August 28, 1995

E. Thomas Boulette, PhD
Senior Vice President - Nuclear
Boston Edison Company
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, Massachusetts 02360-5599

SUBJECT: RESPONSE TO INSPECTION NO. 50-293/95-09

Dear Dr. Boulette:

This letter refers to your July 21, 1995 correspondence, in response to our June 21, 1995 letter that contained a Notice of Violation for inadequate control of special nuclear material (SNM).

We observed that your search plan effectively located the missing pieces of SNM. Your corrective actions to provide SNM training, enhance programmatic controls, and to conduct a physical audit of portable SNM stored in the spent fuel pool, serve to preclude future similar violations. Our resident inspectors will monitor the results of your physical audit of portable SNM stored in the spent fuel pool, which is scheduled to be completed by the end of the second quarter in 1996.

Thank you for informing us of the corrective and preventive actions documented in your letter. These actions will be examined during a future inspection of your licensed program. Your cooperation with us is appreciated.

Sincerely,

ORIGINAL SIGNED BY:

James C. Linville, Chief
Projects Branch No. 3
Division of Reactor Projects

IE01

Docket No. 50-293

cc w/encl:
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T. Sullivan, Plant Department Manager
R. Fairbank, Manager, Regulatory Affairs and Emergency Planning Department
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D. Ellis, Acting Senior Compliance Engineer

cc w/cy of Licensee's Response Letter:
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The Honorable Therese Murray
The Honorable Linda Teagan
B. Abbanat, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Chairman, Nuclear Matters Committee
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Boston Edison

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

E. T. Boulette, PhD
Senior Vice President – Nuclear

July 21, 1995
BECo Ltr. #95-078

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Docket No. 50-293
License No. DPR-35

Subject: **RESPONSE TO A NOTICE OF VIOLATION**

Reference: **NRC INSPECTION REPORT NO. 95-09**

Please find enclosed the response to the Notice of Violation.

Boston Edison Company has implemented a number of interim and permanent corrective steps which are described in the enclosure. In addition, the following are commitments to future corrective steps that will be taken to avoid further violations:

- We will perform a physical inventory of portable Special Nuclear Material (SNM) stored in Pilgrim's spent fuel pool to establish a new SNM inventory baseline.
- The procedure governing SNM inventory and transfer control will be revised to reflect the results of the programmatic review we conducted.
- Maintenance procedures involving SNM will be reviewed and revised as necessary.
- The General Employee Training (GET) Program will incorporate a module on the control of SNM. Focused training will be given to personnel who may work with SNM in performing their duties.

Please feel free to contact me if there are any questions regarding this response.

L. J. Olivier for
E. T. Boulette, PhD

PMK/nas/Rap95/SRMIRM

cc: See next page

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Attachment

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Senior Resident Inspector
Pilgrim Nuclear Power Station

ENCLOSURE 1

NOTICE OF VIOLATION

Boston Edison Company
Pilgrim Nuclear Power Station

Docket No. 50-293
License No. DPR-35

During an NRC inspection conducted on April 4, 1995 through May 16, 1995 a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the violation is listed below:

10 CFR 70.51(b)(1) requires that records will be kept showing the receipt, inventory (including location), disposal, acquisition, and transfer of all special nuclear material.

Contrary to the above, on March 29, 1995, Boston Edison Company (BECo) did not possess records showing location and transfer of six nuclear detectors. Additionally, on April 6, 1995, a fuel loading chamber was also found missing. As a result of an extensive search effort, all seven pieces of the missing special nuclear material were located, with two of the seven missing nuclear detectors located offsite.

This is a Severity Level IV violation (Supplement III).

REASON FOR THE VIOLATION

The reason for the violation were SNM program weaknesses that included training, the procedure governing SNM inventory and transfer control, and the accountability of the personnel responsible for the SNM program.

Overview

Six Intermediate Range Monitors (IRM) and one Source Range Monitor (SRM) were misplaced. The total amount of Special Nuclear Material (SNM) contained in these monitors was 0.0162 grams of Uranium 235 (U^{235}). The U^{235} is SNM, but the material/detectors were not of strategic significance because of the small quantity contained in each detector. The SRM and IRMs were not used in the reactor vessel and therefore were not contaminated. The monitors emit very low levels of detectable activity; hence personnel radiation exposure during the cleanup and search was insignificant.

