

June 6, 2002

Mr. R. J. Agasie, Director
University of Wisconsin Nuclear Reactor Laboratory
Room 141 Mechanical Engineering
1513 University Avenue
Madison, WI 53706-1687

SUBJECT: NRC INSPECTION REPORT NO. 50-156/2002-201

Dear Mr. Agasie:

This letter refers to the inspection conducted on May 13-16, 2002, at your University of Wisconsin Nuclear Reactor Laboratory. 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 significant issues were identified.

In accordance with 10 CFR 2.790 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/NRC/ADAMS/index.html>.

Should you have any questions concerning this letter, please contact Craig Bassett at 404-562-4712.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-156
License No. R-74

Enclosure: NRC Inspection Report
cc w/encl:
Please see next page

University of Wisconsin

Docket No. 50-156

cc:

University of Wisconsin
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Madison, WI 53702

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

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U. S. NUCLEAR REGULATORY COMMISSION

Docket No: 50-156

License No: R-74

Report No: 50-156/2002-201

Licensee: University of Wisconsin

Facility: University of Wisconsin Nuclear Reactor Laboratory

Location: Madison, WI

Dates: May 13-16, 2002

Inspector: Craig Bassett

Approved by: Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of Wisconsin
Report No: 50-156/2002-201

This routine, announced inspection included onsite review of selected aspects of various licensee programs including: organization and staffing, review and audit, radiation protection, transportation of radioactive materials, physical security, and material control and accountability since the last NRC inspection of this TRIGA conversion research reactor.

Organization and Staffing

- The facility organization and staffing remain in compliance with the requirements specified in the Technical Specifications.

Review and Audit Functions

- Audits and reviews were being conducted in compliance with the requirements specified in the Technical Specifications.

Radiation Control

- Surveys were being completed and documented acceptably.
- Postings met the regulatory requirements.
- Personnel dosimetry was being worn as required and doses were well within NRC regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The environmental protection program at the facility satisfied regulatory requirements..
- The Radiation Protection and ALARA Programs were being acceptably implemented.

Transportation of Radioactive Materials

- Radioactive material produced in the reactor was transferred to the campus broad scope license and shipped under the auspices of that license, transferred to other authorized users on campus, or maintained at the reactor facility for use in labs in accordance with procedure.

Physical Security

- The licensee's Physical Security Plan was being implemented and intrusion detection equipment maintained in an acceptable manner.

Material Control and Accountability

- No deficiencies were identified in the licensee's Material Control and Accounting program.

REPORT DETAILS

Summary of Plant Status

The licensee's one megawatt (1 MW) Research and Test Reactor (RTR) continues to be operated in support of education, research, operator training, and various experiments. During this inspection, the RTR was operated two days at various power levels up to 1 MW for physics experiments and to support research and training.

1. Organizational Structure and Staffing

a. Inspection Scope (Inspection Procedure [IP] 69001)

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Technical Specification (TS), Section 6.1, were being met:

- organizational structure
- management responsibilities
- staffing requirements for the research reactor facility
- University of Wisconsin Nuclear Reactor (UWNR) Procedure No. 001, "Standing Operating Instructions," Revision (Rev) 13, Reactor Safety Committee (RSC) approval date May 7, 2001

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organization at the UWNR Laboratory had not changed since the previous NRC inspection in May 2001 (Inspection Report No. 50-156/2001-201). However, since that inspection, it was noted that the Reactor Director had retired and the individual who had been the Associate Director had assumed the responsibilities of the Director's position.

Through review of records and logs and through discussions with licensee personnel, the inspector determined that the staffing at the facility was acceptable to support the current workload and ongoing activities. The staffing met the requirements of the TS.

c. Conclusions

The licensee's organization and staffing remain in compliance with the requirements specified in the TS.

2. Review and Audit Functions

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in the requirements of TS Sections 6.1 and 6.2 were being completed:

- Reactor Safety Committee (RSC) meeting minutes
- TS duties specified for the RSC including review and audit functions
- Audits and reviews completed by the RSC, Safety Department, and operations staff personnel
- UWNR Procedure No. 005, "UWNR Administrative Guide," Rev 37, RSC approval date May 7, 2001

b. Observations and Findings

The inspector reviewed the RSC's meeting minutes from November 2000 to the present. These meeting minutes showed that the committee met at the frequency required by the TS with a quorum being present. The inspector also noted that the RSC had considered the types of topics outlined by the TS.

