U. S. NUCLEAR REGULATORY COMMISSION
REGION I

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LICENSEE: North Atlantic Energy Service Corporation (NAESCO)
Seabrook, New Hampshire

FACILITY: Seabrook Station

DATES: August 21-25, 1995

INSPECTORS: D. Moy, Reactor Engineer, RI
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LEAD INSPECTOR: Leonard Prividy 9/22/95
Leonard Prividy, Sr. Reactor Engineer Date
Systems Section
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APPROVED BY: Eugene M Kelly 9/22/95
Eugene M. Kelly, Chief Date
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SUMMARY: Engineering performance continues to be strong. The inspector concluded that the technical support department was providing good support, as evidenced by knowledgeable system engineers who have been instrumental in resolving plant problems well, and closely coordinating the implementation of plant modifications. Good system performance monitoring methods were being developed with the system engineer's frequent use of real time plant data. Communications between the system engineers and other departments were good. Root cause evaluations and corrective actions to plant problems were timely and thorough, except for one instance regarding the thermal barrier head tank level instrumentation. Planned modifications for improving system performance were well conceived. Quality assurance audit reports continue to conclude that the engineering performance is good.

DETAILS

1.0 INSPECTION SCOPE

The objective of this inspection was to evaluate the effectiveness of the engineering organization to provide technical support for the plant. This inspection is the first of three planned NRC visits during the current SALP period at Seabrook. The inspection focused on the identification and resolution of plant problems by the technical support department, including the roles of the system engineers in monitoring system performance, performing root cause evaluations, and implementing corrective actions for improvements. The inspectors also reviewed plant modifications and assessed independent reviews of engineering activities.

2.0 INSPECTION FINDINGS

2.1 Technical Support Department Reviews

The inspectors conducted reviews of the service water (SW) and primary component coolant water (PCCW) systems, because of their risk significance, discussing with the system engineer the 1994 system performance report and conducting system walkdowns. The system performance report, which each system engineer compiles annually, includes information regarding any recent major component failures, the status of corrective actions, major performance data, significant trends, and planned system improvements.

The system engineers were knowledgeable concerning the design and operation of their systems, including planned improvements to be implemented during the next refueling outage. The system engineers communicated well with other plant departments as evidenced by their involvement in developing resolutions to plant problems. The inspectors observed the system engineers' frequent use of the new computerized system for accessing real time plant data which afforded a valuable means of monitoring system performance.

2.1.1 SW System Review

System Performance

The inspector noted that the SW system pumps and valves have been performing well with no major problems being identified during inservice testing. Only 16 corrective work requests, none of which were high priority, were outstanding. Regarding heat exchanger performance, the licensee was prepared to inspect both PCCW heat exchangers (SW side) for tube degradation during the next refueling outage. The inspection results would be used to evaluate the condition of the heat exchanger tubes in light of the past premature tube failures. An additional item of interest concerned the accumulation of up to one foot of debris in the floor of the service water pump house (SWPH) bay during the last refueling outage. Since the buildup occurred during one operating cycle and was considered to be a more rapid buildup from previous experience, the licensee established a work task to clean the SWPH bay each refueling outage. The inspector considered this action to be appropriate.

Planned Improvements

The inspector reviewed the modification planning and coordination aspects of the engineering work being performed to resolve concerns regarding the corrosion problem that had been observed at certain 24-inch field welded joints of the concrete lined, carbon steel pipe in the SWPH and the primary auxiliary building (PAB). The licensee had begun the site preparation work to construct a new concrete inspection vault (design coordination report 95-0013) needed for refurbishing the SW piping. The licensee had also prepared design coordination report (DCR) 95-0012, "B-Train Service Water Underground Piping Refurbishment," for the "B" train pipe repairs to be done during refueling outage OR04. A similar modification will be prepared to accomplish the "A" train repairs during refueling outage OR05.

