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Our ref: HEM-08-57
Date: May 19, 2008

Subject: Written Report of the Apparent Loss of Licensed Material (Event No. 44149) at the Hematite Decommissioning Project (Docket No. 70-36, License No. SNM-33)

References:
1. 10 CFR 20.2201, "Reports of theft or loss of licensed material"
2. Westinghouse Facsimile Entitled "Summary of 10 CFR 20.2201 Telephone Report to the Nuclear Regulatory Commission (NRC) Operations Center on April 18, 2008 at 11:28 a.m. (Eastern Time)," Event No. 44149, dated April 18, 2008

Dear Sir:

As required by 10 CFR 20.2201(b) (Reference 1), this letter submits the Westinghouse Electric Company LLC (Westinghouse) written report of an apparent loss of licensed material at the Hematite Decommissioning Project. The report, provided as an attachment to this letter, supplements Westinghouse's April 18, 2008, telephone report (Event No. 44149; Reference 2) made in accordance with 10 CFR 20.2201(a).

The attached report is provided to meet the content and timeliness requirements of 10 CFR 20.2201(b). As discussed further in the report, Westinghouse does not believe that the missing licensed material resulted in any significant exposure to individuals.

If you have any questions concerning this letter, please contact me at the number indicated above, or Matt Featherston of my staff at 314-810-3361.

Sincerely,

E. Kurt Hackmann
Director, Hematite Decommissioning Project

Attachment

cc: NRC Document Control Desk
J. J. Hayes, NRC/FSME/DWMEP/DURLD
B. A. Watson, NRC/FSME/DWMEP/DURLD
G. M. McCann, NRC Region III
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WRITTEN REPORT OF THE APPARENT LOSS OF LICENSED MATERIAL

EVENT NO. 44149

This report addresses the apparent loss of a small depleted uranium pellet used as a detector source. The depleted uranium pellet was one of several installed and used as a radioactivity source in Eberline Model DA-1 gamma detectors to provide an indication of continuous operability. As detailed further herein, the missing depleted uranium pellet appears to be the result of a loss of licensed material in amounts requiring reporting under 10 CFR 20.2201(a) and (b). On April 18, 2008, Westinghouse Electric Company LLC (Westinghouse) made the telephone report required by 10 CFR 20.2201(a).[1] Following up on the telephone report, this written report is provided pursuant to the requirements of 10 CFR 20.2201(b), which states:

> *"Written reports. (1) Each licensee required to make a report under paragraph (a) of this section shall, within 30 days after making the telephone report, make a written report setting forth the following information:*
>
> *(i) A description of the licensed material involved, including kind, quantity, and chemical and physical form; and*
>
> *(ii) A description of the circumstances under which the loss or theft occurred; and*
>
> *(iii) A statement of disposition, or probable disposition, of the licensed material involved; and*
>
> *(iv) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas; and*
>
> *(v) Actions that have been taken, or will be taken, to recover the material; and*
>
> *(vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed material."*

Introduction

On April 4, 2008, Hematite technicians were removing five pairs of Eberline Model DA-1 gamma detectors (total of 10 detectors) from former Hematite Process Buildings for potential reuse during upcoming decommissioning activities. During the removal activity, it was discovered that of the ten detectors, only nine of the detectors had installed sources. Although

[1] Westinghouse facsimile entitled "Summary of 10 CFR 20.2201 Telephone Report to the Nuclear Regulatory Commission (NRC) Operations Center on April 18, 2008 at 11:28 a.m. (Eastern Time)," Event No. 44149, dated April 18, 2008.

the source was missing, the tenth detector still contained a source holder. Inspection of the source holder revealed the presence of residual epoxy that appears to have joined the source holder to the source, and tape partially attached to the source holder that appears to have been used to hold the source holder to the source (depleted uranium pellet). It is reasonable to assume that this detector originally contained a source of the same type, activity content, and form as the sources installed in the other detectors to provide an indication of operability.

This report provides additional information regarding the subject missing licensed material to the extent that details can be determined or reasonably surmised. However, it is noted that Westinghouse's investigation into this matter has been challenged by: (1) the subject depleted uranium pellet and similar pellets used as radioactive sources have not been formally controlled and tracked within a source inventory and tracking system, apparently since their installation by the previous facility owner in 1993; (2) a change in site ownership in 2000; and (3) site management and staff turnover since the cessation of fuel fabrication activities in 2001, such that individuals who may have had first-hand knowledge of the cause and/or disposition of the subject missing depleted uranium pellet are no longer at the facility.

Based on the information that is available, it appears that a contributing factor to the apparent loss of licensed material is the aforementioned determination that the depleted uranium pellets may not have been formally controlled and tracked as radiological sources since their installation. The corrective actions described in this report are intended to address this issue and any underlying programmatic weaknesses.

