UNIVERSITY OF MARYLAND TRAINING REACTOR

License # R-70
Facility Docket # 50-166

ANNUAL OPERATING REPORT

for the period

July 1, 1995 - June 30, 1996

Department of Materials and Nuclear Engineering
University of Maryland
College Park, Md 20742-2115

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I. INTRODUCTION

The University of Maryland Training Reactor (MUTR) is an open-pool type, TRIGA fueled reactor. The core is cooled by natural convection of the pool water with auxiliary coolers provided for protection of filters and ion exchange equipment associated with the reactor support piping.

The MUTR is used for academic instruction and operator training, performing neutron and gamma irradiations, neutron activation analysis experiments, and tours and demonstrations for internal and outside groups. Operator training includes qualification training for student and staff operators as well as for visiting nuclear power plant trainees.

II. REACTOR USAGE

During the past year the MUTR operated a total of 82 runs, which can be organized into the following categories.

Operator training	11 runs
Tours, Labs & Demonstrations	11 runs
Calibration and Maintenance	11 runs
Nuclear Engineering Classes	41 runs
Irradiations and Activations*	8 runs

* Many of the Engineering classes involved activations and are not counted in the total runs under activations.

To perform these runs, the core produced 0.96 MWh, with a corresponding burn-up of 0.49 grams of uranium-235.

A substantial number of the runs were conducted for tours and demonstrations. These involved high school, university, and visiting University of Maryland students. Individual tours were also conducted. Many of these groups account for more than one visit, as it was common for a high school to return with groups from different classes.

III. SURVEILLANCE TESTS AND INSPECTIONS

All required surveillance tests and inspections were performed at the specified intervals.

The required surveillance items for this reporting period include:

WATER SAMPLE TESTS

AIR SAMPLE TESTS

RADIATION SURVEYS

POWER CALIBRATION

CONTROL ROD DROP TEST

RAM CALIBRATION

EXCESS REACTIVITY DETERMINATION

CONTROL ROD INSPECTION

CONTROL ROD CALIBRATION

EXTERNAL AUDIT

In addition to the above surveillance items, the following maintenance operations were performed on the indicated dates:

REPLACED ION EXCHANGER RESIN (Make-up water system)*	01/23/96

Most of the maintenance performed during this reporting period was routine consisting of fine tuning or adjusting of operating equipment. Various items from Section III of the report fall under the categories of Maintenance Operations Performed and Changes to the Facility. The above items accompanied with a "*" are considered maintenance operations. There were no changes to the facility for this reporting period.

No other major maintenance was performed during this reporting period.

IV. CHANGES TO THE FACILITY

There were no significant changes to the reactor or facility during this reporting period.

V. ENVIRONMENTAL SURVEYS OF SURROUNDING AREAS

Reactor surveys taken with portable beta/gamma detectors while at power indicate no changes in shielding requirements or a need to redesignate restricted areas.

All continuous monitoring for this year was accomplished using fixed mounted film badges throughout the interior of the reactor building itself. These fixed mounted film badges recorded the following exposures:

Monitor	Location	Dose
1	Control Room	<10 mrem
2	Pool Surface	370 mrem
3	Hot Room	240 mrem
4	Prep Room	20 mrem
5	S. Wall Upper	<10 mrem
6	S. Wall Lower	<10 mrem
7	E. Wall Lower	20 mrem
8	Pump Room	2460 mrem*
9	N. Wall Lower	60 mrem
10	W. Wall Lower	180 mrem

* Principally from PuBe sources in storage.

VI. RADIOACTIVE RELEASE AND DISCHARGE TO THE ENVIRONMENT

Two enclosures are included with this report. The first enclosure is the calculation for Ar-41 production (from the previous year's report), that provides a description of our approach for calculating airborne releases, the possible sources for Ar-41 at the facility, and the basis and assumptions for the calculation. The second enclosure contains the updated calculations for this reporting period. The total run time for this reporting period was 0.96 MW hours that yields a calculated total release of 0.649658 mCi of argon-41 at a maximum concentration of 8.7×10^{-11} µCi/ml of air.

The Reactor Storage Sump was not discharged during this reporting period.

VII. ALARA REVIEW FOR FACILITY PERSONNEL AND VISITOR EXPOSURE

A review of exposure records and all facility operations were performed by facility management as part of the annual ALARA audit.

For this reporting period, all badged facility personnel and students received less than 10 mrem.

The Pocket Dosimeters recorded minimal exposure for all guests and service personnel. Calibrations of these self-reading dosimeters were performed at six month intervals by the University of Maryland's Radiation Safety Office.

VIII. UNSCHEDULED REACTOR SHUTDOWNS/REPORTABLE OCCURRENCES

Four unscheduled shutdowns took place during the reporting period. The first three occured as follows:

Run number 3320	Feburary 14, 1996
Run number 3329	Feburary 28, 1996
Run number 3335	March 7, 1996

All three of these unscheduled shutdowns experienced fluctuation in the period meter resulting in a period scram. At the time, the cause was to belived to be spurious signals induced to the period meter circuitry. The ultimate cause was revealed when, in July 1996, high voltage power supply number 1 (HV1) failed completely, resulting in a loss of indications for the left side of the console (period meter included). Inspection of the power supply revealed several failed electronic components, probably the result of age. HV1 was repaired and placed back in service in August, 1996. Reactor operations have been resumed, and the period meter appears to function normally.

The fourth unscheduled shutdown occured during run number 3358, April 30, 1996. This was a result of loss of building power. Operations were resumed once power was restored. No action required.

IX. CHANGES IN THE FACILITY ORGANIZATION

No special experiments were performed during this reporting period.

During the reporting period, no individuals earned NRC licenses on the MUTR.

ENCLOSURE 1:

Ar-41 Production Calculation for Previous Reporting Period