

August 13, 2015

Mr. John P. Foster, (Interim) Director  
Nuclear Reactor Laboratory  
Massachusetts Institute of Technology  
Research Reactor  
MITNRL-NW 12  
138 Albany Street  
Cambridge, MA 02139

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY NUCLEAR REACTOR -  
ISSUANCE OF AMENDMENT NO. 40 REGARDING DIRECTOR OF REACTOR  
OPERATIONS QUALIFICATION REQUIREMENTS PER TECHNICAL  
SPECIFICATION 7.1.4.1 (TAC NO. MF6320)

Dear Mr. Foster:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 40 to Renewed Facility Operating License No. R-37 for the Massachusetts Institute of Technology Nuclear Reactor. The amendment consists of changes to the technical specifications (TSs) in response to your application dated May 28, 2015.

The amendment revises the qualification requirement for the Director of Operations as listed in TS 7.1.4.1.

A copy of our safety evaluation is also enclosed. If you have any questions, please contact me at (301) 415-3936.

Sincerely,

**/RA/**

Patrick G. Boyle, Project Manager  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-020

Enclosures:

1. Amendment No. 40 to R-37
2. Safety Evaluation

cc: w/enclosure: See next page

Massachusetts Institute of Technology

Docket No. 50-020

cc:

City Manager  
City Hall  
Cambridge, MA 02139

Department of Environmental Protection  
One Winter Street  
Boston, MA 02108

Beverly Anderson, Interim Director  
Radiation Control Program  
Department of Public Health  
Schrafft Center, Suite 1M2A  
529 Main Street  
Charlestown, MA 02129

John Giarrusso, Planning and Preparedness Division Chief  
Massachusetts Emergency Management Agency  
400 Worcester Road  
Framingham, MA 01702-5399

Test, Research and Training  
Reactor Newsletter  
P.O. Box 118300  
University of Florida  
Gainesville, FL 32611-8300

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RecordsAmend	NParker, NRR		

**ADAMS Accession No: ML15180A091**

**NRR-058**

OFFICE	DPR/PRLB/PM	DPR/PRLB/LA	OGC/NLO	DPR/PRLB/BC	DPR/PRLB/PM
NAME	PBoyle	ABaxter/NParker	GMizuno	AAdams (Pisaac for)	PBoyle
DATE	6/29/2015	7/13/2015	07/29/15	8/13/2015	8/13/2015

**OFFICIAL RECORD COPY**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DOCKET NO. 50-20

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 40  
Renewed License No. R-37

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the Massachusetts Institute of Technology Research Reactor, (the facility), Renewed Facility Operating License No R-37 filed by the Massachusetts Institute of Technology (the licensee), dated May 28, 2015, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements have been satisfied.
  - F. Prior notice of this amendment was not required by 10 CFR 2.105, "Notice of proposed action," and publication of notice for this amendment is not required by 10 CFR 2.106, "Notice of Issuance."

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2 of Renewed Facility Operating License No.R-37 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised from Amendment 38 through Amendment No. 40, are hereby incorporated in the license. The Massachusetts Institute of Technology shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA by Plsaac for/**

Alexander Adams, Jr., Chief  
Research and Test Reactors Licensing Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Operating License  
and Technical Specifications

Date of Issuance: August 13, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 40  
RENEWED FACILITY OPERATING LICENSE NO. R-37  
DOCKET NO. 50-20

Replace the following page of the Renewed Facility Operating License with the revised page. The revised page is identified by amendment number and contains a vertical line indicating the area of change.

Remove

3

Insert

3

ATTACHMENT TO LICENSE AMENDMENT NO. 40  
RENEWED FACILITY OPERATING LICENSE NO. R-37  
DOCKET NO. 50-20

Replace the following page of the Appendix A Technical Specification with the enclosed page. The revised page is identified by amendment number and contains a vertical line indicating the area of change.

