U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/90-23

Docket No. 50-293

License No. DPR-63

Licensee: Boston Edison Company
RFD #1 Rocky Hill Road
Plymouth, Massachusetts 02360

Facility Name: Pilgrim Nuclear Power Station

Inspection At: Plymouth, Massachusetts

Inspection Conducted: November 5 - 9, 1990

Inspectors: _____ 12/5/90
D. Mann, Radiation Specialist date
Facilities Radiation Protection Section

_____ 12/5/90
S. Sherbini, Senior Radiation Specialist date
Facilities Radiation Protection Section

Approved by: _____ 12/5/90
W. Pasciak, Chief, Facilities date
Radiation Protection Section, DRSS

Inspection Summary: Inspection on Novem r 5 - 9, 1990 (Report No. 50-293/90-23).

Areas Inspected: A routine, unannounced inspection of the radiological controls program on site was performed. Areas inspected included procedures review, access control, dosimetry records, organization, training and qualifications of the health physics staff, and tours of the facility. Also reviewed were circumstances connected with the release of a radioactive item to a local waste disposal facility.

Results: Within the scope of this inspection, two violations were identified.

DETAILS

1.0 Personnel Contacted

1.1 Licensee Personnel

* R. Anderson, Vice President, Operations
  A. Bowens, Supervisor, Dosimetry Records
* G. Davis, Vice President, Nuclear Assurance
* N. DiMascio, Manager, Radiological Section
  P. Drooff, Senior Supervising Rad Engineer, Dosimetry
  J. Fitzsimmons, Supervisor, Rad Protection
  J. Geary, Administrative Coordinator
  C. Grevenitz, Senior Rad Waste Specialist
* P. Hampton, Manager, Compliance
* B. Lunn, Senior Compliance Engineer
* T. McClellan, Senior QA Engineer
* D. McClosky, Manager, Chemistry and Rad Waste
* B. McDonald, Manager, Rad Operations Support
  D. Moutt, Principal Chemical Engineer
  K. Perito, Supervisor, Technical Training
* L. Schmeling, Acting Plant Manager
* E. Wagner, Vice President, Engineering
* A. Williams, Manager, Radwaste

1.2 NRC Personnel

* J. MacDonald, Senior Resident Inspector
  B. Olsen, Resident Inspector
  A. Cerne, Resident Inspector

2.0 Procedure Review

A sample of procedures was reviewed to determine their quality and ease of use. The sample included those procedures that applied to the areas reviewed during this inspection. Based on this review, the procedures were found to be well written, easy to read, and technically correct. A 2-year procedure review cycle was being implemented by the licensee. This review cycle required that all procedures be reviewed and revised as necessary at least once every two years, or more frequently if the need arose. The review dates on the sampled procedures showed that these procedures had been through the review cycle.

Several strengths were identified in the area of procedure

development. These included the use of a procedure writer's guide for developing new procedures, accompanied by an extensive check list for use to ensure that the procedure includes all the relevant elements in the proper format. A procedure validation process is also required before a new or substantially revised procedure is approved.

5.5 Qualifications and Training of the Health Physics Staff

The training program for newly hired health physics technicians (not including contractors) was reviewed. The program was found to be quite extensive and included a combination of classroom and on-the-job training. In addition to the General Employee Training (GET), which is required training for all workers, new technicians spend approximately 13 weeks in classroom training, and the total initial training period is about six months. Exams are given at various stages as well as at the end of the training. An oral qualification board is also required before full qualification. Contractor technicians receive 3-4 weeks of initial training before working on site.

Cyclic training is also provided for the health physics technicians. The cycles are about 8 weeks long and each session includes 4-5 technicians and a supervisor. The training session per cycle lasts about a week and includes industrial safety, industry events, procedures changes, and any other relevant topics. Annual requalification is included in one of the cycles, as well as retraining on radwaste shipping. The licensee stated that all health physics technicians receive two weeks of initial shipping training and are rotated for six-month duties in radwaste. Contractor technicians are not included in cyclic training unless they are long-term contractors. The licensee stated that they do not currently have any long-term contractor technicians on site.

