



# UNIVERSITY OF MARYLAND AT COLLEGE PARK

DEPARTMENT OF MATERIALS AND NUCLEAR ENGINEERING  
NUCLEAR ENGINEERING

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## SUBJECT: ANNUAL REPORT

Enclosed is the Annual Report for the MUTR in accordance with requirements set forth in the Technical Specifications. This report covers the time period from July 1, 1991 to June 30, 1992.

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Reactor Files

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# **MARYLAND UNIVERSITY TRAINING REACTOR (MUTR)**

License # R-70  
Facility Docket # 50-166

## **ANNUAL OPERATING REPORT**

for the period

**July 1, 1991 - June 30, 1992**

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

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## I. INTRODUCTION

The Maryland University Training Reactor 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 154 runs, which can be broken down into the following categories.

Operator training	68 runs
Tours, Labs & Demonstrations	36 runs
Calibration and Maintenance	15 runs
Nuclear Engineering Classes	14 runs
Irradiations and Activations*	21 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 8.3 MWh, with a corresponding burn-up of 0.41 grams of Uranium-235.

Operator training was undertaken for facility operator qualification and visiting power plant trainees. Seven operators were granted licenses by the NRC; three being qualified as Reactor Operators, and two being upgraded to Senior Reactor Operator. As well, 2 were issued instant SRO certificates. Power plant trainees from the

Baltimore Gas and Electric Calvert Cliffs Plant also participated in several two week long training sessions to give them some operational reactor training time.

A substantial number of the runs were conducted for tours and demonstrations.

These involved high school, university, and visiting University of Maryland students. In these group tours a total of 616 students visited the MUTR. Individual tours were also conducted with a total of 69 students. The group tours that were given came from the following institutions:

DATE	ORGANIZATION	PEOPLE
7/29/91	National Science Foundation	16
8/10/91	English 393 Class	7
8/22/91	The Department of Defense	8
9/6/91	The Flaherty Family	5
9/9/91	The Department of Energy	9
10/7/91	National Institute of Standards and Technology	50
10/12/91	Northern Virginia Community College	24
11/21/91	Environmental Safety	4
11/25/91	Chemistry 403 Class	13
12/3/91	Nuclear Engineering 440 Lab	12
12/4/91	Georgetown Preparatory School	12

12/6/91	UMCP MaryPirg	6
1/31/92	William Virt Middle School	14
2/3/92	Nuclear Engineering 320 Lab	27
2/4/92	Westinghouse	3
2/19/92	ANS Second Look Fair	46
2/21/92	Middletown High School	27
2/21/92	Society of Women Engineers	28
	High School Conference	
3/2/92	Nuclear Engineers Class	12
3/4/92	Essex High School	21
3/6/92	Hannah Penn Middle School	21
3/6/92	Baltimore Gas and Electric Company	5
3/21/92	Boy Scouts of America	28
3/24/92	University College	5
3/27/92	Northern High School	33
3/31/92	UMCP Physical Plant	10
4/10/92	Lake Braddock High School	85
4/11/92	Society of Physics Students	12
4/15/92	Prince Georges Community College	22
4/29/92	West Nauttingham High School	15
6/9/92	Boy Scouts	9

6/26/92	High Point High School	4
7/1/92	Society of Hispanic Engineers	23

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

The following calibration and maintenance operations were performed on the indicated dates.

LINEAR POWER RECORDER CHECK & ROD POSITION INDICATOR	7/10/91
AT POWER SURVEY	quarterly
ALARM SYSTEM CHECK	triannually
POWER CALIBRATION	annually
REPLACED PARTICULATE FILTER *	9/25/91
REPLACED AIR PUMP TO DETECTOR CONDUIT	9/30/91
WATER SAMPLE TEST	monthly
RAM CALIBRATION	11/21/91
LOG PERCENT POWER BOARD REPAIRED *	11/25/91
DIGITAL FUEL TEMPERATURE METER INSTALLED **	2/14/92
FUEL ROD INSPECTION/CONTROL ROD REPLACEMENT	2/29/92
RADIATION SURVEY	3/16/92
CALIBRATED BULK WATER SENSOR *	3/18/92
CONTROL ROD WORTH CURVE DETERMINATION	3/23/92
ADJUSTED COMPENSATION VOLTAGE TO CIC *	3/19/92
CONTROL ROD INSPECTION	4/30/92
CONTROL ROD DROP TEST	4/30/92

