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UNIVERSITY OF MARYLAND AT COLLEGE PARK

GLENN L. MARTIN INSTITUTE OF TECHNOLOGY • A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF MATERIALS AND NUCLEAR ENGINEERING • NUCLEAR ENGINEERING PROGRAM

September 15, 1997

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SUBJECT: ANNUAL REPORT

Enclosed is the Annual Report for the University of Maryland Training Reactor (MUTR) in accordance with requirements set forth in the Technical Specifications. This report covers the time period from July 1, 1996 to June 30, 1997.

Signature

Walter Chappas
Director
University of Maryland Training Reactor

cc: Dr. Aris Christou, Chairman
Department of Materials and Nuclear Engineering

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Reactor Files

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UNIVERSITY OF MARYLAND TRAINING REACTOR

**License # R-70
Facility Docket # 50-166**

ANNUAL OPERATING REPORT

for the period

July 1, 1996 - June 30, 1997

**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 62 runs (Run Numbers 3360 - 3421), which can be organized into the following categories:

Operator Training	12 runs
Tours, Labs & Demonstrations	5 runs
Calibration and Maintenance	15 runs
Nuclear Engineering Classes	28 runs
Irradiations and Activations*	2 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 0.59 MWh (kWh meter 153178 - 158248), with a corresponding burn-up of 0.30 grams of Uranium-235.

Five 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

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

REPLACED ION EXCHANGER RESIN (Primary water system) 04/15/97

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. 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:

<u>Monitor</u>	<u>Location</u>	<u>Dose (mrem)</u>
1	Control Room	<10 mrem
2	Pool Surface	180 mrem
3	Hot Room	510 mrem
4	Prep Room	20 mrem
5	S. Wall Upper	<10 mrem
6	S. Wall Lower	<10 mrem
7	E. Wall Lower	<10 mrem
8	Pump Room	2880 mrem*
9	N. Wall Lower	20 mrem
10	W. Wall Lower	10 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 0.59 MW hours that yields a calculated total release of 0.39 mCi of argon-41 at a maximum concentration of $5.3 \times 10^{-11} \mu\text{Ci/ml}$ 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

No unscheduled shutdowns took place during the reporting period.

IX. SPECIAL EXPERIMENTS

No special experiments were performed during this reporting period.

X. CHANGES IN FACILITY STAFF

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

COMPLY: V1.5d.

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40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH
THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS
FROM THE COMPLY CODE, VERSION 1.5d

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COMPLY: V1.5d.

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MUTR 1997 Annual Report Ar-41 Release Compliance

SCREENING LEVEL 1

DATA ENTERED:

Effluent concentration limits used.

DATA ENTERED FOR STACK 1:

Nuclide	CONCENTRATION (curies/cu m)
-----	-----
AR-41	1.82E-07

DATA ENTERED FOR STACK 2:

Nuclide	CONCENTRATION (curies/cu m)
-----	-----
AR-41	1.82E-07

NOTES:

Input parameters outside the "normal" range:

None.

RESULTS:

You are emitting 53.5 times the allowable amount
given in the concentration table.

*** Failed at level 1.

COMPLY: V1.5d.

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MUTR 1997 Annual Report Ar-41 Release Compliance

SCREENING LEVEL 2

DATA ENTERED:

RELEASE RATES FOR STACK 1.

Nuclide	Release Rate (curies/YEAR)
AR-41	1.550E-04

RELEASE RATES FOR STACK 2.

Nuclide	Release Rate (curies/YEAR)
AR-41	1.550E-04

SITE DATA FOR STACK 1.

Release height 7 meters.

Building height 11 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 7 meters.

Building width 15 meters.

SITE DATA FOR STACK 2.

Release height 7 meters.

Building height 11 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 7 meters.

Building width 15 meters.

Default mean wind speed used (2.0 m/sec).

COMPLY: V1.5d.

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NOTES:

Input parameters outside the "normal" range:

None.

RESULTS:

, Effective dose equivalent: 2.1E-04 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

***** END OF COMPLIANCE REPORT *****