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ENGC Ltr. 2.00.021

10 CFR 50.73

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

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

The enclosed Licensee Event Report (LER) 2000-001-00, "Small Amount of Special Nuclear Material Misplaced and Subsequently Located," is submitted voluntarily in accordance with NURG-1022 (rev. 1) section 2.9.

This letter contains no commitments.

Please do not hesitate to contact me if there are any questions regarding this report.

Sincerely,

J.F. Alexander

DWE/

Enclosure (LER 2000-001-00)

cc: Mr. Hubert J. Miller
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IE22

NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/200

LICENSEE EVENT REPORT (LER)

(See reverse for number of digits/characters for each block)

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TITLE (4)

Small Amount of Special Nuclear Material Misplaced and Located

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
07	29	1998	2000	001	00	06	26	2000	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)

	20.2201 (b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	22.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)	x	OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Douglas W. Ellis - Regulatory &Industry Affairs Principal Engineer	(508) 830-8160

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 July 29, 1998, four intermediate range monitors (IRMs) containing a small quantity of special nuclear material (SNM) were determined to be misplaced (i.e., not located in the expected location) in the Spent Fuel Pool (SFP), a material balance area. Later that day, one of the IRMs was found in the SFP, the material balance area of record for storage of that IRM. The second IRM was found in the SFP on August 18, 1998. The other two IRMs were subsequently located and returned to SFP by August 27, 1998. At all times the IRMs were handled or stored within Pilgrim Station radiological controls. This report was submitted voluntarily in accordance with NUREG-1022.

The root cause was human error associated with a lack of attentiveness in the transfer of the IRMs into the SFP. Corrective action taken included installing permanent lighting in the SFP, removing unnecessary tie-offs from SFP railings, Nuclear Material Custodian review of work packages involving handling or movement of SNM, including this problem in the technician training program, changing the storage method of IRMs and similar detectors, and procedure revisions.

The discovery occurred during 100 percent reactor power operation. The reactor mode selector switch was in the RUN position. The reactor vessel pressure was about 1032 psig with the reactor water temperature at the saturation temperature for that pressure. The IRMs posed no threat to public health and safety.

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

BACKGROUND

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." The SNM definition in 10 CFR 70.4 is identical to the SNM definition in 10 CFR 20.1003.

At Pilgrim Station, uranium is contained in reactor fuel and sealed devices used for the detection of neutrons. The neutron monitoring system intermediate range monitors (IRMs) use sealed detectors that contain uranium, including its isotope U-235. Installed or spent reactor fuel, installed devices (e.g., IRMs), and devices stored in the spent fuel pool are considered inaccessible.

On July 29, 1998, it was determined that four IRMs were determined to be misplaced (i.e., not located in the expected location) in the spent fuel pool, a material balance area. According to the SNM accounting records, the four IRMs should have been in the spent fuel pool (SFP), stored on the east side of the pool. A corrective action program document, PR 98.9409, was written to document the discovery. For simplification in this report, each of the 4 IRMs is assumed to contain 0.008 grams of total uranium, or 0.05 microcuries. The discovery occurred as a result of performing an inventory of the IRMs in the SFP.

In the context of this report, 10 CFR 70.52(a) requires verbal notification within one hour after the discovery of any loss, other than normal operating loss, of SNM. The NRC Operations Center was not initially notified of the problem because the IRMs were believed to be in the SFP. The on-shift senior licensed operator's review of PR 98.9409, on July 29, 1998, concluded that NRC notification would be necessary if the IRMs were determined to be lost. Searches were conducted and the 4 IRMs were located as follows:

- Two of the IRMs were located in the SFP, near or below the location of the bucket in which the IRMs had been stored. The first IRM was retrieved and then stored in the SFP (MBA-1736) on July 29, 1998. The second IRM was retrieved and then stored in the SFP (MBA-1736) on August 18, 1998.

- The other two IRMs were retrieved from a high radiation waste liner on August 27, 1998, and were then stored in the SFP (MBA-1738). The IRMs had been inadvertently placed in the liner, instead of a SFP storage bucket, during a transfer to the SFP on November 28, 1997. On July 2, 1998, the liner was moved to the low-level waste storage facility, which is located outside the radiological protected area. The liner was moved into the radiological protected area on August 27, 1998, as part of the search of the IRMs.

In summary, all 4 IRMs were located and returned to the SFP by August 27, 1998, which is less than 30 days from July 29, 1998, the date it became known the IRMs were not in their expected location. With the location of all 4 IRMs, the IRMs were no longer misplaced or missing and, therefore, were not and had not been lost.

On October 1, 1999, the NRC Operations Center was notified of the problem (PR 98.9409) pursuant to 10 CFR 70.52(a). The notification was the result of a management decision made regarding the problem and 10 CFR 70.52(a).

