

July 24, 2015

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 INSPECTION REPORT
NO. 50-188/2015-201

Dear Dr. Geuther:

From June 22–25, 2015, the U.S. Nuclear Regulatory Commission (NRC or the Commission) conducted an inspection at the Kansas State University Nuclear Reactor Facility (Inspection Report No. 50-188/2015-201). 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 findings of non-compliance 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 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>.

J. Geuther

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

Sincerely,

/RA/

Kevin Hsueh, 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:
NRC Inspection Report
No. 50-188/2015-201

cc: See next page

Kansas State University

Docket No. 50-188

cc:

Office of the Governor
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Reactor Newsletter
202 Nuclear Sciences Center
University of Florida
Gainesville, FL 32611

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- 2 -

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NAME	GMorlang	KHsueh
DATE	7/20/2015	7/24/2015

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

Docket No: 50-188

License No: R-88

Report No: 50-188/2015-201

Licensee: Kansas State University

Facility: TRIGA Mark II Research Reactor

Location: Manhattan, Kansas

Dates: June 22–25, 2015

Inspector: Gary Morlang

Approved by: Kevin Hsueh, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Kansas State University TRIGA Mark II Research Reactor Facility NRC Inspection Report No. 50-188/2015-201

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: (1) operations logs and records; (2) experiments; (3) health physics and environmental protection; (4) design changes; (5) committees, audits, and reviews; and (6) transportation of radioactive material. 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 (NRC) requirements.

Operations Logs and Records

- Operations Logs and records were maintained in accordance with procedures and Technical Specifications

Experiments

- Experiments were being reviewed and performed in accordance with Technical Specifications requirements and the licensee's written procedures.

Health Physics and Environmental Protection

- The radiation safety program was conducted in compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 requirements, Technical Specifications, and licensee procedures.
- Effluent monitoring satisfied license conditions and regulatory requirements and releases were within the specified regulatory and Technical Specifications limits.

Design Changes

- The review and evaluation of changes to the facility and procedures satisfied NRC requirements as specified in 10 CFR 50.59.

Committees, Audits, and Reviews

- The Reactor Safety Committee provided the oversight required by the Technical Specifications.

Transportation of Radioactive Material

- Due to the nature of the licensee operations, no shipments had been made from the reactor facility under the reactor license during the past 2 years.

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. The reactor was operated only for short sample irradiations during the inspection.

1. Operations Logs and Records

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

The inspector reviewed selected parts of the following reactor operations records to verify that the requirements of Technical Specifications Section 6.5, "Operating Records," were being met:

- Technical Specifications for KSU TRIGA Reactor, dated March 13, 2008
- KSU TRIGA Mark II Console Logbooks, dated June 9, 2014, to present
- Daily Checklists, dated September 13, 2013 to present
- SOT-1 Instrument and Equipment Checkout, Rev. 4, dated August 13, 2007
- Test and Maintenance Procedure No. 28, "Temperature Channel Calibration," dated March 14, 2008
- 2013 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated June 30, 2014
- 2014 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated April 7, 2015

b. Observations and Findings

The inspector noted in the operating logs that there were 5 inadvertent scrams in 2013 and 2 inadvertent scrams in 2014, a significant reduction from previous inspections in this area. Detailed operator training and equipment upgrades both contributed to the improvement.

Console operating logs were well maintained and easily cross referenced to other documents. Several recent modifications to the log book pages had facilitated in better data entry and tracking of evolutions.

c. Conclusion

Operating logs and records were being maintained in accordance with procedures and Technical Specifications.

2. Experiments

a. Inspection Scope (IP 69001)

In order to verify that any existing experiments and newly proposed experiments met all Technical Specifications requirements, the inspector reviewed selected aspects of:

- Technical Specifications for KSU TRIGA Reactor, dated March 13, 2008
- KSU TRIGA Mark II Experiment 1, dated October 18, 2013
- KSU TRIGA Mark II Console Logbooks, dated June 9, 2014, to present
- KSU TRIGA Mark II By-Product Logbook, dated October 2011 to present
- Reactor Safety Committee meeting minutes for 2013, 2014, and 2015

b. Observations and Findings

The licensee maintained a file of existing experiments. The facility's Technical Specifications, which were issued on March 13, 2008, when the facility's license was renewed, require any new experiments to be approved by the Reactor Safety Committee. Two new experiments had been proposed to the Reactor Safety Committee since the last inspection.

Experiment #51, Auto Irradiation in the Lazy Susan ring, and Experiment #52, Positive Period Method for Measuring the Worth of a Fuel Element had both been approved by the Reactor Safety Committee.

c. Conclusion

Experiments were being reviewed and performed in accordance with Technical Specifications requirements and the licensee's written procedures.

3. Health Physics and Environmental Protection

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20 requirements:

- 2013 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated June 30, 2014
- 2014 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated April 7, 2015
- Radiation Dosimetry Report for 2013, 2014, and 2015 to present
- Radiation Safety Manual for KSU (August 2007)
- 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 3, "Remote Area Monitor Calibration," dated March 14, 2008
- Test and Maintenance Procedure 8, "Calibration of Continuous Air Monitor," dated March 14, 2008
- Nuclear Reactor Facility Monthly Radiation and Smear Surveys, May 2013 to May 2015
- Sump Discharge Calculations for 2013 and 2014
- Semiannual Management Audit Report of Reactor Operations and Radiation Protection from 2013 to 2014

b. Observations and Findings

The inspector toured the facility to interview and observe licensee personnel and practices regarding the use of dosimetry and radiation monitoring equipment, placement of radiological signs and postings, use of protective clothing, and practices for handling and storing radioactive material or contaminated equipment.

