

July 25, 2012

Dr. Jeffrey Geuther, Manager
KSU Nuclear Reactor Facility
Department of Mechanical and
Nuclear Engineering
112 Ward Hall
Kansas State University
Manhattan, KS 66506-5204

SUBJECT: KANSAS STATE UNIVERSITY - NRC ROUTINE, ANNOUNCED INSPECTION
REPORT NO. 50-188/2012-201

Dear Dr. Geuther:

From June 25 to 27, 2012, the U.S. Nuclear Regulatory Commission (NRC or the Commission) conducted an inspection at the Kansas State University Nuclear Reactor Facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

This inspection was an examination of 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. 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 noncompliances with NRC requirements 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 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 (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Gary Morlang at 301-415-4092 or by electronic mail at Gary.Morlang@nrc.gov.

Sincerely,
/RA/

Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-188
License No. R-88

Enclosure: As stated

cc w/encl: See next page

Kansas State University

Docket No. 50-188

cc:

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

Docket No: 50-188

License No: R-88

Report No: 50-188/2012-201

Licensee: Kansas State University

Facility: TRIGA Mark II Research Reactor

Location: Manhattan, Kansas

Dates: June 25-27, 2012

Inspector: Gary (Mike) Morlang

Approved by: Gregory T. Bowman, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Kansas State University TRIGA Mark II Research Reactor Facility NRC Inspection Report No. 50-188/2012-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Kansas State University (the licensee's) Class II research reactor facility safety programs, including: organization and staffing, operations logs and records, procedures, requalification training, surveillance and limiting conditions for operation, emergency planning, maintenance logs and records, and fuel handling logs and records. The licensee's programs were acceptably directed toward the protection of public health and safety, and were in compliance with the U.S. Nuclear Regulatory Commission's requirements.

Organization and Staffing

- The organization and staffing was consistent with Technical Specification (TS) requirements.

Operations Logs and Records

- Operational activities were consistent with applicable TS and procedural requirements.

Procedures

- Procedure administrative review, revision, and implementation satisfied TS requirements.

Requalification Training

- The records reviewed by the inspector indicated that the licensee was in compliance with Title 10 of *Code of Federal Regulations* Part 55 and the licensee's Requalification Plan.

Surveillance and Limiting Conditions for Operation

- The inspector found that the surveillance program and supporting procedures were in compliance with TS.
- Operations were found to be in compliance with the limiting conditions for operation and surveillance requirements were completed as described in the TS.

Emergency Planning

- The emergency preparedness program was conducted in accordance with the Emergency Plan.

Maintenance Logs and Records

- Maintenance was performed and logs and records maintained consistent with TS and licensee procedure requirements.

Fuel Handling Logs and Records

- Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

Follow-up on Previously Identified Issues

- Unresolved Item 50-188/2007-202-01 was discussed and closed during the inspection.
- Inspection Follow-Up Item 50-188/2009-201-01 was discussed and closed during the inspection.

REPORT DETAILS

Summary of Facility Status

The Kansas State University's (KSU's or the licensee's) 1250 kilowatt reactor continued to be operated in support of the University's academic program in nuclear engineering laboratory instruction and research. Since the inspection was performed during the summer recess, laboratory experiments were not scheduled and the reactor was operated only for short sample irradiations. During the performance-based aspect of the inspection, the reactor was operated to support this area.

1. Organization and Staffing

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

The inspector reviewed the following to verify compliance with the organization and staffing requirements in Technical Specification (TS) Section 6.1:

- Kansas State reactor organizational structure and staffing
- TS for Kansas State University TRIGA reactor, dated October 8, 2008
- Reactor console logbooks covering operations from November 19, 2010 to present (seven books)
- KSU Annual Report to the U.S. Nuclear Regulatory Commission (NRC), January 2010 to December 2010, dated February 8, 2011
- KSU Annual Report to the NRC, January 2011 to December 2011, dated February 1, 2012

b. Observations and Findings

Since the last inspection (NRC Inspection Report No. 50-188/2011-201), the organizational structure and the responsibilities of the reactor management and staff had not changed. Review of records verified that management responsibilities were administered as required by TS and applicable procedures. The inspector observed reactor operations and noted the shift staffing of the licensee satisfies the requirements for TS. There were four licensed senior reactor operators (SROs) and five licensed reactor operators (ROs).

c. Conclusion

The organization and staffing was consistent with TS requirements.