The inspector noted that the licensee's modification planning has been extensive regarding DCRs 95-0012 and 95-0013, with the system engineer playing a key role in the SW project team meetings which began in late 1994. Engineering, with the assistance of Stone and Webster Engineering Corporation, conducted a thorough evaluation to determine the best way to refurbish the SW underground piping. Based on this evaluation, which was presented by the system engineer and the cognizant corporate design engineer at the June 1995 Service Water System Reliability Seminar, the licensee selected the AMEX-10/WEKO seals, manufactured by Miller Pipeline Company for the welded joint piping repairs. Other options considered were pipe replacement or relining the SW piping with cured-in-place-piping (CIPP).

The WEKO seals are designed for the internal sealing of joints in a variety of pipe materials, including cement liners. These joint seals are comprised of an elastomer boot which overlaps the field weld cement liner crevice. The boot is held in place by two 6% molybdenum stainless steel rings, one on each side of the joint. Dropout spool pieces will be installed in the new concrete inspection vault, the primary auxiliary building and the cooling tower to facilitate the piping repairs and inspections. Engineering evaluations 95-14, Underground Service Water Piping Field Weld Refurbishment Justification, and 95-15, Service Water System Operability Assuming Underground Piping Degradation, were in progress to technically support the use of the WEKO seals for this modification work.

The inspector verified that the impact of the seals on the SW system hydraulic resistance was being appropriately considered by the licensee. The licensee evaluated the system hydraulic performance by allocating additional resistance for the seals in the flow model, and concluded that adequate SW flows would be provided during design-basis events for both the ocean and cooling tower alignments. The licensee will gather data during post modification testing to verify that the actual hydraulic loss coefficients of the seals are not greater than those used in the flow model.

The inspector concluded that the engineering work for DCRs 95-0012 and 95-0013 was being appropriately planned and coordinated. However, the licensee has not been successful in implementing a modification for a new design strainer element to be installed in the SW supply to each PCCW heat exchanger. This modification was being pursued to improve the strainer performance and thereby minimize the time that the strainer was bypassed for cleaning. The system engineer indicated that several coordination problems developed between engineering and the strainer vendor, including concerns regarding the seismic qualification of the new strainer. While engineering appropriately identified seismic qualification problems with the new strainer elements that required resolution before installation, these problems have substantially delayed implementation of the modification, resulting in the current use of less-than-optimal strainers. The system engineer expected installation to occur in approximately 6 months.

2.1.2 PCCW System Review

System Performance

The inspector reviewed the licensee's method of trending the performance of PCCW equipment and concluded that appropriate performance monitoring was being conducted. The inspector noted that the PCCW trending reports were documented in Procedure ES 1851.020, Rev. 0, "Primary Component Cooling Water System Performance Monitoring." The review of these reports indicated that the PCCW system equipment had been performing well during the year. It was apparent that the system engineer frequently monitored PCCW pump performance data (flow and differential pressure) for any adverse trends. No alert values had been experienced for the pumps and valves during inservice testing.

The inspector also reviewed the licensee's corrective actions regarding two adverse condition reports (ACRs). The licensee appropriately evaluated ACR 95-053 and corrected applicable procedures to prevent recurrence of PCCW system relief valves lifting due to slave relay testing during an emergency safety feature actuation system surveillance test. However, the inspectors had several observations regarding the licensee's corrective actions to resolve problems with the thermal barrier head tank level indication and loop seal line, which were identified in adverse condition report (ACR) 95-052.

Two concerns associated with the thermal barrier head tank loop seal line had been apparent for several years, namely: (1) oxygen ingress into the thermal barrier system that results in hydrazine depletion if the loop seal drain valve CC-V1231 is left open to the containment atmosphere; and (2) the loop seal line's impact on head tank level indication. The problem of hydrazine depletion, due to oxygen ingress with a normally open loop seal drain valve, had been evaluated in 1990 via request for engineering services (RES) 90-337. Engineering concluded that the loop seal drain valve should be left open and the operations procedures were revised accordingly. However, in response to recent thermal barrier head tank erratic level indication, the chemistry staff noted that the loop seal drain valve was open and not closed as specified in chemistry department procedures. Apparently, the chemistry procedures had not been revised as a result of the conclusions from RES 90-337. The licensee indicated that the chemistry procedure would be revised.

