

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-443/94-12  
Docket No. 50-443  
License No. NPF-86  
Licensee: North Atlantic Energy Service Corporation (NAESCO)  
Post Office Box 300  
Seabrook, New Hampshire 03874  
Facility Name: Seabrook Station  
Inspection Period: May 9-13, 1994

Inspectors: *L. Eckert* 6/2/94  
L. Eckert, Radiation Specialist Date

Approved By: *Robert J. Bore* 06/10/94  
Dr. R. Bore, Chief Date  
Facilities Radiation Protection Section

**Areas Inspected**

Changes in the radiological controls intended to accommodate priorities of the refueling outage, radiation protection during scheduled and emergent work during the refueling outage, radiological discrepancy evaluation, and contamination control.

**Results**

Generally good performance in the areas of maintaining occupational exposure as low as reasonably achievable (ALARA) and in the control of work in radiologically controlled areas was observed. No significant poor radiation worker practices were observed. Of those radiological discrepancies reviewed, it was determined that appropriate corrective actions had been emplaced. One violation regarding locked high radiation area controls was also identified and was promptly resolved by licensee staff.

## DETAILS

### 1.0 Personnel Contacted

#### 1.1 Station Personnel

- \* M. Anderson, Radwaste Department Supervisor
- \* J. Bourassa, Quality Assurance Engineer, Yankee Atomic Energy Corporation
- \* B. Cash, Health Physics (HP) Department Supervisor
- \* W. DiProfio, Station Manager
- \* S. Dodge, Radiation Services Department Supervisor
- \* B. Drawbridge, Executive Director Nuclear Production
- J. Grillo, Operations Manager
- J. Kwasnik, Principal Radiation Scientist
- \* W. Leland, Manager Chemistry and HP
- \* R. Litman, Chemistry Support Supervisor
- G. McDonald, Nuclear Quality Manager
- \* J. Peschel, Regulatory Compliance Manager
- J. Peterson, Maintenance Manager
- \* N. Pillsbury, Director of Quality Programs
- \* J. Rafalowski, Chemistry and HP Projects Supervisor
- \* J. Sobotka, NRC Coordinator
- \* E. Sovetsky, Technical Projects Supervisor
- R. Sterrit, ALARA<sup>1</sup> Supervisor
- \* J. Warnock, NSA Manager
- J. Tarzia, Senior Health Physicist
- \* W. Temple, Nuclear Licensing

Other licensee personnel were contacted during the inspection.

#### 1.2 NRC Personnel

- \* A. Cerne, Senior Resident Inspector
  - \* J. Laura, Resident Inspector
- \* Denotes attendance at the exit meeting.

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<sup>1</sup>As Low As Reasonably Achievable

## 2.0 Health Physics (HP) Outage Organization

At the time of this inspection, all supervisory positions within the Radiological Controls Department were filled by fully qualified personnel. The HP organization in OR03 (the third refueling outage) was split into a day and a night shift. The day and night shift HP organizations are led by the HP Department Supervisor who continues to report to the Chemistry and HP Manager in the outage organization.

The outage day-shift HP organization was split into field operations, ALARA, and HP Technical Support Groups. Day-shift field operations personnel were subdivided into task areas which included radiologically controlled area (RCA) balance of plant lead, radiation work permit (RWP) lead, refuel floor lead, steam generator (S/G) lead, and balance of containment building lead. The outage night-shift organization was structured similarly with the HP Supervisors heading the department.

The inspector reviewed the amount of overtime expended by HP supervision during the outage and limited the review to the time period of this inspection. No individual was noted to have spent greater than 72 hours working in a 7-day period at the station.

The inspector reviewed qualification records for radiological controls technicians (RCTs) covering S/G work. The inspector noted that time spent for accreditation status was conservative. The inspector also noted that contractor RCTs had been qualified in accordance with the licensee's established training program. Contractor RCT training on instrumentation will be the subject of further inspection efforts.

## 3.0 Radiation Protection Program

This inspection was conducted during the most radiologically challenging week of the licensee's scheduled maintenance outage. Work activities conducted during this week included completion of S/G foreign object search and retrieval (FOSAR), S/G sludge lancing, S/G eddy current testing, and refueling bridge lower mast replacement.

