

December 1, 2008

Dr. John A. Bernard, Jr.  
Director of Reactor Operations  
Massachusetts Institute of Technology  
Research Reactor  
MITNRL-NW 12  
138 Albany Street  
Cambridge, MA 02139

SUBJECT: NRC INSPECTION REPORT NO. 50-020/2008-203

Dear Dr. Bernard:

This letter refers to the inspection conducted on November 3 through 6, 2008, at your research reactor facility. The inspection included a review of activities authorized for your 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 concern or noncompliance with NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.390 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>.

If you have any questions concerning this inspection, please contact Marcus H. Voth at 301-415-1210.

Sincerely,

**/RA/**

Johnny H. Eads, Branch Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No.: 50-020  
License No.: R-37

Enclosure: NRC Inspection Report No. 50-020/2008-203

cc: See next page

Massachusetts Institute of Technology

Docket No. 50-20

cc:

City Manager  
City Hall  
Cambridge, MA 02139

Department of Environmental Protection  
One Winter Street  
Boston, MA 02108

Director  
Radiation Control Program  
Department of Public Health  
90 Washington Street  
Dorchester, MA 02121

Nuclear Preparedness Manager  
Massachusetts Emergency Management Agency  
400 Worcester Road  
Framingham, MA 01702-5399

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

December 1, 2008

Dr. John A. Bernard, Jr.  
Director of Reactor Operations  
Massachusetts Institute of Technology  
Research Reactor  
MITNRL-NW 12  
138 Albany Street  
Cambridge, MA 02139

SUBJECT: NRC INSPECTION REPORT NO. 50-020/2008-203

Dear Dr. Bernard:

This letter refers to the inspection conducted on November 3 through 6, 2008, at your research reactor facility. The inspection included a review of activities authorized for your 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 concern or noncompliance with NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.390 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>.

If you have any questions concerning this inspection, please contact Marcus H. Voth at 301-415-1210.

Sincerely,  
**/RA/**  
Johnny H. Eads, Branch Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No.: 50-020  
License No.: R-37  
Enclosure: NRC Inspection Report No. 50-020/2008-203

cc: See next page

**DISTRIBUTION:**

PUBLIC PRTB r/f RidsNrrDprPrtb RidsOgcMailCenter  
BDavis(Ltr only O13-B19) RidsNrrDprPrta AAdams

**ACCESSION NO.: ML083240145**

OFFICE	PRTB:RI	PRTB:LA	PRTB:BC
NAME	MVoth mhv	EBarnhill eeb	JEads jhe
DATE	11/18/2008	11/21/08	12/1/08

OFFICIAL RECORD COPY

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

Docket No.: 50-020

License No.: R-37

Report No.: 50-020/2008-203

Licensee: Massachusetts Institute of Technology (MIT)

Facility: MIT Research Reactor

Location: Cambridge, Massachusetts

Dates: November 3 through 6, 2008

Inspector: Marcus H. Voth

Approved by: Johnny H. Eads, Branch Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

Massachusetts Institute of Technology  
Research Reactor Facility  
NRC Inspection Report No.: 50-020/2008-203

The primary focus of this routine, announced operations inspection was the onsite review of selected aspects and activities at the Massachusetts Institute of Technology related to operation of the five megawatt Class 1 research reactor. It included a review of the licensee's safety programs including: review and audit and design change functions; experiments; procedures; radiation protection; effluent and environmental monitoring; transportation; and follow-up on a previous special inspection of a higher than expected exposure event. In each topical area that was inspected special emphasis was focused on recent changes and corrective actions to the higher than expected exposure event. The licensee's programs were found to be acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

### Review and Audit and Design Change Functions

- The inspector found the licensee's review and audit program and its design change evaluation program to be in compliance with the Technical Specifications and NRC regulations

### Experiments

- The observed conduct and control of experiments met the requirements of regulations, the MIT Technical Specifications, and the applicable facility procedures.

### Procedures

- Procedures were observed being properly prepared and implemented in compliance with license requirements.

