



NUCLEAR REACTOR LABORATORY
AN INTERDEPARTMENTAL CENTER OF
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



O. K. HARLING
Director

138 Albany Street, Cambridge, Mass. 02139-4296
Telefax No. (617) 253-7300
Telex No. 92-1473 MIT-CAM
Tel. No. (617) 253-4211/4202/8-5642

J. A. BERNARD, JR.
Director of Reactor Operations

March 12, 1992

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

Subject: Reportable Occurrence 50-20/1992-2, Incorrect Inventory of Three Fission Chambers

Gentlemen:

Massachusetts Institute of Technology hereby submits this report of an occurrence at the MIT Research Reactor in accordance with 10 CFR 70.52. A formal report of this occurrence was made to NRC Region I (Mr. Arthur Della Ratta) on March 12, 1992. Informal reports on the possibility of this occurrence had been made on several previous occasions to either NRC Region I (Mr. Thomas F. Dragoun) or NRC Headquarters (Mr. Alexander Adams, Jr.).

The format and content of this report are based on Regulatory Guide 1.16, Revision 1.

1. Report No.: 50-20/1992-2
- 2a. Report Date: 12 March 1992
- 2b. Date of Occurrence: 30 October 1991 with search completed on 11 March 1992
3. Facility: MIT Nuclear Reactor Laboratory
138 Albany Street
Cambridge, MA 02139
4. Identification of Occurrence:

Three fission chambers could not be located during the annual inventory of SNM material required under license No. SNM-986. The three chambers are:

WL-7657 SN100
WL-7657 SN101
WL-6376 SN313

1522 1/0

Two contain 1.68 grams of enriched U-235 and one contains 1.72 grams of enriched U-235.

5. Conditions Prior to Occurrence:

The three fission chambers were used for operation of the original MIT Research Reactor, MITR-I. They had been placed in a shielded storage area (wall storage) pending their disposal as low level waste.

6. Description of Occurrence:

All special nuclear material held under license No. SNM-986 is inventoried annually in October. For most of this material, the inventory consists of a visual sighting. However, this is not possible for certain items such as installed instruments or used chambers that are in shielded storage where opening of the storage facility might generate significant personnel exposure and/or contamination. For SNM in this situation, the inventory consists of verifying records of the item's use and, where appropriate, seals on the storage area.

In 1991, it was decided to sight all SNM visually except that which was part of an installed instrument. Upon opening the shielded wall storage area where chambers WL-7657 SN100, WL-7657 SN101, and WL-6376 SN313 were recorded as being located, the three chambers could not be found. A systematic search was then made of all possible storage areas. This was quite time-consuming because of the potential radiation hazards involved. The search was completed on March 11, 1992 without locating the three chambers in question.

7. Description of Apparent Cause of Occurrence:

In addition to instituting a search of all possible storage areas, a review was conducted of waste shipment records to determine if the three missing chambers might have been legally disposed of as waste. To the best of our knowledge this is in fact what occurred. The cause of this occurrence is therefore believed to be a failure to update inventory records. Specifically, from 1979 to 1981, three shipments of waste items from the original MIT Research Reactor were made. The last of these occurred in February 1981 and it was authorized to contain 11 grams (0.0004 Ci) of enriched uranium in metallic, alloy, or oxide form. Unfortunately, the shipment records gave no breakdown of the material. The individuals in charge of the 1981 shipment have been interviewed and, to the best of their recollection, the SNM in that shipment consisted of used fission chambers and a small quantity of uranium that had been used for student thesis research. Inventory records document the disposal of the latter, but not the chambers.

8. Analysis of Occurrence:

It is believed that the three missing chambers were properly disposed of and that this occurrence is simply the result of a failure to update the inventory records.

9. Corrective Action:

The 1991 SNM inventory has been amended to show the probable disposition of the above-identified three fission chambers as identified in this report.

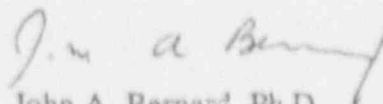
10. Failure Data:

None.

Sincerely,



Kwan S. Kwok, Ph.D.
Superintendent
MIT Research Reactor



John A. Bernard, Ph.D.
Director of Reactor Operations
MIT Research Reactor



for Francis X. Masse, CHP
MIT Radiation Protection Officer

JAB/gw

cc: MITRSC

USNRC - Project Manager,
NRR/PDNP

USNRC - Region I - Chief,
Effluents Radiation Protection Section (ERPS)
FRSSB/DRSS