



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

September 18, 2019

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SUBJECT: UNIVERSITY OF NEW MEXICO – U.S. NUCLEAR REGULATORY
COMMISSION ROUTINE INSPECTION REPORT NO. 50-252/2018-201

Dear Dr. Busch:

From December 18-20, 2018, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the University of New Mexico Aerojet General Nucleonics-201 Modified AGN-201 Research Reactor Facility. The enclosed report presents the results of that inspection, which were discussed on December 20, 2018, with members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with Commission's rules and regulations and with the conditions of your license. The inspector 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, 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 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).

R. Busch

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Should you have any questions concerning this inspection, please contact Mr. Johnny Eads at 301-415-0136 or electronic mail at Johnny.Eads@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Docket No. 50-252
License No. R-102

Enclosure:
As stated

cc: w/enclosure: See next page

University of New Mexico

Docket No. 50-252

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SUBJECT: UNIVERSITY OF NEW MEXICO, U.S. NUCLEAR REGULATORY COMMISSION
ROUTINE INSPECTION REPORT NO. 50-252/2018-201
DATE: SEPTEMBER 18, 2019

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

Docket No.: 50-252

License No.: R-102

Report No.: 50-252/2018-201

Licensee: University of New Mexico

Facility: AGN-201M Research Reactor Facility

Location: Albuquerque, New Mexico

Dates: December 18-20, 2018

Inspector: Johnny Eads

Approved by: Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

University of New Mexico
AGN-201M Research Reactor Facility
Nuclear Regulatory Commission
Inspection Report No. 50-252/2018-201

The primary focus of this routine, announced inspection included onsite review of selected aspects of the University of New Mexico (UNM, the licensee) Class II research reactor safety program including: (1) organization and staffing; (2) operations logs and records; (3) procedures; (4) requalification training; (5) surveillance and limiting conditions for operation (LCO); (6) experiments; (7) health physics; (8) design changes; (9) committees, audits and reviews; (10) emergency planning; (11) maintenance logs and records; (12) fuel handling logs and records; and (13) transportation of radioactive materials procedures. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and Staffing

- Organizational structure and staffing satisfied technical specification (TS) requirements.

Operations Logs and Records

- The facility was maintaining and retaining records in accordance with the TS.

Procedures

- Procedural control and implementation satisfied TS requirements.

Requalification Training

- The licensee's requalification program was up-to-date and plan requirements were met.

Surveillance and Limiting Condition for Operation

- Surveillances and limiting conditions for operation were being performed and observed in accordance with the TS.

Experiments

- The approval and control of experiments met TS requirements.

Health Physics

- The radiation protection program was being maintained and implemented as required.

Design Changes.

- The licensee's design change program was being implemented as required.

Committees, Audits, and Reviews

- Review and oversight functions required by the TS were acceptably completed by the Reactor Safety Advisory Committee (RSAC).

Emergency Planning

- The facilities emergency preparedness program was consistent with the approved Emergency Plan (E-Plan).

Maintenance Logs and Records

- Maintenance activities were performed in accordance with facility procedures. Maintenance records were retained in accordance with TS required periodicity.

Fuel Handling Logs and Records

- Fuel handling operations were performed in accordance with facility procedures, protocol, and adhered to TS reactivity specifications for storage in a secured location outside the reactor.

Transportation of Radioactive Materials

- The licensee did not ship any radioactive material from the facility using the reactor license.

REPORT DETAILS

Summary of Facility Status

The UNM Aerojet General Nucleonics-201 Modified (AGN-201M) research reactor continued to operate the reactor in support of operator training, surveillances, teaching, and classroom experiments/demonstrations. During the inspection, the reactor was operating.

1. Organization and Staffing

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

The inspector reviewed the following to ensure that the requirements of TS Section 6.0 (revised May 2018) were being met:

- Management responsibilities
- Qualifications of facility personnel
- Organization chart
- Selected portions of the Reactor Operations Logs

b. Observations and Findings

This organization was consistent with that specified in the TS. The organizational structure and the responsibilities of the reactor staff had not changed since the last inspection.

Staffing levels remained consistent with those noted during the last inspection of the facility. Through the review of selected records, during operations when the reactor was not secured, the facility met the minimum operating staff requirements specified in TS Section 6.1.12.

c. Conclusion

Organizational structure and staffing satisfied TS requirements.