### Radiation Protection

- Radiation protection practices were found to be in compliance with license and regulatory requirements.
- Significant enhancements had been implemented in the licensee's As Low As Reasonably Achievable (ALARA) program.

### Effluent and Environmental Monitoring

- Effluent release measurements and analyses and environmental monitor measurements showed compliance with regulatory requirements.

### Transportation

- The licensee shipped radioactive material in accordance with regulatory requirements.

Follow-up of Special Inspection 50-020/2007-203-01, Higher than Expected Exposure Event

- IFI 50-020/2007-203-01 was closed; Follow-up on the licensee's corrective actions that are yet to be taken in response to the higher than expected exposure event.
- IFI 50-020/2008-203-01 was opened; Track ALARA Committee action items remaining from the 2007 higher than expected exposure event.

## REPORT DETAILS

### Summary of Facility Status

The licensee's five megawatt Massachusetts Institute of Technology Reactor - II (MITR-II) routinely operated 24 hours a day, seven days a week, for three-month cycles in support of educational experiments, research and service irradiations, reactor operator training, and periodic equipment surveillances. At the end of each of the first two months of a cycle the reactor was shutdown for a short outage to perform surveillance testing. At the end of every third month the reactor was shut down for approximately a week for maintenance, refueling, and surveillance testing. During the inspection, the reactor was operating continuously.

### 1. Review and Audit and Design Change Functions

#### a. Inspection Scope (Inspection Procedure (IP) 69007)

To verify compliance with Sections 7.5.1, Safety in Reactor Operations, and 7.5.2, MIT Reactor Safeguards Committee (RSC), of the license's Technical Specifications (TS) and NRC regulation 10 CFR 50.59, the following documents were reviewed:

- Charter of the MIT Reactor Safeguards Committee, December 10, 1985
- Minutes of Ninety-Fifth MIT Reactor Safeguards Committee Meeting, June 6, 2007
- MIT Reactor Safeguards Committee Minutes of Committee Meeting # 96 held on December 14, 2007
- MIT Reactor Safeguards Committee Minutes of the 97<sup>th</sup> Committee Meeting held on June 16, 2008
- Minutes of the MIT Reactor Safeguards Committee Standing Subcommittee Meeting, October 23, 2007
- Minutes of the Standing Subcommittee of the MIT Reactor Safeguards Committee, July 17, 2008
- MIT Procedure Manual 1.10.2, MIT Reactor Safeguards Committee
- Procedure 1.18.1, Internal Audits, January 10, 1986
- Administrative Audit, Calendar Months of July, August, and September 2008
- Safety Review Form # E-08-1, Installation and Testing of New Blade Height Indicators, July 1, 2008
- Safety Review Form # O-07-1, Procedure 3.5, Daily Surveillance Check, March 7, 2007
- Safety Review Form # O-07-4, NTD Silicon Procedure for Radiation Guidelines, Unload, Load, and Cleaning Cans/Dummies, October 29, 2007
- Safety Review Form # O-08-1, Procedure 3.1.1.4, Two Loop Restart Incorporating Required Monthly Startup Surveillance, January 23, 2008
- Safety Review Form # O-08-2, NTD Silicon Procedures for Unload, Load, and Entering Silicon Cells, July 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. D, 6" Load Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. E, 6" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. C, 6" Unload Procedure, November 18, 2007

- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. D, 6" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. D, 4" Load Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. E, 4" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. C, 4" Unload Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. D, 4" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-7, Rev. C, Cleaning Empty Cans and Dummies, November 28, 2007
- MIT NRL Silicon Program Procedure 7.5.1-8, Rev. A, Entering Silicon Cells and Rescue, October 9, 2008

b. Observations and Findings

The inspector reviewed the RSC charter and minutes of the full committee and the standing subcommittee for the past year to verify compliance with TS requirements. Members were duly appointed and designated in writing, meeting the requirements for the disciplines stipulated in the TS. Meetings were well attended; requirements for quorums were met. Minutes indicated a thorough review of the material being reviewed. The frequency of meetings exceeded minimum requirements. The majority of material considered by the RSC during the past year was related to the higher than expected exposure event of 2007. As part of its safety oversight program the licensee performed internal and external audits of operations. The inspector reviewed the procedure and report of the past internal audit. The RSC appeared to be appropriately focused on performing both routine reviews and promptly attending to non-routine emerging issues.

