Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
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Michael A. Balduzzi
Site Vice President

July 19, 2006

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No.: 50-293
License No.: DPR-35

Licensee Event Report 2006-002-00

LETTER NUMBER: 2.06.067

Dear Sir or Madam:

The enclosed Licensee Event Report (LER) 2006-002-00, "Small Quantities of Unaccountable Licensed Material," is submitted in accordance with 10 CFR 20.2201(b).

This letter contains no commitments.

Please do not hesitate to contact Bryan Ford, (508) 830-8403, if there are any questions regarding this subject.

Sincerely,

Michael A Balduzzi

Michael A. Balduzzi

DWE/dm
Enclosure

cc: Mr. Samuel J. Collins
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1. NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104
LICENSEE EVENT REPORT (LER)	

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Small Quantities of Unaccountable Licensed Material

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
06	23	2006	2006	002	00	07	19	2006	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)			
POWER LEVEL (10)	100	X 20.2201(b)	22.2203(a)(3)(i)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)
		22.2202(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)
		20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)
		20.2203(a)(2)(i)	50.36(3)(1)(i)(A)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(A)
		20.2203(a)(2)(ii)	50.36(3)(1)(ii)(A)	50.73(a)(2)(iv)(A)	50.73(a)(2)(x)
		20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(A)	73.71(a)(4)
		20.2203(a)(2)(iv)	50.46(a)(3)(ii)	50.73(a)(2)(v)(B)	73.71(a)(5)
		20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(C)	OTHER
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(B)	50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Bryan Ford – Licensing Manager	(508) 830-8403

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE(15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 23, 2006 the NRC Operations Center was notified that sealed detectors containing a small amount of special nuclear material greater than ten times the limit specified in 10 CFR 20.2201(a)(1)(ii) were not in the expected locations. The discovery was made as a result of removing previously used and severed dry tubes as part of a planned cleanup of the spent fuel pool (SFP). These detectors are in addition to the detectors that could not be accounted for that were reported in LER 97-001-00 and notifications made in June 2001.

The apparent cause was inadequate verification of assumptions during the 1996 inventory of the spent fuel pool. A contributing cause was the failure to track special nuclear material (SNM) of quantities of less than one gram between 1975 and 1987 that prevented accurate inventory reconciliation and masked an incorrect conclusion that dry tubes stored in the SFP contained the detectors containing licensed material. All special nuclear material in inventory has been reviewed to determine if a similar condition may exist. Corrective actions planned include updating and validating the SNM records based on the results of the SFP inventory review and correcting shipping records.

The devices were most probably shipped to a licensed disposal facility prior to 1996 and pose or posed no threat to national defense or public health and safety.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

BACKGROUND

Licensed material is defined in 10 CFR 20.1003 as, "source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the Commission." Special nuclear material (SNM) is defined in 10 CFR 70.4 as, "(1) plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 of the act, determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing but does not include source material...." Pilgrim Station is licensed to receive, possess, and use licensed material including SNM.

At Pilgrim Station, plutonium, the uranium isotope 233, and the isotope uranium 235 (U-235) are contained in sealed devices utilized for the detection of neutrons. These isotopes are contained within a new detector or are produced as a result of neutron irradiation. The source range monitors (SRMs), intermediate range monitors (IRMs), local power range monitors (LPRMs), and traversing incore probes (TIPs) utilize sealed detectors containing U-235. SRMs, IRMs and TIPs are inserted into the reactor via a closed-end tube, referred to as a dry tube.

An NRC inspection of SNM controls and accounting was conducted in early February 1987 (Inspection 87-06) resulted in a finding that the procedure governing SNM inventory and transfer control did not provide for the effective control and accounting of items (devices) containing less than one gram of SNM. As a result of the finding, the procedure was revised in March 1987 and a baseline inventory of portable devices containing SNM was established in 1987. The procedure revision included the addition of devices that contain less than one gram of SNM to the controls of the procedure. In other words, devices containing less than one gram of SNM - SRMs, IRMs, LPRMs, and TIPs - that had been deleted from the controls of the procedure when the procedure was previously revised (in 1975), were re-added as items controlled by the procedure when the procedure was revised in March 1987.