As a result of an SNM inventory in response to the discovery of the misplaced SRM and IRMs, a previously irradiated Fuel Loading Chamber (FLC) was also identified as being misplaced. The misplaced FLC contained approximately 1.5 grams of U^{235} at 3.05% enrichment. Individual detectors can vary by as much as 0.3 grams. The SNM contained in the FLC was not of strategic significance because of its small quantity. The FLC had been used in the reactor vessel during refueling and was irradiated. It was shipped to a facility licensed to receive contaminated material and was in an appropriate container, thereby minimizing personnel exposure. The FLC was verified to be intact and no SNM migrated from it. Survey results show the measured dose rates were less than 0.1 MR/hr, and the highest fixed contamination level was 400 net counts per minute for direct frisks.

Misplacement Circumstances of the 6 IRMs and 1 SRM

The IRMs and SRM were discovered misplaced March 29, 1995. Investigation indicated these detectors were last seen on March 24, 1995, on the Pilgrim Station Refueling Floor (Elevation 117') in a magenta colored bag.

The IRMs and SRMs were moved from the Instrument and Control (I&C) Shop on Elevation 51' on March 2, 1995. This move was made as part of a Shop cleanup effort. There were eight detectors in the Shop: two SRMs, and six IRMs. One SRM was contaminated and was not prepared for the move. The seven remaining detectors had the signal cabling ends removed to a length of approximately 3 to 6 inches by an I&C Technician. The removal was done for volume reduction and the cables were discarded. The Nuclear Technician checked the tagged serial numbers of the detectors against the transfer form and accounted for seven detectors. The cut-off ends were placed in a small magenta tool bag and a SNM tag was pasted to the bag. A self-adhesive Radiation Protection swipe was used to label the bag. The label had "IRM/SRM" printed on it. The bag was moved by the I&C Technician and the Nuclear Technician to the 117' Elevation (Refuel Floor). The bag was placed on the North side of the Refuel Floor adjacent to the elevator, on top of temporary ventilation units in a roped off area. This location was used as a temporary storage location because the plan was to place the detectors in the Spent Fuel Pool. However, the detectors were not placed in the Spent Fuel Pool.

On March 29, 1995 the semi-annual SNM physical inventory was being conducted and the magenta bag with the detectors was not found at the recorded location. Searches of Elevation 117' were immediately conducted but the detectors were not found. A second search of Elevation 117' by different individuals was completed at 1830 hours, but the detectors remained mispiaced .

Previous to the discovery, on March 24, 1995, a general cleanup of Elevation 117' had been initiated. Based on this information it was postulated the bag with the detectors left the floor within the contaminated material stream as trash, laundry, or tools during the cleanup.

Subsequent personnel interviews were conducted, during which several Radiation Protection (RP) Technicians stated they had observed such a bag of small items on the night shift, Friday, March 24, 1995, next to the 117' elevator. Also, the bag was light in weight and could have been believed to be empty.

Another search was completed on March 30, 1995 of Elevation 117'.

Four RP Technicians were interviewed concerning the magenta bag.

- One RP Technician recalled picking the bag up, surveying the contents, finding them of low activity, and placing a Radioactive Material sticker on it labeled "IRMs/SRMs - I&C". There was no "SNM" tag on it at the time. The bag was then placed on a tool cart in the clean area of the Elevation 117' access point. The Technician stated that this happened, "late last week". This was construed to mean between Wednesday, March 22, 1995 and Saturday, March 25, 1995.

- Two RP Technicians recalled surveying the bag and setting it in the clean area of 117' Elevation. The bag did not have a Radioactive Material sticker or SNM tag on it at the time. These RP observations occurred about the same time as described above.

- A fourth RP Technician recalled handling and surveying the bag on the Friday, March 24, 1995, night shift. The Technician placed the bag next to the elevator, but on the Controlled side of the boundary. The bag was light in weight and it was possible to mistake it for being empty.

This information was factored into the search plan, which is discussed in the following section, "Corrective Steps and Results Achieved".