2. Operations Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to ensure that the operations program was being implemented as required in TS Section 6:

- Reactor console log books, dated from November 11, 2010 to present
- KSU operator licenses for four SROs and five ROs
- KSU TRIGA Mark II Daily Checklist (March 2008 revision), dated from January 5, 2010 to present
- KSU Annual Report to the NRC, January 2010 to December 2010, dated February 8, 2011
- KSU Annual Report to the NRC, January 2011 to December 2011, dated February 1, 2012

b. Observations and Findings

Reactor operations were carried out following written procedures and TS requirements. The inspector observed the performance of the required checklist for operation of the reactor. Additionally, a reactor start-up to power was observed. The inspector noted that the licensed operator on duty was knowledgeable and competent. The inspector verified that reactor operating characteristics, and other TS- and procedure-required entries, were recorded on the appropriate forms and logs. The inspector determined that reactor operations were carried out in accordance with written procedures and TS requirements.

On July 19, 2011, a new console log book was instituted providing additional space for information on irradiation and maintenance. Additionally, new by-product material spreadsheets are inserted into the log books. These changes were made to aid in tracking sample irradiations.

c. Conclusion

Operational activities were consistent with applicable TS and procedural requirements.

3. Procedures

a. Inspection Scope (IP 69001-02.03)

The inspector reviewed the following to ensure that the requirements of TS Section 6.3, "Operating Procedures," were being met concerning written procedures:

- TS for Kansas State University TRIGA reactor dated October 8, 2008
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-15 Reactor Startup," dated April 7, 2011
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-16 Reactor Shutdown," dated March 14, 2008
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-1 Biennial Control Rod Inspection," dated February 7, 2012
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-10 Fuel Element Inspection," dated April 7, 2011
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-19 Gamma Ray Assay of Reactor Samples," dated April 7, 2011

b. Observations and Findings

Oversight and review of procedure implementation was provided by licensee management and the Reactor Safeguards Committee. All procedures were current and had been approved by the Reactor Safeguards Committee. During reactor operations and other evolutions procedure compliance was evident.

c. Conclusion

Procedure administrative review, revision, and implementation satisfied TS requirements.

4. Requalification Training

a. Inspection Scope (IP 69001-02.04)

The inspector reviewed the following to verify that the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, Operators' Licenses, were being met:

- Requalification Program, Kansas State University, dated September 11, 2002
- KSU Annual Report to the NRC, January 2010 to December 2010, dated February 8, 2011
- KSU Annual Report to the NRC, January 2011 to December 2011, dated February 1, 2012
- Personal RO/SRO files
- Reactor console log books, dated from November 11, 2010 to present

- KSU operator licenses for four SROs and five ROs
- Console spreadsheet for operator training and requal
- NRC Form 396, "Medical Qualification," for all SROs and ROs

b. Observations and Findings

A section of the licensee's monthly data sheets for the reactor operations report contained operator requalification data, such as each operator's manipulations, operating hours, and last date of operating. This data was collected from the console log books which provided detailed entries for each operator.

The inspector reviewed the training records for the required lectures of the requalification plan. Each operator had assigned lectures to present. Training was being conducted on a weekly basis. Four operators were on summer internships away from the university. They will enter accelerated requalification upon their return to the university.

The inspector reviewed the medical qualification sheets for all operators. One of the four operators on summer internship will be required to undergo a physical exam upon returning.

c. Conclusion

The records reviewed by the inspector indicated that the licensee was in compliance with 10 CFR Part 55 and the licensee's Requalification Plan.

5. Surveillance and Limiting Conditions for Operations

a. Inspection Scope (IP 69001-02.05)

The inspector reviewed the following to verify compliance with TS Section 3.0, "Limiting Conditions for Operations (LCO)," and to determine if the periodic surveillance tests on safety systems were performed as stipulated in TS Section 4.0, "Surveillances:"

- Maintenance and surveillance reports for the months of January 2011 to present
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-15 Reactor Startup," dated April 7, 2011
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-16 Reactor Shutdown," dated March 14, 2008
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-1 Biennial Control Rod Inspection," dated February 7, 2012
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-10 Fuel Element Inspection," dated April 7, 2011
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-19 Gamma Ray Assay of Reactor Samples," dated April 7, 2011

b. Observations and Findings

The licensee used a monthly form listing periodic tests, including those required by TS and by procedures. This tool aided the licensee in assuring that surveillances were completed on a timely basis. The inspector verified that surveillances had been completed on schedule, in accordance with licensee procedures, and in compliance with the TS.

c. Conclusion

Operations were found to be in compliance with the LCO and surveillances requirements as stated in the TS.

6. Emergency Planning

a. Inspection Scope (IP 69001-02.10)

The inspector reviewed documentation verifying implementation of selected portions of the emergency preparedness program (EPP) including:

- Emergency telephone contact list
- Emergency support center equipment inventories
- Emergency Plan (EP) KSU TRIGA Mark II Nuclear Reactor Facility, August 2, 2011
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 2, "Notification List," dated August 2, 2011
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 3, "Emergency Classification," dated August 8, 2006
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 5, "Fire," dated August 2, 2011
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 7, "External Hazard," dated August 8, 2006
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 8, "Radiation Hazard," dated August 8, 2006

b. Observations and Findings

The inspector along with the licensee made a trip to the Manhattan Fire Department and inspected the radiological hazardous materials truck and trailer. Inventories of equipment and calibrations of equipment were current.

