

April 18, 2017

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

SUBJECT: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY—NUCLEAR  
REGULATORY COMMISSION ROUTINE INSPECTION REPORT  
NO. 50-184/2017-201

Dear Dr. Dimeo:

From March 20 – 23, 2017, the U.S. Nuclear Regulatory Commission (NRC or the Commission) conducted an inspection at the National Institute of Standards and Technology Center for Neutron Research facility. The enclosed report documents the inspection results which were discussed on March 23, 2017, with you and members of your staff.

This inspection examined 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. The inspectors reviewed selected procedures and records, observed various activities, and interviewed various personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

R. Dimeo

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If you have any questions concerning this inspection, please contact Craig Bassett at (301) 466-4495 or by electronic mail at [Craig.Bassett@nrc.gov](mailto:Craig.Bassett@nrc.gov).

Sincerely,

*/RA/*

Anthony J. Mendiola, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

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

Enclosure:  
As stated

cc: See next page

National Institute of Standards and Technology

Docket No. 50-184

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SUBJECT: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY — NUCLEAR  
REGULATORY COMMISSION ROUTINE INSPECTION REPORT  
NO. 50-184/2017-201, DATED: APRIL 18, 2017

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

Docket No. 50-184

License No. TR-5

Report No. 50-184/2017-201

Licensee: National Institute of Standards and Technology

Facility: National Bureau of Standards Reactor

Location: Gaithersburg, MD

Dates: March 20 – 23, 2017

Inspectors: Craig Bassett  
Gary Morlang

Accompanied by: Anthony J. Mendiola, Chief

Approved by: Anthony J. Mendiola, Chief  
Research and Test Reactors Oversight Branch  
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. 50-184/2017-201

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) 20 Megawatt Class I test reactor facility safety program including: (1) organization and staffing, (2) review and audit functions and design change control, (3) procedures, (4) radiation protection program, (5) environmental monitoring program, and (6) transportation of radioactive materials since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety and in compliance with NRC requirements.

### Organization and Staffing

- The organizational structure was consistent with Technical Specifications (TSs) Sections 6.1 and 6.3.
- Health physics staffing appeared to be adequate for the current level of operations.

### Review and Audit Functions and Design Change Control

- The facility Safety Evaluation Committee was meeting as required and reviewing the topics outlined in the TSs.
- The independent Safety Audit Committee was conducting annual audits as required.
- The design change control program being implemented at the facility satisfied NRC requirements.

### Procedures

- The procedure revision, control, and implementation program satisfied TSs requirements.

### Radiation Protection Program

- Surveys were being completed and documented as required.
- Postings met the regulatory requirements specified in Title 10 of the *Code of Federal Regulations* Parts 19 and 20.
- Personnel dosimetry was being worn as required and recorded doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.

- Radiation work permits were generated as needed to provide guidance and precautionary requirements for on-going and emergent work at the facility.
- The radiation protection training program being implemented by the licensee satisfied regulatory requirements.

#### Environmental Monitoring Program

- Effluent monitoring satisfied NRC requirements and releases were within regulatory limits.
- Effluent monitoring equipment was being calibrated as required.

#### Transportation of Radioactive Materials

- The program for transportation of radioactive materials satisfied U.S. Department of Transportation and NRC regulations.

## REPORT DETAILS

### Summary of Facility Status

The National Institute of Standards and Technology (NIST or the licensee) Center for Neutron Research (NCNR) continued to operate the 20 Megawatt test reactor, commonly known as the National Bureau of Standards Reactor (NBSR), in support of laboratory experiments and various types of research. During the inspection, the reactor was operating on the normal operations cycle.