2. Operation Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed administrative procedures and reviewed record retention to verify compliance with TS Section 6.10. This included:

- Reactor Operations Logs, various 2017 and 2018
- Surveillance and LCOs records, various 2017 and 2018
- Maintenance records, various 2017 and 2018

b. Observations and Findings

Reactor operations logs are maintained on an Appendix IIIB form "The University of New Mexico AGN-201M Reactor Operations Log." The logs identify the

completion of the pre-critical startup checklist, startup, power changes, and shutdown of the reactor. The logs and records identify the installation or removal of fuel elements, control rods, or experiments that could affect core reactivity. The logs and records identify rod worth measurements and other reactivity measurements.

It was noted that the reactor operators (ROs) followed the appropriate procedures, were knowledgeable of the required actions, and professional in the conduct of their duties. The reactor logs were generally found to be properly completed and maintained.

c. Conclusion

The facility was maintaining and retaining records in accordance with the TS.

3. Procedures

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

The inspector reviewed the following to ensure that the procedural control requirements of TS Section 6.6 were being met:

- Records of changes to procedures
- RSAC meeting minutes dated January 11, 2018, and June 22, 2018
- Selected procedures from the Reactor Operation and Training Manual, revised January 2013

b. Observations and Findings

The inspector reviewed the licensee's written procedures and revisions to procedures. The procedures were organized to address the full scope of activities conducted at the reactor facility. The inspector noted that procedural changes were being reviewed and approved as required by TS. Training of personnel on procedures and changes was acceptable. Through observation of various activities at the facility, including reactor operation, the inspector determined that licensee personnel conducted activities in accordance with applicable procedures.

c. Conclusion

Procedural control and implementation satisfied TS requirements.

4. Requalification Training

b. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses," and the requalification program:

- Operator active license status
- UNM AGN-201M Requalification records 2017-2018
- Training requirements stipulated in American Nuclear Society Institute/American Nuclear Society-15.4-1977, "Standards for the Selection and Training of Personnel for Research Reactors"

b. Observations and Findings

At the time of the inspection, there were three qualified senior reactor operators (SROs) working at the facility and one qualified RO. The inspectors verified the operating licenses were current for the SROs and RO. It was also noted that annual operating examinations and biennial written examinations had been completed by the operators as required.

The Operator and Senior Operator Requalification Program for the UNM reactor facility requires that each certified individual take an annual operational examination to demonstrate competency.

c. Conclusion

The licensee's requalification program was up-to-date, and plan requirements were met.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with TS Sections 3.0 and 4.0:

- AGN-201M Annual Maintenance form, dated August 15, 2016
- Reactor Operations Logs, various 2017 and 2018
- Monthly Reactor Inspection AGN-201M, SN-112 Reactor forms, various for 2017 and 2018

b. Observations and Findings

The inspector verified that LCOs for reactor core reactivity conditions, reactor control and safety systems, limitations of experiments, and radiation monitoring, control and shielding were met since the last NRC inspection. At the UNM reactor facility, LCOs are verified through monthly and annual surveillances, the results are maintained within the Monthly Maintenance Logbook. Monthly maintenance activities include such determinations as nuclear instrumentation channel checks to verify scram set points and interlocks and rod drop tests. The annual maintenance involves extensive determinations such as power calibration, core excess reactivity, shutdown margin, and rod worth calibrations.

c. Conclusion

Surveillances and LCOs were being performed and observed in accordance with facility TS.

6. Experiments

a. Inspection Scope (IP 69005)

The inspector reviewed selected aspects of the following to verify compliance with TS Sections 3.3, 4.5, and 6.7:

- Request for Use Authorizations No. 599-610, January 2017 to present.

b. Observations and Findings

The UNM AGN-201M reactor was primarily used as a training reactor for undergraduate and graduate students. Experiments that had been performed typically consisted of operations performed for semester coursework, including: sample activation, approach to critical, reactor period and reactivity measurements, control rod calibrations, importance function measurements, and transfer function measurements.

No experiments were performed during the inspection. The inspector reviewed how experiments are performed in order to verify compliance with the TS and procedures. Additionally, from a random sampling of forms for experiments performed since the previous inspection, the inspector found that experiments were being reviewed and performed in accordance with TS requirements and the licensee's written procedures.

c. Conclusion

The program for reviewing and conducting experiments satisfied TS and procedural requirements.

7. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with TS Section 4.4 as well as 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," and 10 CFR Part 20, "Standards for Protection against Radiation," requirements:

- Radiological signs and posting and area control
- Quarterly dosimetry records for the reactor room for 2017 and 2018.
- Quarterly dosimetry records for reactor staff and students for 2017 and 2018
- Maintenance and calibration of portable radiation survey instruments, records for 2017 and 2018
- Nuclear Engineering AGN-201M Reactor Radiation Surveys during periods of operation and for laboratory preparation

c. Observations and Findings

The inspector toured the Nuclear Engineering Laboratory (NE Lab) and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel

were interviewed as well. The inspector also discussed the subjects of surveys, dosimetry, training, and radioactive effluents with UNM Department of Safety & Risk Services (SRS), and Radiation Safety Division representatives.

