U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/95-20

Docket No. 50-293

Licensee: Boston Edison Company
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, Massachusetts 02360-5599

Facility Name: Pilgrim Nuclear Power Station

Inspection At: Plymouth, Massachusetts

Inspection Conducted: August 21-24, 1995

Inspector: J. Noggle, Senior Radiation Specialist — Date: 8/31/95

Approved by: R. Bores, Chief, Facilities Radiation Protection Section — Date: 9/08/95

Areas Inspected: The inspection was an announced review of the radioactive waste/transportation program. Areas reviewed included: solid radwaste processing, waste stream sampling and analysis, preparation and shipment of radioactive material, and interim on-site storage of radwaste.

Results: The licensee had in place very effective programs for the solidification, storage and shipment of radwaste. The licensee's solid radwaste processing and transportation programs received excellent management attention with several system improvements noted. The trash compaction facility (TCF) and the low level radwaste storage facility (LLWSF) were well maintained and controlled.

DETAILS

1.0 INDIVIDUALS CONTACTED

1.1 PRINCIPAL LICENSEE EMPLOYEES

F. Famulari, Quality Assurance Department Manager
C. Goddard, Nuclear Services Department Manager
S. Landahl, Radiation Protection Section Manager
B. Lunn, Principal Radwaste Specialist
H. Oheim, Engineering Services Manager
L. Olivier, Vice President of Nuclear Operations
A. Shiever, Regulatory Affairs Division Manager
T. Sullivan, Pilgrim Plant Manager
T. Trepanier, Operations Section Manager
G. Whitney, Licensing Engineer

1.2 NRC EMPLOYEES

R. Laura, Senior Resident Inspector

The above individuals attended the inspection exit meeting on August 24, 1995.

The inspector also interviewed other individuals during the inspection.

2.0 PURPOSE OF INSPECTION

The purpose of this inspection was to review the solid radioactive waste processing, storage and shipment program at the Pilgrim Nuclear Power Station.

3.0 AUDITS AND SURVEILLANCES

3.1 LICENSEE AUDIT AND SELF-ASSESSMENTS

The latest licensee audit of the radwaste/transportation program was conducted on November 2 - 18, 1994. The audit comprised both the chemistry and radwaste/transportation programs. The audit team included two outside utility technical specialists. No findings or recommendations pertaining to the radwaste program were made. The audit report appeared to be weighted toward the chemistry program area with brief mention of some of the radwaste program areas.

The licensee has begun a station-wide self-assessment program which was initiated in the radwaste department in early 1995. Radwaste supervisors were assigned program areas to review within their department. Management summaries of these activities were provided on a quarterly basis. The inspector reviewed the first and second quarter, 1995 summary reports and selected self-assessment reports. Areas reviewed included: area decontamination, tool decontamination, trash compaction facility operations, waste shipments, hazardous material operations, and laundry. Several improvement areas were identified, such as, the need for repairing the decontamination facility, developing

area decontamination training and the need for reorganizing the radwaste truck lock. The radwaste self-assessment program has provided a variety of areas for future improvement. The inspector determined that although the radwaste audit was only a general program review, the radwaste department's self-assessment program provided an indepth look at program areas and identified several enhancement opportunities.

3.2 VENDOR AUDITS

IE Bulletin 79-19 specifies the requirements for periodic audits of all transfer, packaging and transport activities associated with low-level radioactive waste. The inspector reviewed recent vendor audits for two vendors that supplied services on behalf of the licensee covering the packaging and shipping of low level radioactive materials.

Chem Nuclear Systems, Incorporated (CNSI) was audited by the utility consortium, Nuclear Utilities Procurement Issues Council (NUPIC), on May 23-27, 1994. This audit was conducted at the Barnwell Low-Level Radioactive Waste Disposal Facility and resulted in one non-significant finding that had been resolved. Scientific Ecology Group, Incorporated (SEG), was audited by NUPIC on March 22-25, 1994 with respect to radwaste processing, packaging, and shipping. Six findings were identified and were all subsequently closed. The issues involved custom order procedural controls, audits needed for two supporting vendor calibration laboratories, calibration information details needed on some documentation, and several other calibration discrepancies, which were identified and subsequently resolved.

