June 2, 2011

Betty Adrian, Reactor Administrator
Department of the Interior
U.S. Geological Survey
Box 25046., MS 975
Denver, CO 80225

SUBJECT: UNITED STATES GEOLOGICAL SURVEY – NRC ROUTINE INSPECTION REPORT NO. 50-274/2011-201

Dear Ms. Adrian:

On May 2-5, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your U.S. Geological Survey TRIGA Reactor facility. The enclosed report documents the inspection results, which were discussed on May 5, 2011, with Mr. Timothy DeBey, Reactor Supervisor, and other members of your staff.

The 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 activities, and interviewed 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, and 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).

Should you have any questions concerning this inspection, please contact Jack Donohue at (301) 492-1950 or by electronic mail at Jack.Donohue@nrc.gov.

Sincerely,

/RA/

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

Docket No. 50-274
License No. R-113

Enclosure: NRC Inspection Report No. 50-274/2011-201
cc: See next page

U.S. Geological Survey Docket No. 50-274

cc:

Mr. Brian Nielsen
Environmental Services Manager
480 S. Allison Pkwy.
Lakewood, CO 80226

Mr. Eugene W. Potter
State of Colorado
Radiation Management Program
HMWM-RM-B2
4300 Cherry Creek Drive South
Denver, CO 80246

Mr. Timothy DeBey
Reactor Director
U.S. Geological Survey
Box 25046 – Mail Stop 424
Denver Federal Center
Denver, CO 80225

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

June 2, 2011

Betty Adrian, Reactor Administrator
Department of the Interior
U.S. Geological Survey
Box 25046., MS 975
Denver, CO 80225

SUBJECT: UNITED STATES GEOLOGICAL SURVEY – NRC ROUTINE INSPECTION REPORT NO. 50-274/2011-201

Dear Ms Adrian:

On May 2-5, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at your U.S. Geological Survey TRIGA Reactor facility. The enclosed report documents the inspection results, which were discussed on May 5, 2011, with Mr. Timothy DeBey, Reactor Supervisor and other members of your staff.

The 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 activities, and interviewed 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, and 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).

Should you have any questions concerning this inspection, please contact Jack Donohue at (301) 492-1950 or by electronic mail at Jack.Donohue@nrc.gov.

Sincerely,

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

Docket No. 50-274
License No. R-113
Enclosure: NRC Inspection Report No. 50-274/2011-201
cc: See next page

DISTRIBUTION:

PUBLIC PROB r/f	RidsNrrDprPria Resource	RidsNrrDprProb Resource
MNorris, (MS T3B46M)	MCompton,(Ltr only O5-A4)	GLappert, NRR,
LTran, NRR	GWertz, NRR	

ACCESSION NO.: ML111430012 ***Concurrence via e-mail** **TEMPLATE#: NRC-002**

OFFICE	PROB:RI*	PROB:LA	PROB:BC
NAME	JDonohue	GLappert	JEads
DATE	5/22/2011	5/23/2011	6/2/2011

OFFICIAL RECORD COPY

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

Docket No:	50-274
License No:	R-113
Report No:	50-274/2011-201
Licensee:	United States Geological Survey
Facility:	U. S. Geological Survey TRIGA Reactor
Location:	Building 15, Denver Federal Center Denver Colorado
Dates:	May 2-5, 2011
Inspectors:	Jack Donohue Craig Bassett
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

United States Geological Survey
U. S. Geological Survey TRIGA Reactor
Report No. 50-274/2011-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the U. S. Geological Survey (the licensee's) Class II research and test reactor safety program including: 1) organization and staffing, 2) review and audit and design change functions, 3) reactor operations, 4) operator requalification, 5) maintenance and surveillance, 6) experiments, 7) fuel handling, and 8) emergency preparedness 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. No violations or deviations were identified.

Organization and Staffing

- The organizational structure and functions were consistent with the requirements specified in Section H of the Technical Specifications and Section 3 of the Reactor Operations Manual.

Review and Audit and Design Change Functions

- Audits and reviews were being conducted by the Reactor Operations Committee in compliance with the requirements specified in Section 3 of the Reactor Operations Manual and Section H.2 of the Technical Specifications.