The 1987 baseline inventory of SNM was based on review of SNM material balance transfer forms and SNM inventories, searches for and review of historical documentation that included receipt inspections of devices containing SNM, radioactive shipments identified as containing SNM, and maintenance requests pertaining to devices containing SNM. The method used for the 1987 baseline inventory was a piece count of portable devices containing SNM except for installed devices or devices in the spent fuel pool (SFP). For the 1987 baseline inventory and subsequent semi-annual physical inventories of devices containing SNM, installed devices (SRMs, IRMs, LPRMs, and TIPs) or devices stored in the SFP that were not attached to lanyards were considered inaccessible.

In a letter to the NRC on July 21, 1995, Boston Edison Company committed to conduct a physical inventory of portable devices containing SNM located in the SFP in order to establish a new SNM inventory baseline. The new baseline would supersede the previous baseline of SNM established in 1987.

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A physical inventory of portable devices containing SNM in the SFP was completed in 1996. The inventory used visual verification (piece count) and segregation from other materials into one of four discrete storage locations. Once identified as an item or device containing SNM, the item was added to inventory and moved under the controls of the procedure governing SNM and material balance transfer forms. The completed material balance transfer forms provided the formal documentation for each item included in the inventory. After the inventory, a reconciliation was made of the portable devices containing SNM inventoried in 1996 to the SNM inventory baseline established in 1987 and subsequent movements of devices containing SNM prior to the 1996 physical inventory.

Licensee Event Report 97-001-00 reported the total activity contained in 18 devices (14 SRMs/IRMs and 4 TIPs) containing the SNM that could not be accounted for, as a result of the reconciliation of the 1987 - 1996 baseline inventories, was approximately 0.1211 micro-Curies. The disposition of the devices containing the SNM that could not be accounted for was that the devices were most probably included in one or more shipments made to the licensed Barnwell, South Carolina, disposal facility as miscellaneous waste. The procedures governing SNM inventory and transfer control were revised to strengthen the procedural controls governing the control and accounting of SNM.

Subsequent to LER 97-001-00, errors in the 1996 baseline inventory have been identified. Notification was made to the NRC via event reports on June 8, 2001 and June 13, 2001 concerning additional detectors (2 TIPs) that were not reported in LER 97-001-00. Notification was also made concerning additional detectors (SRMs/IRMs) on May 22, 2006, May 23, 2006, May 26, 2006 and June 23, 2006.

DESCRIPTION OF LICENSED MATERIAL INVOLVED

In February 1997, LER 97-001-00 reported eighteen (18) detectors (14 SRMs/IRMs and 4 TIPs) that could not be accounted for. In June 2001, it was discovered that the serial numbers of two (2) additional detectors (TIPs) did not match the SNM accounting records and were considered to be missing or lost. In June 2006, nine (9) additional detectors (SRMs/IRMs) were determined to be unaccounted for.

The chemical and physical forms of SRMs, IRMs, and TIPs are similar. Each contains U-235 enriched to greater than 90 percent, sealed in a circular fission chamber having a dark brown to black color, up to two inches in length and approximately three-eighths inch in diameter. Depending on irradiation exposure, each detector would contain varying amounts of nuclides, including U-235.

The table below identifies the maximum activity (in Curies) for any one of these detectors.

Activity (Curies)

Nuclide	Detector		
	1 SRM	1 IRM	1 TIP
Am-241	1.16 E-09	2.71 E-10	1.78 E-13
Am-243	1.08 E-11	3.36 E-12	4.45 E-16
Cm-242	7.96 E-09	2.37 E-09	3.63 E-12
Cm-243	1.08 E-11	4.54 E-12	1.16 E-16
Cm-244	2.57 E-10	1.08 E-10	2.86 E-15
Np-237	7.73 E-09	1.31 E-09	1.18 E-11
Pu-238	6.76 E-06	1.54 E-06	2.32 E-09
Pu-239	4.93 E-07	5.45 E-08	3.05 E-09
Pu-240	5.07 E-08	6.78 E-09	1.07 E-10
Pu-241	8.27 E-06	1.46 E-06	4.71 E-09
Pu-242	7.27 E-12	1.72 E-12	1.09 E-15
U-235	5.98 E-09	1.65 E-09	2.16 E-09
Total (approx.)	15.52 E-06	3.10 E-06	1.22 E-08

The maximum activity in 23 SRMs/IRMs and 6 TIPs would be approximately 3.7 E-04 Curies.