3.3 QUALITY CONTROL INSPECTIONS

The inspector noted that the licensee has only one authorized radioactive material shipper. The licensee maintains the quality of each shipment by providing quality control inspections of each radioactive shipment leaving Pilgrim Station. The inspector counted 108 quality control (QC) shipment inspections conducted between April 1, 1994 and May 10, 1995. The QC inspections consisted of completed shipment checklists that ensured the details of each outgoing vehicle and the shipment documentation were completed.

The licensee indicated that in the future, the practice of providing QC inspections of each shipment would be discontinued. Instead, the licensee has indicated that two other radwaste personnel would become qualified as authorized radioactive material shippers and that after qualification, the radwaste department would provide their own shipment verification. The effectiveness of this will be evaluated in a future inspection.

3.4 INSPECTOR'S CONCLUSIONS

The licensee has demonstrated very good management oversight program over the radwaste program. Although the latest radwaste audit provided marginal review of the program, the licensee has implemented a very

effective self-assessment program that has resulted in the identification of several areas for program improvements. The licensee has provided thorough QC coverage of each outgoing shipment which has resulted in excellent quality of those shipments. No discrepancies were noted.

4.0 ORGANIZATION

The Station Services Division Manager has been replaced by the previous Technical Programs Division Manager. Although the new Station Services Division Manager has no experience in the radwaste area, he has significant experience as a manager and has experienced personnel reporting to him. No other changes in the organization were identified. No discrepancies with the above division manager change were noted.

5.0 TRAINING

The inspector reviewed the training records for the licensee's authorized radioactive material shipper. Although the shipper had attended a two-day radwaste computer code training class in June of 1995, it has been several years since complete radioactive shipment regulation training has been provided. The licensee committed to provide this training at the next available opportunity. This will be reviewed in a future inspection.

The liquid radwaste operations group has recently broadened the scope of system training to include all nuclear plant reactor operators and nuclear plant operators. The liquid radwaste system training is scheduled to be given during the fall of 1995. The operations group expects to cycle the nuclear plant reactor operators into the liquid radwaste processing group after completion of the training. The licensee expects that this rotation will provide additional insight into system performance and procedural adequacy. The inspector considered this to be a very good initiative. No significant discrepancies were noted by the inspector in the training area.

6.0 SOLID RADWASTE PROCESSING

Pilgrim Nuclear Power Station produces radioactive waste water from several sources and processes this water through various radwaste systems. Radioactive waste water from plant floor and equipment drains is filtered through diatomaceous earth flatbed filters and then de-ionized with resin bead radwaste demineralizers. The diatomaceous earth medium represents one solid radwaste stream. Besides the radwaste demineralizer, the condensate and fuel pool cleanup systems also utilize resin bead demineralizers. In addition, the licensee has installed and is currently testing the use of another resin bead radwaste demineralizer system that bypasses the flatbed filters. This system will supply an alternate liquid radwaste processing option and doubles the throughput capability from 30 gallons per minute to approximately 65 gallons per minute. The resin beads from the two radwaste demineralizer systems, the condensate demineralizers, and the fuel pool cleanup

systems, constitute the resin bead waste stream.

The reactor water cleanup system uses Powdex resin and this powdered resin represents a third solid radwaste stream. Both the powered resin and the bead resin radwaste streams are dewatered inside high integrity containers to remove any free standing liquid prior to storage or shipment for burial.

A fourth solid radwaste stream consists of miscellaneous trash termed dry active waste (DAW). The licensee collects both clean and contaminated trash from inside the radiological controlled area of the station and also includes solidified sanitary sewage processed at the licensee's onsite waste treatment plant. The concentrated sanitary sewage sludge indicates detectable cobalt-60 and cesium-137 and is included in the DAW that is bulk-shipped by seavan to SEG for segregation, survey, and incineration or compaction. After processing, the remaining radioactive waste material is shipped back to the licensee for onsite storage or to the Barnwell Low-Level Radioactive Waste Disposal Facility for burial.

