



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II

101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

NOV 23 1979

MEMORANDUM FOR: G. H. Smith, Chief, FFMS Branch, RI

FROM: J. T. Sutherland, Chief, FFMS Branch, RII

SUBJECT: ASSIST INSPECTION, U.S. DEPARTMENT OF THE ARMY AT
LEXINGTON-BLUE GRASS DEPOT ACTIVITY (LICENSE NO. 2901022-08)
AND INQUIRY INTO OVEREXPOSURE OF WRIST FILM BADGES

With reference to your request dated June 13, 1979, for an assist inspection of the above facility, and the PNO-1-79-08 dated October 16, 1979, enclosed is the inspection report details that includes an evaluation of the exposed wrist badges.

The inspection was conducted on October 23 and 24, 1979, by Richard L. Woodruff of this office. A summary of the findings was telephoned to Mr. McClintock by Mr. Woodruff on October 30, 1979. If you have further questions please contact Mr. Woodruff at 242-5609.

Jack T. Sutherland
Jack T. Sutherland, Chief
Fuel Facility and Materials
Safety Branch

Enclosure:
Inspection report details

CONTACT: R. L. Woodruff
242-5609

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DETAILS

1. Persons Contacted

Licensee Employees

*Joe M. King, Chief, Nucleonics Branch, RPO
*Phillip G. Jackson, Chief, Quality Assurance Division
Douglas L. Hanna, Chief, Calibration Branch
Arch Howard, Supervisor, Calibration Branch
Beatrice W. Barker, Secretary
Edward Abney, Assistant RPO
William Bosley, Nucleonics Branch
Individual A, Calibration Branch
Individual B, Calibration Branch
Tom Hunter, Nucleonics Branch

Other Organizations

Barry Silber, Health Physicist, CERCOM

2. Licensee Action On Previous Inspection Findings

No previous noncompliance items have been identified at this facility, under this license.

3. Unresolved Items

A mandatory recall program was initiated for the inspection and modification of all AN/UDM-2 Radiac Calibrators. Four distinct and specific modifications have been performed at the Lexington - Blue Grass facility, these modifications have been developed by Lexington personnel and reviewed by the RPO; however, written procedures have not been furnished by higher command or documented by the Lexington facility.

4. Exit Interview

The inspection scope and findings were summarized on October 24, 1979, with those persons indicated by an asterisk in paragraph 1 above. The licensee was informed that this was an assist inspection, and that our formal report would be sent to Region I for review and any enforcement action correspondence would come from our Region I office.

5. Organization

Commander - Col. John A. Munnelly

Quality Assurance Division

Chief - Mr. Phillip G. Jackson

Calibration Branch - Mr. Douglas L. Hanna

Nucleonics Branch - Mr. Joe M. King

Twenty-three persons work for the above Quality Assurance Division which is located primarily in building 139.

6. Licensee Activities

This facility functions as a supply and distribution depot; maintenance and repair of radiation equipment; calibration services; and maintains an Army-wide film badge service. The primary function under this license is the calibration of radiation detectors using the AN/UDM-2 calibrator and the repair and maintenance of these calibrators.

7. Modification of the AN/UDM-2 Calibrators

One room (controlled area) at building 139 is used for modification of the calibrators. Three persons have worked on this project; however, only one person is currently involved in the modification program. The current workload is about ten (10) modifications per person-week.

Five modifications are made to the calibrator. One of these is the relocation of a screw in the swivel cover of the timer assembly, located on the discharge well assembly. All other modifications are made to the dose rate jig assembly, drawer and spacer block. No modifications are made to the source devices.

Discharge well assembly. This assembly contains 3 each 25 millicurie encapsulated strontium-yttrium - 90 sources and one encapsulated source of 20 microcuries. When the swivel cover is removed for modification, the access hole is covered with a sheet of 1/2 inch thick plexiglass to reduce the radiation level to normal limits of about 2 mR per hour from bremsstrahlung radiation.

Dose - rate jig assembly. This assembly contains one, twenty-five millicuries encapsulated strontium-yttrium - 90 source, a drawer, and a spacer block. The drawer and spacer block are removed prior to modification. The modifications are: (1) enlargement of groove in spacer block; (2) Spreading the sides of the drawer; (3) installation of spacer washers on the drawer sides and (4) installation of a larger pin in the drawer.

