

June 5, 2002

Dr. Michael D. Slaughter
Director of CENTER
122 S. Central Campus Drive, Room 104
University of Utah
Salt Lake City, UT 84112

SUBJECT: NRC INSPECTION REPORT NO. 50-407/2002-201

Dear Dr. Slaughter:

This letter refers to the inspection conducted on May 20-23, 2002, at your TRIGA Research Reactor 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 violations of NRC requirements were identified. No response to this letter is required.

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 inspection, please contact Mr. 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. 50-407
License No. R-126

Enclosure: NRC Inspection Report

cc w/enclosure:
Please see next page

University of Utah

Docket No. 50-407

cc:

Karen Langely
Radiation Safety Officer
100 OSH, University of Utah
Salt Lake City, UT 84112

Dr. Ronald J. Pugmire
Assoc. Vice President for Research
210 Park, University of Utah
Salt Lake City, UT 84112

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

June 5, 2002

Dr. Michael D. Slaughter
Director of CENTER
122 S. Central Campus Drive, Room 104
University of Utah
Salt Lake City, UT 84112

SUBJECT: NRC INSPECTION REPORT NO. 50-407/2002-201

Dear Dr. Slaughter:

This letter refers to the inspection conducted on May 20-23, 2002, at your TRIGA Research Reactor 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 violations of NRC requirements were identified. No response to this letter is required.

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 inspection, please contact Mr. 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. 50-407
License No. R-126
Enclosure: NRC Inspection Report
cc w/enclosure:
Please see next page

DISTRIBUTION:

PUBLIC	RORP/R&TR r/f	AAdams	CBassett
PDoyle	TDragoun	WEresian	FGillespie
SHolmes	EHylton	Plsaac	DHughes
MMendonca	WBeckner	PMadden	EDO (O16-E15)
BDavis (Cover letter only) - (O5-A4)		NRR enforcement coordinator (Only for IRs with NOV's, O10-H14)	

ACCESSION NO.: ML021500703

TEMPLATE #: NRR-074

OFFICE	RORP:RI	RORP:LA	RORP:SC
NAME	CBassett:rd	EHylton:rd	PMadden
DATE	06/ /2002	06/ 04 /2002	06/ 05 /2002

C = COVER

E = COVER & ENCLOSURE
OFFICIAL RECORD COPY

N = NO COPY

U. S. NUCLEAR REGULATORY COMMISSION

Docket No: 50-407

License No: R-126

Report No: 50-407/2002-201

Licensee: University of Utah

Facility: Center for Excellence in Nuclear Technology, Engineering,
and Research (CENTER)

Location: Salt Lake City, Utah

Dates: May 20-23, 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 Utah
Report No. 50-407/2002-201

This routine, announced inspection included onsite review of selected aspects of various licensee programs including: organization and staffing, review and audit, radiation protection, material control and accountability, security, and transportation of radioactive materials since the last NRC inspection of this facility. The inspection also involved discussions with licensee personnel.

Organization and Staffing

- The licensee's organization and staffing remain in compliance with requirements specified in the Technical Specifications.

Review and Audit Functions

- Audits were being conducted by the Reactor Safety Committee in compliance with requirements specified in the Technical Specifications.

Radiation Protection Program

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.
- Postings met regulatory requirements.
- Personnel dosimetry was being worn as required, and doses were well within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- Radioactive effluents released from the facility were being evaluated and reported as required.
- The radiation protection and ALARA programs satisfied regulatory requirements.

Material Control and Accountability

- No deficiencies were identified in the licensee's material control and accounting program.

Physical Safeguards and Security

- The licensee had implemented and was maintaining an adequate physical security system and program.

Transportation of Radioactive Materials

- The licensee did not ship any radioactive material from the facility under the reactor license.

Report Details

Summary of Plant Status

The licensee's one hundred kilowatt (100 kW) Research and Test Reactor (RTR) continues to be operated in support of research, reactor operator training, and educational demonstrations, as well as performing preventive maintenance and operational surveillance required by the Technical Specifications (TS). During the inspection, the RTR was not operated but typically operates one or two days a week at various power levels up to 90 kW 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 the Technical Specifications (TS), Sections 6.1-6.3, were being met:

- organization structure
- management responsibilities
- guidance contained in "Description of Operations," Section I, Organization and Responsibilities, undated
- staffing requirements for the RTR facility

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organizational structure and staffing at the facility had not changed since the last NRC inspection in April 2001 (Inspection Report No. 50-407/2001-201). The organizational structure and staffing observed at the facility and reported in the Annual Report met the requirements of the TS.

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.

c. Conclusions

The organizational structure and functions were consistent with TS requirements.

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 the TS Section 6.5 were being completed:

- Reactor Safety Committee (RSC) meeting minutes from June 2000 to the present

- safety review records
- ALARA and Radiation Safety Audits completed during the past two years
- responses to safety reviews and audits
- guidance contained in "Description of Operations," Section I, Organization and Responsibilities, undated
- Form CENTER-035 R1, "Audit and Review Program Checklist," RSC approval dated June 9, 1993

b. Observations and Findings

Records showed that safety reviews and audits were conducted at the TS required frequency. The audits were completed by the RSC or a subcommittee as required. Topics of these reviews and audits were also consistent with TS requirements to provide guidance, direction, and oversight, and to ensure the RTR was used acceptably.