#### 1. Organization and Staffing

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

To verify that the licensee was complying with the requirements specified in Technical Specifications (TSs) Sections 6.1 and 6.3, the inspectors reviewed selected aspects of the following:

- Current NCNR organization
- Staffing of the NCNR Health Physics Group
- Management and staff responsibilities outlined in the TSs
- NBSR Administrative Rule 2.0, "Personnel Requirements," issued July 30, 2009

##### b. Observations and Findings

The inspectors noted that the organizational structure had not changed since the last inspection in the area of radiation protection (refer to NRC inspection report (IR) No. 50-184/2016-201). The group leader of the facility Reactor Health Physics (RHP) Group continued to report to the Director, NCNR. The inspectors noted that this organization was generally reflected in TS Section 6.1.1 and Figure 6.1

The inspectors also noted that the RHP group was composed of the group leader and 10 staff members. Six of these individuals, including the group leader, were Health Physicists (HPs); the other five were Health Physics (HP) technicians. The staffing level appeared to be adequate to support the current level of activity at the facility.

##### c. Conclusion

The organizational structure was consistent with TSs Sections 6.1 and 6.3 requirements. HP staffing appeared to be adequate for the current level of operations.

Enclosure

## 2. Review and Audit Functions and Design Change Control

### a. Inspection Scope (IP 69007)

The inspectors reviewed the following to ensure that the requirements of TS Section 6.2 and Title 10 of *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests, and experiments," were being implemented in accordance with NRC regulations:

- Safety Evaluation Committee (SEC) meeting minutes for October 2015 through the present (Meeting Nos. 380 and 382) including subcommittee meeting minutes
- NBSR Procedure No. NBSR-0007-DOC-04, "Engineering Manual," Revision 4
- Reactor HP Procedure, HP-1.2, Revision A, "ALARA [as low as reasonably achievable] and Program Review"
- 2016 Reactor Audit in accordance with TS 6.2.4 (1-4), conducted by the Audit Subcommittee of the NCNR SEC, dated October 17, 2016
- 2015 Annual Report of the Safety Assessment Committee for calendar year (CY) 2015, dated March 15, 2016
- 2016 Annual Report of the Safety Assessment Committee for CY 2016, dated March 2, 2017
- Annual Review of the Reactor Radiation Protection Program, completed each year by the Group Leader, RHP Group, for 2015 and 2016
- Quarterly Facility Audit Reports completed by RHP Group staff members for 2016
- NBSR Engineering Change Request (ECR) No. 887, "Change N-16 Monitors to Critical Power," and the associated NBSR Engineering Change Notice (ECN)
- NBSR ECR No. 929, "Change RM-4-1 Output to Drive New Meters," and the associated NBSR ECN
- NBSR ECR No. 952, "Technical Specifications Change for Low Power Testing," and the associated NBSR ECN
- Operations Report No. 67, "NBSR Annual Report," for the period from January 1, 2014, through December 31, 2014, issued April 8, 2015
- Operations Report No. 68, "NBSR Annual Report," for the period from January 1, 2015, through December 31, 2015, issued April 13, 2016

### b. Observations and Findings

#### (1) Review and Audit Functions

Records of the meetings held by the SEC from October 2015 through the date of the inspection were reviewed. It was noted that the requirements stated in TSs Sections 6.2.1 through 6.2.4 were being fulfilled. A charter had been approved for the SEC explaining the review and audit responsibilities of the committee. The meeting minutes showed that

meetings were held at least semiannually as required by the SEC charter and reviews of proposed changes to the facility, experiments, and procedures were conducted by the SEC or a designated subcommittee. The minutes also indicated that the SEC provided appropriate guidance and direction for reactor operations and ensured suitable use and oversight of the reactor.

Other records reviewed by the inspectors showed that annual independent audits had been conducted by designated Safety Assessment Committees as required by TS Section 6.2.5. The inspectors reviewed the last two audits and noted that the audit teams provided an independent review of the NCNR reactor operations and the performance of the SEC as outlined in the TSs. The audit teams also made various observations which the licensee had addressed or was in the process of addressing. The audits appeared to be beneficial to the licensee in addressing issues that could be improved.

It was noted that the facility radiation protection program was being reviewed annually as required by 10 CFR 20.1101(c). The inspectors also reviewed quarterly audits of the facility completed by HP staff members. The audits included observations of facility conditions, radiation and contamination surveys of various areas, and recommendations for improvements as required by procedure.

