UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 30, 2019

Mr. Robert Seymour, Reactor Supervisor
Nuclear Reactor Facility
Department of Mechanical and
Nuclear Engineering
117 Ward Hall
Kansas State University
Manhattan, KS 66506-5204

SUBJECT: KANSAS STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 50-188/2019-201 AND NOTICE OF VIOLATION

Dear Mr. Seymour:

From October 7-11, 2019, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Kansas State University Nuclear Reactor Facility. The enclosed report documents the inspection results, which were discussed on October 11, 2019, with you, the Reactor Facility Manager, and the campus Radiation Safety Officer.

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 inspector reviewed selected procedures and records, observed various activities, and interviewed personnel.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it constitutes a failure to meet regulatory requirements that has more than minor safety significance and the licensee failed to identify the violation.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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 enclosures, and your response 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). To the extent possible, your response should not include any personal privacy or proprietary information, so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Craig Bassett at 240-535-1842 or by electronic mail at Craig.Bassett@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

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

Enclosures:
1. Notice of Violation
2. NRC Inspection Report No. 50-188/2019-201

cc: w/enclosure: See next page

cc:

Office of the Governor
State of Kansas
300 SW 10th Avenue, Suite 212 S
Topeka, KS 66612-1590

Kim Steves
Radiation Control Section
Kansas Department of Health and Environment
1000 SW Jackson, Suite 330
Topeka, KS 66612-1365

Mayor of Manhattan
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Robert Seymour, Reactor Supervisor
Kansas State University
117 Ward Hall
Manhattan, KS 66506

Test, Research and Training
Reactor Newsletter
Attention: Ms. Amber Johnson
Department of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

Dr. Alan Cebula
Nuclear Reactor Facility Manager
Kansas State University
112 Ward Hall
Manhattan, KS 66506-5204

SUBJECT: KANSAS STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 50-188/2019-201 AND NOTICE OF VIOLATION DATE: OCTOBER XX, 2019

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NAME	CBassett	NParker	AMendiola
DATE	10/29/2019	10/28/19	10/30/2019

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NOTICE OF VIOLATION

Kansas State University
Nuclear Reactor Facility

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

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted October 7-11, 2019, a violation of NRC requirements with two examples was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Kansas State University technical specification (TS) contains various requirements, two of which are listed below:

a. Section 6.3 a), "Procedures," states, in part, that "written procedures, reviewed and approved by the Reactor Safeguards Committee, shall be followed for the activities listed below. The procedures shall be adequate to assure the safety of the reactor, persons within the Laboratory, and the public." The Kansas State University Radiation Protection Program states in the Introduction, that the program is a part of the Operations Manual for the Reactor Facility, although it is published separately. Section 4.4.b, "Environs Monitoring," states, in part, that "additional monitoring imposed by the Reactor Safeguards Committee is as follows: . . .Semi-annual environmental monitoring, involving measurement of both gamma-ray and neutron dose rates at the Facility operations boundary with the reactor at full-power operation."

b. Section 6.11 e), "Reporting Requirements," states, in part, that "in addition to the requirements of applicable regulations, and in no way substituting therefor, reports shall be made to the U.S. Nuclear Regulatory Commission (NRC) as follows: . . .A routine report in writing to the US. Nuclear Regulatory Commission within 60 days after completion of the first calendar year of OPERATING and at intervals not to exceed 12 months, thereafter, ..."

Contrary to the requirements referenced above, on October 10, 2019, the NRC inspector found that:

a. The licensee failed to meet the TS requirement involving procedures, in that, the Kansas State University Radiation Protection Program requirement concerning measurement of both gamma-ray and neutron dose rates at the Facility operations boundary with the reactor at full-power operation was not met because, for at least the past four years, the required survey had only been performed annually and not semi-annually as required.

b. The licensee failed to meet the TS requirement involving the submission of a report to the U.S. Nuclear Regulatory Commission within 60 days after completion of the first calendar year of operating and at intervals not to exceed 12 months. Specifically, the report for calendar year 2017 was not submitted until December 31, 2018, and the report for calendar year 2018 had not been submitted as of the date of the inspection, which are both periods exceeding 60 days after the completion of the calendar years.