The staffing levels in the health physics organization were reviewed. Also reviewed was a randomly selected sample of resumes of senior health physics technicians. Based on this review, the following areas of concern were identified.

o The licensee has not developed formal criteria for use in evaluating the experience of applicants being considered for the position of senior health physics technician. The licensee's technical specifications require experience as specified in ANSI Standard N18.1-1971. However, the standard

only specifies two years of working experience in their specialty. It does not specify the kind of experience that would be considered acceptable toward qualifying the person as a health physics technician because the specification applies to all technicians and not only health physics technicians. The Standard therefore needs to be supplemented by information applicable specifically to health physics technician experience. The licensee stated that the resumes of all applicants for the senior technician positions are reviewed by the highest levels of management in the health physics organization.

o A review of the staffing level of technicians showed that there has been an unusually high turnover rate in the health physics technician staff on site. The data showed that in 1988, five technicians either resigned, were terminated, or were transferred out of the section. In 1989, three resigned and four transferred or promoted out of the section. In 1990, five resigned, and two transferred out of the section. The licensee stated that much of this turnover rate is related to living conditions in the area rather than to working conditions on site.

o The position of Manager Radiological Operations Division is currently vacant while the person who occupied that position serves in another capacity within the site organization; the duration of that assignment has not been established. The Manager, Radiological Operations Support is serving as acting manager for that division in addition to managing his own division.

o The licensee can credit Navy experience on a one for one basis. However, this may not be appropriate since Navy programs frequently assign personnel to radiological controls activities only part of the time during their tours of duty. The licensee has not developed formal criteria to determine what part of the time spent in a Navy program may be credited toward experience for senior technician position. The licensee stated that they take these factors into account when evaluating experience gained during military service. The licensee also stated that developing such guidance is currently a low priority item, especially since resumés are being reviewed by senior health physics management.

o The licensee stated that they may appoint an applicant

with Navy background to the position of senior health physics technician without any prior commercial power plant experience. As discussed above, no formal criteria have been developed to ensure that such a practice is appropriate in any particular case, given the applicant's past experience.

4.0 Plant Tours, Posting, and Access Control

Tours of the licensee's facilities were conducted during this inspection. This included the process and reactor buildings as well as the trash compacting facility. The tours showed housekeeping within the plant to be good. Postings in the radiological controls areas (RCA) were also found to be good. Access control to the controlled areas was also found to be good. The licensee has replaced most of the self reading ionization chamber dosimeters with electronic integrating and alarming dose rate meters. These meters are integrated into a computer-based access control system that allows the licensee to exert greater control on the number of personnel who are permitted to enter under the active radiation work permits (RWP). Three type of RWP are used by the licensee: Regular, Extended, and Continuing. Regular RWPs are job specific RWPs that apply only to a specific job and are of short duration. Extended RWPs are used for routine operations and surveillance work, and are usually valid for up to one year. Continuing RWPs are used in cases requiring minimal or no radiological controls measures, and their primary function is for dose accountability. They are also generally valid for up to one year. All RWPs require the approval of at least a radiation protection supervisor and an ALARA specialist. RWPs with estimated exposures of greater than 5 man-rem require progressively higher levels of management approval.

During the plant tours, the following items of concern were identified.

o Discarded ear plugs were noted on the floor at several locations within the RCA. The inspector pointed them out to the licensee and they were removed. The reason for not properly discarding earplugs after use was not apparent, particularly since disposal bins for that purpose are provided at several locations.

o One worker was noted improperly wearing his alarming

dosimeter. This was pointed out to the worker. Guidance on proper use of these dosimeters was not found in the procedures, but the licensee stated that workers receive appropriate instruction during their access training.

o Two technicians on two separate occasions were observed crossing frisking stations without performing a frisk. Although the areas from which the technicians were leaving on both occasions were not contamination areas, frisking was required as a precaution since these points marked transitions from potentially contaminated areas.

