

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-443/90-19

Docket No. 50-443

License No. NPF-56

Licensee: Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, New Hampshire 03105

Facility Name: Seabrook

Inspection At: Seabrook, New Hampshire

Inspection Conducted: September 10-14, 1990

Inspector: RL Nimitz  
R. L. Nimitz, Senior Radiation Specialist

9/28/90

Date

Approved by: W. J. Pasciak  
W. J. Pasciak, Chief  
Facilities Radiation Protection Section

10/1/90

Date

Inspection Summary: NRC Inspection Report No. 50-443/90-19 (Conducted September 10-14, 1990) This inspection was a routine, unannounced inspection of the licensee's radiological controls program. Areas reviewed were: the licensee's actions on previous inspection findings, oversight of the radiological controls program, external and internal exposure controls, radioactive waste handling and processing, ALARA, and calibration of radiation monitoring equipment.

Results: No violations were identified. The in-plant radiation protection program was found to be properly implemented.

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## DETAILS

### 1.0 Individuals Contacted

#### 1.1 Public Service of New Hampshire

D. Moody, Station Manager  
\*W. DiProfio, Assistant Station Manager  
\*W. Leland, Chemistry, Health Physics Manager  
\*J. Rafalowski, Health Physic Department Supervisor  
\*J. Linville, Chemistry Department Supervisor  
\*S. Dodge, Health Physics Supervisor - Support  
\*W. Cash, Health Physics Supervisor - Operation  
E. Darois, Health Physics Supervisor - Dosimetry  
\*M. Anderson, Radwaste/Utilities Department Supervisor  
\*R. Krohn, NRC Coordinator  
\*J. Grillo, Operations Manager  
\*J. Peschel, Regulatory Compliance Manager

#### 1.2 NRC

\*Noel Dudley, Senior Resident Inspector, Seabrook Station

\*Denotes those individuals attending the exit meeting on September 14, 1990.

The inspector also contacted other licensee personnel.

### 2.0 Purpose and Scope of Inspection

This inspection was a routine, unannounced radiological controls inspection. The following matters were reviewed:

- action on previous inspection findings
- ALARA
- radiological controls program oversight
- radioactive waste processing and handling
- radioactive and contaminated material control
- contamination controls
- external exposure controls
- internal exposure controls
- calibration of radiation monitoring instrumentation

### 3.0 Action on Previous Finding

(Open) Unresolved item (50-443/90-18-01) The licensee's Technical Specifications did not contain a definition of digital channel operations test. The licensee was reviewing this matter and will provide information relative to what actions would be taken to address this matter by October 12, 1990.

The inspector's preliminary review indicated that the monitor alarms and automatic initiation features, associated with monitor alarms, were properly tested but at an alarm set point lower than that indicated in the Technical Specifications.

#### 4.0 Radiological Controls Program Oversight

The inspector reviewed the various methods used by the licensee to perform oversight of the radiological controls program.

The inspector's evaluation of the licensee's performance in this area was based on discussions with cognizant personnel and review of documentation.

Within the scope of this review, no violations were identified. The inspector considered the licensee's overall methods to maintain oversight of the radiological controls program, for this period of station life, to be good. The following matters were noted:

- A review of the licensee's audit program, conducted during NRC Inspection 50-443/90-18, found that audits, surveillances and self-assessments of the radiological controls program to be of good quality and performance based.
- The licensee established and implemented procedure SM 7.3, Supervisory Walkdown Program. The program requires a minimum of four hours of walkdowns of station areas by assigned station supervisors. Reports of the reviews are provided monthly to station management with any identified items discussed at a quarterly meeting with the station manager.
- The licensee established and implemented procedure HD 0958, Health Physics Plant Walkdowns. The procedure requires weekly plant walkdowns by assigned radiation protection supervisors with the results provided to radiation protection department management.
- The licensee's senior management meets weekly with department heads, including the radiological controls and chemistry department head, to discuss items of interest, plans, and potential problems.
- The licensee's senior management routinely attends the station daily morning meeting.
- The licensee implemented the Phase 2 self-assessment of power ascension from 50 percent reactor power through 100% power. The self-assessment reviewed program implementation

The following matter was under development:

- The licensee is currently establishing a comprehensive station goals program for purposes of monitoring and tracking station performance. Goals and strategies in the areas of radiation protection, radwaste, industrial safety, and ALARA are being developed. Actions were being developed by personnel within the radiological controls department to implement the strategies.

