were the intrusions cation, anion, mixed bed?
  - 2.2 What were the durations of these intrusions?
  - 2.3. Does the plant's RCS water chemistry Technical Specifications follow the EPRI guidelines?

- 2.4 Identify any RCS chemistry excursions that exceed the plant administrative limits for the following species: sulfates, chlorides or fluorides, oxygen, boron, and lithium. Identify any conductivity excursions which may be indicative of resin intrusions. Provide a technical assessment of each excursion and any follow-up actions.
- 2.5 Provide an assessment of the potential for any of these intrusions to result in a significant increase in the probability for IGA of VHPs and any associated plan for inspections."

Response: North Atlantic has reviewed the Seabrook Station records to determine if any incident of resin ingress similar to those which occurred in 1980 and 1981 at the Jose Cabrera (Zorita) plant has occurred at Seabrook Station. This data search was structured to identify all resin intrusion events into the primary coolant system with a magnitude greater than 1 ft<sup>3</sup> (30 liters). The threshold of 1 ft<sup>3</sup> was chosen as a conservative lower bound since it represents less than 15% of the estimated volume of resin released into the reactor coolant system during the two events at Jose Cabrera.

Routine analysis for sulfate in reactor coolant was performed for plant operation since August 19, 1990. A sulfate concentration in the range of 15 to 17 ppm peak concentration was used as the indicator of cation resin ingress. This concentration is approximately equivalent to a volume of 1 ft<sup>3</sup>. This corresponds to an elevation of a 28 micro S/cm increment in specific conductance.

Had either specific conductance or sulfate increases indicated resin ingress to the magnitude of the threshold quantity identified above, additional data evaluation would have been conducted to look for a corresponding depression in pH or elevation in lithium as corroborating information of the incident. In the case of the use of sulfate data as the indicator, specific conductance would also have been included as confirmatory data had a significant in leakage event been identified.

There is no evidence of a cation, anion, or mixed bed resin intrusion in the reactor coolant system for the period reviewed. Similarly, there were no indications of resin intrusion into the reactor coolant system based on a review of specific conductivity data for the review period.

Reviews for boron, chlorides, fluorides and oxygen are not considered necessary because these species are not viewed as valid indicators of cation resin ingress and degradation within the primary coolant system of a PWR. Borate, chloride, and fluoride anions could be associated with the anion portion of mixed bed resin (cation plus anion); however, if mixed bed resin leakage to the RCS had occurred, the cation portion of the resin would contain the sulfate indicator described above. Detectable dissolved oxygen in reactor coolant during power operation, with appropriate hydrogen overpressure on the volume control tank and specified residual dissolved hydrogen in the reactor coolant, was not postulated to occur and therefore, could not be associated with resin inleakage.

Notwithstanding, no RCS excursions that exceeded administrative limits were observed for the period for boron, sulfates, chlorides and fluorides. Minor lithium transgressions have occurred during plant operation that exceeded administrative limits however, were not determined to be attributed to resin intrusion.

On one occasion, RCS oxygen was measured above limits during a plant heatup following Refueling Outage 2. The limit was exceeded while in Mode 5 and was the result of placing an air-saturated mixed bed demineralizer in service after the reactor coolant system had been deoxygenated. The RCS temperature at the time of discovery was approximately 185°F. This event did not occur as a result of resin intrusion.

Seabrook Station has followed the EPRI PWR Primary Water Chemistry Guidelines since commercial operation on August 19, 1990 and has implemented revisions when issued.