The design change review function addressed the screening and safety review of changes, tests, or experiments to determine if pursuant to 10 CFR 50.59 a change required NRC prior approval or if it was within the umbrella of the existing Safety Analysis Report. The inspector found procedures in place to control such a review process and evidence of adherence to the procedures, most notable in response to the higher than expected exposure event. The inspector noted that while the regulation was being properly implemented, the implementing procedures contain nomenclature made obsolete by past changes to 10 CFR 50.59; the licensee noted that plans exist to update the procedures.

c. Conclusions

The inspector found the licensee's review and audit program and its design change evaluation program to be in compliance with the Technical Specifications and NRC regulations.

## 2. Experiments

### a. Inspection Scope (IP 69005)

To verify compliance with the licensee's procedures, TS Sections 6.1, General Experiment Criteria, 7.9, Experiment Approval Procedures, and 7.5.1, Safety in Reactor Operations, and 10 CFR 50.59, the inspector reviewed:

- Procedure 1.4, Review and Approval of Plans, Procedures, and Facility Equipment and Changes Thereto
- Safety Review Form # O-79-23, Procedure 1.4.1, Plans, Procedures, and Equipment Changes Classification, September 19, 1979
- Procedure 1.5, Procedure Adherence and Temporary Change Method, September 19, 1979
- MIT Procedure Manual 1.10, Experiment Review and Approval, September 19, 1979
- MIT Procedure Manual 1.10.2, MIT Reactor Safeguards Committee
- MIT Procedure Manual 1.10.3, MITR Operations
- MIT Procedure Manual 1.10.7, Records
- MIT Part I, Irradiation Request Form
- MIT Part II, Irradiation Information Form
- Safety Review Form # O-92-21, Irradiation Assisted Stress Corrosion Cracking (IASCC), November 24, 1992
- Safety Review Form # O-05-11, High Temperature Irradiation Facility (HTIF), July 12, 2005
- Safety Review Form # O-06-4, Advanced Clad Irradiator Loop, April 30, 2006
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. D, 6" Load Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. E, 6" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. C, 6" Unload Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. D, 6" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. D, 4" Load Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. E, 4" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. C, 4" Unload Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. D, 4" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-7, Rev. C, Cleaning Empty Cans and Dummies, November 28, 2007
- MIT NRL Silicon Program Procedure 7.5.1-8, Rev. A, Entering Silicon Cells and Rescue, October 9, 2008

b. Observations and Findings

The inspector reviewed the licensee's procedures governing the review and approval of experiments. A three step process existed. First, the sponsor submitted a safety review form for review by the RSC describing the experimental equipment, its operation, and safety considerations. Second, a Part I Irradiation Request Form was processed which approved a new experimenter to perform an approved experiment. Third, a Part II Irradiation Request Form was processed to approve a specific irradiation on a daily basis, identifying the individual experimenter, the quantity and type of material to be irradiated, the irradiation time, etc. Experiments were conducted using approved, written procedures. The inspector reviewed various examples of the procedures being properly reviewed and approved in accordance with license requirements, giving special emphasis on those recently processed as part of the response to the higher than expected exposure event.

c. Conclusions

The observed conduct and control of experiments met the requirements of regulations, the MIT Technical Specifications, and the applicable facility procedures.