The inspector noted that the safety reviews and audits and the associated findings were acceptably detailed and that the licensee responded and took corrective actions as needed.

c. Conclusions

The review and audit program satisfied TS requirements.

3. **Radiation Protection Program**

a. Inspection Scope (IP 69001)

To verify compliance with TS Sections 3.4, 3.7, 4.3.3, 5.4, and 6.10, the inspector reviewed selected aspects of:

- radiological signs and posting
- routine surveys and monitoring documented on Form CENTER-020 R11, "Monthly Inspection Checklist," RSC approval dated March 26, 2002
- dosimetry records from 2000 to the present
- maintenance and calibration of radiation monitoring equipment documented on Form CENTER-023 R4, "Annual Maintenance and Calibration of the Area Radiation Monitors (ARMS) and Continuous Air Monitor (CAM)," RSC approval dated December 17, 1997
- ALARA (As Low As Reasonably Achievable) reviews for the past two years
- University of Utah Radiation Procedures and Records (RPR) Number (No.) 50, "Radioisotope Laboratory Evaluations," dated March 1999 and associated forms, Form RPR 50A, "Laboratory Evaluation Checklist," Form RPR 50C, "Contamination Wipe Test Results," and Form RPR 50D, "Radioisotope Laboratory Evaluation Report"
- RPR No. 52, "Portable Radiation Survey Instruments Use and Calibration," dated March 1999
- Form CENTER-032, Rev 0, "Liquid Effluent Discharge Authorization," RSC approval dated March 19, 1992

b. Observations and Findings

(1) Surveys

The inspector reviewed monthly radiation and contamination surveys of licensee controlled areas conducted by campus Radiation Safety Office personnel. The inspector also reviewed monthly general area radiation surveys of the Reactor Room and support areas from 2000 to date. These latter surveys had been completed by the licensee personnel as required by Form CENTER-020 R11, "Monthly Inspection Checklist." The results of all the surveys were documented and evaluated as required, and corrective actions were taken when readings or results exceeded set action levels. During the inspection, the inspector conducted a radiation survey of the Reactor Room and compared the readings detected with those found by a campus Radiation Safety Office analyst. The two sets of results were comparable and no anomalies were noted.

(2) Postings and Notices

The inspector reviewed the postings at the entrances to various controlled areas including the Control Room, the Reactor Room, and various laboratories in the CENTER. The postings were acceptable and indicated the radiation and contamination 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 detected in the facility. Copies of current notices to workers required by 10 CFR Part 19 were posted on various bulletin boards in the facility, as well as one posted in the Control Room on the door leading to the Reactor Room.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program accredited vendor (Landauer) to process personnel dosimetry. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel.

An examination of the records for the past two years through February of 2002 showed that all exposures were well within NRC limits and licensee action levels. Extremity monitoring, accomplished through the use of finger rings, also showed relatively 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 twenty-five (25) millirem. The highest annual extremity exposure for the past two years was less than one hundred forty (140) millirem.

(4) Radiation Monitoring Equipment

The use and calibration of radiation monitoring equipment was reviewed by the inspector. Portable survey meters and friskers were calibrated by Radiation Safety Office personnel. Fixed radiation detectors and the continuous air

monitor were typically calibrated by licensee personnel. The calibration records showed that calibration frequency met the requirements established in the applicable surveillance procedures and records were being maintained as required. Through observation the inspector determined that the equipment was being used acceptably.

(5) Environmental Protection

Environmental samples were collected, prepared, and analyzed consistent with the TS requirements. Laboratory equipment was maintained and calibrated acceptably by reactor staff personnel. Data indicated that there were no measurable dose above background. This was acceptably documented in the Annual Reports. Observation of the facility found no new potential release paths.

The inspector determined that gaseous releases continued to be monitored as required, were calculated according to established protocol, and were acceptably documented in the annual reports. The dose rate to the public, as a result of the gaseous releases, was well below the dose constraint specified in 10 CFR 20.1101(d) of 10 millirem per year. Also, airborne concentrations of gaseous releases were well within the concentrations stipulated in 10 CFR 20, Appendix B, Table 2, and TS limits.

There had been no liquid releases from the facility to the sanitary sewer within the past year. The previous release, in February 2000, was within the limits specified in 10 CFR 20, Appendix B, Table 3.

(6) Radiation Protection Program

The licensee's Radiation Protection Program was established in the University of Utah campus document entitled, "Radiation Safety Policy Manual and Radiation Procedures and Records," revised September 1998, and last updated April 2002. The program required that all personnel who have unescorted access to work in a radiation area or with radioactive material receive training in radiation protection, policies, procedures, requirements, and facilities prior to entry. The inspector verified that training had been completed by reactor staff personnel. Also, the radiation protection program was being reviewed annually as required.