It was noted that RSC members and personnel from the Campus Safety Department and operations personnel completed audits and reviews of the radiation protection and security programs and that the audits were completed within the time frame stipulated by TS. The inspector noted that the audits and reviews, and the resulting findings, were acceptable. If the findings contained recommendations for possible changes, the licensee responded and took corrective actions as necessary.

c. Conclusions

Audits and reviews were being completed according to the requirements specified in the TS.

3. **Radiation Control**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20, TS Sections 4.2.3, 6.6, and 6.7.2 and the applicable procedural requirements:

- health physics survey records as documented in accordance with UWNR Procedure No. 100, "Surveillance Activities," Rev 34, RSC approval date May 7, 2001
- radiological signs and posting
- UWNR dosimetry records for 2000 through the present
- calibration and periodic check records for radiation monitoring instruments as required by UWNR Procedure No. 171, "Air Monitor Calibration and Records," Rev 21, RSC approval date November 27, 2001, and UWNR Procedure No. 177, "Procedure for Use and Calibration of Health Physics Instruments," Rev 16, RSC approval date November 27, 2001
- the Radiation Protection and ALARA Programs
- Annual Reports for Fiscal Years 1999-2000 and 2000-2001

- UWNR Procedure No. 100C, "Procedure for Gross Gamma Counting of Water Samples," Rev 15, RSC approval date May 7, 2001
- UWNR Procedure No. 109, "Procedure for Liquid Waste Disposal," Rev 21, RSC approval date May 7, 2001
- UWNR Procedure No. 117, "Air Monitor Operating Procedure," Rev 16, RSC approval date May 7, 2001
- UWNR Procedure No. 118, "Area Radiation Monitor Operating Checks," Rev 1, RSC approval date May 7, 2001
- UWNR Procedure No. 172, "Sampling and Calculation Procedure - Air Particulate Activity Samples," Rev 11, RSC approval date November 27, 2001

The inspector also toured the licensee's facility and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed as well.

b. Observations and Findings

(1) Surveys

The various periodic contamination and radiation surveys were completed by reactor staff and by the Safety Department staff as required by TS and procedure. Survey readings were evaluated to ensure that the survey results had not exceeded established action levels. When readings or results were above these set levels, the licensee took the appropriate corrective actions.

During the inspection, the inspector conducted a radiation survey of the Reactor Bay area and other laboratory and storage areas and compared the readings detected with those found by the licensee. The results were comparable and no anomalies were noted.

(2) Postings and Notices

Postings at the entrances to the controlled areas, including the Reactor Bay, were acceptable for the hazards present. The facility's radioactive material storage areas were properly posted. No unmarked radioactive material was noted. Copies of current notices to workers required by 10 CFR Part 19, including NRC Form-3, were posted in numerous locations in the facility including the Control Room, entrances/exits to the Reactor Bay and laboratories, and in hallways.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP) accredited vendor to process personnel dosimetry. The inspector noted that dosimetry was acceptably used by facility personnel. An examination of the records for the past two years through January of 2002 showed that all exposures were well within NRC regulatory limits. Extremity monitoring, accomplished through the use of finger ring TLDs, also showed low doses to the hands of staff members. The highest annual whole body exposure received by a single individual for the past two years was less than

200 millirem. The highest annual extremity exposure for the past two years was less than 225 millirem.

During the inspection, the inspector noted that the various vendors had been used in the past to process the licensee's dosimetry and track personnel exposure. This often led to various "tracking numbers" being assigned to each individual and consequently to some confusion about the total dose received by each person monitored. While a careful review of the records indicated that no licensee personnel received more than the above mentioned doses per year, it was not easily discernible from the records who had received what dose. This was noted as an area for improvement and will be followed by the NRC as an Inspector Follow-up Item during future inspections (50-156/2002-201-01).

(4) Radiation Monitoring Equipment

The calibration of portable survey meters, as well as air and area radiation monitors, was typically completed by reactor staff personnel. A few of the portable instruments were taken to the facility operated by the Safety Department for calibration on the upper scales. Calibration frequency met procedural and/or TS requirements and records were maintained as required.