#### 5.0 ALARA Program Implementation and Adequacy

The inspector reviewed the implementation of the licensee's ALARA Program. The inspector also examined the adequacy of selected aspects of the program. The review was with respect to current industry practices, applicable licensee procedures, and applicable NRC guidance.

The inspector evaluated the licensee's performance in this area by reviews of appropriate documentation and discussions with cognizant personnel.

Within the scope of this review, no violations were identified. The licensee was implementing a defined ALARA Program.

The following positive attributes were noted:

- The licensee has performed a self-assessment of the ALARA Program. Self-assessment findings are being tracked to completion.
- The licensee established radiation work permit checklists and ALARA checklists to assist in ALARA planning efforts for radiological work activities. The checklists were being used.
- The licensee has established a steam generator task force to plan for steam generator work.
- The licensee is enhancing ALARA training of station personnel as follows:
  - General Employee Training is being enhanced to include additional ALARA training.
  - The licensee is developing an ALARA training program for working foreman and supervisors.
  - The licensee is developing an ALARA training program for design engineers.
  - The licensee has provided continuing training in ALARA for radiation protection personnel.

- The licensee has in place and is implementing a one week systems training course for personnel, including radiation protection personnel. This training will be augmented with special training of radiation protection personnel on the radiological significance of selected systems. Continuing training has been provided on the radiation monitoring system, the incore detector system and the air handling systems.
- In August 1990, the licensee placed an ALARA engineer in the engineering group to assist in performing ALARA reviews. The licensee also placed a Health Physics planner in the planning group to assist in overall planning for radiological work activities.

The following matters were brought to the licensee's attention:

- The licensee's ALARA program provides for review of on-going work activities to ensure work is being performed in accordance with initial pre-planning decisions. However, the program does not identify criteria as to which work activities should receive on-going ALARA reviews or what the frequency of such reviews should be.
- The licensee's ALARA program provides for post-job reviews of work activities after work completion. However, the specified criterion for this review (aggregate exposure greater than 10 person-rem) appears to be high and does not appear to provide for post-job ALARA reviews for work activities during which an aggregate personnel exposure of less than 10 person-rem was sustained.
- There is no apparent formalized program for developing, issuing or revising station ALARA goals. The current ALARA goal for aggregate personnel exposure appears to be high by a factor of 10. The licensee has initiated action to revise the goal.
- The licensee has limited mock-ups for ALARA training purposes.

The licensee's representatives indicated the above matters would be reviewed.

#### 6.0 Radioactive Waste Processing and Handling

The inspector reviewed the processing and handling of radioactive waste. The review was with respect to 10 CFR 20, applicable Technical Specifications, and applicable licensee procedures.

At the time of this inspection, the licensee was not shipping material off site for disposal.

The following matters were reviewed:

- the program to minimize the introduction of extraneous material into the radiological controlled area
- the program to collect and transport radioactive and contaminated material within the radiological controlled area to central processing facilities and the radiological controls applied during the transfer
- the handling of filter and demineralizer wastes and the radiological controls applied during the handling operations
- the processing and sorting of dry active waste including the instrumentation to perform surveys of the waste and the sensitivities of the instrumentation
- the program for the release of material from the radiological controlled area
- the organization and staffing to support radwaste handling and processing operations
- radioactive and contaminated material posting

The evaluation of the licensee's performance in this area was based on review of documentation, discussions with cognizant personnel, and independent observations made by the inspector during tours of the facility. The inspector performed independent tours of radwaste facilities and observed installed facilities and waste handling and processing activities.

Within the scope of this inspection, no violations were identified.

The following matters were discussed with the licensee's representatives.

- The licensee has a well defined program for collecting, handling, transporting and sorting of dry active waste. Bags of waste with contact dose rates of less than 25 uR/hr are sent to a sorting trailer for processing. If the bag measures less than 15,000 disintegrations per minute (dpm) total activity when measured with an aggregate radioactive waste monitor, each item is separately frisked for contamination. To reduce volume, certain dry active waste materials are shredded. Material receives a final check for aggregate radioactivity before being sent for disposal.

If a bag of waste measures greater than 15,000 dpm or greater than 25 uR/hr on initial measurement, the bag is sent to a compactor for compaction and handling as radioactive waste.