CIRCUMSTANCES UNDER WHICH THE LOSS OCCURRED

LER 97-001-00 reported the most probable cause of detectors that could not be accounted for was less than effective methods used for control and accounting of devices containing less than one gram of SNM in the 1975 – 1987 timeframe. The cause(s) appeared similar to those in NRC Information Notice 88-34, "Nuclear Material Control and Accountability of Non-Fuel Special Nuclear Material at Power Reactors."

The apparent cause for the identification of additional detectors that could not be accounted for in June 2001 and June 2006 was inadequate verification of assumptions coupled with a lack of positive physical inspection during the 1987 and 1996 inventories. All of the detectors identified are believed to have been disposed of prior to the 1996 inventory and the establishment of additional controls at that time.

During the 1996 baseline inventory, assumptions were made concerning items such as the contents of dry tubes stored in the SFP. In the case of the dry tubes, the assumption was based on the mistaken premise that each detector had been removed with its dry tube when the dry tube was cut and removed from the reactor vessel. It is now known from documentation that some of these detectors were removed from the vessel and transferred to the SFP separately from the dry tubes. A contributing cause was failure to track SNM of quantities of less than one gram between 1975 and 1987 that prevented accurate inventory reconciliation and masked the incorrect conclusion that the stored dry tubes contained detectors with SNM.

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DISPOSITION OR PROBABLE DISPOSITION OF LICENSED MATERIAL INVOLVED

The devices containing the licensed material that could not be accounted for were most probably included in radioactive materials shipments made to the licensed Barnwell, South Carolina, disposal facility. The packaging, transport, and disposal of radioactive materials is regulated and controlled. Therefore, it is reasonable to conclude that no unregulated exposures occurred to persons in unrestricted areas as a result of the devices containing the licensed material that could not be accounted for.

PROCEDURES OR MEASURES TAKEN OR WILL BE ADOPTED TO ENSURE AGAINST RECURRENCE

LER 97-001-00 discussed additional controls put in place for the control and tracking of SNM. The review performed identified that these controls have been successful. All of the items identified are believed to have been disposed of prior to the 1996 inventory and the establishment of the additional controls discussed in LER 97-001-00.

In addition to corrective actions previously taken for the control of devices containing SNM, all special nuclear material in inventory has been reviewed to determine if a similar condition may exist.

The following corrective actions are planned. Updating and validating the SNM records based on the results of the spent fuel pool SRM/IRM inventory review, and performing an assessment of the SNM accountability program. These actions may be modified in accordance with the corrective action program.

EXPOSURES OF INDIVIDUALS TO RADIATION

From the table in this report, the maximum total activity of all licensed material in the devices that could not be accounted for was less than approximately 3.7 E-04 Curies. The licensed material that could not be accounted for was contained in sealed devices. These sealed devices were most probably irradiated and/or contaminated. Contaminated or not, these devices were and are handled as devices that contain radioactive material. Radiation detection and monitoring is regulated and controlled and is accomplished through several means including radiation surveys and survey instrumentation, radiation work permits, postings and/or barriers, personnel dosimetry, friskers, area radiation monitors, and portal monitors. It is reasonable to conclude the detectors containing the licensed material that could not be accounted for were maintained in the controlled waste process stream. Therefore, it is reasonable to conclude that no unregulated exposures occurred to persons in restricted areas as a result of exposure to the devices containing the licensed material that could not be accounted for.

REPORTABILITY

This report is submitted in accordance with 10 CFR 20.2201(b) because the activity of the licensed material that could not be accounted for was greater than 10 times the activity identified by 10 CFR 20 Appendix C.