DEPARTMENT OF THE ARMY
ADELPHI LABORATORY CENTER
2800 POWDER MILL ROAD, ADELPHI, MARYLAND 20783-1145

License No. 29-01022-14
Docket No. 030-29741
MLER-RI - 90-115

REPLY TO ATTENTION OF:

AMCSF-P/90-0137
SLCIS-RK (385-11m)

8 June 1990

MEMORANDUM THRU Commander, U. S. Army Materiel Command, ~~ATTN: AMCSF-P, 5001 Eisenhower Avenue,~~ Alexandria, VA 22333-0001

P. Elder 28 Jun 90

FOR U. S. Nuclear Regulatory Commission, Region I, Nuclear Materials Section B, 475 Allendale Road, King of Prussia, PA 19406

SUBJECT: Missing Plutonium Check Source

1. Reference:

a. Telephone conversations between Ms. Betsy Ullrich and John Kinneman of your office, and Mr. Michael Borisky of this office, 15-17 May 90, subject: Missing Plutonium Check Source.

b. Environmental Assessment and Finding of No Significant Impact for the AN/UDM-6 Radiac Calibrator Set, U.S. Army Communications-Electronics Command, Jan 1982, submitted as supporting documentation for NRC License 29-01-022-14.

2. As reported during the referenced telephone conversations, this office recently discovered a box marked as containing 0.036 microcuries of plutonium-239. Only the source mount was found inside the box. The box was found at the bottom of a collection of old radioactive waste during preparations for disposal of the waste.

3. Investigation has revealed that on 1 May 64, a 0.036 microcurie plutonium-239 check source was received at Harry Diamond Laboratory. Documentation reveals that the numbers located on the source mount found correspond to those on the source received. The source was purchased from the Monsanto Research Corporation. According to documents, the source was manufactured by placing the desired activity of a dilute solution of plutonium onto a platinum backing material, and heating to 500 degrees centigrade. The platinum backed source was then attached to a larger metal source mount, and the source mount stamped with the source number. The source was not included on any formal inventories either at the time it was received, or shortly afterward when it was placed in the radioactive waste.

4. Further investigation reveals that the source was used for a short-term project in 1964-65 that involved the design, fabrication, and testing of a nuclear time base. Discussion with the individual that used the source reveals that the source was

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incorporated into a prototype source-detector assembly used in the nuclear time base.

5. A search for the source as well as the prototype assembly produced in 1964-65 has been conducted. Neither could be located. It must therefore be assumed that the radioactive source is lost.

6. The Environmental Assessment (EA) referenced in paragraph 1b above was prepared for the AN/UDM-6 Radiac Calibrator Set containing approximately 30 times the plutonium-239 present in the missing source. The AN/UDM-6 plutonium sources were manufactured using the same methods as the missing sources. The EA considered: the dispersion during handling of a quantity 3.5 times greater than the missing source; the ingestion of a quantity 1.75 times greater than the missing source; the incineration or land disposal of a quantity 194 times greater than the missing source; a fire involving a quantity 19,444 times greater than the missing source; and a transportation accident involving a quantity 8,333 times greater than the missing source. After considering the external and internal exposure of any personnel involved in the above scenarios, the EA found that there would be "no discernable radiological health or environmental quality degradation". A "Finding of No Significant Impact" was therefore concluded for the receipt, possession, delivery, use, and transfer of the AN/UDM-6. Since the missing source contains much less plutonium then the AN/UDM-6, it stands to reason that the same conclusions can be drawn for the missing source. We therefore propose that the search for the missing source be discontinued.

7. This report has been provided as requested by your office in the referenced telephone conversations. Since it has been determined that a substantial hazard will not be created in unrestricted areas, further reporting is not required per 10CFR20.402.

8. The point of contact in this office is Mr. Michael Borisky, Radiation Protection Officer, (202) 394-2218.

STUART M. MARCUS
Director, Installation
Support Activity