Tours of the radiologically controlled areas indicated adequate housekeeping throughout the plant considering the fact that the licensee was conducting a refueling outage. No radiological posting discrepancies were noted. Access control to the containment was effectively maintained by the posting of a security guard who checked containment access privileges prior to entry.

As part of this inspection, several direct observations of work activities inside the RCA were conducted by the inspector. In general, all work was conducted in a professional manner, and monitored appropriately by the radiation protection staff. The inspector did observe some minor cases of poor radiation worker practices, such as workers touching their faces with potentially contaminated gloves and workers who had not fully zippered their protective

clothing. The licensee was aware of this situation and station management was taking steps to reemphasize the importance of following good radiation worker practices. All personnel were observed to be properly wearing their thermoluminescent dosimeters and direct reading dosimeters. All locked High Radiation Areas challenged by the inspector were properly secured.

The inspector also observed the presence of both ALARA and HP supervisory personnel observing work in progress, and reviewing the successes and failures of ALARA initiatives in the plant. This will help yield ideas for use in future outages which can help to maintain exposures accrued on jobs ALARA. No backlogs of personnel or work were observed at the access point to the RCA. Radiation protection personnel were able to provide Radiation Work Permits to the work crews in a timely manner, and to provide appropriate job coverage to all work crews.

As noted previously, S/G eddy current testing was observed by the inspector. The licensee made extensive use of robots (both primary and a secondary side robots were utilized) and teledosimetry (minimizes RCT exposure) for this job.

The refueling bridge lower mast replacement job was well conducted overall. The job was conducted in a small area and hot particle controls were still effectively maintained. The inspector also attended a pre-job brief for this job. This briefing was effective in clearly delineating responsibilities for the upcoming task. A plastic sock placed over the mast was effective in minimizing exposures by lessening the potential for the spread of contamination and significantly reducing the decontamination effort.

For 1994, the licensee has established an annual goal of not more than 100 person-rem, of which 94.15 person-rem was allotted for the outage. At the time of the inspection, it appeared that less exposure was being accrued than expected, with some jobs being completed below their established goals. Licensee OR03 ALARA performance will be the subject of further inspection efforts.

#### **4.0 Radiological Discrepancy Evaluation**

The inspector noted that the initiation of the HP Stop-Act-Think-Review (STAR) was a good licensee initiative. At the time of the inspection this program was still under development. During the conduct of this inspection, the Chemistry and Health Physics Supervisor was observed conducting a performance review of the refueling bridge lower mast replacement job using this new program. Impact of this program will be evaluated in future inspections.

Some improvement has been noted in the depth of investigation, how trends are developed, and in the application of corrective actions. These actions are taking place in a more timely manner than has been seen in previous inspections. The following discrepancies relating to the licensee's radiological controls program were reviewed.

#### 4.1 Failure to Maintain Locked High Radiation Area Controls

On April 9, 1994, the licensee was at 0% power and was in the initial stages of OR03. At this time, the containment building (CTB) was posted and controlled as a locked high radiation area (LHRA). Work was being conducted by the HP Department to complete radiation surveys, post discrete areas within the containment building as LHRAs and HRAs, and release the CTB from LHRA controls in order to permit less restrictive access controls to CTB access. In this case, there were no accessible areas where dose rates exceeded 1,000 mrem per hour at 30 cm.

The CTB still was posted and controlled as a LHRA at the time of the conduct of a containment elevator inspection. However, the RCT who was providing the LHRA controls by "continuous" coverage for the two elevator inspectors allowed them to work on the -26-foot, 0-foot, and 26-foot elevations of the CTB without continuous coverage for up to 45 minutes. The licensee concluded that the two workers were not exposed to any unexpected radiation levels as verified through dosimetry analysis (digital alarming dosimetry and thermoluminescent dosimetry) and post-event radiation surveys of the areas visited by the two workers.

The licensee conducted a formal investigation using their Station Information Report (SIR) system to evaluate this event to determine the causes and to develop corrective actions to prevent recurrence. The SIR system is a discrepancy resolution system used station-wide and is used to evaluate discrepancies of a more significant nature. The licensee determined that the root cause was personnel error and/or inattention to detail. Also, the licensee concluded that the incident was a violation of station procedures but not of Technical Specifications (TS).

Licensee actions included discussion of the event with all HP Department personnel and RCT contractors and disciplinary action against the RCT assigned to cover the elevator inspection team.

