

August 30, 2016

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

SUBJECT: KANSAS STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION
ROUTINE INSPECTION REPORT NO. 50-188/2016-201

Dear Dr. Geuther:

From August 1-4, 2016, 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 component of 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).

J. Geuter

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

Sincerely,

/Michael Takacs for RA/

Anthony J. Mendiola, 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/enclosure: See next page

Kansas State University

Docket No. 50-188

cc:

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University of Florida
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Gainesville, FL 32611

J. Geuter

- 2 -

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

Docket No. 50-188

License No. R-88

Report No. 50-188/2016-201

Licensee: Kansas State University

Facility: TRIGA Mark II Research Reactor

Location: Manhattan, Kansas

Dates: August 1-4, 2016

Inspector: Gary M. Morlang

Approved by: Anthony J. Mendiola, 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. 50-188/2016-201

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) organization and staffing, (2) procedures, (3) requalification training, (4) surveillance and limiting conditions for operation, (5) emergency planning, (6) maintenance logs and records, and (7) 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 (NRC's) requirements.

Organization and Staffing

- The organization and staffing was consistent with Technical Specification (TS) 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 the *Code of Federal Regulations* (10 CFR) Part 55, "Operator's Licenses," 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 and were completed as described in the TS.

Emergency Planning

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

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

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 for training purposes and a tour.

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, "Organization and Responsibilities of Personnel":

- Kansas State reactor organizational structure and staffing
- TSs for Kansas State University TRIGA reactor, dated October 8, 2008
- Reactor console logbooks covering operations from January 2015 to present
- KSU Annual Report to the Nuclear Regulatory Commission (NRC), January 2014 to December 2014, dated April 7, 2015
- KSU Annual Report to the NRC, January 2015 to December 2015, dated January 13, 2016
- Reactor Safeguards Committee (RSC) Meeting Minutes for 2015 and 2016
- Semi-Annual Audit Reports by the Reactor Manager on Reactor Operations and Radiation Protection Program for 2015 and 2016
- Daily Reactor Startup and Shutdown Checklist from January 2015 to present

b. Observations and Findings

Since the last inspection (NRC Inspection Report No. 50-188/2014-201), 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 on two separate occasions and noted the shift staffing of the licensee satisfied the requirements for TS. There was one licensed senior reactor operator (SRO) and six licensed reactor operators (RO) at the facility.

c. Conclusion

The organization and staffing was consistent with TS requirements.

2. Procedures

a. Inspection Scope (IP 69001-02.03)

The inspector reviewed the following to ensure that the requirements of TS Section 6.3, "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 May 20, 2016
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-1 Biennial Control Rod Inspection," dated February 3, 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 August 14, 2012

b. Observations and Findings

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

c. Conclusion

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

3. 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, KSU, dated December 2011
- KSU Annual Report to the NRC, January 2014 to December 2014, dated April 7, 2015
- KSU Annual Report to the NRC, January 2015 to December 2015, dated January 13, 2016
- RSC Meeting Minutes for 2015 and 2016
- Personal RO/SRO files
- Reactor console log books, dated from January 2015 to present
- KSU operator licenses for one SRO and six ROs
- Console spreadsheet for operator training and requalification

- 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. Two reactor operators were on a summer internship away from the university. They will enter accelerated requalification upon their return to the university.

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.

4. 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, "Limiting Conditions for Operations," and to determine if the periodic surveillance tests on safety systems were performed as stipulated in TS Section 4, "Surveillances":

- Maintenance and surveillance reports for the months of January 2014 to present
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, "OP-15 Reactor Startup," dated May 20, 2016
- 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 August 14, 2012

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 Limiting Conditions for Operations and surveillance requirements as stated in the TS.

5. Emergency Planning

a. Inspection Scope (IP 69001-02.10)

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

- Emergency telephone contact list dated June 24, 2016
- Emergency support center equipment inventories
- Emergency Plan (EP) KSU TRIGA Mark II Nuclear Reactor Facility, October 27, 2014
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 2, "Notification List," dated October 27, 2014
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 3, "Emergency Classification," dated August 2, 2011
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 5, "Fire," dated October 27, 2014
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 7, "External Hazard," dated October 27, 2014
- KSU TRIGA Mark II Nuclear Reactor Facility EP Procedure 8, "Radiation Hazard," dated October 27, 2014

b. Observations and Findings

Agreement letters with outside support groups were on file, dated during 2014. New agreement letters had been sent to supporting facilities and were being returned as they were signed. The EP requires that the agreement letters be reviewed and updated every 2 years. The inspector verified that current emergency call lists were available and personnel knew where to find the current list. Emergency equipment inventories were conducted quarterly. Emergency drills were being conducted annually as required.

c. Conclusion

The EP was being followed as required.

6. 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 January 2015 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 2014 to December 2014, dated April 7, 2015
- KSU Annual Report to the NRC, January 2015 to December 2015, dated January 13, 2016
- RSC Meeting Minutes for 2015 and 2016

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, "Surveillances."

c. Conclusion

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

7. 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, "Reactor Fuel and Fueled Devices in Storage," and 6.3.a.2:

- Reactor console logbook, January 2015 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, Fuel Log Book
- Fuel location status map (control room)

b. Observations and Findings

The licensee performed fuel inspection during the period of June 1, 2016. All fuel movements were documented in the console log and the Fuel Log Book. Numerous fuel movements had been made for Experiment 52. All movements were documented in the console log and the Fuel Log Book. 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.

8. Exit Interview

The inspector presented the inspection results to licensee management at the conclusion of the inspection on August 4, 2016. 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

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED

None

CLOSED

None

DISCUSSED

None

PARTIAL LIST OF ACRONYMS USED

10 CFR Title 10 of the *Code of Federal Regulations*
EP Emergency Plan
IP Inspection Procedure
KSU Kansas State University
NRC U.S. Nuclear Regulatory Commission
RO Reactor Operator
OP Operating Procedure
RSC Reactor Safeguards Committee
SRO Senior Reactor Operator
TS Technical Specification