Remove

7-6

Insert

7-6

3. Pursuant to the Act and 10 CFR Part 30, to receive, possess, and use:
  - a. a 150-curie antimony-beryllium sealed neutron source in connection with operation of the facility;
  - b. such byproduct material as may be produced by operation of the facility, which, except for byproduct material produced in non-fueled experiments, shall not be separated; and
  - c. byproduct materials activated in reactors other than the MIT reactor (for use in the reactor hot cells) that are in solid form and have atomic numbers 3 through 83. The total inventory of this byproduct material shall not exceed 100,000 curies at any one time. This material may be irradiated in the reactor.
- C. This renewed license shall be deemed to contain and is subject to the conditions specified in Parts 20, "Standards for Protection against Radiation," 30, 50, 51, 55, "Operators' Licenses," 70, and 73, "Physical Protection of Plants and Materials," of the Commission's regulations; is subject to all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

Maximum Power Level

1. The licensee is authorized to operate the reactor at steady-state power levels not to exceed 6.0 megawatts (thermal).

Technical Specifications

2. The Technical Specifications contained in Appendix A, as revised from Amendments 38 through 40, are hereby incorporated in the license. The Massachusetts Institute of Technology shall operate the facility in accordance with the Technical Specifications.

Additional Conditions

3. The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The approved physical security plan consists of a Massachusetts Institute of Technology Nuclear Reactor Laboratory document, withheld from public disclosure pursuant to 10 CFR 73.21, entitled, "Physical Security Plan for the M.I.T. Research Reactor Facility," dated July 22, 2013, as revised.

#### 7.1.4 Selection of Personnel

Minimum educational and/or experience requirements for those individuals who have line responsibility and/or authority for the safe operation of the facility are as follows:

1. Director of Reactor Operations - The Director of Reactor Operations shall have a minimum of seven years of nuclear experience. The individual shall have a recognized baccalaureate or higher degree in an engineering or scientific field. Education or experience that is job-related may be substituted for a degree on a case-by-case basis. The degree may fulfill four years of the seven years of nuclear experience required on a one-for-one time basis. At least three years of experience shall be in a responsible position in reactor operations or a related field including at least one year's experience in reactor facility management or supervision. The Director of Reactor Operations shall hold a senior operator's license for the MIT Research Reactor, or have held the equivalent at the MIT Research Reactor or another reactor facility. In the case of the latter, the individual shall receive facility-specific training, based on the individual's background and abilities.
2. Superintendent of Operations and Maintenance - The Superintendent of Operations and Maintenance shall have a minimum of five years of responsible reactor experience. A maximum of two years of experience may be fulfilled by academic or related technical training on a one-for-one basis. The Superintendent shall hold a senior operator's license for the MIT Research Reactor.
3. Reactor Radiation Protection Officer - The Reactor Radiation Protection Officer shall have a minimum of five years of experience in radiation protection including at least one year of experience at a nuclear reactor

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 40 TO

RENEWED FACILITY OPERATING LICENSE NO. R-37

MASSACHUSETTS INSTITUTE OF TECHNOLOGY REACTOR

DOCKET NO. 50-20

1.0 INTRODUCTION

By application dated May 28, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15159A403), the Massachusetts Institute of Technology (MIT, the licensee), requested changes to the technical specifications (TSs) for the Massachusetts Institute of Technology Reactor (MITR, the facility).

The proposed changes would revise the qualification requirements in TS 7.1.4.1 for the Director of Operations to allow the equivalent of a senior reactor operator's license at another facility as an alternative to holding a senior reactor operator's license for the MITR.

