U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/85-07

Docket No. 50-293

License No. DPR-35 Priority -- Category C

Licensee: Boston Edison Company M/C Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Facility Name: Pilgrim Nuclear Power Station

Inspection At: Plymouth, Massachusetts

Inspection Conducted: March 18-22, 1985

Inspectors: R. L. Nimitz 5/14/85
R. L. Nimitz, Senior Radiation Specialist date

R. L. Nimitz for 5/14/85
F. M. Costello, Senior Radiation Specialist date

R. L. Nimitz for 5/14/85
B. H. Carson, Radiation Specialist date

Approved by: W. J. Pasciak 5/15/85
W. J. Pasciak, Chief date
BWR Radiation Protection Section

Inspection Summary: Inspection on March 18-22, 1985 (Report No. 50-293/84-44)

Area Inspected: Special announced inspection of the following: licensee action on previous findings; licensee action on bulletins and circulars; licensee action on high reading TLDs identified in December 1984 and January 1985. The inspection involved 64 inspector hours on site by three region based inspectors.

Results: No violations or deviations were identified. Some problems were identified in the licensee's issuance, control, and Quality Assurance of personnel dosimeters.

DETAILS

1.0 Persons Contacted

1.1 Boston Edison Company

*W. D. Harrington, Senior Vice President-Nuclear
A. L. Oxsen, Vice President-Nuclear Operations
*P. Mastrangelo, Chief Operating Engineer
W. H. Deacon, Assistant to Senior Vice President
*E. Ziemianski, Nuclear Operations Support Manager
*A. R. Trudeau, Chief Radiological Engineer
*E. T. Graham, Compliance Group Leader
J. Mattia, Audit Group Leader
R. Smith, Chief Chemistry Engineer

1.2 Contractors

D. R. Neely, Vice President-Hydro Nuclear
*G. H. Smith, Senior Radiological Engineer, Hydro Nuclear
C. Yoder, Manager Technology, Landauer Inc.

1.3 NRC

*J. R. Johnson, Senior Resident Inspector
M. McBride, Resident Inspector

*denotes those individuals attending the exit meeting on March 22, 1985

The inspector also contacted and interviewed other personnel.

2.0 Purpose

The purpose of this special, announced radiological controls inspection was to examine the following program elements:

- Licensee Action on previous findings
- Licensee Action on Bulletins and Circulars
- Issuance, Control, Processing and Quality urance of personnel monitoring devices (i.e. thermoluminescer simeters [TLD]).
- Licensee Evaluation and Resolution of the fo.lowing; high reading TLDs:
  - the TLDs worn by two individuals (A&B) in December 1984 (see Report No. 50-293/85-02).
  - eight TLDs identified in January 1985

3.0 Licensee Action of Previous Findings

3.1 (Closed) Follow-up Item (50-293/80-05-16) Licensee to establish a program to rotate the sampling of charcoal beds on the licensee's safety related ventilation systems. The licensee established procedure 7.1.44, "Sampling of Charcoal Cells in Standby Gas Treatment and Control Room Environmental Filters Systems for Methyl Iodide Testing". The procedure provides adequate guidance for performing the sampling. Inspector review found that the procedure was being properly implemented.

3.2 (Closed) Follow-up Item (50-293/82-20-02) Licensee to establish a program to identify resin intrusion into ventilation duct work and initiate appropriate action following its identification. The licensee established procedure TP 83-58, "Resin Inspection of H&V Duct Work". The procedure provides adequate guidance for performing the inspection. The licensee also established procedure TP 85-11, "Resin Removal from RBV". The procedure provides adequate guidance for resin removal.

Inspector review found the procedures to be implemented. However, the following matters were brought to the licensee's attention.

•Procedure TP 83-58 data sheets did not contain a space for logging the date of inspection, consequently, the inspection history and time of procedure implementation was not clear based on data sheets reviewed.

•Procedure TP 83-58 did not provide any guidance or steps to initiate a review to determine the source of resin intrusion into H&V duct work. No sign-offs for this matter were included in the procedure, consequently, the licensee's identification and removal program did not provide assurance that such action would be taken.

The above two matters will be reviewed during a subsequent inspection (50-293/85-07-01).

3.3 (Closed) Follow-up Item (50-293/83-02-01) NRC to perform a review of the licensee's post accident sampling facility. The licensee was notified that a special team inspection of the licensee's Post Accident Sampling capability would be performed in the near future. This item is closed for administrative purposes.