- The licensee's design change protocol continues to be implemented at the facility.

Operations

- Reactor operations and logs were acceptable and completed in accordance with procedural and Technical Specifications requirements.

- Staff communications were appropriate.

Operator Requalification

- The requirements of the Operator Requalification Program were being met and the program was being acceptably implemented.

- Medical examinations were being completed biennially for each operator as required.

Maintenance and Surveillance

- The facility maintenance program was being implemented as required by facility procedures.

- The licensee's program for completing surveillance checks and tests and confirming Limiting Conditions for Operation satisfied Technical Specifications requirements.

Experiments

- Conduct and control of experiments and irradiations met the requirements specified in the Technical Specifications Section I and the applicable Experiment Authorizations and procedures.

Fuel Handling

- Fuel handling activities and documentation were as required by the Technical Specifications and facility procedures.

Emergency Preparedness

- The current facility Emergency Plan and implementing procedures were being reviewed biennially as required and updated as needed.

- Emergency response equipment was being maintained and alarms were being tested at the required frequency.

- A Letter of Agreement with the University of Colorado Hospital was being updated biennially as required.

- Annual evacuation drills was scheduled and completed and biennial emergency drills were being conducted as required by the Emergency Plan.

- Emergency preparedness training was being completed as required.

REPORT DETAILS

Summary of Plant Status

The U.S. Geological Survey's (USGS, the licensee) one megawatt TRIGA research and test reactor was typically operated in support of USGS programs directed at improving methods and techniques to enhance scientific knowledge about water and earth materials. During the inspection the reactor was operated on Monday for demonstration and on Wednesday and Thursday to support ongoing experimental and research work.

1. Organization and Staffing

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

The inspectors reviewed selected aspects of the following regarding the licensee's organization and staffing to ensure that the requirements of Section H of Technical Specifications (TS), implemented through License Amendment Number (No.) 11 to the Facility Operating License, No. R-113, dated January 30, 2006, is being met:

- Current staff qualifications
- Staffing requirements for safe operation of the facility
- Organizational structure for the Geological Survey TRIGA Reactor (GSTR) Facility
- Reactor Operations Manual (ROM), Section 3, "Nuclear Center Organization," dated November 2004 with the latest Revision (Rev.) dated March 2011
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2009 through December 31, 2009, submitted January 25, 2010
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2010 through December 31, 2010, submitted January 31, 2011
- American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 15.4, "Standards for Selection and Training of Personnel for Research Reactors," dated 1977

b. Observations and Findings

The organizational structure and staff responsibilities had not changed since the last U. S. Nuclear Regulatory Commission (NRC) inspection (refer to NRC Inspection Report No. 50-274/2010-201). The facility remained under the direct control of the Reactor Supervisor (RS) and he was responsible to the Reactor Administrator for safe operation and maintenance of the reactor and its associated equipment. However, staffing levels had changed somewhat with the current operations staff being made up of the RS, the Reactor Health Physicist (RHP) for the GSTR, and two other people. It was noted that all these individuals were Senior Reactor Operators (SROs) and worked full-time at the facility. Two students who were Reactor Operators, and who had been working part-time at the facility, had left.

The organization and staff responsibilities were as specified in, and required by, Section H of the TS, Section 3 of the ROM, and Figure 3.1 in the ROM. Section 3.4.1 of the ROM stated that the training and qualification requirements contained in ANSI/ANS Standard 15.4, "Standards for Selection and Training of Personnel for Research Reactors" were the minimum for USGS TRIGA Reactor Facility personnel. The inspectors confirmed that the reactor staff met ANSI/ANS 15.4 education, training, and experience requirements.

c. Conclusion

The licensee's organization and staffing were in compliance with the facility TS Section H and ROM Section 3.