REMOVED PARTICULATE FILTER FROM SYSTEM

7/18/92

REPLACED IT WITH A NEW SYSTEM \*

REPLACED B-3 PRESSURE REGULATOR ON MAKE UP

7/18/92

WATER SYSTEM WITH B-3M \*

REPLACED GLOBE VALVES ON SYSTEM WITH

7/18/92

1/4 TURN VALVE \*

GAUGES ADDED TO HIGH AND LOW SIDES OF

7/18/92

NEW WATER FILTER

Most of the maintenance performed during this reporting period were 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 and the above operations designated (\*\*) are considered changes to the facility.

No other major maintenance was performed during this reporting period.

All maintenance and Facility changes were performed in accordance with 10 CFR 50.59.

#### **IV. CHANGES TO THE FACILITY**

The most significant change to the reactor involved replacement of the lights over the reactor vessel. The reactor has been in use for two decades in its present configuration and some of the electric components are reaching the end-of-life.

New monitoring systems for the Bulk\In\Out Water system were purchased. Also ultrasonic level sensors for the bulk and sump systems were purchased. Work on the new mass flow system has begun. A digital fuel temperature meter was installed during this period. The pressure regulator valve on the make-up water system and a system stop valve for the city water feed were replaced.

All maintenance and facility changes were performed in accordance with 10 CFR 50.59.

## **V. ENVIRONMENTAL SURVEYS OF SURROUNDING AREAS**

Reactor surveys taken with portable neutron and 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 (reported under personnel exposure as internal building monitoring) was accomplished using fixed mounted film badges throughout the interior of the reactor building itself.

## **VI. RADIOACTIVE RELEASE AND DISCHARGE TO THE ENVIRONMENT**

**There were no airborne releases to the environs during this reporting period.**

**The Reactor Sump was dumped via the city sewer system after sampling under the supervision of the Radiation Safety Office showed that concentrations of dissolved and suspended radioisotopes were below MPC levels.**

## VII. FACILITY PERSONNEL AND VISITOR EXPOSURE SUMMARY

For this reporting period, all badged facility personnel and students received less than 10 mrem. The Reactor Building fixed mounted film badges recorded the following exposures:

<u>Monitor</u>	<u>Location</u>	<u>Dose</u>
1	Control Room	<10 mrem
2	Pool Surface	330 mrem
3	Hot Room	50 mrem
4	Prep Room	30 mrem
5	S. Wall Upper	<10 mrem
6	S. Wall Lower	<10 mrem
7	E. Wall Lower	<10 mrem
8	Pump Room	560 mrem
9	N. Wall Lower	60 mrem
10	W. Wall Lower	20 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 our Radiation Safety Department.

## **VIII. UNSCHEDULED REACTOR SHUTDOWNS/REPORTABLE OCCURRENCES**

**No Unscheduled Shutdowns or Reportable Occurrences took place during this reporting period.**

## **IX. CHANGES IN THE FACILITY ORGANIZATION**

**No special experiments were performed during this reporting period.**

**Dr. Walter J. Chappas replaced Dr. Munno as acting Reactor Director and was approved by the Reactor Safety Committee.**

**There are five new licensed operators qualified on the MUTR. Ed McCoy, Jason Floyd and Chris Jackson are qualified Reactor Operators. Vince Adams and Walter Chappas qualified as Senior Reactor Operators. Kendra Foltz and Mark Pella took the SRO upgrade exam and now are qualified as Senior Reactor Operators.**