U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-166/94-01

Docket No. 50-166

License No. R-70

Licensee: University of Maryland College Park

Facility Name: Maryland University Training Reactor

Inspection At: College Park, Maryland

Inspection Conducted: January 25-31, 1994

Inspector: Stephen W Holmes 2/23/94

S. en W. Holmes, Radiation Specialist — Date
Effl. nts Radiation Protection Section (ERPS)
Facilities Radiological Safety
and Safeguards Branch (FRSSB)

Approved By: Judith A. Joustra 2/23/94

Judith Joustra, Chief, ERPS, FRSSB — Date
Division of Radiation Safety and Safeguards

Areas Inspected: Status of a previously identified item, staffing, personnel dosimetry, instrument calibration, radiation surveys and analyses, postings, procedures and policy, and new 10 CFR 20 implementation.

Results: Portable survey equipment calibration, personnel monitoring programs, postings, and general housekeeping were good. Weaknesses in health physics staffing were noted. The licensee was requested to evaluate the adequacy of the present staffing to support the campus and reactor health physics functions (Section 3.0). The last of three previously identified violations was closed.

DETAILS

1.0 Persons Contacted

* V. Adams, Facility Manager
* W. Chappas, Director MUTR
  S. Hand, Health Physicist
* T. Long, Manager, Radiation Safety Office
* R. Ryan, Director, Environmental Safety

*Attended the exit interview on January 31, 1994

2.0 Status of Previously Identified Item

(Closed) Violation (VIO 50-166/92-01-02) The licensee failed to perform adequate surveys to determine that individuals were not exposed to airborne concentrations exceeding the limits specified in 10 CFR 20.103 and to detect surface contamination. Specifically, samples taken for these purposes had been analyzed on equipment not calibrated quantitatively or qualitatively for the counting configuration of the samples or for the isotopes of concern. The inspector found that the licensee had procured NIST-certified sources and calibrated the counting system both quantitatively and qualitatively for the counting configuration and isotopes of concern. This item is closed.

3.0 Staffing

Staffing in the University of Maryland health physics program, to support the radiation safety activities of both the campus and reactor facilities, consisted of the Radiation Safety Officer (RSO), two full-time health physicists (HPs), and one half-time technician. This reflected the loss of the former RSO and gain of a half-time technician since the last inspection. The HP staffing and qualifications (one Senior HP, two Junior HPs, and a half-time technician) were noticeably less than what the licensee, in response to an former inspection concern (Report 50-166/92-01 and UMDCP letter dated December 7, 1992), had determined to be adequate (2 Senior HPs and two Junior HPs) and considerably less than provided to the NRC as a basis for license renewal, which was "five professional health physicists and several student technicians." The inspector stated that the licensee would be requested to evaluate the adequacy of the present staffing and report the results and any actions taken or to be taken to improve staffing, or provide justification to show that the present staffing is adequate. This will be reviewed in a future inspection (IFI 50-166/94-01-01). No violations of regulatory requirements were identified.

4.0 Personnel Dosimetry

The inspector reviewed personnel radiation exposure records and dosimetry procedures, and interviewed members of the staff. The licensee uses a National Voluntary Laboratory Accreditation Program (NVLAP) vendor to process personnel dosimetry.

The RSO maintains dosimetry records for both the reactor facility staff and the campus staff. A review of records indicated that all exposures were within NRC limits, with most showing no exposure above background. The vendor-supplied exposure reports are reviewed by HP staff and then the reactor staff. Exposures are forwarded to the Reactor Director for review. The program includes action levels for investigation of elevated exposures and lost dosimetry badges, and implements the new 10 CFR 20 dose limits for declared pregnant workers, minors, occupational workers, and members of the public. The inspector found that the licensee's investigations for lost or damaged dosimetry, and the subsequent assignment of an administrative dose, were good. The licensee had implemented an effective personnel monitoring program. No safety concerns or violations of regulatory requirements were identified.

5.0 Instrument Calibration

The inspector reviewed the calibration records for the radiation area monitors (RAM), the portable survey instruments, and counting laboratory equipment. Calibrations were performed in-house by the licensee or off-site by certified vendors, using National Institute of Science and Technology (NIST)-traceable calibration sources and American National Standards Institute (ANSI) or manufacturer accepted techniques. Calibrations were performed at the manufacturer's recommended intervals. The licensee's computer tracking of portable instrument calibrations was excellent, and enabled efficient control and timely calibration of portable survey equipment. All instruments checked had been calibrated as required.