The inspector reviewed the licensee's program for sampling and characterization of the four solid radwaste streams. The diatomaceous earth, bead resin, and DAW radwaste streams were most recently sampled and characterized by an outside radiochemical laboratory on September 27, 1994, while the powdered resin was last analyzed on November 12, 1993. The licensee indicated that the powdered resin had been recently sampled, however no results have been received and no powdered resin has been shipped for burial within the past year. The inspector determined that the licensee's activities were within the regulatory guidance for annual characterization of class B and C wastes and biennial sampling for class A wastes.

The licensee has incorporated several improvements into the station's radwaste systems. In late 1993, a series of ultrasonic flow transducers were mounted external to various radwaste piping systems to determine the source of liquid radioactive waste influent and effluent. This monitoring system provides data to allow the licensee to improve liquid radwaste management. Since implementing this system, the licensee determined that the average influent to the liquid radwaste processing system was approximately 30 gallons per minute. Of this, approximately 12 gallons per minute originated from the turbine building equipment sump. To improve system operation, the licensee has rerouted the turbine building equipment sump wastes to the main condenser hot well for processing through the condensate demineralizers. This change has better balanced the radwaste processing system load, preserving system capacity and extending the life of the radwaste bead resins. Another system improvement involved the installation of an additional radwaste demineralizer system. This consists of a pressurized twin vessel bead resin demineralizer system that has a design capacity of 35 gallons per minute throughput. This radwaste demineralizer system is designed with improved operational flexibility based on station water processing requirements. This new system is currently undergoing testing trials.

Finally, the licensee has indicated future plans to replace the diatomaceous earth flatbed filter system and is currently evaluating various alternatives. The inspector viewed the above mentioned liquid radwaste processing system improvements as excellent initiatives.

7.0 TRANSPORTATION

The following shipment documentation was reviewed by the inspector.

Shipment No.	Activity (Ci)	Volume (ft^3)	Waste Type
94-16	134	132.4	Filters
94-101	5.82E-1	2560	DAW
94-104	1.92E-1	2560	DAW
95-01	9.14E-1	202.1	Bead Resin
95-108	1.53E-1	2632	DAW
95-111	2.23E-1	2560	DAW
95-238	1.74E-2	1734	Laundry
95-316	1.97E-3	1280	Equipment
95-327	114	745.9	Control Rod Drives
95-356	3.74E-10	0.2	Samples

All shipping records were determined to be complete and to meet the applicable requirements of 10 CFR Parts 20, 61, 71, and 73 and 49 CFR Parts 171-178. The inspector reviewed the shipping cask certificates of compliance and verified that all consignee licenses were on file as required. No safety concerns or violations were identified.

8.0 EXISTING ONSITE RADWASTE STORAGE

8.1 TRASH COMPACTION FACILITY

The trash compaction facility was reviewed by the inspector. The inspector noted that the facility had been renovated since the last inspection with outside doors and doorknobs repaired or replaced. The roof downspouts had also been replaced and there were very few unsalvageable waste containers left in the area. This was a significant facility improvement over the previous inspection. Inside the trash compaction facility (TCF), the inspector observed that 26 contaminated laundry containers were awaiting shipment (22 containers to a shipment). The TCF also served as a depot for supplying the protective clothing needs for the station. Approximately 25 clean laundry containers were staged in the TCF for this purpose. The TCF is also utilized for sorting DAW collected in the station for reusable materials prior to shipment to SEG for DAW volume reduction services. The sorting room was appropriately posted as a contaminated area and included a HEPA vented sorting table. Also included in the TCF was a mixed waste storage room that was well inventoried, and controlled. The inspector determined that limited radioactive materials were kept in the TCF and the facility

was well organized and maintained at the time of this inspection.

