U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 85-02

Docket No. 50-166

License No. R-70 Priority -- Category G

Licensee: University of Maryland

Facility Name: Maryland University Training Reactor

Inspection At: College Park, MD

Inspection Conducted: March 7-8, 1985

Inspectors: a.a. Weadock 4/5/85
A. A. Weadock, Radiation Specialist date

a.a. Weadock for 4/5/85
B. H. Carsor, Radiation Specialist date

Approved by: M. Shanbaky 4/5/85
M. Shanbaky, Chief, PWR Radiation Protection Section date

Inspection Summary: Inspection on March 7-8, 1985 (Report No. 50-166/85-02)

Areas Inspected: Routine, announced inspection of the licensee's Radiation Protection Program. Areas inspected included Posting and Labeling, Instrument Calibration, Surveys and Sampling, Dosimetry, Controls During Experimentation, and Reports and Audits. The inspection involved 22 hours onsite by two region-based inspectors.

Results: No violations were identified.

DETAILS

1.0 Persons Contacted

During the course of this routine inspection, the following personnel were contacted or interviewed:

*J. P. Menard, Provost Office, Division of Mathematics and Physical Sciences and Engineering
*F. J. Munno, Director, Nuclear Engineering Programs
*R. L. Belcher, Director, Nuclear Reactor
*S. Shanks, Assistant Radiation Safety Officer
R. Carter, Health Physicist
K. Smith, Health Physicist

*Denotes those present at the exit interview.

2.0 Purpose

The purpose of this routine inspection was to review the licensee's radiation protection program with respect to the following elements:

- Posting and Labeling
- Instrument and Monitor Calibration
- Surveys and Sampling
- Dosimetry and Exposure Control
- Controls during Experimentation
- Reports and Audits

3.0 Posting and Labeling

The inspectors toured the Maryland University Training Reactor (MUTR) immediately after the entrance interview. Housekeeping of the facility was good. Posting of the facility and labeling of radioactive materials were in accordance with 10 CFR 20.203 requirements.

4.0 Instrument and Monitor Calibration

The inspector noted during a tour of the MUTR facility that all portable radiation detection instruments were calibrated and properly maintained. Responsibility for portable instrument calibration belongs to the Radiation Safety Office of the Environmental Safety Department. Although an instrument calibration source is currently maintained in the lower level of the reactor facility, portable instruments are sent off campus for calibration.

The inspector was aware of previous operability problems with the licensee's area radiation monitors and noted that the reactor bridge, ventilation exhaust, and water room area radiation monitors were operable at the time of the inspection. The licensee indicated they were currently

negotiating for the purchase of three new area monitors and hoped to have them in place by the last quarter of 1985. The inspector reviewed procedure #205, "Area Radiation Monitor Calibration," Rev. 0, and monitor calibration records and determined that the area monitors were being calibrated as required by the Technical Specifications. The following weaknesses in this area were identified:

- Procedure 205 requires meter response and adjustment to be made while a source is positioned at four distances from the detector. After initial adjustment a second check of meter response by re-positioning the source at each distance from the detector is not specified by the procedure. The licensee stated that this was typically done during calibration and would be included in the procedure.

- Calibration data recorded in the Control Room Log was minimal and should be more complete. It was not obvious if the monitor readings given were "as found" or "as left" readings, and, therefore, whether meter adjustment at each distance was required. The data also included no evaluation as to whether the meter reading met the licensee's acceptance criteria; this determination should be made at the time of calibration. The inspector discussed with the licensee proper documentation of calibration data. The documentation of the "as found" and "as left" readings will provide the basis to establish proper calibration frequencies.

  The licensee stated that procedure 205 will be revised to require the proper documentation of calibration data.

  The licensee stated that procedures for instrument use and calibration will be prepared for the proposed radiation monitoring equipment.

  The inspector stated that this area will be reviewed in a subsequent inspection (166/85-02-01).

5.0 Surveys and Sampling

Monthly radiation and contamination surveys of the MUTR facility are performed by the Health Physics staff of the campus Radiation Safety Office. The inspector reviewed selected facility surveys for the latter half of 1984 and for January 1985 and found them to be adequate. It was noted that none of the reviewed surveys identified any areas of loose contamination in the MUTR facility. The licensee indicated this was due to both the short half-life of their isotopes and the tight contamination controls in place at the facility (the licensee controls to 100 dpm/100 cm^2 gross beta-gamma).

The inspector reviewed analytical results and licensee sampling methods for the reactor pool and sump tank water. Samples from the sump tank are taken and analyzed by the licensee to determine if tank contents meet allowable

limits for discharge to the sanitary system. The inspector determined that representative samples from the 1400 gallon sump are not being taken; sump contents are not mixed prior to sampling and the sample is taken at the top of the water level in the sump.