**3. Procedures**

a. Inspection Scope (IP 69008)

To verify that the licensee was meeting the requirements of TS Section 7.8, Operating Procedures, the inspector reviewed selected aspects of:

- Procedure 1.4, Review and Approval of Plans, Procedures, and Facility Equipment and Changes Thereto
- Procedure 1.5, Procedure Adherence and Temporary Change Method, September 19, 1979
- Safety Review Form # O-79-23, Procedure 1.4.1, Plans, Procedures, and Equipment Changes Classification, September 19, 1979
- Safety Review Form # O-08-1, Procedure 3.1.1.4, Two Loop Restart Incorporating Required Monthly Startup Surveillance, January 23, 2008
- Safety Review Form # O-08-2, NTD Silicon Procedures for Unload, Load, and Entering Silicon Cells, July 9, 2008
- Safety Review Form # O-07-4, NTD Silicon Procedure for Radiation Guidelines, Unload, Load, and Cleaning Cans/Dummies, October 29, 2007
- Safety Review Form # O-07-1, Procedure 3.5, Daily Surveillance Check, March 7, 2007
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. D, 6" Load Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-1, Rev. E, 6" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. C, 6" Unload Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-2, Rev. D, 6" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. D, 4" Load Procedure, November 18, 2007

- MIT NRL Silicon Program Procedure 7.5.1-3, Rev. E, 4" Load Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. C, 4" Unload Procedure, November 18, 2007
- MIT NRL Silicon Program Procedure 7.5.1-4, Rev. D, 4" Unload Procedure, October 9, 2008
- MIT NRL Silicon Program Procedure 7.5.1-7, Rev. C, Cleaning Empty Cans and Dummies, November 28, 2007
- MIT NRL Silicon Program Procedure 7.5.1-8, Rev. A, Entering Silicon Cells and Rescue, October 9, 2008

b. Observations and Findings

Since the inspector had reviewed the licensee's system of preparing, maintaining, and utilizing written procedures in multiple previous inspections, this inspection was focused on verifying that the reviewed process continued to be properly implemented and that approved procedures were being followed, a problem identified in the special inspection report of the higher than expected exposure event. The inspector found that the procedures were being properly prepared, reviewed, and implemented, both regarding follow-up to the exposure event and for other facility activities. Management and supervisory oversight was focused on the proper implementation and adherence to procedures. The inspector observed that procedures were being followed.

c. Conclusions

Procedures were observed being properly prepared and implemented in compliance with license requirements.

#### 4. Radiation Protection

a. Inspection Scope (IP 69012)

To ensure that the licensee was following the requirements of TS Section 7.10, Radiation Protection Program, the inspector reviewed selected aspects of the following:

- NRC Special Inspection Report No. 50-020/2007-203, Higher than Expected Exposure Event, December 19, 2007
- Unusual Occurrence Report 2007-1, Abnormally High Exposure on Dosimetry Badges, May 23, 2008
- Superintendent of Reactor Operations ALARA Review Notebook, October 19, 2007 to October 24, 2008
- Action Item status matrix for issues related to the 2007 higher than expected exposure event
- Bulletin board ALARA display of cumulative dose received versus ALARA objectives, electronic dosimeter alarms, etc.
- Observations of facilities, equipment, operations, and postings during facility tour
- Quarterly Landauer dosimetry reports for 2007 and 2008

b. Observations and Findings

The inspector performed spot checks of routine radiation protection practices such as posting of areas, calibration of survey instruments, display of area radiation monitor levels throughout the facility, and radiation exposure to personnel. Special attention was focused on recent changes to the radiation protection program, in large part as a response to the higher than expected exposure event of 2007.

The inspector reviewed the licensee's in-depth internal report of the incident. Extensive analysis by the licensee, the dosimetry vendor, and outside consultants identified numerous lessons learned. Among them, it was determined that data from the four-part dosimeter was inconsistent with the dose an individual would receive (the shielded portions indicated greater exposure than the less-shielded portions), suggesting a significant exposure gradient existed across the four dosimeter sections. The gradient hypothesis was consistent with the individual's practice of wearing the dosimeter on a lanyard which suspended it close to the source being handled and was not indicative of the whole body exposure, a lesson in the proper dosimeter placement.

The licensee had made significant enhancements to the ALARA program. Regular meetings of the newly formed ALARA committee reviewed activities having potential for significant dose. Means of dose minimization were discussed, dose objectives were set for each activity, and personnel planned and integrated activities so as to minimize exposure. The committee maintained records of activities underway and responsible individuals. ALARA goals for each functional work group (operations, maintenance, radiation protection, silicon processing) were established at the beginning of 2008. Following high dose maintenance activities in the third quarter adjustments were made among work groups, keeping the facility total goal the same. All hands meetings and training sessions had focused on ALARA and a quiz had been added to the qualification requirements for radiation worker training.

