December 19, 2002

Dr. John A. Bernard, Jr
Director of Reactor Operations
Massachusetts Institute of Technology
Research Reactor
MITNRL-NW12
138 Albany Street
Cambridge, MA 02139

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO. 50-20/2002-203

Dear Dr. Bernard:

This letter refers to the inspection conducted on November 4-5, 2002, at your MIT Research Reactor facility. The inspection reviewed the use of the new medical irradiation facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances of NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Programs
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-20

License No.: R-37

Enclosure: NRC Inspection Report No. 50-20/2002-203

cc w/enclosure: See next page

Massachusetts Institute of Technology

Docket No. 50-20

cc:

City Manager
City Hall
Cambridge, MA 02139

Department of Environmental Quality Engineering
100 Cambridge Street
Boston, MA 02202

Test, Research, and Training Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

December 19, 2002

Dr. John A. Bernard, Jr
Director of Reactor Operations
Massachusetts Institute of Technology
Research Reactor
MITNRL-NW12
138 Albany Street
Cambridge, MA 02139

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO. 50-20/2002-203

Dear Dr. Bernard:

This letter refers to the inspection conducted on November 4-5, 2002, at your MIT Research Reactor facility. The inspection reviewed the use of the new medical irradiation facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances of NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,
/RA/
Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Programs
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-20
License No.: R-37
Enclosure: NRC Inspection Report No. 50-20/2002-203
cc w/enclosure: See next page

Distribution

PUBLIC	RORP/R&TR r/f	AAdams	CBassett
WBeckner	LBerg	PDoyle	TDragoun
WEresian	FGillespie	SHolmes	DHughes
EHylton	PIsaac	PMadden	
MMendonca	BDavis (Ltr. Only O5-A4)		

NRR enforcement coordinator (Only for IRs with NOVs, O10-H14)

ACCESSION NO.: ML023510631 **TEMPLATE #: NRR-106**

OFFICE	RORP:RI	RORP:LA	RORP:SC
NAME	TDragoun:rdr	EHylton	PMadden
DATE	12/ 19 /2002	12/ 18 /2002	12/ 19 /2002

C = COVER **E = COVER & ENCLOSURE** **N = NO COPY**

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.:	50-20
License No.:	R-37
Report No.:	50-20/2002-203
Licensee:	Massachusetts Institute of Technology
Facility:	MIT Research Reactor
Location:	138 Albany Street Cambridge, MA
Date:	November 4-5, 2002
Inspector:	Thomas F. Dragoun
Approved by:	Patrick M. Madden, Section Chief Research and Test Reactors Section Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY
Massachusetts Institute of Technology
Report No.: 50-20/2002-203

The primary focus of this routine, announced inspection was the on-site review of the use of the new medical irradiation facility. This facility uses a fission converter (FC) to enhance the neutron beam flux available for the study of boron-neutron capture therapy (BNCT) for the treatment of cancer. The first use of this facility for irradiation of a human patient occurred on October 24, 2002. The second use occurred during this inspection.

The inspector reviewed the completed records related to the first irradiation and the in-process records for the second irradiation. Within the scope of this review, the facility was determined to be operated in accordance with the regulatory requirements.

REPORT DETAILS

Summary of Plant Status

The reactor was operated at various power levels to support patient irradiation and the measurement of boron levels in the blood using the prompt gamma facility. An adequate number of reactor operations, radiation protection, and hospital personnel were present to handle potential contingencies. The reactor instrumentation supervisor acted as overall coordinator, maintained the required check list, and obtained the required sign offs at the procedurally specified hold points.

1. Surveillance Operations

a. Inspection Scope (Inspection Procedure [IP] 61745)

The inspector reviewed the following procedures and records to ensure that the requirements in Technical Specifications (TS) Sections 6.5 and 6.6 were met:

- Document, "Written Directive Authorizing Delivery of BNCT", revision 4.31, dated October 23, 2002
- Procedure PM 3.16.3.1, "General Preparations of the FC Medical Therapy Facility for Human Use", dated October 22, 2002
- Procedure PM 3.16.3.2, "Conduct of Human Therapy Using the FC Medical Therapy Facility Beam", dated October 22, 2002, data for October 24, 2002
- Procedure PM 3.15.2, "Test of Fission Converter Scram and Trip Points", dated July 28, 2000
- Procedure PM 3.15.4, "Test of Fission Converter PLC Scrams" dated October 22, 2002
- Procedure PM 3.16.1.1, "Tests of Requirements for Fission Converter Facility Listed in MITR Technical Specification 6.5", dated October 23, 2002, data for October 24, 2002
- Procedure PM 3.16.1.3, "Source Check and Alarm Operability Test of the FC Medical Therapy Facility Radiation Monitor", dated October 22, 2002
- Procedure PM 3.16.1.4, "Surveillance Schedule for the FC Medical Therapy Facility Procedures", dated October 22, 2002
- Procedure PM 3.16.2.1, "Functional and Calibration Check of the FC Medical Therapy Room Beam Monitors", dated October 22, 2002
- Procedure PM 3.16.2.3, "Beam Monitor Plateau and Discriminator Setpoints", dated October 22, 2002
- Procedure PM 3.16.2.4, "Characterization of the FC Medical Therapy Beam", dated October 22, 2002
- MIT Safety Review Committee minutes of meeting for May 27, 1999 (Review and approval of the BNCT experiment)
- Safety Review 0-02-1, "PM 3.16 et. al., Procedures for BNCT Using the Fission Converter", dated October 22, 2002. This safety review included the documentation of reviews required by 10 CFR 50.59, 50.54(i-1), 50.54(p), and 50.54(q).

b. Observations and Findings

Control and implementation of safety precautions during the irradiation of patient # two was satisfactory. Records associated with the treatment of patient # one were complete and satisfactory.

The inspector noted that there were approximately 57 separate procedures associated with the use of the medical facility. Some of the procedures were new and specifically associated with the new FC facility. Some of the procedures were old and applied to the old medical treatment room located under the reactor. However, some of the old procedures were incorporated by reference into the use of the new facility. This made the verification of the implementation of TS requirements a complex task. In addition, the surveillance schedule had 23 line items with varying times for completion. The Director of Reactor Operations acknowledged this situation and stated that a "road map" would be developed linking the procedural and regulatory requirements. This matter will be reviewed in a future inspection.

c. Conclusions

Within the scope of this review, the new FC medical facility was operated in accordance with the regulatory requirements.

2. Exit Interview

The inspection scope and results were summarized on November 5, 2002, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Bernard, Director of Reactor Operations
R. Dresios, Radiation Protection Technician
O. Harling, Principal Investigator
E. Lau, Assistant Operations Superintendent
F. McWilliams, Reactor Radiation Protection Officer
S. Tucker, Quality Assurance Supervisor
G. Wallace, Instrumentation Supervisor

INSPECTION PROCEDURES USED

IP 61745 CLASS I NON-POWER REACTOR SURVEILLANCE

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

none

Closed

none

LIST OF ACRONYMS USED

BNCT	Boron Neutron Capture Therapy
CFR	Code of Federal Regulations
FC	Fission Converter
NRC	Nuclear Regulatory Commission
TS	Technical Specifications