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February 26, 1993

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: 1992 Secondary Chemistry Annual Report

Gentlemen:

Enclosed is the Seabrook Station Secondary Chemistry Annual Report for 1992. This report, submitted in accordance with Branch Technical Position MTEB 5.3, summarizes and evaluates the 1992 condensate, feedwater, and steam generator water chemistry operating experience and reports the total time secondary water chemistry parameters were out of specification.

Should you have any questions regarding this report, please contact Mr. James M. Peschel, Regulatory Compliance Manager, at (603) 474-9521, extension 3772.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Ted C. Feigenbaum", is written over a large, stylized circular flourish.

Ted C. Feigenbaum

Enclosures

TCF:MDO/act

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North Atlantic
February 26, 1993

ENCLOSURE TO NYN-93036

1992 SECONDARY CHEMISTRY ANNUAL REPORT

The Secondary Chemistry Annual Report for 1992 summarizes and evaluates the condensate, feedwater, main steam and steam generator chemistry, as well as documenting total out-of-specification hours on these systems. This report also includes special tests or programs implemented beginning January 1, 1992.

I. Commercial Power Operation - Cycle 2

The evaluation of secondary chemistry for this operational mode is from January 1 to September 6, 1992, at which point the plant was brought to below 30% in preparation for refueling. The total out-of-specification hours for the steam generators, condensate, feedwater and main steam during this time period are listed below.

1. Steam Generators = 166.6 hours
2. Condensate = 33 hours
3. Feedwater = 1033.6 hours
4. Main steam = 0 hours

Out-of-specification hours for the steam generators were attributed to the intrusion of regen chemicals into the condenser and to a main steam drain piping leak. The majority of condensate hours were due to plant maintenance activities while feedwater out-of-specification hours were mostly caused by suppressed hydrazine values necessary for maintaining pH within specifications. Overall, no significant trends were noted for this operating period of Cycle 2.

The Chemistry Performance Index (CPI) averaged 0.38. Steam Generator Blowdown cation conductivity and sodium averaged 0.24 μ mhos and 1.6 ppb respectively. The mean condensate pump discharge dissolved oxygen was 7.5 ppb. Values were calculated from plant data at a power level greater than 30% utilizing monthly averages.

A. Elevated Secondary System pH

The Chemistry Department began implementation of the elevated pH program on February 12, 1992, by raising feedwater pH to 9.3. Following extensive evaluation, pH was increased to 9.4 on June 3, 1992. The goal is to achieve a pH of 9.6 which should decrease iron transport to the steam generators and thus reduce the associated sludge burden. Total copper and iron levels are being monitored on feedwater, condensate and steam generator blowdown via corrosion product transport sampling units. Excluding data captured during abnormal plant conditions or flow variations, feedwater total iron transport, which averaged 12 ppb in January, was reduced to an average of 8 ppb by August. No increase in copper was noted. The Chemistry Department plans to continue this program in Cycle 3.

B. Air Inleakage and Secondary Oxygen Levels

The major problem during the year has been ingress of oxygen into the condensate system. Cycle 2 saw the average dissolved oxygen level remain at approximately 7.5 ppb. While this value is within the EPRI guidelines, an Air Inleakage Task Force has been established to further reduce the oxygen levels.

A significant amount of leaks have been identified, utilizing helium mass spectrometry, and repaired.

II. Refueling

On August 26, 1992 Seabrook Station began power reduction in preparation for refueling (RF02). An unplanned reactor trip from 18% power occurred on September 7, 1992. The plant entered Mode 5 on September 9, 1992.

A. Hideout Return Study

On September 3, 1992, the Chemistry Department began a hideout return study on the Model F steam generators installed at Seabrook Station.

Preliminary results indicate peak returns of chloride and sodium to be a factor of two less than those exhibited during RF01 shutdown. Sulfate appears to show returns similar to those found during the previous study. Extensive analysis and computations are still ongoing.

