

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/91-15
Docket No. 50-293
License No. DPR-35
Licensee: Boston Edison Company
RFD #1 Rocky Hill Road
Plymouth, Massachusetts 02360
Facility Name: Pilgrim Nuclear Power Station
Inspection At: Plymouth, Massachusetts and at the
Yankee Atomic Environmental Laboratory,
Framingham, Massachusetts
Inspection Conducted: July 8-12, 1991

Inspector: *Laurie Peluso*
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Section (ERPS), Facilities Radiological
Safety and Safeguards Branch (FRS&SB)

07/19/91
date

Approved by: *Robert J. Bores*
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Division of Radiation Safety
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7-29-91
date

Inspection Summary: Inspection on July 8-12, 1991 (Inspection Report No.
50-293/91-15)

Areas Inspected: Routine, unannounced inspection of the licensee's radiological environmental monitoring program including: management controls, audits, QA/QC of contractor laboratories, surveillance procedures, meteorological monitoring program, and implementation of the above programs. The inspection included a visit to the licensee's contractor environmental laboratory.

Results: Within the areas inspected, the licensee's use of the Master Surveillance Tracking System to ensure all required environmental sampling and analyses are scheduled and completed was noteworthy. The licensee effectively implemented the above programs. No deficiencies or violations were identified.

DETAILS

1.0 Individuals Contacted

1.1 Licensee Personnel

- *R. Anderson, Vice President, Nuclear Operations
- R. Cannon, Senior Compliance Engineer
- *N. Desmond, Compliance Division Manager
- *F. Famulari, Quality Assurance Division Manager
- *C. Goddard, Radwaste & Chemistry Section Manager (Acting)
- *E. Kraft, Plant Manager
- D. LeVitere, General Test Division, Technician
- *J. McClellan, Senior Quality Assurance Engineer
- *V. Oheim, Regulatory Affairs Manager
- *L. Schmeling, Radiological Control & Chemical Processes Dept. Mgr.
- *K. Sejkora, Senior Environmental Program Manager
- T. Sowdon, Corporate Health Physicist
- D. Stauber, General Test Division, Technician

1.2 Yankee Atomic Environmental Laboratory (YAEL), Framingham, MA

- S. Farber, Manager, Operational Support
- M. Kralian, Manager, Analytical Services Group
- R. Marcello, Jr., Director, Environmental Laboratory
- D. McCurdy, Laboratory - Technical Director
- N. Panzarino, Manager, Dosimetry Services Group

1.3 NRC Personnel

- *R. Bores, Chief, Effluents Radiological Protection Section (DRSS)

*Denotes those individuals present at exit interview on July 12, 1991.

Other licensee and contractor personnel were also contacted or interviewed during this inspection.

2.0 Purpose

The purpose of this routine safety inspection was to review the licensee's ability to implement the Radiological Environmental Monitoring Program (REMP) during normal and emergency operations and the operations of the licensee's environmental analytical laboratory, the Yankee Atomic Environmental Laboratory (YAEL).

3.0 Management Controls

3.1 Organization

Since the previous inspection of this area conducted in January 1990, there was a change in this portion of the licensee's organization. In November 1990, the responsibility for the REMP was transferred from the Radiological Section to the Chemistry Section. The Environmental Program Manager (EPM) and the Environmental Engineer are responsible for implementing the REMP. The EPM now reports to the Chemistry Division Manager who in turn reports to the Chemistry and Radwaste Section Manager (CRSM). The CRSM reports to the Radiological Control and Chemical Processes Department Manager.

In addition to and independent of the above change, a temporary program change was placed into effect in November, 1990 to support the current plant outage. This temporary change put the Radiation Section of the Plant Support Section and Radwaste and Chemistry Section of the Operations Section under a single manager, the Radiological Control and Chemical Processes Department Manager. The licensee left open the question as to whether this "temporary" change would become permanent at the end of the outage.

Based on discussions with the licensee, the inspector determined that the transfer of the REMP from the Radiological Section to the Chemistry Department appears to have been a smooth transition; relations between the REMP and other programs with which it needs to interface appear to have been enhanced; and the transition did not adversely affect the implementation of the REMP.

3.2 Audits

The inspector reviewed the following audits of the Radiological Environmental Monitoring Program with respect to Technical Specifications.