o Housekeeping in the tool decontamination facility was found to be very poor. The licensee stated that they periodically alert personnel responsible for this area of the poor housekeeping status. The licensee stated that they are considering measures to permanently improve housekeeping in that area.

o Radioactive material was observed suspended from the edge of the fuel storage pool. The inspector asked how that material is being controlled to prevent inadvertent exposure if some of the items suspended are highly radioactive. The licensee stated that they are currently taking action to improve control of this material. This action includes performing an inventory of all material suspended in the pool and providing physical controls on those that are hazardous to prevent inadvertent handling. The licensee also stated that in the interim, until this action is completed, the area around the fuel pool, which is the refueling floor in the reactor building, is being controlled as a locked high radiation area.

The status of the above items will be reviewed during future inspections.

5.0 Inadvertent Release of Radioactive Material To Unrestricted Use

On October 31, 1990, the Regional Disposal Facility, a privately operated nonradioactive waste disposal facility, detected radioactivity in a dumpster that was entering the facility to dispose of a load of trash from the licensee's site. The dumpster was sent back to the site without being opened. According to Section 20.301 of 10 CFR Part 20, no

licensee shall dispose of licensed material except by transfer to an authorized recipient or as authorized by the NRC. Contrary to these requirements, licensed material was released to the waste disposal facility, which is not authorized to receive such material, without prior approval from the NRC. This is a violation of 10 CFR Part 20 requirements (50-393/90-23-01).

At the site, the returned dumpster was parked at a location remote from the station buildings to obtain a low background environment, and the dumpster was surveyed from the outside using a standard probe. An area about midway along the length of the dumpster was found that read 40-60 counts per minute above background. This reading was found when surveying from either side of the dumpster. The inspector stated that there appears to be a contradiction between this finding and the licensee's release requirements, which specify that the minimum detectable activity using standard frisking techniques is 100 net counts per minute. The licensee stated that this was not the case because frisking is normally performed on site, where the background levels are relatively higher, making detection at the level of 40-60 net counts per minute difficult or impossible.

The dumpster was unloaded to the point at which activity was detected by the external frisk, and the bag containing the activity, which was a green bag, was located. The bag read 2 mR/hr on contact. The bag was opened and the radioactive item was found to be an oil-soaked piece of cloth. Since green bags are not labeled, it was not possible to directly trace the bag back its origin. However, during the licensee's investigations, the technician who had placed the cloth in the bag was identified. The person stated that he had used the cloth, which was initially clean, to remove a layer of oil floating on water contained in a 55-gallon drum that was stored in the Trash Compacting Facility (TCF). He stated that he had done this in preparation for taking the drum back into the plant to process the water in it in the normal liquid radwaste stream. The oil-soaked cloth was placed in a green bag on Friday October 26, and the bag had been left in the general vicinity of the drum until late Tuesday, October 30, when it was taken and placed next to the clean trash bag monitor. The licensee's investigation was unable to track the bag beyond this point, and the scenario describing the manner in which the bag ended up in

the compactor with clean trash is based on speculation and reasonable assumptions based on the way in which the TCF is known to routinely operate.

The licensee maintains a "Green-is-clean" program at the site. This program, which is commonly used by many licensees, is an attempt to reduce the volume of solid radwaste generated by the facility. Green trash bags are distributed through the site, including areas within the RCA. Trash that is known to be uncontaminated by radioactive materials is disposed of in these green bags. The bags are collected and taken to the TCF for compaction before shipping offsite as clean waste. However, most of the bags come from the RCA, and there is therefore the chance that radioactive waste may have inadvertently or through negligence been disposed of in a green bag. Therefore, all green bags are monitored in a bag monitor prior to being released for uncontrolled use. This is done at the TCF, and any bag that alarms the monitor is recounted. If it alarms a second time it is either treated as radwaste or is opened and sorted to identify the radioactive item. The licensee stated that the bag monitor has a lower limit of detection of approximately 20 nanocuries (nCi).