(1) Surveys

The inspector reviewed monthly radiation and contamination surveys of the licensee's controlled areas completed by the SRS Radiation Safety Division personnel. The surveys had been completed in accordance with procedure and the results were documented on the appropriate forms and evaluated as required. It was noted that the SRS Radiation Safety Division personnel also completed an annual radiation survey of the facility while the reactor was at power in accordance with TS. No readings in excess of those noted in the past were discovered. The inspector noted that the surveys clearly included the date, survey instrument used with calibration date, reactor power level and the type of survey.

(2) Postings and Notices

The inspector toured the NE Lab and reviewed the postings required by 10 CFR Parts 19 and 20 at the entrances to various controlled areas including the Reactor Facility, the Reactor Room, and radioactive material storage areas. The postings were acceptable and indicated the radiation and contamination hazards present. The facilities' radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was found in the facility. Control of radioactive material and control of access to radiation and high radiation areas were acceptable.

(3) Dosimetry

The inspector determined that the licensee typically used thermoluminescent dosimeters (TLD) for whole body monitoring of beta and gamma radiation exposure. The TLDs also contained a component to measure neutron radiation. The dosimetry was supplied and processed by a National Voluntary Laboratory Accreditation Program accredited vendor, Landauer. An examination of the TLD results indicating radiological exposures at the facility for the past two years showed that the highest occupational doses, as well as doses to the public, were within 10 CFR Part 20 limitations.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters and friskers was completed by the Radiation Safety Division personnel or by a company that specializes in calibrations. Fixed area radiation monitors were calibrated at the facility by reactor staff personnel using a portable source. The calibration records of portable survey meters and fixed radiation detectors in use at the facility were reviewed. The calibration frequencies of the various

instruments examined met the requirements established in TS 4.4, Specification a., and records were being maintained as required.

(5) Radiation Protection Program

The licensee's Radiation Protection Program (RPP) was established through the UNM Radiation Safety Manual. The inspector verified that the RPP was being reviewed annually as required. The review of the program did not identify issues related to radiation protection at the NE Lab.

(6) Training

The Radiation Safety Manual required that all personnel who worked with radioactive materials receive training in radiation protection, policies, procedures, requirements, and the facilities prior to having unescorted access at the facility. UNM SRS Radiation Safety Division personnel were responsible for conducting the training and all the training was typically conducted by a radiation safety specialist. A test was administered at the end of the training to verify that the individuals understood the material presented. The training covered the topics required to be taught in 10 CFR Part 19 and a review of training materials and tests indicated that reactor staff and student personnel were instructed on the appropriate subjects.

(7) Environmental Monitoring

The licensee complied with NRC regulations for environmental monitoring by ensuring that all doses at the site boundary were less than the dose limits specified in 10 CFR 20.1301, "Dose limits for individual members of the public." Several TLDs were strategically placed in several locations around the inside perimeter of the facility; there were no abnormal doses noted. There were no liquid or gaseous effluents discharged from the facility since the last inspection.

c. Conclusion

The RPP was being maintained and implemented as required.

8. Design Changes

a. Inspection Scope (IP 69001)

To verify compliance with the licensee's procedures, TSs, and 10 CFR 50.59, "Changes, tests and experiments," the inspector reviewed selected aspects of:

- 2018 Annual Report for the AGN-201M reactor
- Selected "Request for Use" forms from January 2017 to the present
- Completed "Reactor Maintenance Log Sheet – The University of New Mexico AGN-201M Reactor Facility," forms for the period from 2017 to the present

b. Observations and Findings

The inspector reviewed the records related to experiments and requested maintenance since the last inspection. The inspector determined that there were no new experiments or maintenance requests (i.e., design changes) since the last NRC inspection.

The inspector reviewed the Requests for Use forms and maintenance log sheets to determine if they conformed to the screening and vetting process as described under 10 CFR 50.59. None of the changes involved a change to the TSs or met any of the criteria in 10 CFR 50.59(c)(2).

c. Conclusion

The licensee's design change program was being implemented as required.

9. Committees, Audits and Reviews

a. Inspection Scope (IP 69001)

To verify that TS requirements were being met since the last inspection, the inspectors reviewed selected aspects of:

- RSAC Meeting Minutes dated January 11, 2018 and June 22, 2018

b. Observations and Findings

The functions and responsibilities of the RSAC were defined in the TS. The inspector verified that the RSAC held semiannual meetings and a quorum was present as required. The inspector followed up on the RSAC audits required under TS 6.4.3. The audit findings were noted in the meeting minutes.