2. Review and Audit and Design Change Functions

a. Inspection Scope (IP 69001)

In order to verify that the licensee had established and conducted reviews and audits as required by TS Section H.2 and to verify that the design change requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 were being met, the inspectors reviewed selected aspects of:

- Facility configuration records
- GSTR Experiment Review Checklist
- Facility design change records for the past two years
- Safety review records and audit reports for the past two years
- Responses to the safety reviews and audit reports for the past two years
- Reactor Operations Committee meeting minutes for 2009, 2010 and to date in 2011
- Reactor Operations Committee charter outlined in the U.S. Geological Survey Manual, 308.44, "Reactor Operations Committee," dated February 5, 1999
- ROM, Section 3, "Nuclear Center Organization," Rev. dated November 2004

b. Observations and Findings

(1) Review and Audits Functions

The inspectors attended the Reactor Operations Committee (ROC) conducted on May 2, 2011. The ROC was meeting semiannually as required and that the committee membership satisfied TS Section H.2, the ROC charter, and ROM Section 3.8 requirements. Review of the meeting minutes for 2009, 2010 and to date in 2011 indicated that the committee provided guidance, direction, and oversight for the reactor and ensured suitable and safe reactor operations.

The ROC minutes and audit records showed that safety reviews and individual audits had been completed for the functional areas specified by

TS Sections H.2, H.5, and I.3 and at the frequency specified. The inspectors noted that audit topics included reactor operations, maintenance and operations logs, facility procedures, the operator requalification program, fuel movement, Physical Security Plan and the Radiation Protection Program. The inspectors reviewed the results of the audits that had been completed. The inspectors determined that the audit findings, and licensee actions taken in response to the findings, were acceptable.

(2) Design Control Functions

The inspectors determined that design changes at the GSTR were initiated by a facility staff review followed by an ROC review and subsequent approval of the changes. The inspectors noted that various design changes had been processed during the past two years. The most recent review was an upgrade of hardware and software changes to the Reactor Control System Console (CSC) and Data Acquisition Control (DAC) System. The hardware and software were installed and thoroughly tested to ensure that the compliance with the TS was maintained.

The established protocol was that staff members would evaluate a proposed change, test, or experiment and conduct a review. The ROC would review the evaluation and approve the change if they felt it was appropriate and did not constitute a change in the TS or pose a safety problem. The inspectors determined that all staff members were familiar with the protocol and would follow it if a change to the facility or to an experiment were proposed.

From review of these changes, as well as through interviews with licensee personnel, the inspectors determined that an actual written procedure stipulating the steps to be taken to complete a 10 CFR 50.59 design change evaluation were completed.

c. Conclusion

Audits and reviews conducted by the ROC were in accordance with the requirements specified in Section H.2 of the TS and Section 3 of the ROM. The licensee's design change protocol was being implemented at the facility.

3. Operations

a. Inspection Scope (IP 69001)

The inspectors reviewed selected aspects of the following to verify operation of the reactor in accordance with TS Sections C - E:

- Reactor Operations Logbooks Numbers (Nos.) 139–146
- Staffing for operations as required by Section 5.2 of the ROM

- Daily TRIGA Prestart Test data sheet printouts for 2009–2011 to date
- Selected GSTR Facility Monthly Checklists from 2009–2011 to date, checklist Rev. 11, checklist revision dated April 2010
- Selected GSTR Facility Shutdown Checklists from 2009 – 2011 to date, checklist Rev. 13, checklist revision dated April 2002
- Selected GSTR Facility Start-Up Checklists from the 2009 – 2011 to date including Page 1 of the checklist, Rev. 10 dated April 2010, and Page 2 of the checklist, Rev. 7 dated April 2002
- ROM, Section 5, "Operating Procedures," Rev. 4, dated October 1995
- GSTR Procedure No. 1, "Procedure for Reactor Startup, Operation, and Shutdown," dated October 11, 1991 and last reviewed April 16, 2010
- GSTR Procedure No. 17, "Procedure for Determining Ar 41 Release," dated August 17, 1991 and last reviewed May 2, 2011
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for January 1, 2011 through March 31, 2011
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for April 1, 2010 through June 30 , 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for July 1, 2010 through September 30, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for October 1, 2010 through December 31, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for January 1, 2009 through March 31, 2009
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2010 through December 31, 2010, submitted January 31, 2011

