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The Northeast Utilities System

November 23, 1998 <u>Docket No. 50-443</u> <u>AR# 98013661</u> NYN-98132

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

> Seabrook Station Response to Generic Letter (GL) 98-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency M² igation Functions While in a Shutdown Condition"

The purpose of this letter is to respond to the Nuclear Regulatory Commission's request for information regarding Generic Letter 98-02.

On July 28, 1998, the Nuclear Regulatory Commission issued Generic Letter 98-02 to request licensees to (1 assess the susceptibility of their Residual Heat Removal (RHR) and Emergency Core Cooling Systems (ECCS) to common-cause failure as a result of Reactor Coolant System (RCS) draindown while in a shutdown condition, and (2) submit certain information, pursuant to Section 50.54(f) of Title 10 of the Code of Federal Regulations (10CFR50.54(f)) concerning their findings regarding potential pathways for inadvertent RCS drain-down and the suitability of surveillance, maintenance, modification and operating practices and procedures regarding configuration control during reactor shutdown cooling. The North Atlantic Energy Service Corporation (North Atlantic) responses to the required information identified in Generic Letter 98-02 are provided in the enclosure to this letter.

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.

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Ted C. Feigenbaum Executive Vice President and Chief Nuclear Officer

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cc: H. J. Miller, NRC Region I Administrator
J. T. Harrison, NRC Project Manager, Project Directorate 1-3
R. K. Lorson, NRC Senior Resident Inspector

STATE OF NEW HAMPSHIRE

Rockingham, ss.

DATE: November 23, 1998

Then personally appeared before me, the above-named Ted C. Feigenbaum, being duly sworn, did state that he is Executive Vice President and Chief Nuclear Officer of the 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.

Susan J. Messer, Notary Public

My Commission Expires: December 22, 1998

ENCLOSURE TO NYN-98132

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Generic Letter 98-02 Requested Information

REQUIRED INFORMATION:

Within 180 days of the date of this generic letter, addressees are required to perform the following:

- (1) an assessment of whether your emergency core cooling systems include certain design features, such as a common pump suction header, which can render the systems susceptible to common-cause failure as a result of events similar to the Wolf Creek RCS draindown event of September 17, 1994; and if this susceptibility is found,
- (2) prepare, with consideration of plant-specific design attributes, a description of the features of your Appendix B quality assurance program (for example, the methods used to verify valve position, the controls in place to assure compliance with plant surveillance, maintenance, modification and operating procedures, and the adequacy of operator training for such activities) that provide assurance that the safety-related functions of the RHR system and ECCS will not be adversely affected by activities conducted at hot shutdown (such as at Wolf Creek).

Addressees may limit their attention to those surveillance, maintenance, modification and operational activities at hot shutdown during which it is feasible to divert RCS fluid to the RWST, resulting in simultaneous drain-down of the RCS and voiding in the suction header for the RHR and ECC system pumps. Addresses may further limit their response to the consideration of potential configurations and conditions that involve flow paths with pipe diameters equal to or greater than 2 inches. If the assessment performed in response to part (1) of the above requested information does not reveal that a susceptibility exists, then no submittal is necessary.

If the assessment performed in response to part (1) of the above required information reveals that the susceptibility exists, then the result of the assessment shall be submitted in writing. The response to part (2) of the above information request need not be submitted to the NRC.

RESPONSE:

Part (1)

As described in Generic Letter 98-02, the RCS drain-down event occurred at Wolf Creek while the reactor was in the Hot Shutdown (Mode 4) condition. In that event, operators were attempting to reborate RHR train B, while at the same time maintenance personnel were repacking an RHR train A-to-train B crossover line isolation valve. Train B was reborated by recirculating water through a loop that contains the RHR system piping, the RWST, a containment spray pump, a manual RWST isolation, and an RHR system crossover line. When the RWST isolation valve was opened for stroke testing, a drain-down path was inadvertently created from the RCS to the RWST.

The primary function of the ECCS at Seabrook Station is to remove the stored fission product decay heat from the reactor core, so that fuel rod damage, to the extent that it would impair effective cooling of the core is prevented following an accident. The ECCS consists of the centrifugal charging pumps (CCP), safety injection (SI) pumps, a refueling water storage tank (RWST), the residual heat removal pumps, the residual heat removal heat exchanger, the safety injection accumulators, and the associated valves and piping.

