June 18, 2002

MEMORANDUM TO: James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Robert D. Starkey, Project Manager, Section 2 ***/RA/***
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: REQUEST FOR SEABROOK STATION TO REVIEW TECHNICAL INFORMATION IN SUPPORT OF A PROPOSED INFORMATION NOTICE REGARDING SEABROOK STATION STEAM GENERATOR TUBE OUTSIDE DIAMETER AXIAL CRACKING (TAC NO. MB5299)

On May 28, 2002, I faxed the attached DRAFT "Background" and "Description of Circumstances" sections of a proposed Information Notice to North Atlantic Energy Services Corporation, the licensee for Seabrook Station, Unit No. 1. The purpose of the fax was to facilitate the NRC staff's writing of an Information Notice by requesting the licensee to review the draft information for technical accuracy. The DRAFT document described the licensee's identification of outside diameter axial cracking on 15 tubes in steam generator "D". The Seabrook Station steam generator tubes are constructed of thermally treated Alloy 600. Until the findings at Seabrook, no known or likely instances of stress corrosion cracking affecting thermally treated Alloy 600 tubing had been reported in the United States. On May 31, 2002, during a phone call with the staff, the licensee offered clarifying comments on the faxed document. The licensee's clarifications did not significantly change the technical content of the DRAFT document.

Docket No. 50-443

Attachment: DRAFT "Background" and "Description of Circumstances" sections of a proposed Information Notice

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DRAFT

Background

Seabrook is a four-loop Westinghouse 1150 MWt PWR unit. Commercial operation started in July of 1990. The unit has operated for 10 effective full power years (EFPY).

Seabrook has four Westinghouse Model-F recirculating steam generators (A, B, C, D). Each steam generator contains 5626 thermally treated Inconel 600 tubes, which are nominally 0.688 inch in diameter with a wall thickness of 0.040 inches. Prior to installation, Row 1 through Row 10 of the tubes were thermally treated in a furnace intended for the stress relief of the U-bends. Each steam generator contains eight stainless steel tube support plates and 6 upper support bars. The first tube support plate is a partial drill-hole plate which contains drilled tube holes in the outer periphery, and quatrefoil broached holes in the rest of the plate. The remaining 7 plates contain quatrefoil broached tube holes. Plates 1 - 4 are 0.75 inches in thickness; Plates 5 - 8 are 1.12 inches thick.

Description of Circumstances

During the current refueling outage at Seabrook in May 2002, the licensee (North Atlantic Energy Services Corporation) performed steam generator tube inspections as required by the plant technical specifications. The initial scope of the inspection included two of the four steam generators, SGs "A" and "D". While performing bobbin probe inspections of tubes in "D" Steam Generator, the licensee detected indications at a number of tube to tube support plate intersections. Subsequent plus-point probe inspection confirmed the indications as axially oriented linear indications, initiating on the outside diameter (OD) tube surface. The licensee also

performed ultrasonic testing (UT) which further confirmed the linear, axial indications. Indications such as these are typical of outside diameter stress corrosion cracking (ODSCC).

As of May 23, 2002, the licensee has confirmed 42 axial indications in 15 tubes located between Row 2 and Row 9 of SG "D". All indications are located within the thickness of the tube support plates, opposite the broached tube hole lands. The affected support plates are Support Plates 2 through 6 on both the hot leg and cold leg side. Depths of the indications were measured up to a maximum of 62% through-wall (TW). Lengths range from 0.3 inches to the full tube support plate thickness (0.75-1.12 inches).

The licensee has also completed inspections of SG "A" and analyzed all data collected. No similar degradation was noted in SG "A". The inspection scope has been expanded to steam generators "B" and "C". Results of these inspections indicated no similar degradation. The licensee stated that eddy current analysts were re-trained, after the detection of ODSCC indications in SG "D", to be sensitive to the characteristics of the signal. Based on the data analysis, the licensee has concluded that there were no similar degradation detectable in the other steam generators.

The licensee has pulled two tubes for metallurgical analysis to characterize the apparent degradation and to identify its root cause. The activities are on-going. The pulled tubes contain five intersections with indications including the one with the maximum voltage amplitude and the one with the maximum measured depth. The rest of the affected tubes will be plugged.