b. Observations and Findings

(1) Routine Operations

The inspectors reviewed the operations logs from March 2010 through the present. The inspectors also reviewed selected Daily Start-Up and Shutdown Checklists and Monthly Checklists. From the records reviewed the inspectors determined that reactor operations were carried out in accordance with written procedures as required by TS Section H.3. Information on the operational status of the facility was appropriately recorded in log books or on checklists as required by Section 3.C. of the Facility License and ROM Section 5. Scrams were identified in the logs and records, and were reported and resolved as required before the resumption of operations. Through interviews with operators and review of the logs, the inspectors confirmed that shift staffing met the minimum requirements of at least two reactor staff members on duty whenever the reactor was operating as required by ROM Section 5.2.4.

c. Conclusion

Reactor operations and logs were acceptable and in accordance with procedural, TS, and License requirements. Staff communications were appropriate.

2. Operator Requalification

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of the NRC-approved operator requalification program and 10 CFR Part 55, the inspectors reviewed selected aspects of:

- Status of active duty GSTR operators
- Effective dates of current operator licenses
- Operator competence evaluation and written examination records
- Physical examination records documented on NRC Form 396 records
- GSTR Reactor Operator Requalification OJT forms for the 2007-2008 and 2009-2010 training cycles
- Appendix 3-1 to ROM Section 3, entitled "U.S. Geological Survey TRIGA Reactor Operator Requalification Program," dated September 1989 with the latest Rev. dated April 2010, which included the "GSTR Fitness for Duty Policy for Licensed Reactor Operators," dated April 2010
- Individual operator training records documented on GSTR Reactor Operator Requalification OJT forms for the periods from January 2007 – December 2008, January 2009 – December 2010, and from January 2011 – to the present
- ANSI/ANS Standard 15.4, "Standards for Selection and Training of Personnel for Research Reactors," dated 1977

b. Observations and Findings

As noted above, there were four qualified SROs at the facility. The inspectors determined that the operator licenses of these individuals were current.

The inspectors reviewed the various operators' training records and confirmed they were being maintained as required. The records showed that the operators were knowledgeable of the appropriate subject material required by the program as demonstrated by successful completion of annual written examinations. Individual requalification records also showed that each operator demonstrated operational competence by completing annual operating performance exams administered by the RS as required by the Requalification Program. The inspectors further confirmed that all the operators had completed the required reactivity manipulations and the quarterly hours of operation required by the program.

The inspectors noted that the operators were also receiving the required biennial medical examinations as required by 10 CFR Part 55, Subpart C. The appropriate restrictions for each individual, if any were required, were listed on the medical forms as required.

c. Conclusion

The requirements of the Operator Requalification Program were being met and the program was being acceptably implemented. Medical examinations were being completed biennially as required.

3. Maintenance and Surveillance

a. Inspection Scope (IP 69001)

To verify that the maintenance and surveillance programs were being conducted as required in TS Sections C - E, the inspectors reviewed selected aspects of:

- Reactor Operations Logbooks Nos. 139–146
- Reactor operations, periodic checks, tests, and verifications
- Reactor Activity Calendar maintained by the Reactor Supervisor
- Surveillance, calibration, and test data sheets and related records
- USGS TRIGA Reactor Maintenance Log detailing the maintenance performed on equipment
- Selected GSTR Facility Monthly Checklists for the past 13 months, checklist Rev. 9, revision dated April 2006
- Selected GSTR Facility Shutdown Checklists for the past 13 months, checklist Rev. 13, revision dated April 2002
- Selected GSTR Facility Start-Up Checklists for the past 13 months including Page 1 of the checklist, Rev. 8 revision dated April 2005, and Page 2 of the checklist, Rev. 7, revision dated April 2002
- GSTR Procedure No. 2, “Procedure for Reactor Power Calibration,” dated April 30, 1993 and last reviewed May 27, 2010
- GSTR Procedure No. 3, “Procedure for Control Rod Calibration,” dated April 1990 and last reviewed April 16, 2010
- GSTR Procedure No. 7, “Procedure for Control Rod Measurement, Inspection, or Replacement,” dated April 1990 and last reviewed April 16, 2010
- GSTR Procedure No. 12, “Procedure for Changing Demineralizer Resin,” dated April 1990 and last reviewed November 9, 2009
- GSTR Procedure No. 13, “Procedure for Use of Leak Testing Device,” dated April 1990 and last reviewed April 16, 2010
- GSTR Procedure No. 19, “Procedure for Test Equipment Calibration,” dated April 30, 1993 and last reviewed May 2, 2010
- GSTR Procedure No. 21, “Procedure for Measuring Control Rod Drop Time,” dated October 5, 1992 and last reviewed May 2, 2011
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2010 through December 31, 2010, submitted January 31, 2011
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2009 through December 31, 2009, submitted April 19, 2010