(2) Design Change Control

The inspectors met with the Quality Assurance Program Manager who managed the ECR program. The inspectors reviewed three changes that had been proposed and implemented pertaining to radiation protection systems and/or equipment. The changes were acceptably documented and reviewed in accordance with the TSs and the licensee's guidelines. It was noted that all of the ECNs included: (1) a design description, (2) safety considerations, and (3) a safety evaluation and conclusions. None of the changes met the criteria in 10 CFR 50.59 for further review or NRC approval. The design change program appeared to be implemented in accordance with NRC requirements.

c. Conclusion

The SEC was meeting as required and reviewing the topics outlined in the TSs. Annual audits were being conducted as required. The independent Safety Assessment Committee was conducting annual audits as required. The design change control program was being implemented by the licensee in accordance with NRC requirements.

### 3. Procedures

#### a. Inspection Scope (IP 69008)

The inspectors reviewed the following to ensure that the requirements of TS Section 6.4 regarding written procedures for radiation protection were being met:

- Procedure revision, review, and approval process
- SEC and subcommittee meeting minutes for October 2015 through the present
- NBSR Administrative Rule 5.0, "Procedures and Manuals," issued June 5, 2010
- Selected NCNR Health Physics Instructions (HPIs) for the RHP Group (11 Total HPIs)
- NCNR Health Physics Procedure (HPP)-2.2, "Personnel Monitoring," dated February 13, 2017
- NCNR HPP-2.3, "Radiation Work Permits," dated February 8, 2017
- NCNR HPP-2.4, "Contamination Control," dated February 8, 2017
- NCNR HPP-2.7, "NCNR Experimenter Controls," dated January 1, 2016
- NCNR HPP-3.1, "Tritium Sample Analysis," dated January 2, 2016
- NCNR HPP-3.2, "Smear Sampling Analysis," dated January 2, 2016
- NCNR HPP-3.3, "Radiological Surveys," dated February 9, 2017

#### b. Observations and Findings

The inspectors noted that the RHP Group at NCNR continued to use three types of procedures. One type consisted of high-level guidance documents developed by the NIST Office of Safety, Health, and Environment (OSHE), to implement the radiation safety program for the various NIST sites around the United States. Another type was the HPPs for the NBSR issued and used by the reactor operations group. These procedures applied only to the NCNR and the work conducted there. Nine of the 16 HPPs were revised and approved in 2016 and 2017. The third set of procedures consisted of instructions, the HPIs, developed for RHP Group staff at the facility. The HPIs had been revised and reformatted using interdivisional procedures developed by the NIST Gaithersburg Radiation Safety Division (GRSD) as a basis. These instructions (11 total) had all been rewritten and approved in 2016.

Two ECNs were reviewed that related to the HPPs/HPIs. Both of the changes had undergone a 10 CFR 50.59 screening as part of the proposal process. The changes were documented in detail and included changes to procedures as required.

#### c. Conclusion

Licensee HP procedure changes were being reviewed and approved as required.

#### 4. Radiation Protection Program

##### a. Inspection Scope (IP 69012)

The inspectors reviewed selected aspects of the following to verify compliance with 10 CFR Part 20, "Standards for Protection against Radiation," TSs Sections 3.7 and 4.7, and procedural requirements:

- Selected HPPs and HPIs
- ALARA Policy as outlined in various HPPs
- Copies of radiation work permits (RWPs) for 2016 and to date in 2017
- Selected HP survey records documented on "Duty HP Weekly Data Summary," sheets for 2016 and to date in 2017
- Selected HP contamination survey records documented in the Smear Data Analysis Logbook for 2016 and to date in 2017
- Quarterly Facility Audit Reports, which included survey records, completed by RHP Group staff members for 2016
- NIST Personnel Dosimetry Summary records for facility personnel for 2015 and the first three quarters of 2016 (the most recent records available)
- Calibration and periodic check records for portable radiation monitoring instruments documented on "NIST HP Survey Instrument Calibration," forms
- Calibration records for area radiation monitors (ARMs) documented on the form "Confinement Area Radiation Monitors," RM 1-1
- Facility Annual Operations Reports for the past 2 years (Nos. 67 and 68)

The inspectors also observed the use of dosimetry and radiation monitoring equipment during tours of the facility. In addition, the inspectors accompanied the Duty HP during surveys in the C-200, C-100, basement, and guide hall areas.

