

April 11, 2006

Dr. Patrick D. Gallagher, Director  
NIST Center for Neutron Research  
National Institute of Standards and Technology  
U. S. Department of Commerce  
Gaithersburg, MD 20899

SUBJECT: NRC ANNOUNCED INSPECTION REPORT NO. 50-184/2006-201

Dear Dr. Gallagher:

This letter refers to the inspection conducted on February 6 - 10, 2006 at your National Bureau of Standards Reactor. 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 concerns or noncompliance with NRC requirements were 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>.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun in King of Prussia, PA at 610-337-5373.

Sincerely,

Brian E. Thomas, Acting Branch Chief /**RA by**  
**Marvin Mendonca for/**  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-184  
License No. TR-5  
Enclosure: NRC Inspection Report No. 50-184/2006-201  
cc w/enclosure: See next page

April 11, 2006

Dr. Patrick D. Gallagher, Director  
NIST Center for Neutron Research  
National Institute of Standards and Technology  
U. S. Department of Commerce  
Gaithersburg, MD 20899

SUBJECT: NRC ANNOUNCED INSPECTION REPORT NO. 50-184/2006-201

Dear Dr. Gallagher:

This letter refers to the inspection conducted on February 6 - 10, 2006 at your National Bureau of Standards Reactor. 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 concerns or noncompliance with NRC requirements were 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>.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun in King of Prussia, PA at 610-337-5373.

Sincerely,

Brian E. Thomas, Acting Branch Chief /**RA by**  
**Marvin Mendonca for/**  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-184  
License No. TR-5  
Enclosure: NRC Inspection Report No. 50-184/2006-201  
cc w/enclosure: See next page

**Distribution**

PUBLIC	R&TR r/f	AAdams	CBassett	Plsaac
MMendonca	PDoyle	TDragoun	DHughes	EHylton

BDavis (cover letter only)(O5-A4)  
NRR enforcement coordinator (Only IRs with NOV's, O10-H14)

**ACCESSION NO.: ML060890485**

**TEMPLATE #: NRR-106**

PUBLIC	NON PUBLIC	SENSITIVE	NON SENSITIVE	
OFFICE	R&TR:RI	R&TR:PM	R&TR:LA	R&TR:SC
NAME	MMendonca for/TDragoun:tls*	MMendonca:tls*	EHylton*	MMendonca forBThomas:tls*
DATE	3/30/2006	3/31/2006	4/4/2006	4/11/2006

OFFICIAL RECORD COPY

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

Docket No: 50-184

License No: TR-5

Report No: 50-184/2006-201

Licensee: U. S. Department of Commerce

Facility: National Bureau of Standards Reactor

Location: National Institute of Standards and Technology (NIST)  
NIST Center for Neutron Research  
Gaithersburg, Maryland 20899

Dates: February 6 - 10, 2006

Inspector: Thomas Dragoun

Approved by: Brian E. Thomas, Branch Chief  
Research and Test Reactors Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

NIST Center for Neutron Research  
National Bureau of Standards Reactor  
Report No. : 50-184/2006-201

This announced inspection included onsite review of selected activities including: fuel movement, routine surveillance on safety equipment, reactor operator requalification program, and change control.

The license programs were acceptably directed toward the protection of public health and safety, worker health and safety, and in compliance with NRC requirements.

### Fuel Movement

Fuel movement was conducted in accordance with Technical Specification and procedural requirements.

### Change Control

The licensee's revised policy for processing engineering change notices acceptably satisfied the regulatory requirements.

### Operator Requalification

Operator requalification was conducted in accordance with the requirements.

### Surveillance

The surveillance program satisfied Technical Specification requirements.

## Report Details

### Summary of Plant Status

The reactor had been shut down in anticipation of the routine addition of three new fuel elements to the core, a shuffle of all elements, and removal of three spent elements. The reactor was restarted during this inspection.