- The licensee's processing of dry active waste has backed-up. There was about seven weeks of work to do to process on-hand waste considering the current processing rate. However, the majority of the material is not expected to result as dry active waste.
- The licensee's material decontamination facilities, equipment and methods are limited. The licensee has a small area for decontamination of material. The method of decontamination is soap and water. The licensee is currently evaluating the need for additional decontamination facilities, equipment and methods.
- The licensee has established a Radioactive Waste Minimization Committee. This is an inter-departmental group of managers involved with the reduction of radwaste at the Seabrook Station.
- The total quantity of actual radioactive waste at the facility was low. The inspector considered this to be due in-part to the low radwaste source term and efforts by the licensee to minimize radwaste. However, the licensee's program to minimize radioactive waste appears to have limited visibility throughout the station.
- The licensee has implemented a radwaste training program. The training includes radwaste handling, policies, shipping, system operations, and decontamination.
- The licensee has installed a temporary filter/demineralizer to process liquid waste. The system is being used in lieu of the installed waste evaporator to minimize generation of radioactive waste. The installation of the system was considered a good initiative by the licensee. The use of the filter/demineralizer prevents the generation of evaporator bottom waste and spent floor drain filters. The system was approved as a temporary modification, the system received a 10 CFR 50.59 review, and trained personnel were operating the system with approved procedures. The actual system has limited ALARA features to minimize personnel exposure (e.g., shielding). Because the level of radioactivity within plant systems is low, the filter/demineralizer exhibits low radiation dose rates on contact.  
  
Because the dose rates from this system will increase as the plant operates, the licensee has initiated an engineering service request to evaluate placement of the facility in a permanent location and provide shielding for the system.
- The licensee has installed a permanent filter handling/transfer system to allow for removal, transport, and storage of radioactive filters in a shielded transfer system. This system appears to provide for effective exposure control during filter removal and transfer operations.

- The licensee has an installed asphalt extruder solidification system for solidification of wastes. However it is not being used and no solidification was on-going at this point in plant operations. Primary system clean-up resins will be sent to two collection tanks. However no spent resins have been generated. The licensee has two open contracts for solidification services if needed.
- The licensee is currently developing a program and procedures for control of radioactive material contained in water filled pools.
- In addition to the frisking of material for release from the radiological controlled area (RCA) with geiger-mueller (GM) detectors, the licensee uses gamma scintillation detectors to survey material for release from the RCA. The gamma scintillators are used in a small access monitor (SAM) at the main access control point and the aggregate waste monitor (AWM) used for trash frisking. A gas flow proportional counter is also used (CM-7) for frisking of material. The procedure specified criteria for release, using the GM monitors, was consistent with Circular 81-07, Control of Radioactively Contaminated Material. The AWM was being used for aggregate monitoring of waste to provide an indication of build-up of small quantities of contamination. The procedure specified criteria for release, using the CM-7, did not appear to meet the criteria for release specified in Circular 81-07. The licensee reviewed the sensitivity of the CM-7 and concluded that it met the intent of Circular 81-07 and the criteria specified therein. The licensee indicated the procedure would be revised to reflect the criteria specified in Circular 81-07. This was considered to be a minor administrative issue.
- The licensee's procedures do not specify minimum instrument background values when frisking material for release from the RCA. Backgrounds should be maintained low in order to optimize instrument sensitivity. The licensee's review of this matter indicated the value selected had apparently been inadvertently removed from procedures.
- The licensee plans to use the 10 CFR 20, Appendix B values (for liquids in unrestricted areas) as criteria for release of potentially contaminated used oil. The inspector informed the licensee that this criteria is not acceptable. The licensee indicated this matter would be reviewed prior to shipments or disposal of oil.
- The responsibilities for processing and handling and shipping radioactive waste are described in an Interface Agreement between station departments. The licensee was revising the agreement. The following was noted:
  - the agreement incorrectly identifies the individual responsible for shipping.
  - the in-plant radioactive waste handling responsibilities of the radiation protection group were not identified.



- There is no long term plan in place which describes the licensee's actions to be taken in the event the licensee is unable to ship radioactive waste off site for burial.

The licensee's representatives indicated the above matters would be reviewed.

#### 7.0 External and Internal Exposure Controls

The inspector reviewed external and internal exposure controls. The review was with respect to criteria contained in 10 CFR 20, applicable Technical Specifications, and applicable licensee procedures.

Because of the low radioactivity content of systems at the facility, radiologically significant work activities were not routinely occurring. As a result, the inspector reviewed the external and internal radiological controls for a selected radiation work permit associated with repair of the letdown heat exchanger. The inspector also reviewed posting and access control during tours of the facility.

The evaluation of the licensee's performance in this area was based on review of documentation, discussions with cognizant personnel and independent observations and radiation intensity measurements made by the inspector during tours of the facility.

Within the scope of the review, no violations were identified. The external and internal exposure control program was properly implemented. Records were complete, maintained, and retrievable.