The inspector reviewed records of monthly radiation surveys and contamination surveys performed by the reactor staff and health physics technicians, and found the results to be generally low and consistent with facility postings and readings of instruments observed by the inspector. A copy of the current NRC Form 3, "Notice to Radiation Workers," was posted as required by 10 CFR Part 19.

An examination of dosimetry results indicating radiological exposures at the facility since the last inspection showed that the highest occupational doses, as well as doses to the public, were within 10 CFR Part 20 limits. The Environmental Health and Safety personnel have the responsibility and facilities for the calibration of all portable radiation detectors on the campus. The calibration records of selected devices were reviewed and found to be up to date.

The inspector reviewed the Annual Operating Reports for the 2013 to 2014 period. There were a total of 7 liquid discharges from the reactor bay sump during those 2 years. All isotope levels were below 10 CFR Part 20, Appendix B limits.

During a six month leave by the Radiation Safety Officer, the Deputy Director, Radiation Safety Office was designated in writing by the Associate Vice President of the University to perform all Radiation Safety Officer duties, this resulted in a smooth turnover and detailed coverage of duties required.

c. Conclusion

The radiation safety program was conducted in compliance with 10 CFR Part 20 requirements, Technical Specifications, and licensee procedures.

4. Design Changes

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that if design changes were made, they were reviewed and approved in accordance with 10 CFR 50.59, the Technical Specifications, and the licensee's administrative procedures:

- 2013 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated June 30, 2014
- 2014 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated April 7, 2015
- Technical Specifications for KSU TRIGA Reactor, dated March 13, 2008
- Annual 10 CFR 50.59 Reports for 2013 and 2014
- KSU TRIGA Mark II Console Logbooks, dated June 9, 2014, to present
- 10 CFR 50.59 Evaluation Reports for 2013 and 2014
- Reactor Safety Committee Annual Operating Audits for 2013 and 2014

b. Observations and Findings

The licensee had performed a 10 CFR 50.59 evaluation for 7 facility modifications and numerous procedure changes since the last inspection in this area. The facility modifications included items such as installing steel grid plates over the bulk shield tank, meter replacement, pump replacement and radiation monitor replacement. All evaluations were completed and submitted to the Reactor Safety Committee for final approval.

c. Conclusion

The review and evaluation of changes to the facility and procedures satisfied NRC requirements specified in 10 CFR 50.59.

5. Committees, Audits, and Reviews

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that audits and reviews stipulated in the facility's Technical Specifications were conducted by the Reactor Safety Committee:

- KSU TRIGA Mark II Console Logbooks, dated June 9, 2014, to present
- Technical Specifications for KSU TRIGA Reactor, dated March 31, 2008
- 2013 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated June 30, 2014
- 2014 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated April 7, 2015
- Reactor Safety Committee Semiannual Meeting minutes from October 8, 2013,

- March 14, 2014, October 17, 2014, and May 8, 2015
Semiannual Management Audit Report of Reactor Operations and Radiation Protection from 2013 to 2014

b. Observations and Findings

The inspector verified that the Reactor Safety Committee conducted meetings at the required frequency with a quorum present, pursuant to Technical Specifications requirements and that the Reactor Safety Committee conducted the required audits, reviewed and approved procedures and experiments, and provided direct oversight of reactor operations.

c. Conclusion

The Reactor Safety Committee provided the oversight required by the Technical Specifications.

6. Transportation of Radioactive Material

a. Inspection Scope (IP 86740)

The inspector interviewed licensee personnel and determined that no shipment of radioactive material had been conducted under the license since the last inspection in this area. The inspector also reviewed the following:

- 2013 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated June 30, 2014
- 2014 Annual Operating Report for KSU Triga Mk II Nuclear Reactor Facility dated April 7, 2015
- Reactor Safety Committee Semiannual Meeting minutes from October 8, 2013, March 14, 2014, October 17, 2014, and May 8, 2015

a. Observations and Findings

There were two individuals authorized to ship radioactive material at the university. The inspector verified that these individuals had been properly trained and that their certifications were up-to-date. There had been no shipments of radioactive material since the last inspection in this area.

b. Conclusion

Although the licensee had not shipped any radioactive material, personnel and procedures were in place should the need to ship arise.

7. Follow-up Item

Aspects of the licensee's implementation of the fingerprinting requirements in 10 CFR 73.57 were reviewed and verified. Specifically, the licensee has at least one

NRC-approved reviewing official to receive fingerprinting results and make trustworthiness and reliability determinations based on those results. The licensee was appropriately limiting unescorted access to SNM and to those individuals who have been determined to be trustworthy and reliable based on a fingerprint-based criminal history records check. The licensee was properly controlling and protecting the fingerprint records as required by regulations. Based on the observations and findings of the inspection the fingerprinting requirements appeared to be acceptably implemented by the licensee.

8. Exit Interview

The inspector presented the inspection results to licensee management at the conclusion of the inspection on June 25, 2015. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the results of the inspection and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bridges	Head of Radiation Safety Office, Environmental Health and Safety Division and Campus Radiation Safety Officer
M. Catanach	Deputy Director, Radiation Safety Office, Environmental Health and Safety
J. Geuther	Reactor Manager
J. Chadwich	Senior Reactor Operator
T. George	Senior Reactor Operator
N. Fellows	Senior Reactor Operator

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
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ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Document Access Management System
IP	Inspection Procedure
KSU	Kansas State University
NRC	U.S. Nuclear Regulatory Commission
SNM	Special Nuclear Material