- Audit Report 90-23, August 15 - September 7, 1990
- Audit Report 91-06, February 8 - March 26, 1991

The audits, conducted by the Quality Assurance Department, covered the stated objectives and were thorough and of good technical depth. Audit findings and recommendations were excellent. Findings were assigned to the appropriate section or department and followup on some items have been completed and others are in progress. The audit report for the contractor laboratory audit had not been issued at the time of the inspection, however, discussions with the

Environmental Program Manager, who was a participant of the audit, indicated that there were no significant findings or recommendations as a result of the audit. The inspector identified no concerns relative to effective program implementation in this area.

4.0 Direct Observations

The inspector examined selected sampling stations with respect to the requirements of the Technical Specifications, the Offsite Dose Calculation Manual (ODCM), and procedures. These stations included air particulate and airborne iodine samplers, the composite water sampling station at the discharge canal, milk and various vegetable sampling stations, and a number of thermoluminescent dosimeter (TLD) stations for measurement of direct radiation. The inspector witnessed the collection of certain samples including the water grab sample from an indicator surface water location, the weekly exchange of charcoal cartridges and air particulate filters, and the quarterly exchange of environmental TLDs at selected locations. All air sampling equipment and the composite water sampler were operational at the time of the inspection. Milk, water, and vegetation, including cranberries, appeared to be available at the locations specified in the Offsite Dose Calculation Manual. The TLDs were placed at the designated locations as specified in the ODCM. Sample collection was performed according to the appropriate procedures and the observed air sampling equipment appeared to be well maintained and the associated air volume measurement equipment was in calibration at the time of inspection.

4.1 Ring Monitor System

In addition to the routine sampling stations, the inspector made note of the newly installed Ring Monitor System. This system, which surrounds Pilgrim Station, is comprised of fourteen real-time detectors, each of which has two energy-compensating Geiger Mueller (GM) tubes tied to local microprocessors and then via local phone lines to the licensee's Emergency Operations Facility (EOF) and from the EOF to the Massachusetts Department of Public Health. This system was installed by Boston Edison Company for the Commonwealth of Massachusetts who has responsibility for its operation and maintenance. This system provides the Commonwealth (and Boston Edison) with an independent means of measuring radiological conditions in the vicinity of Pilgrim Station and for obtaining these data on a real-time basis.

4.2 School Monitor System

The Boston Edison Company (BECo) has furnished eight schools in the surrounding area with meteorological and radiation detection instrumentation. Individuals at each school are able to monitor ambient radiation conditions in

the area and correlate the information to the weather conditions such as amount of rainfall, wind direction, wind speed and dew point at that time. This system can also be accessed by both BECo and the Massachusetts Department of Public Health.

Both of the above systems, in addition to the required monitoring implemented by Pilgrim Nuclear Station, the Commonwealth of Massachusetts' TLD monitoring system, NRC TLD Direct Radiation Monitoring Network, and the Citizens' Radiological Monitoring Network provide redundancy and independent monitoring of environmental conditions in Pilgrim area.

5.0 Review of the REMP Procedures, Documentation and Controls

The inspector reviewed a number procedures as part of the evaluation of the implementation of the REMP in accord with Section 7.0/8.0 of Technical Specifications and the ODCM, including the following.

6.2-013, Rev. 0, Administration of the Radiological Environmental Monitoring Program

SI-RP.8020, Rev. 3, Garden Census

SI-RP.8035, Rev. 1, Review & Evaluation of Radiological Environmental Monitoring Program Results

SI-RP.8050, Rev. 0, Sample Preparation and Delivery of Air Particulate and Charcoal Iodine Filters

The inspector noted that several procedures were in the process of being updated to reflect current practice. The reviewed procedures were concise and provided all required direction and guidance for implementing an effective program.

In addition to the procedures, the inspector also reviewed other aspects of the REMP, including sampling techniques for various environmental sample media, sampling frequencies, and calibration records of air samplers. The calibrations were performed as scheduled and results were within the licensee's acceptance criteria.