b. Observations and Findings

(1) Maintenance

The inspectors reviewed selected maintenance guidance documents and records, including the Maintenance Log. This Log was used effectively to document detailed maintenance activities completed on specific items of equipment including the primary and secondary pumps, exhaust fans, the cooling tower, and the sump pump. The records reviewed indicated that routine and preventive maintenance was controlled, conducted, and documented in the Maintenance or Operations Log consistent with licensee procedures. Verifications and operational systems checks were performed to ensure system operability before an item of equipment or a system was returned to service. Unscheduled maintenance or repairs were reviewed to determine if they required a 10 CFR 50.59 evaluation.

(2) Surveillance

The inspectors reviewed selected records of TS required checks, tests, and Limiting Conditions for Operation (LCO) verifications performed since January 2009. These included the daily checkouts that provided documentation of control rod scram, withdraw prevent, and interlock functions, and weekly conductivity tests, as well as monthly surveillance checks of the reactor ventilation system, building alarms, radiological safety, and reactor water system. Other periodic surveillances and verifications were reviewed including power calibrations, control rod inspections and fuel elements inspections. The review showed that the periodic checks, tests, and LCO verifications for TS required surveillances were completed as required. The results of these activities were within prescribed TS limits and procedure parameters and in agreement with the previous surveillance results.

The various surveillance checks, inspections, and verifications reviewed were being tracked through the Daily and/or Monthly Checklists. Documentation of completion of these activities was maintained in the Checklists and/or in the Operations or Fuel Logbooks. This system was found to provide adequate control of the reactor operational tests and checks, and LCO verifications.

c. Conclusion

The licensee's maintenance program was being implemented as required by GSTR procedures. The program for surveillance checks and LCO verifications satisfied TS requirements.

6. Experiments

a. Inspection Scope (IP 69001)

The inspectors reviewed selected aspects of the following to verify that experiments were conducted in compliance with TS Section I:

- Selected Experiment Authorizations, logs, and records
- Experiment program requirements contained in ROM Sections 4.5 through 4.8
- U.S. Geological Survey TRIGA Survey Reactor Experiment Authorization Forms including Parts I, II, and III for Experiment Nos. L-119, L-120, C-43, C-45, C-47, C-48, and O-23
- Selected U.S. Geological Survey TRIGA Survey Reactor Radioisotope Request and Receipt Forms which had been completed during October 2008 through the present
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2009 through December 31, 2009, submitted January 25, 2010
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2010 through December 31, 2010, submitted January 31, 2011
- ANSI/ANS Standard 15.6, "Review of Experiments for Research Reactors," dated July 1974

b. Observations and Findings

Experiments at the GSTR were categorized as either Class I or Class II experiments by the RS. Class I experiments were those that had been performed previously or were minor modifications to previous experiments. They were classified and approved by the RS and reviewed by the ROC for proper classification. Class II experiments were new experiments or major modifications of previously existing ones. These were required to be reviewed and classified by the RS and then reviewed and approved by the ROC. All current experiments at the facility were also required to be reviewed on an annual basis by the RS and approved if still active and the appropriate controls remained in effect.

The inspectors reviewed various previously approved and six new Experiment Authorization Forms. The authorization forms listed a description of the experiment, the experiment class, limiting conditions for reactor operations, personnel authorized to deliver and/or pick up samples, and the license number of the authorized recipient. It was noted that the five of the new experiments were designated as Class I and involved irradiation of samples for isotope or tracer production. One of the new experiments was designated as a Class II experiment and involved irradiation of samples of uranium oxide.