(5) Environmental Protection

The inspector reviewed the records documenting liquid and airborne releases to the environment for the past two years. Environmental samples were collected, prepared, and analyzed consistent with TS requirements. Laboratory equipment was maintained and calibrated acceptably.

The inspector determined that gaseous releases continued to be calculated as required by procedure and were adequately documented. The releases were determined to be within the annual dose constraints of 10 CFR 20.1101 (d), 10 CFR Part 20 Appendix B concentrations, and TS limits. Liquid releases were approved by a Senior Reactor Operator after analyses indicated that the releases would meet regulatory requirements for discharge into the sanitary sewer. This was in accordance with procedure and the results of the analyses were acceptably documented in the Annual Reports.

(6) Radiation Protection Program

The licensee's Radiation Protection Program was established in the University of Wisconsin manual entitled "Radiation Safety Regulations," Rev 2, dated January 1997. The program included requirements that all personnel who had unescorted access to the facility receive training in radiation protection, policies, procedures, requirements, and facilities. This was accomplished by personnel attending a class and reading the manual entitled "Radiation Safety for Radiation Workers," dated July 2001. Completion of this training was verified by reactor staff and by Safety Department personnel. The program appeared to be acceptable and was being reviewed annually as required.

(7) ALARA Program

The ALARA Program was also outlined and established in the University of Wisconsin manual "Radiation Safety Regulations" and in various UWNR guidance documents and procedures. The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR 20.

(8) Facility Tours

The inspector toured the Control Room, Reactor Bay, adjacent laboratories, and support areas. Control of radioactive material and control of access to radiation areas were acceptable. As noted above, the inspector also conducted an independent radiation survey in various areas of the facility and determined that radiation levels recorded on licensee survey maps were representative and accurate.

c. Conclusions

The inspector determined that the Radiation Protection and ALARA Programs satisfied regulatory requirements because: 1) surveys were being completed and documented acceptably, 2) postings met regulatory requirements, 3) personnel dosimetry was being worn as required and doses were well within the NRC's regulatory limits, 4) radiation monitoring equipment was being maintained and calibrated as required, and, 5) the environmental protection program satisfied NRC requirements.

4. Transportation

a. Inspection Scope (IP 86740)

The inspector reviewed the following to verify compliance with regulatory and procedural requirements for shipping or transferring licensed material:

- UWNR Procedure No. 022, "Procedure and Record Sheet for Radioactive Material Packages," Rev 10, RSC approval date May 7, 2001
- UWNR Procedure No. 022B, "Driver Instructions," Rev 0, RSC approval date May 7, 2001
- UWNR Procedure No. 023, "Procedure for Receipt of Radioactive Material Shipments," Rev 4, RSC approval date May 7, 2001
- UWNR Procedure No. 130, "Request for Isotope Production," Rev 14, RSC approval date May 7, 2001
- UWNR Procedure No. 131, "Production of Radioisotopes in Nuclear Reactor," Rev 17, RSC approval date May 7, 2001
- UWNR Procedure No. 134, "Request and Authorization for Services of the UW Reactor," Rev 3, RSC approval date May 7, 2001
- selected records of radioactive material transfers for 2001 and to date

b. Observations and Findings

Records showed that radioactive materials produced in the reactor and destined to be shipped off site were transferred to the broad scope license in accordance with licensee requirements. These radioactive materials were then shipped under the campus broad scope license. This program for radioactive material transfer and transport is consistent with license and procedural requirements. The documents indicated the transfer of material had been signed by Campus Safety Department personnel as required.

The other radioactive materials produced in the reactor were either maintained under the reactor license for use in labs or transferred to other authorized users on campus.

c. Conclusions

Radioactive material produced in the reactor was transferred to the campus broad scope license and shipped under the auspices of that license, transferred to other authorized users on campus, or maintained at the reactor facility for use in labs in accordance with procedure.