The Environmental Program Manager utilized the licensee's Master Surveillance Tracking Program (MSTP) to schedule REMP sampling and track analyses to ensure that all REMP Technical Specification requirements are completed in a timely manner. Through discussions with licensee representatives and review of selected MSTP lists, the inspector determined that the listing was maintained current and was a valuable tool in tracking the program status. The licensee also uses a system of Failure and/or Malfunction Reports and Discrepancy Reports to flag any equipment and/or sampling problems to ensure their timely correction.

The inspector noted that the licensee utilized a satellite navigational system for validating sampling locations while performing the garden and milk animal census. This system was used to positively identify the precise geographical location of each station relative to the plant. This initiative is rather unique and adds precision in assessing dose implications from collected samples.

Based on the above reviews, the inspector determined that the licensee met the requirements for sampling and analysis of environmental media, frequency of sampling and analysis and the lower limits of detection (LLD) for required analyses, and that the licensee implemented the REMP effectively.

6.0 Review of Environmental Data

The Annual Radiological Environmental Reports provide a comprehensive summary of the results of the REMP around the Pilgrim site. The inspector reviewed the reports for 1989 and 1990 to determine how well the licensee's results compared with its ODCM and with NRC Regulatory Guide 1.109. From the measured levels of radioactivity in selected environmental samples the inspector independently calculated the internal dose to a maximally exposed individual from the ingestion of blue mussels and the external dose from the shoreline deposits along Pilgrim Station discharge canal. The inspector used the Reg. Guide 1.109 equations for aquatic foods, a conservative value for maximum ingestion rate of 9 kg/yr defined in the annual report, the ingestion dose factor for adults for total body and the maximally affected organ given in Reg Guide 1.109, and the actual average yearly concentration in blue mussels given in the annual report to verify the licensee's calculational methodology. The inspector also utilized the appropriate information to estimate the external dose to an individual from sediment. Comparisons of the results of both environmental media were in agreement with the licensee's dose assessment as calculated using the ODCM.

The inspector's review of the 1989 and 1990 annual reports and the available 1991 environmental analytical data for the REMP indicated that the reviewed results appeared to be reasonable and were within the licensee's acceptance criteria.

Because the inspector was aware of increased gaseous releases from the site at the end of the last fuel cycle, the inspector closely reviewed the licensee's air sampling and milk sampling results for 1991 to date. No detectable radioiodines were measured in any of the samples reviewed. No increases in other radioactivity were observed as a result of the increase in the site release rate. The inspector then reviewed all of the radioiodine releases from Pilgrim Station since January 1, 1991, and reviewed the associated meteorological data during this time-frame. The inspector concluded that the observed increase in gaseous effluents were unlikely to have been sufficient to be detected in any offsite samples.

No anomalous measurements requiring Pilgrim followup were noted during this data review.

7.0 Quality Assurance Program for REM?

The inspector reviewed the licensee's quality assurance procedures and the environmental contractor's reports to determine the adequacy of the licensee's program. The licensee audits the contractor laboratory on a yearly basis, choosing program areas in such a way as to ensure that all portions of the program are reviewed every three years. Quality control of analytical measurements for analysis of environmental media were reviewed and discussed with the licensee and the contractor personnel. The inspector determined that the laboratory quality control program was being implemented through the contractor laboratory, YAEL, with additional samples supplied for this purpose by each of the laboratory's client utilities. The inspector had no further questions in this area.

7.1 Yankee Atomic Environmental Laboratory (YAEL)

As part of this inspection, the inspector visited the licensee's environmental analytical contractor laboratory along with a licensee representative. The inspector toured the YAEL facilities and reviewed laboratory activities including processing, preparation, and analysis of environmental media. The inspector also followed an actual sample through this process. The inspector reviewed selected sample preparation and analytical procedures, QC charts for counting equipment, trending for QC data, interlaboratory and intralaboratory comparisons, and QC of environmental TLDs. Based on the above review and discussions with technical staff members, the inspector concluded that the procedures were excellent and results of analyses were within the tolerance limits. Accuracy and precision tests were performed on interlaboratory and intralaboratory comparisons as well as for environmental TLDs. The results were in good agreement. The contractor laboratory had implemented a well-defined quality control program.