Agreement letters with outside support groups were on file, dated during 2010. The EP requires that the agreement letters be reviewed and updated every 2 years. New letters had been sent to the supporting agencies but had not been returned at the time of the inspection.

The inspector verified that current emergency call lists were available and personnel knew where to find the current list.

c. Conclusion

The EPP was conducted in accordance with the EP.

7. Maintenance Logs and Records

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the applicable regulations, the inspector reviewed selected aspects of:

- Reactor logbooks for the period November 19, 2010 to present
- Test and Maintenance Procedure 13, "Portable Radiation Meter Calibration," dated August 22, 2011
- Test and Maintenance Procedure 20, "Liquid Scintillation Assay Methods," dated March 14, 2008
- Test and Maintenance Procedure 8, "Calibration of Continuous Air Monitor," dated March 14, 2008
- Test and Maintenance Procedure 6, "Semi-Annual Pulse Rod Drive Cylinder and Air Supply Inspection," dated March 14, 2008
- Test and Maintenance Procedure 3, "Annual Remote Area Monitor Calibration," dated March 14, 2008
- Maintenance and surveillance monthly reports from January 2011 to present
- KSU Annual Report to the NRC, January 2010 to December 2010, dated February 8, 2011
- KSU Annual Report to the NRC, January 2011 to December 2011, dated February 1, 2012

b. Observations and Findings

The inspector reviewed the maintenance records related to scheduled and unscheduled preventive and corrective maintenance activities that had occurred during the inspection period. Routine and preventive maintenance was controlled and well documented in the console logs and the reactor utilization report. The inspector verified that all maintenance reviewed was conducted in accordance with the requirements of TS Section 4.0.

c. Conclusion

Maintenance logs, records, and performance satisfied TS and procedure requirements.

8. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001-02.12)

The inspector reviewed the following to verify compliance with requirements of TS Sections 5.2 and 6.3.a.2:

- Reactor console logbook, November 19, 2010 to present
- Procedure No. 26, "Fuel Handling Procedure," dated August 22, 2011
- Procedure No. 27, Removal of Fuel from the Reactor Tank," dated August 22, 2011
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-1 Biennial Control Rod Inspection," dated February 7, 2012
- KSU TRIGA Mark II, special nuclear material (SNM) notebook
- Fuel location status map (control room)

b. Observations and Findings

The licensee performed fuel inspection during the period of May 14 to 16, 2012. All fuel movements were documented in the console log and the SNM notebook.

Procedures for refueling, fuel movement, and TS-required fuel inspections and control rod surveillances had been reviewed and approved as required. Fuel movement and data recording were being done according to facility procedures.

c. Conclusion

Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

9. Follow-up on Previously Identified Issue

a. Inspection Scope (IP 92701)

The inspector reviewed progress on an unresolved item (URI) from a previous inspection, 50-188/2007-202-01, "Storage of reactor waste at campus decay-in-storage facility." Additionally, the inspector reviewed progress on an inspection follow-up item (IFI) from a previous inspection, 50-188/2009-01-01, "Corrective action to address reactor trips associated with operator error."

b. Observations and Findings

The reactor licensed waste had been moved back to the reactor facility, within the purview of the reactor license. This item is considered closed.

The IFI was initiated in 2009 as a result of 13 reactor trips resulting from operator errors. Since that time training and procedure improvements have reduced the number of trips to a more reasonable level. The inspector reviewed the console

logs and noted five operator error trips since the last inspection. This is down from eight trips noted during the previous inspection. This item is considered closed.

c. Conclusion

URI 50-188/2007-202-01 and IFI 50-188/2009-201-01 were discussed and closed during this inspection.

10. Exit Interview

The inspector presented the inspection results to licensee management at the conclusion of the inspection on July 27, 2012. The inspector described the areas inspected and discussed in detail the inspection observations. No information was identified as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bridges	Head of Radiation Safety Office, Environmental Health and Safety Division and Campus Radiation Safety Officer
J. Geuther	Reactor Manager

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 92701	Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED

None

CLOSED

50-188/2007-202-01	URI	Storage of reactor waste at campus decay-in-storage facility
50-188/2009-201-01	IFI	Corrective action to address reactor trips associated with operator error

DISCUSSED

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
EP	Emergency Plan
EPP	Emergency Preparedness Program
IFI	Inspection Follow-up Item
IP	Inspection Procedure
KSU	Kansas State University
LCO	Limiting conditions for operation
NRC	U. S. Nuclear Regulatory Commission
RO	Reactor Operator
RSC	Reactor Safety Committee
SNM	Special Nuclear Material
SRO	Senior Reactor Operator
TS	Technical Specifications
URI	Unresolved Item