#### NRC Conclusions

The inspector concluded that the licensee adequately documented this event and had initiated adequate corrective actions. The consequences of the event were minimal, since the actual dose rates in the areas visited by the elevator inspection team were considerably less than one rem per hour. Also, the individuals were not subjected to any radiation fields in which extremity doses would have been a more important parameter than whole body doses. Two other incidents regarding HRA/LHRA controls had occurred in the last two years. The inspector reviewed these events and concluded that corrective actions emplaced as a result of these incidents could not have reasonably precluded this incident from occurring. Significant disciplinary actions were imposed by the licensee on the RCT assigned to cover the elevator inspection team. The inspector also concluded that the failure to maintain continuous surveillance over the elevator inspection team was not the result of a willful action on the

part of licensee personnel. Based on the above and the licensee's prior performance in the radiological controls area, the violation of failing to maintain continuous RCT coverage in the area posted and controlled as a LHRA as required by licensee procedures is not being cited, since the event meets the criteria of 10 CFR 2, Appendix C, VII. B. for enforcement discretion.

#### 4.2 Radiological Occurrence Report (ROR) 94-06: Failure of Merlin Gerin (MG) Model DMC-90 Electronic Dosimeters

On April 23, 1994, the licensee initiated a ROR to document a case in which two alarming dosimeters were found to have blank displays. The dosimeters were assigned to individuals detensioning the reactor head studs in the cavity. Both of the workers were wearing two additional alarming dosimeters which functioned properly.

Licensee actions following the above malfunctions included instructing RCTs to check alarming dosimeter displays for abnormal indications prior to issuance and installation of new batteries in 78 alarming dosimeters with the remainder of the dosimeters taken out of service pending further evaluation.

On April 24, 1994, two additional cases of alarming dosimeter failure occurred while performing stud detensioning work. These individuals were also wearing multiple-alarming dosimeters. The licensee contacted the MG representative and discussed the failures. The licensee was informed that certain DMC Model 90s shut down after recording the maximum number of time intervals for dose histogram information in radiation fields greater than background. DMC-90 dosimeters can be set to record information at 1-minute, 10-minute, 1-hour, and 24-hour time intervals. The licensee then attempted confirmatory testing which provided inconclusive results. The MG representative was contacted again who assured the licensee that the problem was of an intermittent nature. The MG representative also advised the licensee that changing to 10-minute intervals would prevent this problem from evidencing itself again. Based upon this information, the licensee returned to issuing one DMC-90 per person and the DMC-90s which had been taken out of service were returned to service.

Licensee actions included issuing multiple alarming dosimeters pending resolution and understanding of the failures, conducting confirmatory dosimeter tests, disseminating information on this event through the Nuclear Network Bulletin (a system which provides a medium for the exchange of information between US nuclear stations), changing the historical time intervals of the subject dosimeters to ten minutes, and obtaining replacement dosimeters from Merlin Gerin.

#### NRC Conclusions

The inspector concluded that the licensee adequately documented this event and had taken appropriate actions regarding the failure of the electronic dosimeters. Since the individuals were wearing multiple alarming dosimeters and this redundancy provided continuous

monitoring capability, there was no violation of TS. There were also no violations of licensee procedures.

#### 4.3 ROR 94-07: Failure of Eberline HP-210 Probes

On May 8, 1994, the Health Physics Support Supervisor noted a problem with two Eberline HP-210 probes. Both probe count rates dropped to zero as the probes were moved closer to the source. One probe dropped to zero at about 10,000 cpm and the other at 25,000 cpm. The two probes were removed from service and other probes were tested. No similar problems were encountered during these tests. An ROR was initiated to document this discrepancy. The licensee suspects that the root cause was quench gas depletion or anode degradation as these probes had been in service for a considerable length of time. At the time of the inspection, the ROR investigation had not been completed and as such no significant actions had been taken in order to help prevent recurrence. This was not a case of violation of TS or licensee procedures. Final licensee actions will be evaluated in a future inspection.

#### 5.0 **Exit Meeting**

The inspector met with licensee representatives at the end of the inspection, on May 13, 1994. The inspector reviewed the purpose and scope of the inspection and discussed the findings with the licensee. The licensee acknowledged the findings.

In a June 8, 1994 telephone call the Chemistry and Health Physics Manager was informed that the LHRA continuous coverage issue was dispositioned as a non-cited violation.