In late March 1995, after receiving a head tank high level alarm several days after a hydrazine addition had been made to the head tank, operations issued ACR 95-052, identifying sluggish and erratic response of the head tank level instrumentation. Operations initially assumed that the high level alarm was due to thermal expansion. However, this initial assumption was later questioned when operations experienced level indication problems during attempts to drain the head tank. Specifically, it took about 12 hours for indicated level to match actual level.

In a memorandum dated June 2, 1995, which documented a screening review for corrective action to resolve this problem, the Occurrence Review Committee concluded that the head tank level problems in ACR 95-052 did not meet the operating experience threshold reporting criteria, and should be resolved by the RES process. Consequently, ACR 95-052 was canceled and RES 95-176 was issued with a Priority 3 classification to address the head tank level problems. Engineering was requested to evaluate if the reference leg of the head tank level instruments should be vented back to the head tank. In light of the high importance of the CCW system based on the licensee's probabilistic risk assessment studies, the inspector questioned the basis for a Priority 3 classification for RES 95-176, which places this RES in a routine category competing for resources with many RESs of very minor safety significance. The operations manager stated that the licensee would be reconsidering the prioritization for the corrective action to these problems, which may also involve revisiting the issue through the ACR process.

The inspector acknowledged the licensee's recent efforts to resolve the head tank level and hydrazine depletion problems. However, in light of the history of these problems, the inspector concluded that the licensee's long term corrective actions have been ineffective, to date.

2.2 Containment Sump Isolation Valve Minor Modification 95-509

The inspector reviewed this modification to verify the appropriate use of design criteria and design input requirements. The quality of the safety evaluation was also reviewed. The engineering work had been completed and implementation was scheduled for the next refueling outage.

In the event of a loss-of-coolant accident (LOCA), the containment building spray (CBS) sump isolation valves (CBS-V8 & V14), which are normally closed flexwedge gate valves, are required to open for aligning the suction of the CBS and residual heat removal pumps to the containment sump. If liquid became entrapped in the valve bonnet and was subsequently heated due to the increased temperature following a LOCA, the valves could be prevented from opening due to excessive pressure in the bonnet area (i.e., pressure locked condition).

Minor modification 95-509 includes a 3/4-inch vent line from the valve bonnet area to the upstream piping (containment sump side), thereby providing a relief path for any potential pressure buildup. The inspector considered this modification to be a good resolution of the safety concern. A normally open valve will also be included to allow for isolation of the vent line as needed. The inspector found that the design criteria and design input requirements

were appropriate. The licensee conducted adequate independent and interdisciplinary reviews of the design changes, performed a detailed safety evaluation, and included appropriate information to revise plant records and the final safety evaluation report.

3.0 MANAGEMENT OVERSIGHT

The inspector reviewed several recent QA audits conducted of engineering activities, and discussed the results with the QA audit supervisor. A QA audit of the licensee's readiness for closure of the Generic Letter (GL) 89-10 program identified no major problems. The audit was conducted by technical personnel familiar with motor-operated valve issues and the requirements for GL 89-10 program closure. Ten recommendations were provided for improvements to the program. Also, an audit of the electrical engineering work involved with associated circuits resulted in some minor comments. These results support the QA organization's view that engineering performance remains strong.

Management involvement in engineering activities was also evident by the short-term corrective actions being implemented in addressing plant problems such as the PCCW system, and in long-term actions being planned and implemented regarding plant modifications.

4.0 MANAGEMENT MEETINGS

The scope and purpose of the inspection were discussed at an entrance meeting conducted on August 22, 1995. During the course of the inspection, the inspectors' findings were discussed with licensee representatives. The inspectors met with the principals listed below on August 25, 1995, to summarize the preliminary findings. During the inspection, the licensee indicated that there was no proprietary information involved in the inspection, or expected to be included as part of this inspection report.

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