U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Inspection No.	03012630/2011002
Docket No.	03012630
License No.	01-00126-16
EA No.	EA-2012-014
Licensee:	Department of the Army U.S. Army Aviation and Missile Command U.S. Army TMDE Activity
Location:	AMSAM-TMD-SR, Building 5417 Redstone Arsenal, Alabama
Inspection Dates:	October 24 & 25, 2011
Dates Follow-up Information Received:	November 4 and 21, 2011, December 7, 2011 January 11-14, 17, and 25, 2012

Inspector: ***/RA/*** _____ ***02/13/12*** _____

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EXECUTIVE SUMMARY

Department of the Army
NRC Inspection Report No. 03012630/2011002

An unannounced routine inspection of U.S. Army Test, Measurement, Diagnostic, and Equipment (TMDE) activities in Redstone, Alabama, was conducted on October 24 and 25, 2011, and concluded on January 25, 2012. This inspection was conducted pursuant to Inspection Manual Chapter (IMC) 2800 and Inspection Procedures (IP) 87126 and 87122.

The inspection included interviews with licensee representatives, including the radiation safety officer, a member of the radiation staff and an irradiator operator. The inspector observed TMDE licensed activities at Redstone Arsenal. The inspection also included a review of selected records relevant to compliance with NRC requirements.

Within the scope of this inspection, three apparent violations of NRC regulations were identified. One of the apparent violations is being considered for escalated enforcement; it involves a radiation monitor that was not integrated with the personnel access door locks to prevent room access when radiation levels are high inside the radiation room as required by 10 CFR 36.23(c). The monitor had not been integrated with the access door lock since September 24, 1996. The second apparent violation involves the key used to move the panoramic irradiator source. The key was not attached to a portable radiation survey meter by a chain or cable as required by 10 CFR 36.31(a). The third apparent violation involves the operator not checking the functioning of the survey meter with a radiation check source prior to entry following each irradiation, as required by 10 CFR 36.67(a).

REPORT DETAILS

I. Organization and Scope of the Program

a. Inspection Scope

The inspector interviewed staff to determine the current organization and the scope of the licensee's program at the Redstone Arsenal located in Alabama.

b. Observations and Findings

The licensee operates calibration facilities at 19 locations within the United States including the Redstone Arsenal and 5 locations overseas that mainly support the Army. The licensee performs gamma, alpha, and beta calibration on radiation instruments and devices including dosimetry. Materials are used daily at the Redstone Arsenal for calibration of instruments, wipe counting, and dosimetry support. The licensee uses an open beam calibrator, and one open beam irradiator as defined by 10 CFR Part 36, at Redstone Arsenal.

In addition License No. 01-00126-16 authorizes the following locations: Edgewood, Maryland; Fort Letterkenny, Pennsylvania; Fort Dix, New Jersey; Tobyhanna, Pennsylvania; Anniston, Alabama; Fort Benning, Georgia; Bragg, North Carolina; Fort Campbell, Kentucky; Hunter, South Carolina; Richmond Kentucky; Bliss, New Mexico; Lewis, Washington; Carson, Colorado; Schofield Barracks, Hawaii; Fort Hood, Texas; Fort Riley, Kansas; Wainwright, Alaska; and Wine Sands, New Mexico.

These additional locations were not part of this inspection.

c. Conclusions

The organization and scope of the program are as described in the license application dated January 18, 2002. No violations were identified.

II. Management Oversight of the Program

a. Inspection Scope

The inspector reviewed records of the annual program review, and discussed the oversight of licensed activities with licensee representatives.

b. Observations and Findings

The program is managed by the Radiation Safety Officer (RSO) and reviewed by a Radiation Safety Committee (RSC). The RSC meets semiannually. The RSO has a staff of 17 people. There are normally two technicians managing the program at each remote site.

The licensee sends personnel from the Redstone Arsenal to review the radiation program content and implementation at each satellite site annually, not to exceed 18 months. The inspector reviewed records of the annual radiation program content and implementation audit that was performed at Redstone Arsenal for 2010 and the RSC meetings for the last two years.

c. Conclusions

The inspector concluded that the management oversight of the program was appropriate. No violations were identified.