(7) ALARA Policy

The ALARA Policy was also outlined and established in the aforementioned "Radiation Safety Policy Manual." The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(8) Facility Tours

The inspector toured the Control Room, Reactor Room, and selected support laboratories and offices. Control of radioactive material and control of access

to radiation and high radiation areas were acceptable. As noted earlier, the postings and signs for these areas were appropriate.

c. Conclusions

Based on the observations made and the records reviewed, it was determined that, 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) environmental monitoring was being conducted as required, the Radiation Protection Program being implemented by the licensee satisfied regulatory requirements.

4. Material Control and Accounting

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR 70, the inspector reviewed selected aspects of:

- nuclear material inventories (DOE/NRC Forms 741 and 742) for the past 18 months
- accountability records and fuel storage locations
- Form CENTER-005, Rev 4, "Core Change and Critical Fuel Loading," RSC approval dated March 29, 2000
- Form CENTER-018, Rev 0, "Fuel Element Inventory Sheet," RSC approval dated May 25, 1988

b. Observations and Findings

The records reviewed by the inspector showed that the licensee was maintaining control of Special Nuclear Material (SNM) storage areas as required. The inspector also verified that selected SNM was being stored in the locations specified by licensee documents. 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) had been completed semiannually and submitted by the licensee to the appropriate regulatory agencies in a timely manner and as required by 10 CFR 74.13(1).

c. Conclusions

SNM was acceptably controlled and inventoried and accountability records were being maintained.

5. Physical Security

a. Inspection Scope (IPs 81401, 81402, and 81431)

The inspector reviewed selected aspects of:

- the physical security plan (PSP) and implementing procedures

- security system barriers, equipment, and instruments
- intrusion alarm tests documented on Form CENTER-020 R11, "Monthly Inspection Checklist," RSC approval dated March 26, 2002
- key control log and accountability records
- access control program and maintenance procedure
- "Unauthorized Entry Procedures," last revised December 31, 2001
- "CENTER Response - University Police Dispatcher," last revised December 31, 2001
- "CENTER Response - University Police Officers," last revised December 31, 2001
- Form CENTER-031, Rev 0, "Safeguard Event Log," RSC approval dated March 21, 1990

b. Observations and Findings

The PSP being maintained by the licensee, entitled "University of Utah Center for Excellence in Nuclear Technology Engineering and Research Physical Security Plan for Protection of SNM of Low Strategic Significance," Rev 6, dated February 28, 1996, was the same as the latest revision approved by the NRC. The physical protection system, consisting of barriers, alarms, equipment, and instrumentation, was as stipulated in and required by the PSP. The system was being maintained and tested as required by procedure. Access controls were implemented as required and keys to access doors were held and controlled only by designated personnel. Implementing procedures were consistent with the PSP. Acceptable security response and training were demonstrated through alarm response and drill response in accordance with procedures. The program was being reviewed biennially as required.

c. Conclusions

The physical security system implemented at the facility satisfied PSP requirements.

6. **Transportation**

a. Inspection Scope (IP 86740)

The inspector reviewed selected aspects of:

- radioactive material shipping procedures
- radioactive material transportation and transfer records

b. Observations and Findings

Records indicated that radioactive material designated for disposal was transferred to the University of Utah's broad scope license in accordance with license requirements. This program for radioactive material transfer is consistent with license requirements. Actual transportation of the material was done under the broad scope license and was not included in this inspection of the reactor license.

c. Conclusions

The licensee did not ship any radioactive material from the facility under the reactor license.

7. Exit Meeting Summary

The inspection scope and results were summarized on May 23, 2002, with licensee representatives. The inspector discussed the findings for each area reviewed. The licensee did identify as proprietary some of the material provided to or reviewed by the inspector during this inspection. However, this report does not contain any proprietary material.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Choe, Senior Reactor Operator
M. Krahenbuhl, Reactor Supervisor
R. Pugmire, Associate Vice President for Research
B. Shelkey, Senior Reactor Operator
D. Slaughter, Reactor Administrator
J. Wilde, Senior Reactor Operator

Radiation Safety Office Personnel

L. Bosworth, Health Physicist, Radiological Health Department
K. Langley, Radiation Safety Officer, Radiological Health Department
E. McCormack, Radiological Analyst, Radiological Health Department

Campus Police

L. Bradfield, Police Officer, University of Utah Public Safety
B. Lemon, Police Chief, University of Utah Public Safety
A. Penman-Morgan, Alarms System Coordinator, University of Utah Public Safety
A. Rosen, Police Officer, University of Utah Public Safety

Other Personnel

F. Van Demeer, Supervisor, Key Shop

INSPECTION PROCEDURE (IP) 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

None

Closed

None

PARTIAL LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DOE	Department of Energy
kW	Kilowatt
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PARS	Publicly Available Records
PSP	Physical Security Plan
RPR	Radiation Procedures and Records
RSC	Reactor Safety Committee
RTR	Research and Test Reactor
SNM	Special Nuclear Material
TS	Technical Specifications