

January 7, 2010

Dr. Robert Dimeo, Director
NIST Center for Neutron Research
National Institute of Standards and Technology
U.S. Department of Commerce
100 Bureau Drive, Mail Stop 8561
Gaithersburg, MD 20899-8561

SUBJECT: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY - NRC
ROUTINE INSPECTION REPORT NO. 50-184/2009-204

Dear Dr. Dimeo:

On December 7-9, 2009, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at NIST Center for Neutron Research. The inspection included a review of activities authorized for your facility. The enclosed report documents the inspection results, which were discussed on December 9, 2009, with members of your staff.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. 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 Title 10 of the *Code of Federal Regulations* Part 2.390 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 (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Patrick Isaac at 301-415-1019 or by electronic mail at Patrick.Isaac@nrc.gov.

Sincerely,

/RA/

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

Docket No. 50-184
License No. TR-5

Enclosure: As stated
cc w/encl: See next page

National Institute of Standards and Technology
cc:

Docket No. 50-184

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Director, Department of Natural Resources
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Dr. Wade Richards, Manager of Operations
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Gaithersburg, MD 20899-8561

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

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

Docket No: 50-184

License No: TR-5

Report No: 50-184/2009-204

Licensee: National Institute of Standards and Technology (NIST)

Facility: National Bureau of Standards Reactor (NBSR)

Location: Gaithersburg, MD

Dates: December 07-09, 2009

Inspector: Patrick J. Isaac

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

EXECUTIVE SUMMARY

National Institute of Standards and Technology
National Bureau of Standards Reactor
NRC Inspection Report No. 50-184/2009-204

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the National Institute of Standards and Technology (the licensee's) Class I research reactor facility safety programs including operator licenses, requalification, and medical examinations, experiments, organization and operations and maintenance activities, reactor procedures, fuel movement, surveillance, and emergency preparedness. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with U. S. Nuclear Regulatory Commission requirements.

Organization and Operations and Maintenance Activities

- The reactor appeared to be well maintained and the organizational structure was consistent with technical specification (TS) requirements. Staffing levels were adequate for current level of operations.

Experiments

- Experiments were being reviewed and performed in accordance with TS requirements and the licensee's written procedures.

Procedures

- Written procedures were being maintained in accordance with TS requirements. The procedure change process satisfied TS and procedural requirements.

Surveillance

- Surveillance practices were being maintained in accordance with TS requirements.

Operator Licenses, Requalification, and Medical Examinations

- The licensee was conducting the reactor operator requalification program in accordance with procedural and regulatory requirements.

REPORT DETAILS

Summary of Facility Status

The National Institute of Standards and Technology (NIST, the licensee) Center for Neutron Research (NCNR) Test Reactor, a 20-megawatt test reactor commonly known as the National Bureau of Standards Reactor (NBSR), continued to be operated in support of laboratory experiments and various types of research. During the inspection, the reactor was operated continuously on a 24-hour per day basis.

1. Organization and Operations and Maintenance Activities

a. Inspection Scope (Inspection Procedure (IP) 69006)

The inspector reviewed the following regarding the licensee's organization and staffing to verify that the requirements of technical specifications (TS) were being met:

- Reactor Shift Supervisor Logbook # 36, July 31, 2009 to present
- Reactor Console Logbook # 133, July 4, 2009 to October 11, 2009
- Reactor Console Logbook # 134 October 11, 2009 to present
- NBSR Administrative Rule (A.R.) 9.0, Reactor Startup and Operation, July 30, 2009
- Red Tag Logbook, July 30, 2009 to present
- NBSR Administrative Rule (A.R.) 2.0, Personnel Requirements, July 30, 2009
- NBSR A.R. 1.0, Responsibilities of Operations Personnel, July 30, 2009
- NBSR Annual report dated March, 2009

b. Observations and Findings

The inspector observed a shift turnover on December 8, 2009. A review of the reactor console logbook demonstrated that operations crew met the minimum staffing requirements of TS Section 6.1.3. The licensee recorded maintenance required by TS in the Reactor Operations Daily File. The inspector observed the performance of procedure 4.7.1 (4) (a), Area Radiation Monitor Monthly Test. In all the records that the inspector reviewed, no indication was found that maintenance was not performed in a timely and appropriate manner.

c. Conclusions

Staffing levels were adequate for current level of operations. The reactor appeared to be well maintained, consistent with TS requirements, and operated with sufficient staffing of qualified operators.