This has been determined to be a Severity Level IV violation with two examples (Sections 6.7 and 6.9).

Pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 2.201, "Notice of violation," Kansas State University is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation," and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

In accordance with 10 CFR 19.11, "Posting of notices to workers," you may be required to post this Notice within two working days of receipt.

Dated this 30th day of October 2019

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

Docket No.	50-188
License No.	R-88
Report No.	50-188/2019-201
Licensee:	Kansas State University
Facility:	TRIGA Mark II Research Reactor
Location:	Manhattan, Kansas
Dates:	October 7-11, 2019
Inspector:	Craig Bassett
Approved by:	Anthony J. Mendiola, Chief Non-Power Production and Utilization Facility Oversight Branch Division of Advanced Reactors and Non-Power Production and Utilization Facilities Office of Nuclear Reactor Regulation

Enclosure 2

EXECUTIVE SUMMARY

Kansas State University
TRIGA Mark II Research Reactor Facility
Inspection Report No. 50-188/2019-201

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 program including: (1) organization and staffing; (2) procedures; (3) health physics (4) design changes; (5) committees, audits and reviews; and (6) transportation of radioactive materials since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's safety program was acceptably directed toward the protection of public health and safety. However, one violation (VIO) of Technical Specification requirements with two examples was noted.

Organization and Staffing

- Organization and staffing were consistent with the requirements outlined in Section 6 of the facility technical specifications (TSs).

- Shift staffing met the minimum requirements for duty and on call personnel.

- One example of an apparent violation of a TS requirement was noted involving failure to submit an annual report within 60 days after the end of the calendar year.

Procedures

- Written procedures were being maintained in accordance with TS requirements.

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, "Standards for Protection against Radiation," requirements, the TSs, and licensee procedures.

- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

- A second example of an apparent VIO of a TS requirement was identified for failure to perform semi-annual surveys as required.

Design Changes

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

Committees, Audits and Reviews

- The Reactor Safety Committee provided the oversight required by the TSs.

Transportation

- 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 (KSU) 1,250-kilowatt reactor continued to be operated in support of the University's academic program in nuclear engineering laboratory instruction and research. During the inspection, the reactor was operated on several occasions in support of laboratory classes.

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 TS Section 6.1:

- KSU nuclear reactor organizational structure and staffing
- TSs for the KSU TRIGA (Training, Research, Isotopes, General Atomics) Mark II Reactor, dated March 13, 2008, and amended April 2011
- KSU TRIGA Mark II Reactor console logbooks covering operations from January 2018 to the present
- KSU TRIGA Mark II Reactor Daily Reactor Startup and Shutdown Checklist from January 2018 to the present
- 2017 Annual Operating Report for KSU TRIGA Mark II Nuclear Reactor Facility dated December 31, 2018 (most recent issue submitted to the NRC)

b. Observations and Findings

(1) Organization and Staffing

The organizational structure and the responsibilities of the reactor management and staff had not changed since the last inspection (NRC Inspection Report No. 50-188/2018-201). It was noted that a new Reactor Supervisor (RS) had been appointed in January 2019. Review of pertinent records verified that management responsibilities were administered as required by the TSs and applicable procedures. The inspector observed reactor operations and noted that the shift staffing satisfied the requirements indicated in the TSs. The inspector noted that there were three licensed senior reactor operators (SROs) and three licensed reactor operators (ROs) who were licensed to operate the research reactor at the facility.

(2) KSU TRIGA Mark II Reactor Annual Reports

TS Section 6.11(e) states that the licensee shall submit "A routine report in writing to the US. Nuclear Regulatory Commission within 60 days after completion of the first calendar year of OPERATING and at intervals not to exceed 12 months."