#### 8.0 Instrument Calibration

The inspector reviewed the calibration of selected instruments used for counting airborne radioactivity samples. The inspector's review was with respect to common industry practices and applicable licensee procedures.

The inspector evaluated the licensee's performance in this area by discussions with cognizant personnel and review of documentation.

The following matters were noted:

- The licensee maintained a good system of instrumentation calibration records. The records included equipment history logs, individual calibration data sheets, and model and individual instrument data files.
- The licensee needed to select a principal radionuclide for which to calibrate gross airborne radioactivity counting instruments and other instruments against to ensure appropriate efficiencies were calculated and used for counting activities.

The licensee performed and documented an evaluation that supported the use of Cs-137 as a calibration standard. This was based on collection of data at other facilities which indicated that Co-58 was the principal radionuclide of concern during initial operations and that Cs-137 (which decays by beta radiation decay) was a reasonable standard to use for calibration purposes.

The inspector's review of radioactivity analysis results of contamination for letdown heat exchanger repair indicated that 61% of the radioactivity was due to Cr-51 with only 19% attributable to Co-58. Because Cr-51 decays by electron capture the radioactivity attributable to Cr-51 would not be readily detectable by the type of instruments calibrated for beta radiation emitters (e.g., Co-58) and which were used to perform analysis of gross airborne radioactivity samples and survey material for release from the radiological controlled area (RCA). As a result, the inspector questioned the appropriateness of the licensee's calibrations for gross airborne radioactivity sample counters and instruments used to frisk material for release from the RCA.

The licensee immediately reviewed this matter and determined that this smear sample analysis results, for the letdown heat exchanger were not representative of general contamination levels of radioactive systems. In addition, the licensee concluded that the frisking capabilities, based on the calibration standards used, met the intent of IE Circular 81-07, Control of Radioactively Contaminated Material.

The inspector noted that the 10 CFR 20 maximum permissible concentration (MPC) value for Cr-51 was considerably larger than the MPC for Co-58 and therefore the potential for significant airborne radioactivity intake would not likely occur even when considering that the licensee principally relied on gross beta analysis of airborne radioactivity samples as the initial indicator of airborne radioactivity. Samples that indicated gross beta results greater than 25 % MPC were re-analyzed with a gamma spectroscopy system which would easily detect the Cr-51. Therefore the licensee indicated that no undetected, significant exposure of personnel to Cr-51 was likely.

The licensee plans to establish a program to monitor smear samples and reactor coolant crud samples for potential undetected gamma emitters. Such a program was in-place for beta emitters and alpha emitters. The licensee's efforts in this area will be reviewed during a subsequent inspection.

#### 9.0 Post Accident Sampling

The inspector reviewed the licensee's actions on a number of observations identified during the Post Accident Sampling and Analysis Inspection (Reference NRC Inspection Report No. 50-443/89-05).

The evaluation of the licensee's performance in this area was based on discussions with cognizant personnel and review of documentation.

Within the scope of this review, no violations were identified. The licensee's efforts in this area were considered to be of good quality. The following matters were identified:

- The inspector's review indicated that the licensee took action on each of the items identified in a technically acceptable manner.
- One item remaining open involved the licensee's need to verify that the post accident sampling system collected representative samples of reactor coolant. This matter remained open because there was insufficient radioactivity within the primary system, at the time of the inspection, to evaluate the sampling system capability to provide representative samples.

The inspector noted that the licensee established and implemented a test program to test the capabilities of the system to provide representative samples. At the time of this inspection the licensee had completed two of three planned tests to verify system capabilities. The inspector's review indicated that the test results met acceptance criteria specified in NUREG-0737, Clarification of TMI Action Plan Requirements. The results of the third run and the licensee's review and approval of final test results will be reviewed during a subsequent routine inspection.

The following matters were brought to the licensee's attention:

- Emergency cabinet inventory lists did not identify hydrogen monitors contained in the cabinets. The monitors were to be used when entering potential explosive atmospheres
- The licensee took corrective actions to readily identify an inoperable fume hood in which radioactive samples were being handled. However, it was not clear as to what actions the licensee would take in the event the fume hood remained inoperable. The licensee's initial review of this matter indicated no significant radiological concern was present. The licensee's review of this matter will be examined during a subsequent inspection.

#### 10.0 Exit Meeting

The inspector met with the licensee's representatives identified in Section 1 of the report on September 14, 1990. The inspector summarized the purpose, scope and findings of the inspection. In addition to the exit meeting, the inspector periodically met with licensee personnel during the course of the inspection to summarize findings.