The above modifications require thirty minutes for disassembly, thirty minutes for assembly, and about thirty minutes to re-check the calibration. Most exposure to the worker occurs during the assembly phase, while replacing

the screw type pin at rear of the drawer. During this procedure, the fingers are exposed for fifteen to thirty seconds at approximately ten mR/hr.

Unresolved Item

The modification procedures above were developed at this facility. These procedures have not been documented in writing by this facility or CERCOM.

8. Excessive exposure to wrist - film badge

Two persons using the AN/UDM-2 Calibrator to calibrate radiacmeters (IM-174/PD) received beta doses to their wrist badges of 70 and 150 rems respectively during the month of August, 1979.

A follow-up investigation by the RPO demonstrated that the doses were beta doses as opposed to gamma or bremsstrahlung and the circular patterns were duplicated by placing the film badges inside the drawer of the dose-rate jig assembly; AN/UDM-2 calibrator. The 70 rem dose was duplicated exactly with respect to shape, size, and OD of the exposed film. The 150 rem dose could not be duplicated with respect to size of the pattern; however, it was reasoned from the exposure pattern and shape that the exposure was also deliberate, and did not represent an actual exposure to personnel.

The badges could not have been exposed with similar results with the badges located outside the calibrator, and the calibrator drawer is not large enough for insertion of one's hand or wrist.

Both of the individuals (A and B) were interviewed and observed during routine calibration procedures. Both individuals are trained in electronics and received two days OJT in the use of the AN/UDM-2 calibrator and calibration of the radiacmeters.

Building 139 and the area where calibration work was performed was a controlled area; however, the calibrator was left unlocked during coffee and lunch breaks during working hours. It is believed that the film badges were deliberately exposed during some break period when every one was away from their work areas.

Noncompliance

Department of the Army Technical Bulletin (TB11-6665-227-12) was submitted as part of the application for license no. 29-01022-01. Page five (5), paragraph 11 of this document discusses the "Duties of Radiological Protection Officer for AN/UDM-2." Item 11.1. states "Secure items against unauthorized use and removal".

Deliberate exposure of the wrist badges was unauthorized and was in noncompliance with Item 11.1.

9. Interview

Each interview was conducted in a private room with Mr. Silber from CERCOM, and the NRC inspector present.

Individual A (70 rem exposure) has worked in calibration since March 1979, he was retired from the Air Force but does not plan to retire from civil service any time soon. He wore a dosimeter for three (3) years in the Air Force and received one week of Radiological Health training. He was observed to wear his film badge over his right wrist. He stated that he did not know how the badge was exposed and that he had not exposed any badge deliberately and that the badge was tossed onto the work bench during breaks but stored on a film badge board at night. He had not used any other sources of radiation. He also stated that the key was left in the calibrator during breaks.

Individual B (150 rem badge dose) has no previous occupational radiation exposure, he has worked at the facility for 27 years and took the calibration job in May 1979. He was observed to wear his wrist badge on the underside of his left wrist. He stated that he always laid his wrist badge on the work bench during breaks, that the key was left in the calibrator during breaks, and that one time he found his badge on top of the calibrator upon his return from lunch. He stated that he had not deliberately exposed any film badge.

Archie Howard, calibration supervisor, stated that he did not believe either individual would deliberately expose their film badge, and that he was not aware of any personnel problems or practical jokes that would lead to a deliberate exposure.

Joseph M. King, Chief, Nucleonics Branch and RPO, stated that he was certain that the exposure was not actual extremity or whole body exposure. He stated that the two individuals calibrate about 90 units per month and each unit required approximately 15 seconds of actual calibration time. He stated that he was not aware of any personnel problems with the two individuals during the exposure period and that both men were very reliable. He stated that he confirmed the excessive dose to the wrist badge on October 4, 1979.

Noncompliance

The NRC Region I Office apparently was not notified of the possible over-exposure until October 16, 1979; therefore, the licensee is in noncompliance with 10 CFR 20.403 (b)(1).

10. Enclosure

Attachment A contains photographs of the exposed film badges and the duplicated exposures as follows:

- a. #063 - 150 rem dose from Beta
- b. #064 - 70 rem dose from Beta
 - #007 - badge exposed inside drawer, 80 seconds exposure
 - #008 - badge exposed inside drawer, 90 seconds exposure.
 - #009 - badge exposed inside drawer, 100 seconds exposure
- c. Picture showing drawer, spacer block, and swivel cover modifications compared to unmodified components.