Further discussion of the follow-up actions to the higher than planned exposure event can be found in Section 7 of this report.

c. Conclusions

Radiation protection practices were found to be in compliance with license and regulatory requirements. Significant enhancements had been implemented in the licensee's ALARA program.

**5. Effluent and Environmental Monitoring**

a. Inspection Scope (IP 69004)

The inspector interviewed licensee representatives and reviewed the following to verify compliance with the requirements pertaining to discharges from the facility and environmental surveys pursuant to TS 7.13.5.f and h:

- MIT Research Reactor Annual Report to the U.S. Nuclear Regulatory Commission for the Period July 1, 2007 to June 30, 2008, submitted August 27, 2008
- Facility records of measurements and analysis of effluent samples

b. Observations and Findings

The licensee submitted a timely written annual report to the NRC in accordance with TS 7.13.5 in which annual releases of gaseous, liquid and solid effluents were reported.

The only detectable gaseous release from the facility was Argon-41 from activated air which measured 31.4 percent of the 10 CFR Part 20 limit based on the authorized, conservative dilution factor of 3000. Using the COMPLY code at Level 5 for the same release indicated a much greater dilution factor and therefore a much smaller fraction of the release limit.

The licensee reported an annual liquid release of 34.5 millicurie of tritium, the predominant source being in the cooling tower blowdown to the sanitary sewer system. The concentration was below the 10 CFR 20.2003 limit with no credit for dilution due to other MIT waste streams.

Solid waste and tritiated liquid waste was shipped to an licensed, offsite disposal facility as discussed in Section 6 of this report. There were no investigative studies or human therapy exposures during the year to be reported pursuant to TS 7.13.5.i.

The licensee recorded data throughout the year from five radiation monitors mounted within a quarter mile of the reactor, finding that exposure to individuals in that area was approximately 0.3 millirem for the year, the predominant source being Argon-41.

c. Conclusions

Effluent release measurements and analyses and environmental monitor measurements showed compliance with regulatory requirements.

**6. Transportation**

a. Inspection Scope (IP 86740)

To verify compliance with regulatory requirements for shipping licensed radioactive material, the inspector reviewed the following:

- NRC Form 540, Uniform Low Level Radioactive Waste Manifest, May 20, 2008
- NRC Form 540, Uniform Low Level Radioactive Waste Manifest, May 28, 2008
- Gamma Spectrums for each of the drums in the above May 20, shipment
- Drum Certification and Closure Instruction Packet for 7A Containers, September 29, 2006
- MIT Procedure RRP-103, Rev. 0, Packaging of Radioactive Material and Waste, June 2007

b. Observations and Findings

The inspector reviewed shipping papers for two recent shipments of low level radioactive waste of reactor origin shipped to an out-of-state licensed disposal facility. The May 20, 2008, shipment referenced above consisted of a seavan containing 24 drums (55 gallon size) of Low Specific Activity (LSA) solid waste which was characterized with gamma spectrum analyses. The May 28, 2008, shipment consisted of 41 drums (85 gallon size) of tritiated water containing a total inventory of 1771 millicuries of radioactivity. Shipments

were performed using a recently prepared licensee procedure. The licensee reported that members of both the Reactor Operations staff and the Reactor Radiation Protection staff had received training on current regulations and procedures for the shipment of radioactive material.

c. Conclusions

The licensee shipped radioactive material in accordance with regulatory requirements.