Misplacement of the FLC

On April 6, 1995, as a corrective action to the SRM/IRM misplacement event (Problem Report 95.9178), Reactor Engineering was transferring portable SNM to the newly established storage area on Elevation 91'. This new storage area was established as part of the actions resulting from the misplaced IRMs and SRM. Part of this task was to re-tag all portable SNM with SNM tags. At that time the FLC (No. 6578997) was thought to be inside a core-ready package which had been wrapped and sealed for contamination control. This FLC had been used in-core in 1991 (during RFO-8) and had been removed, wrapped in plastic, and put into SNM storage.

A core-ready FLC package consists of approximately 80 feet of hose with conductors inside, connected to a water-tight canister (dunking chamber) which contains the FLC. The unit is waterproof and leak tested. When a core-ready FLC is removed from the water, and is kept as a unit for future use, it is wrapped in plastic sheeting to contain contamination. The wrapped package with coiled hose is approximately 4 to 5 feet in diameter and 1 foot wide. Only the dunking chamber was verified present during physical inventories. The FLC was not visually verified present during inventories because breaking the dunking chamber seal compromises its leak - tightness, precluding the chamber's use in the reactor vessel. Also, a dunking chamber assembly can be verified present while wrapped, making removal of the wrapping unnecessary.

On, March 29, 1993, two I&C Technicians were to prepare an FLC for the RFO-10 outage. At 1735 hours, I&C located two FLCs in the Elevation 117' Storage Cage and tested them per procedure 3.M.2-5.7, "Installation and Checkout of the Fuel Loading Chambers". At 2220 hours I&C found that one FLC, the one used in RFO-8 (6578997), was damaged and required a new hose and signal cable. A second dunking chamber (outer canister) did not have a detector in it. I&C removed the detector (6578997) from the damaged chamber and installed it in the spare chamber. I&C then performed testing. The data entry for this date concludes the "other chamber should be made up with new poly and new signal cable for a spare".

On March 30, 1993 at 1030 hours, I&C pressure tested the dunking chamber with satisfactory results and stored the spare chamber with two detectors and one cable in the storage cage.

This event chain indicates the FLC (No. 6578997) was removed from its wrapped package and placed in another unit. The package remained tagged and labeled as SNM without the detector inside. The location of the new detector assembly was not stated in the narrative, nor was it stated if it was wrapped in yellow poly like the one removed. Reactor Engineering records indicate the two "spare" detectors as being in a yellow barrel marked "FLC" and stored in the Northwest corner of the Elevation 117' North tool cage since October 31, 1991.

Previously, on April 6, 1993, the physical inventory by Reactor Engineering had found that FLC (No. 6578997) was not in its expected location in the Elevation 117' South cage. Problem Report 93.0216 was written to document this discovery. The FLC was subsequently discovered in the Northwest corner of the North tool cage. This is the empty package that I&C moved to the North cage on March 30, 1995. Inventories conducted between April 1993 and April 1995 counted the SNM tagged package containing the empty dunking chamber as one of the three on-site FLCs.

Because Reactor Engineering was not informed about the creation of a new detector assembly, it was not tagged with an SNM tag. The lack of identifying tag lead to the misplacement of the FLC. This conclusion is based on there being no record in the I&C Log of an interface between Reactor Engineering and I&C during 1993 FLC work.

CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

Overview of Search Results

All the misplaced detectors (1 SRM, 1 FLC and 6 IRMs) were recovered and their integrity was verified to be intact. No SNM migrated from within the detectors. The misplaced SNM was therefore recovered and restored to controlled circumstances.

IRMs and SRM Search

A search plan was developed to retrieve the misplaced SNM. The search plan focused on the controlled contaminated waste process stream.

Searches of the storage containers (sea-vans) at Pilgrim's Trash Compacting Facility (TCF) on March 30, 1995 discovered the bag in which the misplaced SNM (1 SRM and 6 IRMS) had been stored. The bag had the Radioactive Material sticker on it and was dated March 21, 1995. Six (6) of the original SNM tags as used in the I&C Lab were also found during the search on March 30, 1995.

On March 31, 1995 at 1600 hours, five of the detectors were found by I&C Technicians while searching contaminated trash. A sixth detector was found at about 1700 hours in another bag of contaminated trash. Both lots of contaminated trash had been previously searched and the search for the seventh detector continued. The six detector pieces were assayed in a multi-channel analyzer as one SRM and five IRMs.

