

July 5, 2017

Mr. Alberto Queirolo, Director
of Reactor Operations
Massachusetts Institute of Technology
Nuclear Reactor Laboratory
Research Reactor
138 Albany Street, MS NW12-116A
Cambridge, MA 02139

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY – REGULATORY AUDIT
FOR NUCLEAR SAFETY SYSTEM UPGRADE LICENSE AMENDMENT
REQUEST (TAC NO. MF5003)

Dear Mr. Queirolo:

By letter dated September 30, 2014, as supplemented by letter dated May 12, 2016 (Agencywide Documents Access and Management System Accession Nos. ML14282A039 and ML16139A786, respectively), Massachusetts Institute of Technology (MIT, the licensee) submitted an application to amend the MIT license (application) as part of the upgrade of the Nuclear Safety System (NSS) for the MIT Reactor (MITR).

The U.S. Nuclear Regulatory Commission (NRC) staff will conduct an onsite regulatory audit to review the MITR NSS upgrade application on July 24-26, 2017. The intent of the audit is to gain understanding of your application and status of your facility. In addition, the regulatory audit will identify information that will be required to be docketed in order to support the basis of the licensing decision and will allow the NRC staff to more efficiently gain insights on the MITR NSS custom built components. The NRC staff has provided a copy of the audit plan as an enclosure to this letter.

At the completion of the regulatory audit, a regulatory audit summary will be prepared and provided to MIT. MIT will have the opportunity to supplement the application to provide additional information or the option to withdraw the application.

We appreciate your support in providing space, the requested documentation and access to the necessary personnel and other materials that will assist in an efficiently conducted audit. Should you have any questions on this matter, please contact me at 301-415-3936 or by e-mail at Patrick.Boyle@nrc.gov.

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. 50-83

Enclosure:
As stated

cc: w/enclosure: See next page

Massachusetts Institute of Technology

Docket No. 50-83

cc:

City Manager
City Hall
Cambridge, MA 02139

Department of Environmental Protection
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Boston, MA 02108

Mr. Jack Priest, Director
Radiation Control Program
Department of Public Health
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Mr. John Giarrusso, Chief
Planning and Preparedness Division
Massachusetts Emergency Management Agency
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Test, Research and Training
Reactor Newsletter
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Gainesville, FL 32611-8300

Ms. Sarah M. Don, Reactor Superintendent
Massachusetts Institute of Technology
Nuclear Reactor Laboratory
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138 Albany Street, MS NW12-116B
Cambridge, MA 02139

SUBJECT: MASSACHUSETTS INSTITUTE OF TECHNOLOGY – REGULATORY AUDIT
FOR NUCLEAR SAFETY SYSTEM UPGRADE LICENSE AMENDMENT
REQUEST (TAC NO. MF5003) DATED: JULY 5, 2017

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ADAMS Accession No.: ML17177A189; *concurrent via e-mail

NRR-106

OFFICE	NRR/PRLB/PM*	NRR/PRLB/LA*	NRR/PRLB/BC	NRR/PRLB/PM
NAME	PBoyle	NParker	AAdams	PBoyle
DATE	06/28/2017	6/28/2017	06/28/2017	07/05/2017

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NUCLEAR REGULATORY COMMISSION
INSTRUMENTATION AND CONTROL BRANCH
REGULATORY AUDIT PLAN FOR
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
NUCLEAR SAFETY SYSTEM REPLACEMENT
JULY 24-26, 2017, CAMBRIDGE, MA

Background

The U.S. Nuclear Regulatory Commission (NRC) staff is currently engaged in a review of the Massachusetts Institute of Technology (MIT, the licensee) request to upgrade the reactor's Nuclear Safety System (NSS), portion of the Reactor Protection System. By letter dated September 30, 2014, as supplemented by letter dated May 12, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML14282A039 and ML16139A786, respectively), MIT submitted this request. The proposed upgrade of the NSS will replace the current six channels (three for reactor period and three for reactor power level, any one of which will trip the reactor). This regulatory audit is intended to assist NRC staff in confirming information submitted as part of the licensing amendment request.

Regulatory Audit Bases

The purpose of this audit is to determine if the development processes used, and the outputs of those processes have resulted in NSS' components for use at MIT reactor (MITR) that will meet applicable regulatory requirements, and address applicable criteria in Section 7.4, "Reactor Protection System," of draft NUREG-1537 Part 2. This audit will provide information necessary to complete the NRC staff's evaluation of the proposed NSS. In addition, the regulatory audit will identify information that will be required to be docketed in order to support the basis of the licensing decision and will allow NRC staff to more efficiently gain insights on the software development programs and processes.

To support this audit, NRC staff will visit MIT facility in Cambridge, MA.

Regulatory Audit Scope

As part of the audit, the NRC staff will review non-docketed procedures and records related to the design and development processes followed by MIT to develop its NSS components, as well as interview key MIT personnel. The NRC staff will be evaluating whether the results of these actions substantiate that processes described in the license amendment are being followed.

Information Necessary for the Regulatory Audit

MIT should be prepared to have the following information and personnel available to discuss:

- NSS components developed by MIT – discuss the design and/or modifications made by MIT to the NSS components (e.g., signal distribution module, scram logic cards, etc.)
- MIT development process – in order to gain an overview of the NSS logic and hardware development processes, NRC staff would like to review documentation from functional requirements through testing.

Enclosure

- NSS Software Quality – for this section of the audit, NRC staff will review the quality assurance process used during the NSS development process.
- Secure Development Environment – for this section of the audit, NRC staff will conduct interviews with personnel and observations of the development environment.
- Cyber Security – NRC contractor will review information necessary for addressing system and services controls as set forth in the licensee’s NRC-approved Cyber Security Plan.

NRC staff will use the open items list (ADAMS Accession No. ML17170A271) during the audit to discuss and close relevant items identified for discussion during the audit.

Team Assignments / Resource Estimates

The NRC staff performing this audit will be:

- Rossnyev Alvarado (Audit Leader)
- Duane Hardesty (Technical Reviewer)
- Norbert Carte (Technical Reviewer)
- Michael Waters (Training) {tentative}
- NRC Cybersecurity Contractor (Technical Reviewer)
- Michael Muhlheim (Observer, Oak Ridge National Laboratory)

Logistics

The audit will take place at MIT. The audit will start on the afternoon of July 24, 2017 (Monday) and conclude at noon on July 26, 2017 (Wednesday).

Deliverables

At the completion of the regulatory audit, NRC staff will prepare a regulatory audit report, which will be issued 30 days after the audit.

Audit Schedule

Monday, July 24, 2017

1:00 PM Arrive at MIT
1:30 PM Entrance meeting, introductions, and project status
2:30 PM Audit
5:00 PM End for the day

Tuesday, July 25, 2017

8:00 AM Meeting between staff and MIT to discuss logistics for the day
8:15 AM Resume Audit
12:00 PM Break for lunch
1:00 PM Resume Audit
5:00 PM End for the day

Wednesday, July 26, 2017

8:00 AM Resume Audit

11:30 AM Internal NRC Staff Meeting

12:00 PM Exit Meeting – Summary of audit, general overview of observations, and discussion of open items

12:30 PM Conclude Audit