

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report/License No.: 50-443/94-31/NPF-86
Licensee: North Atlantic Energy Service Corporation
Post Office Box 300
Seabrook, NH 03874
Facility Name: Seabrook Station
Inspection At: Seabrook, New Hampshire
Inspection Conducted: December 12 through 15, 1994

Inspector:

J. Nick, Radiation Specialist 1/6/95

Approved by:

R. Boyes, Chief 1/12/95
Facilities Radiation Protection Section

Areas Inspected: Implementation of the radiological controls program. Areas included audits and appraisals; major changes in organization, personnel, facilities, equipment, or programs; training and qualifications of personnel; external exposure control; internal exposure control; planned special exposures; dose to the embryo/fetus and declared pregnant women; control of radioactive materials and contamination, surveys and monitoring; the program to maintain occupational exposures as low as reasonably achievable; and the effectiveness of licensee controls.

Results: The radiological controls program was very effective in protecting the health and safety of workers in radiological areas. Areas toured in the facility were well maintained and exhibited good housekeeping. The radiation protection group was adequately staffed by qualified individuals. Improvements were noted in the corrective actions and follow-up from previous problems with high radiation area controls. Program strengths were noted in plant chemistry and radiological source reduction, and in attention to details in radiation protection program records. Three areas had opportunities for improvement and included contamination controls, professional health physics support staff training program, and attention to detail in implementation of procedures. No safety concerns or violations were identified.

DETAILS

1.0 INDIVIDUALS CONTACTED

1.1 PRINCIPAL LICENSEE EMPLOYEES

- * M. Anderson, Radwaste Department Supervisor
- C. Berry, Technical Training
- * W. Cash, HP Department Supervisor
- * E. Darois, HP Supervisor
- * W. DiProfio, Station Manager
- * S. Dodge, Radiological Services Department Supervisor
- * R. Donald, Auditor
- J. Grillo, Operations Manager
- * W. Leland, Chemistry/HP Manager
- * I. McCabe, HP Records Supervisor
- * G. McDonald, Nuclear Quality Manager
- * J. Rafalowski, Chemistry & HP Projects Supervisor
- * J. Sobtka, NRC Coordinator
- * B. Sterritt, HP Supervisor - ALARA
- R. Thurlow, Senior HP Supervisor

1.2 NRC EMPLOYEES

- * R. Laura, Senior Resident Inspector
- * W. Olsen, Resident Inspector

* Denotes those present at the exit meeting on December 15, 1994.

The inspector also interviewed other licensee and contractor personnel.

2.0 PURPOSE OF INSPECTION

The purpose of this announced inspection was to assess the licensee's implementation of the radiological controls program.

3.0 FUNCTIONAL AREAS INSPECTED

The functional areas inspected included audits and appraisals; major changes in organization, personnel, facilities, equipment, or programs; training and qualifications of personnel; external exposure control; internal exposure control; planned special exposures; dose to the embryo/fetus and declared pregnant women; control of radioactive materials and contamination, surveys and monitoring; the program to maintain occupational exposures as low as reasonably achievable; and the effectiveness of licensee controls.

4.0 AUDITS AND APPRAISALS

The inspector reviewed the audits performed by the licensee's quality assurance group during the period from April 1994 through November 1994. Among the areas included in the audits were the radiation protection program, implementation of the revisions to 10 CFR Part 20, the radioactive materials shipping program, and radiological support

activities during the third refueling outage. The audit reports documented no major findings and some minor deficiencies. The inspector concluded that the audits covered an appropriate scope and contained an appropriate level of detail.

The inspector also reviewed internal assessments performed by the radiological support staff. The assessments were performed during the period from January 1994 through October 1994 and assessed the various parts of the radiation protection and radiological waste programs. The assessments were detailed and documented some areas for improvement.

The inspector determined that the quality of audits/assessments was very good and the licensee was identifying areas for improvement. Corrective actions or resolution of concerns were very timely and appropriate for the audits/assessments reviewed by the inspector. The inspector found that the licensee's self-assessment and corrective action program was continuing to document, track, and trend minor areas for improvement in the radiological controls program. Timely and effective corrective actions were implemented. The inspector noted no deficiencies or violations of NRC regulations in this area.

5.0 MAJOR CHANGES

The inspector reviewed major changes to the facilities, equipment, personnel, training, and procedures related to the radiological controls program through a review of documents and interviews with licensee personnel.

The inspector noted that the licensee was planning to convert a contractor technician position to a permanent utility technician position after the end of 1994. Also noted, were the licensee's plans for commencing a procedure upgrade program in 1995 and trial use of a new automated access control system.

Since these changes had not been implemented at the time of this inspection, their impact will be reviewed in future inspections.

6.0 TRAINING AND QUALIFICATIONS

The inspector reviewed the training provided to radiation protection technicians and health physics support personnel through a random selection of records. The training provided good information, including industry events and other relevant topics. Professional technical support personnel (health physicists and health physics supervisors) had attended some training, but the training was not well documented. The requirements for training of the support personnel was also not well defined. The inspector identified this as an area for improvement.