The inspector determined that the RSAC was performing the audits within the periodicity outlined in TS 6.4.3. Audit results and comments were captured within the meeting minutes and during this inspection it was noted that there were no corrective action items needed to be addressed. The inspector noted that there were no safety significant issues recorded during the audits since the last inspection.

c. Conclusion

Review and oversight functions required by the TS were acceptably completed by the RSAC.

10. Emergency Planning

a. Inspection Scope (IP 69001)

The inspector verified compliance with the facilities E-Plan by reviewing selected aspects of:

- E-Plan for the UNM AGN-201M Reactor Facility, dated August 31, 2015
- Emergency Drill Critique, dated December 4, 2017
- Emergency Contact Lists
- Emergency Facilities and Capabilities

b. Observations and Findings

The inspector reviewed the E-Plan, emergency implementing procedures, and toured the facility, noting emergency response capabilities. The E-Plan did not have significant changes and did not appear to change its effectiveness.

The inspector conducted a walk down of the facility to verify that the equipment specified in E-Plan Section 8.0, "Emergency Facilities and Equipment," was available.

In addition, the inspector reviewed the latest facility drill critique dated December 4, 2017. The drill was found to satisfy the requirements of E-Plan Section 10.2, "Training and Drills."

c. Conclusion

The licensee was maintaining acceptable emergency preparedness in accordance with TS and E-Plan requirements.

11. Maintenance Logs and Records

a. Inspection Scope (IP 69001)

To verify that maintenance was being performed in accordance with procedures, the inspector reviewed the following:

- Maintenance Log
- Selected portions of the Reactor Operations Logs

b. Observations and Findings

The inspector reviewed selected portions of the control room and maintenance logbooks governing the interval of time since the previous inspection.

Maintenance during this inspection period included troubleshooting and minor repairs. Routine and preventive maintenance was controlled and documented in the appropriate logs. These documents indicated that all maintenance activities were in accordance with the requirements in licensee administrative controls. The inspector verified that all maintenance was conducted in accordance with the requirements of TS Section 4.0, and system operational checks were performed before returning them to service.

c. Conclusion

Maintenance activities were performed in accordance with facility procedures. Maintenance records were retained in accordance with TS required periodicity.

12. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001)

To verify compliance with TS 5.2, the inspector interviewed facility staff and reviewed the following:

- Reactor Operations Log, various 2017 and 2018

b. Observations and Findings

Through discussion with reactor facility staff and record reviews it was determined that the majority of fuel handling was performed during laboratory experiments (e.g., 1/M plots for criticality determination) or annual surveillances (e.g., rod drop tests).

The inspector found that the records of fuel movements completed during the inspection period adequately documented the location of fuel elements at all times.

c. Conclusion

Fuel handling operations were performed in accordance with facility procedures, protocol, and adhered to TS reactivity specifications for storage in a secured location outside the reactor.

13. Transportation

a. Inspection Scope (IP 86740)

To verify compliance with procedural requirements for shipping radioactive material, the inspector interviewed licensee personnel, Radiation Safety Division personnel, and reviewed operational logs and records.

b. Observations and Findings

Through records review and discussions with licensee and UNM Radiation Safety Division personnel, the inspector determined that the licensee had not shipped any radioactive material from the reactor facility under the auspices of the reactor license. If the licensee needed to ship radioactive material, it would likely be transferred to the UNM's Broad Scope license and shipped or disposed of under that license.

c. Conclusion

No radioactive material was shipped from the reactor facility under the reactor license.

14. Exit Meeting

The inspection scope and results were summarized on December 20, 2018, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the findings 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

R. Busch	Chief Reactor Supervisor
K. Carpenter	Reactor Supervisor
M. Eden	Radiation Safety

INSPECTION PROCEDURES USED

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

OPENED:

None

CLOSED:

None

DISCUSSED:

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
AGN-201M	Aerojet General Nucleonics-201 Modified
E-Plan	Emergency Plan
IP	Inspection Procedure
LCOs	Limiting Conditions for Operation
NE Lab	Nuclear Engineering Laboratory
NRC	U.S. Nuclear Regulatory Commission
RPP	Radiation Protection Program
RSAC	Reactor Safety Advisory Committee
RO	Reactor Operator
SRO	Senior Reactor Operator
SRS	Safety & Risk Services
TLD	Thermoluminescent Dosimeters
TS	Technical Specifications
UNM	University of New Mexico