



**NUCLEAR REACTOR LABORATORY**  
AN INTERDEPARTMENTAL CENTER OF  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



John A. Bernard  
Director of Reactor Operations

138 Albany Street, Cambridge, MA 02139-4296  
Telefax No. (617)253-7300  
Telephone No. (617)253-8333

Activation Analysis  
Coolant Chemistry  
Nuclear Medicine  
Reactor Engineering

June 16, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Subject: Reportable Occurrence 50-20/2005-1, Missed Daily Secondary Coolant Sample

Gentlemen:

The Massachusetts Institute of Technology hereby submits this ten-day report of an occurrence at the MIT Research Reactor (MITR) in accordance with paragraph 7.13.2(d) of the Technical Specifications. An initial report was made by telephone to Mr. Alexander Adams on 6 June 2005.

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

1. Report No.: 50-20/2005-1
- 2a. Report Date: 16 June 2005
- 2b. Date of Occurrence: 5 June 2005 (Identified 6 June 2005)
3. Facility: MIT Nuclear Reactor Laboratory  
138 Albany Street  
Cambridge, MA 02139

4. Identification of Occurrence:

Technical Specification 3.8.4(a) specifies that whenever the secondary cooling water is flowing through a D<sub>2</sub>O heat exchanger to the cooling towers, the secondary water shall be sampled daily for tritium content. On 5 June 2005, the cooling towers were on line, but no secondary water sample was collected. This omission was identified on the following day.

5. Conditions Prior to Occurrence:

The reactor had been operating normally.

IE22

6. Description of Occurrence:

PM 3.5, "Daily Surveillance Checklist", specifies that this sample be drawn in order to satisfy Technical Specification 3.8.4(a). The person performing the checklist is supposed to read each step, perform the step, and then initial the step to signify that the action has been completed. On 5 June 2005 this was not done. The individual who was performing PM 3.5 reached the step that directed sampling of the secondary water. He realized that he had forgotten to bring the sampling container with him. He should have returned for the sampling container, but instead continued with the checklist with the intent of drawing the sample later. He erred in signing off the requisite step, and then forgot to draw the sample.

When the matter was brought to the individual's attention, he readily acknowledged his omission and took full responsibility for it.

7. Description of Apparent Cause of Occurrence:

The cause of this occurrence was human error in that the proper procedure for performing a checklist was not followed.

8. Analysis of Occurrence:

Nothing of safety significance occurred. The purpose of Tech. Spec. 3.8.4(a) is to ensure that any leakage of tritiated heavy water into the cooling tower (secondary) water is detected. The cooling tower samples taken both the day before and the day after showed no tritium to be present. Also, redundant online water monitors, which sample continuously for the short-lived gamma and high-energy beta activity that is present when the reactor is operating at or near full power, would have detected any leakage from the heavy water systems.

The other issue raised by this occurrence is the proper performance of checklists. This issue was investigated and it was determined that, as far as the individual involved in this occurrence was concerned, the error was a one-time event. The proper performance of the checklist by other members of the staff was also reviewed. No incidents similar to the one reported here were identified. However, suggestions were received regarding ways to improve checklist performance. For example, the step in PM 3.5 that calls for sampling of the secondary water for tritium is to be done on weekdays by radiation protection personnel and on weekends by Reactor Operations personnel. This split of responsibility was cited as possibly a potential source of future confusion. This finding remains under review.

9. Corrective Action:

- a) The individual involved was suspended from licensed duties pending retraining. This was completed on June 15, 2005.
- b) All licensed and all non-licensed individuals who have responsibilities for checklists were briefed on this occurrence and all signed a set of memoranda indicating that they understood the proper protocol for performing checklists. This was completed on June 15, 2005.
- c) Review of PM 3.5 to clarify performance requirements. Action to be completed by July 29, 2005.

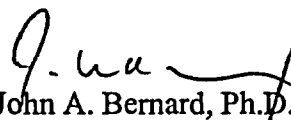
10. Failure Data:

None.

Sincerely,



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



John A. Bernard, Ph.D.  
Director of Reactor Operations  
MIT Nuclear Reactor Laboratory

JAB/koc

cc: MITRSC

USNRC - Senior Reactor Inspector,  
Research and Test Reactors Section  
New, Research and Test Reactors Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

USNRC - Senior Project Manager,  
Research and Test Reactors Section as above