The inspector did not identify any safety concerns or violations of NRC regulatory requirements in this area.

7.0 EXTERNAL EXPOSURE CONTROL

The licensee monitored the radiation exposure of individuals performing work in the radiological controlled area (RCA) by the use of self-reading dosimeters (SRDs) and thermoluminescent dosimeters (TLDs). After initial issuance, the SRD and TLD were worn during each work shift within the RCA. At the end of the work shift, the SRD and TLD were stored near the health physics access control point, within the security restricted area. An alarming SRD was issued when necessary upon each entry to the RCA. After exiting the RCA, the alarming SRD was returned to the control point for charging and storage.

The inspector observed workers in the RCA wearing their assigned SRDs and the whole body TLDs with the correct body placement. The licensee used an onsite laboratory to process whole body TLDs. The laboratory was currently accredited through the National Voluntary Laboratory Accreditation Program (NVLAP). In an effort to reduce costs, an outside laboratory for TLD processing was being considered. The licensee had performed an audit of the outside laboratory and had identified some weakness in that lab's program for processing TLDs. The licensee representative stated that personnel TLDs would continue to be processed onsite until June 1995 to ensure that the quality of the TLD processing would not be compromised. After that time, the vendor dosimetry laboratory would be re-evaluated. If the licensee found the weakness was corrected, then the outside lab would be used. The licensee was also considering the use of other vendor labs.

The inspector toured many of the radiologically controlled areas (RCAs) of the facility, including the primary auxiliary building, the reactor building, the turbine building, radwaste processing areas, and outside areas within the protected area. All areas were generally well posted and exhibited good housekeeping.

High Radiation Area (HRA) and Very High Radiation Area (VHRA) postings and barriers were checked throughout the facility. All areas were posted as required by NRC regulations. All areas were appropriately barricaded and all areas were locked as required.

The licensee maintained an exposure tracking system that recorded the worker's dose from the SRD. The worker's radiation exposure was read and recorded by the worker after each entry into the RCA. The TLD was processed periodically, and the radiation protection staff monitored and performed trending on the results, including a comparison with the SRD total for the same period. Abnormal readings (poor agreement between TLD and SRD readings) were investigated and resolved. Typically, the SRD total was slightly higher (e.g., 5 to 10%) than the TLD reading.

The licensee documented incidents of skin and clothing contamination found on workers when they exited a contaminated area or the RCA. As of December 1, 1994, the licensee had written over 130 personnel contamination reports. The personnel contamination report was used to determine the shallow dose assignment to the worker's skin of the whole

body. The highest skin dose assignment reviewed by the inspector was 262 millirem for 1994 to date. This is well below the regulatory limit for skin dose of 50,000 millirem per year for each worker. The inspector noted that the number of personnel contamination reports was relatively high for a facility with very good contamination controls and a low number of contaminated areas. Many of the personnel contamination reports documented contaminations involving discrete particles. Although the total dose assigned from personnel clothing and skin contaminations is relatively minor, this area of contamination controls was identified by the inspector as an area for potential improvement.

The inspector concluded that the licensee was providing effective external dose controls. No violations or safety concerns were identified in this area of the program.

8.0 INTERNAL EXPOSURE CONTROL

The control of internal exposure was inspected through a review of internal dose assignments, and through observation of air sampling instruments in the work locations and the use of respirators or engineering controls. The licensee's internal dose tracking software was maintained on a network computer system. The system allowed the assignment of internal dose from air sample results, bioassay results, or calculations. The licensee summed the total external dose and the effective internal dose for monitored individuals in the tracking system. The inspector found that the licensee had an effective tracking system to control internal exposure.

Estimated internal dose was assigned to workers based on the results of air samples in the work areas. Air sample results were calculated in derived air concentrations (DACs) and multiplied by the time spent by the worker in the area to obtain DAC-hours. The dose calculated from the bioassay determination replaced the estimated dose assigned from the air sample results. The licensee did not have many individuals who had received internal dose assignments since the third refueling outage due to the limited scope and quantity of work in airborne areas.

The licensee maintained a bioassay program to verify the effectiveness of the respiratory protection program and determine internal dose assessments. The program included annual whole body counts for personnel with RCA access and whole body counts after personnel radioactive contamination events.

During tours of the radiologically controlled areas, the inspector observed that air sampling equipment in the work place was as appropriate. The inspector also observed that the air sampling equipment had current calibration dates and documented daily operational checks. Air filtration and air handling units were placed in some areas to provide better breathing air in potentially contaminated areas.

Overall, the inspector concluded that the licensee provided adequate control of internal exposure to the workers through engineering or

process controls. The licensee effectively tracked and assigned internal dose and performed bioassay assessments when necessary. No deficiencies or violations were noted in this area of the program.

9.0 PLANNED SPECIAL EXPOSURE

The licensee had not had any planned special exposures since the implementation of the revisions to the NRC regulations (10 CFR 20) in January 1994.