7.2 Environmental Dosimetry Program Comparisons

The results of the Nuclear Regulatory Commission (NRC) TLD Direct Radiation Monitoring Network are published quarterly in NUREG-0837. This network provides continuous measurements of the ambient radiation levels around 72 nuclear power plant sites around the country. One of its purposes is to provide a means of comparison of direct radiation monitoring results of programs conducted by individual nuclear power plants with that of the nation-wide NRC program.

During this inspection, the monitoring results of the licensee's TLDs which were collocated with those of the NRC were compared and are listed in Table 1. The results were generally in agreement although there were some differences. Some of the differences observed may be due to the physical placement of the TLDs. It was discovered that in some "collocated" locations the TLDs were actually separated by

distances of 30 to 60 feet. In conversations with the licensee, the inspector noted that the licensee has shown good initiative to document the placement of the collocated TLDs and has met with Commonwealth of Massachusetts representatives, who physically place and exchange the NRC TLDs at the Pilgrim site, to discuss this topic. This effort should lead to ensuring "collocated" TLDs are actually collocated in close physical proximity to enable truer comparisons. The NRC supports these efforts.

8.0 Meteorological Monitoring Program

The inspector reviewed the licensee's meteorological monitoring program to determine whether the instrumentation and equipment were operable, calibrated and maintained. The inspector compared the meteorological parameters wind speed, wind direction, temperature, and delta temperature at the 33-ft and 220-ft levels of the primary tower to the control room and the parameters of the 33-ft and 160-ft levels of the backup tower to the equipment house at the base of the tower. The parameters from both towers were subsequently compared to the values collected in the computerized data base at the BECO corporate headquarters in the Prudential Building in Boston. Based on this review, the comparisons were in good agreement. The licensee continues to use the General Testing Division (GTD) to perform quarterly calibrations and maintenance using the Procedure EP-AD-421, "Surveillance, Maintenance and Calibration of MEDAP Equipment". The inspector noted that calibrations were performed as scheduled and that the instrumentation was operable at the time of the inspection. No concerns were identified in this area.

9.0 Exit Interview

The inspector met the licensee representatives denoted in Section 1.1 of this inspection report at the Pilgrim Nuclear Power Station at the conclusion of the inspection on July 12, 1991. The inspector summarized the purpose and scope of this inspection, and discussed the inspection findings.

Table 1
Comparison of Collocated Environmental LIC
Monitoring Results 1990 (First 3 Quarters)

<u>Station</u>		<u>Jan-March</u>	<u>Apr-June</u>	<u>Jul-Sept</u>
<u>Lic</u>	PI	35.6 ± 2.1	33.5 ± 1.8	36.6 ± 2.1
<u>NRC</u>	1	32.5 ± 2.3	29.5 ± 1.2	32.8 ± 1.4
<u>Lic</u>	PA	16.5 ± 1.0	17.6 ± 0.7	18.6 ± 0.8
<u>NRC</u>	2	15.7 ± 0.8	14.4 ± 0.3	18.5 ± 1.0
<u>Lic</u>	MP	14.4 ± 0.9	14.7 ± 0.7	14.9 ± 0.5
<u>NRC</u>	22	---	12.2 ± 0.8	15.8 ± 0.9
<u>Lic</u>	WH	14.3 ± 0.9	14.3 ± 0.6	14.6 ± 0.5
<u>NRC</u>	25	12.5 ± 0.8	13.6 ± 0.8	15.4 ± 0.9
<u>Lic</u>	MS	17.5 ± 1.0	17.7 ± 0.9	18.4 ± 0.8
<u>NRC</u>	30	15.4 ± 0.8	17.1 ± 0.9	19.2 ± 1.0
<u>Lic</u>	SP	14.4 ± 1.0	15.0 ± 0.6	15.5 ± 0.7
<u>NRC</u>	37	13.5 ± 0.8	14.1 ± 0.8	15.7 ± 0.9
<u>Lic</u>	MB	13.3 ± 0.8	14.5 ± 0.9	14.0 ± 0.9
<u>NRC</u>	38	11.0 ± 0.7	10.7 ± 0.7	13.5 ± 0.9
<u>Lic</u>	NP	17.0 ± 1.1	16.9 ± 0.6	16.8 ± 0.5
<u>NRC</u>	43	15.7 ± 0.8	15.2 ± 0.9	17.0 ± 1.0

Units: (mR ± s.d.)/90 days