#### **1. Fuel Handling**

##### a. Inspection Scope (Inspection Procedures (IP) 69009)

The inspector observed fuel handling at the spent fuel pool and reactor top areas. The inspector also reviewed selected records and procedures to verify that fuel handling was in compliance with TS Section 3.7 "Fuel Handling and Storage" and Section 3.8 "Fuel Handling Within Reactor Vessel" as follows;

- 10 CFR 50.54(m)(1)
- ANSI Standard -15.1 Section 6.1.3(3)(b)
- personnel qualifications
- supervisory oversight
- recordkeeping
- radiological controls
- NIST Procedure O.I. 6.1 "Fueling and Defueling Procedures" issued August 20, 1997 with minor changes dated July 23, 1999, and March 17, 1998
- NIST Procedure O.I. 6.2 "Operation of the Fuel Transfer System" issued January 14, 2005
- tour of the new fuel storage location and discussion of the receipt process

##### b. Observations and Findings

The inspector noted that the licensee's procedural controls for fuel movement do not specifically require a licensed reactor operator to be present at the reactor top or spent fuel pool. A review of recommendations in the consensus standard ANSI 15.1 and NRC requirements do not specifically require that fuel movement be directly controlled or accomplished by a licensed reactor operator. NRC regulations in 10 CFR 50.54(m)(1) state that a licensed SRO shall be present at the facility...(during) refueling. General practice at research reactors goes beyond this basic requirement and often requires a licensed SRO be in charge and coordinate the movement of fuel. The inspector noted that other practices were incorporated into the fuel movement at this facility as well as use of senior licensed operators coordinated by a supervisor in the control room. The Director stated that as part of his review of programs after his recent appointment, the procedural requirements for fuel handling will be reviewed for incorporation of safety enhancements.

The radiological controls employed at the spent fuel pool and reactor top were appropriate for the radiological conditions.

The identification numbers on each fuel element entering the spent fuel pool were read and confirmed by two licensed operators and entered into the log. The procedures for the work activities at the pool and reactor top were available and in use by the staff.

The duty reactor operator at the reactor control console was clearly in charge and granted approval for each movement of fuel and maintained a record of the location of each element. Communications between the control room and the work stations was clear and required a repeat-back for each verbal instruction. The inspector reviewed selected records dated December 2, 2005, for the last refueling, including the "to - from" location of fuel, results of the verification that elements were latched in place, and results of reactor coolant flow checks. Records and results were satisfactory.

c. Conclusions

Fuel handling was conducted in accordance with TS and procedural requirements.

**2. Change Control**

a. Inspection Scope (IP 69007)

The inspector reviewed the following information to determine if the licensee's recently revised approach to the review and approval of changes to equipment, procedures, tests, and experiments satisfied NRC requirements in 10 CFR 50.59 and TS Section 7.2 "Safety Evaluation Committee":

- Engineering Change Notice (ECN) No. 473 "Adding Domestic Water Header to Existing Experimental Chilled Water Header" revision 0, dated December 7, 2005. Assigned to "level 1" by new procedure and does not require a 50.59 screening.
- ECN No. 469 "Fuel Storage Pool (HE-8) Heat Exchanger Upgrade" dated October 21, 2004
- ECN No. 479 "Install a D2O Tipped Rabbit Facility in RT-2 that Mimics the Parameters of RT-4" revision 1, dated January 3, 2006
- Document No. NBSR-DOC-0004-00 "NCNR Reactor Safety Evaluation Committee Charter" dated April 4, 2005
- Document No. NBSR-00003-DOC-00 "Guidelines for Completing Engineering Change Notices" dated April 1, 2005

b. Observations and Findings

The inspector reviewed a new draft policy for processing of ECNs through discussions with the Acting Chief of Reactor Engineering and the Reactor Operations Manager. The draft policy was comprehensive and incorporated many NIST financial and purchase specification requirements along with the technical reviews of the purchased goods and services. The licensee motivation for the development of this draft policy was a large engineering contract that was awarded for engineering services for the next five years. In addition to policy making, the engineering chief position was refilled six months earlier and the Reactor Operations Manager was assigned to the completion of the "screening" as specified in 10 CFR 50.59.

c. Conclusions

The licensee's revised policy for processing engineering change notices acceptably satisfied the regulatory requirements.

**3. Operator Requalification**

a. Inspection Scope (IP 69003)

The inspector reviewed the following to verify compliance with the requirements in 10 CFR Part 55:

- "Reactor Operator Requalification Program for the National Bureau of Standards Reactor" revision 2, dated April 24, 1975
- NRC Approval of the Requalification Program by letter dated September 12, 1977
- Lesson outlines for four training sessions as follows: nucleonics fundamentals, operator responsibilities, common formulas, and health physics topics
- requalification status for four licensed reactor operators including NRC license renewal date, annual operating evaluation, written exam scores, and medical evaluation.

b. Observation and Findings

The end of a biennial requalification cycle was nearly complete at the time of this inspection. Medical evaluation of the operators were conducted as required. The subject matter quizzes were technically challenging. Logs showed that operators reviewed procedure changes and participated in emergency drills as required.

c. Conclusion

Operator requalification was conducted in accordance with the requirements.