3.4 (Closed) Follow-up Item (50-293/83-20-03) Licensee to revise the General Employee Training (GET) Program to include information to be provided to workers as to the types of radiation exposure reports that workers could request or expect to receive. Inspector review found that the licensee had modified the GET Program to provide for such information being provided to workers.

3.5 (Closed) Violation (50-293/84-06-02) Licensee did not implement the requirements of 10 CFR 20.201. Inspector discussion with licensee representatives and review of documentation indicated the licensee implemented the corrective actions described in his May 16, 1984, letter to NRC Region I.

3.6 (Closed) Violation (50-293/84-14-05) Licensee did not implement the requirements of 10 CFR 20.201. Inspector discussions with licensee representatives and review of documentation indicated the licensee implemented the corrective action described in his August 30, 1984, letter to NRC Region I.

3.7 (Closed) Follow-up Item (50-293/84-14-06) Licensee to improve communications between workers and radiation protection personnel at access control points. The licensee issued a memorandum to all appropriate radiation protection personnel regarding briefing of personnel performing radiation work permit work. Inspector review of training documentation indicated all appropriate personnel were trained in the memorandum. The licensee has included the memorandum in his radiation protection technician training program.

3.8 (Closed) Violation (50-293/84-25-06) Licensee did not adhere to the requirements of Technical Specification 6.8. The licensee implementation of correction action for this violation was reviewed in part during inspection 50-293/84-29. The inspector review of documentation and discussion with licensee personnel indicated the corrective action specified in the licensee's December 28, 1984 letter to NRC Region I was implemented.

3.9 (Open) Follow-up Item (50-293/83-27-01) Licensee to revise radiological occurrence report system as necessary to ensure that necessary corrective actions for occurrences are identified and applied on a priority basis. Inspector review of the licensee's radiological occurrence program indicated occurrences were being categorized per type of occurrence, summed per type of occurrence and plotted in terms of occurrences per month. However, review of the corrective action section of a number of occurrence reports indicated no specific corrective action was documented to identify the corrective actions taken to prevent recurrence. For example, the occurrence reports for a number of licensee identified breakdowns in high radiation area access controls (i.e. open doors) did not specify what, if any, action was taken to prevent recurrence. The inspector brought the matter to the licensee's attention and indicated this matter remains open (50-293/85-07-02).

3.10 (Closed) Unresolved Item (50-293/85-02-02) NRC to review licensee's evaluation of a high reading TLD worn by an individual (Individual A) in December 1984. This matter is discussed in section 5 of this report.

3.11 (Closed) Unresolved Item (50-293/85-02-03) NRC to review licensee's evaluation of a high reading TLD worn by an individual (Individual B) in December 1984. This matter is discussed in section 5 of this report.

3.12 (Closed) Unresolved Item (50-293/85-02-04) NRC to review licensee evaluation of a high reading TLD worn by an individual (Individual C) in January 1985. This matter is discussed in section 6 of this report.

3.13 (Closed) Follow-up Item (50-293/85-02-05) NRC to review the licensee's personnel dosimetry Quality Assurance Program. This matter is discussed in section 6 of this report.

4.0 Licensee Action or Bulletins and Circulators

4.1 IE Bulletin 80-10

The inspector reviewed the licensee's implementation of the requirements of IE Bulletin 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored/Uncontrolled Release to Environment".

This bulletin required that the licensee perform the following:

- Review facility design and identify nonradioactive systems which could become contaminated through interfaces with radioactive systems.

- Establish a routine sampling and analyses or monitoring program for these systems in order to promptly identify any contamination events which could lead to unmonitored releases to the environment.

- Restrict use of a nonradioactive system which becomes contaminated until the cause of the contamination is identified and corrected, and the system is decontaminated or if it is necessary to operate the system contaminated, perform an immediate 10 CFR 50.59 evaluation. (Note: This 10 CFR 50.59 review is to address the matters discussed in the bulletin.)

The evaluation of the licensee's performance was based on:

- Review of licensee response (dated July 11, 1980; BECO Ltr #80-141) and supporting documentation.

- Discussion with licensee chemistry personnel.

Within the scope of this review, the following matters requiring licensee attention were identified:

- The licensee's Chemical Engineer had not seen the documented system evaluation performed to identify contaminated systems which interface with noncontaminated system. Consequently it was not evident that the licensee had established all necessary sampling/monitoring programs to monitor noncontaminated systems which could lead to an unmonitored release. The licensee should review the system sampling program to ensure all appropriate systems are sampled or monitored.

•The licensee's evaluation did not clearly identify which systems could lead to an unmonitored/uncontrolled release to the environment. The license should clearly identify such systems.