##### b. Observations and Findings

###### (1) Surveys

The inspectors reviewed the results of selected surveys including: (1) daily general area radiation surveys of work areas, (2) weekly contamination surveys of controlled areas at the facility, (3) monthly general area radiation surveys of the interior uncontrolled areas and the area around the exterior of the NCNR, (4) radiation and contamination surveys conducted during the quarterly audits, and (5) contamination surveys of various items being removed from the controlled areas of the facility for 2016 and to date in 2017. The surveys had been completed as stipulated by procedure and the results were documented on the appropriate forms. Areas or items found to be contaminated were decontaminated and then surveyed again to verify there was no contamination present. The survey program appeared to be adequate.

One inspector accompanied the Duty HP during rounds of the facility to check on the radiation levels in the various areas and around experimental instruments in the facility. The Duty HP was knowledgeable and diligent in checking for any problems that might exist. The inspector also took radiation level readings in various areas. The readings noted by the inspector were similar to those found by the Duty HP and no anomalies were noted.

In addition, on various occasions during tours of the facility, the inspector noted that exit frisking was completed by facility personnel using hand and foot monitors and/or portal monitors. Frisking practices were found to be acceptable.

(2) Postings and Notices

The inspectors reviewed the postings at the entrances to, and inside, various controlled areas including the C-100 area, the basement area, the guide hall, and the "B" wing laboratories. The postings were acceptable and indicated the radiation hazards present. Other postings also showed the industrial hygiene hazards present in the areas. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was found in the facility. Copies of current notices to workers, required by 10 CFR Part 19, "Notices, Instructions and Reports To Workers: Inspection and Investigations," were posted in the main hallways of the facility as well as near or above the racks where personnel dosimeters were stored.

(3) Dosimetry and Personnel Exposure

Through direct observation of licensee staff members, the inspectors determined that dosimetry was worn acceptably. An examination of the thermoluminescent dosimeter (TLD) results indicating radiation exposures at the facility for 2015 and the first three quarters of 2016 showed that occupational whole body doses, as well as doses to the public, were within 10 CFR Part 20 limits.

The facility also collected and analyzed urine samples for tritium bioassay purposes. The highest attributable doses in 2015 and 2016 from tritium were also within 10 CFR Part 20 limits.

The inspectors also verified that NRC Form 5 letters had been prepared for those facility personnel who had received a dose greater than 100 millirem (mrem) during 2015. All those who should have received a letter had been issued the appropriate letter and form. The final dose data for 2016 had not yet been made available for NCNR personnel; thus, the letters/reports for the 2016 reporting period had not been issued to date.

(4) Calibration and Operation of Radiation Monitoring Equipment

The calibration of portable survey meters was typically completed by NIST GRSD personnel as well as by reactor HP staff. Calibration of fixed radiation detectors, air monitoring instruments, and other instrumentation associated with the reactor was completed by the Reactor Instrumentation Group. The calibration records of selected portable survey meters, friskers, and ARMs that were in use at the facility were reviewed. The inspectors verified that portable instruments were being calibrated annually and records were being maintained as required. The ARMs were checked monthly and calibrated annually. The inspectors verified that the radiation monitoring instruments required in TSs Sections 3.7 and 4.7 were operable and were being tested and calibrated as required.