2. Experiments

a. Inspection Scope (IP 69005)

The inspector reviewed the following to ensure that the requirements of TS Section 4.8, Experiments, and TS Section 6.5, Experiment Review and Approval, were being met:

- NCNR Safety Evaluation Committee Meeting Minutes No. 367, July 6, 2009
- Draft Safety Committee Meeting Minutes No. 368
- Experimental Proposal Approval Sheet, dated November 3, 2009
- Approval Procedure for Experimental Proposals
- NBSR Irradiation Request/Proposal

b. Observations and Findings

The majority of experimental activity is related to that which involves use of the neutron beams. Pneumatic samples were the primary form of in-reactor experiments. The inspector observed control room operators discuss pneumatic samples for irradiation on December 8, 2009 and verifying that the irradiation requests were within established limits. The inspector interviewed the chairman of the NCNR Safety Evaluation Committee and the Beam Experiment Subcommittee and discussed how workers are protected from the neutron beam.

c. Conclusions

Experiments were being reviewed and performed in accordance with TS requirements and the licensee's written procedures.

3. Procedures

a. Inspection Scope (IP 69008)

The inspector reviewed the following to ensure that the requirements of TS Section 6.4, Procedures, were being met:

- NBSR Administrative Rule 9.0, Reactor Startup and Operation, July 30, 2009
- NBSR Administrative Rule 2.0, Personnel Requirements, July 30, 2009
- Emergency Instructions for the NBSR, November 15, 2008
- Operating and Refueling Procedures

b. Observations and Findings

Officially approved copies of procedures were maintained in the Control Room. The inspector reviewed samples of the licensee's written procedures and

revisions to procedures. Written procedures existed for for each of the categories stipulated in TS 6.4, Procedures. Changes to existing procedures were observed to have been reviewed in accordance with Procedure Administrative Rule 5.0, Procedures and Manuals, and TS.

c. Conclusions

Written procedures were being maintained in accordance with TS requirements. The procedure change process satisfied TS and procedural requirements.

4. Surveillance

a. Inspection Scope (IP 69010)

The inspector reviewed the following to ensure that the requirements of TS Section 4.0, Surveillance Requirements, were being met concerning surveillances:

- TS Surveillance Schedule, December 2009
- TS Surveillance Schedule, November 2009
- TS Surveillance Schedule August 2009
- TSP (Technical Specification Procedure) 4.5.2, November 15, 2009
- TSP 4.7.1(2)(a), Operability Check of the Fission Product Monitor, July 2, 2009
- TSP 4.5(2) Operability Check of Controls in the Emergency Control Station, July 2, 2009
- Reactor Console Logbook # 133, July 4, 2009 to October 11, 2009
- Reactor Console Logbook # 134 October 11, 2009 to present
- Reactor Shift Supervisor Logbooks, July 31, 2009 through November 20, 2009

b. Observations and Findings

The inspector conducted a random sample of four surveillances to verify that they were performed in accordance with the requirements in the TS and at the required frequency. All surveillances and Limiting Conditions for Operation (LCO) reviewed were completed on schedule as required by TS 4.0, Surveillance Requirements and in accordance with licensee procedures.

c. Conclusions

Surveillance practices were being maintained in accordance with TS requirements

5. Operator Licenses, Requalification, and Medical Examinations

a. Inspection Scope (IP 69003)

The following documents were review to verify that the licensee was in compliance with the facility requalification program and 10 CFR Part 55:

- Reactor Operator Requalification Program for NBSR, March 2009
- Operator License Requalification Files
- Operator Evaluations, Period 2009
- NBSR Requalification Examinations, January to March 2008
- Requalification Program Document Review and Reactivity Changes, Requalification Period 2009
- Medical History and Examination Form, Period 2009
- Certification of Medical Examination by Facility Licensee

b. Observations and Findings

The inspector reviewed the operator requalification program, particularly the individual operator history files, operator evaluations performed in 2009, and the written requalification examination administered in early 2008. The inspector considered the written examination to be of similar difficulty to an NRC-administered examination. Files for operators were selected at random and examined in depth. Medical examiners used ANS/ANSI 15.4-2004, Selection and Training for Research Reactor Personnel, as a basis for their evaluations. Records indicated that each operator reviewed key procedures and additional information specified by the requalification program.

c. Conclusions

The licensee was conducting the reactor operator requalification program in accordance with procedural and regulatory requirements.

6. Exit Interview

The inspection scope and results were summarized on December 9, 2009, with members of licensee management. The inspector described the areas inspected and discussed the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. Downing	Chair NCNR Safety Evaluation Committee
T. Myers	Chief, Reactor Operations
W. Richards	Chief of Operations and Engineering

INSPECTION PROCEDURES USED

IP 69003	Class 1 Research and Test Reactor Operator Licenses, Requalification, and Medical Examinations
IP 69005	Class 1 Research and Test Reactor Experiments
IP 69006	Class 1 Research and Test Reactor Organization and Operations and Maintenance Activities
IP 69008	Class 1 Research and Test Reactor Procedures
IP 69010	Class 1 Research and Test Reactor Surveillance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Discussed

None

Closed

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Document Access Management System
CFR	<i>Code of Federal Regulations</i>
HP	Health Physicist
IP	Inspection Procedure
NBSR	National Bureau of Standards Reactor
NCNR	NIST Center for Neutron Research
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
Rev.	Revision
TS	Technical Specification