III. Irradiator Operations

a. Inspection Scope

The inspector interviewed the RSO and a qualified irradiator operator, and observed the licensee operate the irradiator.

b. Observations and Findings

The inspector requested that the operator demonstrate the operation of the irradiator while the RSO was present. At this facility, there is a single entrance to the irradiator room. The operator demonstrated and the inspector observed the activation of the "enable switch" inside the radiation room, and the operator shutting and locking the entrance door. The operator energized the irradiator control console and a conspicuous visible and audible alarm in the radiation room was activated, before movement of the source. After a time delay, the source position indicator on the console went from the fully shielded position, to transit, and then to the exposed position. The console also displays a camera picture of the irradiator beam port, which allows the operator to determine if the source is shielded or unshielded. Readings from the two radiation monitors located inside the radiation room are displayed on the irradiator console and are monitored by the operator when stationed at the console. The inspector determined that the operator has clear sight through the room windows of the area inside the radiation room. The entrance door to the radiation room is posted as required by 10 CFR 20.1902.

The inspector asked the operator to demonstrate the door interlocks. The operator had to call for assistance to obtain a second key that was maintained outside of the area. The RSO noted that the console key and the door key were two different keys but they were welded together. This configuration was in agreement with an exemption granted by the NRC and authorized in Amendment No. 17 to License No. 01-00126-16 on April 4, 1996. The lock on the entrance door is set manually by a key and is not connected to electrical power. The inspector concluded that the door lock would not become deactivated by a power failure.

When the radiation room door was unlocked and the door was pushed slightly open, the source is returned to its shielded position as required. The inspector observed that there is an audible and visible alarm which remained activated until the source returned to its shielded position. There are two independent means to send a signal to shield the source when the door opens. The first is an infrared light beam that is parallel and just behind the door, such that when the door opens slightly it breaks the light beam. The second is a mechanical device attached to the door such that it senses when the door is opening and sends a signal to shield the source. Prior to entering the radiation room, the key was removed from the console, and the operator obtained a calibrated radiological instrument and performed a radiation survey at the doorway.

The inspector observed that the door was able to be opened when the source was exposed. When the inspector asked how the dose rate monitor was integrated with the door lock, the RSO stated that there was no device in the door that was controlled by the dose rate monitor. The RSO explained that the radiation monitor is connected to the door interlocks such that the source is returned to the shielded position when the door is open and dose rates are high.

This is an apparent violation of 10 CFR 36.23(c), which requires, in part, that a radiation monitor must be provided to detect the presence of high radiation levels in the radiation room of a panoramic irradiator before personnel entry. The monitor must be integrated with personnel access door locks to prevent room access when radiation levels are high.

In March 1996, the licensee had contracted with a vendor to install a device that would comply with 10 CFR 36.23(c) which would integrate the radiation monitor with the personnel access door, but the actual installation failed to meet the specific requirement stated in 10 CFR 36.23(c). Subsequent to the installation the licensee informed the NRC by letter dated September 24, 1996, that the irradiator was in operation [ML022060229].

On January 12, 2012, the licensee implemented the following procedure as interim corrective actions: operators will verify the two radiation monitor readings are measuring background prior to entry after the source is placed in the safe position. Verification is documented by the operator's signing their initials on a sign off sheet. Training was provided to each operator prior to them operating the irradiator. In addition, the licensee committed to installing a door lock integrated with the radiation monitors by February 17, 2012, which will comply with 10 CFR 36.23(c).

The inspector observed that the dose rate meter being used by the operator was not connected to the console key by a chain or cable. The inspector concluded that this is an apparent violation of 10 CFR 36.31(a). The RSO immediately directed that the dose rate meter be attached to the console key by a chain.

The inspector also noted that the operator did not perform the check of the functioning of the radiation meter with a radiation source before entry as required by 10 CFR 36.67(a). The RSO stated that they perform this check once a day. The inspector asked if they made more than one irradiation a day. The RSO stated that it depends on the schedule and that they could do several irradiations in a day. The inspector concluded that this is an apparent violation of 10 CFR 36.67(a). The RSO implemented the requirement of checking the functioning of the survey meter with a radiation check source on October 25, 2011 for each entry following irradiation.

Inside the radiation room, the inspector observed that there are two visible and accessible controls that would allow an individual in the room to return the source to its fully shielded position. The inspector performed an area radiation survey using Ludlum Model# 2401-EC2, NRC S/N: 188865, calibration expiration date July 6, 2012. The inspector found that the irradiator and radiation room shielding complied with 10 CFR 36.25.

The inspector observed the heat and smoke detectors located in the radiation room. There is a fire extinguishing system in the radiation room with a shut-off valve to control flooding as required in 10 CFR 36.27. During the last annual fire drill, the licensee performed a test on the detectors and verified that they activated an audible alarm and returned the source to its fully shielded position.