As of April 6, 1995, after repeated searches of all contaminated trash streams, formal notification to the NRC was made that one IRM detector had been misplaced.

On April 20, 1995, our vendor for contaminated laundry, the Interstate Nuclear Services Company, notified us they had discovered what they believed to be the sixth misplaced IRM. This belief was based on photographs provided to them as part of the search plan. A Technician from Pilgrim was sent to the laundry facility. The Technician identified the piece and returned it to Pilgrim Station. The piece is an exact duplicate of the other IRM/SRM in our possession. The piece was assayed on a multi-channel analyzer and contains the same relative U-235 activity as the other recovered IRMs.

FLC Search

A detailed search plan based on the IRM/SRM search plan was developed for the process buildings' storage vans, metal containers, and the contaminated waste process stream. All contaminated metal and trash handling facilities receiving material from Pilgrim were contacted and a "hold" was placed on any Pilgrim Station storage vans in their custody. These vans were located in Pennsylvania and Tennessee.

On April 17, 1995, while the search continued on site, personnel were sent to licensed facilities in Whampum, Pennsylvania and Oak Ridge, Tennessee to search the vans. These vans are part of the controlled contaminated waste stream.

On April 19, 1995, we were notified that our representative sent to American Ecology Corp. (waste processor) in Oak Ridge, Tennessee to conduct a search had found the misplaced FLC. It was found in a storage van which had been shipped from Pilgrim Station on March 10, 1995. The van contained three (3) LSA boxes and bagged material. The FLC had been shipped as bagged material. The original packaging could not be retrieved.

The FLC was still in its outer canister. The FLC had been cut from its cable/hose. The FLC was returned to Pilgrim.

Other Corrective Steps Taken

- The responsibilities of the Nuclear Material Custodian (NMC) were transferred to a different individual. The personnel responsible for the SNM program were held accountable and received disciplinary action. A physical inventory of SNM at Pilgrim was conducted under the auspices of the new NMC. Actions initiated by the new NMC led to the discovery of the misplaced FLC.

- Portable SNM transfers were and are to be approved by the Plant Manager until programmatic review related changes are complete.

- A dedicated, locked area for the storage of portable SNM was established. SNM located in the process buildings that was portable and accessible (some material was in use or stored in the spent fuel pool) was transferred to the dedicated area.

- Work plans are administratively required for detector cutting until the programmatic review related changes are complete.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

- A physical inventory of portable SNM contained in Pilgrim's spent fuel pool will be performed to establish a new spent fuel pool SNM inventory baseline. The inventory project was being planned when this response was prepared. The inventory project is planned to begin in 1995 and is currently expected to be completed by the end of the second quarter in 1996. The new inventory baseline will supersede the current baseline established in 1987 by a documentation review. (The document inventory was voluntarily conducted in response to Inspection 87-06. Inspection 87-06 found our control of SNM adequate and our records complete, well maintained and available. However, we had not inventoried items containing less than 1 gram of SNM since 1975; hence we conducted an inventory to establish a baseline.) After January, 1975 and prior to 1987, items containing small quantities of SNM were not included in the SNM program and may have been removed from the pool as part of the contaminated waste disposal process.

  Since 1991, an annual inventory of non-fuel items in the spent fuel pool has been conducted which identified SNM storage locations, but did not inventory SNM at the piece-part level. Please note that the spent fuel pool's configuration, i.e. the material is under water and is located in a controlled area, and current administrative controls makes unlikely the unauthorized movement of SNM.

- Procedure 4.0 (currently Rev. 17), "SNM Inventory and Transfer Control", will be revised to reflect the results of the programmatic review that was completed. The revision is expected by September 1, 1995.

- Maintenance procedures involving SNM will be revised as necessary. The procedure changes will be completed by September 1, 1995.

- The General Employee Training Program will incorporate a module on the control of SNM. Training of greater focus will be given to personnel who may work with SNM in performing their duties, such as Operations, Maintenance, Radiation Protection, and Receipt Inspectors.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved by April 20, 1995 when the misplaced SNM (IRMs, SRMs and the FLC) was returned and located at Pilgrim Station.

PMK/nas/Rap95/SRMIRM