Calibration of the RAMs was performed by the reactor staff. Review of records and observation of a walk-through calibration procedure by the reactor staff indicated that acceptable calibration procedures were being followed, and that the frequency met license requirements. As previously committed (Inspection Report No. 50-166/92-01), the licensee had located the calibration certificate for the source used to calibrate the RAMs. However, it could not be determined from the manufacturer's certificate if the calibration source was NIST-traceable. The licensee stated that the source would be recertified with a secondary standard and/or a certified source for use in these calibrations would be acquired. This will be reviewed in a future inspection (IFI 94-01-02).

The gamma spectrometry system is also maintained and calibrated by the reactor staff. The system had been calibrated, using NIST-traceable sources, quantitatively and qualitatively for the counting configuration and isotopes of concern applicable to the required surveys and analyses being performed. Calibration frequency and technique followed the manufacturer's recommendations. The inspector found that, although the high confidence counting setting used was appropriate for the routine analyses being performed, a lower setting should be used if analyzing for environmental release levels or identification of radioactive wastes. The licensee stated that lower confidence factors would be used under these conditions.

The LKB liquid scintillation counter was checked/calibrated by the health physics staff each time it was used. NIST-traceable sources and appropriate background standards are used, following the manufacturer's counting programs. Informal tracking of source level and background counts was being performed. The RSO stated that formal control chart tracking will be accomplished in the future. This will be reviewed in a future inspection.

Within the scope of this review, no safety concerns were observed.

6.0 Radiation Surveys and Analyses

Weekly air samples were taken by the health physics staff while monthly pool water and "as needed" smear surveys of the hot hood, beam ports, etc, were taken by the reactor staff. The air sample charcoal sample component and the monthly reactor pool water sample were analyzed on the gamma spectrometry system by the reactor staff. The smears and filter component of the air sample were counted by the health physics staff using the LKB liquid scintillation counter. Written sampling and counting procedures were available and found to be technically sound. Results were reviewed by the health physics and reactor staffs as required. The frequency and type of monitoring technique were adequate for the facility's level of hazard. The reactor pool water sampling procedure stated that the sample would be taken after a power run. However, since no time frame was specified, sampling times over the last nine months ranged from one to twenty days after a power run. The reactor director stated that an appropriate sample time would be incorporated into the procedure. This will be reviewed in a future inspection. No safety concerns or violations of regulatory requirements were identified.

7.0 Postings

General housekeeping of the facility was good. Warning signs and postings properly reflected the radiological conditions in the facility. Radioactive material storage cabinets and the storage room for calibration sources were secured and properly posted. An NRC Form 3 was conspicuously posted on the bulletin board. The radiological posting program was adequate. No safety concerns or violations of regulatory requirements were identified.

8.0 Procedures and Policy

The Radiation Safety Manual had been revised and details the Radiation Protection (RP) and ALARA programs. In conjunction with this revision, numerous procedures had been or were being updated to implement the new 10 CFR 20 requirements and incorporate recent operational changes. The Radiation Safety Manual along with the revised procedures provided adequate guidance and instruction to radiation workers and fulfilled the NRC requirements for a formal RP and ALARA program. The licensee's use of procedures and policies was appropriate. No safety concerns or violations were identified.

9.0 New 10 CFR 20 Implementation

In general, the implementation of the new 10 CFR 20 requirements had not been functionally difficult for the facility to implement. Dosimetry, surveys, postings, calibrations, and training continued to be performed as normal. Personnel exposures, effluent releases, and area radiation levels at the facility were extremely low or consistent with background. No internal exposures or planned special exposures would normally occur. The new public and fetal exposure limits were already being complied with. The actual impact was on written procedures and program guidance. As mentioned in Section 8.0 of this report, new procedures and a revised Radiation Safety Manual had been promulgated to comply with the new regulatory requirements. The inspector identified a few lapses in converting to the new 10 CFR 20. The items were minor and of the type expected during such a conversion of written procedures and policy documents (i.e, referring to quarterly limits rather than yearly,the pregnant worker procedure stating the 500mr limit was a guideline, or inadvertently referencing an old 10 CFR 20 table). The licensee corrected these items by the end of the inspection and was performing an ongoing review of the procedures. No safety concerns or violations of regulatory requirements were identified.

10.0 Exit Interview

The inspector met with the licensee representatives listed in Section 1.0 of this report on January 13, 1994, and discussed the scope and findings of this inspection. The licensee acknowledged the inspection findings.