During the inspection, the inspector asked to review the most recent annual reports that had been submitted to the NRC. The licensee provided only the 2017 Annual Report. When asked about the 2018 Annual Report, the licensee indicated that it was in the process of being completed. After reviewing the 2017 Annual Report, the inspector noted that it was dated and had been submitted on December 31, 2018. The licensee was informed that failure to submit the facility annual report for 2017 and 2018 within 60 days after the end of the calendar year was an example of an apparent VIO of a TS requirement (i.e., Section 6.11(e)) (VIO 50-188/2019-201-01).

c. Conclusion

The licensee's organization and staffing complied with the requirements specified in TS Section 6.1. The operations log and associated records confirmed that shift staffing met the minimum requirements for duty and on call personnel. One example of an apparent VIO of a TS requirement was noted involving failure to submit an annual report within 60 days after the end of the calendar year.

2. Procedures

a. Inspection Scope (IP 69001)

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

- TSs for the KSU TRIGA Mark II Reactor, dated March 13, 2008, and amended April 2011
- KSU TRIGA Mark II Reactor Safeguards Committee (RSC) meeting minutes for 2017 through 2019 to date
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, Procedure No. 5, "Semi-Annual Minimum Interlock & SCRAM Checks," dated January 11, 2019, and signed by the RSC Chairman on January 15, 2019
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, Procedure No. 8, "Reactivity Balance," dated September 12, 2018, and signed by the RSC Chairman on September 28, 2018
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, Procedure No. 12, "Instrument Checkout," dated September 12, 2018, and signed by the RSC Chairman on September 28, 2018
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedures, Procedure No. 15 "Steady State Operations," dated September 12, 2018, and signed by the RSC Chairman on September 28, 2018

b. Observations and Findings

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

c. Conclusion

The licensee was maintaining and implementing written procedures in accordance with the TS requirements.

3. Health Physics and Environmental Protection

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 20, requirements:

- Sump Discharge Calculations for 2017 and 2018 maintained in the Waste Disposal Log Notebook
- Nuclear Reactor Facility Monthly Radiation and Smear Surveys for May 2017 to the present maintained in the Surveillance Notebook
- Results of periodic calibrations of monitors and meters maintained in the Handheld Survey Meters Notebook and the Area Radiation Monitors and Continuous Air Monitor Notebook
- Copies of the monthly the Radiation Dosimetry Report for facility personnel for 2017, 2018, and 2019 to date
- KSU Nuclear Reactor Radiation Protection Program dated August 23, 2011
- KSU, Department of Environmental Health and Safety, Radiation Safety Manual dated August 2018
- Copies of various "Semiannual Audit Report of Reactor Operations and Radiation Protection Program," conducted by the RSC for 2017 through 2019 to date
- 2017 Annual Operating Report for KSU TRIGA Mark II Nuclear Reactor Facility dated December 31, 2018 (most recent issue submitted to the NRC)
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedure, Procedure No. 3, "Annual Remote Area Monitor Calibration," dated March 14, 2008, and signed by the RSC Chairman March 17, 2008
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedure, Procedure No. 9, "Entrance to the Reactor Bay," dated March 14, 2008, and signed by the RSC Chairman March 17, 2008
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedure, Procedure No. 13, "General Radiation Detector Calibration and Efficiency Determination," dated December 5, 2016, and signed by the RSC Chairman December 5, 2016
- KSU TRIGA Mark II Operation, Test, and Maintenance Procedure, Procedure No. 19, "Gamma-Ray Assay of Reactor Samples," dated August 14, 2012, and signed by the RSC Chairman August 15, 2012

b. Observations and Findings

(1) Surveys

Selected monthly and other periodic and special radiation and/or contamination surveys were reviewed by the inspector. The surveys were typically completed by members of the licensee staff who had received the

appropriate training to conduct surveys. Any contamination detected in concentrations above established action levels was noted and the area or item was decontaminated. Following decontamination, the area or material was again surveyed to ensure that it was radiologically clean. Results of the surveys were acceptably documented by staff personnel.

During the inspection the inspector accompanied the RS during completion of a routine monthly radiation and contamination survey. Areas surveyed at the facility included the Control Room, the reactor bay and the auxiliary equipment area. Various items in these areas were also surveyed and several water samples were taken. The techniques used during the survey were adequate and the survey was conducted and documented in accordance with the guidance specified by procedure. The inspector conducted a radiation survey alongside the RS. The radiation levels noted by the inspector were comparable to those found by the RS and no anomalies were noted.