2.0 EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(5), "Administrative controls," includes, among other requirements, provisions related to the organization and management necessary to assure operation of the facility in a safe manner. NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content," provides guidance for creation of TSs in Appendix 14.1, "Format and Content of Technical Specification for Non-Power Reactors". Appendix 14.1 states that the Nuclear Regulatory Commission (NRC) accepts the position of the American Nuclear Standards Institute, Incorporated/American Nuclear Society (ANSI/ANS) Standard 15.1, "The Development of Technical Specifications for Research Reactors," as modified by Appendix 14.1. In Section 6, "Administrative Controls," Subsection 6.1.4, "Selection and Training of Personnel," of Appendix 14.1 of NUREG 1537, Part 1, which corresponds to the MITR Section 7.1.4, "Selection of Personnel," it states: "Compliance with 10 CFR Part 55 is required of the licensee and licensed operators, unless the NRC has issued an exemption. ANSI/ANS 15.4-1998 ["Selection and Training of Personnel for Research Reactors"] provides additional guidance for non-power reactors."

The licensee has requested a change to TS 7.1.4, "Selection of Personnel." TS 7.1.4.1 currently reads:

1. Director of Reactor Operations - The Director of Reactor Operations shall have a minimum of seven years of nuclear experience. The individual shall have a recognized baccalaureate or higher degree in an engineering or scientific field. Education or experience that is job-related may be substituted for a degree on a

case-by-case basis. The degree may fulfill four years of the seven years of nuclear experience required on a one-for-one time basis. At least three years of experience shall be in a responsible position in reactor operations or a related field including at least one year's experience in reactor facility management or supervision. The Director of Reactor Operations shall hold a senior operator's license for the MIT Research Reactor, or have held such a license at the MIT Research Reactor.

The licensee has proposed changing TS 7.1.4.1 to read as follows:

1. Director of Reactor Operations - The Director of Reactor Operations shall have a minimum of seven years of nuclear experience. The individual shall have a recognized baccalaureate or higher degree in an engineering or scientific field. Education or experience that is job-related may be substituted for a degree on a case-by-case basis. The degree may fulfill four years of the seven years of nuclear experience required on a one-for-one time basis. At least three years of experience shall be in a responsible position in reactor operations or a related field including at least one year's experience in reactor facility management or supervision. The Director of Reactor Operations shall hold a senior operator's license for the MIT Research Reactor, or have held the equivalent at the MIT Research Reactor or another reactor facility. In the case of the latter, the individual shall receive facility-specific training, based on the individual's background and abilities.

The proposed license amendment changes the requirement in TS 7.1.4.1 from "The Director of Operations shall hold a senior operator's license for the MIT Research Reactor or have held such a license at the MIT Research Reactor," to include additional language allowing for an equivalent senior reactor operator's license at another facility provided the individual receives "facility-specific training, based on the individual's background and abilities," at MITR.

The Director of Operations is considered to be a Level 2 position. ANSI/ANS 15.4 states: "At the time of appointment to the position, the Level 2 person shall have a minimum of six years nuclear experience." Also, "the individual shall receive appropriate facility-specific training based upon a comparison of the individual's background and abilities with the responsibilities and duties of the position. Because of the educational and experience requirements of the position, continued formal training may not be required. If this individual is also, to be licensed, the individual shall meet the licensing requirements of the respective position and responsible authority." ANSI/ANS 15.4 clearly implies some flexibility with the training and background requirements of the Level 2 position. Additionally, the licensee has added language to the TS requiring "appropriate facility-specific training," if that individual is not currently or had not been licensed at the MITR.

Based on our review, the NRC staff finds that the proposed TS requirements for the Director of Operations, adequately addresses technical background and facility knowledge requirements relevant to the position.

Also, the proposed revision to TS 7.1.4.1 is consistent with the guidance in ANSI/ANS 15.4, which has been accepted by the NRC staff as stated in NUREG-1537. Therefore the NRC staff

concludes that the proposed revision to the TS is acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATION

The amendment changes an administrative requirement in Section 7 of the TS. The NRC staff has determined that the amendment is confined to organizational and procedural matters. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(12)(i). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

### 4.0 CONCLUSION

The NRC staff has concluded, based on the considerations above, that (1) since the amendment changes an administrative requirement no significant hazards are involved, (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributor: Patrick. G. Boyle

Date: August 13, 2015