•The licensee has not selected (a priori) a specific lower limit of detection for radioactivity with which to:

•Define what is a radioactive/nonradioactive system; and

•develop sampling and analysis programs in order to assure that a certain minimum defined concentration is identified.

(NOTE: The licensee's evaluation stated that fluid concentrations in excess of 10 CFR 20 Appendix B limits define a radioactive system. However, the licensee did not indicate whether these were 10 CFR 20 Appendix B Table 1 or 2 values and whether they were for identified or unidentified radionuclides.)

The licensee should clearly identify this/these concentrations.

•The licensee has not established a program such that in the event a nonradioactive system is contaminated:

•the system is not used until it is decontaminated, or

•if the system is to remain in operation, an immediate 10 CFR 50.59 review (addressing the matters discussed in IE Bulletin 80-10) is performed.

The above matters were discussed with licensee representatives during the inspection and during a management meeting at the NRC Region I Office on March 27, 1985. Licensee representatives indicated these matters would be reviewed and appropriate action taken. These matters are unresolved and will be reviewed during a subsequent inspection (50-293/85-07-03).

5.0 Licensee Evaluation and Resolution of High Reading TLDs

5.1 Background

On December 14 and 22, 1985, the licensee identified two high reading personnel monitoring devices (thermoluminescent dosimeters [TLD]) worn by two individuals at the Pilgrim Station. On January 15-18, 1985, a special NRC inspection (50-293/85-02) was conducted to review the circumstances and licensee evaluation of the high reading TLDs. At the time of the inspection, several NRC concerns were raised relative to: 1) adequacy of personnel dose evaluation for individuals who wore the high reading dosimetry and; 2) adequacy of issuance, control and quality assurance of the personnel monitoring devices worn. These matters were discussed in part during a licensee/NRC meeting held at the NRC Region I office on January 31, 1985.

(NOTE: An indepth discussion of the two high reading TLDs is included in Inspection Report 50-293/85-02)

In January 1985, the licensee also identified eight high reading TLDs. The licensee's evaluation of readings of these eight TLDs was also reviewed during this inspection.

5.2 December, 1984 High Reading TLDs (Two TLDs)

The inspector reviewed the licensee's action on a number of NRC identified concerns relative to the two high reading TLDs identified in December 1984. The evaluation of the licensee's actions on these concerns was based on:

- inspector review of documentation and
- discussions with licensee representatives

The following provides the concern and the licensee's action/resolution of the concern:

Individuals A and B

Concern 1

The licensee was unable to inform the inspector as to what these individuals were doing while in the Reactor Building and not signed in on a radiation work permit or what maximum radiation field these individuals may have been in.

Licensee Action on Concern 1

The licensee performed a comprehensive review of the whereabouts of the individuals while they were onsite and wearing their respective high reading TLD badges. The licensee was able to provide the maximum dose rates the individuals could have been exposed to while on site. Considering the time the individuals were onsite and the maximum radiation fields the individuals could have been in, the inspector concluded that the individuals did not sustain the exposure indicated by the high reading TLDs.

Individuals A and B

Concern 2

The licensee was unable to show that the individuals had not received an unplanned exposure from radiography source use.

Licensee Action on Concern 2

The licensee reviewed the use of radiography sources during the time period when the individuals were on site and wearing their respective high reading TLD.

The licensee was able to show that the workers did not receive unplanned exposures from radiography source use.

Individuals A and B

Concern 3

The licensee was unable to show that the individuals' pocket dosimeters had not malfunctioned and indicated a lower exposure value than actually received by the TLD badge worn by the individuals.

Licensee Action on Concern 3

The licensee performed an evaluation of his entire pocket dosimeter compliment and determined that the pocket dosimeters worn at the station have a high degree of reliability. The inspector reviewed this data and concluded that the dosimeters worn do not have a significant failure rate. The inspector was unable to identify any incidence of pocket dosimeter failure which resulted in a high reading TLD.

Conclusion

Based on the above reviews and the independent inspector reviews performed during inspection 50-293/85-02, the following conclusions were identified:

- The individuals were not present in a radiation field of sufficient magnitude for a sufficient period of time to have sustained the exposures indicated on their high reading TLDs.

- The inspector could not identify any deficiencies in the licensee's review of infield activities. The activities of the individuals involved would not have resulted in an unplanned exposure of the individuals.

(Note: The review of the issuance, control and Quality Assurance of personnel dosimetry is discussed in section 7 of the report. A review of these areas was performed to determine if the high readings of the TLDs were associated with problems in the area of dosimetry issuance, control, and Quality Assurance.)