5. **Physical Safeguards and Security**

a. Inspection Scope (IP 81401, 81402, 81431)

The inspector reviewed the following to determine compliance with the requirements in the facility operating license and 10 CFR 50.54(p):

- UWNR Procedure No. 003, "Physical Security Plan," Rev 4, RSC approval date May 7, 2001
- UWNR Procedure No. 153, "Riot, Civil Disturbance, Unauthorized Entry, or Bomb Threat," Rev 9, RSC approval date November 27, 2001
- UWNR Procedure No. 154, "Emergency Procedure - Theft or Threat of Theft of SNM: Breaching of Security of Rector Laboratory," Rev 8, RSC approval November 27, 2001
- security systems and equipment
- logs, records, and reports concerning security
- audits of security
- access and key control

b. Observations and Findings

The inspector reviewed the implementation of the licensee's physical security plan (PSP) entitled, UWNR 003, "University of Wisconsin Nuclear Reactor Security Plan," Rev 4, last reviewed and approved by the RSC on May 7, 2001. The site, facility, barriers, and intrusion detection system were verified to be as described in the PSP. Keys to access doors were held and controlled only by designated personnel. The inspector interviewed representatives at the campus Locksmith Shop to verify that only authorized personnel could receive a restricted/secure area key. The inspector also verified that intrusion system and devices were being checked and maintained at the required frequency.

The inspector visited the University Police Department and, through discussions, determined that police and security personnel were well acquainted with the reactor facility and appropriately trained. Police representatives indicated that it would be a good practice in the future to have periodic, perhaps biennial, training and drills involving the reactor facility. The licensee acknowledged this and indicated that plans were being developed to hold such training and drills. Licensee and campus police personnel also acknowledged that the facility was patrolled by University Division of Police and Security personnel at the required frequencies. The inspector also verified that there had been no safeguards events since the last inspection.

c. Conclusion

The licensee's PSP was being implemented and intrusion detection equipment was being maintained in an acceptable manner.

6. Material Control and Accounting

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR 70 and TS Section 6.6, the inspector reviewed:

- control of storage areas
- annual inventory results of Special Nuclear Material (SNM)
- associated records and reports
- UWNR Procedure No. 143, "Procedure for Fuel Handling and Core Arrangements," Rev 1, RSC approval date May 7, 2001

b. Observations and Findings

The records reviewed by the inspector showed that the licensee was maintaining control of SNM and SNM storage areas as required. Records also showed that physical inventories were conducted at least annually as required by 10 CFR 70.51(d). Nuclear Material Transaction Reports (DOE/NRC Form 741) and Material Status Reports (DOE/NRC Form 742) were being submitted by the licensee as required by 10 CFR 74.13(a)(1).

c. Conclusion

No deficiencies were identified in the licensee's Material Control and Accounting program.

7. Exit Meeting Summary

The inspection scope and results were summarized on May 16, 2002, with licensee representatives. The inspector discussed the findings for each area reviewed. The licensee indicated that the Physical Security Plan and associated documents were proprietary information.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Agasie, Reactor Director
S. Matusewic, Reactor Supervisor
J. Murphy, Senior Reactor Operator

Safety Department

A. Ben-Zikri, Alternate Radiation Safety Officer/Advanced Health Physicist
R. Bresell, Associate Director, Chemical and Radiation Protection Safety Department - FP&M
and Radiation Safety Officer

University Police

T. Kuschel, Captain

Locksmith Shop

W. Scott, Locksmith, Physical Plant/Facilities Planning and Management Division

INSPECTION PROCEDURES USED

IP 69001: Class II Non-Power Reactors
IP 81401: Plans, Procedures, and Reviews
IP 81402: Reports of Safeguards Events
IP 81431: Fixed Site Physical Protection of Special Nuclear Material of Low Strategic
Significance
IP 85102: Material Control and Accounting - Reactors
IP 86740: Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-156/2002-201-01 IFI Follow-up on resolution of the problems noted with the current
system of tracking personal exposure for licensee personnel.

Closed

None

LIST OF ACRONYMS USED

ALARA	As low as reasonably achievable
CFR	Code of Federal Regulations
DOE	Department of Energy
IFI	Inspector Follow-up Item
IP	Inspection Procedure
HP	Health physics
MW	Megawatt
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PSP	Physical Security Plan
RSC	Reactor Safety Committee
RTR	Research and Test Reactor
SNM	Special Nuclear Material
TLD	Thermoluminescence dosimeter
TS	Technical Specifications
UWNR	University of Wisconsin Nuclear Reactor