MIT NUCLEAR REACTOR LABORATORY

AN MIT INTERDEPARTMENTAL CENTER

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April 29, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Room
Washington, DC 20555

Re: Massachusetts Institute of Technology; License No. R-37; Docket No. 50-20; Reportable Occurrence 50-20/2011-1: Operation without the Core Purge Blower; NRC OPS Center Log # 46-783

Dear Sir or Madam:

The Massachusetts institute of Technology hereby submits a report of an occurrence at the MIT Research Reactor (MITR) in accordance with paragraph 7.7.2 of the Technical Specifications. An initial report was made by telephone to the U.S. Nuclear Regulatory Commission Headquarters Operations Center on 25 April 2011.

The format and content of this report was based on Regulatory Guide 1.16, Revision 1.

1. Report No. 50-20/2011-1; Ops Center No. 46-783

2a. Report Date: 29 April 2011

2b. Date of Occurrence: 20 April 2011

3. Facility MIT Nuclear Reactor Laboratory

4. Identification of Occurrence:

For a period of 50 minutes the reactor was operated without the core purge blower. Technical Specification No. 3.3.2 requires that the reactor power be lowered to less than 100 kW if the air space above the core is isolated for more than five minutes. Isolation of this space occurs if the core purge blower is tripped on high radiation.

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5. Condition Prior to Occurrence:

The reactor was operating normally at 5.5 MW. The on-duty shift personnel (senior operator and operator on console) were conducting tests of an off-site reactor alarm system in accordance with an approved written procedure.

6. Description of Occurrence:

At 2230 the senior operator, who was stationed outside the reactor containment building for purposes of the test, directed that the console operator turn down the high level trip on the sewer monitor in order to generate a "High Radiation" alarm. This alarm is in turn transmitted off-site, and hence its receipt can be used to verify operability of the off-site alarm system. The sewer monitor is employed for this purpose because it is used very infrequently during the year. The operator inadvertently turned down the trip of the core purge radiation monitor instead of the sewer monitor. This generated a "Low Flow Core Purge" alarm and a "High Radiation Core Purge" alarm but not the intended "High Level Radiation" alarm. The console operator acknowledged these two alarms, but did not recognize that they were not the expected ones. The "High Radiation Core Purge" alarm was cleared by resetting its trip. However, the blower was not restarted. (Note: The "Low Flow Core Purge" alarm and "High Radiation Core Purge" alarm, although both associated with the core purge blower, are located in different sections of the reactor's three-part annunciator panel.) The senior operator assumed that the operator had turned down the sewer monitor's trip and that for some reason it had not generated the desired off-site alarm. Accordingly, the senior operator directed that the console operator use an area radiation monitor to generate the "High Level Radiation" alarm. The operator did so and acknowledged its alarm. This time, the off-site alarm was received. The operator then reset the trip of the area radiation monitor and cleared the "High Level Radiation" alarm. The senior operator continued with the rest of the procedure for testing the off-site alarms. At 2320, the procedure was completed. The senior operator returned to the control room, noted that the core purge blower was off, and restarted same.

7. Description of Apparent Cause of Occurrence

The immediate cause of this occurrence was human error. A related cause is that, while the core purge blower is equipped to alarm on low flow, there is no scram on a low flow core purge condition.

8. Analysis of Occurrence:

There was no abnormal release of radioactive particulates as a result of the core purge blower's being off. Determination of the possible H_2 concentrations in the air space above the core is currently pending.

9. Corrective Action:

Corrective action consists of the following:

a) Retraining of the on-duty console operator. (Action completed by 04/27/11.)

b) Installation of a scram function on the core purge blower. The system will now alarm (as it does now) on loss of flow. If flow is not restored within two minutes, a second alarm will occur. If flow remains off for an additional two minutes, a scram will occur. (Action completed by 04/27/11.)

10. Failure Data

None.

Sincerely,

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MIT Research Reactor

Edward S. Lau, NE
Superintendent for Operations & Maintenance
MIT Research Reactor

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Director of Reactor Operations
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cc: MITRSC

USNRC - Senior Project Manager
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

USNRC - Senior Reactor Inspector
Research and Test Reactors Branch B
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