Through the review of the Experiment Authorization Forms, the inspectors verified that the new Class II experiment had been classified and reviewed by the RS and reviewed by the ROC and approved by the Chairman of the ROC as required. The inspectors also noted that three of the new Class I experiments had been classified and approved by the RS and referred to the ROC for review as

required. However, two of the Class I experiments had been approved by the RS but had not been reviewed by the ROC. When this was discussed with the RS, he confirmed that there was no documentation of the ROC review of the two Forms. He immediately took corrective actions by sending electronic-mail messages (E-mail) to each of the ROC members asking them to review the two new Class I experiments and confirm that they were classified correctly. By the end of the inspection, two of the ROC members had returned E-mails concurring that the experiments were properly designated as Class I.

The review of current experiment authorizations, Radioisotope Request and Receipt (RR&R) Forms, and related reactor log book entries, also confirmed that experiments were installed, performed, and removed as outlined in the approved experiment authorizations. The inspectors also verified that the various RR&R Forms were used to list the radioisotopes produced during the irradiation and the disposition thereof. The inspectors determined that the resulting radioisotopes were appropriately controlled and held for decay or transferred as required. This information was documented on the RR&R Forms.

c. Conclusion

The control and performance of experiments were acceptable and in accordance with Experiment Authorization and TS Section I requirements.

7. Fuel Handling

a. Inspection Scope (IP 69001)

To verify that reactor fuel was handled, moved, and inspected in compliance with TS Sections D and G, the inspectors reviewed selected aspects of:

- Fuel movement and examination records
- Fuel handling equipment and instrumentation
- Reactor Operations Logbooks Nos. 139–146
- Fuel Element Location Board maintained in the Reactor Room
- GSTR Fuel Book containing the various USGS TRIGA Reactor Fuel Element History sheets for all the elements at the facility
- GSTR Procedure No. 4, “Procedure for Fuel Loading and Unloading,” dated April 1990, last revised April 2008, and last reviewed April 16, 2010
- GSTR Procedure No. 8, “Procedure for Measuring Fuel Elements,” dated October 11, 1991, last revised April 2010, and last reviewed April 16, 2010
- GSTR Procedure No. 9, “Procedure for Locating Fuel Element Cladding Failure,” dated April 1990, last revised April 2010, and last reviewed April 16, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for January 1, 2009 through March 31, 2009
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for April 1, 2009 through June 30, 2009

- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for July 1, 2009 through September 30, 2009
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for October 1, 2009 through December 31, 2009
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for January 1, 2010 through March 31, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for April 1, 2010 through June 30, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for July 1, 2010 through September 30, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for October 1, 2010 through December 31, 2010
- U.S. Geological Survey TRIGA Reactor Quarterly (Operations) Report for January 1, 2011 through March 31, 2011

b. Observations and Findings

The inspectors reviewed the GSTR fuel handling at the facility and found that the appropriate fuel logs and inspection records were being maintained. It was noted that fuel movements were planned and a written sequence developed prior to completing the actual transfers. Log keeping and data recording followed the guidance specified in the facility procedures and fuel inspection met TS Section D.6 requirements. Data recorded for fuel movement was cross referenced in the Fuel Book and Operations Logs. Through review of the fuel movement and inspection records and interviews with operations staff, the inspectors verified that fuel was moved and controlled according to established procedure. The inspectors also verified that fuel was being stored in the locations indicated by licensee records and as required in TS Section G.

c. Conclusion

Fuel handling activities and the documentation thereof were acceptable and in accordance with procedural and TS requirements.