6.0 High Reading TLDs Identified in January 1985

6.1 Background

In January 1985, the licensee identified an individual (Individual C) whose TLD badge appeared to have received an unexplained exposure of about 1.7 rem. The exposure of the badge was unusual in that the whole body TLD chip (chip 2) indicated a whole body dose of 1.7 rem while another whole body TLD chip (chip 3), contained in the badge did not indicate any significant exposure. The third chip (chip 3) of the licensee's badge is a "QA chip" which is used to provide a limited backup verification of TLD chip 2's results. The badge also contains another TLD chip (chip 1) which is used to monitor dose to the skin. The 3 chips are contained on a "card" and are essentially inseparable from each other.

Subsequent review and evaluation by the licensee identified an additional 7 badges with similar exposure discrepancies between chips 2 and 3.

The licensee initiated reviews to determine the apparent cause of the TLD chip exposure discrepancies. These reviews included:

- dose evaluations for the individuals who wore the TLDs,
- examination of TLD testing records, and
- review of the history of the usage of the TLD badges.

Based on the review, the licensee concluded that the 8 individuals who wore the TLD badges in January 1985 had not received the exposure indicated by the badges. The licensee stated that the exposures resulted from undocumented testing of the badges and subsequent failures to read out the exposure of TLD chip 2. The third chip of the TLD badges had been read out by the licensee's vendor.

6.2 NRC Review

The inspector reviewed the following matters to determine the circumstances surrounding the exposure of the eight TLD badges:

- licensee dose evaluation for the eight individuals
- read out history of the TLD badges
- issuance program for TLD badges
- control program for TLD badges
- Quality Assurance Program for TLD badges

6.2.1 Badge History Review

Within the scope of this review, the following matters were identified:

•The 8 TLD badges were last used in August 1984. The badges were read out (chip 1, 2, and 3) in early September 1984. No unusual readings were identified.

•The 8 badges, based on available data, were not used in September, October or November of 1984. The badges were not in any radiation fields while in storage.

•On December 13, 1984, the third chip of each of the eight badges were read out by the licensee's dosimetry vendor. (NOTE: The third chips when read indicated a maximum of about 1.8 rem. However, because the badges had not been assigned to any individuals after their use in August 1984, the licensee's vendor did not report the dose to the licensee.)

•In January 1985, the licensee issued the eight TLD badges to eight individuals in January 1985. (NOTE: The badges were issued with out having been sensitized and "zeroed" before issuance.)

•The licensee initiated a review in January 1985 when Individual C's TLD badge (chip 2) indicated an unexplained dose of 1.7 rem. At that time the licensee requested a read out of chip 3 for this individual's badge and a low exposure was identified (50 mrem). The vendor later provided the third chip reading obtained in September 1984. The review of that data indicated the third chip reading was comparable to the reading of chip 2. This was also the same situation for the other 7 high reading TLDs.

6.2.2 Conclusion

The inspector review of the circumstances surrounding the 8 high reading TLD results in the following conclusions:

•The eight individuals were not in radiation fields of sufficient magnitude or time duration to have sustained the indicated exposures.

•The licensee did not have adequate procedures for issuance of TLD badges in that badges with up to about 1.8 rem exposure were issued to personnel.

The licensee indicated that such procedures would be establish by April 30, 1985.

•The licensee was using out of date procedures for processing TLDs.

The licensee removed the out of date procedures and verified that all appropriate personnel were trained on the new procedures.

•The licensee did not have adequate procedures for control of personnel dosimetry cards.

The licensee indicated such procedures would be established by April 30, 1985.

•The licensee did not have adequate procedures for evaluation of high or unusual readings on chip 3 of his TLD badge.

(NOTE: Some discrepancies as high as 68 rem were identified.)

The licensee indicated such procedures would be established by April 30, 1985.

The licensee stated that he will evaluate personnel exposures for all personnel where third chip TLD reading indicates exposures in excess of regulatory limits. This will be completed by June 1, 1985.

•The licensee does not appear to have an adequate TLD badge control program in that site personnel dosimetry is readily accessible by other personnel.

The licensee indicated this matter would be reviewed and appropriate action taken.

The inspector indicated that the above matter requires licensee attention and would be reviewed during a subsequent inspection 50-293/85-07-04.

6.2.3 Licensee Comments

Licensee representatives indicated that his radiological improvement program would address overall improvement of the Personnel Dosimetry Program.

7.0 Exit Interview

The inspector meet with licensee representative (devoted in Section 1) at the conclusion of the inspection or March 22, 1985. The inspector summarized the purpose, scope and findings of the inspection. At no time during the inspection did the inspector provide written material to the licensee.