1. 10 CFR 20.2201(b)(i) – A Description of the Licensed Material Involved, Including Kind, Quantity and Chemical and Physical form

Based on the type, activity content, and form of similar depleted uranium pellets used in Eberline Model DA-1 gamma detectors at the Hematite facility, the missing depleted uranium pellet is in solid oxide form, with a total mass of approximately 5.5 grams. The total uranium mass of the depleted uranium pellet is approximately 4.85 grams. The activity and mass content of the depleted uranium pellet by isotope is indicated in the table below.

Isotope	Mass (grams)	Activity (μCi)
U-234	0.0002	1.118
U-235	0.017	0.037
U-238	4.831	1.624

2. 10 CFR 20.2201(b)(ii) – A Description of the Circumstances Under Which the Loss or Theft Occurred

For reasons discussed in the introduction above, the circumstances under which the apparent loss of licensed material may have occurred cannot be determined with certainty. Due to the presence of residual epoxy that appears to have joined the source holder to the source, and tape

partially attached to the source holder that appears to have been used to hold the source holder to the source, it appears that a radioactive source had been installed in the detector. It appears likely that the source was separated from its source holder and dislodged from the detector housing, and subsequently was "lost," at some point after decommissioning activities progressed to the point that the gamma detectors were no longer immediately needed. This supposition is supported by the fact that any attempt to use the detector without the source would have made the absence of the source readily apparent (since the continuous operability indication would have been lost without the source in position).

3. 10 CFR 20.2201(b)(iii) – A Statement of Disposition, or Probable Disposition, of the Licensed Material Involved

Although the disposition of the missing licensed material cannot be determined with certainty, it is probable that the missing depleted uranium pellet was packaged and shipped off site either as Special Nuclear Material inventory or as radioactive waste. Either situation is credible since significant decommissioning activities in the site Process Buildings have involved the removal of remaining Special Nuclear Material inventory and contaminated process equipment.

4. 10 CFR 20.220(b)(iv) – Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas

Westinghouse does not believe that the missing material resulted in significant exposures to individuals in restricted or unrestricted areas. As previously discussed, Westinghouse believes that the missing material was shipped off site during concerted decommissioning efforts involving removal of remaining Special Nuclear Material inventory and contaminated process equipment.

Notwithstanding the above, Westinghouse believes there is no reasonable likelihood that the missing depleted uranium pellet could have resulted in significant exposure to individuals. The activity content of the depleted uranium pellet results in a measured beta-gamma dose rate of approximately 90 μR/hr on contact. At a distance of 30 cm from the depleted uranium pellet, the measured beta-gamma dose rate is equivalent to background radiation levels. Based on these dose rates, any resultant exposures experienced by individuals working in the Process Buildings until the pellet was packaged and shipped off site would have been minimal, and in any credible scenario would have been well below regulatory limits for exposure to an individual.

5. 10 CFR 20.220(b)(v) – Actions that have been taken, or will be taken, to recover the material

Westinghouse has taken the following actions to attempt to recover the material:

(a) On April 7, 2008, a physical search and radiological surveys were conducted to determine if the missing depleted uranium pellet remains in the Process Building area. The depleted uranium pellet was not found.

(b) Hematite records have been reviewed to ascertain if further information is available regarding the depleted uranium pellets that have been used as detector sources or the possible disposition of the missing depleted uranium pellet. No further information was found.

6. 10 CFR 20.220(b)(vi) – Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed material

The following measures have been adopted to prevent recurrence of a loss of licensed material:

(a) The depleted uranium pellets that had been installed as sources in the Eberline Model DA-1 gamma detectors (that are no longer in use) have been removed from the detectors. The pellets have been accounted for as part of the formal Hematite Material Control and Accounting Program, and are properly stored awaiting shipment off site as radiological waste.

(b) The depleted uranium pellets that are installed as sources in the two operational Eberline Model DA-1 gamma detectors located in Building 230 have been added to the Hematite radiological source inventory to ensure proper tracking and control. The proper tracking and control of these depleted uranium pellets minimizes the potential for recurrence of a loss of licensed material.

(c) Westinghouse has actively augmented the capabilities of the Radiation Protection Department over the past year. The new Radiation Safety Officer (RSO) assumed his duties in October 2007 and has considerable industry and decommissioning health physics experience. Subsequently, the RSO has augmented his staff with an additional five permanent and two temporary health physics professionals. This has resulted in significantly improved Radiation Protection Program implementation and oversight, work practices, and staff technical capability. These improvements enhance the program requirements for tracking and control of radioactive material, and thus minimize the potential for recurrence of a loss of licensed material.

From: Origin ID: SUSA (314)810-3320
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