(5) Radiation Work Permit Program

The inspectors reviewed RWPs that had been written and used in 2016 and those issued to date in 2017. There were various "standing" RWPs that remained in effect for the entire year due to the repetitive nature of the work they covered. Other RWPs were generated for specific work, such as fuel storage pool activities, instrument calibration work, and fuel handling. It was noted that the controls specified in the RWPs were acceptable and applicable for the work being done. Also, the RWPs had been reviewed and approved as required.

(6) Radiation Protection Program

The radiation protection program was established and described in various licensee documents including: (1) NIST Administrative Manual, Chapter 12, "Safety," Subchapter 12.03, "Ionizing Radiation Safety;" (2) HPPs for the NBSR; and (3) HPIs for the RHP Group. These documents were revised as needed and were approved by the appropriate organizations. The inspectors noted that the documents contained acceptable instructions concerning audits, safety, training, and personnel responsibilities. As noted above, the radiation protection program was reviewed each year as required by 10 CFR 20.1101(c).

The ALARA policy was also outlined in the aforementioned documents. The ALARA program provided guidance for keeping doses ALARA and was consistent with the requirements in 10 CFR Part 20. The ALARA program at the facility appeared to be effective.

The inspector also discussed the licensee's actions related to ALARA reviews for various work projects. As jobs or projects were developed, the separate groups involved would meet and discuss the scope of the work, the tools and materials needed, and the hazards involved. A member of the HP group was always in attendance to provide guidance

on the precautions and type of personal protective clothing required. The radiological aspects of the project reviews were documented through the issuance an RWP specific for the job delineating the controls and personal protective equipment needed. Jobs and projects were also discussed in the monthly safety meetings held by the NCNR Director and any problems were discussed and resolved.

(7) Radiation Protection Training

The training program was set up so that all types of radiation workers, including NIST staff, as well as authorized beam users, pneumatic tube (rabbit) users, laboratory users, and radioisotope users visiting from other countries/organizations, received radiation protection training. The inspectors noted that individuals who required unescorted access to the reactor facility and/or who worked with radioactive material completed a course on radiation safety principles. As an alternative, if people could provide evidence that they had received such training at another facility, they would be given credit for the training at NIST. Refresher training was given every 2 years and completion was tied to a person's facility access authorization, which was also renewed biennially.

The inspectors verified through records review, direct observation, and licensee interviews that facility employees, guest researchers, and emergency responders had received the required training at the required frequency. The inspectors also participated in the biennial refresher training provided by the facility. The training program was extensive and appeared to be adequate.

(8) Facility Tours

The inspectors observed conditions and/or activities in areas including the C-100 or the experimental floor area, the guide hall, and the "B" wing laboratories. The inspectors also toured other areas, including the C-200 area (which included the control room), portions of the basement area, including the pneumatic tube (rabbit) labs, and other selected areas including the spent fuel storage area and the process area. Control of radioactive material and access to radiation and high radiation areas was acceptable. As noted earlier, the postings and signs for these areas were appropriate.

c. Conclusion

The inspectors determined that the radiation protection and ALARA programs being implemented by the licensee satisfied regulatory requirements. Specifically, (1) surveys were being completed as required, (2) postings met regulatory requirements, (3) personnel dosimetry was being worn as required and doses were within the NRC's regulatory limits, (4) radiation monitoring

equipment was being maintained and calibrated as required, and (5) radiation protection training was provided to facility employees and guest users.

## 5. Environmental Monitoring Program

### a. Inspection Scope (IP 69004)

The inspectors reviewed selected aspects of the following to ensure that the requirements in 10 CFR Part 20 were being met and the calibrations and monitoring required in TSs Sections 3.7 and 4.7 were being conducted:

- Selected HPPs and HPIs
- Tritium and Argon-41 release data sheets for 2015 and 2016
- Building 235 environmental survey sheets for 2015 and 2016
- Gammatracer data results for 2015, 2016, and to date in 2017
- NIST environmental sample analysis results for 2015, 2016, and to date in 2017
- TLD results for environmental stations for 2016 through the date of the inspection
- Calibration records for the stack gas monitors documented on the form "Building Exhaust Stack Radiation Monitor," RM 4-1
- Calibration records for the fission product monitor documented on the form "Helium Sweep Gas Radiation Monitor," RM 3-2
- Calibration records for the secondary coolant monitor documented on the form "Secondary Cooling N16 Radiation Monitor," RM 3-1
- Calibration records for the tritium concentration monitor documented on the form "Certification of Calibration," issued by the monitor vendor, Canberra
- Facility Operations Report for the past 2 years (Nos. 67 and 68)