It is unlikely that discharges above 10 CFR 20.303 limits have occurred, however, since monthly samples of the reactor pool water, which is the source of water to the sump, are taken after two hours of mixing of the pool water and routinely show activity below the limits specified in 10 CFR 20.303. The licensee indicated that a procedure for representative sampling of the sump would be in place by June 30, 1985. The revised procedure for sump tank sampling will be reviewed during a subsequent inspection (166/85-02-02).

6.0 Dosimetry and Exposure Control

Film badges for personnel radiation monitoring are provided for the users of the MUTR facility by the campus Radiation Safety Office, which also issues dosimetry for other radioactive material users on the College Park campus. The Radiation Safety Office contracts with Landauer to provide film badges and badge processing services. In addition to personnel monitoring, the Radiation Safety Office also posts area film badges in various locations throughout the MUTR facility.

The inspector reviewed a 1984 cumulative exposure record for personnel in the Department of Chemical and Nuclear Engineering, which includes MUTR facility users, and noted no exposures greater than 10 mrem, with the majority of personnel showing less than detectable exposure. The license attributed this exposure record to their low area dose rates and aggressive commitment to ALARA. The Landauer badges used by the facility provide neutron monitoring capability; however, it was noted that no neutron exposure was recorded on the personnel or area badges. The licensee indicated that this was consistent with their neutron survey findings; neutrons were detectable only at one location in the facility and did not constitute a significant contribution to dose.

The inspector discussed quality control with the Health Physicist in charge of dosimetry and the Assistant Radiation Safety Officer and determined there is no formal program or procedures to assure the quality of their personnel radiation monitoring. The licensee has, however, taken the following actions to identify dosimetry problems:

- The HP in charge of dosimetry has had this responsibility for three years and reviews all vendor exposure reports for inconsistent or anomalous values;
- The licensee's vendor (Landauer) has been certified by NVLAP;
- The Assistant Radiation Safety Officer maintains communications with other area users of Landauer to stay abreast on any problems other

users might be having.

The licensee identified problems with their previous dosimetry vendor by their review of exposure data and switched to Landauer in June, 1983. The licensee reports that the current vendors services have been satisfactory.

No violations were noted in this area.

7.0 Controls During Experimentation

The inspector evaluated the licensee's implementation of radiological controls during the performance of irradiation experiments by the following methods:

- Review of procedure OP 105, "Installation of Experiments,"
- Review of the Control Room and Isotope logbooks,
- Discussion with involved licensee personnel,
- Direct inspection of the sample hot lab area and pneumatic rabbit tube glovebox.

Within the scope of the above review it was determined the licensee is adequately controlling the performance of irradiation experiments. Experimenters using the facility are required to take either a departmental course in Reactor Operations or an orientation course given by the campus Radiation Safety Office.

The inspector verified that the licensee is aware of 10 CFR 20.203 requirements and has the capability to post and secure access to the hot lab if an irradiated sample causes a high radiation area. The hot lab also contains a shielded sample repository where high reading samples are allowed to decay. A sample inventory log identifies samples kept in the repository.

Summary information for each irradiation experiment is kept in the Isotope logbook. Procedure OP 105 requires the operator to fill out an attachment to the procedure which, when completed identifies the sample number, type, reactor parameters, and survey results after irradiation of the sample. These attachment sheets are kept in the Isotope logbook. During review of the Isotope log book the inspector noted that on seven (7) occasions, survey results were not included on the attachments for experiments performed between September and December, 1984. The license indicated that the survey results being documented in this space on the sheet were not performed by the experimenters using portable instruments, but were in fact readings from an installed radiation monitor in the rabbit glovebox which were read out from the Control Room panel. The licensee also indicated that after the sample was sent into the glovebox the operator

checked the meter reading on the panel before signaling to the experimenter to enter the hot lab area. The inspector determined that the glovebox monitor was operating and had been calibrated and concluded this was an instance of poor documentation rather than failure to perform a survey. The licensee indicated their intention to revise the attachment sheet to make the line requiring survey information more prominent to improve record keeping. The licensee also indicated that they were planning to mount another read-out for the glovebox monitor near the entrance of the hot lab so the experimenter could verify radiation levels prior to entry.

Reports and Audits

The following records and audits were reviewed during the course of this inspection:

- Annual Report of Reactor Activities, June 30, 1983 - June 30, 1984
- 1984 ALARA Audit
- Reactor Safety Committee Meeting minutes for the following dates: April 20, 1984, May 17, 1984, September 27, 1984, November 8, 1984, and February 1, 1985.

The inspector noted that required audits and reports were being performed as required by the Technical Specifications.

No violations were noted in this area.

Exit Interview

The inspector met with licensee personnel denoted in Section 1.0 at the conclusion of the inspection on March 8, 1985. The scope and findings of the inspection were discussed at that time. At no time during this inspection was written material provided to the licensee by the inspector.