10.0 DOSE TO THE EMBRYO/FETUS AND DECLARED PREGNANT WOMEN

The licensee had monitored two pregnant females during 1994 under the guidance of their procedure for declared pregnant women (DPW). The workers received a baseline in-vivo bioassay (whole body count) upon declaration of the pregnancy. The workers were placed on restricted duty assignments to maintain their radiation exposure uniform and ALARA. An administrative exposure limit of between 50 and 75 millirem per month was assigned to each worker. The TLDs for the workers were processed periodically to further ensure that the dose to the worker and the embryo/fetus were below regulatory limits. For both individuals, the total effective dose assignments for 1994 was 0 millirem during the period of pregnancy. The regulatory limit for the embryo/fetus due to occupational exposure of the mother is 500 millirem during the entire pregnancy.

11.0 CONTROL OF RADIOACTIVE MATERIALS AND CONTAMINATION, SURVEYS AND MONITORING

The licensee provided good controls to prevent the spread of radioactive contamination. Contaminated areas were well posted and marked with tape or rope. Step-off pads were placed at the entries/exits to these areas to alert workers of the change from a contaminated area to a cleaner area. A sufficient inventory of protective clothing was available for work in contaminated areas. After leaving a contaminated area and removing potentially contaminated protective clothing, radiological frisking instruments were provided to workers for checking their hands and feet for contamination. Whole body monitors were used to detect radiological contamination or potential intakes when workers exited the RCA. The frisking and monitoring equipment was calibrated and had current calibration stickers. Receptacles, provided for the collection of potentially contaminated protective clothing, were periodically emptied and the undressing areas were neatly kept to prevent inadvertent spread of contamination.

The inspector noted that most containers labelled with radioactive material stickers provided other information (such as radioactivity levels, dose rates, the radionuclides present, kinds of the material, etc.) to allow workers to maintain their exposures ALARA. The containers were generally tool boxes, metal storage bins, or other storage containers.

12.0 MAINTAINING OCCUPATIONAL EXPOSURES ALARA

The licensee's radiological controls program contained several components to maintain personnel radiation exposure ALARA. The licensee held periodic ALARA Committee meetings, posted radiological controls and dose data summaries on plant bulletin boards, maintained an ALARA suggestion program, and posted signs indicating lower dose rate areas in the plant. ALARA responsibilities and instructions were stressed in the radiation worker training classes.

The health physics staff prepared ALARA reviews of jobs and tasks performed in the RCA. ALARA reviews for major tasks and jobs were maintained by the ALARA Supervisor. ALARA reviews included preplanning, surveillance during the job, and post-job reviews. Engineering personnel, job supervisors, and job planners were also included in ALARA preplanning. The ALARA staff also generated reports, dose summaries, and other graphs and charts showing the staff's progress with total exposure and other radiation protection goals.

The licensee dose reports stated the total personnel exposure for all workers from January 1, 1994 through December 11, 1994, was approximately 110 person-rem. Most of this exposure was attributed to the third refueling outage activities. Some exposure was attributed to routine activities (approximately 5 person-rem). The total personnel exposure goal for 1994 was 128 person-rem. The licensee noted that this dose total was one of the lowest annual dose totals (including a refueling outage) for all operating pressurized water reactors in the United States.

The inspector concluded that the program to maintain personnel exposures ALARA was very effective. The licensee used planning, mock-up training, worker education, and departmental accountability to exposure goals. Overall, radiation exposures were very good compared to other pressurized water reactors of the same age. No deficiencies or violations were noted.

13.0 EFFECTIVENESS OF LICENSEE'S CONTROLS

The licensee provided very good radiological controls for a recent entry into the reactor containment building with the reactor at full power. These activities included routine surveillance and inspection. The controls included constant health physics coverage, a pre-job briefing, appropriate personnel monitoring, and heat stress awareness. Neutron TLDs were issued to the personnel due to the neutron dose rate. Since voice communication was not always effective, the workers were instructed in hand signals.

The licensee had planned some radiation protection program improvements. These improvements included increasing the use of automated SRDs, implementing a new access control system, and initiating a procedure upgrade program.

Overall, the inspector found that the licensee maintained a very good radiation protection program with continuing improvements. Minor areas of weakness were identified through audits and self-assessments and were corrected (see Section 4.0 of this inspection report). Corrective actions for the control of high radiation areas had not prevented another violation of NRC regulations, as was reported in the last NRC inspection of the radiological controls program (reference NRC Region I Inspection Report 50-443/94-14). However, the staff had made excellent improvements in controls for high radiation areas since that inspection. Other areas of improvement were continuing and were incorporated into a procedure upgrade plan.

14.0 EXIT MEETING

The inspector met with the licensee representatives denoted in Section 1.0 of this report at the conclusion of the inspection on December 15, 1994. The inspector summarized the purpose, scope, and findings of the inspection. The licensee acknowledged the inspection findings.