During a Loss of Coolant Accident (LOCA), the ECCS operates in three distinct phases. During the injection phase, ECCS components draw borated water from the Refueling Water Storage Tank (RWST) and inject it into the RCS. As the supply of injection water is depleted, the level in the containment recirculation sumps increases and the ECCS is shifted to the cold leg recirculation phase before the RWST is empty. Later in the accident response, the ECCS is shifted to the hot leg recirculation phase.

A review of the Wolf Creek ECCS and Containment Building Spray (CBS) pump supply design as outlined in AEOD/S95-01 "Reactor Coolant System Blowdown at Wolf Creek on September 17, 1994," indicates that there are number of differences from the Seabrook Station design. The Wolf Creek design incorporates the use of a single 24-inch supply header from the RWST which supplies both trains of RHR, SI, CBS and CCPs. Both trains of the RHR, SI and CBS pumps are normally aligned to take suction from the common RWST supply header. The CCPs are normally isolated from the common supply header during plant operation. The CCPs are automatically aligned to take suction from the RWST header upon receipt of a SI signal.

At Seabrook Station, the RWST is the normal source of water for the RHR pumps, the SI pumps, the CBS pumps and the CCPs. A single 14-inch line is used to supply the Train "A" RHR, SI and CBS pumps from the RWST. A separate 14-inch line is used to supply the Train "B" RHR, SI and CBS pumps from the RWST. The RHR, SI and CBS pumps are normally aligned to take suction from the RWST. Two separate individual 8-inch lines from the RWST supply the CCPs.

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The CCP's normally take suction from the Volume Control Tank (VCT) during plant operation. In the event of an accident, the CCPs are started and automatically aligned to take suction from the RWST.

The RHR system design at Seabrook incorporates a similar drain-down line located between the RHR train A-to-train B crossover line isolation valves as identified at Wolf Creek. This line is primarily used at the end of refueling outages to drain the refueling cavity to the RWST. The boration of the RHR system is not conducted by the method used at Wolf Creek and does not include operation of the draindown line. The major difference between the Seabrook Station and the Wolf Creek design is that the drain-down line at Seabrook Station physically ties into the suction line for the "B" train components instead of a common header for all ECCS and Containment Spray components. Therefore, Seabrook Station is not as susceptible as Wolf Creek to this type of event.

However, the two individual RWST supply lines to the RHR, SI and CBS pumps in the Seabrook Station design are connected to a common header inside of the RWST to form the RWST mixing chamber for the mixing of chemical spray additive tank fluid with the RWST fluid. In the event of a LOCA during an inadvertent opening of the locked closed isolation valve of the draindown line during Hot Shutdown (Operational Mode 4), it is possible due to the common suction tie inside of the RWST, that a steam bound Train "B" suction piping could adversely impact the operation of the Train "A" RHR, SI and CBS systems. Additionally, the suction lines to the SI pumps are cross-tied through a 6-inch line. Therefore, they are potentially susceptible to a common cause failure. Since the suction lines for the CCPs from the RWST have completely independent suction lines, they are not susceptible to a common cause failure.

A review of RCS and RHR connections to other systems that could lead to RCS inventory loss during mode 4 operations was conducted. This revealed that the only potential configuration of a flow path of equal to or greater than 2-inches to these systems is the 8-inch drain line described above. In addition to the above, a review of the procedures which operate the RCS draindown isolation valve (RH-V33) indicates that RH-V33 is not operated with the plant in the Hot Shutdown (Mode 4) condition while the RHR system is aligned to the RCS. Therefore, it is unlikely that a similar event could occur at Seabrook Station.

The differences in the Seabrook Station design, described above minimize the possibility of a similar event occurring at Seabrook Station. Additionally, the Seabrook Station procedural controls, procedure compliance policy, methods used to verify valve position and the station operator training program further minimize the possibility of such an event at Seabrook Station.

Part (2)

The response to Part 2 has been completed and is available for review at Seabrook Station.