### b. Observations and Findings

Environmental vegetation samples were collected and prepared quarterly for analysis during April through September. Environmental soil samples were collected and prepared quarterly for analysis during October through March. Environmental water samples were collected and prepared quarterly for analysis throughout the year. The 2015, 2016, and 2017 (to date) results of these various analyses were acceptably documented and the results showed no significant changes when compared with previous years. These analysis results were outlined in the licensee's Annual Operations Report.

The inspectors reviewed the records documenting liquid and airborne releases to the environment for the past 2 years. The inspectors determined that liquid and gaseous releases continued to be monitored as required by the TSs. The resultant amount of activity that was released was calculated as required by procedure and was acceptably documented. Separate calculations were performed by the licensee using the Environmental Protection Agency's COMPLY computer code. The tritium release for 2015 was 1,241 curie (Ci) and

for 2016 was 1,991 Ci. The annual releases were determined to be within the annual dose constraints of 10 CFR 20.1101(d), 10 CFR 20.1301, "Dose limits for individual members of the public," and TSs limits.

On-site gamma radiation monitoring was completed using the reactor facility stack effluent monitor and various environmental TLDs in accordance with the applicable procedures. The data indicated that there were no measurable doses above any regulatory limits. These results were reported in the facility Annual Operations Reports for 2015 and 2016.

The fence line of the facility was monitored by Gamma Tracers at 16 different locations. Review of the data recorded by the tracers showed no gamma exposure above background. All locations were below 50 mrem/year and 2 mrem/hour. Significant periods of snow or rain were noted on the traces of data provided.

The inspectors reviewed the calibration records of the stack gas, fission product, secondary coolant, and tritium monitoring systems. The systems were being calibrated annually according to procedure as required.

c. Conclusion

Effluent monitoring satisfied license and regulatory requirements and releases were within the TSs and regulatory limits. Effluent monitoring equipment was being calibrated as required.

**6. Transportation of Radioactive Material**

a. Inspection Scope (IP 86740)

The inspectors reviewed the following documents to determine compliance with NRC and Department of Transportation (DOT) regulations governing the transport of radioactive material as specified in 10 CFR Part 20 and 10 CFR Part 71, "Packaging and Transportation of Radioactive Material," and 49 CFR Parts 171–178:

- Licenses of shipment recipients
- Material Transfer Request forms for 2016
- Radioactive material shipment records for 2016
- Training records for those designated as "shippers"

b. Observations and Findings

The inspectors reviewed records of shipments of radioactive material made during 2016. Through this review and discussions with licensee personnel, the inspectors determined that the licensee had shipped various types of radioactive material, including radioactive waste, since the previous inspection in this area. The records indicated that the radioisotope types and quantities involved were

calculated and dose rates measured as required. The records also indicated that the shipping containers were appropriate and had been labeled if required. The radioactive material shipping records reviewed by the inspectors had been completed and maintained as required by NRC and DOT regulations.

The inspectors verified that the licensee was maintaining copies of consignees' radioactive material possession licenses as required. If the current copy of the license was not available at NCNR, the licensee was aware that they were required to contact the consignee and obtain a current copy before a shipment could be made.

The licensee also maintained on file the certificates of compliance pertaining to those shipping containers that were used to ship radioactive material as required. In addition, the inspectors verified that the licensee staff members assigned to complete and/or review the shipping paperwork were trained and that refresher training was being completed biennially as required by the International Air Transport Association. It was noted that DOT only requires shippers to take refresher training triennially.

c. Conclusion

The program for transportation of radioactive materials satisfied DOT and NRC regulations.