The TCF is divided into two sections, one for handling clean waste and the other for handling mixed waste (mixed waste is defined as chemically hazardous waste that contains some radioactive contamination). The bag monitors and compactors for the green bags are located in the clean side of the building. A short conveyor belt takes the trash from the bag monitors to the dumpster through a door that is normally locked and that marks the boundary between the inside of the TCF and the outside, which is an uncontrolled area and in which the dumpster is parked.

The scenario considered by the licensee as most likely for explaining the release of the contaminated green bag involves clean trash brought for compaction from the training facility. This facility is located outside the protected area, and trash generated there is normal office trash, with no possibility of contaminated articles getting mixed in it. In order to reduce the volume of this trash, it has been the licensee's practice for the past year or so to bring this trash into the protected area to the TCF where it is placed into the compactors and then onto the dumpster. Since the origin of that trash is known to be an

uncontaminated area, it is not checked in the bag monitor before placing it on the conveyor that takes it to the dumpster. The licensee speculates that at some point during processing of the training facility's waste on Wednesday October 31, the contaminated bag, which had been placed next to the bag monitor the night before, was mistakenly taken to be part of the clean batch being processed and was placed on the conveyor belt to the dumpster.

Operation of the TCF is controlled by a special procedure, No. 6.9-218, "Operation and Control of the Trash Compaction Facility". Other subsidiary procedures are used to describe the operation and calibration of the bag monitors. A review of the TCF operation procedure showed that the TCF was routinely operated in manner that was in violation of several requirements specified in the procedure:

o Section 6.0 [3] states that "Non-radioactive waste is not to be processed out of the TCF without documented survey results". Trash from the training facility was routinely processed out of the TCF without surveys, the stated reason being that this trash was known not to contain radioactive material.

o Section 7.1, CAUTION 2, states that "The access door to the waste compactor is to be locked any time it is not attended by an RP technician who is surveying material for release. The key is to be in the possession of the shipping and storage supervisor/designee". Contrary to this requirement, and for an undetermined period, the key to the access door had not been controlled in this manner.

Both of these practices are examples of violations of applicable procedures (50-293/90-23-02).

In addition to the above well defined procedural violations, some problem areas were also identified.

o Application of the TCF operation procedure depends in part on the ability of personnel using the procedure to identify "mixed waste". However, the procedure does not define mixed waste, nor is mixed waste clearly defined in any other procedure or document available to the technicians who may use that procedure. Discussions with several licensee representatives showed that many were not familiar with the characteristics that identified mixed waste. The licensee's

definition of mixed waste is any waste containing both chemically hazardous waste and radioactive contamination. The definition or identification of hazardous wastes by name or points of origin in the plant were also not clearly specified.

o The TCF procedure, Section 6.0[2], states that "No radioactive liquid will be transported to the TCF for processing with the exception of mixed waste". However, the 55-gallon drum containing water and a layer of oil that was the source of the radioactive cloth was brought into the TCF even though it was being treated as non-mixed waste. The cloth with the oil was deposited into a green bag, and the purpose of skimming the oil layer off the water was to take the drum of water back to the plant for waste processing as non-hazardous waste. It appears from discussions with licensee personnel that the technician who skimmed the oil with the cloth believed the oil to be non-radioactive and non-hazardous and he therefore disposed of the cloth in a green bag.

o Section 6.0[2] states that "In the case of mixed waste, no liquid with concentrations in excess of those specified in reference 2.1[17] shall be transported to the TCF. (The reference mentioned is 10 CFR Part 20, Appendix B, Table 2, Column 2). The licensee does not make a determination of concentrations before transporting mixed waste to the TCF, nor were such determinations made in the past. The licensee stated that they use a survey instrument to measure the exposure rate on the outside of drums to be taken to the TCF. If the exposure rate is less than 0.1 mR/hr, the concentrations are assumed to be lower than those specified in the procedure and the drum is taken to the TCF. The licensee, however, had not made any analysis to justify this practice.