The inspector interviewed the operator and found the operator to be knowledgeable about the operation of the irradiator. The operator received annual training and successfully completed a test. In addition, the licensee performs a drill of emergency situations as part of the training.

The inspector confirmed that the licensee requires the operator to be present during irradiation. The operator is situated about five feet from the entrance door. There is also a second person that is qualified to respond to an alarm.

c. Conclusions

The inspector concluded that there were three apparent violations. 10 CFR 36.23(c) requires, in part, that a radiation monitor must be provided to detect the presence of high radiation levels in the radiation room of a panoramic irradiator before personnel entry. The monitor must be integrated with personnel access door locks to prevent room access when radiation levels are high. As of September 24, 1996, the licensee's monitor was not integrated with personnel access door locks, therefore it did not prevent room access when radiation levels are high.

10 CFR 36.31(a) requires, in part, the mechanism that moves the sources of a panoramic irradiator must require a key to actuate, and that the key must be attached to a portable radiation survey meter by a chain or cable. As of October 25, 2011, the key to the mechanism that initiates panoramic irradiator source movement was not attached to a portable radiation survey meter by a chain or cable.

10 CFR 36.67(a) requires, upon first entering the radiation room of a panoramic irradiator after an irradiation, that the irradiator operator shall use a survey meter to determine that the source has returned to its fully shielded position, and that the operator shall check the functioning of the survey meter with a radiation check source prior to entry. As of October 25, 2011, the operators did not check the functioning of the survey meter with a radiation check source prior to entry following each irradiation. The licensee had been checking the functioning of the survey meter with a radiation check source each day.

IV. Material Receipt, Use, Transfer, and Control

a. Inspection Scope

The inspector reviewed the use and control of licensed materials through observation and a review of records.

b. Observations and Findings

The inspector using the licensee's inventory performed random checks of radioactive sources to ensure the sources were listed on the inventory. The inventory was compared to the license amount to ensure compliance with the license. National Source Tracking System information was also reviewed for the sources maintained at this facility.

c. Conclusions

The use and control of licensed materials were as described in the license application. The National Source Tracking System information was correct. No violations were identified.

V. Training of Workers

a. Inspection Scope

The inspector interviewed available personnel regarding the licensee's training program.

b. Observations and Findings

The inspector determined that the workers obtained radiation training annually and they were knowledgeable regarding postings and methods to maintain doses as low as reasonably achievable (ALARA).

c. Conclusions

Based on interviews, personnel were knowledgeable concerning radiation safety. No violations were identified.

VI. Radiation Protection

a. Inspection Scope

The inspector reviewed licensee dosimetry records and observed dosimetry worn by personnel. The inspector observed a calibration being performed and reviewed leak test records.

b. Observations and Findings

The inspector reviewed dosimetry records for the first and second quarter of 2011 and the fourth quarter of 2010. The inspector confirmed that documented doses did not exceed 100 millirem for years 2010 and 2011. Licensee personnel were observed wearing dosimeters as required. Selected sealed source leak tests records were reviewed by the inspector for 2010 and 2011. The inspector confirmed that the leak tests had been performed at six month intervals for beta gamma sources and at three month intervals for alpha sources during 2010 and 2011.

The licensee operated liquid scintillation counters which were calibrated and operated per manufacturer specifications. A contract for vendor support to perform required checks was in place.

The inspector observed the calibration of a dose rate instrument. Calibration was in accordance with NUREG-1556, Volume 18, Appendix J, “Radiation Monitoring Instrument Specifications and Model Survey Instrument Calibration Program.” The technician used appropriate ALARA methodology to minimize dose while performing the calibration.

c. Conclusions

The dosimetry usage was as described in the license application. Leak tests were performed as required. Calibrations were performed properly. No violations were identified.

VII. Exit Meeting

An exit meeting was held by telephone on January 25, 2012 to discuss the scope of the inspection and the inspector observations and findings. The circumstances surrounding the apparent violations, the significance of the issues, and the need for lasting and effective corrective action were discussed. Corrective actions being employed by the licensee were also reviewed.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Dee Prinkel, Health Physicist
#* Stephen V Howard, CHP, Radiation Safety Officer
Arthur Young, Technician
*Larry Tarr, Director Army Primary Standards Lab
*Dave Walsh, CHP, Health Physicist

Individual(s) present at entrance meeting (October 24, 2011)
* Individual(s) present at exit telephone call (January 25, 2012)