**4. Surveillances**

a. Inspection Scope (IP 69010)

The inspector reviewed the following to ensure that the safety settings and periodic surveillances on safety systems were performed on schedule and results were acceptable:

- TS Procedure 5.1.1, Channel Test of Confinement Closure System Using Each of the Four Signals, issued July 24, 2004
- TS Procedure 5.1.1A, Channel Test of Confinement Closure System Using External Source, issued December 11, 1998
- TS Procedure 5.1.2, Integrated Leak Test of Confinement Building, issued July 23, 1999. Data for April 20 and August 14, 2005
- TS Procedure 5.2.2, Testing of Primary System Relief Valve, issued April 19, 1991
- TS Procedure 5.3.1, Determining Reactivity Worth of Each Shim Arm and Regulating Rod, issued November 16, 2005. Data for October 11, 2005
- TS Procedure 5.3.2, Withdrawal and Insertion Speed of Each Shim Arm and Regulating Rod, issued September 20, 2004. Data for August 11, 2005 and January 31, 2006
- TS Procedure 5.3.3, Scram Time for First 5 Degrees of Each Shim Arm Drive, issued September 20, 2004. Data for August 11, 2005 and January 31, 2006
- TS Procedure 5.3.4, Quarterly Operability Test of Reactor Safety System Channels, issued July 4, 2004. Data for April 27 and August 17, 2005
- TS Procedure 5.3.4, Annual Calibration of Reactor Safety System Channels, issued July 4, 2004
- TS Procedure 5.4.1, Control Valves in the Emergency Cooling System, issued December 11, 1998. Data for April 25, July 30, October 2 and December 27, 2005
- TS Procedure 5.4.2, Starting Function of the Emergency Cooling Sump Pump, issued April 2, 2001. Data for April 25, July 30, October 2, and December 27, 2005
- TS Procedure 5.4.2, Operability Check of the Emergency Cooling Sump Pump, issued July 24, 2004. Data for July 30, 2005
- TS Procedure 5.5.1, Operability Check and Calibration of N-16 Monitors, issued August 25, 1995
- TS Procedure 5.6.2, Operability Test of Controls in the Emergency Control Station, issued August 25, 1995

b. Observations and Findings

As previously noted by the inspector, the TS does not require procedures for the conduct of surveillances and calibrations of safety systems that are described in Section 5.0 of the TS. However, the licensee has procedures for performing the surveillance, recording data, and documenting the completion of the required surveillance. This allows the inspector to verify that the safety systems are being tested in a manner that provides a high confidence that they will perform as



required. The frequency that these activities were to be done was specified in the TS.

Within the scope of this review, surveillance verifications and calibrations were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed were complete and were being maintained as required. Checks, tests, and calibrations were completed as required by TS.

c. Conclusions

The surveillance program satisfied Technical Specification requirements.

## **5. Exit Interview**

The inspection scope and results were summarized on February 10, 2006, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee Personnel

P. Gallagher, Director, Center for Neutron Research  
T. Myers, Chief, Reactor Operations  
W. Richards, Chief, Reactor Operations and Engineering  
P.Brandt, Acting Chief, Reactor Engineering

### NRC Personnel

W.Schuster, Nuclear Engineer  
M. Voth, Reactor Inspector

## **INSPECTION PROCEDURES USED**

IP 69003: Class 1 Research and Test Reactor Operator Licenses, Requalification, and Medical Activities  
IP 69007: Class 1 Research and Test Reactors Review and Audit and Design Change Functions  
IP 69009: Class 1 Research and Test Reactors Fuel Movement  
IP 69010: Class 1 Research and Test Reactors Surveillance

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### Opened

None

### Closed

None

## **LIST OF ACRONYMS USED**

CFR	Code of Federal Regulations
ECN	Engineering Change Notice
IP	Inspection Procedure
IR	Inspection Report
MW	Megawatt
NBSR	National Bureau of Standards Reactor
NCNR	NIST Center for Neutron Research
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
SRO	Senior Reactor Operator
TS	Technical Specification