(2) Postings and Notices

Radiological signs were typically posted at the entrances to controlled rooms, or at the areas themselves (i.e., beam ports or experimental equipment). Other postings also showed the industrial hygiene hazards that were present in the areas as well. Caution signs, postings, and controls for radiation areas were as required by 10 CFR Part 20, Subpart J. The inspector noted that licensee personnel observed the signs and postings and the precautions for access to radiation areas.

Copies of current notices to workers were posted in appropriate areas in the facility. The copy of NRC Form 3, “Notice To Employees,” noted at the facility was the latest issue and was posted as required by 10 CFR 19.11, “Posting of notices to workers.” The form was posted on the bulletin board in the hallway leading to the Control Room. Other copies were posted inside the Reactor Bay and adjacent areas.

(3) Dosimetry and Completed Copies of NRC Form 5

The inspector determined that the licensee used thermoluminescent dosimeters (TLDs) for whole body monitoring of beta and gamma radiation exposure. The TLDs also had a separate component to measure neutron radiation. The licensee also used TLD finger rings for extremity monitoring. The TLD dosimetry was supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor, Mirion Technologies Inc. On occasion the licensee also used digital direct-reading dosimeters for monitoring dose. This type of dosimeter was usually given to visitors.

An examination of the TLD results indicating radiological exposures at the facility for the past three years showed that the highest occupational doses, as well as doses to the public, were well within 10 CFR Part 20 limitations. In fact, only one person monitored by the licensee had

received a dose of more than 100 millirem (mrem) during the year 2017 and no one received such a dose in 2018. Through direct observation the inspector determined that dosimetry was generally acceptably used by KSU reactor facility personnel.

The inspector verified that individual copies of the NRC Form 5, "Occupational Dose Record for a Monitoring Period," were routinely issued to each licensee staff member. No problems were noted.

(4) Calibration of Radiation Survey and Monitoring Equipment

Examination of selected meters in the facility, which were used for radiation monitoring, indicated that the instruments had the acceptable up-to-date calibration sticker attached. Review of the instrument calibration records for various meters and monitors indicated that the calibration of portable survey meters was typically completed on-site by licensee personnel. However, on occasion, some instruments were shipped off-site to vendors for calibration. The inspector verified that the instruments were calibrated annually which met procedural requirements. Also, calibration records were maintained as required.

Area Radiation Monitors and the Continuous Air Monitor were also being calibrated annually as required. These various monitors were also typically calibrated by licensee staff personnel as well.

(5) Radiation Protection Training

The inspector reviewed the radiation worker and orientation training given to KSU reactor facility staff members, to those who were classified as experimenters, and to students taking classes at the facility. The required training could be completed in either of two ways. Training was available on-line through the KSU Environmental Health and Safety (EH&S) Department website. Alternately, the training was provided through completion of laboratory courses which were typically taught by the Nuclear Reactor Facility Manager. The training included initial radiation worker training for those who were new experimenters and new students just beginning the program. More extensive training was provided in the laboratory courses. The inspector reviewed the completed forms of various KSU reactor staff members and students and verified that they had the appropriate training. The training program was acceptable and consistent with the requirements outlined in 10 CFR Part 19, "Notices, Instructions and Reports To Workers: Inspection and Investigations," as well.

Once the training was completed, a request form was sent to the Radiation Safety Office. Then the individual(s) could receive a TLD, and extremity monitoring finger rings if required. Annual refresher training was required to be competed for licensee personnel.

(6) Radiation Protection Program

The licensee's radiation protection and as low as reasonably achievable (ALARA) programs were established and described in the "Kansas State University Nuclear Reactor Radiation Protection Program," booklet which was dated August 23, 2011, in conjunction with the KSU EH&S Department Radiation Safety Manual dated August 2018. The radiation protection program contained instructions concerning organization, training, monitoring, record keeping, personal responsibilities, audits, emergency equipment, and maintaining doses ALARA. The ALARA portion of the booklet provided guidance for keeping doses ALARA which was consistent with the requirements in 10 CFR Part 20. The program, as established, appeared to be acceptable. The inspector verified that the radiation protection program was being reviewed annually as required by 10 CFR 20.1101, Radiation Protection Programs," item (c).