Regulation 10 CFR 20.2201(a) also contains verbal reporting requirements if certain considerations are met:

- 10 CFR 20.2201(a)(1)(i) is for verbal notification immediately after it becomes known to the licensee of any lost, stolen, or missing licensed material[1]. The regulation is focused to the total (aggregate) amount of licensed material (e.g., SNM) involved -- an amount greater than or equal to 1000 times the quantity in 10 CFR 20 Appendix C -- under such circumstances that it appears that an exposure could occur to persons in unrestricted areas. The aggregate amount of licensed material (SNM) for the 4 IRMs was 0.200 microcuries (0.05 microcuries each). The most conservative (low) activity in the 10 CFR 20 Appendix C listing of any uranium isotope is 0.001 microcuries. Thus, the aggregate amount, 0.200 microcuries, in the 4 IRMs was less than 1.0 microcuries. Therefore, a 10 CFR 20.2201(a)(1)(i) verbal notification was not applicable.

- 10 CFR 20.2201(a)(1)(ii) is for verbal notification within 30 days after it becomes known to the licensee of any lost, stolen, or missing licensed material. The regulation is also focused to the timeframe and amount of licensed material (e.g., SNM) involved -- an amount greater than 10 times the quantity in 10 CFR 20 Appendix C that is missing after 30 days. The most conservative (low) activity of any uranium isotope in 10 CFR 20 Appendix C is 0.001 microcuries. Thus, a verbal notification to the NRC would have been required in 30 days if all 4 IRMs (0.05 microcuries each) had not been located within 30 days. All 4 IRMs were located by August 27, 1998 -- within 30 days of July 29, 1998. Therefore, when the last 2 IRMs were located on August 27, 1998, the potential for a 10 CFR 20.2201(a)(1)(ii) verbal notification no longer existed.

Regulation 10 CFR 20.2201(b) requires a written report within 30 days of a 10 CFR 20.2201(a)(1)(i) or (ii) verbal notification. A 10 CFR 20.2201(b) written report was not required because none of the 10 CFR 20.2201(a)(1) verbal reporting requirements were met. The 10 CFR 70.52(a) verbal notification made on October 1, 1999, was made as a result of a management decision. There is no written reporting requirement for a 10 CFR 70.52(a) verbal notification.

1 The definition of lost or missing licensed material in 10 CFR 20.1003 is: "... licensed material whose location is unknown. It includes material that has been shipped but has not reached its destination and whose location cannot be readily traced in the transportation system."

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

EVENT DESCRIPTION

On July 29, 1998, four IRMs containing a small quantity of SNM were determined to be misplaced (i.e., not located in the expected location, along the east wall within the SFP). Later that day, one of the IRMs was located in the SFP, and a second IRM was located in the SFP on August 18, 1998. The other 2 IRMs were returned to the SFP by August 27, 1998.

The root cause analysis (PR 98.9409) identified two other dates that if considered to be the date when the problem was known, instead of July 29, 1998, would have required a 10 CFR 20.2201(a)(1)(ii) verbal notification to the NRC Operations Center. The dates were June 5, 1998, and July 21, 1998. The following describes the evaluation (PR 00.0408) of those dates:

- Relative to 6/5/98, a video inspection (on 6/5/98) was inconclusive in that the IRMs were not in either of two designated SNM containers (buckets) in the SFP (east wall) or the top of a nearby storage rack in the SFP (east wall). The inspection was inconclusive because what appeared to be pieces of cut cable that resemble an IRM could have been the IRMs, but a more detailed inspection was necessary for confirmation. [See the next bullet for the results of a piece parts inventory and inspection on 7/21/98.] If 6/5/98 is considered to be the date when the problem was known, a 10 CFR 20.2201(a)(1)(ii) verbal notification would have been required on or by 7/5/98 because the considerations of the regulation -- the amount of activity (greater than 0.01 microcuries) and duration (greater than 30 days) -- would have been met. A 10 CFR 20.2201(b) written report would have been required if such a notification had been made. A 10 CFR 20.2201(1)(ii) verbal notification was not made. The verbal notification on 10/1/99 was made pursuant to 10 CFR 70.52(a). Regardless of the 10/1/99 notification, the date when the SNM was known to be misplaced (i.e., not in its expected location) was 7/29/98, not 6/5/98 (on-going inspection).

- Relative to 7/21/98, a piece parts inventory and inspection (on 7/21/98) confirmed the 4 IRMs were not in either of two designated SNM containers (buckets) in the SFP and that a detailed video inspection of the SFP east wall area was necessary. The video inspection was delayed because of SFP lighting limitations and space constraints between the SFP rack and SFP east wall. The inspection was completed on 7/29/98 and it was on 7/29/98 that PR 98.9409 was written. If 7/21/98 (not 7/29/98) is considered to be the date when the problem was known, a 10 CFR 20.2201(a)(1)(ii) verbal notification would have been required on or by 8/21/98 because the last 2 IRMs were not located until 8/27/98. The SNM contained in the last 2 IRMs would have met the considerations of 10 CFR 20.2201(a)(1)(ii) -- the amount of activity (greater than 0.01 microcuries) and duration (greater than 30 days) - would have been met. A 10 CFR 20.2201(b) written report would have been required if such a verbal notification had been made. A 10 CFR 20.2201(a)(1)(ii) verbal notification was not made. The verbal notification on 10/1/99 was made pursuant to 10 CFR 70.52(a). Regardless of the 10/1/99 notification, the date when the material was known to be misplaced was 7/29/98, not 7/21/98 (on-going inspection).