The licensee's corrective actions included the following:

o A level 1 Radiological Occurrence Report (ROR) was generated and a critique was held. A level 1 ROR is the highest severity ROR.

o Key control for the door between the compactor area and the dumpster was instituted.

o The practice of bringing trash into the protected area

from the processing facility for compaction was stopped.

o Upper management met with all the affected staff to discuss the incident and to emphasize the importance of procedural compliance.

o All procedures dealing with the operation of the TCF were reviewed and revised as needed.

o The practice of bringing various drums into the TCF is being re-evaluated.

The complete implementation of the above corrective actions will be reviewed during a future inspection.

6.0 Dosimetry Reporting Requirements

During the inspection, licensee representatives enquired whether personnel who are issued personal dosimetry that is not required by NRC regulations fall under the exposure reporting requirements specified in 10 CFR Parts 19 and 20. The licensee stated that they currently issue dosimetry to all personnel who enter the protected area, even though many of them never enter radiologically controlled areas. The licensee stated that they would like to continue to issue dosimetry to these personnel, even though they are not required by regulations to do so, but they would like to reduce the paperwork processing effort involved in providing exposure reports for these personnel.

The inspector stated that the NRC's position on this issue, based on past interpretations of the regulations as documented in NRC internal memoranda on the subject, is summarized as follows:

o Termination reports must be sent to all persons for whom monitoring has been provided, unless the licensee documented before the fact that personal monitoring was not required by 20.202(a), "Personnel Monitoring". Thus, only persons monitored under section 20.202(a) must receive notification of exposure upon termination, regardless of the exposure received.

o On the issue of documentation before the fact, the licensee is required to maintain a record of the surveys

conducted to demonstrate compliance with section 20.202 (see section 20.401(b), "Records of surveys, radiation monitoring, and disposal").

The position, in summary, is that 10 CFR 19 and 20 do not require licensees to report to the individual or the NRC exposure data for individuals who terminate employment when these individuals were not monitored in accordance with 20.202(a). Furthermore, 20.201, "Surveys", and 20.401, "Records of surveys, radiation monitoring and disposal", do not require licensees to document decisions or conclusions for each individual regarding whether or not they are required to be monitored in accordance with 20.202(a). However, the requirements of 20.401(b) and 20.201(a) do require licensees to record and maintain the results of measurements made to determine levels of radiation or concentrations of radioactive material, obtained to evaluate the radiation hazard under a specific set of conditions. For example, general area or building radiation levels, used to determine an individual's monitoring requirements are required to be recorded and maintained.

7.0 Review of Licensee's Termination Reports

The inspectors reviewed the licensee's program involved in issuing termination reports. NRC regulations require the licensee to provide dose reports to its employees under the following conditions:

- At the request of a currently employed person, an annual dose report is to be provided (10 CFR 19.13,b).

- At the request of a former employee, a report showing the dose history at the facility for each calendar quarter of employment is to be provided within 30 days of receipt of the request or within 30 days of after determining the individual's exposure, whichever is longer (10 CFR 19.13,c).

- At the request of a terminating employee, a report is to be provided showing the exposure for the quarter in which termination occurred, or, if the actual dose is not available, an estimate of that dose (10 CFR 19.13, e).

- Whenever the licensee is required by NRC regulations to provide the NRC with an individual's exposure to radiation or radioactive material, a copy of the report must be sent to the employee at the same time that the letter is sent to the NRC (10 CFR 19.13,d).

According to a licensee study of the dosimetry records system, it was found that in July of 1987, "there were many letters that were out of compliance with 10 CFR 19.13 and 20.408. At that time, there was no system in place to successfully check both outstanding termination letters and exposure request letters". The licensee estimated that, at that time, there were 2000 - 3000 letters that awaited a response.

The system has been improved considerably since 1987. A computer system was installed to replace the manual processing of dosimetry data and to track requests for dosimetry reports. A check of the status of randomly selected requests for dose reports, and also of randomly selected dose record folders for current and past employees, showed that there were no violations of exposure reporting requirements.

8.0 Exit Meeting

The inspector met with licensee representative at the conclusion of this inspection, on November 9, 1990. The inspector reviewed the purpose and scope of the inspection and discussed the inspection findings.