**7. Follow-up Special Inspection 50-020/2007-203, Higher than Expected Exposure Event**

a. Inspection Scope (IP 92701)

To determine licensee actions in response to Inspector Follow-up Item, IFI 50-020/2007-203-01, Follow-up on the licensee's corrective actions that are yet to be taken in response to the higher than expected exposure event, as identified in NRC Special Inspection Report No. 50-020/2007-203 issued on December 19, 2007, the inspector reviewed:

- Unusual Occurrence Report 2007-1, Abnormally High Exposure on Dosimetry Badges, May 23, 2008
- Superintendent of Reactor Operations ALARA Review Notebook, October 19, 2007 to October 24, 2008
- Action Item status matrix for issues related to the 2007 high exposure event
- Bulletin board ALARA display of cumulative dose received versus ALARA objectives, electronic dosimeter alarms, etc.
- Observations of new facilities, equipment, operations, and postings during facility tour
- Memorandum on Formation of ALARA Committee, March 10, 2008

b. Observations and Findings

Note that this discussion builds on the observations and findings reported under the routine inspection of the licensee's Radiation Protection program addressed in Section 4 of this report.

IFI 50-020/2007-203-01 (cited above), Follow-up on the licensee's corrective actions yet to be taken in response to the incident, addressed seven major items with numerous sub-topics that the licensee had planned or in progress at the time of the special inspection. In the present inspection and a previous routine inspection conducted in May of 2008 the NRC inspector observed that numerous actions had been completed or implemented as on-going practices. To acknowledge the licensee's numerous pro-active follow-on measures to enhance safety and ALARA as a result of the findings of their internal analysis of the incident and the NRC Special Inspection Report, and to focus attention on the much smaller list of remaining action items, IFI 50-020/2007-203-01 was closed and replaced with IFI 50-020/2008-203-01, Track ALARA Committee action items remaining from the 2007 higher than expected exposure event. (IFI 50-020/2007-203-01 was closed. IFI 50-020/2008-203-01 was opened.)

c. Conclusions

IFI 50-020/2007-203-01 was closed; Follow-up on the licensee's corrective actions that are yet to be taken in response to the higher than expected exposure event. IFI 50-020/2008-203-01 was opened; Track ALARA Committee action items remaining from the 2007 higher than expected exposure event.

#### **8. Exit Briefing**

The inspection scope and results were summarized on November 6, 2008, with members of licensee management. The inspector described the areas inspected and discussed the preliminary inspection findings. The licensee did not state any dissenting opinions or identify any information to be withheld from public disclosure.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee:

J. Bernard	Director of Reactor Operations
L. DiBerardinis	Director of Environmental Health and Safety (EHS)
P. Drooff	Assistant Health Physicist
E. Lau	Superintendent for Reactor Operations
F. McWilliams	Reactor Radiation Protection Officer and Deputy Director, EHS
P. Menadier	Reactor Instrumentation Supervisor
T. Newton	Associate Director, Reactor Engineering
B. Rice	Reactor Radiation Protection Technician, EHS
S. Tucker	Quality Assurance Supervisor

## INSPECTION PROCEDURES USED

IP 69004	Class 1 Research and Test Reactor Effluent and Environmental Monitoring
IP 69005	Class 1 Research and Test Reactors Experiments
IP 69007	Class 1 Research and Test Reactors Review and Audit and Design Change Functions
IP 69008	Class 1 Research and Test Reactor Procedures
IP 69012	Class 1 Research and Test Reactor Radiation Protection
IP 86740	Transportation
IP 92701	Follow-up

## ITEMS OPENED, CLOSED, AND DISCUSSED

### OPENED:

50-020/2008-203-01	IFI	Track ALARA Committee action items remaining from the 2007 higher than expected exposure event.
--------------------	-----	---

### DISCUSSED without Closure:

None

### CLOSED:

50-020/2007-203-01	IFI	Follow-up on the licensee's corrective actions that are yet to be taken in response to the higher than expected exposure event.
--------------------	-----	---

## LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	<i>Code of Federal Regulations</i>

EHS	Environmental Health and Safety
IFI	Inspector Follow-up Item
IP	Inspection Procedure
LSA	Low Specific Activity
MIT	Massachusetts Institute of Technology
MITR	Massachusetts Institute of Technology Reactor
No.	Number
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
Rev.	Revision
RO	Reactor Operator
RSC	Reactor Safeguards Committee
TS	Technical Specification