8. Emergency Preparedness

a. Inspection Scope (IP 69001)

To verify compliance with the facility Emergency Plan (E-plan) entitled, “Emergency Plan for the U.S. Geological Survey TRIGA Reactor Facility,” dated February 2005, the inspectors reviewed selected aspects of:

- Training records for the past two years
- Emergency drills and critiques for 2009 and 2010
- GSTR Emergency Call List, last updated March 2011
- Offsite support agreement with the University of Colorado Hospital
- Emergency response facilities, supplies, equipment and instrumentation

- Notification Information sheet for the U. S. Geological Survey TRIGA Reactor Facility, last updated October 2010
- E-plan implementing procedures contained in ROM Section 7, "Emergency Procedures," Rev. dated April 2011
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2010 through December 31, 2010, submitted January 31, 2011
- U.S. Geological Survey TRIGA Reactor Annual Reports for January 1, 2009 through December 31, 2009, submitted January 25, 2010

b. Observations and Findings

The inspectors verified that the E-Plan in use at the facility was the same as the version most recently submitted to the NRC. The E-Plan was audited and reviewed at least biennially (this was typically done annually) by the ROC as required by TS Section H.5 and revised as needed. The implementing procedures were also reviewed and revised as needed to ensure the effectiveness of the E-Plan.

Through a check of the emergency equipment and portable detection instrumentation listed in the Emergency Procedures, the inspectors determined these resources were available and being maintained as required by the E-Plan. The evacuation horn and other alarms were being tested at the required frequency. The inspectors also verified that a Letter of Agreement, which was in effect with the University of Colorado Hospital, was being maintained as required and was adequate.

Through reviews of training records and drill summaries and critiques, and through interviews with GSTR personnel, the inspectors confirmed that emergency response training was given as required by the E-Plan and that emergency responders were knowledgeable of the proper actions to take in case of an emergency. It was noted that annual Evacuation Drills and biennial Emergency Drills had been conducted as required by the E-Plan. Each Emergency Drill provided a practical and reasonable test of the participants' knowledge and skills. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions for any problems identified.

The inspectors reviewed the previous drill and determined it was very beneficial and the critique following the drill was informative. As a result of the critique, suggestions were made for improvement to facility response and site procedures, as well as to the fire department response and procedures. Also following the drill, a familiarization tour and training were conducted by the licensee at the GSTR facility for fire department personnel. The inspectors noted that there was a good working relationship between GSTR and fire department personnel.

The inspectors also visited the Denver MEGA Center and observed the facilities, supplies, and equipment there that would be available in case of an emergency at the GSTR. The equipment utilized was new and state of the art. There also

appeared to be a good working relationship between the licensee and this support organization.

c. Conclusion

The inspectors concluded that the emergency preparedness program was conducted in accordance with the E-plan because: 1) the Emergency Plan and implementing procedures were being reviewed biennially as required, 2) emergency response equipment was being maintained and alarms were being tested as required, 3) a Letter of Agreement with the university hospital was being maintained, 4) drills were being conducted as required, and 5) emergency preparedness training was being completed.

9. Exit Meeting Summary

The inspectors reviewed the inspection results with members of licensee management at the conclusion of the inspection on May 5, 2011. The licensee acknowledged the findings presented 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 Personnel

B. Adrian	Reactor Administrator
A. Buehrle	Senior Reactor Operator
T. DeBey	Manager, GSTR and Reactor Supervisor
C. Farwell	Senior Reactor Operator
D. Liles	U.S. Geological Survey RSO and Senior Reactor Operator
B. Roy	Senior Reactor Operator

Other Personnel

M. Coska	ROC Member
J. Higginbotham	ROC Chairman
S. O'Kelly	ROC Member
D. Taulie	Manager, Denver Mega Center, Federal Protective Service, Department of Homeland Security
S. Mahan	ROC Member

INSPECTION PROCEDURE (IP) USED

IP 69001 Class II Research and Test Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ANSI/ANS	American National Standards Institute/American Nuclear Society
E-Plan	Emergency Plan
GSTR	Geological Survey TRIGA Reactor
LCO	Limiting Conditions for Operation
No(s).	Number(s)
NRC	U. S. Nuclear Regulatory Commission
Rev.	Revision
RO	Reactor Operator
ROC	Reactor Operations Committee
ROM	Reactor Operations Manual
RR&R	Radioisotope Request and Receipt (form)
RS	Reactor Supervisor
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
TS	Technical Specifications
USGS	United States Geological Survey