8.2 INTERIM ONSITE RADWASTE STORAGE

The licensee has constructed a 200-foot by 240-foot storage facility located immediately to the east of the trash compaction facility. This facility consists of a gravel pad that is surrounded by a ten-foot high shield wall. The shield wall consists of 4-foot thick dirt-filled concrete panels that surround the gravel pad, incorporating shielded mazes for equipment and personnel entry points. The facility is located inside of the restricted area fence that also surrounds the TCF and which restricts personnel access to the facility. The inspector observed that there were a total of 15 onsite storage containers (OSSCs) containing spent resins stored inside the facility at the time of this inspection. Current licensee surveys indicated a maximum of 80 mR/hour on contact with the OSSCs and a maximum of 0.1 mR/hr at contact with the outside storage facility shield wall.

The inspector reviewed the interim onsite radwaste storage surveillance program and storage waste inventory documentation. Procedure No. 6.9-303, Rev. 0, "Operation of the Interim Low Level Radwaste Storage Facility", contained very good guidance for limiting radiation levels associated with the facility and provided the surveillance requirements. These consisted of weekly radiation dose rate surveys outside of the Low Level Radwaste Storage Facility (LLWSF), quarterly air and liquid (if present) surveys from inside of selected OSSCs stored inside the facility, as well as quarterly visual inspections of the storage facility. The inspector verified that these surveillances had been performed. For each OSSC stored inside the facility, the licensee maintained documentation with waste type descriptions, radiation dose rate information and dates of transfer into the facility. However, some of the files contained documentation of waste sampling and some did not. The inspector noted that no procedural guidance specified sampling and characterization of the wastes in storage. The licensee stated that this type guidance would be evaluated and, as appropriate, be included in the procedure(s).

In conclusion, the inspector determined that the interim Low Level Radwaste Storage Facility operations were well handled. One area for enhancement was in the documentation of the radioactivity contents of the radioactive waste containers in storage.

8.3 OTHER RADIOACTIVE WASTE STORAGE

The inspector noted the following unusable radioactive equipment/waste stored at the station.

- 23 local power range monitors, 25 control rod blades and approximatel 30 ft^3 of miscellaneous material placed in storage boxes that are located in the spent fuel pool.

- The floc recycle tank that was abandoned in 1978.

- The radwaste concentrator that was abandoned in 1976 and was partially removed in 1986.

All areas of storage were effectively shielded or locked and posted and appropriately controlled to prevent inadvertent entry of personnel. There was no additional radiation exposure to personnel associated with the above radioactive waste storage.

8.4 INSPECTOR'S CONCLUSIONS

The inspector determined that the licensee continues to very effectively disposition solid radioactive wastes processed at the station. The trash compaction facility has been utilized as an effective staging area for offsite shipments and the interim onsite storage facility has been effectively utilized for the safe storage of radioactive wastes. The spent fuel pool irradiated reactor hardware, the floc recyle tank, and the radwaste concentrator remain to be dispositioned, however, they do not currently pose a safety or radiological hazard to station personnel.

9.0 RADIOACTIVE MATERIAL CONTROL

The inspector reviewed the licensee's program for contamination monitoring of personnel and equipment prior to unrestricted release from the station. Procedure 6.1-213, Rev. 4, "Radiological Control of Vehicles and Materials", provides appropriate contamination control limits and requirements for surveillance of all material carried outside of the radiological controlled areas (RCAs) of the station. Procedure 6.2-018, Rev. 2, "Personnel Decontamination and Skin Dose Assessment", provides appropriate contamination control limits and requirements for surveillance of all personnel exiting the RCA. Applicable action levels were defined that require skin dose assessments to be determined. Both of the above mentioned procedures were determined by the inspector to provide the appropriate controls to limit the release of contaminated personnel or material.

The inspector observed the monitoring of personnel and equipment at the "red line" RCA exit point and observed radiation protection technicians properly implementing the above mentioned procedures. Personnel monitor alarms resulted in recording the event on a log sheet, however, only skin contaminations resulted in documentation of a personnel contamination incident. The inspector noted no discrepancies with the licensee's practices and that the licensee appeared to implement appropriate radioactive material monitoring controls.

10.0 EXIT MEETING

The inspector met with licensee representative (denoted in Section 1.0) on August 24, 1995. The inspector summarized the purpose, scope and findings of the inspection. The licensee acknowledged the inspection findings.