B. Sludge Lancing, Foreign Objects Search and Retrieval (FOSAR) and Inspections.

In preparation for RF02 maintenance and repair activities, the condensate and feedwater systems were drained and left dry. The steam generators were drained and refilled several times, without chemical addition, to aid in steam generator cooldown and removal of hideout return bulk water impurities. The generators were left dry in preparation for sludge lancing.

From September 14 to September 19, 1992, Westinghouse performed sludge lancing and FOSAR on Seabrook Station's four steam generators. High pressure lancing using computer guided jets to spray between columns enabled the removal of 217.5 pounds of sludge from all four steam generators. Two complete coverages per steam generator were used.

FOSAR activities were performed in parallel with tubesheet cleaning operations. In addition to annular and tubelane inspections, inbundle inspections were also done as time allowed. A second support plate inspection was performed in steam generator B and taped for North Atlantic records. One sludge sample per steam generator was taken back to the Westinghouse chemistry facility for analysis.

Of noteworthy mention, is the greater than 50% reduction in sludge copper content. The Chemistry Department has postulated that this is due to the significant reduction in the use of Felpro N-1000 thread lubricant use on wetted secondary system components.

The foreign objects located in steam generator C during the first outage was verified not to have moved from its original position. The item will remain between the four plugged tubes for Cycle 3. Westinghouse also performed blowdown lane/tubesheet, flow distribution baffle, and first and second support plate inspections on steam generator B.

C. Wet Lay-up

Wet Lay-up chemicals were added to steam generators on September 30 and October 1, 1993.

Out-of-Specification hours for Modes 5 and 6 were as follows:

$$\text{pH} \leq 9.8 = 258.1 \text{ hrs}$$

$$\text{Hydrazine} \leq 75 \text{ ppm} = 226.9 \text{ hrs}$$

III. Cycle 3 - Startup From RF02

The condensate system was filled and placed on recirculation on October 24 1992. Hydrazine addition was initiated during the fill. Several hotwell dumps were performed for system purification. Vacuum was drawn on October 28, 1992.

Draining and filling the steam generators was done on October 31 and November 1, 1992. Vacuum was broken on November 1, 1992 for a tube plugging and stabilization on feedwater heater 22A. Also on November 1, 1992 an increase in CPD pH, N_2H_4 and Ammonia was traced back to the inadvertent drain of the steam generators to the hotwells. The hotwells were dumped several times in an effort to cleanup the condensate system. The plant entered Mode 4 on November 6, 1992 and Mode 3 the following day. Steam generator blowdown was established at 20 gpm per steam generator on November 7, 1992. Mode 2 was entered on November 11, and Mode 1 on November 13, 1992. Blowdown was increased to 65 gpm per steam generator to assist in plant purification.

Power escalation continued throughout the month. The plant reached 100% power on November 22, 1992. The total Out-of-Specification hours for steam generators, condensate, feedwater and main steam during power escalation from Mode 4 are listed below:

1. Steam Generator - 306.9 hrs
2. Condensate - 150.4 hrs
3. Feedwater - 166.4 hrs
4. Main Steam - 324 hrs

IV. Commercial Power Operation - Cycle 3

The evaluation of secondary chemistry for this operational mode is from November 22 to December 31, 1992, for out-of-specification hours and from November 16, when power ascended above 30%, to December 31, 1992, for plant performance parameters. The total out-of-specification hours for the steam generators, condensate, feedwater and main steam are listed below.

1. Steam Generator - 198.7 hrs
2. Condensate - 104.8 hrs
3. Feedwater - 72.8 hrs
4. Main Steam - 138 hrs

The majority of out-of-specification hours were attributed to two plant trips and a secondary system flow controller failure. With the exception of the aforementioned instances, secondary system parameters displayed downward trends following startup.

The Chemistry Performance Index averaged 0.45. Steam generator blowdown cation conductivity and sodium averaged 0.48 μmhos and 2.3 ppb respectively. The mean condensate pump discharge dissolved oxygen was 6.4 ppb. Values were calculated utilizing monthly averages.