**7. Follow-up on Previously Identified Issues**

a. Inspection Scope (IP 92701)

The inspectors reviewed the actions taken by the licensee in response to a previously identified Inspector Follow-up Item (IFI), IFI 50-184/2015-201-01.

b. Observations and Findings

During an inspection in 2015, it was noted that the organizational structure had changed since the last inspection in the area of radiation protection (refer to NRC IR No. 50-184/2014-201). As noted in the 2014-201 IR, the group leader of the NIST reactor HPs group previously reported to the NIST campus Director of Radiation Protection. Because of an organizational change at NIST, the reactor HP group leader was reassigned and directed to report to the Director, NIST Center for Neutron Research. The inspector noted that this change was not clearly reflected in the current TSs. The licensee indicated that they were preparing an amendment request to obtain NRC approval to modify the TSs to more accurately reflect the revised organizational structure. The licensee was informed that the submission of an amendment request for a change to the TSs would be followed by the NRC as an IFI.

During this inspection the inspectors discussed this issue with the licensee. It was noted that the licensee had submitted a request for a change to the facility

license to revise the TSs to allow low power testing during or following fuel reloading. The request also included a page which reflected the current organizational structure that existed at the facility. This change request is now under review by the NRC and this issue will remain open pending a decision by the NRC.

c. Conclusions

One IFI was discussed and remains open at this time pending final review and approval by the NRC.

**8. Exit Interview**

The inspection scope and results were summarized on March 23, 2017, with members of licensee management. The inspectors described the areas inspected and discussed the preliminary inspection findings. The licensee acknowledged the results of the inspection and did not identify as proprietary any of the material provided to or reviewed by the inspectors during the inspection.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee

P. Brand	Chief, Reactor Engineering and Chair, Hazards Review Committee
D. Brown	Senior Reactor Health Physicist and Leader, Reactor HP Group
K. Consani	Reactor Health Physicist
R. Dimeo	Director, NIST Center for Neutron Research
D. Hughes	Chief, Reactor Operations and Chair, Procedures Review Subcommittee
F. Scarano	Reactor Health Physics Technician
R. Strader	Quality Assurance Program Manager
J. Tracy	Reactor Health Physicist
R. Williams	Chair, NCNR Safety Evaluation Committee

### Other Personnel

J. Shupe	Certified Health Physicist, Radiation Facilities Group, Gaithersburg Radiation Safety Division, OSHE
S. Yu	Physical Science Technician, Radiation Facilities Group, Gaithersburg Radiation Safety Division, OSHE

## **INSPECTION PROCEDURES USED**

IP 69004:	Class 1 Research and Test Reactor Effluent and Environmental Monitoring
IP 69006:	Class 1 Research and Test Reactors Organization, Operations, and Maintenance Activities
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:	Inspection of Transportation Activities
IP 92701:	Follow-up on Previously Identified Items

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

### Opened

None

### Discussed

50-184/2015-201-01	IFI	Follow-up on the licensee's actions to request approval to modify the TSs to more accurately reflect the current organizational structure with the facility HP group leader reporting to the Director of the NCNR.
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### Closed

None

## LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ALARA	As Low As Reasonably Achievable
ARM	Area Radiation Monitor
Ci	Curie
ECN	Engineering Change Notice
ECR	Engineering Change Request
GRSD	Gaithersburg Radiation Safety Division
HP	Health Physics/Health Physicist
HPI	Health Physics Instruction
HPP	Health Physics Procedure
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
Mrem	Millirem
NBSR	National Bureau of Standards Reactor
NCNR	NIST Center for Neutron Research
NIST	National Institute of Standards and Technology
NRC	U.S. Nuclear Regulatory Commission
RHP	Reactor Health Physics
RWP	Radiation Work Permit
SEC	Safety Evaluation Committee
OSHE	Office of Safety, Health, and Environment
TLD	Thermoluminescent Dosimeter
TSs	Technical Specifications