The inspector noted that the licensee did not have a respiratory protection program but did have a planned special exposure program. The planned special exposure program was outlined in the booklet noted above.

(7) Effluent and Environmental Monitoring

(a) Environmental Radiation Monitoring

(i) Radiation Survey

Section 6.3 a), "Procedures," states, in part, that "Written procedures, reviewed and approved by the Reactor Safeguards Committee, shall be followed for the activities listed below. The procedures shall be adequate to assure the safety of the reactor, persons within the Laboratory, and the public." The KSU Radiation Protection Program states in the Introduction, that the program is a part of the Operations Manual for the Reactor Facility, although it is published separately. Section 4.4.b, "Environs Monitoring," states, in part, that "additional monitoring imposed by the Reactor Safeguards Committee is as follows: . . Semi-annual environmental monitoring, involving measurement of both gamma-ray and neutron dose rates at the Facility operations boundary with the reactor at full-power operation."

The inspector reviewed the surveys that had been performed to fulfill this requirement. It was noted that an annual survey involving measurement of both gamma-ray and neutron dose rates at the facility operations boundary with the reactor at full-power operation had been conducted in 2016, 2017, and 2018. The survey was not being conducted semi-annually as required. The licensee was informed that failure to conduct semi-annual environmental monitoring measuring the dose rates at the facility boundary with the reactor at full-power operation was

a second example of an apparent violation of a TS requirement (i.e., Section 6.3 a) (VIO 50-188/2019-201-01).

(ii) TLD Environmental Monitoring

The inspector noted that additional site radiation monitoring was completed using a TLD positioned outside one of the windows of the reactor dome. Data indicated that there were no measurable doses above natural background radiation measured by this TLD.

(b) Effluent Releases

The inspector determined that gaseous releases continued to be calculated and reported in the Semiannual Audit Report of Reactor Operations and Radiation Protection Program conducted by the RSC. The airborne concentrations of the gaseous releases were within the concentrations stipulated in 10 CFR Part 20, Appendix B, Table 2. (Also, the dose rate to the public because of the gaseous releases, was calculated to be 3.8 mrem per year which was well below the dose constraint specified in 10 CFR 20.1101(d) of 10 mrem per year. This was documented in Chapter 11 of the facility Safety Analysis Report dated May 23, 2008.) Records were current and acceptably maintained.

The inspector inquired about the use of the Environmental Protection Agency's (EPA's) COMPLY code for calculating off site releases to demonstrate compliance. The campus Radiation Safety Officer (RSO) indicated that this had been done in the past but that the results had always shown compliance at the lowest level. Therefore, neither the licensee nor the university was using the COMPLY code currently. The inspector indicated that the issue of continued use the EPA's COMPLY code or a later version known as CAP-88 would be identified as an Inspector Follow-up Item (IFI) and would be reviewed during a future inspection (IFI 50-188/2019-201-02).

(c) Liquid Releases

The inspector reviewed the annual report for 2017. There was a total of three liquid discharges from the reactor bay sump to the sanitary sewer during that year. All isotope levels were below 10 CFR Part 20, Appendix B limits.

(d) Liquid and Solid Radioactive Waste

The licensee's program for monitoring, storing, and/or transferring radioactive liquid and solid waste was reviewed. Liquid and solid radioactive waste was being stored on-site awaiting disposal. The campus RSO indicated that it could not be transferred to the KSU Materials License due to restrictions enumerated in the license. It was noted that KSU held a State of Kansas Materials License

No. 38-0011-01 for processing and disposal of all other campus radioactive waste.

(8) Facility Tours

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 on various occasions. No problems were noted. The inspector did note that facility radioactive material storage areas were properly posted. No unmarked radioactive material was noted. Radiation areas were also posted as required.

c. Conclusion

The radiation safety program was conducted in compliance with 10 CFR Part 20 and TSs requirements, and licensee procedures. A second example of an apparent violation of a TS requirement was identified for failure to perform semi-annual surveys as required.