In summary, 7/29/98 was the date when the problem was known to the licensee, during the senior licensed operator's review of PR 98.9409 on 7/29/98. Thus, there was no requirement under 10 CFR 20.2201 for a verbal notification or written report even if a 10 CFR 70.52(a) verbal notification had been made on 7/29/98.

The problem (PR 98.9409) was discovered during power operation while at 100 percent reactor power. The reactor mode selector switch was in the RUN position. The reactor vessel pressure was about 1032 psig with the reactor water temperature at the saturation temperature for that pressure.

CAUSE

The root cause of the 4 misplaced IRMs was human error associated with a lack of attentiveness to the activity being performed. Specifically, (1) the failure to properly perform and verify the transfer of 2 IRMs to the SFP as specified by the material balance area (MBA) transfer form (MBA-1724) on November 28, 1997; and (2) insufficient care taken in the movement of material in the SFP. Contributing causes were also identified and included poor lighting in the SFP, the manner and quantity of various materials tied to the SFP rails, storage of the IRMs in an open bucket in the SFP, job preparation for the disposal of cut IRM cables, incomplete shift turnover relative to job briefing requirements, and mindset by an Operations engineer that only 3 IRMs would be present in a transfer bucket.

CORRECTIVE ACTION TAKEN (PR 98.9409)

The problem (PR 98.9409) was included in the training program for Instrumentation & Control technicians. The responsible personnel received management attention. Procedure 1.5.20, "Work Control Process," was revised (to rev. 12); the revision added a requirement for a work planner to notify the nuclear materials custodian for review and identification of hold points for any work plan that involves handling or moving SNM. Procedure 3.M.2-5.13, "IRM and SRM Detector Changeout," was revised (to rev. 13); the revision added precautions to place IRM/SRM detectors in a bucket alone and to keep SNM separated from other material. Procedure 3.M.2-5.6.12 (rev. 95), "TIP Detector Removal and Replacement," was reviewed and determined to contain sufficient controls. Procedure 4.0, "SNM Inventory and Transfer Control," was revised (to rev. 26); the revision added a notes section to the SNM material balance area transfer form, added a requirement to record the unique locked seal number used on an irradiated IRM/SRM/TIP detector storage container in the remarks section of the individual unit history card, and added a step describing the use and controls of locked sealed storage containers for irradiated IRM/SRM/TIP detectors. Permanent lighting was installed in the SFP. Unnecessary material tied to the SFP rails was relocated, and ropes used to tie material to the SFP rails were replaced with stainless steel cable.

SAFETY CONSEQUENCES

The misplaced IRMs posed no threat to national defense or public health and safety.

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The 4 IRMs contained a total of 0.032 grams of total uranium. The total quantity was less than the quantity in the 10 CFR 70.4 definition of special nuclear material of low strategic significance.

Two of the 4 IRMs were located in the SFP and the other 2 IRMs were located outside the SFP, in a high radiation waste liner. The liner containing the 2 IRMs was stored in the low-level waste storage facility during July 2 - August 27, 1998, timeframe. While in the liner, the 2 IRMs were maintained in the controlled waste process stream. At all times the IRMs were handled or stored within Pilgrim Station radiological controls.

An isotopic analysis of the four misplaced IRMs was not performed. A previous analysis, however, of irradiated IRMs identified the following isotopes: Neptunium (237), Plutonium (238, 239, 240, 241, 242), Americium (241, 243), and Curium (242, 243, 244). The 10 CFR 20 Appendix C listing for any isotope, including these isotopes, is equal to or greater 0.001 microcuries. Assuming an isotopic analysis of the four IRMs that resulted in the same or very similar results as the noted analysis, the four IRMs contained less than the amount (0.05 microcuries) that was used for simplification in the BACKGROUND section of this report.

REPORTABILITY

This report was submitted voluntarily in accordance with NUREG-1022 (rev. 1) section 2.9 as a result of the evaluation contained in the EVENT DESCRIPTION section of this report.

SIMILARITY TO PREVIOUS EVENTS

A review of Pilgrim Station LERs submitted since January 1984 was conducted. The review focused on reports involving special nuclear material (SNM). The review identified LER 97-001-00 that involved a very small amount of SNM that could not be accounted for due to a period in the 1980's during which small quantities of SNM were not tracked. A similar review of LERs submitted since 1972 was conducted and the review identified no LERs involving the loss, theft, or misplacement of SNM.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODES
Monitor (IRMs)	MON