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 TS, and the licensee's administrative procedures:

- KSU TRIGA Mark II RSC meeting minutes for 2017 through 2019 to date
- TSs for KSU TRIGA Reactor, dated March 13, 2008, amended April 2011
- KSU TRIGA Mark II Reactor console logbooks covering operations from January 2018 to the present
- 2017 Annual Operating Report for KSU TRIGA Mark II Nuclear Reactor Facility dated December 31, 2018 (most recent issue submitted to the NRC)

b. Observations and Findings

During 2018 and to date in 2019, the licensee had performed 10 CFR 50.59 reviews for five facility modifications, one experimental method change, and four procedure changes. The facility modifications included items such as replacing an Uninterruptible Power Supply (UPS), connecting various pieces of equipment to the UPS, and replacing a resistor. All reviews and evaluations were completed and submitted to the RSC for final approval as required.

c. Conclusion

The review and evaluation of changes to facilities, experiments, 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 TS were conducted by the RSC:

- KSU TRIGA Mark II RSC meeting minutes for 2017 through 2019 to date
- TSs for KSU TRIGA Reactor, dated March 31, 2008, amended April 2011
- KSU TRIGA Mark II Reactor console logbooks covering operations from January 2018 to the present
- 2017 Annual Operating Report for KSU TRIGA Mark II Nuclear Reactor Facility dated December 31, 2018 (most recent issue submitted to the NRC)
- Copies of the Semiannual Audit Report of Reactor Operations and Radiation Protection Program conducted by the RSC for 2017 through 2019 to date

b. Observations and Findings

The inspector verified that the RSC conducted meetings twice a year as required with a quorum present, pursuant to TS requirements. The RSC conducted the required audits and reviewed and approved procedure and experiment changes and facility modifications. It was noted that the RSC provided direction and oversight for reactor operations.

c. Conclusion

The RSC provided the oversight required by the TSs.

6. Transportation of Radioactive Material

a. Inspection Scope (IP 86740)

Regarding the of transportation of radioactive material, the inspector reviewed the following:

- RSC meeting minutes for 2017 through 2019 to date
- KSU Annual Operating Report for 2017 as mentioned above

b. Observations and Findings

The inspector interviewed licensee personnel and determined that no shipments of radioactive material had been conducted under the Facility Operating License No. R-88 since the last inspection in this area. It was noted that there were two individuals authorized to ship radioactive material at the university. These people both worked in the campus Radiation Safety Office. The inspector verified that these individuals had been properly trained and that their certifications were up-to-date. If the licensee needed to make any shipments of radioactive material, the individuals in the Radiation Safety Office were available and would help.

c. Conclusion

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

7. Exit Interview

The inspection scope and results were summarized on October 11, 2019, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the observations presented 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 Personnel

A. Cebula	KSU Nuclear Reactor Facility Manager
D. Nichols	Senior Reactor Operator
D. Montalvo	Reactor Operator
R. Seymour	Reactor Supervisor and Senior Reactor Operator

Other Personnel

R. Bridges	Campus Radiation Safety Officer, Environmental Health and Safety Division

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-188/2019-201-01	VIO	Two examples of a violation of TS requirements involving: 1) Failure to submit the facility annual report for 2017 and 2018 within 60 days after the end of the calendar years; and, 2) Failure to conduct semi-annual environmental monitoring surveys measuring the dose rates at the facility boundary with the reactor at full-power as required.
50-188/2019-201-02	IFI	Follow-up on the need for the licensee to continue using the EPA's COMPLY code or a later version known as CAP-88 for calculating off site releases to demonstrate compliance.

Closed

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ALARA	As low as reasonably achievable
EH&S	Environmental Health and Safety
EPA	Environmental Protection Agency
IP	Inspection Procedure
KSU	Kansas State University
MREM	Millirem
NRC	U.S. Nuclear Regulatory Commission

Attachment

RO	Reactor Operator
RS	Reactor Supervisor
RSC	Reactor Safeguards Committee
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
RS	Reactor Supervisor
TLD	Thermoluminescent dosimeter
TRIGA	Training, Research, Isotopes, General Atomics
TSs	Technical Specifications
UPS	Uninterruptible power supply